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The Radio Society of Great Britain Members' Magazine

RadCom

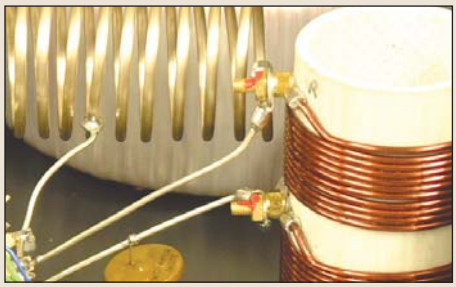
£3.95 Vol 80 No. 9 September 2004

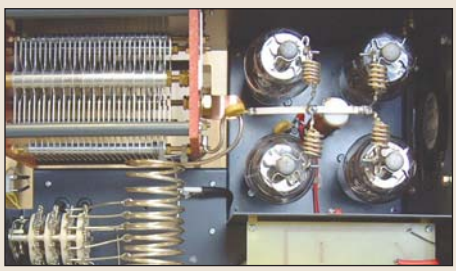
GB4FUN

The RSGB 'fun bus' makes a successful visit to Mablethorpe p15

REVIEW

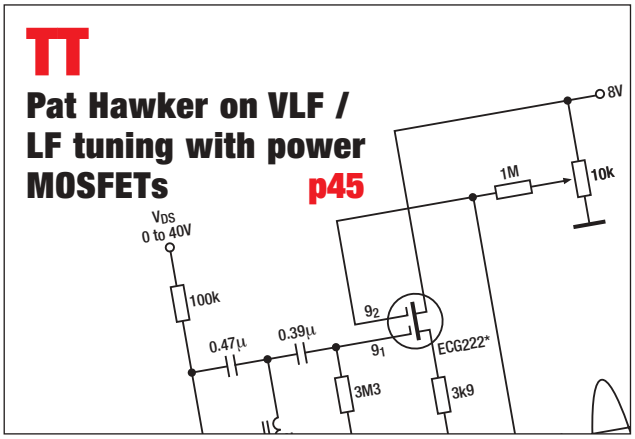
Linear Amp UK Ranger 811K kit p34





TT

Pat Hawker on VLF / LF tuning with power MOSFETs p45



VHF/UHF

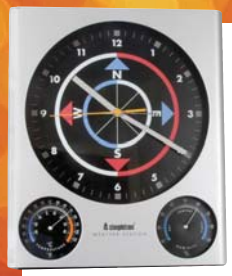
VHF DXpedition to Iceland plus news of some impressive propagation on 6m and 2m p75

INSIDE

WATERS & STANTON

ZERO DEPOS

NO DEPOSIT NOTHING TO PAY



FREE!

Get this lovely Wall Clock (worth £24.95) with temperature & humidity readout absolutely free. Purchase any transceiver or receiver more than £100 and mention this offer to get your *free* wall clock. Subject to Availability

NEW IC-7800 In Stock!

No deposit and 12 months interest free! Subject to status - see details below

NEW Wrap round protective covers for IC-706 & IC-703.

Preserves your radio

The ideal way to protect your radio from scratches and scuffs. Preserve the second hand value of your radio. Fits like a bikini around the radio.

SP-706 £19.95 A

Control Head Pouch

(Fits Yaesu, Icom and Kenwood)

Lovely padded pouch to store the head unit of most popular radios. Fits all mobile head units. Keeps them out of sight of thiefs and preserves their value.

SP-POF £14.95 A

BUY NOW PAY LATER AT ALL THREE STORES

You won't find a better deal!

Proof that at W&S you get the best possible deal. On selected items it is now possible to pay nothing for a whole year without incurring any interest charge. Amazing but true. And what's more, you get probably the best prices in the business. Give us a call today or visit one of our branches.

If you can find a better advertised deal we will match it!

0% APR TYPICAL EXAMPLE OF BUY NOW PAY LATER. CASH PRICE £600. PAY NO DEPOSIT AND PAY THE FULL AMOUNT 12 MONTH'S LATER. PAY NO INTEREST.

OR AFTER TWELVE MONTHS

29.8% APR REPAY £31.53 PER MONTH FOR 36 MONTHS. TOTAL AMOUNT DUE £1135.08. INTEREST IS CALULATED FROM THE DATE OF THE AGREEMENT.

ALL FINANCE SUBJECT TO STATUS WRITTEN QUOTATION ON REQUEST.

ICOM IC-756 PRO II £1899 C

Flagship of the Icom range of HF transceivers. HF & 50MHz, features large colour LCD with spectrum scope, auto ATU and 32-bit floating point DSP unit.

ICOM IC-7400 SPECIAL OFFER £1299 C

HF/VHF 100W transceiver covers 1.8 - 146MHz Features large LCD with spectrum scope, auto ATU and same DSP system as IC-756PRO II. A great base station!
Comes with *FREE* SP-21 Speaker & SM-20 Desk mic

ICOM IC-703 SPECIAL OFFER £589 C

HF/ 50MHz Transceiver 0.1-10W Portable, Mobile, Base-Station. Ideal for Foundation Licence/QRP. Auto ATU, DSP memory keyer. External batt **BP-228 £71.76.** B

FREE Icom IC-703 Logbook with every IC-703 - While Stocks Last!

ICOM IC-706 IIG DSP £769 C

HF/VHF/UHF mobile DSP transceiver. Its relative small size not only makes it a great mobile rig but also for fixed station use as well. HF general coverage and VHF & UHF .

Heil Traveler single ear "706" headset + PTT **£89.95 B**

ICOM IC-718 £449 C

HF 100W transceiver. Covers all HF bands plus wideband receive. C/w auto notch, dual VFO, SWR meter etc. Options include extnl ATU DSP & filters.

KENWOOD TS-2000 £1599 C

Top-of-the-range Kenwood transceiver. HF/VHF/UHF or up to 23cm with the optional module. Built-in auto ATU, DSP and its unique TNC.

ARCP Control Software. **£44.95 B**

KENWOOD TS-870S DSP £1399 C

HFDSP 100W base station. 1.8 - 30MHz. Excellent all round rig great for DX working with its ability to winkle out weak stations using its true IF DSP. No filters to buy.

MC-60A base mic with pre-amp. Ideal match. **£117.95 B**

KENWOOD TS-570DGE £849 C

HF100W base station with built-in auto ATU. Very popular rig, excellent performance on SSB and CW. Two fitted antenna sockets - very handy.

SP-23 Matching base station receiver **£68.95 B**

ICOM IC-910X with 23cm £1249 C

Icom's all mode VHF/UHF transceiver with 23cm.
Large clear LCD with lots of facilities. 100W on VHF and 75W on UHF, 10W on 23cm.

UT-106 DSP unit **£84.99 B**

Basic Model IC-910H £1129 C

YAESU FT-1000 MKV £2349 C

200W HF transceiver, EDSP, Collins filter, auto ATU, 220V AC PSU - Acknowledged as one of the finest DX rigs on the market. Superb tailored audio and the ability to select Class A bias for dramatic signal purity.

YAESU FT-1000 FIELD £1749 C

100W HF transceiver, EDSP, Collins filter, auto ATU, 220V AC / 13.8V DC - Building on the success of the FT-1000MkV, the Field has become a respected leader in its class.

KENWOOD TS-480SAT & TS-480HX

NEW

The **TS-480SAT** is the 100W version of this new HF+6m transceiver from Kenwood. Smaller than the TS-2000/ TS-B2000 it has many similar features.
TS-480SAT £999 C
The **TS-480HX** is the 200W version of this new HF+6m transceiver. **TS-480HX £1099 C**

YAESU FT-897D £899 C

100W HF rig plus 2m and 70cms (50W/20W) 13.8V external supply / internal optional FP-30V AC power supply / self powered portable using optional Ni-MH pack at 20W output. Compatible with FC-30 auto ATU and ATAS 120/100 antennas. The "must have" radio for 2003.

YAESU FT-847 £1199 C

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

YAESU FT-857D NEW £729 C

HF / 50 / 144 / 430MHz Mobile Transceiver. HF/6m 100W, 2m 50W, 70cm 20W. (13.8V DC)
Developed on the FT-897 and FT-817 transceivers. Built-in features 32 colour display, spectrum scope, AM airband aircraft reception, built-in memory keyer, detachable front panel.

YAESU FT-817ND £499 C

bhi NE-DSP1061 Module available!

160m - 70cms. Up to 5W output all modes. ***Ours includes*** **battery and charger.** **Add £90 for DSP ready fitted.**

NEW DSP Module

There is NO new FT-817 DSP! The fact is that the UK manufacturers, **bhi**, (of whom we are their largest distributor), have produced a lovely 4-stage DSP module that can be fitted inside the FT-817. The NE-DSP1061 module costs £89 plus a fitting charge of £25 for retro-fitting to existing models. This includes installing a mini switch and LED on top cover.

TOKYO HY-POWER HL-50B £269.95 C

FT-817 VERSION !

This Linear Amplifier has been specifically designed for use with the FT-817. Enjoy up to 50 Watts output

SIT ZERO INTEREST

FOR 12 MONTHS ON SELECTED ITEMS MARKED BY £

THE ONLY THING WE WON'T DISCOUNT • CUSTOMER SERVICE •

ICOM IC-E208 NEW £279 C

VHF/UHF FM Dual Band Mobile Transceiver **Freq range 144-146MHz, 430-440MHz Tx *55/50W (3 pwr steps each band) *Wideband Rx 118-173, 230-549 & 810-999MHz *512 memories *FM narrow capability *104x2 DTCS, 50 CTCSS tone squelch *16 DTMF channels *HM-133 remote control mic *Packet ready for 9600/1200bps-mini DIN or 1200bps-mic socket *Supply 13.8V*

ICOM IC-2725E £269 C

The Icom IC-2725 dual band FM transceiver is proving very popular. Easy to install, the controller is separated from the main unit - great where space is limited.

ICOM IC-2100H £229 C

2m 55W FM mobile. Commercial grade, rugged construction. One piece die-cast aluminium chassis. Selectable green or amber display.

YAESU FT-8900R NEW £339 C

Want the best of all worlds then the FT-8900R is just the ticket! A rig with four of the most popular mobile bands - 10m/6m/2m & 70cm. Detachable head.

YAESU FT-2800M NEW £159 C

**144-146MHz *FM *137 - 174MHz expanded Rx *RF Pwr 65/25/10/5W *25/12.5kHz channel spacing.*The NewFT-2800M from Yaesu with 65 Watts High Power, rugged construction, excellent receiver performance and direct keypad entry.

YAESU FT-8800E £289 B

Dual Band FM Mobile 50/35W
The FT-8800R series operates as two radios in one, with independant two channel operation.
Remote head mounting capability, wideband receive on VHF & UHF and over 1000 memories.

YAESU FT-7800E NEW £239 C

**2m/70cms Dual Band Mobile *High power 50W 2m /40W 70cms *Wide receive inc. civil & military airband *CTCSS & DCS with direct keypad mic. *Detachable front panel *1000 memories plus five one-touch*

We Price Match!
Call 08000 73 73 88

KENWOOD TMD-700E £449 C

Certainly the best 2m/70cm dual band mobile transceiver with APRS. Does not need extra high cost boards to function. The only extra if required is a compatible GPS receiver.

KENWOOD TM-V7E £359 C

Dual-band 2m/70cm.
A lovely cool blue display, easy to read with 50/35W output. 50W/35W plus 280 memos and five storable operating profiles.

KENWOOD TM-G707E £289 C

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

YAESU VX-7R £299 B

6m/2m/70cm

Available in Silver or Black

The VX-7R is the best outdoor handie ever. The case, keypad, speaker and connectors are all sealed against water damage. Wide Frequency coverage from 500kHz to 900MHz the VX-7R is ideal for monitoring a variety of broadcasts. The display is a dazzling 132x64 dot matrix providing easy-to-read frequencies and information plus pictorial graphics.

YAESU VX-150 £125 B

The VX-150 is a fully featured compact yet incredibly rugged 2m 5W Handheld. Features include direct keypad frequency entry, CTCSS, DTMF, 1750Hz tone calling, wide/narrow deviation selection. It has a die-cast case, large high output speaker, illuminated keypad and battery voltage meter.

YAESU VX-2E NEW £169 B

Dual Band handy, 1.5W (2m) and 1W (70cm). Full DTMF, CTSS and DCS. With 1300 memories and AM/FM coverage 500kHz-960MHz.

ICOM IC-E90 £269 B

The new E-90 offers triple band coverage of 6m, 2m and 70cms. Up to 5W output and rx coverage from 495kHz - 999MHz makes this a very attractive rig.

ICOM IC-T3H £129 B

The IC-T3H 2m handheld features tough quality but with slim looks. Its striking green polycarbonate case has been ergonomically designed. The rig is capable of providing a powerful 5.5W output with either Ni-Cad or Ni-MH battery packs. Supplied with charger and rechargeable battery.

KENWOOD TH-D7E £319 B

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.

KENWOOD TH-F7E £249 B

WITH EXTRA WIDE RX COVERAGE

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

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

KENWOOD TH-G71E 199 B

If you want an excellent 2m/70cm dual-bander then you can't go wrong with the TH-G71. Fully functional with three power levels, 200 memories, CTCSS tone encoder/decoder, illuminated keypad and backlit LED.

YAESU VX-110 £119 B

Combining the ruggedness of the VX-150 with the simplicity of 8-key operation, the VX-110 is a fully featured 2m hand held ideal for the most demanding of applications. With its die-cast case, large speaker, and illuminated keypad, it is particularly well suited for most conditions. The VX-110 is a very affordable, rugged and reliable handheld.

Price Match Competitor's goods must be: new, UK sourced via official UK distributors and be in stock. Some competitors items offered may be non-UK compatible, ex demonstration or have no CE or E approval. All our new products come through official sources.

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

LOWE ELECTRONICS OPEN DAY MATLOCK 10am SATURDAY SEPTEMBER 4TH

Stalls from Icom, Kenwood & Yaesu as well as the spacious Lowe showroom.

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MIDLANDS STORE
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SCOTTISH STORE
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WATERS & STANTON

PRICE MATCH

THE ONLY THING WE CUSTOMER SERVICE WON'T DISCOUNT

VERTICAL ANTENNAS

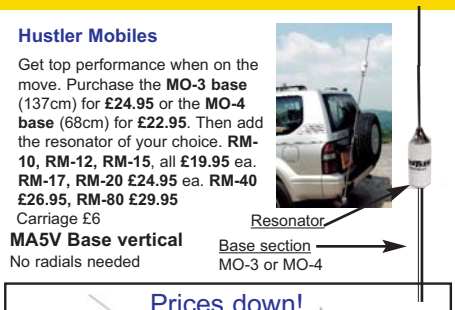
Hustler Mobiles

Get top performance when on the move. Purchase the **MO-3 base** (137cm) for **£24.95** or the **MO-4 base** (68cm) for **£22.95**. Then add the resonator of your choice. **RM-10, RM-12, RM-15**, all **£19.95** ea. **RM-17, RM-20 £24.95** ea. **RM-40 £26.95, RM-80 £29.95**
Carriage £6

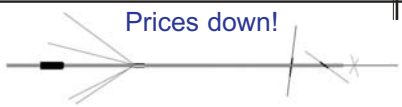
MA5V Base vertical
No radials needed

Resonator

Base section
MO-3 or MO-4



Prices down!



CUSHCRAFT BASE ANTENNAS

MA6V *NEW*	20-17-15-12-10-6m 250W PEP	**£269.95**	C
MA5V	20-17-14-12-10m 250W PEP	**£239.95**	C
R-8	40-30-20-17-15-12-10-6m 1.5kW	**£469.95**	C
R6000	20-17-15-12-10-6m 1.5kW PEP	**£329.95**	C

DIAMOND CP6 £239.95 C

**Bands: 3.5 -50MHz *Power: 200W *VSWR: Better than 1.5:1*
**Socket: SO-239 *Height: 4.6m *Radials: 1.8m adjustable*

Covers five popular HF bands and the 6m band. Low angle radiation makes it ideal for DX work. Outperforms dipoles for long distance contacts and compares favourably with beams located 10m+ above ground. It doesn't need long wire radials. Adjustable rigid radials, DC return helps the antenna get rid of static noise. Antenna is adjustable for each band.

HARI High quality German traps. (Pairs)
200W 20m £44.95 40m £49.95 80m £53.95
1kW 20m £59.95 40m £64.95 80m £73.95
Carriage £2.75

HARI High quality German Baluns
SO-239200W 1:1, 4:1 or 6:1 £25.95 ea.
1kw 1:1 £34.95 4:1 or 6:1 £41.95 ea
Carriage £2.75

HORIZONTAL BEAMS & DIPOLES

CUSHCRAFT Prices down!

Premier HF beam used around the world by serious DX'ers.

X-7	20/15/10m 7 el. Yagi 2kW	**£669.95**	D

Not got the space for a full sized HF beam antenna, then the mini beam MA-5B should be considered.

MA5B	10-12-15-17-20m 4 el. Yagi 2kW	**£369.95**	C
A4-S	10-15 & 20m 4 el. Yagi 2kW	**£569.95**	D
A3-WS	12 & 17m 3 el. Yagi 2kW	**£379.95**	D
D-3	10-15-20m dipole element 2kW	**£249.95**	C

Don't want a wire antenna but can't fit a Yagi, then consider a rotatable dipole.

D-3W	12-17-30m dipole element 2kW	**£249.95**	C
D-4	10-40m dipole element 2kW	**£349.95**	C
D-40	40m dipole element 2kW	**£319.95**	C
TEN-3	10m 3 el. Yagi 2kW	**£229.95**	C
ASL-2010	13.5-32MHz 8 el. log periodic	**£749.95**	C

RADIO WORKS - CAROLINA WINDOMS

A choice of quality wire antennas available to fit almost any circumstances. Prices down!

CW-160	160-10m 76.8m long	**£129.95**	C
CWS-160	160-10m 40.5m long	**£119.95**	C
CW-80	80-10m 40.5m long	**£89.95**	C
CWS-80	80-10m 20.1m long	**£109.95**	C
CW-40	40-10m 20.1m long	**£84.95**	C
CW-20	20-10m 10.36m long	**£89.95**	C
CW-620	20-6m 9.7m (32ft) long	**£89.95**	C
G5RV PLUS	80-10m with balun 31m (102ft) long	**£59.95**	B

SGC's Unique Portable Auto Tuner

Self Powered 160m - 10m

SG-211 Smart Tuner

1W to 60W PEP
Zero State Relays
Dipoles, wires and whips
Open Line feeder
LED Status Indicators

This is a revolutionary Auto ATU. Not only does it match virtually any antenna, it is self powered from 4 x AA cells that last for ages - well over a year. Zero state relays mean no current drawn unless actually tuning. And coming from an established pedigree, you can be assured of top performance. With its 256 memories it tunes like lightning and can handle impedances from 03 - 5000 Ohms and VSRs as high as 10:1. If you are a portable enthusiast, then this is for you. Just a single coax line back to your radio and no external DC needed. Now that really is a Smart Tuner!

Can run on 4 x AA cells for up to Five Years!

£189.95 C

No other model comes near it

First shipment sold out before we advertised it!

Zero Space DX Antennas

From Hustler USA

Run full legal power - 80m to 10m - with no masts or guys to worry about. 50 Ohm feed.

Small garden, planning problems or similar restrictions? Then the Hustler range is the answer. These HF verticals will take 1kW of power, work at ground level, and are self-supporting. A single earth rod will get you going. Add buried radials for even better results. Many hams have got on the HF bands with just this simple system. So why not join in the fun. These are rugged, well-built antennas that American hams have been using for years. Now they are available in the UK from our three stores.

4BTV
40-20-15-10m. 6.52m high. Full band coverage.
£149.95 C

5BTV
80-40-20-15-10m. 7.64m high. Full band coverage (100kHz on 80m).
£179.95 C

6BTV
80-40-30-20-15-10m. 7.3m high. Full band coverage (100KHz on 80m).
£209.95 C

BATTERIES & CHARGER

Ni-Cad and Ni-MH Charger with four Nickel Metal Hydride (Ni-MH) batteries. The charger can charge up to four Ni-Cad/Ni-MH AA, AAA cells or one or two PP3 rechargeable batteries.
The Ni-MH AA cells provided are 1.2V @ 1550mAh. These do not have memory effect and are a direct replacement for use in most equipment.

Order As V-2888 DEAL
£9.95 + £2P&P

PORTABLE ANTENNAS

MIZUHO (FOR FT-817)

ATX-WBN	Walkabout 80-6m Whip 1.5mBNC	**£44.95**	B
ATX-WPL	Walkabout 80-6m Whip1.5mSO-239	**£44.95**	B
ATX-W38	Walkabout 80-6m Whip 1.5m 3/8in	**£44.95**	B

New Low price on Walkabout whips, three to choose from with three different connectors.

AT-80	Single band 80m whip with BNC	**£19.95**	A
AT-40	Single band 40m whip with BNC	**£19.95**	A
AT-30	Single band 30m whip with BNC	**£14.95**	A
AT-20	Single band 20m whip with BNC	**£14.95**	A

Range of single band HF antennas with BNC connection. Ideal for FT-817.

AT-17	Single band 17m whip with BNC	**£14.95**	A
AT-15	Single band 15m whip with BNC	**£14.95**	A
AT-12	Single band 12m whip with BNC	**£14.95**	A
AT-10	Single band 10m whip with BNC	**£14.95**	A

Check our website for more info - www.wsplc.com

RADIO SOCIETY
OF GREAT BRITAIN

THE NATIONAL SOCIETY
WHICH REPRESENTS UK
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Founded in 1913 incorporated 1926.
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Membership is open to all those with an active interest in radio experimentation and communication as a hobby. Applications for membership should be made to the Subscriptions Department from which full details of Society services may also be obtained.

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Details of the Society's volunteer officers can be found in the RSGB Yearbook 2004

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RSGB matters

Board and National Council elections 2004

It is formally announced that the following vacancies will arise to the Board for the 2004 elections.

The Board (four vacancies)

Ed Taylor, G3SQX, and Richard Constantine, G3UGF, have each completed their three year terms of office. There are two further vacancies outstanding from the 2003 elections.

Members who wish to stand for election to the Board must have been a Corporate Member of the RSGB for at least two years, and need to obtain nominations and supporting signatures from 10 or more Corporate Members of the Society in good standing.

National Council (six vacancies)

Elections will be held in the following Regions:
Region 3 - North West, Regional Manager has completed three-year term of office
Region 4 - North East, Regional Manager has completed three-year term of office
Region 6 - North Wales, Regional Manager has completed three-year term of office
Region 10 - South and South East - Vacant
Region 12 - East and East Anglia, Regional Manager has completed three-year term of office
Region 13 - East Midlands - Vacant.

At the present time there are co-opted Regional Managers serving in the following regions:
Region 10 - South and South East
Region 13 - East Midlands.

These appointments cease on 31 December 2004. The Regional Council therefore has six vacancies.

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

Members of the Society who wish to stand for the National Council must reside in the relevant Region. They must have been a Corporate Member of the Society for at least two years and need to obtain the nominations and supporting signatures of a minimum of five, but no more than 10, Corporate Members of the Society in good standing and residing in the Region in which the candidate is standing.

♦ Apologies to Gordon Adams, G3LEQ: in the August *RadCom* we said that he retires from the Board at the end of this year. In fact he retires from the Board at the end of 2005.

RSGB MEETS THE CAA

It was a long time coming but worth the wait. After requesting a meeting with the Civil Aviation Authority nearly four years ago, the meeting finally took place in London recently. Attending the meeting were representatives from the RSGB, BATC, Ofcom and the CAA. The main agenda point of the meeting was to discuss the delays and refusals of clearances by the CAA of amateur TV repeaters in the 23cm band. However, other related issues were also raised. New lines of communications were agreed and more transparent clearance procedures were put in place.

LOTTERY GRANT FOR AMATEUR RADIO TRAINING

The Thornton-Cleveleys Amateur Radio Society has recently received a grant of £4900 to help in the promotion of amateur radio and to assist in training for the Radio Communications Examination. A club official said "the Awards for All scheme has made it simple to apply for funding and the grant received will help us continue our training work." Over the past two and a half years the club has held 18 examination classes with 150 candidates passing the Foundation licence exam.

SCIENCE AMBASSADORS PROMOTE AMATEUR RADIO

Under the SETPOINT scheme, SETPOINT Cumbria recently held a radio workshop at which over 100 children spent the day finding out about radio waves, practising Morse code and building an AM radio. Seven members of the RSGB trained as Science and Engineering Ambassadors to support the project. A SETPOINT spokesman said, "Their dedication and enthusiasm rubbed off on the children and their teachers, which made the day a great success." The Science and Engineering Ambassadors scheme is sponsored by the government and is coordinated nationally by SETNET, the Science, Engineering, Technology and Mathematics Network (www.setnet.org.uk).

NOMINATIONS INVITED FOR RSGB TROPHIES

♦ The **G5RP Trophy** is an annual award 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. Seasoned HF DXers are able to reward and encourage newcomers by nominating an up-and-coming DXer for this award. Your nominations for the 2004 - 2005 award are needed now. The trophy is awarded jointly by the Vale of White Horse Radio Society and the RSGB, and will be presented at the RSGB International HF and IOTA Convention. Nominations

Richard Pollard, M0RJP, the current holder of the G5RP Trophy, receiving the award from last year's RSGB President, Bob Whelan, G3PJT, at the RSGB HF Convention.

should be sent to Colin Thomas, G3PSM (QTHR), or c/o RSGB Spectrum Forum at RSGB HQ, or by e-mail to: spectrum.chairman@rsgb.org.uk to arrive not later than 15 September.

♦ Nominations are invited for the **LF Experimenter's Award**, also known as the **Nevada Cup** from its sponsor Nevada Communications Ltd. The award is for the most significant contribution by an RSGB member towards scientific or engineering development of receiver and / or transmitter design, modulation technique or propagation on the 136kHz amateur band. Nominations must either be a full description of the work or references to where it is published, and must indicate aspects that are original. Nominations should be addressed to 'Nevada Cup' at RSGB HQ, or preferably e-mailed to John Gould, G3WKL, at g3wkl@btinternet.com by Monday 20 September. Full details of the award, and its past winners are atwww.rsgbspectrumforum.org.uk/Nevadacup.htm

VOLUNTEER VACANCIES

Chair of the Planning Advisory Panel

The Society has an immediate vacancy for the position of Chair of the Planning Advisory Panel. Ideally you should be au fait with current planning legislation and work as a planning professional. You should also be an active licensed amateur and be a member of the RSGB. If you are interested and meet the criteria please forward a CV to the General Manager, Peter Kirby, G0TWW, at RSGB HQ.

Propagation Studies Committee

The Society's Propagation Studies Committee (PSC) is looking for an additional member. PSC works to promote interest in and increase knowledge about radio propagation among radio amateurs and listeners. In particular, it aims to encourage the study of propagation throughout the radio spectrum. It currently has a vacancy for an additional member. This would ideally be someone with a particular involvement in UHF or microwaves but who is prepared to encourage and discuss work at other frequencies. Readiness to bring findings and developments to other amateurs and would-be amateurs would be very welcome. Much of PSC's work is conducted by e-mail but it usually meets twice yearly in Leicester. If you are interested please contact the Chairman, Martin Harrison, G3USF, e-mail psc.chairman@rsgb.org.uk

WANT TO BE IN 'WHO'S WHO'?

The RSGB is considering possible publication of a new book called Who is Who in Amateur Radio. The book is intended to be a list of notable figures in amateur radio in the UK and overseas. The RSGB is seeking to be as inclusive as possible by asking for amateurs around the country to submit information on candidates for possible inclusion. If you would like to be considered, you can submit your own information on-line at www.rsgb.org/whoswho It is also possible to include your picture by submitting a small passport-sized photograph to the RSGB. This can be done as an e-mail attachment to whos.who@rsgb.org.uk or by mail to RSGB HQ (unfortunately we are unable to return these photographs, so a jpg or tif e-mail attachment is preferred).

If you would like to nominate another person for possible inclusion in the book, please send a separate letter to "Who is Who Nominations", RSGB, Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JE or e-mail: whos.who@rsgb.org.uk before 6 September 2004. The closing date for completed nominations is 20 September 2004 and not every submission is guaranteed to be included.

CONGRATULATIONS!

Congratulations go to the following RSGB members who successfully upgraded from **Intermediate to Advanced** licence following the exam on **21 June**:

Jason Woodman, 2E0JAY; Michael Carey, 2E0MIC; Mark Rabel, 2E0MWR; Kevin Haworth, 2E0XTC; David Tomlinson, 2E1FED; Kevin Valentine, 2W1VKD; David Brewerton, M3EZP; Declan McGlone, M3FAA; Andrew White, M3FUA; Gary Baker, M3GBX; Paul Waldock, M3LRE; Michael Couchman, M3SAC; Trevor Codner-Armstrong, M3ZEE.

The following members successfully upgraded from **Foundation to Intermediate** licence following the exam on **27 July**:

David Southwell; Robert Hastings, M3AHH; Vernon Werrett, M3BDU; Andrew Smith, M3BKM; Christopher Cook, M3CRC; Derek Pollard, M3CSG; Ian Harley, M3HFI; Rodney Metcalfe, M3HLD; Chris Hamblen, M3LHP; Vincent Frostick, M3LIE; Nigel Lightfoot, M3NOD; Robin Emery, M3NTB; Paul Smith, M3OTA; Brian Aicheler, M3OZJ; Kenneth Rafcliffe, M3RTL; Martin Timms, M3UAC; Jamie Wrightson, M3WON; Alan Watts, M3WSZ; Rebecca Chambers, M3XWJ; Robert Harrigan, MM3EKL; Edward Higgins, MM3EML; Lawrie Dickenson, MM3FMY; George Stoddart, MM3FSF; Graeme Gilmour, MM3FTD; Samuel Martin, MM3TIA; John Wilson, MM3VEG; Dave Hulin, MM3XPG; Peter Ratcliffe, RS191413; Mark Crawford, RS192669.

PAST PRESIDENT IAN KYLE, GI8AYZ / MI0AYZ, SILENT KEY

Ian Kyle, GI8AYZ / MI0AYZ, RSGB President 1997 / 98, died peacefully at home on Friday 23 July after a long illness. Born in 1930, Ian was educated at the Royal Belfast Academical Institution and attended Queen's University, Belfast. Ian spent the first half of his working life in the family textiles business and the second half, until retirement, in telecommunications.

Interested in all things mechanical and electrical at an early age, Ian's first foray into home construction was to build a crystal set in 1942, followed by a very mechanical transmitter some two years later. In 1944 he joined the school ACF followed by the Queen's University OTC which led him to serve with the 107 Bde Royal Signals TA unit in which he rose to Officer Commanding in the rank of Major, retiring in 1966.

The TA rekindled his interest in radio and he took the RAE in 1960 but due to work pressures and other interests such as motorcycling, jazz and real ale he did not apply for a licence until 1967, when he was issued with the callsign GI8AYZ. Ian's initial interest was VHF / UHF contesting and Raynet. Ian joined the RSGB in 1967 and began his active involvement with the Society in 1974 when he became the area representative for North Ulster. From 1978 to 1981 Ian was the regional representative for Region 15 and from 1981 to 1984 Council member for Zone F, Northern Ireland. Ian said, "I became an ordinary amateur after 1984." This was not quite true. Ian became a GB2RS newsreader in 1986 and he continued this activity until a few weeks before he died.

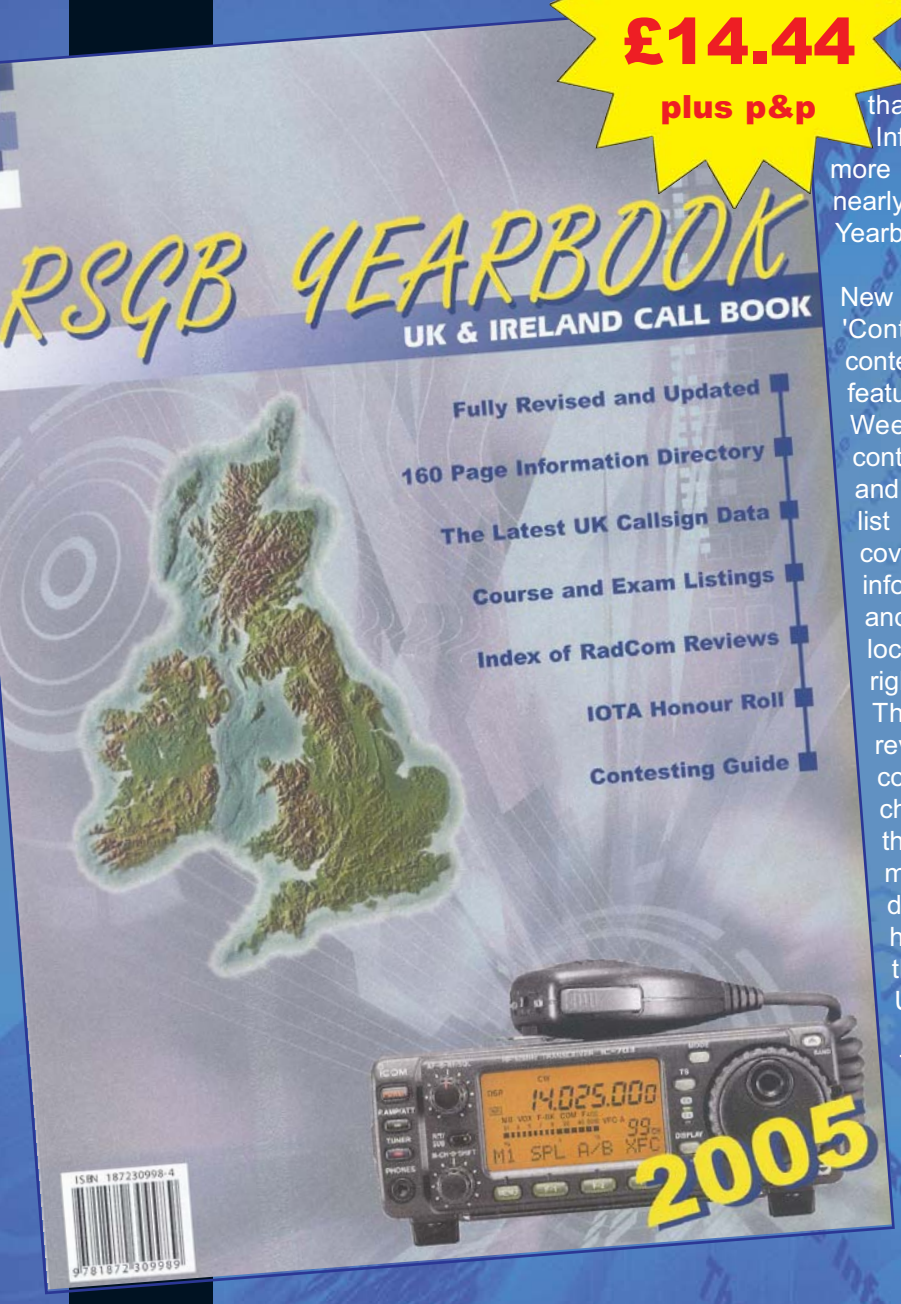
Ian returned to the Council in 1992 and took an active role in representing members' interests as Chairman of the Membership Liaison Committee.

A quiet, but persuasive man, Ian will be remembered as the President who during his term in office presided over the RSGB ground-breaking change of policy not to support compulsory Morse testing. The RSGB was at the time the first major Society in the world to make such an announcement. He also started the negotiations with the RA - now Ofcom - which led to the introduction of the Foundation licence. Ian was a man of vision, a great supporter and friend of amateur radio in his native Northern Ireland and across the UK, and he was well respected around the world. He will be sadly missed by all those who worked with him and operated with him on the bands. Ian is survived by wife Jean whom he married in 1958, son Alasdair and daughter Lynne (both of whom hold amateur radio licences), and four grandsons.

Ian Kyle, GI8AYZ / MI0AYZ, 1930 - 2004.

RSGB Yearbook 2005

ONLY £14.44 plus p&p



UK & Ireland Call Book

Edited by Steve White, G3ZVW

Every page updated and reviewed

The 2005 edition of the RSGB Yearbook is bigger than ever, with even more colour pages. The Information section has grown this year and there are more pages in the callsign listings section reflecting the nearly 62,000 callsigns on issue. As always the RSGB Yearbook reflects the current state of the hobby in the UK.

New for the 2005 edition of the RSGB Yearbook is the 'Contesting Guide', your complete guide to RSGB contests from HF to microwave. You will also find features on Topband Direction Finding and the Mills Weekend. The section devoted to licensing now contains a huge list of all the Foundation, Intermediate and Advanced amateur radio courses available, plus a list of Examination Centres. IOTA receives extensive coverage, with a feature on IOTA's 40th Anniversary, information on the awards scheme, the Honour Roll and Annual Listing. The pages devoted to national and local affiliated clubs and societies have been brought right up to date, and are now listed in regional order. The reference list of equipment that has been reviewed in RadCom continues to grow, and the colour maps which show repeater coverage for each channel have been increased insize. To supplement the list of Postcode areas there is now a Postcode map - useful in contests for determining which direction you need to beam to pick off areas you haven't already worked. The latest Bandplans are there too, from 136kHz to 76GHz, plus lists of every UK repeater in channel order and callsign order.

There is also a callsign listing for the Irish Republic, for short wave listeners and short contest callsigns, plus surname and postcode listings. Plus the mass of information you have come to expect, and the most accurate and comprehensive UK and Eire callsign listings.

All-in-all it adds up to a reference book that no radio amateur should be without. Everything you need at your fingertips and with 488 pages excellent value.

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NOTE:
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RSGB MEMBERSHIP – Annual Rates

Home Corporate	£42.50
Overseas Corporate	£42.50
Corporate (Senior Citizens) (Applications should provide proof of age at last renewal date)	£33.50
Corporate (50 years membership)	50% DISCOUNT
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Family member (Must reside with existing member. Does not include RadCom)	£18.50
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HamClub (under 18)	£18.50
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Special arrangements exist for blind and disabled persons. Details and membership application forms are available from RSGB HQ.

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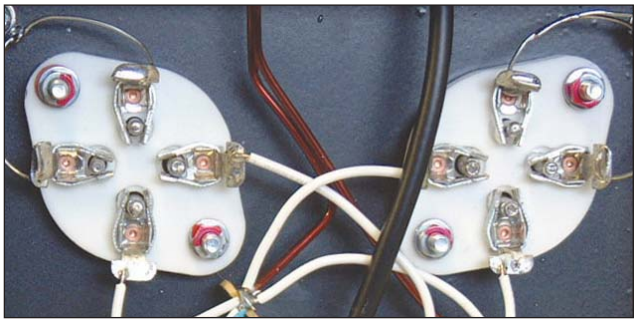


p34 – Linear Amp UK HF amplifier kit

p80 – Microwave: new columnist

G0SBW and G8BLS recreate Battle of Arnhem comms

RadCom article helps TV documentary

September marks the 60th anniversary of the Battle of Arnhem. Despite a heroic fight, the Allies lost the battle and suffered heavy casualties. One of the criticisms is that the British troops did not have adequate radio communications. The History Channel's 'Battlefield Detectives' is currently producing a TV programme on the Battle and wanted to use identical WWII equipment to reproduce the communications. Unfortunately they could not locate any suitable wartime equipment, but the radio consultant to the programme saw the article 'HF backpacking, or operating pedestrian mobile' by Tom Robinson, G0SBW, in the June 2004 *RadCom*. As a result, Tom and Peter Best, G8BLS, another pedestrian mobile enthusiast, were sent to Arnhem by the 'Battlefield Detectives' to be filmed simulating the battle communications.

In 1944 troops used the 68 Set with 0.25W AM to an 11ft whip on frequencies just above 2MHz. For the simulation two IC-703s (one kindly loaned by Icom UK) were used on 160m AM. Two weeks were spent developing backpacks and large loading coils and, on the day, the IC-703s worked perfectly during the battlefield tests.

The new 'Battlefield Detective' series will be shown on the History Channel in 2005. We hope to feature an article by Tom, G0SBW, on his experiences in Arnhem in the near future.

♦ John Berry, G8JBJ, has carried out a comprehensive statistical analysis of the communications during the Battle of Arnhem. His conclusion is that the communications *should* have worked well on the second day of thebattle, when path lengths fell to around 6km (as confirmed in practice by Tom and Peter). John's paper can be found at www.atdi.co.uk/knowledge.htm

Tom, G0SBW, and Peter, G8BLS, with their manpacks at Arnhem.

New amateur satellite project

On 30 July, the Chairman of AMSAT-UK, Prof Sir Martin Sweeting, G3YJO, announced a new amateur transponder to be launched as part of the European Space Agency (ESA) SSETI Express satellite. Speaking at the opening of the 2004 AMSAT-UK Colloquium at the University of Surrey, he expressed his delight that AMSAT-UK had been able to work with the ESA to provide, at very short notice, an S-band (2.4GHz) transmitter. It is intended that it will be used as the downlink of a single-channel FM transponder, with the 437MHz receiver provided by DF2FQ. These frequencies will enable amateurs who have Oscar 40 equipment to use it in an exciting new way.

The 2.4GHz downlink exciter, power supply, control interfaces and power amplifier are being developed by Sam Jewell, G4DDK; David Bowman, G0MRF; Jason Flynn, G7OCD; and Charles Suckling, G3WDG, with Graham Shirville, G3VZV, assisting.

SSETI Express is scheduled to be launched into a sun synchronous 680km orbit from Plestek in Russia in April 2005.

Youngest Advanced licensee?

James, M0EOG, who successfully passed his Advanced licence at the Red Cross Centre in Grimsby just weeks before his 11th birthday, asks if he is the youngest person to obtain an Advanced (Full) licence? James is now the proud owner of a new Yaesu FT-857 - not the edible model shown here!

Amateur radio wedding

On 1 June Nigel Knapton, G1JKE, married Andrea Duffield, M3YTE, at the Old Blacksmith's Shop in Gretna Green. Half the wedding party were licensed radio amateurs and included three generations of one family: John Duffield, M3MKO; his daughter Andrea, and grand-daughter Ruth, M3RHD. Ruth is 11 years old and passed the Foundation exam when she was 10. All are members of the Ripon & District Amateur Radio Society, where the M3s took the Foundation course, and Nigel is treasurer of the club. He said, "Despite the rain, the wedding was a great day and we are currently sorting out antennas at the family QTH!"

Left to right: Andy White, G7AUP; Nigel Knapton, G1JKE (groom); Andrea Duffield, M3YTE (bride); Ruth Duffield, M3RHD (bridesmaid), and John Duffield, M3MKO.

Radio pioneer John Kraus, W8JK, SK

Well-known radio astronomer, antenna designer, cosmic explorer and author John Kraus, W8JK, died on 18 July at the age of 94. John Kraus was a pioneer of radio telescope design and the father of the 'Big Ear' telescope which recorded the famous 'Wow!' signal in 1977, but was perhaps best known within the amateur radio community for his bi-directional wire beam design, dubbed the '8JK array. Other important Kraus designs include the corner reflector and the helix antenna. [ARRL]

NEWS BRIEFS

- Janusz Babol Vel Sobczyk, ZS5ADU (ex-SP7GWF), is an electronics engineer with 20 years experience in military radio communications, cellular and digital telecommunications systems and project management. He is coming to the end of his contract in South Africa and would like to work in the UK. If any potential employer is interested, Janusz's CV is being held at RSGB HQ: please contact the General Manager for further information.
- Orkney Wireless Museum station GB2OWM plans to operate from Kiln Corner, Kirkwall, during the 14th Orkney Science Festival from 2 to 10 September. Probable operating periods will be on Saturdays 10.00am - 12.30pm and on other days at 2.30 - 4.30pm. Operation will be primarily on HF SSB and further information can be obtained from Bill, GM3IBU (QTHR), e-mail gm3ibu@argonet.co.uk
- The DARC Hohenstaufen club (www.darc.de/p41) is holding a long-wave activity day from 1200UTC on Saturday 18 September, for 24 hours. DK0UH will be on 136.5kHz (CW) and 137.7kHz (QRSS3: one CW dot lasts three seconds). An HF station will be active on 7021kHz and those receiving the 136kHz signals are asked to send soundfiles and spectrogram pictures by e-mail to DK8ND@web.de
- Club-TV will broadcast a video about 'Marconi at Poldhu', at 0900UTC on 25 September via the Sirius 2 satellite at 5° East. The downlink frequency will be 12,599MHz vertical polarisation, SR 6667, FEC 1/2. More information can be found at www.parabolic.se under 'Club-TV'.
- The new Martin Lynch & Sons Ltd store at Outline House, 73 Guildford Street, Chertsey, Surrey KT16 9AS opens on 23 August. Martin tells us that he is planning an open day at the new store, date to be confirmed (call ML&S tel: 0845 2300 599, fax: 0845 2300 339 or see www.MLandS.co.uk for more details).
- On 12 / 13 June, members of the Widnes and Runcorn Amateur Radio Club operated GB0MAC to raise funds for Macmillan Cancer Relief. One of the organisers, Norman Walker, M0NOW, reports that "a great weekend was had by all." A total of £1415.50 was raised for Macmillan Cancer Relief.

Raynet provides Norfolk coast safety watch

On 19 July North Norfolk and Broadland Raynet combined to provide communications, on behalf of the County Emergency Planning Officer, while following the progress of a perilous 30-mile kayak charity trip undertaken by the Great Yarmouth Coastguard and the Deputy Mayor of Cromer. The journey was a sponsored event to raise funds for the Coastguard Association and the Civil Protection Volunteers. It took place along the hazardous coastline from Cromer to Great Yarmouth, along which route normal communications are notoriously difficult.

North Norfolk Raynet Controller G4RRN observed and reported progress along the route from his car, with Broadland Raynet Controller G4TWT and G4TWS covering Cart Gap and Eccles Beach. They handed over to G0MXN at Winterton Dunes, who in turn passed to G3IOR at Hemsby Lifeboat lookout with its clear view from Winterton to California, whilst G0MXN went on to Caister-on-Sea. But when the participants were lost to view in the sea spray and had not appeared in sight of Caister beach, a search was commenced from California beach to Scratby by request of Deputy Emergency Planning Officer to G3IOR, then joined by G1EBP at the Lifeboat lookout whilst M3JST of the Hemsby Lifeboat team drove the station's Land Rover along the beach. It transpired that the kayakers, facing a 12 knot head wind and opposing tide had been forced to beach the boat before setting off again to complete their journey.

A listening watch was kept by G7HXI at Eccles and 2E1HAO at Lingwood in case relays were needed between the remote coastal mobiles at critical times. The exercise was considered most valuable, proving Raynet's ability to maintain good communications along a screened stretch of dangerous and flood-prone coastline where mobile telephones and normal VHF radios fail to function.

Pat Gowen, G3IOR, at Hemsby Lifeboat lookout.

Transmission 2004

A final reminder that the British Wireless for the Blind Fund (BWBF) annual amateur radio fund-raising event, 'Transmission', takes place on 25 / 26 September. Full details are included in BWBF's advert on page 56. Brian Murray, MM0ERK, is one of a group who will be taking part in Transmission from the Montrose Air Station museum, where they have established a permanent special event station. For Transmission they will be using the callsign GB2WBF. Brian says, "We will be looking for any radio hams who would like to join in with this annual competition and fun weekend."

Advanced licence courses in Bath and Canterbury

Training courses for the Radio Communications Examinations (Foundation, Intermediate and Advanced exams) now occur throughout the year and at numerous radio clubs throughout the country. However, several Advanced licence courses are expected to commence during the autumn, the 'traditional' time for the start of former RAE courses. We have been informed of two:

Steve Hartley, G0FUW, and Mike Coombs, G3VTO, will be running Foundation, Intermediate and Advanced courses in **Bath** starting on Thursday 9 September. The classes are sponsored by the RSGB Bristol Group so costs will be kept as low as possible. All newcomers are welcome but the Intermediate and Advanced classes will only be open to those who have passed the previous exam. There is no compulsion to do all three courses, students can stop at any level if they wish. Anyone interested in joining should contact Steve, G0FUW, tel: 01225 464394 (evenings), or e-mail: newcomers.radcom@rsgb.org.uk for further details.

It is proposed to run a course covering the Advanced licence syllabus in the **Canterbury** area as part of the Kent Adult Education Service, starting in September, if enough support is forthcoming. For further details please contact Dr Ken Smith, G3JIX (QTHR), tel: 01304 813175; e-mail: g3jix@aol.com

Blind GB2RS newsreader takes to the air

Annick Morris, M0HDE, who has been blind from birth, has appeared in the pages of *RadCom* a couple of times already. Now aged 18, on Sunday 18 July she became a GB2RS newsreader and read the news through the GB3MR repeater. She will be newsreading on 6m, 2m and 70cm and it is hoped that she may do two bands at once in the near future.

Annick has a purpose-built laptop computer which can accept Word files, and which has a single line display, consisting of raiseable dots which form Braille characters. Annick can read Braille fast enough to read out loud from this, although she only 'sees' one character at a time. Braille has quite a lot in common with Morse code, at which Annick also excels; she can read Braille with her right hand whilst sending what she reads in Morse with her left.

Club and Regional News

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.

1 Scotland South & Western Isles

AYR ARG
8, Introduction to the new session.
22, TBA. John, MM1JAS, 01292 445599.
COCKENZIE & PORT SETON ARC
24, Second 144MHz DF hunt: meet at *The Old Ship Inn*. Bob, GM4UYZ, 01875 811723.
LOTHIANS RS
13, Activating Mediterranean Islands on HF / 6m, Peter, GM4BYF. 27, EMC: our hobby in danger. Toby, MM0TSS, 07739 742367, tobysigouin@onetel.net.uk

2 Scotland North & Northern Isles

No club details received.

3 North West

CHESTER & DRS
7, Bring and tell.
21, Talk TBA, Alan, G8OJQ. 28, Surplus sale. Chris, MW3TWI, 01244 683629 or Bruce, 01244 343825.
SOUTH MANCHESTER R & CC
3, Mini lectures.
17, Discussion on members' favourite Software.
24, Introduction to propagation, Ron, G3SVW. Ed, 0161 969 1964.
STOCKPORT RS
7, 'Russian radio: the first 50 years', Paul, G7EAH.
21, Practical skills evening: project debugging. David, M1ANT, 0161 456 7832.
THORNTON CLEVELEYS ARS
6, On air. 13, PAT Testing, Rob, M3FSS.
20, TBA. 27, High-power PSU, Ken, G3RFH. Jack, G4BFH, jack.duddington@btinternet.com
WIRRAL & DARC
1, D&W. 8, Pre-owned equipment sale.
15, D&W. 22, TBA. 29, D&W. Tom, G4BKF, 07050 291850, www.wadarc.com

4 North East

GOOLE R & ES
8, AGM at *The Black Swan*, Asselby. Richard, G0GLZ, 01405 769894.
GRIMSBY ARS
2, Glass engraving, Andy, G0MNI.
16, Military communications, Malcolm, M3NAV. George, G4EBK, 01472 887720.
HALIFAX & DARS
21, AGM. Tom, M0TKA, 01484 715079.
HORNSEA ARC
1, SSB Field Day Preparation.
4, 5, SSB Field Day.
6-12, Antenna workshop, Manor Farm, Bewholme.
15, Low band DX, G4BYG.
22, Tankers, Dave M0IOK.
29, Activity night. Richard, G4YTV, 01964 562498, G4YTV@AOL.com
KEIGHLEY ARS
2, Social evening.
9, On air.
16, Brewery visit.
23, Social evening.
30, 'Mexican Rescue', John Hey. Kath, G0OSA, 01535 656155.
SHEFFIELD ARC
4, 5, SSB Field Day, G3RCM/P.
13, VHF radio.
20, 'Walks with radio, number 8, Dr Tony Whitaker, G3RKL.
27, HF radio. Nick, G4FAL, 0114 255 2893.

5 West Midlands

COVENTRY ARS
3, Quiz.
10, On air, Intermediate, Morse practice.
17, 2m 'foxhunt'.
24, Equipment sale, on air, Intermediate, Morse practice. John, G8SEQ, 024 7627 3190, johng8seq@ntlworld.com
GLOUCESTER AR & ES
6, AGM. 13, Trying out new antenna.
20, 27, HF on air and workshop. Tony, 01452 618 930 office hours.
KIDDERMINSTER & DARS
7, AGM. Tony, G1OZB, 01299 400172.
MID-WARWICKSHIRE ARS
14, Club visit.
28, 'Homebrew'. Bernard, M1AUK, 01926 420913.
SALOP ARS
2, Telford Rally final preparation.
16, Talk TBA, Terry, G8DIQ. Fred, G3NSY, 01743 790457.
ST LEONARD'S ARS
2, Demo of Koch Morse trainer, Stan, G0BYA.
3, Chairman's social evening.
16, On air.
23, Baluns.
30, On air. Derek, G0EYX, 01785 604904, www.freewebs.com/g3sbl
STRATFORD UPON AVON DRS
4, 5, SSB Field Day.
13, Open evening.
27, Low power techniques, Ray, G4FON. Terry, G3MXH, 01789 294387.
TELFORD & DARS
1, On air.
4, Rally setting up, RAF Cosford Museum.
5, Telford Rally at RAF Cosford Museum.
8, Oscilloscopes, M1RKH.
15, Club library.
22, Memories of a radio engineer, G4LU.
29, 'QRP: the whys and wherefores', G0VXG. Mike, G3JKX, 01952 299677, mjstreetg3jkx@aol.com

6 North Wales

MERION ARS
2, Quiz with Newtown club. Martyn, GW4XZJ.

7 South Wales

No club details received.

8 Northern Ireland

No club details received.

9 London & Thames Valley

AYLESBURY VALE RS
8, BBQ at G7VFV QTH. Roger, G3MEH, 01442 826651, roger@g3meh.com
CRAY VALLEY RS
2, Canada 2003, G3SXE.
18, British Wireless for the Blind 'Transmission' weekend, G0VJG. Richard, G7GLW, 07831 715797, rcains@btinternet.com
HODDESDON RC
14, *Windows* II, G4VMR.
28, Video evening. Don Platt, G0TSN.
MAIDENHEAD & DARC
2, 'Air Ambulance'. John, G8RYW, 01628 628463.
NEWBURY & DARS
22, Construction contest. Kevin, G6FOP, 01635 826397, g5xv@ntlworld.com
READING & DARC
9, 'Channel Tunnel', Colin Bayliss.
23, 3B9C Rodrigues DXpedition, Don Field, G3XTT. Pete, G8FRC, 0118 969 5697, www.radarc.org
SHEFFORD & DARS
9, Welcome back.
16, Mobile DF hunt,
23, GCHQ history.
30, Navigation. David, G8UOD, 01234 742757.
SILVERTHORN RC
17, Junk sale.
24, On air. Les, G0CIB, 07980 275081.
SOUTHGATE ARC
9, 'The Great Erg Race'. Mike, M0ASA, 020 8366 0698.

10 South & South East

BASINGSTOKE ARC
4, 5, SSB Field Day.
25, 26, New Forest foxhunt weekend. Frank, M0AEU, barc@2lo.info
BRIGHTON RC
14, 'Remote control using IR signals'.
28, 'Accurate measurement of SWR and power'. Reg, G3GZT, 01273 699104.
CRAWLEY ARC
27, Microwave Round Table. John, G3VLH, 01342 714402.
FAREHAM & DARS
1, On air. 8, Digital signal processing, Jim, M1JJN.
15, Junk sale.
22, Video.
29, Magnetic loop antennas, Steve, G7HEP, John, G6BHB. Steve, G7HEP, 01329 663673.
HARWELL ARS
14, AROS, Barry Scarisbrick, G4ACK. Angus, G0UGO, 01235 522858.
HASTINGS E & RC
15, Bring your own thing (construction): start preparing your items now. Peter, G0FUU, 01424 432418, Peter.Firmin@virgin.net§
HORNDEAN & DARC
7, Social evening.
28, 'Pure Invention: tales from the patent office', Frank Warren. Stuart, G0FYX, 023 9247 2846.
HORSHAM ARC
2, 'Radio Scouting and contesting'. David, G4JHI, 01403 252221.
ITCHEN VALLEY RC
10, 'Aerial Ascending'.
24, WWII New Forest airfields. Sheila, G0VNI, 023 8081 3827, sheila.williams@ivarc.org.uk
SOUTHDOWN ARS
6, 'Broadcasting logistics and Eastbourne Youth Radio', Tim, G8MFO. John, G3DQY, 01424 424319.
SWINDON & DARC
2, 144MHz Trophy contest preparation.
9, Microwave operation, Brian, G4NNS.
23, Members' surplus equipment sale. Mike, M5CBS, 01793 826465.
TROWBRIDGE & DARC
1, Steam generation, Dennis, G3LLZ. Ian, G0GRI, 01225 864698 eve/wknd
WORTHING & DARC
1, Technical book evening.
8, Early electric telegraph, G0ECW.
15, Electric trams'.
22, Construction contest.
26, Mini-rally at Newhaven Fort.
29, 'Waterwise'. Roy, G4GPX, 01903 753893.

11 South West & Channel Islands

APPLEDORE & DARC
20, Backyard trap dipoles / verticals, Terry, G4CHD. Brian, M0BRB, brian.jewell@ic24.net
CITY OF BRISTOL RSGB GROUP
12, Surplus equipment sale / car boot sale (under cover if wet, at Shirehampton). Martyn, G3RFX, 0117 973 6419.
CORNISH RAC
2, Diving, Warren Hastings.
13, Computer section. John, G4LJY, 01872 863849.
POLDHU ARC
14, 'A unique transmitting valve', George, G3AHX. Keith, G0WYS, 01326 574441.
SOUTH BRISTOL ARC
1, Computer & software clinic.
8, Photographs from members' archives.
15, Historic club videos.
22, Working old domestic radios, Sam, M0DIL.
29, On air. Len, G4RZY, 01275 834282.
SOUTH DORSET RS
14, 7Q7MM DXpedition, Richard, M5RIC. Carol, 2E1RBH, 01305 820400, carolonfraggle@tiscali.co.uk
TORBAY ARS
17, Visit to Gemini Radio Torquay studios, contact Mike, G1FON.
18, Visit Brixham Coastguard, contact Mike, G1FON. Dave, G6FSP, dave.helliwell@tesco.net
WEST SOMERSET ARC
7, Surplus equipment sale. Jean, G0SZO, 01984 633060.
WESTON-SUPER-MARE ARS
6, Quiz. D Welch, G0ATD

12 East & East Anglia

CHELMSFORD ARS
7, Pedestrian mobile operating. Colin, G0TRM, 01245 223835, colinpage@ukgateway.net
FELIXSTOWE & DARS
5, HF activity day.
6, Ipswich Transport Museum visit, details Richard, M1ADT.
30, Visit to Orwell Park Observatory, Orwell Park School, meet in observa tory car park. Paul, G4YQC, paul.whiting@bt.com
HARWICH AR INTEREST GROUP
8, 'The diverse role of the Police Search Advisor, Sgt Steve Kettle, Essex Police. Tony, G4EYE, 01255 886065.
NORFOLK ARC
1, SSB Field Day / Police Gala Day final preparations.
4, SSB Field Day at Norfolk Show Ground.
5, Police Gala Day and SSB Field Day at Norfolk Show Ground.
8, Reflections on Field Day and Gala.
15, Summer dinner, Andrew, M1EOX, David, G7URP.
22, Narrow band TV demo, Mark, M0DFF.
26, Bletchley Park visit.
29, Construction / Morse tuition. Reg, G0VDO, 01603 429269.

13 East Midlands

DERBY & DISTRICT ARS
7, Junk sale.
21, Aerials & feeders explained (second attempt!). Martin, G3SZJ, 01332 556875.
EAGLE RADIO GROUP
14, 'First aid and resuscitation in the shack', Homi Shekhdar. Terry, G0SWS, 07979 733640.
HUCKNALL ROLLS-ROYCE ARC
3, Pre-check equipment for RSGB Field Day.
10, Enigma, Ian, G4HTO.
17, Open evening.
24, On air. Keith, G6NHY.
LEICESTER RS & CC
6, BBQ.
13, Junk sale, on air.
20, Recollections of Holland under occu pation, Johanne, G0VZO.
27, Video, construction, on air. Tom, G1IUT, 0116 286 3949, tomchristmas@ukonline.co.uk
LINCOLN SW CLUB
1, On air.
4, 5, SSB Field Day.
15, Hamfest preparation.
19, Lincoln Hamfest, Newark Showground.
29, Quiz. John, G1TSL, 01523 323153.
LOUGHBOROUGH & DARC
7, Vintage radio night.
14, Bring along your unfinished projects.
21, On air.
28, 'The Other Man's Shack', Don, G8AYG. Chris, G1ETZ, 01509 504319.
RAF WADDINGTON ARC
9, Nine churches and one vicar, Alan, M0DBY. Martin, M3MDF, martin@farmer4.freeserve.co.uk
S NORMANTON, ALFRETON & DARC
6, Interclub quiz and buffet.
12, Amateur radio car boot sale.
13, Portable antenna project part 1.
16, ARCON 'foxhunt', SNADARC members invited.
20, Junk sale.
27, SSTV demonstration, Dave, G7DGF.. Mike, M0RMJ, 01949 876523.

BRATS TRAINING WORKS - AND QUICKLY!

Sean Collins, soon to be licensed as M0???/MM, with his yacht *Vortex*.

Sean Collins contacted the Bredhurst Receiving and Transmitting Society (BRATS) Lead Instructor Charles Darley, G4VSZ, in April saying that he was about to embark on a lifetime ambition to sail his yacht, *Vortex*, to the Caribbean and how could he take the necessary exams to talk to radio amateurs while Maritime Mobile? He was told that to operate /MM he had to pass not only the Foundation licence exam and practical assessments, but take the Intermediate exam preceded by *its* practicals, and then take the Advanced exam. Sean thought that all that would take a long time but Charles told him that if he was up for the challenge then so would be the BRATS training team. Sean's response was "Let's go for it!"

Sean sat the Foundation exam on 22 May and passed. On 21 June he sat the Intermediate exam at the BRATS exam centre in Strood (213 ATC Squadron) and 30 minutes later sat down again to take the Advanced exam. Being a pilot exam it was not marked locally but on 16 July he received the news that he had been longing for: a pass at the Advance licence examination. So in 14 weeks Sean had home studied from the BRATS training website (www.amradioinfo.co.uk) and moved from outside the hobby to an Advanced licence.

Sean and *Vortex* plan to leave Chatham, Kent, in mid-August for Falmouth; north-western Spain; Lagos, Portugal; the Canary Islands and then set sail for the Caribbean at the beginning of December with a scheduled arrival date of Christmas Day 2004. He plans to operate SSB and RTTY from on board the yacht.

PENCOED ARC

The Pencoed Amateur Radio Club is a new club, founded in 2003. It meets every Monday evening at the Scouts Hall, Heol Las, Pencoed, near Bridgend in Mid Glamorgan. The club now has 28 members from all over Mid and East Glamorgan, with some travelling the 22 miles from Cardiff to attend the club meetings.

One of the club's successes has been its Foundation and Intermediate courses, with principal instructor Gerry Day, MW0GCD, assisted by Peter Roberts, MW0AMO; Dave Roberts, GW0ROL; Ted Stanmore, MW3EBS; and Gerry's wife, Jan, MW0JAN, leading to 26 new licensees in the club's first year of existence.

The club is always looking for new members, so if you live in the area please go along to a club meeting or contact Phil Randall, 2W0PDR, tel: 01656 745219 or Gerry Day on 01656 860761 for more information.

Mrs U Stevenson, widow of GM3KC (centre), presents a plaque to Montrose Air Museum staff and members of the GB2MAS station, handing over her late husband's callsign to the museum station.

MONTROSE PERMANENT SPECIAL EVENT STATION

The Montrose Amateur Radio Station is a new permanent special event station established at the Montrose Air Museum. Brian Murray,MM0ERK, writes, "We were approached by the museum who were very interested in amateur radio and they asked us if we would be interested in becoming a permanent station at the museum. Everything is going well. We are very busy with special events using our callsign GB2MAS. We have to thank Icom (UK) who are sponsoring us with radio equipment which they let us borrow - an IC-756ProII. As a new station, this is very much appreciated. We now also have the callsign GM3KC, which was kindly 'donated' by Mrs U Stevenson and family on behalf of her late husband. A plaque was presented to the museum. We are now running every Sunday from 12.00 to 4.30pm using the callsign GM3KC. Alan Thomson, MM1EQE, has applied to become an instructor for the Foundation course. The staff at the museum seem keen to do it. RSGB Regional Manager Peter Thomson, GM1XEA, is giving us his support."

NEWS IN BRIEF

♦ The Hoover (Merthyr) ARS in Merthyr Tydfil reports that it recently held its first Intermediate exam. All six candidates (C McCarthy, MW3CPI; M Townsend, MW3END; S Davies, MW3AQH; R Lacey, MW3FEF; P Martin, MW3EGK, and A Budding, MW3BOK) passed.

♦ Rhondda ARS is to run a Foundation course starting on 14 September at the NUM Club, Tonypandy, Rhondda. All enquiries to John Howells, GW4BUZ, tel: 01443 432542.

♦ Hastings Electronics & Radio Club congratulates its publicity officer Ray Heming on passing the Intermediate exam on 21 June. His new callsign is 2E0VJH.

NOSTALGIA THEME AT TELFORD RALLY, 5 SEPTEMBER...

This year's Telford Radio Rally, organised by members of the Telford & Salop Amateur Radio Societies, takes place at the RAF Cosford Aerospace Museum in Shropshire on 5 September. This year there is a nostalgia theme, looking back at equipment that has graced radio amateurs' shacks from 1950 to 2000. Heathkit, Marconi, Collins, PCR, Hammarlund, Eddystone, KW, Trio, Codar, Sommerkamp, Drake, HyGAIN, Datong, Uniden, Microwave Modules, AEA: the list goes on and on. Continuing big names - Yaesu, Icom and Kenwood - go back years too, using valves and analogue dials, of course. The rally group intends to display as many examples of these gems from the second half of the 20th century as possible, working or otherwise. Feature organiser Martyn, G3UKV (tel: 01952 255416; e-mail ukv@globalnet.co.uk) would like to hear from anyone who can offer equipment from their collections. As ex-WD equipment has been featured previously at the rally, they are not seeking ex-military equipment on this occasion.

NEW DEPUTY REGIONAL MANAGER FOR THE WEST MIDS

Peter Braidwood, M1TCP, has been appointed Deputy Regional Manager for District 54. Peter replaces John Davies, G6RTV, and he is a welcome addition to the regional team, supporting members in Gloucestershire and Warwickshire. He will be on the RSGB bookstall at the Telford rally on 5 September, when members in Gloucestershire and Warwickshire will have an opportunity to meet him. His details are: Peter Braidwood, M1TCP, 77 Pheasant Way, Cirencester, Gloucestershire GL7 1BJ; tel: 01285 652 374; e-mail: peter@braidwood.co.uk

Peter Braidwood, M1TCP.

BRAINTREE & DARS'S ANTENNA 'CLINIC'

PHOTO BY TED, G4MU

Dave, G0DEC, comments on a waveform.

The Braintree & DARS's (www.badars.org.uk) annual 'antenna clinic' was held recently. As usual many members turned out to have their antennas given the once over. The items to be checked ranged from commercial mobile whips, ex-military 'tactical' aerials and a collection of home-made 'specialities'. The main test equipment was a Wavetek Amplitude Analyser which displayed graphically the condition of the antenna under test. A plotter was available to give printouts to those who required them. A few eyebrows were raised at some commercial antennas, proving that nothing should be taken for granted just because your aerial was bought 'off the shelf'!

A most interesting evening.

NEW VENUE FOR TRENT VALE CLUB

Trent Vale Amateur Radio Club meets every Friday at a new venue: the 15th Nottingham Scout Group, Woodside Road, Lenton Abbey, in Nottingham. All amateurs in the area are invited to discuss the programme for this newly reformed club. Details from Robert, M1BEY: 0115 913 7232.

CORRECTION

Dyslexic fingers caused Mark, M3NCG, whose photo appeared on page 13 of the August *RadCom*, to be given the callsign of Steve Page, M3CNG, who kindly phoned to point out the error. Apologies to both.

RRM TALK AT LSWC

Recently, Lincoln Short Wave Club (www.lswc.co.uk) hosted a talk by the newly-appointed RSGB Regional Manager for the East Midlands, Ken Frankcom, G3OCA. Ken spoke about the RSGB and his role within the organisation, and also showed us many photographs of his successful DXpedition to Africa. His talk was very informative, and everyone enjoyed it. Baz Matthews, M3DMV, the LSWC activities manager said: "May I through the pages of *RadCom* thank Ken for his efforts, and, on behalf of all the LSWC members, wish him good luck in his new role."

READING & DARC

The Reading & DARC (www.radarc.org) reverts to two meetings per month (2nd and 4th Thursdays) commencing in September. For further details contact Pete, G8FRC, on 0118 969 5697.

ACCRINGTON MEETS MORECAMBE

The North Western Repeater Group and Amateur Radio Club recently visited the Morecambe Bay Amateur Radio Club for a talk on QRP by *RadCom* 'QRP' columnist Rev George Dobbs, G3RJV. Jack Addison, G4PKD, the Chairman of the North Western Repeater Group and Amateur Radio Club, reports that a very enjoyable evening was had by all, and sent in the accompanying photograph to prove it.

By Nevil Brinnen, G3VDV

134 Victoria Road, Mablethorpe, Lincs LN12 2AJ.

GB4FUN was in Mablethorpe, Lincolnshire, recently at the invitation of members of the Eagle Radio Group. Nevil Brinnen from the club shares his thoughts on how GB4FUN can encourage the next generation of radio amateurs.

FUNNY business at the Eagle Radio Group

Supporters of the Radio Communications Foundation

We asked members when renewing their membership to include a donation to help to continue to support the work of the Radio Communications Foundation. The following is the list of those members who have kindly sent in a donation by the deadline date for this issue. Contributions continue to be wanted: if you would like to help, please send your donation to RCF, c/o RSGB HQ.

RCF 'Big Hitters'

Paul O'Kane EI5DI

B G Davis	2E0BGD
D Whitehouse	G0ALA
Mrs E A Hicks-Arnold	G0CDZ
A C E Germaney	G0LGT
Chelmsford ARS	G0MWT
A E Houghton	G0WMB
M B Wilmshurst	G1JZG
R Drabble	G1SLE
E J Bailey	G3BNW
J A Hardcastle	G3JIR
R C Fenton	G3NQF
B J Tarry	G4FKP
K P Jackson	G4KXG
Oldham ARC	G4ORC
D Perry	G4YVM
N A Golding	G6RIG
J R Wilson	G7BZX
R D Phillips	G7FKF
J Edwards	G7PEB
R Elgy	G8EZT
G S York	G8MXD
C C Eccles	G8NMK
M E Harden	G8UEP
M J Turner	GJ0PDJ
W McGill	GM3LGM
J Carson	GM3OXK
F J Rees	GW0JRF
A Lipian	GW0TOI
M Edwards	GW4LHL
L V Fatta	KB9OOM
N Williams	M0CRM
R M Hunt	M0RHI
C Orme	MD0VOD
Livingston & DARS	MM0LIV
G J Johnson	RS193254
D G Bitsios	SV6CZQ

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

Always on the lookout to put a bit of variety into the Eagle Radio Group's events, we decided to contact the RSGB in the hope of getting GB4FUN for the club's open day at the Mablethorpe Show, which is held on the large playing field of Tennyson Secondary School in the heart of the town. The show always takes place on a Sunday and we thought it would be nice if we could book the van for the show, leave it set up and then do a radio demonstration for the pupils and staff the following day. We approached the school which readily agreed, as it was the last week of term before the summer holidays. Our luck held because on contacting Carlos Eavis, G0AKI, the RSGB GB4FUN Co-ordinator, we were informed that he and the vehicle were both available on those dates.

We had no idea what to expect but it sounded good: we had all read in *RadCom* of being able to talk to astronauts in spacecraft from the van, and we had seen photos of children with their smiling faces whist speaking into microphones. Would it happen here?

We always set up our stand on the eve of the show so we are ready to get into the operation bright and early on the Sunday morning. Some members like to keep their Sunday skeds from the playing field, which is a good location. One of the group spends the night there as 'night watchman', often keeping the station on the air. We assumed Carlos would also arrive on the Saturday to set up, but no, we were told it was not necessary. "I'll be there at 7.00am on Sunday, and it takes me about 50 minutes to get set up and on the air", said Carlos. After his drive from Potters Bar Carlos arrived just before 7.00am and soon had things working. It's a good job he arrived early because first he had to field the questions of our members, long before the public arrived. He did this with great patience, giving answers I'm sure he has given thousands of times before. At least it warmed him up for the procession of visitors and their questions throughout the day. We were not able to converse with any astronauts, but one or two of our members had QSOs via satellite. This has encouraged at least one of our M3 members to think about the Full (Advanced) licence.

We usually have a social after the show at our meeting place, the Eagle Hotel, and this year was no exception, with a barbecue arranged for the evening. Carlos was our guest of honour, and was still awake enough to hand out some prizes and give a short after-dinner speech, both informative and humorous.

AT THE SCHOOL

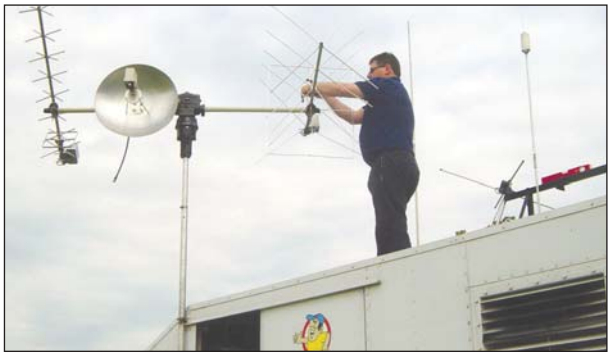
On Monday, after registering at the school and getting our special passes, Carlos; Charles, G0CBM, and I (Nevil, G3VDV) got things ready for the first of the five groups of 10 pupils. I had no idea how Carlos would start things off or how the children would react. I was worried about HF conditions, as I had really struggled to have a CW contact with the only station I could hear on 20m before I left home. The bands were all just about dead, so it could only get better.

The first group, aged between 12 and 13, looked in awe at the equipment and Carlos's imposing figure, probably wondering what they had let themselves in for and thinking that perhaps maths would have been a better option. Carlos opened in a way which convinced them they all knew more than they thought they did, just with the aid of a little jargon-busting. His light and easy manner soon broke down their inhibitions, and by the time we had established a QSO partner on 2m they were all happy to speak on the air. It was Charles and myself who had the job of producing a QSO partner, not always easy when you need one.

As each group passed through the bus Carlos adjusted the depth and content of information to suit their ages. He never had to 'sell' amateur radio, but kept to the topics of communications and technology: it was the pupils themselves who brought up the subject of amateur radio. One young fellow was so enthusiastic I warned Carlos to check for a stowaway before he left. The only disappointment was that after many CQ calls we managed only two 20m QSOs, both with Stuttgart, Germany. Luckily both had excellent English and I had the impression that they recognised the GB4FUN callsign. The stations had great FUN exchanging greetings with us.

It really set me thinking that it is a difficult job to bring new young blood into our hobby. Many come into radio because a family friend or relative is licensed, but anyone else has to 'catch the bug'. The FUN van is where you could easily get 'infected'. Just one of the following modes could be the source: space communications, UHF / VHF / HF radio, digital and computer modes, CW.

I'm sure we are doing the right thing by taking GB4FUN into schools and exhibitions and using Carlos's talents in this way. Try to remember why you are now a radio amateur, and think of how you would sell it to a 12-year old. If you have a public event in the near future ask yourself whether there is a place in it to show the FUN in radio. ♦



Above
Fourteen-year old Mark, M3NCG, from the Eagle Radio Group demonstrating radio to visitors.

Carlos, G0AKI, setting up the satellite antennas on GB4FUN.

Reviewed by Chris Lorek, G4HCL

PO Box 400, Eastleigh SO53 4ZF.

E-mail: g4hcl@rsgb.org.uk

Icom IC-R20 wideband

Chris Lorek says, "When I first heard about the IC-R20 I marvelled at its capabilities. Then when I first saw a prototype of the IC-R20 'in the flesh' at Icom (UK) a couple of months ago, I was pleased to find that *RadCom* would have one of the very first functioning production models in the UK for a technical review. So here it is!"

The antenna can be folded down parallel to the receiver: ideal when it is carried on a belt or in a pocket.

The IC-R20 is the first handheld receiver to my knowledge that has broken the 3GHz barrier, having a receive capability of 150kHz to 3305MHz. SSB and CW as well as AM, FM and WFM reception modes are offered up to 470MHz, with AM, FM and WFM reception modes above that.

Not only can it receive over this staggeringly wide range, it also has a simultaneous dual receive capability on two VFOs. With this you can monitor 150kHz to 470MHz on VFO A and 118MHz to 175MHz and 330MHz to 1305MHz on VFO B. Tuning steps available are 0.01, 0.1, 5, 6.25, 8.33 (on VHF Airband), 9 (on MW), 10, 12.5, 25, 15, 20, 25, 30, 50 and 100kHz, with the set-top rotary control acting as a click-step tuning knob. Most operating parameters can be changed by a simple one-button press, and a comprehensive menu-based 'Set' mode is used to change many of the receiver's lesser-used parameters such as LCD backlight mode, scan resume settings etc.

MEMORIES & SCANNING

The receiver has 1000 memory channels, plus 25 pairs of scan-edge channels, which you can arrange into a total of 26 memory banks. Each bank can store up to a maximum of 100 channels, these being dynamically allocated from the 1000 channel total. Each memory channel can store an eight-character alphanumeric name as well as one of five icons, plus the reception mode, tone frequency or DCS number, skip information and so on. There are also 10 pre-set memories to store your favourite channels for quick recall, and UHF TV channels 21 to 69 are also pre-programmed for WFM audio reception. The user manual includes some frequency lists for the beginner, with VHF marine channels, some general civil aviation frequencies, 27MHz CB and UHF broadcast TV channels listed.

There are plenty of scan modes included, enough to keep anyone busy for quite a while. These include a full scan which scans the entire frequency range, a selected bank scan which scans between the limits of the band you've selected, a programmed scan which scans between two pre-programmed frequencies, a 'bank scan' which scans the channels in one or more selected memory banks, a memory scan which scans the memory channels you've selected and ignores those you've selected to skip, and a frequency / memory skip scan which will ignore frequencies you've designated as unwanted which would otherwise cause your scan to halt. In VFO scan mode, the receiver can cycle through 100 channels per second: very fast! When scanning and after the receiver finds a signal, the scan may be set to resume either after a given period of between 2 and 20 seconds, or immediately the signal disappears, or a period of between 1 and 5 seconds after signal disappears so you can catch replies on the channel.

Finally, and very usefully in my opinion, is an auto-write memory scan. Here, you set the receiver scanning between two pre-set frequencies, and with the press of the 'MR S.MW' button the receiver will automatically store active channels into a special auto-write memory bank. This can contain up to 200 frequencies, which you can then monitor, or simply transfer channel-by-channel or the entire bank, into a normal memory bank for subsequent monitoring. The auto-write bank can then be cleared in its entirety (but not channel by channel) for the receiver to find new active frequencies in, say, a different frequency range.

DIGITAL RECORDER, POWER & ANTENNAS

Here's another unique feature for a handheld scanner. The IC-R20 has a built in 32Mb digital memory which can store up to 260 minutes of off-air received audio. You can also set it to record only when the receiver squelch has raised, to compress hours worth of typical non-broadcast listening into just a few minutes for later replay.

portable receiver

The recording quality is selectable in three steps, with the quality level you choose affecting the overall length of recording available, and the replay speed is variable between half speed and one and a half speed. There are 32 'tracks' available, so you can store up to 32 different recording sessions.

A small but high-capacity rechargeable lithium-ion battery pack is used to power the set, and Icom say this will give at least 11 hours of continuous receive at full volume - remarkable! The receiver also has a 'power saver' which cycles the receiver circuits on / off when it's not receiving a signal, so monitoring a squelched channel with intermittent activity should give you at least a few days' worth of operation. A plug-in wall power supply / charger is provided for recharging, and an optional DC cable is available as well as a 'slot-in' charger pod. The receiver also comes with a small plastic moulding which fits in the battery compartment so you can use three AA sized alkaline cells when needed.

The IC-R20 comes supplied with a set-top dual-hinged telescopic antenna. This is terminated in a BNC plug, which of course also lets you connect different external antennas to the receiver when the need arises. Using the receiver's 'set' mode, in place of the set-top connector you can also individually select to use an internal ferrite bar antenna for AM medium wave reception, and a plugged-in earphone cord for FM Band II reception instead of the set-top whip.

SIGNAL DETECTION & INTERFERENCE REDUCTION

The receiver's squelch has nine level settings, as well as an 'Auto' squelch level which uses a noise pulse-count method to determine when a valid carrier is present. As well as this, a 'voice squelch' can be switched in, which will only raise the squelch when audio is present rather than just a blank carrier. CTCSS (sub-audible tone) and DCS (digital coded squelch) detectors are also included, which again you can select so that the squelch only opens when a signal with a valid tone or code is received. A selectable 'bleep' can also be sounded to alert you whenever such a signal is received. A 'tone scan' can also be initiated with a single button push, which will search and display the relevant sub-tone frequency present, if any, on the signal you're tuned to.

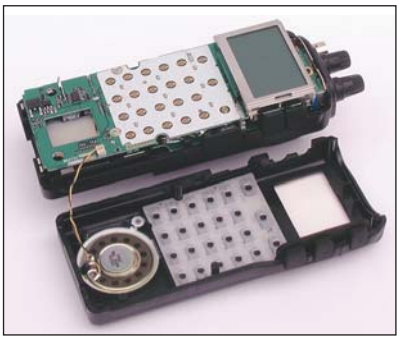
If that's not enough, there's also a real-time 'bandscope'. This can search either side of your tuned frequency, in a bandwidth of between 1kHz and 100kHz, and display the levels of signals present graphically on the display. You can usefully still listen to the tuned signal while the bandscope is searching away.

As well as the receiver usefully having a Icom CI-V remote control port via the earphone jack and employing Icom's CI-V interface standard, it also has PC programming capability using an optional USB cable and CS-R20 cloning software. A dedicated USB connector is fitted below the earphone and DC power sockets for this. With this you can transfer the contents of memory channels, including frequencies, channel name, bank name, and set mode items to and from your PC. Using this it's also possible to transfer recorded audio, although (at the moment at least) you'll need to use the receiver to replay it rather than being able to hear the audio through your PC's speakers.

Using the 'Set' feature, you can select the RF gain of the receiver - is this another 'first' in a handheld wideband scanner? As well as this there's a switchable RF attenuator, the combination giving around 30dB of front-end variable gain - useful for crowded band conditions and especially on HF. For reducing impulse-type interference on SSB and CW modes there's a switchable noise blanker, and a switchable ANL (Automatic Noise Limiter) for use on AM. For WFM there's also an AFC (Automatic Frequency Control) to help you pull-in slightly off-frequency signals, with '<' and '>' indications acting like a discriminator meter. There's also a switchable audio filter to reduce high-frequency audio components, such as HF 'splitches' and so on. Is there *anything* Icom hasn't thought of?

IN USE

The receiver measures 60W x 142H x 35Dmm, and weighs 320g with its battery and antenna attached. As well as the accessories already mentioned it also comes supplied with a sturdy belt clip and wrist strap as carrying aids, and a 94-page user instruction book. The set uses a triple conversion superhet circuit, with IFs of 429.1MHz (a first IF of 266.7MHz is used above 1305MHz), 19.65MHz and 450kHz.



Top left
Close-up of the display, showing the 'bandscope'.

Above
The IC-R20 receives right up to 3305MHz!

Under the front panel.

After receiving the set and plugging in the power supply / charger, I started to have a listen around and to program up a few memories to scan across. At least I tried to, occasionally struggled, and then thought the better of it and resigned myself to the need to read the instruction book! Although many of the operating controls are intuitive to use, others aren't. For example, to exit some modes you need to press the 'Dualwatch' button rather than anything else. But then, after a good read, I found I could master many of the receiver's functions without having to refer back to the book. Icom has also usefully added a cut-out 'Quick Reference Guide' to the rear of the supplied manual, but after a few tens of minutes of operation I found I didn't need this at all.

The comprehensive 'Set' mode is used to pre-program many of the ICR-20 lesser-used conditions, such as LCD backlight mode, beep level, scan resume times etc. Changing parameters is very easy (after I'd read the manual!) due to a text-based 'menu' on the front-panel dot-matrix LCD. One of these is a 'duplex' offset frequency and direction. Here, you can program a TX / RX split, for example -600kHz for 2m, and by pressing the

'Mon' button at the side of the scanner it takes you directly to the input frequency of the repeater you're listening to. Another useful 'nicety' was a selectable VFO 'auto speed-up', where if I rotated the click-step tuning knob above a certain speed the step rate would automatically increase, to help me get to the frequency I wanted that bit quicker.

All in all I found the receiver a real pleasure to use. The auto-write memory scan worked very well and unlike one or two others scanners I've tested, it had the intelligence to remember what's already stored and not simply to fill up the entire 200 channel bank with just a handful of continually repeated frequencies. Leaving it in this mode for a while gave me plenty of new active frequencies to explore, this being even more useful when I spent the odd period or two away from my 'home patch'. Likewise the automatic audio recording, which I used with great success. It meant I could leave the set in the office or whatever monitoring a channel with the volume turned down, and then during a lunch break I could have a good listen to the morning's activity!

The facility of CTCSS decode for 'quiet monitoring' I also found useful, although there was a delay of almost a second between the signal appearing and audio coming from the speaker. This meant that sometimes the first word or so of each transmission was missed. A check on a further IC-R20 showed the same, indicating it wasn't something I was doing wrong like inadvertently enabling the 'power save'. Taking of power, not once throughout the review period did the internal battery ever go flat on me, even after several days of monitoring without a recharge - well done Icom! If I were to own an IC-R20, with so many facilities and available memory channels with their associated alpha-tags and icons, I'd also be very tempted to purchase the optional CS-R20 cloning software and cable as I'm sure this would make memory entry, eg from web-based lists, very easy.

Coupling a variety of external rooftop antennas showed the receiver to be quite reasonable, for such a small set, in rejecting unwanted signals. I usually have to put up with a lot of pager interference on VHF, and almost useless performance on the HF amateur bands from broadcast breakthrough, with other handheld receivers. Not so with the IC-R20: careful settings of the RF gain and attenuator gave me quite reasonable results on HF, even with my full-sized outdoor HF dipoles. The performance was, of course, naturally not that of a dedicated high-cost desk-top base receiver, but even so I was pleasantly surprised. Searching around and above 2.4GHz for various wireless devices was another novel thing, although here I found the set to be rather on the 'deaf' side, this I confirmed in my subsequent lab tests. The manufacturer's sensitivity specifications do reflect, with a sensitivity of 18µV on 2.4GHz compared to 0.4µV on 145MHz. But if you used the set at home at 2.4GHz frequencies with an external antenna you'd probably use a mast-head amplifier, which would overcome this to a large extent.

For portable use, the supplied telescopic antenna can be adjusted to a length of between 16cm fully retracted and 30cm fully extended, as such it can often be set to be around a quarter-wavelength of the frequency band you're monitoring. The retracted antenna can be bent double to lie alongside the receiver, which I found was useful when I was carrying it on my belt or in my inside jacket pocket.

CONCLUSIONS

Throughout the review period the IC-R20 accompanied me almost everywhere I went, and I'm going to miss it! In all, the performance was very good, the operating facilities and modes excellent, and I'm sure there are going to be a great many happy IC-R20 owners out there. Our thanks go to Icom (UK) for the loan of the review receiver. The IC-R20 is priced at £499 and is available from all authorised Icom dealers. ♦

LABORATORY RESULTS

All measurements taken at 145.000MHz, FM, unless otherwise stated, using fully-charged internal lithium-ion battery.

Sensitivity
Input signal level in µV pd required to give 12dB SINAD

Freq	
2MHz	0.28µV pd (AM)
4MHz	0.36µV pd (AM)
6MHz	0.38µV pd (AM)
8MHz	0.37µV pd (AM)
10MHz	0.35µV pd (AM)
15MHz	0.36µV pd (AM)
20MHz	0.34µV pd (AM)
30MHz	0.16µV pd (FM)
50MHz	0.13µV pd (FM)
70MHz	0.15µV pd (FM)
100MHz	0.87µV pd (WFM)
145MHz	0.13µV pd (FM)
170MHz	0.14µV pd (FM)
250MHz	0.65µV pd (AM)
350MHz	0.22µV pd (FM)
435MHz	0.30µV pd (FM)
450MHz	0.30µV pd (FM)
550MHz	1.58µV pd (WFM)
750MHz	1.29µV pd (WFM)
950MHz	0.28µV pd (FM)
1297MHz	0.25µV pd (FM)
1500MHz	1.10µV pd (FM)
1900MHz	0.79µV pd (FM), 4.20µV pd (WFM)
2300MHz	2.23µV pd (FM), 10.62µV pd (WFM)
3300MHz	3.16µV pd (FM), 14.81µV pd (WFM)

S-Meter Indication

Level	RF Level	Relative Level
1	Squelch open	n/a
2	0.47µV pd	-18.2dB
3	0.56µV pd	-16.8dB
4	0.63µV pd	-15.8dB
5	0.77µV pd	-13.9dB
6	0.86µV pd	-13.0dB
7	0.94µV pd	-12.2dB
8	1.14µV pd	-10.6dB
9	1.26µV pd	-9.7dB
10	1.59µV pd	-7.7dB
11	1.77µV pd	-6.7dB
12	2.26µV pd	-4.6dB
13	2.51µV pd	-3.7dB
14	3.09µV pd	-1.9dB
15	3.82µV pd	0dB ref

Squelch Sensitivity
Level of signal required to raise receiver squelch

Sq Level	AM	FM	WFM
Auto	0.12µV pd (5.0dB SINAD)	0.12µV pd (5.0dB SINAD)	5.01µV pd (32.0dB SINAD)
Minimum (1)	0.44µV pd (14.0dB SINAD)	0.39µV pd (23.7dB SINAD)	5.05µV pd (32.1dB SINAD)
Maximum (9)	2.01µV pd (27.7dB SINAD)	1.20µV pd (31.0dB SINAD)	11.7µV pd (33.0dB SINAD)

Adjacent Channel Selectivity
Measured as increase in level of interfering signal, modulated with 400Hz at 1.5kHz deviation, above 12dB SINAD ref level to cause 6dB degradation in 12dB on-channel signal

+12.5kHz	28.5dB
-12.5kHz	25.9dB
+25kHz	50.8dB
-25kHz	49.4dB

SSB Selectivity

3dB Bandwidth	2.31kHz
6dB Bandwidth	2.68kHz
20dB Bandwidth	3.51kHz
40dB Bandwidth	3.69kHz
60dB Bandwidth	Blocking limited

Blocking
Measured as increase over 12dB SINAD level of interfering signal modulated with 400Hz at 1.5kHz deviation to cause 6dB degradation in 12dB SINAD on-channel signal

+100kHz	65.1dB
+1MHz	78.0dB
+10MHz	85.9dB

Intermodulation Rejection
Measured as increase over 12dB SINAD level of two interfering signals giving identical 12dB SINAD on-channel 3rd order intermodulation product

25kHz spaced signals	52.3dB
50kHz spaced signals	51.7dB

Image Rejection
Difference in level between unwanted and wanted IF image signal levels, each giving 12dB SINAD on-channel signals
1st IF (266.7MHz) image >130.0dB (measured at 1350MHz)
1st IF (429.1MHz) image 121.4dB (measured at 145MHz)
2nd IF (19.65MHz) image74.5dB
3rd IF (450kHz) image >130.0dB

Maximum Audio Output
Measured from external audio output socket, using 1kHz audio, at the onset of 10% distortion
133mW RMS

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

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

'Newcomers' News' went 'on the road' in May and June and Steve Hartley will be speaking at the HF Convention in October. Why not go along?

Newcomers' news

The final item in the July column gave some reasons why calls on VHF may not be answered - wrong polarisation of antennas or using the wrong mode / part of the band. Two readers sent in suggestions for improving the numbers of successful contacts.

Tony Jarvis, G6TTL, was first off the mark to point out that stations not only need time to turn their beams but they need to know which direction to point it. Tony advises that you could possibly increase your contact rate by giving more information in your initial calls, for example: "This is M3QQQ beaming south (north / east etc) from Yorkshire . . . ." In contests that use Locator Squares as score multipliers it might be better to call "CQ CQ CQ from 2M0QQQ 2M0QQQ beaming south from IO76, IO76..."

Tony goes on to remind us that when the VHF bands are open for Sporadic E contacts (around 2000km) it is important to keep the contact short, just signal report and locator, unless the other operator is giving and requesting more.

The day after I received Tony's mail, I had a letter from John Butcher, G4GWJ, covering the same subject but with a slightly different slant. John often works mobile using FM and says he finds it useful to know where stations are calling from. "If I hear a weak signal when I am going west and on a hill in Wiltshire, and he calls "CQ from Leicester", I know I won't hear him on the far side of the hill, so I either pull into a lay-by or I don't call. But if he says he is in Salisbury and I'm going that way I might well give him a call." John also makes the point that long CQ calls are not normally needed on FM.

Finally, as I was writing this Geoff Darby, G7RTC, came in with similar comments. Thanks to Tony, John and Geoff, all very useful advice for newcomers.

Students Tomohiro Nakagawa, Michael and Lauren Dixon (seated) with Eric Eastwood, G1WCQ, the lead instructor, Joe Hankin, M3DLT; John Whalley, M3FBS; and Nigel Meakin, 2E0NHM, at the Preston ARS (see 'Club Visits').

One of the Romsey District Scouts enjoying JOTA 2003 with the Itchen Valley Radio Club (see 'Radio Scouting').

CLUB VISITS

In late May and early June I happened to be working in Lancashire (where I grew up) and was able to co-ordinate a couple of invites to give talks at the Preston and Chorley Amateur Radio Clubs. Both talks were well attended and I enjoyed meeting their newcomers. On the spot feedback was also useful.

The Chorley club has a good number of Foundation and Intermediate members and at least two of their tutors attended the RSGB's 'Train the Trainers' event in Telford. The club is intending to offer Advanced training starting in late August with a 'maths primer'.

Further details of the Chorley club can be obtained from Sean Flanagan, M1SMF, who is also one of the Deputy RSGB Regional Managers for the North-West, at 33 Ullswater Rd, Chorley, Lancs PR7 2JB; tel: 07944 515045; or e-mail: sean1226@hotmail.com

Feedback from the talk at Preston indicates that the members were very taken with the details of the Advanced syllabus, book and exam. There now appears to be a renewed interest in going for the Advanced licence with Mike Gray, M0ABK, earmarked as lead tutor.

Eric Eastwood, G1WCQ, is the lead Foundation and Intermediate tutor. He has a 100% pass record since he started training in 1994 and runs 'continuous' courses. Indeed, three members were doing their Morse assessment whilst I was there; father and daughter Michael and Lauren Dixon, and Tomohiro Nakagawa. Tomohiro, the club's first Japanese member, joined the club as a result of visiting the PARS stand at the Norbreck Rally. He travels to Preston from Burnley for classes.

If any other clubs would like me to visit I do get about the country with my day job and if we can co-ordinate dates I would be very please to give you 'Newcomers News' in person.

RADIO SCOUTING

Romsey District Scouts have joined in partnership with the Itchen Valley Radio Club and over 30 Scouts have achieved their Radio Communications badges, with 12 of these going on to achieve their Foundation licence. Mike Baxter, 2E1CYZ, applied to become an instructor and with some trepidation, but a lot of support from the club, his first cohorts became M3s in June 2003.

In October the club took part in Jamboree on the Air ('JOTA'), which allowed the M3s to use their new callsigns and gathered a waiting list for another course. The event included using licence-free PMR radios to set up a net and organise a treasure hunt. VHF and HF amateur stations were also available on site. The Scouts had the opportunity to use Morse code and learnt finger signing.

The group held their second course in March this year with another 12 gaining their M3 callsigns. Fantastic news that shows how popular amateur radio can be with youngsters when it is presented in a positive environment. ♦

By Ian Poole, G3YWX

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E-mail: ian_poole@lineone.net

Phase locked loops

In recent years the phase locked loop has become an integral part of radio technology - many domestic radio sets boast terms such as 'PLL', 'Quartz', 'Synthesised' and the like when they use this technology. Ian Poole describes how PLLs work and some of the uses they can be put to.

Phase locked loops (PLLs) are a particularly useful building block for many radio applications. While the PLL may appear to be an advanced technique, its operation is really quite simple to understand (having said that, if phase locked loops are analysed mathematically it does soon become quite complicated!)

FUNDAMENTALS

As the name suggests, the PLL is based around the concept of *phase*. Radio, and many other signals consist of the familiar *sine wave* as shown in **Fig 1**. This is a repetitive waveform that repeats indefinitely until the signal is turned off. The waveform obtains its name from the fact that it follows a value equal to that of the trigonometric sine expression. As the angle increases from 0 to 360°, so the value of the expression changes to provide the sine wave shape. Thus one complete cycle can be seen to be equivalent to 360°. It is also possible to define any point on the waveform in terms of the angle. 90° would be a quarter of the way through the waveform, 180° half way through and so forth.

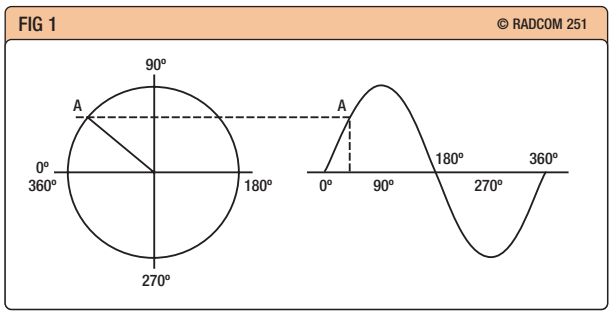
When comparing two waveforms it is possible to look at the position each signal is through its waveform at any given time and note the different stage that each one is through the cycle. This is known as the *phase difference* between the two of them and it can be expressed as a given number of degrees, as shown in **Fig 2**.

When two signals have different frequencies the phase difference between the two signals is always varying. In fact a definition of two signals having exactly the same frequency is that the phase difference between them is constant.

THE PLL

A PLL consists of three main circuit building blocks, namely a phase detector (PD), loop filter and a voltage controlled oscillator (VCO) as shown in **Fig 3**. A reference signal is also required but it is not actually part of the loop.

In operation the VCO produces a signal that enters the phase detector along with the signal from the external reference. The phase detector compares the phase between the two inputs and generates an output that is proportional to the phase difference between the two input signals. This error voltage is filtered to remove any unwanted components and then applied to the control input of the voltage controlled oscillator. The loop filter also serves to determine many of the characteristics of the loop.



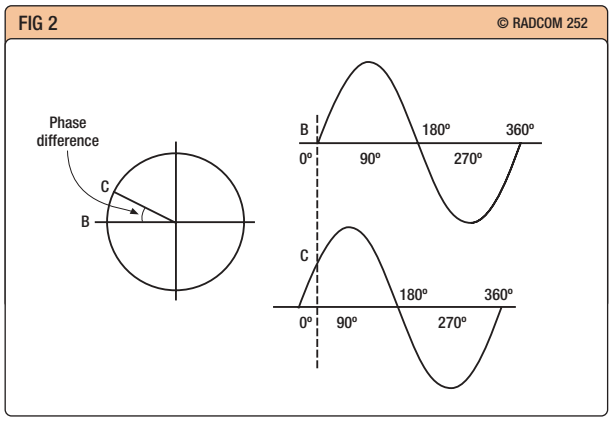


Fig 1
Phase of an individual signal.

Fig 2
Phase difference between two signals.

The error voltage is in such a sense that it tries to reduce the phase difference between the reference and the VCO, thereby minimising the phase difference between the two. As the phase difference diminishes, so the frequencies of the two signals also become closer.

Eventually the loop comes to a state where the error voltage remains steady. The error voltage is the voltage that is required to keep the VCO on the required frequency. Once it has reached this state the loop is said to be *in lock*, and a constant phase error exists between the two signals. As the phase between them is constant and not changing this means that the reference and the VCO are on *exactly* the same frequency.

The circuit that has been produced is now able to reproduce a signal on exactly the same frequency as the reference.

"What use is a circuit that is able to reproduce a signal that one already has?" one might ask! Well, by applying a little ingenuity it is possible to use the circuit in a number of ways, one of which is as an FM demodulator.

FM DEMODULATOR

As FM demodulators, PLLs are able to give a very linear characteristic with low levels of distortion converting the modulation carried as frequency variations of the signal into the audio voltage fluctuations. The way in which a PLL operates as a demodulator is quite simple. The incoming radio frequency signal from the receiver IF stage is applied to the reference input of the phase detector. When no modulation is applied the loop will be *in lock*, and if the radio is properly in tune the carrier will be in the centre of the tune range of the loop. To keep the loop in lock a certain *tune voltage* will be required and this should be at the centre of the tuning range of the VCO, allowing it to track signals up and down in frequency.

When the carrier is modulated it moves up and down in frequency in line with the audio signal. As this occurs the loop will remain in lock following the frequency variations. In doing this the tune voltage will have to vary to keep the VCO on the right frequency. As the signal movements represent the modulation, it can be seen that this is the modulation from the carrier. In other words the PLL has converted the frequency variations into voltage variations. These can be extracted from the tune line, amplified and applied to further stages of audio amplification as required.

One of the main requirements for FM demodulation is that the frequency to voltage characteristic should be very linear so that the distortion is minimised. In a PLL detector, the linearity is dependent upon the voltage to frequency characteristic of the VCO. As it is possible to make the VCO characteristic very linear, the levels of distortion from a PLL demodulator are normally very low.

FREQUENCY SYNTHESISER

Another common use for the PLL is in frequency synthesisers. Although there are other methods of synthesising signals, the method based around the PLL is by far the most commonly used. The PLL-based synthesiser, often called an indirect synthesiser, uses the loop to generate a signal that is based on the reference as we saw earlier. However, elements are added into the loop to enable it to generate other frequencies based on the refer-

and what they can do

ence. The way in which the signals are generated means that they have the same level of stability as the reference signal. As this is normally a crystal oscillator, sometimes even an oven controlled oscillator, the level of stability can be exceedingly high. A further advantage is the way that the frequency is set by digital circuits. These can be very easily linked to a microprocessor, enabling the receiver to have many facilities such as keypad frequency entry, memories, scanning, digital frequency readout, as well as being able to use a traditional tuning dial.

In its basic form a PLL regenerates a signal on the same frequency as the reference. However, the real action of the loop serves to reduce the phase difference and hence the frequency difference between the two signals entering the phase detector. This opens up many possibilities. One of these is to place a frequency divider into the loop between the VCO and the phase detector (see **Fig 4**).

To see how this affects the operation of the loop, take the example of the divider when it is set to divide by two. For the loop to remain in lock the phase difference between the two signals entering the detector must be constant. However, as the frequency of the VCO has passed through the divider this means that the VCO must run at twice the phase detector frequency to remain in lock. In other words it must be running at twice the frequency of the reference signal. Similarly if the division ratio of the divider is increased to three, the VCO must run at three times the reference frequency for lock to be maintained.

From this it can be seen that as the division ratio is altered the VCO steps in increments equal to the reference frequency, assuming that the oscillator can cover the required range. To achieve this under control of a microprocessor or other circuit, a programmable divider is used. Its division ratio can be set to the required figure to give the output frequency that is needed.

Normally the reference oscillator would run at a frequency of 1MHz or 10MHz. This would produce steps that are far too large to be of any use in most applications. As suitable oscillators do not normally run at the sorts of frequencies needed to produce the required step sizes, the easiest solution is to take the reference oscillator output and divide its frequency using a fixed divider, as shown in **Fig 5**.

To see how this might work in a real case, take the example of the requirement for a frequency synthesiser for use within a 2m receiver and where a 10MHz crystal reference oscillator is used. The receiver will need to step in increments of 25kHz, which means that the fixed divider will need to be set to 10MHz / 25kHz = 400. The receiver will need to operate over the range 144 to 146MHz. If it uses a 10.7MHz IF and the oscillator is to run on the low side of the incoming signal, this means that local oscillator will need to run over the range 133.3 to 135.3MHz. In turn this means that the range over which the divider must operate is from 133.3MHz / 25kHz to 135.3MHz / 25kHz. This means that the divider ratio must be from 5332 to 5412.

Further flexibility can be added by introducing a mixer into the loop to enable frequencies to be offset, and further loops to be added to provide a far greater levels of flexibility and performance.

With the widespread use of frequency synthesisers there are now many integrated circuits that contain virtually complete synthesisers in one chip, making them very cheap and easy to manufacture and construct.

FIG 3 © RADCOM 253

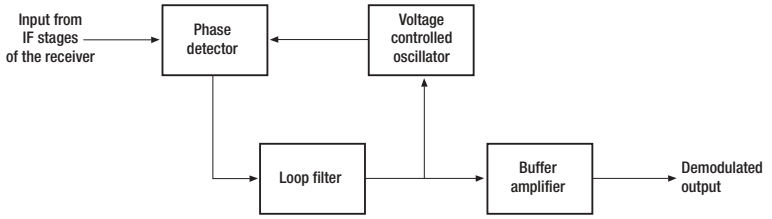


Fig 3: A PLL used as an FM demodulator.

FIG 4 © RADCOM 254

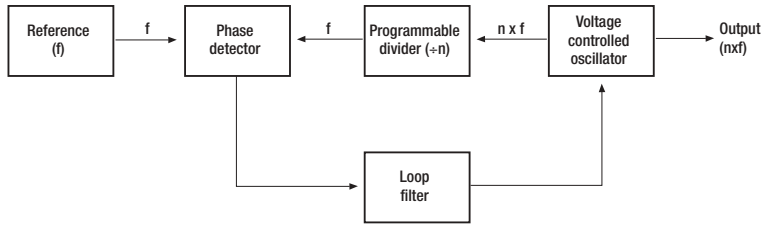


Fig 4: The basic concept of a frequency synthesiser.

FIG 5 © RADCOM 255

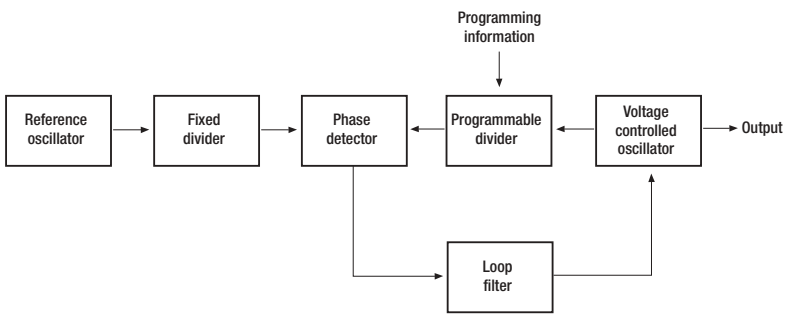


Fig 5: Adding a fixed divider to reduce the phase comparison frequency.

SUMMARY

We have come to rely on PLL and frequency synthesiser technology for many aspects of our daily life. If it were not for the frequency synthesiser many aspects of radio technology would not be possible. Digital tuning on all forms of radio from car radios to hi-fi tuners and televisions with remote controls would not be possible. Also mobile phone technology would not exist without frequency synthesisers because processor control of the tuning is required for base stations to route the mobile handsets to the correct channel. Although the PLL and the synthesiser may only appear a small element in radio technology, without them the whole face of radio and telecommunications technology today would be totally different. ♦

WEB SEARCH

Ian Poole's radio and electronics website	www.radio-electronics.com
Ian Poole's business website	www.adrio-communicatons.com

By Gordon L Adams, G3LEQ

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E-mail: g3leq@boltblue.com

RSGB Board Member Gordon Adams throws open the question: why not join the RSGB Board or Regional Council? Now is the time to start the ball rolling.

Preaching to the converted?

At the Board meeting on Saturday 17 July 2004. Left to right: David Hicks, G6IFA; Ed Taylor, G3SQX; Jeff Smith, MI0AEX (President); Peter Kirby, G0TWW (General Manager); Kath Wilson, M1CNY; Angus Annan, MM1CCR; Gordon Adams, G3LEQ; Colin Thomas, G3PSM; Liz Cabban, GW0ETU. Not in attendance: Richard Constantine, G3UGF.

In the title of this article I am making an assumption that you are a paid-up member of the RSGB. If this is not the case - then I must infer that you are *not* one of the 'converted'. Whatever the reason - these few words are directed primarily to the Membership of the Society. At the time of writing we have some 26,000 members - which amounts to roughly half of the *individual* holders of UK amateur radio licences. When compared with other radio societies world-wide this represents a very good membership proportion.

My question is not "Why did you join?" but "Would you like to serve on the RSGB's Board of Directors or on its Regional Council?" Hopefully you will have read in your August *RadCom* the highlighted announcement concerning Board and National Council elections for 2005. On page 5 of this edition you will find full details of the procedures involved.

A WORTHWHILE EXPERIENCE

I have been a member of the RSGB for 48 years and have now served on its Council and Board for some eight years out of the past 10. I have found the experience extremely worthwhile; but what is it that causes a person to become involved in voluntary committee work in the first place? All kinds of clubs and societies need volunteers if they are to continue in existence, and it goes without saying that they require healthy membership figures if such voluntary organisations are to survive.

When I joined the RSGB in 1956 we had 8102 members and the President was Reg Hammans, G2IG, so we have more than tripled our membership since then. Two people brought about my decision to take up the hobby. These were a school teacher, C Bernard Gordon, who was the Signals Officer ('Pronto') in my school's Combined Cadet Force, and William Herbert Allen MBE, G2UJ, who became a Vice-President of the Society in 1959. Bert Allen lived just around the corner from my home in Tunbridge Wells. He was also the Chairman of the West Kent Amateur Radio Society, which still meets in the town. I was lucky, as a teenager, to meet up with these two gentlemen; because my resultant involvement with the radio hobby has most certainly enriched my life. I also met Harold Robin, who lived in Tunbridge Wells. He was Chief Engineer at the high-power government radio station, known as 'Aspidistra', situated on nearby Ashdown Forest. Professionally, I was later to become employed by the government organisation that controlled 'Aspidistra'.

Your own entry into the hobby may have been totally different, but more often than not there is a mentor who gives much valued encouragement to the newcomer. The Americans refer to radio amateur mentors as 'Elmers'. Such people are altruistic - in the sense that they will often go to a considerable amount of trouble to help others to understand the skills that our hobby embodies.

One often hears radio amateurs saying, "The RSGB has done this" or "The RSGB did nothing about that!" Such comments are frequently based upon a lack of knowledge of the *facts*, and are inaccurate because the speaker is not an active participant in Society affairs! Conspicuously, 'Elmers' are rarely given to such comments. What we need in our Society management structure is a continuous flow of volunteers who are willing to make some constructive input for the good of the membership as a whole - or to assist groups of members with specialist interests.

We could all benefit from learning more about contributing to voluntary organisations such as the RSGB. If you have experience as a committee member in a club and have been a member of the RSGB for a few years, why not ask your friends if they would be willing to support your candidature for one of the Board or National Council vacancies? Obviously, your nominators must be paid-up members of the RSGB and you will require 10 of them (plus one or two more in case of a disqualification) if you would like to stand for a place on the Board.

ASK YOURSELF THIS...

- What will I have to do?
- How much time am I prepared to give?
- If something goes wrong, could I handle it?
- What training or guidance can the Society offer me?
- Will I be given the opportunity to take some initiative and indulge in lateral thinking?
- How will my confidence be built up and then maintained?
- Will my skills develop, and will they be made use of?
- Am I able to recognise my own limitations?
- Will I need support if I take on new responsibilities?
- Will I be wise enough to bow out gracefully if I get bored with what I am doing?

If you think that you can handle these concepts, contact the General Manager right away for the necessary election paperwork. Do not worry if most of your nominators are members of your local radio club: they surely are in the best position to judge your capabilities. One final point: the ability to handle e-mail has now become a *de facto* requirement if you are to communicate effectively with RSGB HQ and your colleagues. ♦

MEET THE BOARD

Saturday 25 September 2004

If Gordon's article has whetted your appetite and you have applied for papers but would like to know more about the role and the work involved in being an RSGB Board member, you are invited to meet the Board for informal discussions on the afternoon of Saturday 25 September 2004. The venue is RSGB HQ in Potters Bar. The invitation is only open to those members who have requested election papers for the Board election only. Those members considering standing in the National Council election should seek information from their Regional Manager.

WEB SEARCH

RSGB Memorandum of Association and Articles of Association
www.rsgb.org/membersonly/memandarts

The Ultimate product of 40 years accumulated RF expertise

ICOM

The new flagship model IC-7800 which is a fusion of forty years analog RF circuit development expertise, with cutting edge digital technology

Icom has been developing radio communication equipment for over forty years. Its heritage has always been based on technical excellence from the first analogue PLL circuit in the IC-200, to the ground-breaking 32-bit floating point DSP of the IC-756PRO. Recent Ham radio stations increasingly use high power and high gain antennas that raise the field strength of unintended signals, and thus require a wider receiver dynamic range. Icom has developed the new flagship model IC-7800 which is a fusion of forty years analogue RF circuit development expertise, with cutting edge digital technology. The result is 110dB dynamic range, +40dB 3rd order intercept point in HF bands and other phenomenal performance features. The receivers combine various current and new technology, to obtain the +40dBm IP3, a specification never before achieved in Ham radio. Quite simply put, the IC-7800 is the ultimate Ham radio. Nothing else comes close!

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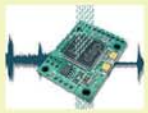

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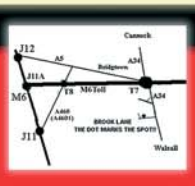

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1KW Auto ATU - 1.8-54MHz - 1-8 secs Tune - Approx SWR Rating of 10:1

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100w Auto ATU - Covers 1.8-54MHz
1-5 secs Tune - Cross needle meters

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LDG RT-11

100w Waterproof Auto ATU - 1.8-54MHz
1-5 seconds Tune

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Power rating 200w

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Alinco-IC1 Alinco Interface	£29.95
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W4RT Electronics

One-Plug-Power

One-Plug Power is the internal FT-817 battery solution you have been waiting for until now.

OPP-817
£54.95

NEW! 1800 mAh Large Capacity FT-817 Internal Battery Soluion Still use Internal 817 Charger

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One Plug Power for the FT-897 4500 mAh; Fully Compatible with the FT-897 and Yaesu Charger.

NEW!

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One-Big Punch

One BIG Punch (OBP) is a custom add-on accessory for the Yaesu MH-31 microphone commonly used with many Yaesu amateur radios

OBP
£49.95

Speech Compressor for the Yaesu MH-31 mic and FT817 FT857, FT897. Improve the TALK POWER.

Hand Mike
£57.95

W4RT Electronics Microphone with One BIG Punch Speech Compressor included.

The One BIG Punch is an AF-based speech compressor specifically configured to provide remarkable increase in talk power while maintaining good audio quality. The OBP is NOT a clipper, but a compressor providing great voice compression, high-level limiting, and noise gating. The unit can be mounted inside the MH-31, requires no additional electrical power, and can be turned on or off by using the MH-31's TONE switch.

One-Board-Filter

The One-Board Filter (OBF) affords you the opportunity to have both the Collins CW and SSB mechanical filters available in your FT-817 together!

OBF
£229.95

Replace two filters in the space of one. OBF includes the two optional filters and fitting.

Collins Mechanical Filters
for the Yaesu FT-817, 857 & 897.

500 Hz CW - £94.95 ***2.3kHz SSB - £94.95***

This is the option that many, many FT-817 owners have requested. The OBF utilizes Collins Mechanical Filters that are the same as used in the optional Yaesu filters for the FT-817. The bandwidth of the 7-pole CW filter is 500 Hz and the 10-pole SSB filter is 2.3 kHz. The One-Board Filter is NOT available for installation by FT-817 owners. This is not a "do-it-yourself" option. The One-Board Filter must be installed by RADIOWORLD, or a competent engineer . If in doubt please call for details.

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At the touch of a button, you have the carrier needed for tuning. One-Touch Tune (OTT) is totally transparent to the FT-817 and to any external equipment that you have attached to the rig.

OTT-817
£54.95

It requires no external power and works with both manual and automatic tuners.

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ATX Walk--about PL-259

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ATX Walkabout BNC	£47.95
ATX Walkabout PL259	£47.95
ATX Walkabout Universal	£54.95

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TX - 40,30,20,17,15,12, 10, 6, 2m & 70cm

Power Limits 25W PEP 10W Cont.

£127.95

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* The Miracle Whip will transmit on almost any frequency you are licensed to use including WARC, MARS/CAP, Alaska Emergency, Citizens Band, Marine, and most commercial HF SSB and VHF/UHF channels

** The Miracle Whip is optimized for for best receive rather than lowest swr on 80 and 160, as no short antenna will present good transmitting opportunities at these frequencies

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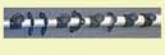
Telescopic Masts Inc Guy Rings



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YAESU

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10A DC Cable	£0.75 per Metre
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Second Hand List

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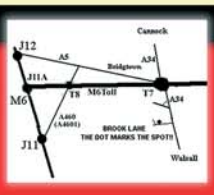

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The Dutch 'balloon foxhunt' - 12

From left
The balloon is launched from KNMI HQ in De Bilt.

The transmitters inside the protective ball.

In 2003 the balloon was found by the PA6M team from Breda: Frank, PA3DYS; Jasper, PE1MZS; Arno, PE1OET, and Theo, PE1MFP.

Every year a high-altitude experiment is carried out in the Netherlands in which a meteorological balloon carrying amateur radio beacons and transponders is launched. Many Dutch amateurs use this to perfect their DF skills, but amateurs here in the UK can also follow the balloon's progress, as Hans Buijserd, PE4HB, explains...

This radio experiment at high altitude has been held for many years in the Netherlands. In this article we want to let you know about the next Dutch 'balloon foxhunt', which will be held on 12 September. The latest news and pictures can be seen on the balloon foxhunt website (see 'Web search').

This event is organised by volunteers from the Stichting VRZA Radiokamp, a group which organises 'the Jutberg week', an annual radio camp for amateurs, SWLs and their families. Many amateurs participate in the organisation in cooperation with the Royal Dutch Meteorological Institute (KNMI) in De Bilt, near Utrecht.

The interest in this event has been growing over the last few years because of the experiments with the 80m beacon, the ATV transmitter and also, since last year, a 70cm - 2m transponder. Many amateurs from all over Europe now follow the behaviour of the balloon and its transmitters. Therefore information about the event has now been sent to many countries and the website has also been translated into English and French.

THE LAUNCH

On 12 September 2004, if possible at exactly 1100UTC, the balloon will be launched from the grounds of the KNMI headquarters in De Bilt. The launch is under the direct control of KNMI co-ordinator Richard Rothe, who facilitates us by launching the helium-filled meteorological balloon. If everything works well, after a few seconds live pictures from the balloon will appear on the PI6ATV relay and also direct on 2330MHz. All other transponders in the balloon will also be switched on.

The wind will then blow the balloon in a random direction and the foxhunt can begin.

HOW THE BALLOON FOXHUNT PROCEEDS

The 'foxhunters' have to locate the balloon using their DF equipment on 2m or 80m. They can start at any time, from any location. After the balloon has eventually landed they need to locate it as quickly as possible.

In order for the organisers to follow the balloon and the foxhunt a 'mission control' station is set up. The organisers have been fortunate to have access to the club building of the Scout group Agger Martini at Maartensdijk, PI4AMG. This group has a well-equipped building with amateur radio equipment and antennas, but other radio amateurs also cooperate by providing apparatus, cables, antennas etc.

Cars on the ground track the balloon using GPS. 2m and 70cm repeaters are used to provide information about the foxhunt and this information is also available on APRS and on the website. The Internet site also includes the frequencies of the 'fox' and other information.

Information is provided from the control station to various relay stations. These include the 70cm repeater in Hilversum, PI2NOS, on 430.125MHz and a special repeater located in the Gerbrandy Tower at IJsselstein at 350m altitude (PI3VRZ on 145.675MHz).

In addition to these frequencies it is also possible to use 80m (probably around 3700kHz) to make contact with the control station. Many amateurs from different countries use this frequency to provide reports to the control station.

TRANSMITTERS IN THE BALLOON

The balloon contains several transmitters:

- The 2m beacon on 145.450MHz. Well-known with its 'wobbling' tone which is used by most hunters to localise the position of the balloon.
- The 80m beacon on 3582kHz. During the hunt it can be heard all over Europe and it is also very suitable to locate the balloon in flight. However, after landing it cannot be used any more as the wire antenna will be lying on the ground or will be in the water. Listening amateurs also use this signal for propagation investigations and provide reports on this.
- The ATV transmitter at 2330MHz with a camera hanging below the balloon. The output frequency of this transmitter has been adjusted to the input frequency of the PI6ATV repeater in the Gerbrandy Tower at IJsselstein. Because of a small aperture of the receiving antenna at PI6ATV the pictures can only be followed for a short time via the repeater, but amateurs equipped for ATV reception can receive direct pictures during the flight using directional antennas. These pictures can also be seen on PI6ATV and perhaps other ATV relays.
- GPS positioning. The GPS equipment sends its information by sending a coded signal to one of the following cars. Here the signal is decoded and the position of the balloon is determined exactly from minute to minute. In this way the organisers are able to follow the flight and to determine the exact landing place.
- The 70cm - 2m transponder (432.550 - 145.475MHz). This experiment was installed for the first time in 2003 without any previous announcement and will be repeated in 2004. The experiment is intended to determine the behaviour of 2m and 70cm signals at very high altitude.

September

Above
ATV pictures sent from the balloon.

For ATV fanatics we will provide live reports during the day by using a direct link to the PI6ATV repeater, also situated in the Gerbrandy Tower. The balloon foxhunt website will also be provided with regular updates, webcam pictures and a direct audio stream from the 2m relay, so all the activities can be followed throughout the world.

After some time the balloon will burst and it will return to earth with a parachute. This year both the 2m and 80m beacons will be on at the same time and the the balloon can be 'hunted' using either band. However, after the balloon has come back down to earth it can only be hunted on 2m, because the 80m antenna, which consists of a 40m long wire, won't radiate when it is lying on the ground or in the water. Everyone who has a 2m or 80m DF receiver can participate in this experiment. When the hunters find the balloon they are asked to leave it in place so that others can also find it later on. All participants who arrive at the place where the balloon comes down will receive some kind of prize and everyone who arrives at the landing place will be mentioned in the final results of the hunt on the website. The day is rounded off with a meeting between the organisers and the hunters in a local pub. ♦

WEB SEARCH	
Balloon Foxhunt	www.ballonvossenjacht.nl

WIN! A High Sierra 1800/Pro mobile antenna

A High Sierra 1800/Pro mobile antenna worth over £350 can be won in our exclusive competition, courtesy of High Sierra Antennas and Waters & Stanton plc.

The High Sierra 1800/Pro mobile antenna was reviewed by Tim Seed, M0FCG, in last month's *RadCom* (see August 2004 *RadCom* pages 36 - 37). If you want to put out a big signal when operating HF mobile this is one of the best antennas about. Tim found it simplicity itself to get going on HF mobile using this antenna and if you have a suitable vehicle there's nothing to stop you from following his lead. Now one lucky member can win a High Sierra 1800/Pro mobile antenna to try HF mobile for himself.

The full rules are listed below. (Hint: re-reading Tim Seed's review in the August 2004 *RadCom* will help you with the answers!)

COMPETITION RULES

Look at the three multiple choice questions below. Write your answers on **a postcard or the back of a sealed envelope** (no letters accepted) and send to: High Sierra mobile antenna Competition, RSGB, Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JE. Entries must be received at RSGB HQ by first post on **Thursday 30 September.** You *must* be a current member of the RSGB on the closing date of the competition (30/9/04) in order to enter. The winner will be announced in the November *RadCom*.

Q1. ***What is the overall length (height) of the High Sierra 1800/Pro?***
(a) 5ft
(b) 10ft
(c) 15ft.

Q2. ***How do you change the frequency of operation of the High Sierra 1800/Pro?***
(a) By changing loading coils
(b) By remote control adjustment of the loading coil
(c) By adjusting the length of the top 'whip' section

Q3. ***What is the current price of the High Sierra 1800/Pro in the UK?***
(a) £379.95
(b) £389.95
(c) £399.95.

Only one entry per member (multiple entries will be disqualified). No other correspondence can be entered into. All entries will become the property of the RSGB and of Waters & Stanton plc. Please state on your entry if you do not wish to receive further promotional material or offers from the RSGB or Waters & Stanton. The competition is open to current RSGB members only. Employees of the RSGB and of Waters & Stanton plc are not eligible to enter.

Book review

RSGB YEARBOOK 2005
Edited by Steve White, G3ZVW
Reviewed by RSGB HQ Staff

The 2005 edition of the *RSGB Yearbook* is launched this month, and it contains the largest Information Section ever. Every page has been updated and reviewed, so readers can be assured they have all the latest information. New for the 2005 edition of the *RSGB Yearbook* is the 'Contesting Guide', your complete guide to RSGB contests from HF to microwave. You will also find features on Topband Direction Finding and the Mills Weekend. The section devoted to licensing now contains a huge list of all the Foundation, Intermediate and Advanced amateur radio courses available, plus a list of Examination Centres. IOTA receives extensive coverage, with a feature on IOTA's 40th Anniversary, information on the awards scheme, the Honour Roll and Annual Listing. The pages devoted to national and local affiliated clubs and societies have been brought right up to date, and are now listed in regional order. The reference list of equipment that has been reviewed in *RadCom* continues to grow, and the colour maps which show repeater coverage for each channel have been increased in size. To supplement the list of Postcode areas there is now a Postcode map - useful in contests for determining which direction you need to beam to pick off areas you haven't already worked. The latest bandplans are there too, from 136kHz to 76GHz, plus lists of every UK repeater in channel order and callsign order.

The Callsign listing section contains the most up-to-date information you'll find anywhere, including the names and addresses of those who have gained their licences this summer. Additionally, there are lists of licensees by surname and by Postcode area. Brand new listings for the Irish Republic are there too, plus Short Wave Listeners and Special Contest Callsigns. This section alone runs to almost 300 pages.

All-in-all the *RSGB Yearbook* is the essential book for every shack, crammed full of information.

RSGB Yearbook 2005
Edited by Steve White, G3ZVW
RSGB Publications, 2004
488 pages, A4 format (210 x 297mm)
ISBN 1-872309-98-4
Member's price £14.44 (non-members £16.99).

RSGB CALLSEEKER PLUS 2005
Reviewed by RSGB HQ Staff

Callseeker Plus is the CD-ROM version of the *RSGB Yearbook*, but with a lot more besides. It contains all the information from both the Information Directory and Callbook sections of the *RSGB Yearbook* in easily-searchable forms, *plus Eurocall*, the European callbook on CD. As well as the most up-to-date listings of United Kingdom and Republic of Ireland amateurs' callsigns, you will also find the callbooks of 18 more European countries: Austria, Belgium, Croatia, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Italy, Lithuania, Luxembourg, Poland, Spain, Sweden and Switzerland.

The *Yearbook* Information Directory pages are viewed as PDFs. To read PDFs, you need the *Acrobat Reader* program installed on your computer and this is also included as part of the *RSGB Callseeker Plus 2005* CD. You can of course also use the *Acrobat Reader* supplied to view PDFs from other sources, such as those on websites.

New for this year is the inclusion on the disc of some really useful amateur radio shareware/freeware. *WSJT* version 4.7.0 is a VHF/UHF digital communications program which decodes meteor scatter pings and signals greater than 10dB weaker than those required for conventional CW. WSJT runs with the latest version of Spectran, which provides an excellent real-time spectral display and which is also included. *Ham Radio Deluxe* supports Icom, Yaesu, Elecraft, Ten-Tec and Kenwood HF/VHF/UHF transceivers and receivers, providing integrated *DX Cluster*, customisable band layouts, scanning facilities etc. One of the best amateur radio contest logging programs, *Super Duper (SD)*, is also included on *RSGB Callseeker Plus 2005*. Finally, *MMSSTV* allows you to use your PC soundcard to transmit and receive slow-scan television (SSTV).

Callseeker Plus is ideal for every radio amateur who prefers to search for data electronically rather than look it up in a book. It is essential for those who require the callsigns and addresses of amateurs in the European countries covered. Whether or not you have the *RSGB Yearbook*, you should get a copy of *Callseeker Plus 2005* if you have a PC!

RSGB Callseeker Plus 2005
RSGB Publications, 2004
Member's price £11.89 (non-members £13.99)

HF ANTENNAS FOR ALL LOCATIONS
By Les Moxon, G6XN
Reviewed by RSGB HQ Staff

With the sad news of the recent passing of antenna guru Les Moxon, G6XN, at the age of 94 (see RadCom News May 2004, page 10), this may be an appropriate time to remind RSGB members that Les's classic work is still in print, more than 20 years after it was first published. I don't know if this is some sort of record, but there cannot be very many RSGB publications that have remained in print for so long.

I was given a copy of *HF Antennas for all Locations* as a present in 1982, and it still has pride of place on my shack bookshelf. In those days, it was a hardback book; the current publication is softback and, although the text is largely the same, it was revised, updated and had an extra chapter added in 1993. Since then, the book has been reprinted twice, in 1995 and 2002. The new chapter, by the way, covers ways of making antennas smaller, with particular emphasis on small transmitting loops. While the difficulties of putting up efficient HF antennas in small gardens were obvious even in 1993, this chapter unfortunately appears to be even more relevant today.

It was Les Moxon who popularised the use of the two-element folded beam originally designed by VK2ABQ and, thanks to his work on it, this is now often referred to as the 'Moxon Rectangle'. It was G6XN too who did much work on the use of sloping land below and in front of HF antennas to increase their gain. Both these subjects are covered in *HF Antennas for all Locations*.

When it as first published, this book was described as "an essential reference for the antenna experimenter and enthusiast". More than two decades may have passed, but that statement is as true now as it was then.

HF Antennas For All Locations
By Les Moxon, G6XN
RSGB Publications, Second edition, reprinted 2002
322 pages, 186 x 245mm
ISBN 1-872309-15-1
Member's price £16.99 (non-members £19.99).

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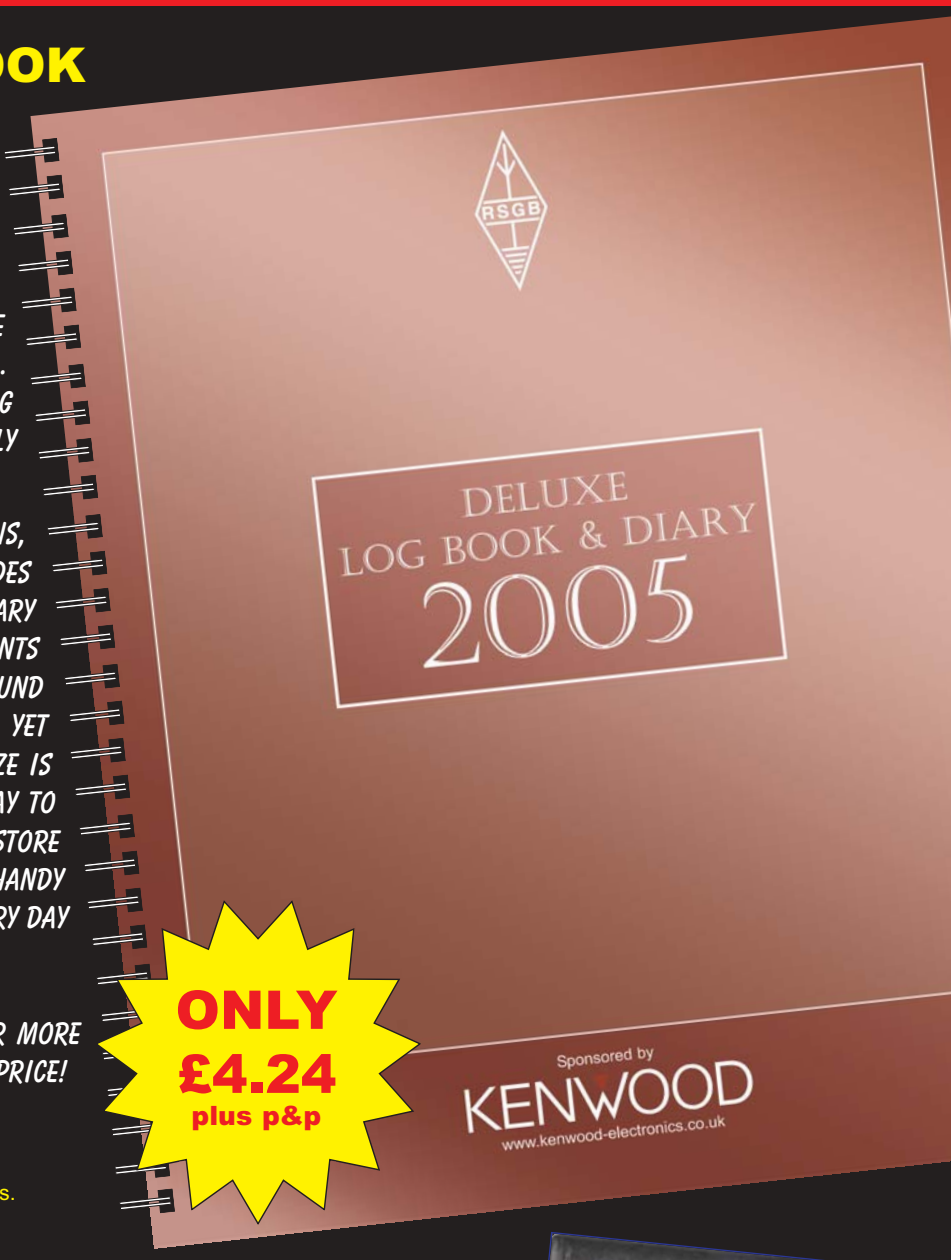

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By Steve Icke, G4ZWY

11 Church Lane, Bromyard, Herefordshire HR7 4DZ.

E-mail: g4zwy@hotmail.com

An HF linear amplifier is a major constructional project, but now Linear Amp UK has made it a little easier by bringing out a kit version of its popular Ranger 811 amplifier. However, with voltages in excess of 3kV present, building the kit should only be attempted by those with a good knowledge of electronics and RF construction techniques.

The Linear Amp UK Ranger

The kit, as it arrives from Linear Amp UK.

In March 2004, Linear Amp UK (see 'Web search') released a kit version of its popular Ranger 811H linear amplifier. Linear Amp UK has been making the Ranger for about six years now and after many requests from amateurs at home and abroad the company has finally released the amplifier in a kit form.

The Ranger 811 is a grounded grid amplifier using four of the popular 811A valves which are readily available and which make replacement a relatively cheap option at around £20.00 each. The amplifier can be used on all bands (160 to 10 metres) and will produce 700 to 800 watts output on SSB and CW with 100W drive. There is no waiting for warm up as this amplifier features an instant warm-up facility so you can use it on air straight away after switching on the mains.

SAFETY FIRST

First things first. ***As always when working with high voltages, due care and attention should be observed at all times***. Be aware that there are voltages present within the Ranger in excess of 3000 volts. You only have to get it wrong once and it will be 'good-night nurse', so it goes without saying ***if you are thinking of buying and building this amplifier you should have a good working knowledge of electronics and RF construction techniques***.

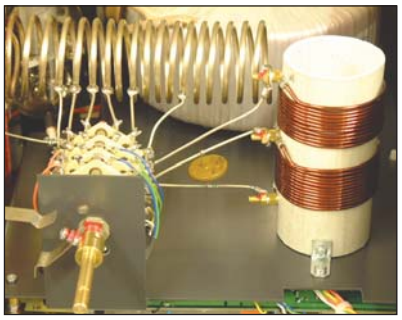
UNPACKING

The kit arrives packed inside the box that the finished amplifier will be housed in. The instructions come in the form of a suggested order of construction rather than a step-by-step guide. A list of parts is included along with pictures of the finished section, which I found very helpful and used as a constant reference. The order of construction is as follows: 1. Rear panel; 2. Valve bases; 3. Filament choke; 4. Antenna relay; 5. Switch and input board; 6. Control board and mains wiring; 7. Tune and Load capacitors; 8. Fit transformer; 9. PSU board; 10. Fan; 11. PA coils; 12. Valves and anti-parasitic choke (APC); 13. Front panel; 14. Test and calibrate; 15. Put on top and bottom covers; 16. Test on air!

All items are bagged for their relevant section and contain all parts required to complete that part of the construction, each section being finished before pressing on to the next where practicable. The total time for me to complete this project was about two and a half weeks allowing about three hours a night for construction. There is a lot to do in this amplifier and each section requires some careful deliberation before assembly (rather than going at it like a bull in a china shop and thinking later it would have been easier if I had done so and so!) Unpack the bag and plan each section as you go. Once you get going it's nice to see the thing starting to take shape and it's not half as daunting as it seems at first.

REAR PANEL

This involves fitting the 10A fuse holder, two SO239 sockets, a filtered mains socket and two phono sockets for PTT and ALC. A linking bar is used to connect the SO239s and one side of the phono connectors via capacitors to one terminal of the



Completed, with the top cover removed.

811K kit

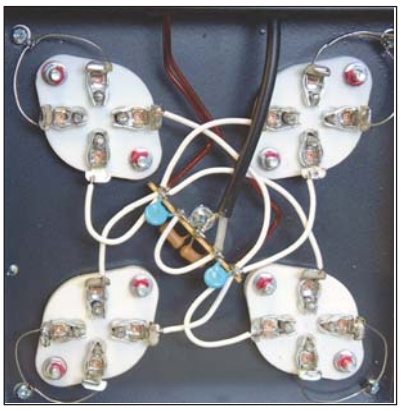
mains socket and then to earth.

Two wires are also soldered to the centre connectors of the phonos. All wires are included and also cut roughly to length. The anode choke is also fitted into the valve compartment now, and is fixed from the underside with a tag block, which is to be used later for terminating valve cables.

VALVE BASES

Fix in four ceramic valve bases and copy the wiring in the picture. Now is a good time to use the circuit diagram in the manual to check what you are doing. You will find yourself constantly checking the diagram in this project. Make sure to scratch off enough paint to ensure a good earth connection. Terminate some high temp wire with red sleeve and an HT decoupling capacitor to the bottom of the anode choke. The other leg of the HT capacitor goes to earth.

Terminate the supplied RG58 coax to the five-way tag strip along with the capacitors, again use pictures and circuit diagram to complete.



Close-up of the valve bases assembly.

Close-up of the four 811A valves in situ.

FILAMENT CHOKE

There is a supplied filament choke. It is basically two enamelled wires wrapped around a ferrite core; one end has a loop and the other ends are open circuit. At this time I suggest cutting the loop end and soldering on some ring terminals which you will find in the transformer pack. These two ends connect to the transformer later. The two free ends are routed into the valve compartment and are soldered to the five-way tag block. Easy!

ANTENNA RELAY

This pack contains a PCB and there is a diagram for mounting the components and a guide for connecting various cables. Route all cables as per the supplied picture and then fix the PCB into the chassis. Solder wires from the relay along with a 470k resistor to the respective SO239 connectors on the back panel.

SWITCH AND INPUT BOARD

This involves fitting a four-pole 12-way ceramic switch to the chassis and soldering wires onto it to connect to the input board. This board gives the correct 50Ω impedance per band when your transceiver looks into the amplifier.

The input board is made on a PCB and you have to wind a coil for each band to give 50Ω impedance. This is adjusted later by inserting a ferrite core into each coil former and setting the SWR to 1:1 on your transceiver. A diagram for winding these coils is supplied, making the task easy. My 20m coil was 1:1 SWR without any adjustment of the ferrite core, so it can't be that difficult and the others did not take much adjustment to bring the SWR down to a workable level.

Take care when fixing in the switch and make sure it is the correct way up and looks exactly the same as the one in the picture. A mistake now will be costly and hard to rectify later.

CONTROL BOARD AND MAINS WIRING

The control board PCB involves fitting three relays; quite a large amount of components and a rat's nest of wires to be routed later to various parts of the amplifier. A complete list of which wire goes where is included and makes the task relatively straightforward. Take care when routing the cables, as a squashed cable can cause some confusion when testing the amplifier for the first time, as I will explain later.

Mains cables are routed to the on / off switch and the control board from the input fuse and mains socket, which is clear in the pictures supplied. Also a tip at this stage would be to unpack the fan which is to be mounted on the rear of the amplifier and take the cable supplied and route it to the control board as this is quite difficult to do later.

TUNE AND LOAD CAPACITORS

Fit capacitor module as per diagram. Also fit slow motion drives on to the capacitor module. The slow motion drives protrude through the front panel and will be the Tune and Load controls. Take care at this stage that the front panel looks square when fitted.

Fasten the copper strip to the chassis, taking care to make a good connection. Also a short piece of wire is routed from the capacitor to the input switch. One of the coaxes that you soldered on the antenna relay board earlier is terminated on the wire with the braid to chassis via a ring terminal. Fit a 300pF capacitor to the capacitor module and a spring clip to the input switch spindle, making sure it connects when the switch is in the 160m position. Check the front panel fits again.

TRANSFORMER

This is a seriously heavy piece of kit and supplies all voltages required in the 811. The voltages are 230V, 300V, 6.75V and 12V.

There are 10 wires coming out of the transformer - a blue and brown for 240V primary input, a purple and black for 300V secondary, an orange and grey for 300V secondary, a red twin and a yellow twin for 6.75V heaters and a green and a white for 12V control.

The blue and brown connect to the blue and brown wires from the control board and mains input filter. Join the black and orange secondary wires together and then connect the purple and grey to the PSU board. Put a ring terminal on each red and yellow twin and route to the filament coil where we soldered ring terminals on earlier and join with nuts and bolts. The green and white join to the reds coming from the control board.

PSU BOARD

Make up the PCB with the capacitors, resistors and diodes supplied. Then fix into the chassis of the amplifier. Now solder on the purple and grey wires from the transformer, the white wire with red screen from the anode choke and the black wire from the control board.

FAN

This is an easy one. Just fix the fan and the safety grill to the rear of the unit with the supplied nuts and bolts and connect the wire we routed from the control board earlier. Check the direction of air flow: air blows *out* of the unit.

PA COILS

There is a pre-formed coil for 10 to 40m which connects to the input switch, the tune and load capacitors and the other end connects to the 80 to 160m coil via three connecting wires. There is also a 68pF capacitor to connect between the 80 and 160m connecting wires.

Take your time doing this part as fitting the PA coil to the input switch is quite a tricky exercise, but with time and patience it will fit.

VALVES AND ANTI PARASITIC CHOKE

This is the assembly that connects the valve anodes to the PA coils, anode filament and the Tune / Load capacitors. This involves making four coils, each with three resistors inserted, with clips on each end to connect to the valve anodes. Then solder the whole assembly to the top of the anode filament and connect the other end via a 1000pF blocking capacitor to the Tune / Load capacitors. Refer to the supplied picture for a better understanding. It's easy to make but not easy to describe!

FRONT PANEL

Fix in the two meters with a small amount of silicon bathroom sealer on the front part of the meter. Then seal all the way around the edge on the inside of the panel. Don't use too much as it will leak on to the front panel and it's very difficult to remove.

Now fit all the other switches and pots. There are also two LEDs to be fitted. Pay attention to the polarity of these and make sure they are in the right place on the panel. Terminate the mains wiring on the On / Off switch and connect all other cables as shown in the diagram. Now slide on the front panel and make sure it is square. Cut the spindles on each switch to length and put on the control knobs. Take your time here and make sure that the controls rotate freely. A little bit of oil makes the switches run better and can also be applied to the band switch to make it rotate freely.

Underside view, completed.

TEST AND CALIBRATE

According to Linear Amp UK's website they will give you back up and help you make a good working amplifier. I had to call them once or twice during the building of this amplifier and found them to be true to their word. With that in mind, now comes the time to switch on and see what happens!

After checking every connection two or three times, all seemed OK, so I switched on. The panel lights came on immediately and after about a second delay the red 'Ready' led came on. Bingo! So at this stage all looked good.

Next I pressed the standby operate switch and strangely the amplifier went straight into transmit so I quickly switched back. "It shouldn't do that", I thought, so I switched off and checked the circuit diagram to see how the switch should be wired. All checked out as per the diagram. What should happen is the PTT jack on the rear of the unit switches in an earth via the standby / operate switch. This earth is supplied by your transceiver so when you key your mic the transceiver sends a earth to the amplifier and sends it into transmit. So I connected my multimeter to the standby switch with everything disconnected and the power switched off. There seemed to be an earth connection on the switch. It transpired that I had pinched one of the wires to the switch under the switch-input board, thus earthing it and subsequently sending the amplifier into transmit. This earth connection was removed and the standby / operate switch operated correctly.

Next the input coils were adjusted for a good SWR at the transceiver and the meters were calibrated. Now was the time to try the amplifier on the air. It tuned up OK and 700 to 800 watts were measured into a dummy load on all bands. The amp on air will loaf along at the UK legal limit and showed no signs of any fault. My first contact on air was into the Bahamas with a 59+ report.

Not long after I managed to work T33C on 20m and also 7Q7MM [see RadCom July 2004 pages 45 and 42 - *Ed.*] So things are working great! Hopefully this article will give a good insight to making this amplifier and maybe inspire one or two to have a go at the kit.

The amplifier was a really enjoyable project and would be a great idea for a club station where someone with electronic and RF experience oversees club members' activities on the amp, checking things as they go. At the end of the project the club would finish up with a really nice home-constructed amplifier and club members would have gained some experience in RF/electronic construction.

The kit is available from Linear Amp UK at £695.00. The Ranger 811H is available ready built for £945.00. My thanks go to all at Linear Amp UK for their help and assistance during the building of this kit. Now, I'm off to 20m to see if there is any DX about. ♦

Completed, in all its glory!

WEB SEARCH	
Linear Amp UK	www.linamp.co.uk

LINEAR AMP UK

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Leconfield Road, Leconfield,
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RANGER 811K

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(see article on page 34/35/36)

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Reviewed by Chris Lorek, G4HCL

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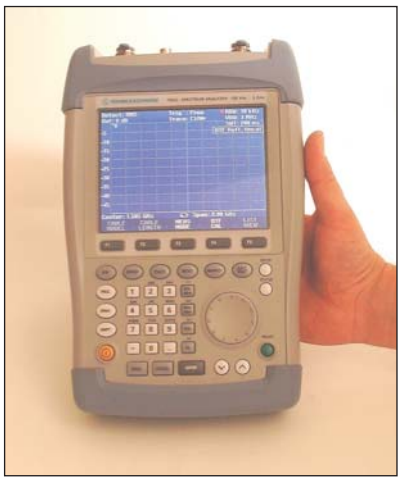
And now for something completely different, as the oft-quoted phrase goes. It's been quite a while since *RadCom* has featured an item of radio test equipment in a review, but when Chris Lorek was offered the opportunity to test a feature-packed hand-held 3GHz spectrum analyser, he jumped at the chance…

Rohde & Schwarz FSH3 hand-held spectrum analyser



The Rhode-Schwarz FSH3 is a portable self-contained unit that's oozing with plenty of RF test and measurement features. At the top of the FSH3 are four connectors; two N-types for RF input and tracking generator output, a BNC which is used for an external trigger or external high-stability frequency reference, and a multi-pin power sensor connector. A front panel numeric keyboard along with various function buttons and a rotary encoder (just like a tuning knob) are used for most functions, such as entering the frequency range and power levels you're interested in.

The upper section of the front panel features a 14cm colour LCD (Liquid Crystal Display) with a resolution of 320 x 240 pixels. As well as this giving you a graphical display of the trace you're interested in, along the bottom variable text 'tags' are used in conjunction with five push-buttons as 'soft keys'. This means, depending upon what you're measuring, the functions of these buttons can change to match what you're interested in, vastly increasing the number of functions available.

The unit covers an RF range of between 100Hz and 3GHz, and the displayed noise level, in a 100Hz measurement bandwidth, can be as low as -135dBm. Now, that's as low or even lower than even the best amateur receivers can detect! With a 1kHz bandwidth the noise level is -125dBm, again very impressive. A 3.5mm audio output socket for received AM and FM signals is provided, there's even a pair of lightweight headphones included.

Besides displaying a spectrum of received signals along with their exact levels it can of course also act as an accurate frequency counter, with a resolution down to 1Hz. Add an external 50Ω attenuator and you can measure the purity of (or lack of) signals from your transmitter, this being especially useful for two-tone tests on SSB as well as looking at harmonics and other unwanted spurii: a home-brewer's dream! The vertical scale can be set to 100dB, 50dB, 20dB or linear, with the horizontal scale start and stop frequencies to virtually whatever you want within the 100Hz to 3GHz range.

TRACKING MEASUREMENTS

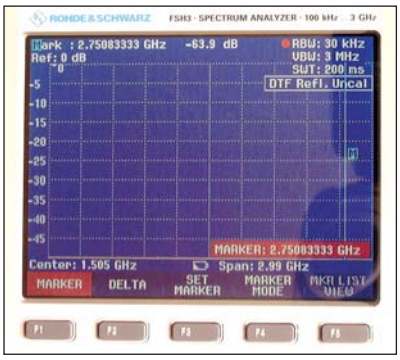
With its built-in tracking generator the unit can also be used to check accurately cables, filters, RF amplifiers and so on. I help in looking after a number of local repeaters, and this facility is invaluable in checking and adjusting the high-Q duplexers used to allow a repeater to use a single antenna for transmit and receive. It works by acting as an RF sweep generator on one port, the other port being used as an input with the FSH3 display 'tracking' the swept output. So, you just connect the filter or whatever in-line with these, and you can instantly see how it's working, or adjust the filter to the exact response you need, and so on. It's also useful if you're experiencing interference, in seeing if the filter is lacking in cut-off across a given frequency range.

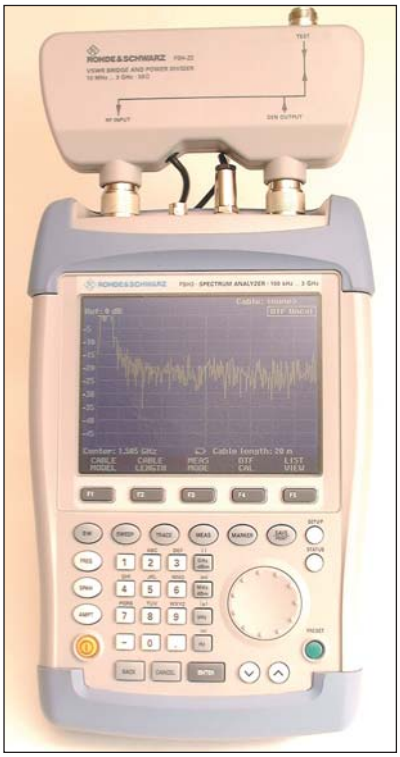
ACCESSORIES

As well as acting as a spectrum analyser and tracking generator, the unit can also be fitted with an optional VSWR bridge and power divider unit, this plugging into the top connections of the FSH3. An optional power sensor can also be plugged in for very accurate RF power measurements, with 8GHz and 18GHz versions being available. Other options include a directional power sensor, an active directional antenna for field-strength measurements, and a padded carrying case which can also store the unit's various accessories. The FSH3 is powered by an internal rechargeable battery pack and a plug-in mains charger / power supply is also supplied with the unit. An optional 12V car adapter is available as well as spare or replacement battery packs.

LATEST FIRMWARE

Recently released for the FSH3 is their version 6.2 firmware, which adds new features like Smith chart and single port cable loss measurement. This wasn't installed on the review sample, but I've used a Smith chart facility on an analyser for some time, finding it absolutely invaluable for antenna work and experimentation. This new facility on the FSH3 allows you to see the precise magnitude and phase of a vector reflection measurement of your antenna impedance - something I could only manage to do in the past using a bench-top network analyser, of around the size and weight of a large mains-operated amateur HF base station transceiver. Also, just in case 3GHz isn't high enough for you, R & S have also just launched a 6GHz model, the FSH6 with otherwise similar measurement capabilities. [Rohde & Schwarz have just





Top:
Showing the four connectors at the top of the unit: two N-types, a BNC and the multi-pin power sensor connector.

Left:
The clear 14cm LCD screen and, underneath, the five soft function keys.

Below right:
The power sensor.

announced the release of firmware version 7.0 which provides even more features - *Ed.*]

IN USE

Illustrations can possibly be deceptive, until you add something like a human hand in the photo. At 270 x 170 x 120mm and weighing 2.5kg, my first impression was that that I'd describe the FSH3 as a chunky size for a 'hand-held' unit. I found it rather easier to carry by using the moulded-in handle at the top of the unit, but even so it was very portable indeed.

Adding the optional VSWR bridge extends the unit's capabilities to single-port measurements, this was supplied with the review unit. Using this in its simplest mode lets you see the VSWR of an antenna to check for any problems. But what's even more useful is a 'distance to fault' capability. Here, I could select from an on-screen list of various coax cable types, enter an approximate overall cable length (or, as I found in practice, one around 10 - 20% longer, 'to be on the safe side'), connect the FSH3 to the end of the coax and get an instant graphical display of what the cable is doing in terms of return loss along its length. So, if your antenna has developed a fault somewhere, you can quickly see whether it's the antenna itself, or a 'kink' or other damage along the length of the coax, and most importantly at exactly what point along its entire length the problem lies.

Some time ago, I had a problem with the performance of an HF dipole. The problem was, it was on a fixed mast rather than a tilt-over type, and after much work at ground level I eventually had to don my safety climbing gear to get up there to investigate, lowering the antenna to ground level to perform further measurements with mains-powered test gear. It eventually transpired that it was the balun at fault, but you can probably now guess that if I had the use of something like the FSH3 the job would have been made considerably easier!

The sheer portability aspect of the unit allowed me to take it to locations where I often would have had problems. Like in the middle of a field for contest-day use, or up in my loft for fine-tuning my small array of loft-mounted antennas including compact HF loops with which I'm currently experimenting. I found the internal battery pack would always give me several hours of continuous use, although various 'power down' settings are included to save the battery life, for example if you forget to switch off the unit. The display was very readable indeed except when in very bright direct sunlight. The upper handle moulding was, however, quite useful for hanging the analyser on whatever was handy, such as the top of a ladder. For shack use, I found that a fold-out stand positioned the unit very nicely for desk-top use.

With each FSH3 comes a copy of 'FSH View' on CD-ROM. Using the provided RS-232 lead complete with in-line opto-isolator, this software lets you transfer measurement data between the FSH3 and for your PC to download the various traces from the analyser. Graphical data can be stored in the common formats of .bmp, .pcx, .png and .wmf, and the software also allows continuous transfer of sweeps to your PC. There's also a 'cable editor' so you can use this for the distance-to-fault analysis for custom cable types. The FSH3 has its own internal memory for storage, with 100 memories available for traces and setups, but I found the software was very useful for obtaining printouts or just archiving the plots I took to a PC hard drive or CD for future reference. The CD also provides plenty of information on the FSH3, although a small printed 'quick start' manual is also provided with the unit.

CONCLUSIONS

So, how much is one of these going to cost you? Well, depending upon options, in the region of £5000. A bench-top version is also available at around £3500. A number of years ago, a bench-top unit of a similar specification would have been 10 times this price: I know this because my employers bought one! Being an RF - and particularly antenna - experimenter, I found the FSH3 invaluable throughout the review period in testing and 'fine-tuning' various systems both at my home shack and out at my local and not-so-local repeater sites. Readers who are owners and maintainers of professional radio systems as well as being in the hobby of amateur radio will need no persuading as to the usefulness of such a handy portable piece of test gear.

Our thanks go to Rohde & Schwarz (UK) Ltd in Fleet, Hampshire, tel: 01252 818888, for the loan of the equipment for review. ♦

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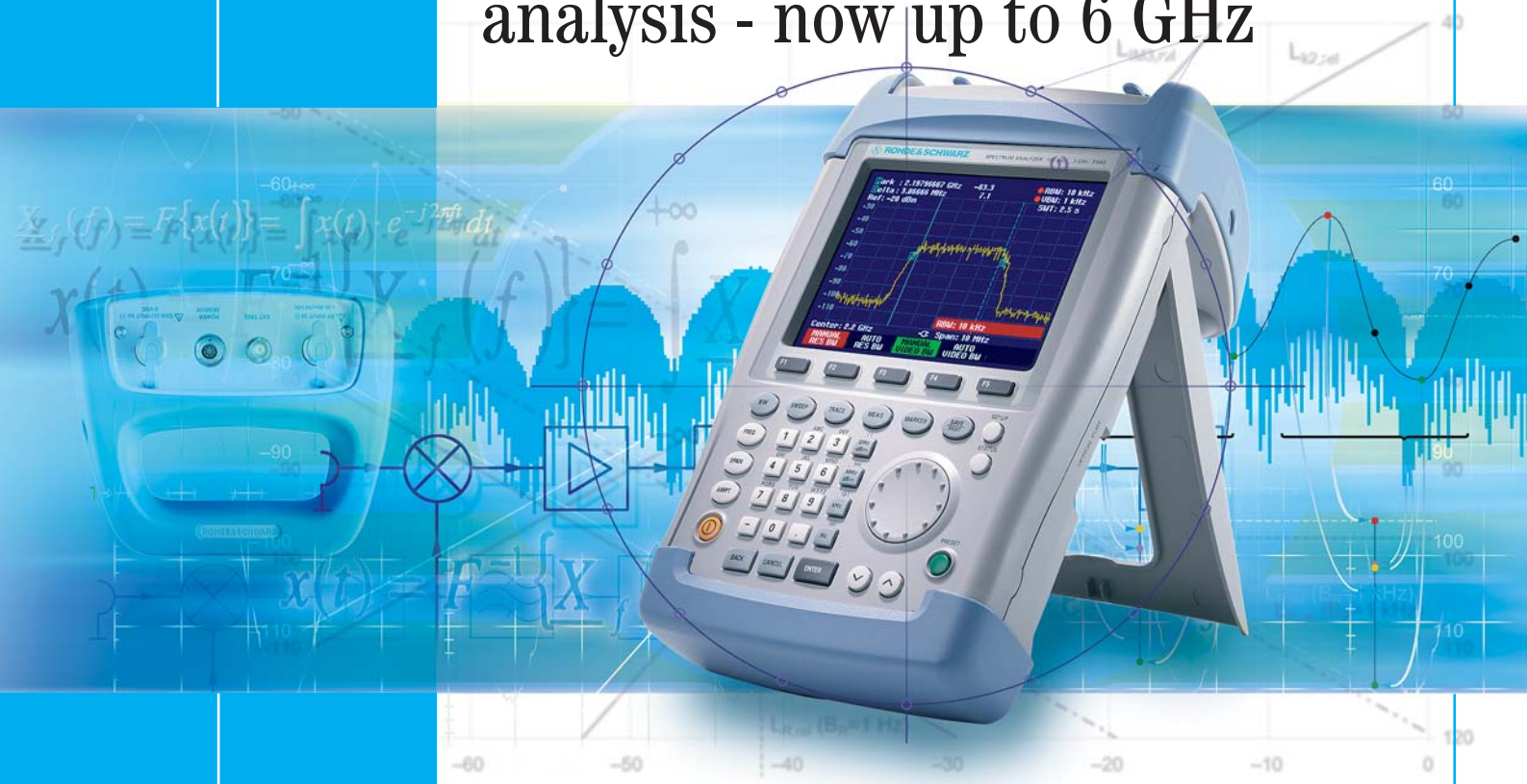

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The secrets of a

What makes a radio club a success? Why is it standing-room only at some clubs yet others complain that no-one has any interest in attending meetings these days and they hardly have enough members to even form a committee? What are the secrets for running a successful club? The *RadCom* Editor asked three clubs to reveal just what it is that makes their club go from strength to strength.

CHELMSFORD AMATEUR RADIO SOCIETY

With some 120 paid-up members on the books and most monthly meetings attended by between 50 and 70 people, something must appeal. A club newsletter, generally a four-page issue, carries news of the next meeting, a fairly full report of the past meeting's talk, short items submitted by readers, details of club nets, contests and other activities, contact details for new members and visitors, and an 'items for sale or wanted' column. The week before each meeting it is distributed to some 80 members by e-mail as a .pdf and to the rest by post.

We try to maintain a strong radio interest in our talks and in Chelmsford we are fortunate that amongst our members we have a number of professional engineers from companies such as Marconi and Cromptons, as well as from technical branches of the former General Post Office, the armed services and government ministries. Many of these members are prepared to give talks, they also know others who will speak to us on radio-related topics. To ensure the talks are audible to the 50- to 70-strong audience the club has a PA system which provides good sound via both stand and dual-channel radio microphones.

We are fortunate in having an excellent meeting place which has a good bar and other facilities. We do not charge an entry fee to meetings but sell raffle tickets, the proceeds of which help to offset the room rent. Money-raising activities are held throughout the year which help with funds. One is the Canvey rally, where donated equipment is sold off at modest cost. Another is an annual electronics table-top sale where table rents and a small percentage of sales profits make a contribution to funds. As a result of these activities we are able to limit our annual membership fee to £10.

The committee meets once a month to organise meetings and other activities and allocate funds. Planning future meetings is an important factor and plans are usually in hand for at least nine months. The committee comprises a president, two vice-presidents, chairman, vice-chairman and some 11 others who carry out the functions of secretary, treasurer, newsletter editor and training. We have a very busy and renowned training team which has been running courses every Thursday since January 2002 with just the month of August off for a well-deserved break. Some superb training material has been developed and is available on our website as well as on a CD compiled by Trevor, M5AKA. The CD has been sent to many other clubs, both here and abroad, to help with their training activities.

The Chelmsford Amateur Radio Society raffle raises much-needed funds.

The Chelmsford Amateur Radio Society contest group on top of the local hill.

Some other benefits of club membership include a range of test and radio equipment that may be borrowed and a well-stocked library with a wide range of technical books at all levels, most of which are illustrated on our website.

We try to extend a warm welcome to visitors and new members. Our excellent chairman and webmaster John Bowen, G8DET, always points out all the committee members for the benefit of newcomers at the start of each meeting.

The club takes part in a number of special events, the main one being International Marconi Day in association with the Chelmsford Science and Industry Museum. A strong Marconi element exists at the museum and our station is set up inside the now preserved wooden hut once used for the 2MT broadcasting experiments in the nearby village of Writtle. With the help of the keeper, Dr Geoff Bowles, we establish stations at the museum during the summer using the callsign G0MWT (from Marconi's Wireless Telegraph Co) and these always generate considerable interest among the museum visitors.

Our activities are advertised as widely as possible. Publicity manager Trevor, M5AKA, makes sure all the main radio publications are kept informed of dates, times and contact names and numbers. A monthly report is sent regularly to the local newspaper, reporting on the last month's meeting and what is in store for the next month and articles on amateur radio are put in local community newsletters.

Colin Page, G0TRM

STEVENAGE & DISTRICT AMATEUR RADIO SOCIETY

The Stevenage and District Amateur Radio Society (G3SAD, M3S) was established in 1956 and two of the original founder members Vic, G3FAU, and Frank, G3OVT, are still stalwart honorary members. The success of any radio club must depend on a diverse membership along with all those who have the necessary skills and experience to pass on to others.

The club has moved premises a few times but is now settled in a very nice location of which that some clubs would be very envious. It includes a 60ft mast that was passed on from Handy Hams, through Peter Daley, G0GTE, when the club went silent.

Society membership has always been good and is in no danger of demise. We always aim to give people a service, particularly those interested

Still going strong: founder members of the Stevenage & DARS, Frank, G3OVT, and Vic, G3FAU.

successful club

in becoming radio amateurs. We are proud of the fact that since the inauguration of the new licensing structure we have swelled the ranks to the tune of 77 M3s and six 2E0s and we are now planning more courses.

The main strength of the club is its membership and, in particular the committee, who must be competent and energetic enough to push the members at all times and make the correct decisions on their behalf. A good contest group is also required to organise things and get the results and recognition for their efforts.

A forecast of events and a website help considerably to advertise the club. Participation in non-amateur radio related public events, ie school fairs, county shows etc, also provides an excellent means of 'free advertising'. Our main annual public events are the Baldock Victorian Fair, and the Bedfordshire Steam and Country Fair (GB0BSR) held at the Shuttleworth Collection, Old Warden, every September, which has an attendance in excess of 30,000 visitors. As this is a major event we are supported by our sister club, the Shefford and District ARS. A short anecdote to show the power of advertising is that two of our retired members, M0XJP and M0JMC, saw what the club had to offer at a public event and duly applied for their licences, having passed the RAE in 1963 and 1967 respectively, but never having taken up the hobby. Needless to say the licensing authority was surprised to receive pass certificates dated 30 or 40 years earlier!

Recognition of individuals who have done more than expected is a nice touch at the AGM and the awards are always welcomed. Societies and clubs survive through self-funding and we are no different, taking every opportunity to attend rallies in the local area, to dispose of equipment to fund the running of the club. We have recently replaced our old equipment with new, including the replacement of antennas and coax, which will hopefully also improve our future results in the contests we participate in.

As for the future, the club is looking into the possibility of hosting a major rally in the spring of next year and the possibility of running an Advanced licence course to complement the already successful Foundation and Intermediate courses. We also intend to improve upon our commitment to the permanent amateur station at Twinwoods, from where Glen Miller's last flight took off. Perhaps this could be another article?!

Ken Blanshard, M0KPB, and Dave Humphries, G4ETG

PHOTO BY MATTHEW WILSON G8XIT

Peter Head, G4LKW, setting up GB8SL at Shoreham Lighthouse during the Lighthouses on the Air weekend in August 2003.

WORTHING AND DISTRICT RADIO CLUB

Maintaining a successful radio club has a lot in common with running a successful business. To be successful a business has constantly to provide its customers with the right product or service at the right price. It needs to keep up with changing customer expectations and at the same time deliver a profit to its shareholders. World class businesses seek to exceed customer expectations. Club customers are also its shareholders so in many ways that makes it easier, or does it?

At the Worthing and District Radio Club our chairman supported by our president and assisted by our committee constantly seek member's views and opinions in an open forum on club nights. They also use the club magazine *Ragchew* and the club newsgroup and website to get input. Everyone encourages open discussion, there is light-hearted banter and leg-pulling and no-one is afraid to ask questions. Two members represent us regularly at meetings of other local clubs to exchange best practice, share news and avoid event conflict.

Just like a business a club also needs to be constantly reviewing its 'product' and to be ready to innovate and try new ideas even if they fail. For example when CW was removed as an HF licensing condition we wrote to all Class Bs in our postcode area to give them the good news and invite them to attend a club night, with the 'carrot' of no entry charge and a free tea. Our membership has increased 30% since that time and now stands at 120.

Another innovation is the night when members bring along examples of their other hobbies. This seems to have gone down particularly well. When Cyril, G3YY, sadly became a silent key we were lucky to have the focus of setting up and running a radio station and museum at Newhaven Fort. Cyril was an Interceptor during WWII and his collection of equipment is now proudly on display. This entailed 15 months of regular work by a team of enthusiastic club members which has helped provide a focus and a common bond [see 'RadCom News' April 2004 p10 - *Ed.*]

Of course we do all the usual things: take part in contests, hold special event stations, have junk sales, collect for charity, have a DF hunt, a quiz night, a barbeque evening, a club dinner and a Christmas party. We also provide licence training, have annual awards and a call book. We meet every Wednesday, so it's not easy to fill every night with a speaker, but generally we manage two a month with guests, one talk by a member and one evening on a discussion subject. Our stalwart secretary Peter, G8MSQ, never fails to write to thank speakers and of course we offer out-of-pocket expenses which are rarely taken up. Subjects are not all radio, but do tend to have either technical content or perhaps a historic or local link.

This vast workload is shared so hopefully nothing becomes too onerous. For example one member is webmaster, another hosts the server and another edits *Ragchew*, another produces and collates it and another issues press releases while yet another takes the membership enquiry calls. We try to keep the media and the local authority informed of what we are doing and never miss the opportunity to blow our own trumpet. Our meeting location is easy to find, is central to our catchment area and there is plenty of easy parking.

Our decision taken many years ago to have a relatively low annual subscription and a weekly door charge was a gamble which has paid off. Together with prudent management which endeavours to run every event without loss has resulted in a thriving club with a very healthy balance sheet. We don't know all the answers but we certainly know how to ask ourselves the questions! We also have a very committed and popular chairman in Eddie, G0ECW.

If you are in Sussex on a Wednesday evening come and join us at Lancing Parish Hall, 8.00pm or take a look at our website.

Jim Hicks, MBE IEng FIIE, G4XRU

WEB SEARCH

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TT

This month: is your double balanced mixer really balanced? ♦ How to 'ghost' power for preamps etc up your coaxial feeder ♦ The N2PK Vector Network Analyser ♦ The N2PK power / SWR meter ♦ VLF tuning with power MOSFETs ♦ Amateur radio's Grim Reaper at work

'UNBALANCED' DOUBLE-BALANCED MIXERS

An important condition for achieving maximum performance from double-balanced switching mixers/modulators is to control the switches with signals having a phase difference of exactly 180° and with a duty cycle of 50% although, in practice, there is often some divergence from these ideal conditions.

VK2EMU has been prompted to put fingers to keyboard by Fig 2 (p46) of the June 'TT', showing the basic configuration of the ZS6BZP switched mixer-demodulator using 74HC4066 analogue switches fed by inverting the input signal using a 74HC04 gate. He writes: "This arrangement is similar to a number of other switching mixers/modulators that have appeared in recent years in 'TT' and elsewhere. Such an arrangement is inherently unbalanced!

"Last year, as part of the 'Radio Homebrew and Experimenter's Group' of the New South Wales Division of the Wireless Institute of Australia (WIA), I produced a prototype SSB exciter board. The intention was that this could be used with different [ladder] filter crystals and different local oscillators to put the signal onto the desired band.

"Version 1 had a crystal filter using four 4.433MHz [PAL] crystals and a local oscillator made using a 8.000MHz crystal to produce a LSB signal on 3.567MHz. The mixer used 74HC4066 analogue switches, with the inverted signal produced by a 74HC04 gate. The board worked OK and produced a nice SSB signal at the milliwatt level. Once the exciter was working, the homebrewer could use it as either a single frequency unit, or replace the 8MHz crystal with an external VFO, DDS or PLL synthesiser etc.

"The audio to the DSB balanced mixer used a standard 3k-3k centre-tapped mini audio-transformer on the audio side, with a trifilar-wound toroid on the RF output side and a 74HC4066 switcher. The mixer after the crystal filter was made up of a pair of trifilar-wound toroids and a 74HC4066 switcher.

"While testing the board, I used a high-speed two-channel CRO to look at the signals controlling the 74HC4066s. I noticed that there was a 6ns delay across the inverters, so that the input signals to the mixer were 6ns out of phase with each other. The 8.000MHz signal has a period of 125ns, so a 6ns phase error equates to 5% or 18°! The switching was decidedly unbalanced!

"Further, I looked very carefully at the input signal and could not tell for sure whether the input to the mixers had a true 50% duty cycle. While I have done no calculations, there would have to be some effect on the balanced output of the mixer.

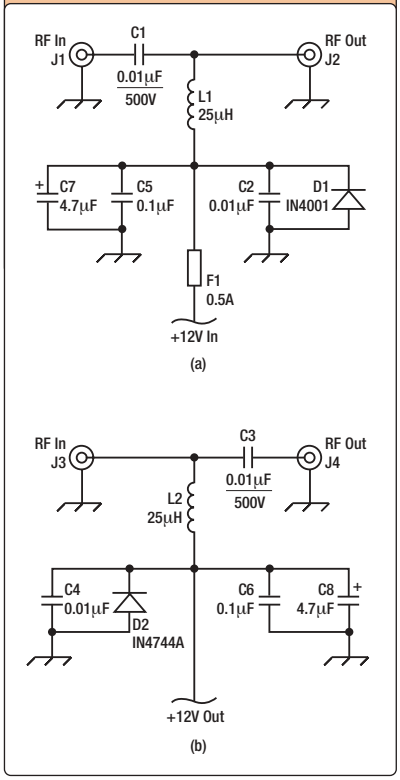
"Version 2 was similar to version 1, but the carrier injection oscillator and VFO oscillator ran at twice the required frequency. The carrier injection oscillator was an 8.8666MHz crystal, while the VFO was a 16.000MHz crystal. Both these signals were fed to 74HC74 flip-flops used as a divide-by-two to produce 4.433MHz and 8.000MHz. In both cases, the outputs had a true 50% duty cycle. There was still a measurable time delay between the Q and $\overline{Q}$ output from the 74HC74 divide-by-two, but approximately 1.5ns, only a quarter the delay of the straight inverter.

"An idea I was considering, but didn't have time to pursue, was to use a 74HC4053, which is an analogue A/B switch. This would remove the need for the use of $\overline{Q}$ output from the 74HC74 divide-by-two, but the flip-flops would still be used to obtain the required 50% duty cycle.

Fig 1
Remote feeding of DC power over a coaxial cable transmission line as described by AD5X in QST. (a) DC injection (send) module used to inject the DC power. (b) DC recovery module used to extract the DC power from the coaxial line. C1 – C4, 10nF 500V disc ceramic capacitor; C5, C6, 100nF 50V capacitor; C7, C8, 4.7µF 35V electrolytic; D1, 1N4001 diode; D2, 1N4744A 15V Zener diode; F1, 0.5A fuse; L1, L2 25µH RF choke.

Fig 2
The Icom IC-706 tune / 12V interface due to AD5X.

FIG 1 © RADCOM 233



"Other personal events – the death of my mother and the birth of my daughter – have meant that work on this project has not advanced since the above tests. However, I am presenting these ideas to 'TT' readers so that others may consider some work on them as part of the advancement of our hobby."

DC POWER OVER COAX FEEDERS

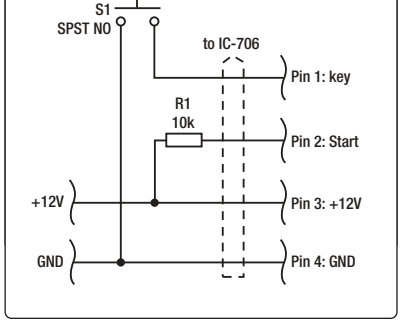
For many years, it has been common practice in TV reception to feed DC power to mast-head amplifiers or satellite down-converters over the coaxial feeder cable; the use of this technique for amateur radio applications has been discussed before in 'TT'. However, an article by Phil Salas, AD5X (*QST*, July 2004) is a reminder that this system is useful for such applications as remote operation of modern auto-tuners and antenna switching relays for those "tired of running separate DC cables out to your tuner or antenna relay".

AD5X discusses in some detail a system protected by fuses and Zener diodes (although little can be done to protect any such system against lightning strikes or near-strikes). **Fig 1** shows the circuit diagrams of (a) the DC injection and (b) the DC recovery modules. For L1 and L2, AD5X used 100µH inductors, but modified them to 25µH by unwinding half the turns, going from 50 turns in two layers to 25 turns single-layer. The original 100µH inductors were series-resonant at 11MHz. He provides details of the construction, weatherproofing, fixing etc of these modules, and also **Fig 2**, an interface for the Icom IC-706 tuner.

COMPUTERS FOR DESIGN & TEST

The use of computers as design tools has a long and still-evolving history. I recall that it was in the 1960s that I

FIG 2 © RADCOM 234



went to Tewkesbury for the official opening by Racal of what was claimed to be the UK's first computer-aided-design (CAD) facility. Then, for amateurs, a major breakthrough was the release in 1982 of *MININEC* (written in 1980 by John Rockway and James Logan). *MININEC* had severe limitations, but opened the way for further advances (see 'Advances in *MININEC*', 'TT', January 1996) with *EL-NEC*, *EZNEC* and *MN-PRO* in the early 1990s. The *EZNEC* program developed by Roy Lewallen, W7EL, from the professional *NEC2* engine remains a well-tried and tested software for the simulation of antenna performance in the amateur environment.

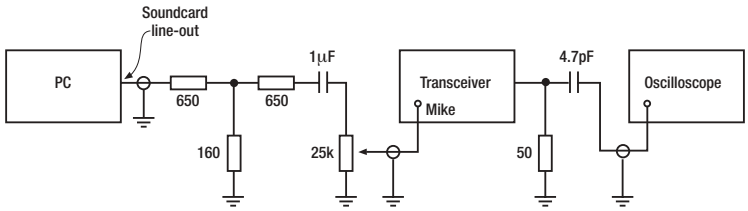
But computers can also form the heart of test instruments presenting the characteristics of actual rather than simulated devices. Jorge Dorvier, EA4EO, has pointed out that, with appropriate software, the sound card of a PC can generate a useful double-tone for testing SSB drivers and amplifiers. He uses what he claims is popular sound software, *Cool Edit 2000*, a program which has in its toolbar, under 'Generate', a file - DTMF SIGNALS - that includes a virtual telephone dial. With this it possible to generate the standard tones of the telephone dial or select the commonly-used tones of analogue two-tone generators such as 670/1000Hz, 700/1900Hz or 800/2000Hz. While I would not recommend the purchase of this software specifically for this application (it would make an expensive two-tone generator!), it seems likely that suitable tones can be generated from other soundcard software that may already be installed. **Fig 3** shows the equipment and components needed to interface the equipment at the correct signal levels.

Just in case you already have *Cool Edit 2000*, the procedure would be as follows: Click 'Generate', Click 'DTMF signals', Select 'Mono', 44100Hz and 16 bits, Click 'OK', Click 'Custom', Click in the vertical and horizontal frequencies in Hertz, Click 'OK'. Note

Fig 3
How EA4EO connects the sound card line-output of his laptop computer to his transceiver and oscilloscope for two-tone linearity testing.

Fig 4
Block diagram of the N2PK vector network analyser (VNA). DUT - Device Under Test connections.

FIG 3 © RADCOM 235



that the waveform shown on the PC's VDU will look odd, but don't worry.

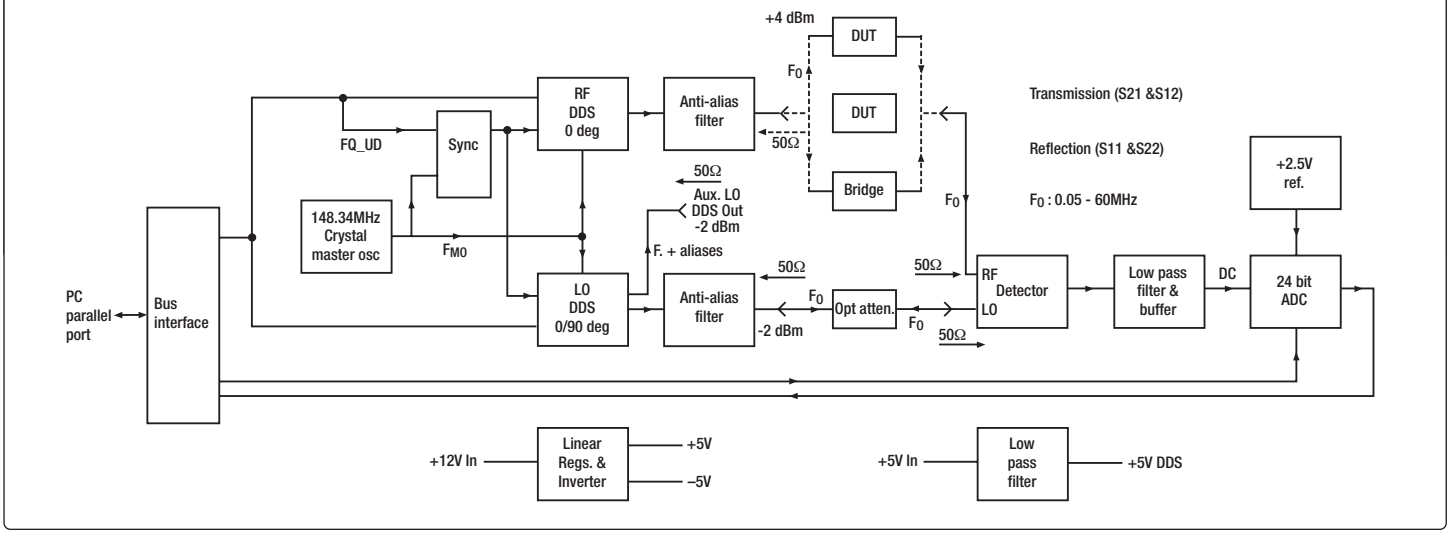
A PC can also be used to form the basis of a far more versatile design tool. Dr Ian White, G3SEK, has drawn attention to the 'Vector Network Analyzer' for home construction, announced on the web in late 2003 by Paul Kiciak, N2PK, following successful implementation by N2PK and leading receiver designers Harold Johnson, W4ZCB, Bill Carver, W7AAZ, and 'In Practice' columnist, G3SEK. Since the initial announcement, this project has been endorsed by others, and it is understood that it is now available to build or buy. Unlike the antenna *NEC* software, this provides an instrument that directly provides Smith Charts, etc from a device under test (DUT). But remember, this is an advanced network analyser that is intended to appeal to amateurs with a good understanding of radio design engineering. For these it can provide virtually the performance of a laboratory-grade vector analyser costing thousands of pounds. As G3SEK puts it: "All on a single PC board about the size of a playing-card".

He adds: "This VNA is a large step beyond commercial 'antenna analysers' and R-X impedance bridges. By a very clever combination of RF design, PC software and sheer meticulous persistence, N2PK has achieved close to the performance of a laboratory-grade instrument, and all on a single PC board about the size of a playing-card. It can do practically anything from broadband sweeps covering 50kHz to 60MHz, down to narrow sweeps that will measure the motional parameters of a single crystal (with Direct Digital Synthesis, the ultimate frequency resolution can be a small fraction of a hertz). With appropriate accessories, the VNA will measure either transmission parameters or impedances. Being a vector instrument, it always gives you both amplitude and phase, or R and X, or any other format that can be calculated from those. It will also measure parameters such as the group delay of filters, and with care it can measure filter stop-band responses down to -110dB or better (if the filter itself is up to it)."

N2PK's Amateur Radio Projects Page – www.qsl.net/n2pk – shows that his Vector Network Analyzer (VNA) is "a home brew VNA capable of both transmission and reflection measurements from 0.05 to 60MHz, with about 0.035Hz frequency resolution and over 110dB of dynamic range. Its transmission measurement capabilities include gain/loss, magnitude, phase and group delay." He provides examples of Smith Charts (impedance plots) of his 14MHz attic dipole, of a 14MHz bandpass filter and a nominal 9MHz quarts crystal. Also, there are gain/phase plots of a 3.758MHz SSB crystal filter, a passband gain/group delay plot of a 3.758MHz SSB crystal filter, and gain/phase plot of an 3.5MHz bandpass filter with AM broadcast-band rejection.

Clearly, this is a project for the serious and experienced experimenter, and home construction of the board with its SMC devices etc is not to be

FIG 4 © RADCOM 236



tackled lightly. As G3SEK puts it: "It wasn't easy with all that SMD, but it *was* possible. The absolute essentials were a good magnifier (and sometimes a handheld magnifying glass as well), a temperature-controlled soldering iron with a fine tip (I used my old Weller TCP, but with a new tip), fine silver-bearing solder, a reel of 3mm desolder braid, a spray can of flux solvent and patience. By 'absolute essentials' I mean just that: unless you kit yourself out with *all* of those facilities, you will fail! The PC board is available at very reasonable cost and, frankly, it would be senseless to attempt to make your own. The DDS and ADC chips were the hardest to mount, with their very fine lead pitch…"

Although there is no intention of publishing the full information that can be found on the web in any magazine, N2PK has given permission for extracts and diagrams to be published in 'TT'. There is space here for just the block diagram: **Fig 4.** I must emphasis that I have no idea of what the total costs would be in building or buying this project. Because of the commercial implications, I have hesitated for several months in drawing attention to N2PK's work until its value (at least to those with professional laboratory design experience) has been endorsed by more than one source.

N2PK's POWER/SWR METER

Steve Hunt, G3TXQ, has drawn attention to another design described by Paul Kiciak, N2PK, on the website – users.adelphia.net/~n2pk/ This uses two AD8307 logarithmic amplifier chips that accurately indicate the SWR with any power between 100µW and 400W and also provides forward power indication. G3TXQ, who had previously developed a basically similar unit (**Fig 5**) has now built the N2PK unit with just a few modifications to the directional coupler. He reports being really impressed with the results. He would be happy to let any reader know what changes he made to Paul's design: (G3TXQ's telephone number is 01604 858 090 or e-mail steve@karinva.net). He writes: "On SSB the meter hardly changes despite the massive fluctuation in output power, and there is even sufficient power in the suppressed carrier to operate it! Imagine the improvement in QRM if everyone tuned up at the 100µW level!"

VLF/LF TUNING WITH POWER MOSFETS

'TT' December 2003, pp71/2, reported (*inter alia*) the use, by Dr F H Raab, WA1WLW, and David Ruppe of the Green Mountain Radio Research Company, of a bank of 12 series-parallel connected high-voltage MOSFETs (such as APT ARF446/7 and APT10050) to form the output filter tuning capacitance of his 100W frequency-agile 5–21MHz Class-D power amplifier. With a voltage range of some 500V, the capacitance range was from 1000 to 500pF – see Fig 5 on p72 of the December 2003 *RadCom*).

A simpler, but apparently effective, means of using an L370N power MOSFET as an tuning varactor is described by Robert Blick of Calgary, Alberta, Canada in the 'Circuit Ideas' feature of *Electronics World,* July 2004, p46: **Fig 6**. The Hartley oscillator with its tank circuit comprising a 32mH ferrite core inductor or transformer is tuned from about 15kHz up to 30kHz using a single L3705N power MOSFET. This device provides a C_{oss} of some 3500pF with a V_{DS} voltage of 1V to about 700pF with 40V. Output voltage is between about 1.8 and 2V peak-to-peak. It is claimed that the output voltage is controllable from 0 to 5Vp-p by means of the 10k potentiometer. Sine-wave distortion is a concern, of course, especially when the V_{DS} of the power MOSFET approaches 0V and with larger oscillator output voltage swings. Be sure to use a low-leakage capacitor to connect the drain of the power MOSFET to the inductor. Ceramic capacitors gave complications. Distortion can be reduced by making the N1:N2 turns ratio greater (say 3:1) and using a higher-value resistor to bias the drain voltage of the power MOSFET. The source resistance of the small-signal FET also affects output voltage swing.

FIG 5 © RADCOM 237

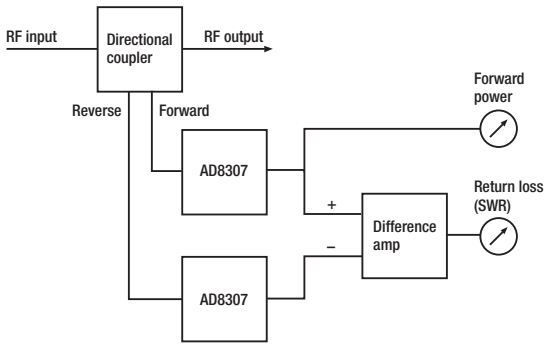


FIG 6 © RADCOM 238

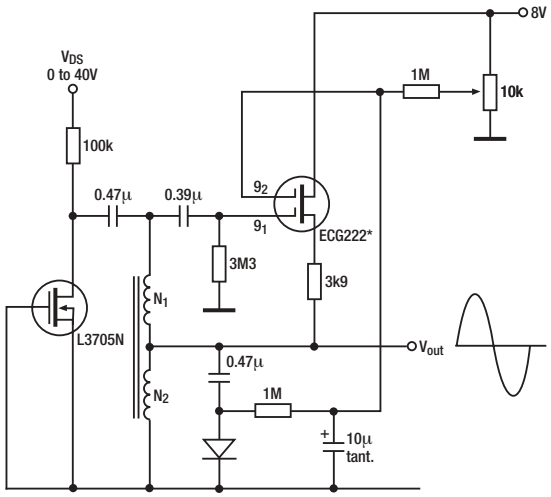


Fig 5
Block outline of the N2PK SWR / power meter with 100dB dynamic range, as implemented by G3TXQ.

Fig 6
Electronic tuning of a 15 – 30kHz oscillator using a single power MOSFET. (Source: Electronics World)

A SAD HARVEST

This year, the Grim Reaper seems to have targeted a succession of those well-known in the radio and audio-electronics field. The May issue (p10) noted the passing of Les Moxon, G6XN, and the August 'TT' that of Dr O G (Mike) Villard, W6QYT, whose long connection with Stanford University had considerable influence on our hobby, in particular his early championing of amateur SSB. In noting his contribution to the classic SSB issue of *QST* (January 1948), I referred also to the accompanying article "What is Single-Sideband Telephony" by Byron Goodman, W1DX, for many years the ARRL's Technical Editor, whose later articles were often quoted in the early years of 'TT'.

Sadly, even before the publication of the August issue, *QST* (July 2004, p77) had reported that By Goodman, W1DX (formerly W6CAL, W1JPE) became a silent key on 11 May at the age of 93. Born in San Francisco, he served as an ARRL staff member for more than 30 years. First licensed in 1930, he joined ARRL HQ in the mid-1930s after graduating from the University of California, Berkeley. For a time, he wrote the 'How's DX?' column from 1936 to 1947. He also wrote a number of April Fool articles for *QST* under the pen name of Larson E Rapp, W1OU.

In the UK, two figures, well-known to home constructors, have departed. Sir Douglas Hall died in April 2004 at the age of 95. Retiring at 51 from the Colonial, later Diplomatic, Service (mainly spent in Africa), he built and described in *Radio Constructor,* and later *Radio Bygones,* many simple valve and solid-state receivers using reflex techniques in which an active device provides both RF and AF amplification. John Linsley Hood, an eminent authority on High Fidelity amplifiers and frequent contributor to *Wireless (Electronics) World* and other periodicals as well as several books, died on 11 March, aged 79.

Many RSGB members will remember H C ('Spenny') Spencer, G6NA, listed as a Silent Key in the July issue. He joined the RSGB in December 1931 as BRS674, obtaining his transmitting licence in late 1932. As a member of the Scientific Civil Service at TRE in 1940, he became involved in the 'Battle of the Beams', and was soon spending weeks listening at the top of a 300ft mast near Hexham, Northumberland. He was part of a secret operation set up by TRE and the RAF in conjunction with Dr R V Jones, Science Advisor to SIS, with the aim of proving beyond doubt that the Luftwaffe had developed a long-range (Knickebein – 'Crooked Leg') navigational beam system, based on the pre-war short-range Lorenz blind landing approach system. Prof Lindemann (later Lord Cherwell), the Scientific Advisor to the PM, Winston Churchill, initially rejected the sug-

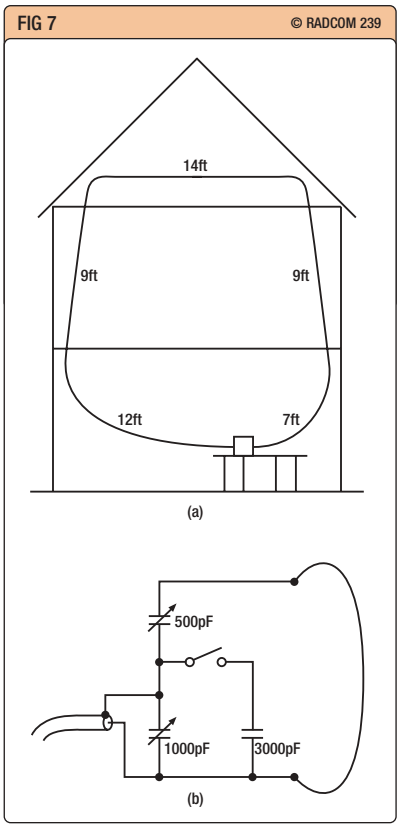
gestion that, because of the curvature of the Earth, a VHF navigational system based on the Continent could cover the UK. He was proved wrong when, first airborne monitoring and subsequently the listeners up masts successfully heard the beams on about 30MHz. Their distinctive 'A' or 'N' signals indicated any divergence from the flight path along which a continuous signal was received. RSS VIs were also asked to listen for these signals, and I recall hearing them at home when the German bombers were directed across Somerset to Cardiff, Swansea, etc in 1940 – 41.

Spenny, in Laurie Brettingham's *Beam Benders*, described his experience: "We had a tiny garden shed (with floor) lashed to the top of a 300ft mast. It kept the weather out, and had a power supply sufficient for a light and our receiver, a Hallicrafters S10. [The 1936 'Ultra-Skyrider' covering 5.5 to 79MHz in four bands – *G3VA*]. By nightfall, I had rigged up a dipole using the curly technique developed by E C Corke of EMI, in which two quarter-wavelengths of wire are wound in spaced helices round a broomstick and connected at their inner ends to a twin-wire feeder cable. This provided reasonable accuracy for measurements of the transmitter's bearings… It was very cold up there. After a week or two, an RAF Corporal was attached to me so that he could [eventually] take over the work. Feeling cold at night, he soon scrounged a one-bar electric fire and a mile drum of signal cable to make enough parallel line to transmit useful power up the tower. He then 'found' a Swan [electric] kettle, a coil of rope and a bucket. Until you've tried it, you have no idea of the effort required to haul a bucket up 300ft…"

G6NA deserves also to be remembered for at least two notable contributions to this journal – both of them as relevant today as when he wrote them as 'Spenny' [presumably to get round Civil Service regulations]. The first was 'A Tunable Oscillator of High-Stability', April 1949, pp245 – 47, at a time when many amateurs were changing over from crystal-control to VFO. Spenny not only gave details of a stable practical design, but gave an excellent explanation of the effects of temperature on coils, capacitors and valve electrodes and how to minimise them. He emphasised that attention to such details was more important than the actual type of oscillator.

A similar excellent combination of theory and practice also showed through in 'Loop Aerials' (*Radio Communication,* April 1968, pp576 – 78, 581). This appeared soon after the original description of the US Army transmitting loop in *Electronics,* highlighted in 'TT' November 1967. He spotted an important mathematical error in the original article that had the effect of exaggerating the radiation resistance of electrically-small transmitting loops – and was soon convinced that the classic formulae given in the classic *Radio Engineering* by Professor F E Terman, of Stanford University, (former operator of W6FT and W6AE) were correct (how little has changed!). But he recognised that the US Army loop had proved effective and set about determining how the classic theory could "produce good aerials without further ado".

Fig 7: (a) The 1968 1.8 / 3.5MHz transmitting loop using the inner and outer conductors of 'half-inch' coaxial cable in lieu of the copper tubing used in the original US Army Loop as described by the late G6NA and erected in a barn; (b) The coupling network used by G6NA for the loop shown in (a). Because of the high RF currents (even with 10W) it is important to use good quality capacitors preferably with brass plates and low-resistance connection to the movable plates.



His article, long before the days of computer simulations, discussed radiation resistance, effective height and resistive losses in a variety of conductors, loop inductance, coupling networks etc. He then showed how an effective 1.8 and 3.5MHz loop could be constructed using the inner and outer copper conductors of 'half-inch' coaxial cable – I believe this was the first reported use of this approach.

G6NA suffered no illusions about the efficiency of transmitting loops. As shown in **Fig 7**, his experimental loop comprised some 51ft of cable of 0.4in overall diameter, with an outer conductor consisting of 142 strands of 0.0072in copper wire, and an inner conductor 0.052in copper wire. Both inner and outer conductors were soldered together at the ends. It was erected in a convenient barn, half in the hay loft and half in the stable beneath. With an area of 16.5m^2, it had a radiation resistance of 14mΩ and a RF resistance of 107mΩ. Assuming no coupling losses, he showed this provides a useful efficiency of some 11.5%. Using a QRP solid-state CO – PA transmitter comprising two 2N3053 transistors, it was tested against a 40ft near-vertical wire antenna, showing a two S-point advantage and bringing useful contacts. G6NA concluded: "As the writer sees it, this form of loop may be of considerable interest to those [1.8MHz] contest operators with little space; a length of cable thrown over the roof for the weekend would probably pass unnoticed, and would enable signals comparable to those from the hilltops to be emitted."

WHOOPS!

'TT' July 2004:
p59 – late PA0KSB's name was Klaas Spaargaren, not Klaus Spargaren (thanks PA0PJE).
p60 – G0GSF's South African call-sign and antenna ZS6BKW, not ZS6AKW.
p62 – GW4HDZ's call given once, wrongly, as GM4HDZ.
Apologies!

HERE & THERE

According to my DK0WCY beacon log, for some days in early July the solar flux dropped below 80 for the first time since October 1997, an indication that we are now well down the slope of the sunspot cycle from the solar flux peak of Cycle 23 in late March 2001, when it exceeded 270 on two days, with the daily sunspot number reaching 352..

US President George W Bush can hardly have improved his November electoral standing among American amateurs when in April he said: "There need to be technical standards to make possible new broadband technologies, such as the use of high-speed communication directly over power lines. Power lines were for electricity; power lines can be used for broadband technology. So the technical standards need to be changed to encourage that." (Reported in the July *QST* editorial 'BPL – A Blind Alley').

Solid-state devices, unless subject to the abuse of over-voltages, will last indefinitely – or at least that is what many believe. Dave Williams, G3CCO, draws attention to the warning given in 'Live Fast, Die Young', by Chris Evans-Pughe (*IEE Review,* July 2004, pp34 – 37). This reports on the fears of those concerned with avionics electronics and other applications demanding reliability even under hostile environments that the latest high-speed, low-voltage SMD chips using nanometre-scale semiconductor processes may prove to have limited operational lifetimes. It is explained that there are three main silicon chip wear-out mechanisms: electromigration, oxide breakdown, and hot-carrier interaction. The author writes: "Understandably, semiconductor firms don't want to talk about wear-out, but grudging 'off the record' admissions suggest that the life expectancy of 130nm chips designed for mobile phones could be as low as three years, while the equivalent figure for PC chips could be five years… Manufacturers of consumer products may not be too troubled by three-to-five year chip lifetimes – a lot of owners will have upgraded or replaced appliances within this time frame. However, where the operating environment is harsh or where safety-critical performance is required, chip wear-out is potentially life-threatening." Although not a safety-critical application, the idea that those latest high-performance SMD chips in amateur equipment could begin to fail in a matter of say five years gives us something to think about! ♦

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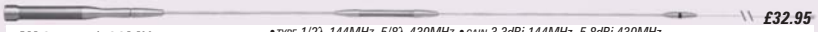
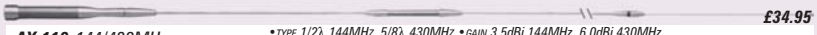
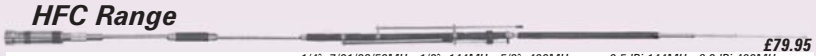
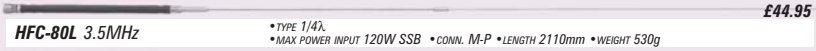
AX-75 144/430MHz — £33.95
•TYPE 1/2λ, 144MHz, 5/8λ, 430MHz •GAIN 3.2dBi 144MHz, 5.7dBi 430MHz, •MAX POWER INPUT 60W •CONN. M-P •LENGTH 760mm •WEIGHT 140g

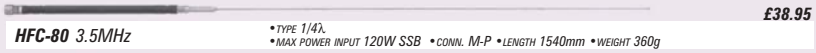

AX-95 144/430MHz — £32.95
•TYPE 1/2λ, 144MHz, 5/8λ, 430MHz •GAIN 3.3dBi 144MHz, 5.8dBi 430MHz, •MAX POWER INPUT 60W •CONN. M-P •LENGTH 950mm •WEIGHT 150g

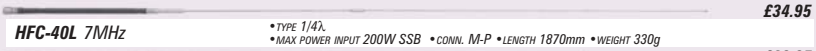

AX-110 144/430MHz — £34.95
•TYPE 1/2λ, 144MHz, 5/8λ, 430MHz •GAIN 3.5dBi 144MHz, 6.0dBi 430MHz, •MAX POWER INPUT 70W •CONN. M-P •LENGTH 1100mm •WEIGHT 150g

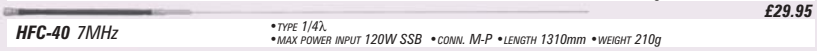
HFC Range


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

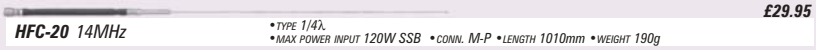

HFC-80L 3.5MHz — £44.95
•TYPE 1/4λ, •MAX POWER INPUT 120W SSB •CONN. M-P •LENGTH 2110mm •WEIGHT 530g


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

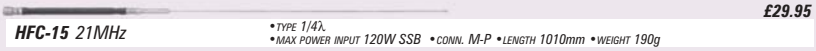

HFC-40L 7MHz — £34.95
•TYPE 1/4λ, •MAX POWER INPUT 200W SSB •CONN. M-P •LENGTH 1870mm •WEIGHT 330g

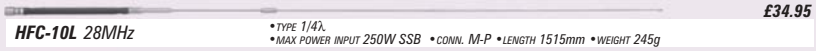

HFC-40 7MHz — £29.95
•TYPE 1/4λ, •MAX POWER INPUT 120W SSB •CONN. M-P •LENGTH 1310mm •WEIGHT 210g


HFC-20L 7MHz — £34.95
•TYPE 1/4λ, •MAX POWER INPUT 250W SSB •CONN. M-P •LENGTH 1515mm •WEIGHT 275g


HFC-20 14MHz — £29.95
•TYPE 1/4λ, •MAX POWER INPUT 120W SSB •CONN. M-P •LENGTH 1010mm •WEIGHT 190g


HFC-15L 21MHz — £34.95
•TYPE 1/4λ, •MAX POWER INPUT 250W SSB •CONN. M-P •LENGTH 1515mm •WEIGHT 250g


HFC-15 21MHz — £29.95
•TYPE 1/4λ, •MAX POWER INPUT 120W SSB •CONN. M-P •LENGTH 1010mm •WEIGHT 190g


HFC-10L 28MHz — £34.95
•TYPE 1/4λ, •MAX POWER INPUT 250W SSB •CONN. M-P •LENGTH 1515mm •WEIGHT 245g


HFC-10 28MHz — £29.95
•TYPE 1/4λ, •MAX POWER INPUT 120W SSB •CONN. M-P •LENGTH 1010mm •WEIGHT 190g

Power Amplifiers from Tokyo-HyPower

As the only Authorised U.K. distributor for Tokyo-HyPower, ML&S are pleased to announce some exciting new products from one of the oldest Japanese manufacturers.

HL-50B The only all mode 50W Linear Amplifier designed to work with the FT-817 & IC-703. **Only £249.95**

HX-240Mkll Got a high performance 2M multimode that you want to use on H.F.? Thought so! Just plug the new compact HX-240mkll straight onto the antenna socket and convert TX & RX across all the main H.F. Amateur Bands (80-10m). Almost 40Watts output and very simple to use. **Only £249.95**

HL-700B Compact All mode solid state 500W Linear Amplifier. Only 10 Watts drive will produce a staggering 400 Watts output. (100W produces 600W). 12V DC required @ 70 Amps. **Only £899.95**

HL-200BDX A mobile/base 200W HF Amplifier (up to 350W with optional Cooling Fan) 5W input produces 100W out. 50W or more 200W plus. Complete with remote control head for easy mobile install. **Only £599.95**

HL-1Kfx A sturdy 240 volt powered 500W linear amplifier all mode with protection against over-drive, over heat, high drain voltage, and faulty band setting. ALC out. Remote TX control, all for a very attractive price. **Only £1399.95**

HL-2Kfx Available early 2004, this new Linear Amplifier not only produces 1kW out on HF but the same on 6 Meters. All solid state, heavily protected and weighing only 22 kilos, we can't wait to get our hands on the first shipment. Place your deposits now! **Price TBC**

HL-72IDX Desined with the TH-F7E, VX-5/7R and other twin banders, just slip this new FM amplifier in line and boost your output to a very respectable 15-18 Watts. **Only £129.95**

Maldol HVU-8

The Maldol HVU-8 is a unique and ultra-compact HF, VHF, and UHF antenna developed for confined and restricted space installations like apartments and condominiums or for temporary or portable use. Installation is easily accomplished and convenient due the HVU-8 being only the traditional height and weight of HF vertical antennas. The HVU-8 comes with mounting brackets, U-bolts, etc. for easy installation.


Only £199.95

HVU-8 Specifications

- Frequency: 80/40/20/15/10/6/2M/70cm bands
- Type: HF and 6M: wave.
- 2M: wave 2.15 dBi gain
- 70cm: Two 5/8 waves in phase 5.5 dBi gain
- Power: 200 watts SSB on HF and 150W FM on 6M to 70 CM
- SWR: 1.5:1 at fO frequency
- Connector: UHF (SO-239)
- Mast Diameter: 1.0 - 2.36 inches (25-60 mm)
- Height: 8.5 feet (2.62 m)
- Weight: 5 Lbs. 7 ounces. (2.4 kg)

Maldol HMC-4

Type:	Amateur HF/VHF/UHF mobile antenna
Band(s):	10 m - 1/4-wave 6 m - 1/4 wave 2 m - 1/2-wave 70 cm - 2*5/8-wave
Gain:	10 - 0 dBi 6 m - 0 dBi 2 m - 2.15 dBi 70 cm - 5.5 dBi
Max power:	120 W (10/6 m: 80 W)
Impedance:	50 ohms, M-plug/PL-259
Length:	1.19m
Weight:	390gr
Manufactured:	Japan. 2003-200x
Other:	Suitable for Yaesu FT-890OR.

Only £69.95

Call today for a catalogue of the Maldol range.
Maldol Handheld Discone.
Maldol HDX30.
Discone to clip on top of any bnc scanner. **Only £38.95**

We will be closed on the 21st/22nd of August for the BIG MOVE and trading at the new premises by the 23rd of August.

ML&S martin lynch & sons
Suppliers of Communications Equipment
tel: 0845 2300 599 local call number
fax: 0845 2300 339
e-mail: sales@hamradio.co.uk
Outline House, 73 Guildford Street, Chertsey, Surrey KT16 9AS

call us six days a week, mon - sat 9.30 -

New Flagship Showroom Opening August 2004

We've been successfully selling radio equipment from Ealing since 1978, so why are we now moving to Chertsey in West London? **The quick answer is - parking and traffic.**

When Martin Lynch first started trading from Ealing, you could drive direct to the showrooms, park outside, spend as long as you wanted trying your new radio or accessory and then go home with little fuss. Then, around five years ago, traffic and parking got so difficult that instead of customers looking forward to their trip into London, they began to view it as a necessary evil to get to London's only Radio Store. We've listened to the complaints and now we're doing something about it by moving to Chertsey.

So how will customers benefit from our move to Chertsey?
The biggest single benefit is obviously parking. We have our own dedicated car park right in front of the showroom. That means you can drive the store, park outside and walk straight in. Bliss! This may not sound like much to those of you used to shopping outside London but to anyone living near a city, it's a real luxury.

Also, traffic is largely unheard of in Chertsey. It's a small town about half a mile from Thorpe Park (drop off the family?) with quiet roads and virtually no rush hour. It also has some excellent local shops including an Italian Deli called Carlo's - to die for and bang opposite the showroom too!

What can you expect when you visit the new Showroom?
Naturally, there's the usual bunch of smiling faces and helpful staff but now they're in an air conditioned showroom that's LARGER than ever before. It has three dedicated sections for Yaesu, Icom & Kenwood along with racks of MFJ, Maldol, Diamond, CT-Keys, Miracle Products, SGC, Linear Amp UK, Avair, MyDEL, BHi and a full range of antennas and associated accessories. There's also a huge selection of famous USED equipment too.

So when is the new super-store open and how do I get there?
We should be open for business on Monday the 23rd of August, assuming the builders, electricians, plumbers and assorted other tradesmen have vacated the premises by then - please call first. There's no need to update your phone book - the telephone and fax numbers are the same.

When we say "easy access", we really mean it.
The new address is Outline House, 73 Guildford Street, Chertsey, Surrey, KT16 9AS and it's located between junctions 11 & 13 of the M25. By car, it's just 1.2 miles from junction 11 or you can come off at junction 13 (Staines turn-off) and follow the signs to Thorpe Park. Follow the first sign past Thorpe Park to Chertsey Town Centre then, after a sharp right bend, Guildford Street is on the right. It's spilt into three sections and if you enter the street from the Windsor/London Street end, you turn right opposite the Royal Mail sorting office.

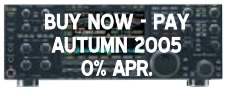
By rail, Chertsey Railway Station is literally only 800 yards away in the same street.
By plane, Heathrow is just 6 miles away.

Our customers have allowed us to become one of the oldest Ham Radio outlets in the country and investing in larger premises in Chertsey shows our commitment to the hobby. Please come along and support your local emporium.

And don't forget, we are still looking for staff to join us at the UK's largest dedicated Ham Radio Store.

73, Martin G4HKS and the gang

Icom IC-7800
The worlds best H.F. Transceiver? Probably.
No silly freebies, just the ultimate understanding and support you deserve when making an investment of this magnitude. To discuss the new HF+6M Super Rig from Icom, call the ML&S Sales team today.



RRP £6400.00

Icom IC-756Promk11
HF & 6M 100W DSP Transceiver.

RRP £2599 ML&S £1895 or 48 x £56.07 p/m

Icom IC-7400
HF/6M/2M DSP Base Transceiver with ATU & 100W.

RRP £1699 ML&S £1299
with FREE SP-21 & SM20 (whilst stocks last)

Icom IC-706mk11G
Eight years old and still going strong. HF/6/2/70 Ideal mobile/base transceiver

RRP £939.00 ML&S £769 or 48 x £22.75 p/m

Icom IC-718
Basic ready to go 100W HF Transceiver supplied with Microphone & DC Lead

RRP £649 ML&S £449 or 48 x £13.29 p/m

Icom IC-910X
The best 2/70 & 23cm dedicated all mode base. 23cm included.

Basic Version (without 23cm) also available £1089 or 48 x £31.93 p/m
RRP £1675 ML&S £1239 or 48 x £36.66 p/m

Icom IC-703
10W Portable HF Transceiver with built-in PSU.

RRP £703 ML&S £589 or 48 x £17.43 p/m

Icom IC-R20E
The latest portable receiver with TWIN RX & digital record facility. For full spec see web

RRP £499 ML&S £419
or 36 x £15.23 p/m

Icom IC-2200H
Just Arrived! 65W o/p 2M FM. The optional UT-115 provides digitally modulated and demodulated clear audio. It also allows you to send voice and data simultaneously.

RRP £235 ML&S £199.00

Icom IC-E208
2/70 mobile 50/55W Transceiver with host of additional features.

RRP £365 ML&S £275.00 or £8.14 p/m

Kenwood TS-870S
The first HF Transceiver to offer full DSP.

RRP £1599.95 ML&S £1199.00
or 48 x £35.18 p/m

Kenwood TH-D7E
A 2/7- Handie with TNC and APRS capability.

RRP £359 ML&S £299 or 48 x £8.85 p/m

Kenwood TS-570DGE
Still the ideal choice if you are keen on H.F. and want an easy to use radio.

RRP £999 ML&S £799 or 48 x £23.64 p/m

Kenwood TS-480SAT
The best selling Kenwood H.F. Can be used mobile or base. Includes ATU

RRP £1099.95 ML&S £949 or 48 x £28.08 p/m

Kenwood TS-480HX
As TS-480SAT but 200 Watts, no ATU.
RRP £1199 ML&S £999 or 48 x £29.56 p/m

Kenwood TS-2000E
Just superb on all bands 160m-2m with optional 23cm (X-Version)

RRP £1699 ML&S £1589 or 48 x £47.02 p/m

Kenwood TS-2000X
As above but with 23cm fitted.
RRP £1999 ML&S £1889.00 or 48 x £55.89 p/m

Kenwood TMD-700E
The unique 700E is not only a dual-band FM rig but has APRS and TNC built-in.

RRP £519 ML&S £439 or 48 x £12.99 p/m

Kenwood TH-F7E
2/70 Handie with Gen Cov RX. If you must have SSB RX on your dual-bander then buy one!

RRP £289.95 ML&S £249

Yaesu FT-1000MP mkV
Still the flagship of theYaesu HF Range. 200W and put the CDXC IOTA crew on the map.

RRP £2599
MLS £Guaranteed LOWEST U.K. Price Call

Yaesu FT-1000MP mkV Field
Ditto mkV but 100W and built in PSU.

RRP £1999
ML&S £Please Call for eye-watering price.

Yaesu FT-857
Our fastest selling HF-70cm Mobile/base

RRP £849, ML&S £729.00 or 48 x £21.57 p/m

Call us 6 days a week, mon-sat 9.30-5.30

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local call number

Five-Year Warranty available

When you next purchase any equipment from us ask about our 5-year warranty plan. It's superb value and made a lot of customers very happy they had it!

ML&S martin lynch & sons
Suppliers of Communications Equipment

We will be closed on the BIG MOVE and trading at premises by the 23rd of

Outline House, 73 Guildford Street, Chertsey, Surrey KT16 9AS

Radio Works New to ML&S, the full range of Radio Works Carolina Windom Wire Antennas.

For full specifications and more detailed information see our NEW WEBSITE: www.hamradio. co.uk


CW-160	160-10m 76.8m long	£129.95
CW-160 Special	160-10m 40.5m long	£119.95
CW-80	80-10m 40.5m long	£89.95
CW-80 Special	80-10m 20.1m long	£109.95
CW-40	40-10m 20.1m long	£84.95
CW-20	20-10m 10.36m long	£89.95
CW-620	20-6m 9.7m long	£89.95
G5RV Plus	80-16m with balun 31m long	£59.95
Baluns & Isolators		
T-4 Plus	Line isolator 1.8-54MHz 4kW	£39.95
T-4 500	Line isolator 1.8-30MHz 500W	£32.95
T-4G Plus	Line isolator 1.8-54MHz + gnd4kW	£39.95
REM-BAL	Ladder line 4:1 balun 1.8-30MHz	£45.95
B1-2K Plus	1:1 current balun - for inverted Vs	£28.95
B4-2K	4:1 voltage balun - loops/folded dipoles	£39.95
Y1-5K Plus	1:1 current yagi balun - 1.8-54MHz	£39.95

Yaesu FT-897

Versatile Base, Transportable, Mobile 160m-70cm.

RRP £1099 ML&S £899 or 48 x £26.60

Yaesu FT-847

160m-70cm Including 4m!

ML&S
CALL FOR LOWEST PRICE

Yaesu FT-817ND

Want to stay in touch on all bands for silly money? HF-70cm, complete with batts, charger etc. Now supplied with Higher Capacity Metal-Hydride Batteries

RRP £Too cheap. ML&S Even cheaper! See web!

Yaesu FT-817DSP

No we are not BHI's largest distributor (ZZzzzz) but we were FIRST to offer the FT-817 with DSP!

RRP £803, ML&S £589 or 48 x £17.43 p/m

Yaesu FT-7800

This weeks new model from Yaesu. Bar make the tea it'll give you 2m/70cm-@50W/40W

RRP £239, ML&S £239

Yaesu FT-8800

Similar to the FT-7800 but can receive on 2 & 70 simultaneously.

RRP £289,
or 48 x £8.26 p/m

Yaesu FT-8900R

A full 4-band mobile, 10/6/2/70 with remote head.

RRP £429 ML&S £329 or 48 x £

Yaesu FT-2800M

2M brick-built 65W rig.

RRP £179, ML&S £158.95

Yaesu VX-2E

Latest version of the VX-1R, higher power.

RRP ML&S £169

Yaesu VX-150

Built on the commercial VX-400, simple to use rugged 2m Handie, supplied with Nicads & Charger

RRP £149 ML&S £119

QPak

From those Miracle Antenna boys comes the worlds best Antenna Tuner. In fact it's so well engineered it's just too good to be called an ATU!

NOW IN STOCK!!!

Specification:
Range: 3.5 - 30 Mhz, 50 Mhz limited
Power: 20 watts max
Loads: Coax, random wire, balanced lines, verticals
Match: Up to 15:1 and beyond in some cases
Size: Inch - 6.5 x 3.1 x 1" case, 2" overall,13.4oz
Cm - 16.5 x 7.8 x 2.5 case, 5 overall, 382g

Special Introductory Offer: Only £119.99

MyDEL MultiTrap

Forget the G5RV. Install a proper TRAPPED wire dipole MutiTrap for 80-10M Only 66i.Must be centre supported. **£89.95**

MyDEL MegaTrap

Same as Multitrap but 160m/80/40m, 105' long **£99.95**

Antenna Analysers

MFJ-259B *1.8-170MHz Analyser* **£259.95**
MFJ-269 *1.8-170 & 415-470MHz* **£349.95**

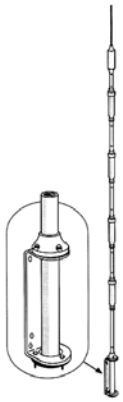
ONE ONLY!
ex-demo VL-1000 Quadra £2500, full 12 months warranty

Hustler 6-BTV

The best performing H.F. Vertical - ever! We have literally sold hundreds of these with fantastic customer reports. At last a vertical that gives you REAL PERFORMANCE on 80m and 40m, as well as the other bands. No radials required. Just mount 18' above the ground, connect to a decent earth spike close by and operate.

Specification:
6-BTV HUSTLER 80-10m Vertical 1kW.

- 6 Bands: 10, 15, 20, 30, 40, 80m
- VSWR 1.6:1 or better
- 10-40m Bandwidth up to 100kHz 80m
- Power: 1kW
- Feed: 50 Ohms
- Solid 25.4mm traps
- Feed with any length 50 Ohm coax
- Heavy duty aluminium mounting bracket
- Solid 25.4mm (1in) fibreglass trap formers
- Use as ground mount with or without radials
- Use with radials on elevated mount
- Size: 7.3m (24ft) - Weight: 7.5kg.



Only £219.95

Buy Now, Pay Autumn 2005!

0% APR. Typical Example, £1000 purchase price, PAY NO DEPOSIT & pay the full amount on the due date with NO INTEREST. or pay £52.55 in 12 months time for 36 months, TAP £1891.80 29.8% APR.

Power supplies

Watson W-25SM 13.8V DC, Switch Mode, Ultra Compact, 22Amps **£79.95**
IC-PS-85 20Amp Matching Switch Mode PSU for Icom Base Transceivers. ..... **Only £169.95**
Yaesu FP-30 Internal PSU for FT-897 ..... **£199.95**
Yaesu FP-1030A 25 Amp power supply. **£179.00**
Nessei MS-1228 25 Amp continuous power supply. 28 Amp peak. **£69.99**

Antenna Tuning Units

MFJ-993
Hot off the press! And is this GOOD!!!! The latest compact Auto ATU from MFJ will BURY the competition. Take a look at our web site for a detailed specification..... **£248.99**

MFJ-941E
The MFJ-941E gives you a 300 Watt antenna tuner that covers everything from 1.8 - 30 MHz -- plus you get a lighted Cross-Needle meter with on/off switch (light uses 12 VDC or 110 VAC with MFJ-1312D), antenna switch and a 4:1 balun... MFJ's lighted Cross-Needle meter shows SWR, forward and reflected power all at a glance in 300/60 and 30/6 watt ranges, 8 position antenna switch lets you select 2 coax lines, random wire/balanced line or dummy load (direct or through)..... **£129.96**

MFJ-969
The MFJ-969 Antenna Tuner gives you MFJ's superb AirCore Roller Inductor and full 6 meteres through 160 Metre coverage!..... **£199.00**

NEW Yaesu FTdx9000

Please see our web site for more detailed information and PDF, or call the sales desk for a brochure.

● 400 Watts ● HF+6M ● Typical IP3 in excess of +40dBm, and best close-in Dynamic Range available today.

In the fifteen years since it was born, the FT-1000D has been recognized as the apex of performance among elite-class HF base station. Now experience the rebirth of the renowned FT-DX series, bearing the electronic DNA from the FT-1000D but advanced far more than just one generation. This is one HUGE Radio - some 30% LARGER than the original "FT-1000D".

MIRACLE ANTENNA

This ***Amazing Antenna*** at only 55 inches long is an ideal companion for any receiver covering 600kHz - 460MHz. *NEW LOWER PRICE* ***£129.99***

NO STATION IS COMPLETE WITHOUT MFJ!

ATU's, SWR Meter's, Antenna Analysers...

NEW MFJ-993 AUTO ATU IN STOCK

In Tune with MFJ...

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

MFJ-993

*Auto ATU with digital data dis[play*1.8-30MHz *Long wire, coax & balanced line *300W SSB, 150W CW *Cross needle metering *Size 255 x 70 x 235mm *Weight 1.8kg

The auto ATU that has a digital data display and can even handle wires!

£249.95 C

MFJ-974H

A true balanced line ATU that is ready made for open wire feeder. Extremely accurate balancing provides optimum performance. It can also be used for long wires and coax. Great for all-band doublets. *1.8-54MHz (MFJ-974H) *300W *Balanced, wire or coax *SO-239 sockets *Size 195 x 155 x 220mm *Weight 2.05kg

£179.95 C

MFJ-989C

3kW 1.8 - 30MHz. Wire, balanced and coax feed. Full metering and switching.

£359.95 C

MFJ-991

Similar to the MFJ-993 but handles 150W SSB/100W CW and matches 6-3200 Ohms. Does not have digital VSWR meter LCD readout aural VSWR, antenna switch or 4:1 balun.

Auto ATU

£209.95 B

MFJ-890UK DX Beacon Monitor

*Beacon frequencies:
14.1/18.110/21.150/24.930/28.200MHz
*Configuable to local 60kHz time signal
*Buit-in Atomic clock receiver
*Manual or Atomic sync
*18 Red LED's on world map
*Supply 9V int or 12V

£99.95 B

MFJ-986

3kW fast differential tuning design. 1.8 - 30MHz. Wire balanced and coax systems. Full metering and switching.

£329.95 C

MFJ-1706 NEW

Antenna switch for balanced line antennas.

*Balanced line , 6x antenna switch *Heavy duty twin terminal posts *Power rating 1kw *Size 230 x 80 x 125mm *Weight 800g

6-Way Balanced Line Switch

£79.95 B

MFJ-9340

CUB CW Transceiver Kit

*Adjustable tx power
*40m 2.2W
*Covers 50kW segment
*Power 12-15V DC regulated
*Size 90 x 47 x 98 mm

£79.95 B

MFJ-949E

1.8 - 30MHz. 300W wire, balanced and coax. Inc dummy load, metering and antenna selector.

£159.95 B

MFJ-941E

A great budget ATU. All the great MFJ features that make it ideal for base station use. *1.8-30MHz *300W *Cross needle meter *VSWR & PWR 30/300W *Terminals for wires and bal. lines *Internal 4:1 balun *Ext. Dummy load socket *SO-239 sockets *Size 260 x 180 x 70mm

Manual ATU

£129.95 B

MFJ-904H

Just the job for portable use. It's so small! *3.5-30MHz (80 - 10m) *150W wire, coax, balanced *Internal 4:1 balun *SO-239 sockets *Size 180w x 60h x 80d (mm) *Weight 650g

Mobile and portable use

Manual ATU

£129.95 B

MFJ-948E

Similar to the MFJ-949E, but without internal dummy load. One of the most popular ATUs in the world!

£139.95 B

MFJ-447

*Speed: 2 - 65 wpm
*Tone 200-1000Hz
*Supply PP3 or ext. 12V
*In/Out: 1/4in jack / phono (sockets)
*Size: 162 x 127 x 38mm *Weight 460g

Memory Keyer

£79.95 B

MFJ-962D

Ideal for use with linears. Gandles balanced, coax and wire. *1.8-30MHz *1.5kW Roller Coaster *VSWR meter *6-way antenna/load switch *Buit-in 4:1 balun *2 coax positions *Size: 270x375x115mm

Manual ATU

£279.95 C

MFJ-910

Mobile Matcher. Connect between mobile whip and transceiver. See your VSWR come down as you switch impedance match.

£24.95 A

MFJ-914

Auto ATU extender. It let's your internal transc. ATU handle difficult coax antennas such as G5RVs etc. Greatly extends the range capability.

£64.95 A

MFJ-815B VSWR / Power Meter

The MFJ-815B offers the convenience of a dual needle meter that permits monitoring forward and reflected power at the same time. *1.8-30MHz *200W, 2kW *Cross Needle Type *Connector S0-239 *12V DC Lamp *180x85x110mm *Weight 700g

£82.95 B

MFJ-1704 4-Way Coax Switch

*4-Way *Connections S)-239 / N
*Power 2.5kW *Range DC - >500MHz
*Isolation 60dB at 30MHz / 50dB at 500MHz *Centre Earth Position *Static Discharge Protector

£69.95 B

MFJ-969

The latest design from MFJ, this unit features an active power meter for really accurate PEP measurements. Powered by an internal PP3 battery (not supplied) or an external 12V source. This is one of the most popular 300W models, having a very wide frequency range an excellent power and VSWR accuracy.

£199.95 B

MFJ-267 1.5kW Dummy Load & VSWR Meter

Combined dummy load and in-line watt meter.
Just switch between one or the other. *1.8 - 54MHz *300/3000W/3kW *50 Ohms *SWR/Wattmeter *3in Cross-needle meter VSWR/PWR *Reads PEP or AVG *Load: 1.5kW 10secs - 100W 1min *SO-239 x2 Sockets *9V int or 12V DC ext *Size 110 x 80 x 265mm *Weight 1kg

£139.95 B

MFJ-1624 HF Mini-mobile Bugcatcher

*8-bands 40-6m (inc WARC)
*300W (PEP)
*Very high 'Q' 2.5" coil
*0.8 / 1.67m telescopic whip
*Standard 3/8in fitting
*Max/min height: 1.67m/0.8m
*Mobile or base use

£89.95 B

MFJ-260C Dummy Load

MFJ-260C 1.5MHz - 150MHz 300W
50 Ohm SO-239
*Size 180 x 57 x63mm *Weight 450g

Handles 300W for 30 seconds and lower powers proportionally longer.

£37.95 B

MFJ-1708 NEW

RF Sense Transmit/Receive Switch

*Fitted with relay *Delay adjustment *3x SO-239 sockets *2x phono sockets *LED power indicator *Power off defaults to transmit mode *Power 12V DC *Size 102 x 72 x 40mm *Weight 200g

£79.95 B

MFJ-971 £99.95 B

QRP portable tuner, 300/30/6W. Wire, coax or balanced.

MFJ-1026 £189.95 C

Active Antenna, 1.8-30MHz with noise canceller.

MFJ-901B Versa Tuner

This compact tuner is a low cost alternative where the main station already has a VSWR meter and just requires the 'bare bones' tuner. It will handle all types of aerials, match coax fed systems, long wires and balanced feeders and is very simple to use. It retains the basic MFJ T-network that has a wide impedance matching capability.

£85.95 B

MFJ-902 Travel Tuner

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*150W
*Mobile & Portable use
*SO-239 sockets
*Size: 90 x 60 x 80mm

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MFJ-259B

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MFJ-269

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£349.95 B

MFJ-461 Morse Reader

The MFJ-461 is a stand-alone pocket sized Morse code reader. Similar in size to the MFJ Morse tutors, all you do is hold it close to your receiver and it instantly displays CW on the 32 character high contrast LCD. It has automatic speed tracking, a serial port - if you wish to connect to a computer to display the text on a bigger screen. It can also be connected to your receivers audio if required.

£84.95 B

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RSGB Radio Communications Voluntary Services National Co-ordinator,
131 Greenfield Road, St Helens, Merseyside WA10 6SH.

E-mail: rcvs@rsgb.org.uk

Raynet cracks the 'Gritstone Challenge'

In the March 2004 *RadCom*, Mike Bedford, G4AEE, and the Cave Radio & Electronics Group issued 'the Gritstone Challenge': how to get a signal through the 5km long Standedge Tunnel under the Pennines. Experiments on VHF and UHF, as well as on LF using 'cave radios', had all failed. Now Paul Gaskell, the RSGB Radio Communications Voluntary Services National Co-ordinator, describes an important Raynet exercise at the same tunnel - which just happened to crack the problem.

Raynet in north England had been requested by Network Rail to participate in the Standedge Tunnel Complex Simulated Disaster Exercise ('Exercise Southbore') on Sunday 25 April. The tunnel complex, consisting of main-line rail and canal tunnels, together with a couple of disused tunnels (all of which are inter-linked), connects the west and east sides of the Pennines, from Diggle on the Greater Manchester side to Marsden at the West Yorkshire end. The rail tunnel in question is a straight, level one of approximately 5km in length, bored through the two outcrops of Pole Hill and Round Hill [see *RadCom* March 2004 page 83 -*Ed*].

The exercise scenario was based on the fictitious derailment of a Diesel Multiple Unit in the operational tunnel. The purpose of the exercise was to test the mobilisation and deployment of police, fire, ambulance, Network Rail, mountain rescue personnel and other assets in a search and rescue situation.

One non-communications problem for Raynet was that on the day, West Yorkshire Raynet assets, including the Leeds and Keighley groups, who would normally be involved, were already committed on the Yorkshire Three Peaks Race and unable to run the Marsden end of the tunnel exercise. However, teams from the North Yorkshire and Sheffield and Rotherham Groups under the overall coordination of N Yorks County Controller, Brian Dooks, G0RHI, covered this. The western side of the Pennines was handled by Greater Manchester Raynet under the overall coordination of Bolton Group Controller Eric Walton, G4FSN.

THE BRIEF

Raynet's brief was to provide communications over the top of the moorland terrain, from portal-to-portal, plus additional on-site comms if required and, if time and circumstances permitted in the later stages of the exercise, to examine communications within and through the tunnel.

The first of these tasks - that of external portal-to-portal communications was achieved by two separate systems. The first was a VHF-UHF-VHF system using two back-to-back crossband 2m/70cm talkthrough units. The second utilised a 160m SSB groundwave link on 1905kHz.

The fire service made use of the VHF-UHF-VHF talkthrough link between the two exercise sites and from about 11.00am until the end of the exercise at 12.15pm the link was used for direct officer-to-officer traffic. After 'endex', the senior fire officer in charge came personally to thank Raynet for all that had been done for them and requested that Raynet make a presentation to his personnel in Greater Manchester on Raynet's capabilities and limitations.

The 160m groundwave SSB link also worked as planned and that was used by the Network Rail Rail Incident Officers (RIO) for officer-to-officer traffic between Diggle and Marsden, relating to the wider management of the exercise. At the conclusion, Richard Davies, the Network Rail Risk Manager North-East (and overall exercise coordinator) came over to Diggle, having spent most of the exercise at Marsden, similarly to offer his personal thanks for a good job well done.

CONQUERING THE TUNNEL

In addition to the HF and talkthrough links, Raynet and Cave Radio & Electronics Group (CREG) member John Rabson, G3PAI, used 23cm mobile and hand-portable rigs and drove though the tunnel with Richard Davies in Richard's 4x4 vehicle. John borrowed an Icom IC-T81 from a local microwave enthusiast while the mobile rig, an Icom IC-910H, was loaned by Icom (UK) specifically for the tests.

Eric Walton, G4FSN, stayed at the Diggle portal with the handheld whilst they drove off into the tunnel, stopping every 200m or so to exchange reports. Communications were maintained at full strength all the way through the tunnel - all 5km of it - and out at the other end on 1297.50MHz FM, thus proving that 23cm *will* travel all that way with very little attenuation. The 'Gritstone Challenge' had been finally conquered! Readers may recall the article in the March 2004 *RadCom* detailing the internal communication challenges of the Standedge Tunnel.

RAYNET DEBRIEF

Overall, Raynet communications links performed successfully and the User Services declared themselves very well satisfied with what had been done for them. Raynet officially attended the debrief at fire service HQ in Bradford, during which this sentiment was reiterated. Many useful contacts have been made and Raynet will be very busy following these up over the next few months.

Whilst there have been notable successes, there are always things that could be improved and finding out these is one purpose of all exercises. In addition, more Raynet engineering tests are planned to enhance further siting of talkthrough units and other communications aspects, such as manpower per shift per portal - one estimate is a minimum of 12 operators to deal effectively with all user service requirements which grew as the exercise went on - plus greater familiarisation with the topography of the area.

I am grateful to Eric Walton, G4FSN; Jon Mossman, G7JKK, and Brian Dooks, G0RHI, for supplying the information for this article. ♦

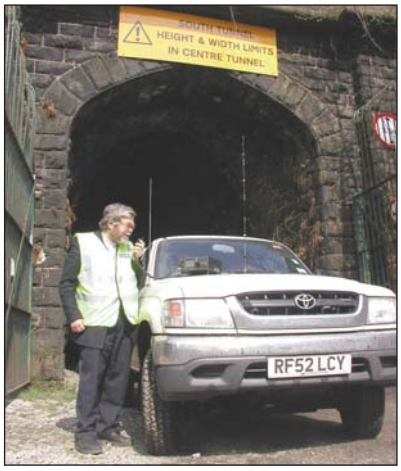

PHOTO BY JACK MCEWEN, G8HIK

John Rabson, G3PAI, with the IC-910 transceiver loaned by Icom (UK) on the Network Rail 4x4 vehicle, following the successful 23cm transmissions through the tunnel.

PHOTO: ICOM (UK)

Close-up of the IC-910 loaned by Icom (UK). The rig also covers the 1.2GHz band which was found to be ideal for communications through the tunnel.

WEB SEARCH

RSGB Emergency Communications	www.rsgb.org/emergency
Radio Amateurs' Emergency Network	www.raynet-uk.net
Cave Radio & Electronics Group	www.sat.dundee.ac.uk/~arb/creg

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E-mail: g3ldo@ukonline.co.uk

Antennas

How to erect a visually low-impact delta loop for 7MHz and above

A mast is usually the main problem when trying to get neighbours to accept the installation of an HF antenna. Beams and their support masts can be quite intrusive and wire antennas normally require two supports, although the house can be one of them. One antenna I used for several years was a large delta loop with a chimney as the main support.

A LOW-VISUAL-IMPACT MULTIBAND ANTENNA

As can be seen from the current discussion on loop antennas in *RadCom*, the efficiency of the small loop antenna improves with an increase in size. A loop larger than 0.25λ will lose its predominant 'magnetic' characteristic and become an 'electric' antenna of the quad or delta type. If a loop antenna in the form of an equilateral triangle is used, only one support is required, and if this support were a short mast fixed to the chimney, it can probably circumvent most planning restrictions.

The structure of the antenna is shown in **Fig 1** and it can be constructed with bare copper wire. You could use insulated wire for the entire loop, however lightweight wire and a lightweight support has a low visual impact. Using lightweight thin wire does not affect the antenna performance because the radiation resistance of a loop is fairly high.

The first experiments were carried out with the coax connected directly to the loop but the SWR was over 3:1. However, most literature puts the feed impedance of a loop greater than 100Ω, and models constructed in *EZNEC* confirm this. A 4:1 balun was fitted enabling the antenna to be fed directly with 50Ω coax that can be matched using the automatic ATU fitted to many modern transceivers. (This applies only to harmonic-related frequencies such as 7, 14, 21 and 28MHz).

On the 'WARC' bands, the impedances are rather wild and the best method of feeding is to use 450Ω-ladder feeder and an ATU. (I prefer this method of feeding for all bands).

FIG 1 © RADCOM 249

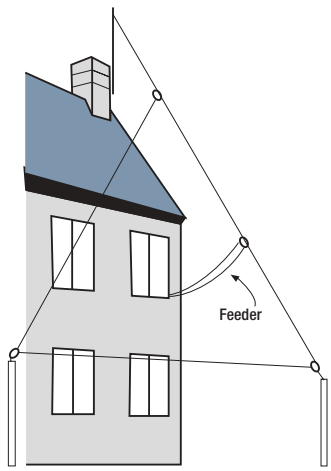


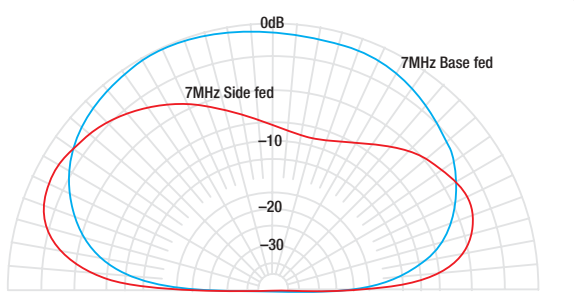
Fig 1
Delta loop antenna one wavelength circumference on 7MHz, using a short stub mast on the chimney as a top support.

Fig 2
Comparison of elevation plots of the full wave delta loop, fed at the base and at the side.

This antenna will give good results, even when the lowest leg of the triangle is only 0.6m from the ground.

The 7MHz characteristics of the antenna varied, depending at just which point the antenna was fed. For use as a NVIS antenna, the centre of the base of the triangle appears to be the optimum point and produces an elevation pattern as shown in **Fig 2**. For use as a DX antenna, the optimum feed point is just over one third up from the bottom on one of the vertical triangle sides as shown in Fig 1. These findings also apply to the 10MHz band. On the higher frequency bands, the lobes become very complicated, and the difference between the base and vertical feeds are less pronounced when it comes to working DX.

FIG 2 © RADCOM 250



CONSTRUCTION

Theoretically, the total length of the loop should be 140ft (42.8m), but my antenna was resonant with a total wire length of 120ft. This might have been due to the close proximity of the base to the ground, or the fact that insulated wire was used for the lower part of the loop, see below. The shape of the delta loop is not important. Fig 1 shows the corner insulators fixed to the ground with tent-peg-type fixtures, although trees and fences will also work as lower supports.

The apex support in the experimental model was a 2.5 metre length of scaffolding pole fixed to the chimney with a double TV lashing kit. The top of the chimney is about 9m above the ground. The pole gives the antenna enough height and a reasonable clearance above the roof. The apex of my loop was nearly 11 metres high.

As you can see, part of this antenna is close to the ground. This means there is a possible danger of someone receiving an RF burn if the antenna was touched when the transmitter is on. For this reason, wire with thick insulation was used for the lower half of the antenna. A loop antenna is not a high-*Q* device, so very high voltages, such as those found at the tips of a dipole, do not occur.

This antenna proved to be a good DX transmitting antenna on 7 and 10MHz. However, it did tend to pick up electrical noise from the house on receive. It could be used in conjunction with a smaller magnetic receiving loop, located in the electrically quietest part of the QTH, if electrical noise or QRM is a problem. This would normally require that the transceiver had provision for separate transmit and receive antenna connectors (rare). I have devised an antenna connector switch box, which I hope to describe in a future 'Antennas' column. ♦

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The end of the world as we know it! It may seem a little dramatic to describe the following piece in such terms, but the fact that earth's magnetic field is collapsing could result in just that.

Whatever next

Deterioration apparently started about 150 years ago and, so far, the strength has dropped by 10-15%. However, the rate of decline is now increasing, especially in part of the Arctic and just south of South Africa, and this is leading to a debate amongst scientists as to whether a reversal of polarity is about to take place.

During a magnetic reversal, the main field weakens, almost vanishes, then re-emerges with the opposite polarity. Afterward, compass needles that used to point north point south, and during the years of transition many of the things we take for granted are no longer so. A reversal could disrupt power grids, harm astronauts, damage satellites, widen atmospheric ozone holes, change radio propagation, send auroras to the equator and confuse animals that rely on the steadiness of the earth's magnetic field as a navigational aid for migration.

Although a total flip may be hundreds or thousands of years away, the rapid decline in magnetic strength is already damaging satellites. Consequently the European Space Agency has approved the world's largest effort at tracking the field's shifts. In 2009 a trio of satellites called *Swarm* is to be launched to monitor the collapsing field with far greater precision than before and help scientists to forecast its prospective state. Dr Gauthier Hulot, a French geophysicist working on the satellite plan, said "We want to get some idea of how this would evolve in the near future, just like people trying to predict the weather… I'm personally quite convinced we should be able to work out the first predictions by the end of the mission" (2015).

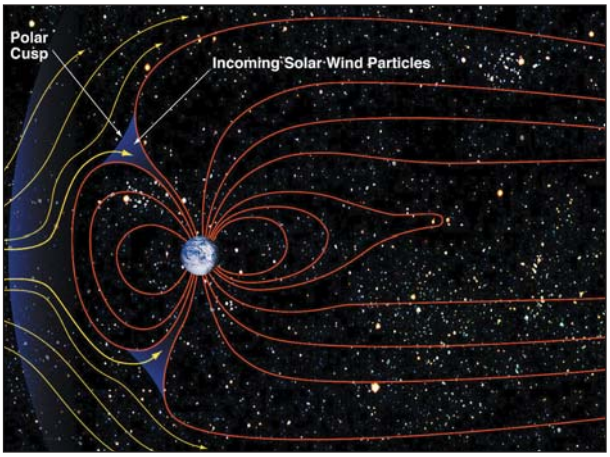
The Earth's core is made largely of molten iron but, because it is (a) very big, and (b) not a runny liquid, it doesn't exactly slosh about. In spite of this, magnetic reversals have taken place several times before in ancient history. Some experts are now suggesting that another is overdue. "The fact that it's dropping so rapidly gives you pause," said Dr John Tarduno, a professor of geophysics at the University of Rochester. "It looks like things we see in computer models of a reversal." In an interview, he put the odds of an impending reversal at "more likely than not". The last one took place about 780,000 years ago, but scientists say there is no need for any of us to panic because, even if another is imminent, it might take 2,000 years to mature.

RADIO-CONTROLLED HUMANS

A new non-lethal weapon is being developed in the USA. It is intended for use on hostile crowds and in peacekeeping operations, where the use of deadly force is considered undesirable. Known as the Active Denial System, it simply bombards people with microwave radiation.

So-called 'Active Denial Technology' uses a transmitter and a dish antenna to transmit a narrow beam of energy at 95GHz towards an identified subject up to 700 yards away. Microwave energy at 95GHz penetrates the skin by less than 1/64in (0.4mm), but within seconds it heats-up the surface and produces an intense burning sensation that stops immediately the transmitter is switched off or when the target moves out of the beam. According to reports, a two-second burst from the system can heat the surface of the skin to a temperature of 130°F (55°C). The resulting pain reflex makes people pull away automatically in less than a second (rather like touching a hot light bulb) but, unlike the light bulb scenario, someone would have to remain in the beam for over four minutes before the skin was actually burned because the penetration is so shallow. Low levels of radiation are used, but there remains a question mark over whether it might cause permanent damage to eyes because the cornea is particularly sensitive. Also unclear is how active denial technology would work in conditions where the beam's energy was absorbed by water in the atmosphere (ie rain, fog or seaspray).

Countermeasures against the weapon are straightforward - wear thick or wet clothing, or carry a metal sheet as a shield or reflector. ♦



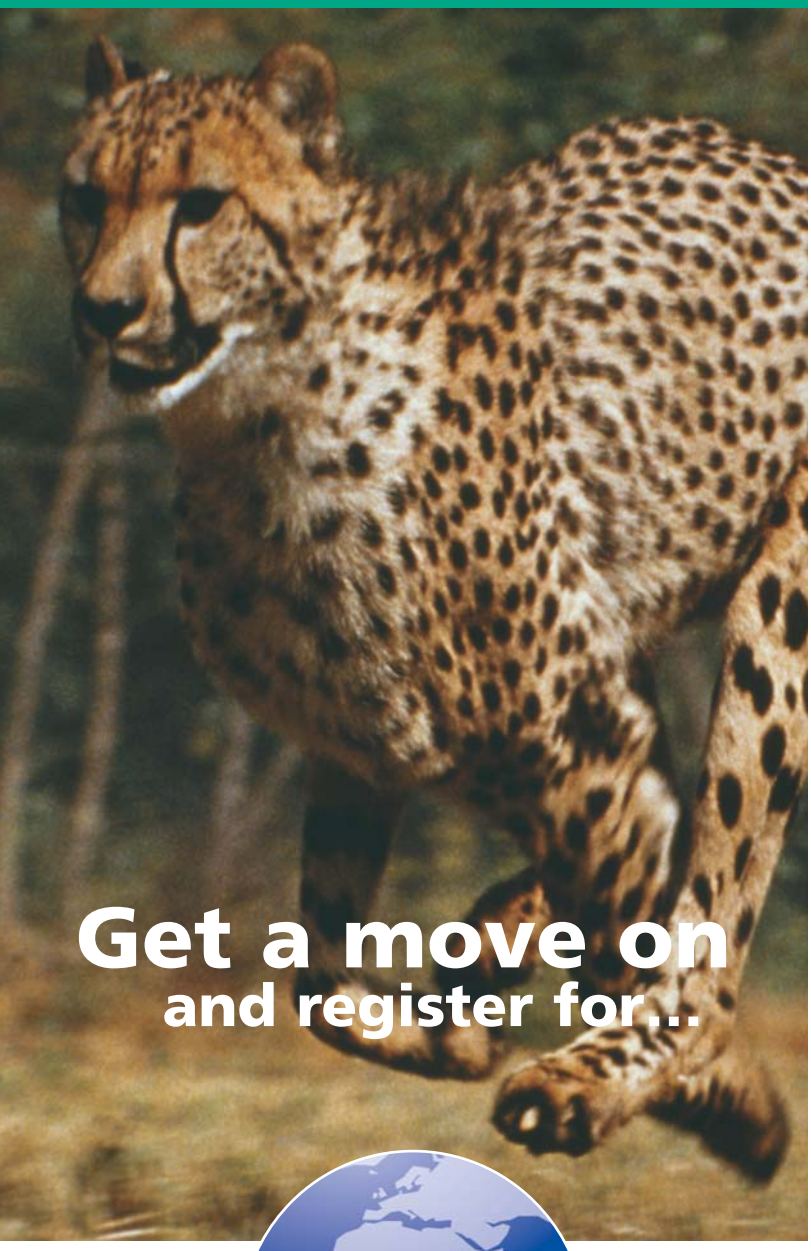
Above, top
Not that different from a microwave cooker with the door open, the Active Denial System deters and breaks-up crowds by making people think they are being burned. Primarily, an operational weapon would be deployed on a vehicle, but aircraft and ship-mounted systems are also being considered.

Above, bottom
The earth's magnetosphere protects us from much of the harmful radiation from the Sun by deflecting the solar wind. Particles do get through, primarily to the polar regions, and when there are solar storms this results in auroras. However, during a reversal of the magnetic field the strength would be much reduced, resulting in earth being bombarded by a much greater level of solar radiation. (NASA illustration)

WEB SEARCH

Earth's collapsing magnetic field	http://tinyurl.com/5wnco
Radio Weapon	http://tinyurl.com/43ede

THINGS TO DO:



TRANSMISSION 2004

25–26 SEPTEMBER

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BWBF

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www.blind.org.uk

ALL ABOUT TRANSMISSION 2004

'Transmission' is the annual amateur radio fund-raising event for the British Wireless for the Blind Fund (registered charity number 1078287). This year, 'Transmission 2004' takes place over the weekend of 25 – 26 September.

All radio amateurs are encouraged to take part in order to raise funds for this very worthwhile charity. The idea is that you ask your friends, family, workmates - anyone in fact - to sponsor you for contacts made during the weekend of 25 – 26 September.

This year is slightly different as trophies will be awarded to the individuals and clubs/groups who make the most contacts or raise the greatest amount of money for the charity. Certificates will be sent to all individuals and groups/clubs who either raise more than £10 for BWBF or who make a donation of at least £10 to BWBF. In order to qualify for one of the trophies you must be a current member of the RSGB and resident in the UK. However, overseas amateurs and non-members of the Society are also invited to join in the fun and raise funds for BWBF (they simply do not qualify for the trophies, although they are eligible for the certificates).

Rules:

1. Obtain an official sponsorship form from: 'Transmission 2004', British Wireless for the Blind Fund, Gabriel House, 34 New Road, Chatham, Kent ME4 4QR; tel: 01634 832501; fax: 01634 817485; e-mail: janet@blind.org.uk; or download one from the BWBF website at www.blind.org.uk

2. Ask as many people as you know – family, friends, workmates, other radio amateurs – to sponsor you for contacts made during 'Transmission 2004' on 25 –26 September. Sponsorship can be for either a certain amount per contact or for a single sum, irrespective of the number of contacts made.

3. Sponsored contacts can be made at any time between 0000UTC on Saturday 25 September and 2400UTC on Sunday 26 September.

4. The definition of a "contact" for the purposes of 'Transmission' is a two-way exchange of callsign and signal report. Each station may only be contacted once per frequency band per day. In other words, every station contacted on 25 September may be contacted again, on the same frequency band(s), on 26 September and that second contact may also be counted towards the overall number of contacts made.

5. This is not an amateur radio contest, so sponsored contacts can be made on any band for which you are licensed, including 10, 18 and 24MHz.

6. Sponsored contacts may be made with your own callsign, a club callsign or a GB special event callsign. (Applications for GB special event callsigns must be made in the normal way at least 28 days prior to the event. Full details from AR Dept, RSGB, Lambda House, Cranborne Road, Potters Bar EN6 3JE; tel: 0870 904 7373 or e-mail: ar.dept@rsgb.org.uk).

7. Trophies will be presented to:

(a) the individual raising the most funds for BWBF;

(b) the group or club raising the most funds for BWBF;

(c) the individual making the greatest number of contacts during 'Transmission 2004';
and

(d) the group or club making the greatest number of contacts during 'Transmission 2004'.

Certificates will be awarded to all stations raising at least £10, or making a donation of £10 or more to BWBF. Please send cheques made payable to 'British Wireless for the Blind Fund' to the address in 1. above.

All donations are gratefully received, no matter how small, but the minimum amount to be raised to qualify for any trophy is £50. The minimum number of contacts to qualify for an award in category (c) or (d) is 50 contacts.

8. An "individual" is when only one person operates a station callsign, whether that callsign is a personal callsign, club call or GB special event station. The definition of a group or club is any operation of a callsign by more than one individual. Groups and clubs are invited to operate on more than one frequency band simultaneously.

9. To qualify for the trophies, you must return the sponsorship form and a cheque for the amount raised, made payable to 'British Wireless for the Blind Fund', to arrive not later than Friday 15 October 2004.

To qualify for the trophies for the greatest number of contacts you must state how many contacts were made during 'Transmission 2004' and enclose a copy of the log. Either a photocopy of a hand-written log or a hard-copy print-out of a computerised log is acceptable. Please do not send the original of hand-written logs as they cannot be returned, and do not send computerised logs on disk. The minimum information required is the date, time, frequency band, and callsign of station contacted. The log should be signed by the licence-holder (or NoV-holder in the case of GB special event callsigns) as follows: "I certify that this is a true copy of the log-book entry for (callsign) during the period 25 – 26 September 2004. (signature)." Sponsorship forms and cheques returned without log copies will only qualify for the trophies for raising the most funds for BWBF.

To qualify for any trophy you must be a current member of the RSGB on 25 September 2004 and be resident in the UK. (However, special certificates will be sent to all stations raising more than £10.)

10. The trophies will be presented at the RSGB HF and IOTA Convention which this year takes place at the Europa Hotel, Gatwick, Sussex over the weekend of 22 – 24 October 2004. The trophies may be taken home by the winners but must be returned as arranged with BWBF for presentation to the winners of 'Transmission' next year.

By Ian White, G3SEK

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E-mail: g3sek@ifwtech.co.uk

In practice

G3SEK explains the many ways by which the bandwidth of a VHF Yagi can be described. He then allays most of your worries about PC soundcards for amateur radio.

'BANDWIDTH' OF VHF YAGIS

Q What is meant by the 'bandwidth' of a VHF Yagi antenna?

A Any antenna has several different kinds of 'bandwidth'. The best known is the SWR bandwidth - mostly because it is so easy to measure. There is also a different bandwidth across which the antenna gain remains reasonably constant. Different again are the bandwidths across which various aspects of the radiation pattern remain approximately the same.

If an antenna claims to be 'impedance matched' to the usual standard of 50Ω, it will have an SWR-frequency curve that dips somewhere inside the operating band and rises towards the band edges – for example, the blue curve in **Fig 1**. The SWR bandwidth is the frequency range within which the SWR remains below a certain limit. In this example, the SWR bandwidth could be quoted as '143.3 – 146.5MHz, for an SWR less than 1.5.' That includes the whole of our 144 – 146MHz band, at even lower values of SWR, so the SWR bandwidth of this particular antenna is very satisfactory.

SWR=1.5 is a good limiting value for use in bandwidth specifications, because it marks the point where control circuits in many solid-state transmitters will begin to reduce the power output, in order to protect the PA devices from unfavourable load impedances [1]. However, the choice of SWR limit in the bandwidth specification is entirely up to the antenna manufacturer. Choosing a higher SWR value will obviously make the antenna's bandwidth look greater, so always watch out for this kind of 'specmanship'. When reading the antenna specification, note both the claimed bandwidth *and* the SWR limit that the manufacturer has chosen.

The SWR bandwidth specifications for HF antennas tend to use higher limiting values such as SWR = 3, but there are justifiable reasons for this. Most of our HF bands are wider (in percentage terms) than our VHF bands, so it is quite difficult to design HF antennas to maintain a good match across the whole of even one band – and the impedance-matching problems for multiband HF antennas are even more complex. You cannot reasonably expect most HF antennas to cover the whole of every band with an SWR less than 1.5, so your transmitter may be unwilling to deliver full power at one or both band edges. This is where a built-in auto-ATU (or a valve PA with manual tuning and loading controls) comes into play. The additional flexibility of impedance matching means you can easily operate with an SWR of 3 or more [1]. SWR = 3 marks a rough boundary between HF antennas that can justifiably claim to be 'impedance matched' and those that are likely to need an external wide-range ATU. Hence it is quite common to see the SWR bandwidths of HF antennas quoted "for SWR less than 3".

Returning to the original question about VHF beams, **Fig 1** plots three important performance parameters – SWR, forward gain and front/back ratio – against frequency. There are several observations to be made about these three curves. The first is that the forward gain and F/B curves are completely independent of the SWR curve. The gain and F/B curves are determined only by the lengths and spacings of the directors and reflector(s) relative to the driven element. In contrast, the SWR curve is mostly determined by the driven element itself, which often includes a built-in matching network (eg a hairpin, T- or a gamma-match). In order to uncouple the gain curve from the SWR curve, each point on the gain curve is plotted as if the driven element were perfectly matched at that frequency; computer models automatically calculate the gain in this way.

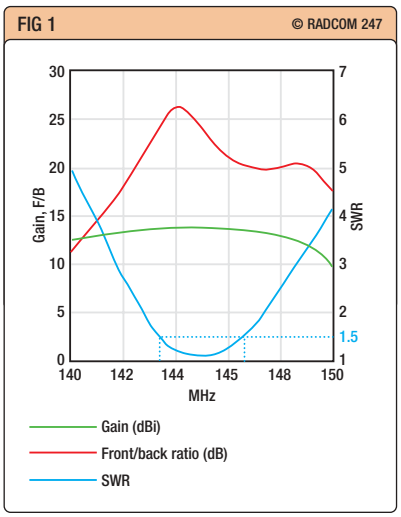

Fig 1
SWR, forward gain and front/back ratio for a typical 2m Yagi. The dotted line shows the SWR bandwidth (for SWR < 1.5).

Gain bandwidth is typically measured between the two frequencies that are 1dB lower than the maximum gain. Fig 1 is typical of many modern VHF Yagis, in that the gain bandwidth is much wider than the SWR bandwidth. However, not all designs are as good as this one. The gain always drops off more steeply on the high-frequency side than on the low side, because at higher frequencies the directors become electrically longer, and will eventually begin to behave like reflectors instead. The Yagi in Fig 1 shows only the mildest signs of this effect, but some older long-Yagi designs have a much narrower gain/frequency peak with a very sharp 'cliff edge' on the high side. Another problem that affects all Yagi designs is that on a significant number of days in the year, the electrical lengths of all the elements will be increased by loading due to raindrops or frost. The effect of this loading is to shift the whole gain curve leftwards, bringing the sharp drop-off in gain closer to the operating frequency. If the Yagi actually goes 'over the edge', it will be useless until the weather clears. Designers take two precautions to stop this happening. One is to design the director structure to have a wide, relaxed bandwidth as shown in Fig 1; and the other is, if in doubt, to reposition the gain peak 1 – 2% higher in frequency. Both of these precautions involve a small sacrifice in forward gain, but it's much better to have a beam that will continue to work well *enough* in almost any weather.

Now let's see how the shape of the radiation pattern varies with frequency. **Fig 2** shows the pattern of our example Yagi at three frequencies, spaced 1MHz apart. You can see that some features of the pattern are almost independent of frequency, while others are quite frequency-sensitive. The outer (0dB) ring in Fig 2 is the forward gain value at 144.3MHz, and all other values

are relative to this. Fig 1 showed that the forward gain varies very little with frequency around 144MHz, so all three patterns in Fig 2 almost overlap at 0°. Fig 2 also shows that the forward beamwidth [2] varies very little with frequency. However, once again this is not true of all designs. You can see in Fig 2 that the first sidelobes at ±50° are quite frequency-dependent, and in some designs they can noticeably affect the shape of the main lobe.

Moving around to the sides of the pattern, an excellent front/side ratio is guaranteed. The horizontal patterns of horizontally-polarised Yagis will always show deep nulls at ±90°, simply because the elements do not radiate end-on. Any filling of the ±90° nulls that you may notice in practice will be due to reflections along the propagation path, and/or unwanted RF currents along the boom or surface of the feed-line. However, vertically-polarised Yagis have no null at ±90° azimuth; for when the elements are vertical, they are always oriented sideways-on towards you. Designers have to work quite hard to achieve a good front/side ratio in that plane of polarisation.

The front/back ratio peaks much more sharply with frequency than the forward gain does, and it always peaks at a lower frequency. The optimum compromise is to place the F/B peak right at the bottom of the band – which will please the VHF DXers – and this will automatically place the gain peak further up the band to please the FMers and satellite operators! As Fig 1 shows, the F/B ratio of this particular Yagi is still quite respectable at 146MHz. However, the F/B ratio only tells you about the suppression of signals in *one* unwanted direction – exactly backwards. Since that isn't where most of the unwanted signals will actually be coming from, you really need to be thinking about the rejection of signals from *all* unwanted directions. Fig 2 shows that our example Yagi has three significant rearward lobes - the back-lobe at 180° and also two more at ±140° - these are quite frequency-dependent. The design is nicely balanced at

FIG 2 © RADCOM 248

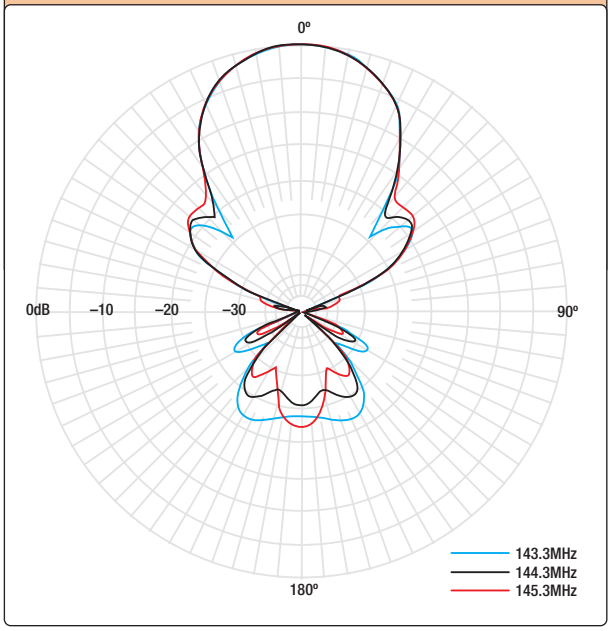

Fig 2
Radiation pattern of the Fig 1 Yagi at three frequencies in 1MHz steps. Note which parts of the pattern are frequency-sensitive, and also which parts are not.

144.3MHz, with all three lobes about equal and tucked inside the -25dB contour. At lower frequencies, the lobes at ±140° start to grow quickly; while at higher frequencies, those lobes shrink and it's only the rear lobe that starts to grow. Details vary from one Yagi design to another, but good suppression of unwanted rearward lobes can only be maintained over a relatively narrow bandwidth compared with the forward gain.

'BEST' SOUND CARD

Q Which sound card would be the best for my radio PC?

A Almost any modern (PCI-era) sound card should be fine. Even the cheapest ones will be more than adequate for amateur radio purposes, and there is no point in using a more expensive card. 'Studio-quality' sound simply isn't going to help when the sound card is interfaced to a radio transceiver. Any objective differences between different sound cards will be completely masked by other variables such as the transceiver, the user settings of input/output levels, and possibly the CPU/RAM resources of the host PC.

I suspect that the question itself is out-of-date – it harks back to the days of very primitive sound cards, when there may indeed have been significant differences in performance between various models. But today, even the cheapest sound card uses a chipset that completely outclasses anything manufactured in the old days. Likewise, any reasonably recent PC is likely to have more than enough CPU/RAM resources to support the sound card and associated software.

In terms of both age and performance, we can draw a rough dividing line between sound cards and PCs that used the old ISA card slot, and the modern PCI slot. The modern hardware is likely to be up to the job, but the older hardware may be struggling. Therefore my advice would be:

- If you already have a PCI sound card, stop worrying.
- If your PC has PCI slots but you're still using an old ISA sound card, upgrade to a PCI sound card. You should be able to get change from a tenner.
- If your PC motherboard is so old that it doesn't even have PCI slots, it's probably time to upgrade that as well.
- In all cases, you're more likely to make worthwhile improvements by reviewing your I/O level settings. This topic has already been covered in the November 2003 and January 2004 columns, and for best results you should also read the pdf of the longer article by K1UHF (follow the link from the 'In Practice' website). ♦

NOTES AND REFERENCES

[1] Strictly speaking, the transmitter does not know or care about the SWR - it only knows about the actual load impedance into which it has to operate. The load impedance at the bottom end of the feed-line will depend on not only the feed-point impedance of the antenna but also the electrical length of the feed-line. The SWR can only indicate what the possible range of load impedance values could be, depending on the length of your particular feeed-line.

[2] The beamwidth is the included angle measured between the two points on either side of the main (forward) lobe that are 3dB down from the maximum at 0°.

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New truths about small tuned loops in a real environment Part 2

Part One showed how the 'intrinsic efficiency' of transmitting loops can typically be 80 to 90% or more, as also confirmed by some proposed extensions to existing EM theory. This part stresses the importance of the loop environment, proposes a resolution of the 'loop controversy' and indicates how loops can best use a poor environment. The second section shows how to make efficient higher power transmitting loops with reasonable bandwidth. It includes some favourites, a few 'curiosities' tried on the way, and some ideas for future small-loop development.

FIG 1 © RADCOM 240

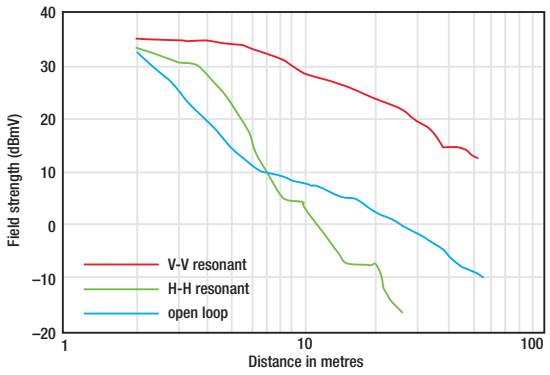


Fig 1
7.01MHz path loss for dry winter conditions. Red – VV with both loops resonated and matched; green – HH with both loops resonated and matched; blue – VV with one loop 'open' and used as untuned H-field sensor

FIG 2 © RADCOM 241

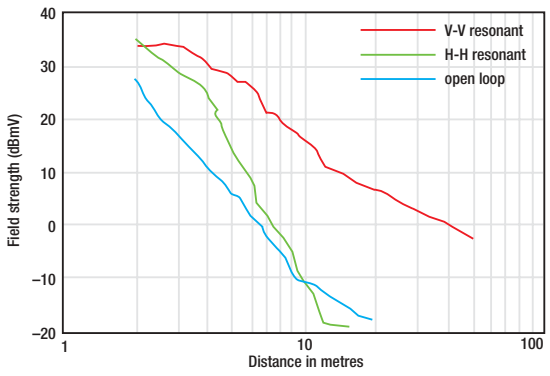


Fig 2
3.68MHz path loss for dry winter conditions (+2°C). Red – VV with both loops resonated and matched; green – HH with both loops resonated and matched; blue – VV with one loop 'open' and used as untuned H-field sensor.

FIG 3 © RADCOM 242

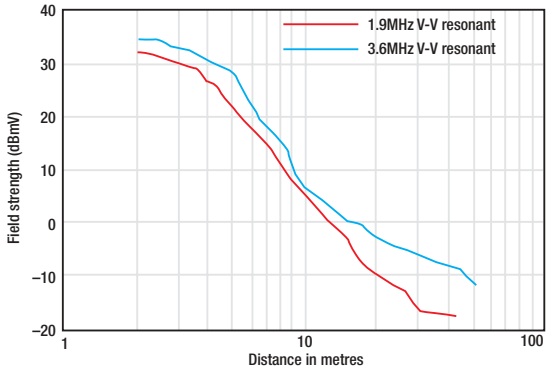


Fig 3
Path loss for wet winter conditions (+5°C). Red – at 1.9MHz, VV with both loops resonated and matched; blue – at 3.6MHz, VV with both loops resonated and matched

My answers to the loop critics should be obvious from the measurements and analysis given below. The results speak for themselves! Once again, the measurements are a joint effort with my PhD student, Marc Harper. I acknowledge his indispensable help with gratitude.

ENVIRONMENTAL EFFECTS

GROUND EFFECT MEASUREMENTS BY THE TWO LOOP METHOD

We have measured the loss between a pair of identical loops at various distances and frequencies over the 'real ground' of a small 80m by 20m 'paddock' of clay soil partly surrounded by trees. Measuring distances are from 2 to 50m. Several 'runs' have been performed at various frequencies, and under different weather and ground conditions. The differences are very revealing and would never have been uncovered by simulation!

With this method, no calibrated field strength probe is required. The field strength at the halfway point is found directly from half the measured loss and the given the source power. Also, the gain and overall 'effectiveness' of both loops together can be found directly by factoring out the inverse square law. The 'environmental' efficiencies of the loops can be found from the saturation path loss values observed at very close spacing. Most of the measurements in **Figs 1 to 3** have already been reported at the Nordic HF04 conference [3, last month].

In Figs 1 to 3, VV means both loops vertical and 'edge on' to each other (in the same plane). HH means both loops horizontal and 'edge on' to each other (in the same plane). 'Open loop' means the receiving loop operated as an untuned field sensor with

FIG 4 © RADCOM 243

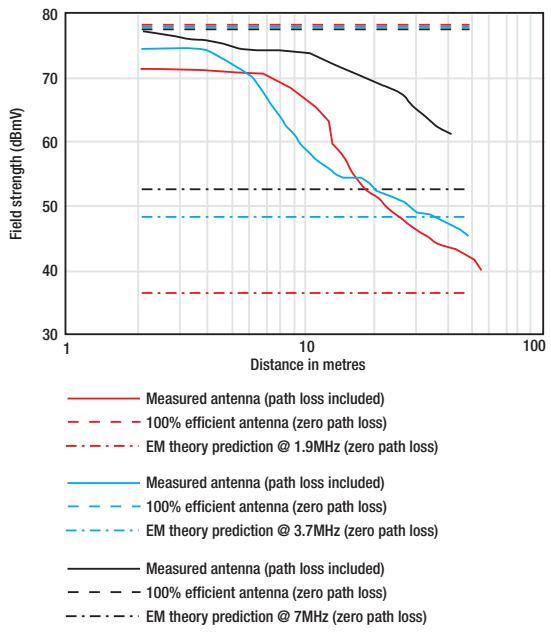


Fig 4 Loop pair 'environmental' efficiency from close-in saturation level relative to upper 100% and lower 0.1% efficiency levels at 1.97MHz, 3.7MHz and 7.1MHz.

no tuning capacitor and with a high-impedance voltmeter (or oscilloscope probe) measuring across the loop.

Battery-powered MFJ-259 and -269 Antenna Analysers were used as signal sources. Both gave 0.5V into 50Ω, or 50mW. A Tektronix 210 sampling oscilloscope was used as the 'calibrated' path-loss meter. Short 2m coax leads were used at each end. The TDS-210 has an FFT option (8-bit) which gave some useful selectivity and a better signal-to-noise capability at lower signal levels. At close range, the FFT overloaded and saturated but, before this point, the FFT was switched out and the signal strength was measured directly as an RMS voltage on the TDS-210 digital oscilloscope. The FFT was calibrated against the TDS-210 RMS voltage reading in the crossover region. For HH measurements, at 50m range, 50mW was not enough to give a sufficient signal-to-noise-ratio for ±0.5dB accuracy. For later measurements, an FT-817 was used, powered by a 12V sealed lead-acid battery, on its second power position which gave an output power of 1.28W.

In most of the plots, the +34dBmV level corresponded to zero loss (± 0.5dB). Zero loss was established by direct connection of a 50mW 50Ω source to the FFT input via a x10 oscilloscope probe.

At 7MHz in Fig 1 for VV orientation, we see a 6dB/8ve slope corresponding to an inverse square law out to 50m. The HH curve has 12dB/8ve slope corresponding to an inverse fourth-power law out to the 30m measurement limit. The 'open loop' VV plot shows an intermediate 6dB/8ve part, surrounded by two 12dB/8ve sections. This indicates that the vertical loop H-field probe is inaccurate and unreliable over real ground, even if calibrated. At 20m, the HH to VV path loss difference is 30dB or 15dB per antenna.

The 'open loop' or 'magnetic field sensor' results are very significant. Figs 1 and 2 show that, at 3.6MHz, the HH and VV open-loop (field-sensor) curves fall abruptly at short distances. The VV curve can be back-projected to argue for a loss of about 5dB per antenna occurring within a radius of about 10m. The conclusion is that, in the near field, 'open', 'closed', and 'tuned' loops behave significantly differently with range.

Figs 2 and 3 show that, for wet ground conditions, the loss under each antenna at 3.6MHz is increased to about 10dB. At 1.9MHz, the wet ground appears to extend the distance over which the fourth-power law holds.

The coupling between two identical high-*Q* tuned circuits becomes 100% at a distance where the coupling factor, *k*, is $kQ = 1$, typically at about 2m to 5m spacing. The latest 'summertime' plots in **Fig 4** also show the 100% and 0.1% efficiency levels assuming 100% coupling. The measured loss is then the 'environmental' loss of *both* loops. The 'environmental' loss includes the loss coupled back from the environment and it is always greater than the 'intrinsic' loss.

The total loss values in dB (to ±0.5dB accuracy) and the resulting 'environmental efficiencies', at 2m distance in Fig 4 are: 6.5dB and 47% at 1.97MHz; 3.6dB and 66% at 3.7MHz; and 0.5dB and 89% at 7.1MHz. The corresponding 'heat-balance intrinsic efficiencies' mentioned in Part One are 74% at 1.98MHz, 85% at 3.7MHz, and 90% at 7.03MHz. Thus, we can conclude that the 'environmental' losses are nearly double the 'intrinsic' losses found from the 'heat balance' method of Part One. This agrees remarkably well with previous 'wide-band *Q*' measurements of both 'environmental' and 'intrinsic' losses for 1m loops.

AMA5 (CapCo) 1.7m loop with two turns and HV tube capacitor for 160m.

CONCLUSIONS FROM THE TWO IDENTICAL LOOPS MEASUREMENTS

1. The losses under vertical and horizontal loops are about 5dB and 15dB respectively. Received sky-wave signals confirm this 10dB difference.
2. Losses occur mainly within a radius of about twice the top height of the loop.
3. For wet ground, the additional path loss at more than 10m range can be about 10dB, or 5dB per loop or field sensor probe.
4. The range plots of open-loop field sensors differ significantly from the same loop used in tuned-loop mode. Different types of field probe will, therefore, give different results, and errors of 5 to 15dB in field probe sensitivity and antenna efficiency are indicated.
5. 'Environmental' losses of a pair of identical loop can be almost double the 'intrinsic' losses found from obtained by Wideband-*Q* and Heat-Balance methods. These are still well above the Chu-Wheeler [5, last month] and Kraus-derived value of about 0.1% to 1% for this size of loop!

In summary, the losses of 'real ground' under a small loop, *and under any field strength probe* are much greater and more variable than previously reported.

LOOP CONTROVERSY CONCLUSION?

Perhaps we can now see how the 'loop (and small antenna) controversy' can be ended. On the one hand, we have the traditional theory and formulas (Kraus and Chu-Wheeler) and the simulations (*NEC*) which say that the small ($D = \lambda/100$) tuned loop is either very inefficient (<0.1% or -30dB) or very narrow bandwidth and high *Q* (>30,000). Furthermore, field strength measurements and *NEC* simulations at distances of 100m to 1km seem to support this. On the other hand, we have the unequivocal 74 to 90% (1m loop) intrinsic efficiency measurements reported in Part One. The difference can, therefore, be as much as 30dB.

But this discrepancy is approximately the same as the total loss we find directly under the loop *and* its field sensor, about 15dB each, depending on real ground conditions at the two ends of the measurement

path. Thus, for field strength measurements taken at more than a few metres from the loops, a loss of up to 30dB may be incorrectly ascribed to one of the loops and its efficiency may *appear* to be only 0.1%.

In summary, *the losses caused by the 'real' ground under the loop* ***and*** *under the field sensor have been incorrectly assumed to be the loss of the transmitting loop itself.* When this is taken into account, there is no 'small loop controversy'. The solution has been found! Need one say any more, except perhaps to bring the theory and simulations up to date? Perhaps, unfortunately, yes we do!

FIELD STRENGTH MEASUREMENTS OVER GROUND – A NEW CONTROVERSY?

These measurements question the validity of many past field strength measurements over real ground made by any type of field sensor. Field sensors need to be calibrated at the time of use for the actual weather and ground conditions. In the UK, it is well known that these are not very predictable! We conclude that most previous antenna gain measurements over ground should be regarded as suspect and in need of re-validation. So, one controversy resolved, but now at the cost of introducing another!

A theoretical explanation is now proposed for this new 'controversy'. It is based on 'How an Antenna Works' given in Part One of this article. The mathematical detail has been left out.

The solutions to Maxwell's equations have traditionally been simplified by the use of the 'Lorenz Condition' which allows separated but 'equivalent' *E*- and *H*-field solutions to be found. The problem is that the Lorenz condition holds in the far-field but conflicts with the boundary conditions at surfaces and thus does not hold in the near-field of an antenna. Thus, the Lorenz Condition does not hold in the near-field and the *E*- and *H*-field equations are not independent and cannot be decoupled. The local coupling between the *E* and *H* equations can be found by establishing a local impedance value $Z = E/H$ at each point in the space surrounding the antenna. The 'boundary conditions' require that the field distribution for *H* is not exactly the same as the distribution of *B*, and the field distribution for *E* is not exactly the same as the distribution of *D*. We therefore use the Biot-Savart and Gauss type of equation (with time delay and distance taken into account) to provide local values of $\varepsilon = D/E$ and $\mu = B/H$. Then, the impedance is found as $Z = \sqrt{(\mu/\varepsilon)}$ and the (phase) velocity as $v_p = \sqrt{(1/\mu\varepsilon)}$. *E*, *D*, *B* and *H*, at any point in space, can now be found.

Multi-resonant 3.5 to 30MHz rotatable 1.4m loop in attic.

Each of these four field quantities can have its own field sensor. We know that the voltage from an open-circuit small loop is a measure of the *B* field (magnetic flux). We know that the open-circuit voltage from a short whip is an *E*-field measure. We suggest that the short-circuit current from a small loop is a measure of the *H* field. We suggest also that the short-circuit current from a short whip (or small folded monopole or dipole) is *D*-field measure. (These proposals can be extended to deal with toroidal and multipole sensors for higher order fields near complex antenna shapes.)

The 'two identical antennas' measurement method can resolve the new 'controversy'. With it, we can find the ground losses at any desired measurement point for a third antenna for which the 'gain' is to be measured. The ground losses at the measurement point may then be factored out and the new 'controversy' is also ended.

DEALING WITH POOR LOOP ENVIRONMENTS

The environment has by far the most dominant effect on loop performance. An indoor environment may, in some cases, be irretrievably poor. Some buildings act as very effective 'Faraday cages', giving almost total screening of 'signals in' and 'signals out'. A case in point is a building with aluminium backed heat insulation (and metal fly-screens). Steel-framed buildings can be almost as bad. What is not well known is just how far the screening effect can extend outside the walls of such a building. When staying at Dayton University for the 2002 Hamvention, I found (with Stewart, G3YSX) serious attenuation (at 7MHz) at up to a distance of 50m.

One way to transmit from 'hopeless' indoor location is to use the loop as an ATU to match a 'concealed' outdoor long loop or long wire. Obviously this is a last resort!

Some actions to optimise the loop in its environment are therefore:

(a) Get the loop as high as possible and preferably out of doors.
(b) Use a (small) ground-plane under the loop whether indoors or out-of-doors. This minimises ground or building losses. An attic ground-plane will also reduce received domestic noise and reduce inference transmitted to domestic equipment.
(c) Use more than one antenna mode, for example, by unbalancing the loop. The bandwidth and power handling is increased and the overall antenna pattern will be changed.
(d) Make full use of the directional properties of a loop with a rotator.
(e) Try a radiating ground wire tapped on the loop. This increases the bandwidth and power handling, and changes the overall antenna pattern.
(f) Use an indoor loop as an ATU for a concealed outside antenna.

EFFECT OF SWR ON EFFICIENCY

When the loop is not perfectly matched to1:1 SWR over the required operating bandwidth, some overall system efficiency may be lost. A useful formula for the SWR versus frequency deviation from resonance as a fraction of the 3dB half-bandwidth can be derived from $\rho = 1/\sqrt{(4/x^2 + 1)}$ and SWR = $S(x) = (1 + \rho)/(1 - \rho)$. See **Fig 5**. Some useful SWR reference points are: $S(x) = 5.83$ at $x = 2$; $S(x) = 2.62$ at $x = 1$ for the 3dB bandwidth points; $S(x) = 1.64$ at $x = 0.5$; $S(x) = 1.5$ at $x = 0.41$; $S(x) = 1.39$ at $x = 0.333$.

Also plotted in Fig 5 is the 'mismatch efficiency' = $(1 - \rho^2)$. But this must treated with care. The loss of overall system efficiency may be (a) more, or (b) less than this:

(a) Practically all solid-state rigs reduce output power from maximum when the SWR is greater than about 1.5:1 (with reflection coefficient, ρ, of 0.2), giving a mismatch efficiency of 96%. But the output power reduction caused by the PA protection circuitry is then typically to 60 to 80% of maximum.

FIG 5 © RADCOM 244

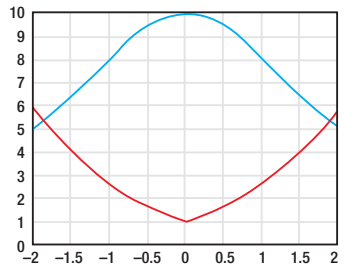


Fig 5
SWR and 'mismatch efficiency' versus frequency, x, as a fraction of the half-bandwidth. Red curve = SWR, S; blue curve = efficiency (on a scale of 0 – 100%).

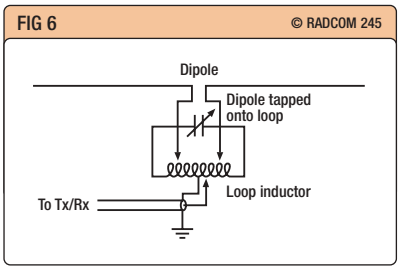


Fig 6
The use of a loop as an ATU for a dipole or long-wire.

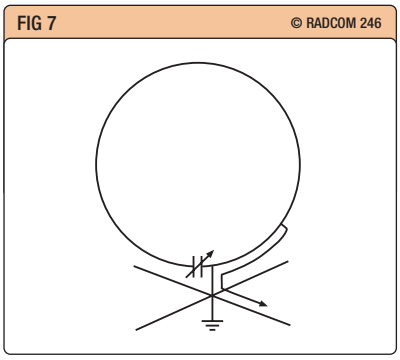
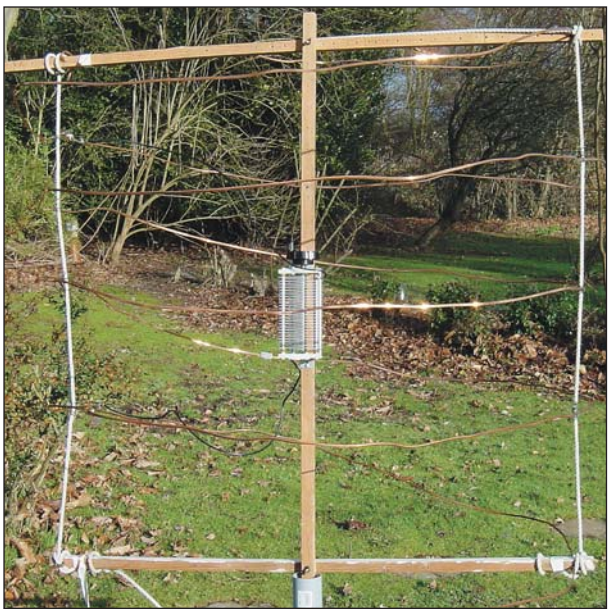


Fig 7
The G3LHZ loop-monopole arrangement.

(b) For a valve PA, mismatch protection is rarely used. Depending on the 'AC resistance' of the PA, and the length of the (coaxial) transmission line between the PA and the ATU, the actual loss may be usefully less than the mismatch loss and the operating bandwidth can be almost doubled.

USE OF AN ATU WITH LOOPS

A well-designed loop can have an adequate SWR over most of its tuning range, but an ATU can give a more flexible system. A simple switched inductor L-net is all that is required, because the loop tuning itself provides a third fine-tuning variable even at the end of a long coax feed. For 100W operation, I use a modified MFJ-16010 (with extra switched capacitance, a 'reversing' switch and a 'bypass' switch). Be aware that the ATU can sometimes increase the system *Q* unnecessarily. Automatic ATUs can also be used if the loop bandwidth is not too small.



Five-turn 'coil' (1m x 1m) for 160m and 80m.

DEALING WITH THE LOW BANDWIDTH OF EFFICIENT (BALANCED) LOOPS

Part One gave the example of an efficient 1.7m two-turn loop with an operational bandwidth of only 2.3kHz on 160m. This low bandwidth needs to be increased without loss of efficiency. Two ways of doing this are:

(a) Unbalance the loop by connecting a ground point to one side of the capacitor. The 'loop-monopole' below is an example.

(b) The loop is made to act (in part) as an ATU for an additional dipole or single wire.

THE LOOP AS AN ATU FOR VERY POOR INDOOR ENVIRONMENTS

Some buildings are 'Faraday Cages' with no 'workable' indoor signals. An indoor loop can then be used as an ATU for a thin 'invisible' outdoor antenna. Dipoles, doublets or long wires can be connected to the loop about one sixth of the loop circumference from the loop ground-point as indicated in **Fig 6.** Tapping points are chosen using crocodile (alligator) clips for attaching the thin wire doublet/dipole or long-wire. The tapping points are chosen to give an increase of SWR to about 2:1 and an ATU is then used to avoid having to change the matching on the loop. Thin wires can be pushed through metal fly screens! Thin black wires are almost invisible out-of-doors.

PRACTICAL LOOPS – THE BEST OF THE BUNCH SO FAR

'Best of the bunch' means loops that are well matched with low SWR, high power, wide tuning range, broadband, and for which the overall antenna system is efficient.

THE LOOP-MONOPOLE

The loop-monopole is my favourite general-purpose loop. **Fig 7** shows a small ground plane and the tuning capacitor at the bottom. I prefer to use a 'twisted gamma-match', but any loop match arrangement may be used, provided the ground is connected to one side of the capacitor. It is an unbalanced loop. As a consequence, we find that the folded monopole and loop radiation resistances become equal at about 4MHz (theoretically almost irrespective of loop size). The loop then becomes usefully unidirectional and the operating bandwidth at this frequency can be as much as doubled. Below this frequency, the antenna behaves more like a monopole ground-plane and less like a loop. The bandwidth continues to increase rapidly and the *Q* typically drops to less than 100. The ground-plane need not be larger than about twice the size of the loop, and this gives a very significant reduction of interference (EMC) to any equipment below the loop. An additional choke balun to suppress feeder radiation further is optional, but gives peace of mind on this score!

Apparently the loop mode being more dominant at lower frequencies is predicted by *NEC*, as Alan Boswell and Jack Belrose report [2, last month], but this contradicts 'traditional' radiation resistances being proportional to f^4 for a loop, and to f^2 for a short dipole! Both cannot be right! But the single 'new' dominant loop mode radiation resistance is proportional to f (actually fD^2), and this solves the problem. Confirmation comes from the observation of 'unidirectional' loop-monopole radiation patterns (towards the capacitor).

LOOP MATCHING

There are three recommended 'inductive' matching methods for the small tuned loop. (Fixed capacitive matching gives a good match only over a restricted loop tuning range.)

A small matching loop, typically about quarter-size or less, isolated from the main loop, gives a naturally 'well balanced' loop. For a perfect 50Ω match, the loop usually has to be 'squashed', partly overlapping the main loop or, alternatively, spaced or twisted away from the main loop. A half-screened Faraday loop is favoured by those who perhaps want a particularly well-balanced loop for local noise rejection. On a balanced transmitting loop, I have never found a Faraday loop to be necessary.

I favour the 'twisted gamma' match. Its advantages and versatility were described in reference 1, last month. It gives no measurable degradation in loop efficiency! The photograph shows a new 'twisted gamma' match on the (AA&A) AMA5 1.7m = 5ft diameter aluminium loop, with the original Faraday loop (disconnected). The AMA5 covers 3.3 to 12MHz and has a particularly nice CapCo variable capacitor that actually allows loop operation at >400W SSB, although only originally specified for 200W! The two-turn 10mm copper tube loop and the 'plumbing' capacitor are additions for 160m operation.

You can also use a 'delta match' with the coax feed conveniently at the centre of the loops. For best balance, the 'earthing' leg can be finely adjust-

ed towards the point on a loop opposite the tuning capacitor. This is a convenient arrangement for a radiating coil as shown in the photograph.

HIGH VOLTAGE CAPACITORS

For transmitter power P_{Tx}, the voltage across the loop tuning capacitor is $V_{cap} = \sqrt{(P_{Tx}\ Q\ X_{Loop})}$ and the current is $i_{cap} = \sqrt{(P_{Tx}\ Q\ /\ X_{Loop})}$, where $X_{Loop} = 20\ f_{MHz}\ D$. For 100W to a 1.7m-diameter loop with a Q of 330 at 2MHz, we have $X_{Loop} = 68\Omega$, $V_{cap} = 1.5$kV and $i_{cap} = 22$A. For 400W, these values are doubled.

The homemade fixed capacitors described in 'The Truth about Loops' [1, last month] had a voltage rating that was inadequate for efficient loops running more than about 50W. The failure mode was puncturing of the polythene dielectric by the high local fields at the sharp edges of the aluminium foil. Several layers of polythene did not stop this!

The latest high voltage capacitors are made from telescoping lengths of 28mm, 20mm and 15mm copper plumbing tubing. The spacing material is Mangers 'Self Adhesive Pipe Lagging' obtainable at hardware stores, or central heating specialists. This is sold typically in 10m lengths of 50mm wide plastic tape-backed foam material nominally 3mm thick. It is wound tightly, diagonally, and non-overlapping, over about half the pipe length at one end, to allow about 50% capacitance adjustment. Modified parts of plastic pipe fittings are used to make sliding waterproof joints at the other end (do not use O-rings as spacers – they burn nicely with a few hundred volts of RF!). First tests indicate usability on loops transmitting at least 400W. The Q is about the same as for an air-spaced capacitor. The larger pair of tube sizes gives a capacitance of about 350pF/m, and the smaller pair, 250pF/m.

The 919D series of low voltage (4.5 to 15V) geared motors (ratios up to 3000:1), from www.mfacomodrills.com, are particularly recommended for loop capacitor tuning. For tuning capacitors with fixed end-stops, an additional epicyclic drive can provide extra gearing and a 'slipping clutch' action to protect the motor and gear train when the end-stops are reached.

RECOMMENDED LOOPS AND COMPONENTS

The photographs show a gallery of loops and components, some already mentioned. The AMA5 aluminium loop has an added 'twisted gamma match' on the left and the 'Faraday loop' at the bottom is disconnected. The two-turn 160m loop at right angles is connected in series with the 'plumbing' capacitor across the AMA capacitor. In this way, some 50kHz of the 160m band can be covered. The unbalanced loop-monopole (multi-resonant rotatable version) recommended above, has a 20dB uni-directional horizontal null on 3.7MHz. The door on the motorised capacitor box at the bottom is shown open. The five-turn coil performed best on 160m with the coil axis horizontal, but it was not as good as a two-turn 1m loop. The 'adjustable coupling' 2 x 1m loop is successfully used in a bungalow (mother-in-law's) in North Thoresby, near Grimsby. An external '(radiating?) counterpoise' is shown connected at the bottom.

FUTURE DEVELOPMENTS

Here are some suggestions for future work.

1. Measuring and overcoming the losses inside and just outside buildings of different types of construction.
2. Further work on (critically) coupled parasitic loops. They give a useful reduction of ground losses and a doubling of bandwidth, but setting up is difficult.
3. Loops on towers for comparison with dipoles at the same height.
4. Rotatable loops for optimising NVIS signals. (The NSEW orientation at both ends should be the same.)
5. Optimised uni-directional loop patterns by control of the proportion of loop mode to monopole/dipole mode.
6. Range switching of higher-power loops requires a home-made 'relay' that can carry about 20A and hold off several kilovolts without corona problems. Any ideas?
7. More on multi-resonant loops for wider frequency coverage without switching.
8. For minimum received local noise, active untuned broadband loops with switching between *B*- and *H*-field sensing modes.
9. A simulation to model a loop (and toroids) correctly in any practical (ground-wave) environment.
10. Investigations of how a loop launches the *DH* and *EB* ground waves (of any polarisation).

CONCLUSIONS

The small tuned loop continues to be seriously underestimated by those who prefer old theory and simulation to 'real' measurements. Typical (intrinsic) efficiencies of transmitting loops of 80% to 90% or more are confirmed by proposed extensions to old EM theory.

Adjustable angle loop pair, used /P.

The ground losses under a loop or any field-measuring probe or sensor, are typically much higher than previously assumed and it is not correct to assign these losses to inefficiency of the loop itself. When correctly assigned, the 'small loop controversy' is no more. A remaining controversy is the credibility of past field measurements over ground, and any antenna efficiency measurements based on them. The two-identical-antenna (short-range) measurement technique obviates the need for field sensors, and provides a means of resolving the 'new controversy' quickly. Potentially useful *D* and *H* field sensors are proposed in addition to existing *E* and *B* field/flux sensors.

A suggestion has been made for dealing with poor and *very* poor loop environments. This may well offend and be derided by the 'loop purists' but it does work. The 'best of the bunch so far' is yet again incomplete. But my favourite at the moment is the 'loop-monopole'!

I believe that theory and simulation will eventually catch up with real measurements, but it may take time. Remember, an exact match of theory and simulation is not a proof or validation of either. Likewise, existence for 60 or 130 years without testing against 'real' measurements is not a proof of validity - it is a failure of the scientific process. We now have the equipment and understanding to make the 'real' measurements needed for the resolution of scientific controversies. There is more to be done, and more 'truth' to be found about the loop in its environment. Considerable damage has been caused to the reputation of tuned loops and other small antennas by past dogmatism and imperfect understanding. We need now to repair it. Whatever you do, do not write off loops on the basis of theory and simulation only. Try them! ♦

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This month Don Field looks at the role of the QSL Manager for DX stations. Plus news of a major UK club operation from the Isle of Man and all the rest of the HF news.

HF

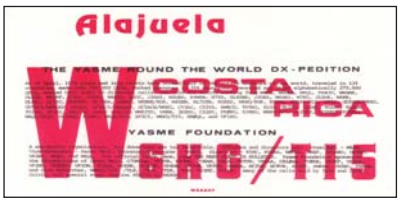
I was asked recently by one of my readers to say something about how to become a QSL manager. It's certainly a good topic, but I'll widen it slightly to talk about QSL management in a broader sense, so that it is relevant to any of you who collect QSLs, whether you intend to become a QSL manager or not.

I'm not sure when the first QSL manager came into being, but it almost certainly goes back several decades. For example, when many UK servicemen were operating from around the world in the 1950s and 60s, a number of them appointed UK-based QSL managers to avoid mail having to be sent overseas and possibly not even finding them, as they may well have been posted elsewhere at short notice. And, of course, with the early 'DXpedition' operators, many would deal with their own QSL cards on their return to the UK, US or wherever.

Nowadays, every DXpedition will have a QSL manager, and many DX stations will, too, even if they are permanent residents. This can be for several reasons, perhaps because of a risk of postal theft so that mail goes missing, perhaps because they are so busy with work and radio that they lack the time to take care of QSL matters.

Most QSL managers come into the job (a voluntary, though often time-consuming one) through personal connections. Maybe they were the one member of the DXpedition who failed to take a step backwards when volunteers were called for, or maybe they are a friend of the overseas amateur concerned. But occasionally a DX station will make a plea for someone to become his QSL manager, and occasionally a would-be QSL manager will volunteer via one of the DX bulletins or Internet reflectors, offering his services to any DX station who needs a manager.

The role takes on various guises. Usually the first job will be to organise the printing of suitable QSL cards, and a mechanism for receiving the DX station's logs. The latter task is much easier nowadays, as they can usually be sent via e-mail. I recall when Martin Atherton, G3ZAY, was QSL manager for VP8ANT (Antarctica) in the early 80s, that the only way to get log information was over the air, through twice-weekly skeds, because supply ships only dropped in a couple of times a year.



QSL from just one of the numerous DXpeditions by Lloyd and Iris Colvin, W6KG and W6QL.

The QSL manager will then need to ensure that the world is aware that he has taken on the role. Again, notices in the DX bulletins and magazines do the trick, plus ensuring there is an entry on the qrz.com website, which is most amateurs' first port of call nowadays. By the way, it's no good offering to be a QSL manager if you are 'details withheld' in the Callbook, or have moved house in, say, the last five years, because many amateurs will look you up in old Callbooks and mail can easily end up going to the wrong place.

Once the mail starts to arrive, the task of actually responding to cards starts in earnest. Most QSL managers aim to turn cards around within a couple of weeks, or a month at the most. How they do this will vary. Some will set aside a regular weekday evening, others will deal with cards daily as they come in. Most nowadays use logging programs to deal with incoming cards, as it is much easier to track down a contact via a logging program than in a paper log, especially if the sender has got the time wrong (maybe didn't convert it to UTC, for example). Many logging programs generate QSL labels, but many managers use specialist QSL management software such as BV by DF3CB.

Of course, there will be the frustration caused by those who make life difficult by not sending a return envelope, sending insufficient return postage, forgetting to write vital information on their QSL card, and the hundred and one other problems that occur. And, of course, the QSL manager will also need to deposit envelopes with his incoming QSL bureau to collect and deal with cards that come via those means.

QSL management isn't a task to be taken on lightly, but is much appreciated by the amateur community as a whole, as it speeds up the whole QSLing process for those cards where you don't really want to wait for the bureau system to work its magic. There have been some real stalwarts over the years, who have handled cards for large numbers of DX stations; people like W2CTN, WA3HUP, W2GHK and W3HNK come immediately to mind. Generally it has been individuals, one notable exception being the YASME Foundation, which handled QSL cards for the expeditions of the late Lloyd and Iris Colvin, W6KG and W6QL, where the task was shared around a team of helpers. The recent 3B9C DXpedition has taken a similar approach, with up to 12 volunteers handling the expected influx of 100,000 or so QSL requests, the difference being that the 3B9C team are able to use the Internet and a server-based QSL management system to streamline the whole process in a way which would not have been possible when Lloyd and Iris were alive.

Whenever you use a QSL manager, do remember the great job they do – a word of thanks enclosed with your card is always appreciated.

QTH Corner

4S7PAG	Joel Sutterlin, F5PAC, 1 Rue du Rossberg, 68310 Wittelsheim, France.
G3HCT	(new address, for A25/G3HCT etc) John Bazley, PO Box 7665, Toowoomba Mail Centre, Toowoomba, 4350 QLD, Australia.
NN9K	Peter E Beedlow, 741 Greenway Avenue, Colona, IL 61241-9337, USA.
OJ0YC	Patrik Willfor, OH6GDX, Långviksgatan 24 B13, FI - 65100 Vasa, Finland.
OX/DL2SWW	Frank Dreyer, DL2SWW, Gartenweg 9, D-19069 Alt-Meteln, Germany.

DX NEWS

Members of the Wrexham and District Amateur Radio Society will be operating from the Isle of Man (EU-116) during the period 1 - 8 September. The site that will be used is Scarlett Point, a disused Coast Guard lookout tower, approximately 1.5 miles south of Castletown (WAB SC26). Operation will be on all bands CW, SSB, RTTY, PSK and some SSTV. The team plans a high level of activity on the low bands, with particular attention being paid to 160 and 80m. They will use the callsigns GB4IOM and GB4SPT. A number of awards are planned for working the

COUNTRIES WORKED, 2004

(sorted this month by CW totals)

CALL	CW	SSB	DATA	MIXED
W1JR	230	230	161	253
G3XTT	208	131	76	238
G4KFT	180	0	0	180
G3LHJ	165	62	97	188
G4IRN	157	0	0	157
G3VDL	156	0	0	156
G3YVH	153	21	0	153
G3SXW	150	0	0	150
MU0FAL	146	87	0	154
G4WXZ	146	68	0	146
G3TXF	145	0	0	145
VK4BUI	133	93	0	152
G4OBK	130	88	77	182
G3ZRJ	129	9	0	129
GM0TGE	118	142	0	178
G3YMC (QRP)	116	0	0	116
M0BVE	114	0	0	114
G4DDL	79	10	14	79
GM8OEG	68	89	78	120
G4FVK	58	78	0	96
G0GFQ	32	77	33	85
M0CNP	28	83	74	102
M5AEF (1W)	9	20	0	25
G4NXG/M	0	157	0	157
M5GUS	0	153	0	153
M0BKV	0	101	34	104
GU0SUP	0	0	96	96
G0LGJ/M	0	89	0	89
MM1APX	0	57	62	73
G7CLY	0	38	0	38

station on multiple bands and / or modes. See below. QSL via the bureau or direct to M1LCR.

The Chippenham & District Amateur Radio Club will be active as GB2LI from Lundy Island (EU-120) on 21-28 September. They plan to operate CW and SSB on all bands. QSL via G3YBT.

A group from the World Wide Young Contesters (WWYC) plan to put on a DXpedition from Market Reef (EU-053) between 23 and 26 September. They will be on all bands and modes, signing OJ0YC. Check their website for further information.

DL2RMC and DL1RTL are due to be active from the Faeroe Islands, (EU-018) signing OY/home call from 30 August through 10 September. More details are available on their website.

John, G4IRN, will be active from Lesotho as 7P8RN on all bands from 3 to 12 September, mainly CW but perhaps some SSB. QSL via G4IRN.

Masa, JQ3DUE / 4S7DUG, and a group of amateurs from Japan will be active from Sri Lanka, 4S7, 18 to 23 September. They will operate all bands, but with particular emphasis on the low bands.

Eight members of the Tennessee Valley DX Association will operate as W4D from Dauphin Island (NA-213) from 1900 on 24 September for three days. The group will be active on 80 - 10m SSB. QSL via WA4AA, direct or the bureau.

Pete, NN9K, will be on Miquelon Island (NA-032), from 10 to 18 September, signing FP/NN9K. This will be a CW-only operation with particular focus on the 30m band.

Three Americans will be on from Bonaire, Netherlands Antilles, 22 - 29 September, 80 - 10m, mostly SSB, CW and RTTY. PJ4/W9ILY will primarily be on RTTY, particularly the CQWW RTTY

9 BAND TABLES No 51

CALL	1.8	3.5	7	10	14	18	21	24	28	TOTAL
MIXED MODE										
W1JR	268	314	331	320	335	326	332	325	329	2880
G3KMA	257	303	329	323	334	330	335	324	332	2867
G4BWP	254	306	333	322	335	329	335	316	326	2856
G3XTT	237	281	320	287	334	317	333	300	314	2723
GW3JXN	193	264	301	291	328	320	322	298	305	2622
G3GIQ	153	248	305	270	334	321	333	308	328	2600
G4OBK	193	236	289	297	330	312	320	304	303	2584
G3SED	240	268	299	289	315	298	304	277	288	2578
G3TXF	145	245	305	304	329	307	327	288	306	2556
G3SNN	186	242	293	247	333	301	326	285	305	2518
GM3YTS	150	247	302	292	334	296	324	261	301	2507
G3TBK	143	241	285	269	331	305	319	293	293	2479
G3LAS	121	215	269	280	322	309	319	301	302	2438
G3YVH	139	172	267	290	325	314	314	280	287	2388
G3IFB	65	229	291	249	327	255	307	250	289	2262
G4PTJ	52	197	261	222	326	281	323	272	305	2239
GM3PPE	148	211	256	273	320	271	279	247	229	2234
G0JHC	3	161	250	287	290	312	319	300	310	2232
G3VJP	107	187	260	190	329	277	316	248	286	2200
G3AKU	115	173	245	254	303	270	277	268	276	2181
G3KMQ	59	214	272	222	324	256	280	260	248	2135
G5LP	75	228	287	227	312	248	286	189	254	2106
G3VKW	50	173	239	148	328	249	324	263	310	2084
G3IGW	129	198	318	242	289	246	264	137	238	2061
M0AWX	48	127	168	26	298	266	292	241	253	1719
G4WFQ	55	154	222	197	254	216	231	175	186	1690
G4OWT	58	118	207	114	311	150	299	122	271	1650
G4NXG/M	26	60	146	0	297	237	292	203	255	1516
G4BGW	10	81	181	166	228	199	229	167	221	1482
G0PSE	49	67	137	133	222	140	181	155	188	1272
MU0FAL	26	32	164	160	167	106	206	151	167	1179
G0LRX	4	105	127	0	241	66	260	82	234	1119
G4FVK	44	79	109	63	191	109	196	87	176	1054
MM0BQI	39	77	136	54	201	86	186	66	175	1020
M0CNP	11	57	86	12	170	106	153	80	123	798
M3CVN	16	55	94	0	129	63	103	41	0	501
M5AEF	0	20	9	7	67	92	72	30	33	330
AVERAGE	**105**	**178**	**235**	**198**	**285**	**240**	**276**	**221**	**253**	**1991**
CW ONLY										
W1JR	264	291	330	320	333	320	326	308	322	2814
G3KMA	251	284	326	323	334	324	332	312	322	2808
G4BWP	233	242	311	320	309	311	314	288	269	2597
G3XTT	229	257	307	287	310	300	309	279	290	2568
G3TXF	145	242	303	304	324	304	322	287	296	2527
GW3JXN	190	241	288	291	315	308	312	277	279	2501
G4OBK	185	221	281	297	314	302	298	287	287	2472
GM3YTS	150	247	300	292	329	290	318	250	289	2465
GM3POI	217	246	295	281	309	272	289	241	259	2409
G0NXX	177	239	282	294	300	292	278	269	270	2401
G3SED	239	256	293	289	291	268	270	233	227	2366
G3YVH	138	172	262	290	317	301	300	265	272	2317
G3SXW	97	209	267	271	318	292	303	260	286	2303
G3LAS	120	162	251	280	285	290	292	267	268	2215
G3AKU	115	173	245	254	293	260	266	251	260	2117
G3NOH	51	124	211	263	303	292	300	258	272	2074
G5LP	75	224	286	227	301	248	277	189	247	2074
G3KMQ	59	208	272	222	316	239	266	233	221	2036
G4PTJ	50	152	236	222	283	264	292	253	267	2019
G3VJP	106	150	249	190	301	254	287	222	254	2013
G3VKW	44	114	195	146	254	196	276	207	221	1653
G4OWT	51	112	182	114	250	107	241	96	218	1371
G4BGW	7	79	175	166	170	188	197	155	192	1329
G4WFQ	29	130	196	179	174	159	166	131	115	1279
G0PSE	48	67	136	133	212	140	175	151	183	1245
MU0FAL	26	21	161	160	145	100	182	127	120	1042
GM4FAM	41	73	102	120	137	109	148	123	124	977
MM0BQI	26	57	100	54	121	54	119	34	117	682
AVERAGE	**120**	**178**	**244**	**235**	**273**	**242**	**266**	**223**	**241**	**2024**

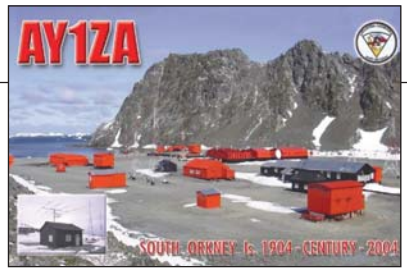
Next Deadline: 8 September 2004. PREPARED BY G3GIQ 8 July 2004 henry@topdx.com

contest. QSL via his home call. QSL PJ4/N2WB via N2OO. QSL PJ4/K9MDO via W9NJB.

Roger, G0SWC, was due to return to the Falkland Islands in mid-August until mid-October signing VP8DBR. He will be active on SSB on the upper HF bands including the WARC bands.

GB4IOM/GB4SPT AWARDS

The GB4IOM / GB4SPT team are offering several awards and there isn't space to give full details here. All involve working both GB4IOM and GB4SPT. There is an M3 / QRP / Mobile award, a Medium Power award and separate 'DX' Awards for European stations and those outside Europe. Also an Islander Award, available to stations operating from a recognised IOTA island and an SWL Award. Then there is a Testing Award for working MD1LCR/P or MD3JRP/P during the 28 August to 1 September set-up



Commemorative QSL from the rare South Orkney Islands which were active earlier this year.

phase. Finally, the team is offering a number of additional awards, which include certificates, Isle of Man, Isle of Man TT and DXpedition T Shirts and Polo Shirts, which they will award to stations whom the team considers, and at the team's discretion, to have fulfilled various specific criteria or been worked at a specific threshold in the operation (eg QSO 10,000). Full details of all awards, including how to apply, appear on the web page.

CORRESPONDENCE AND TABLES

There hasn't been too much detail in your reports this month, reflecting the poor HF conditions, but several of you have noted that you had, indeed, been sending e-mails which obviously hadn't reached me. Apologies for that but, as I said last month, this seems to have been due to a glitch with mail forwarding via the RSGB server.

The nine-band table appears once again this month, with thanks as always to Henry Lewis, G3GIQ. We have collected some 6m scores, but most have stuck with submitting just the nine HF bands, so we will probably include 6m just once a year, especially as scores are not likely to change dramatically during the sunspot minima years.

The Annual Tables scores this month are based on CW scores. It is clear that there is a bias towards CW operating among those of you who participate, though some are exclusively SSB operators. It certainly remains true that it is easier to work DX from a modest station with CW, especially on the crowded bands like 20m, though SSB is more comfortable for 'ragchewing', at least until your CW proficiency becomes quite high. Practice makes perfect, of course.

THANKS

Special thanks go to the authors of the following for information extracted: OPDX Bulletin (KB8NW), The Daily DX (W3UR) and 425 DX News (I1JQJ). Please send items for the November issue by 18 September.

FURTHER READING

YASME - The Danny Weil and Colvin Radio Expeditions, by James D Cain, K1TN. Available from the RSGB Shop.♦

WEB SEARCH	
4S7PAG	www.radio-scouting.org.uk
FP/NN9K	http://nn9k.home.mchsi.com
GB4IOM	http://nn9k.home.mchsi.com
OJ0YC	http://oj0yc.m3php.net
OY/DL2RMC	www.qsl.net/dl2rmc

HF F-Layer, Propagation Predictions for September 2004

	3.5MHz	7.0MHz	10.1MHz	14.0MHz	18.1MHz	21.0MHz	24.9MHz
Time	000011111220	000011111220	000011111220	000011111220	000011111220	000011111220	000011111220
(UTC)	246802468020	246802468020	246802468020	246802468020	246802468020	246802468020	246802468020
*** EUROPE							
Moscow	72.....1456	661....16667	..21.113661.	..2444557...	...67777....	.....	.....
*** ASIA							
Yakutsk	.....	.....21.	.11...136771	..34343.....	...151.....	....1.....	.....
Tokyo	.....	.....22..	.....112..	.....	.....	.....	.....
Singapore	.....	.....11..	.....132..	.....231..	.....122...	.....1....	.....
Hyderabad	.....	.....	2432	.....2451.	..111156....	...22353....	....223.....
Tel Aviv	45.....1222	661.....6665	6.5....37628	...532357...	.....	.....	.....
*** OCEANIA							
Wellington	.....	.....15...	.....1124...	...1122.....	.....	.....	.....
Well (NZ) (LP)	..3.....	.79.....	679.....333	5.82.....664	.....65.	.....	.....
Perth	.....	.....1..	.....1...	.....	.....1.....	.....	...11.....
Sydney	.....	.....11..	.....111..	.....	.....11.....	.....	.....
Melbourne (LP)	.....	..37.....	.138.....	...71.....1	...5.....1.	.....	.....
Honolulu	.....	.....	..11.....	...11.....	.....	.....	.....
Honolulu (LP)	.....	.....	.....1...	.....16...	..1...1.721.	..2111..73..	...222..6...
W. Samoa	.....	.....	..111.....	...1221.....	....111.....	.....	.....
*** AFRICA							
Mauritius	.....	1.....111	.....121.	.....121..	.....12...	.....11...	.....
Johannesburg	25.....111	48.....6876	.5.....7873	.....1885.	.....275..	...1..1362..	...334567...
Ibadan	.....	11.....	315.....222	..72....12..	..68422362..	...832127...	...8....9...
Nairobi	.....	.....	.1.....	11	..2.....11..	..121..12...	...231232...
Canary Isles	333.....432	775.....1656	6563...13566	..262112465.	...7766777..	...5777776..	.....3...
*** S. America							
Buenos Aires	.....	324.....13	..1.....1.	.....	....1....4..	....11..13..	....1...12..
Rio de Janeiro	.....	..1.....1.	.....1..	.....1..	....1...261.	....211135..	....111132..
Lima	.....	.....	.....	.....	.....1..	.....1.....	.....1.....
Caracas	.....	.....	..1.....	.....	....1.....	.....1.....	.....1..1...
*** N. America							
Guatemala	.....	.....	.....	.....	.....	.....	.....
New Orleans	.....	.....	.....	.....	.....23334..	......2121..	.....
Washington	.....	333.....2	5.1.....25	.....14.	.....43345..	.....12232..	.....
Quebec	451.....15	665.....67	.....2.	.....112..	.....72237..	.....4..	.....
Anchorage	.....	121.....	..1.....	.....11..	.....	.....	.....
Vancouver	.....	.....	.....	.....	.....11..	.....	.....
San Francisco	.....	.....	.....	.....	.....1...	.....	.....
San Fran (LP)	.....	.....	.....	.....3....	.....52...	.....531..	.....32...

Key: Each number in the table represents the expected circuit reliability, e.g. '1' represents reliability between 1 and 19% of days, '2' between 20 and 30% 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 it is expected to be strong.
The RSGB Propagation Studies Committee provides propagation predictions on the Internet at http://members.aol.com/g4fkhgwyn The page is updated monthly. The provisional mean sunspot number for July 2004 issued by the Sunspot Data Centre, Brussels, was 51.0. The daily maximum / minimum numbers were 100 on 19 July, and 9 on 7 July respectively. The predicted smoothed sunspot numbers for September, October and November are respectively: (SIDC classical method - Waldmeier's standard) 38, 36, 35 (combined method) 40, 40, 40. Longpath predictions are shown with (LP) following the path name. Higher input power and superior aerials have been used for these predictions; less well-equipped stations may find the longpath predictions somewhat inaccurate.

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E-mail: g3kma@dsl.pipex.com

IOTA

Roger Balister reports on the first event celebrating IOTA's 40th anniversary and congratulates the recipient of the first VHF IOTA award.

Aboard the *Königin Katharina* on Lake Constance, l to r: Joe, I2YDX; Roger, G3KMA; Teresa, M3MKI (IOTA Co-ordinator); Nando, IT9YRE; Mauro, I1JQJ; and Carlo, IK2IWU.

The first event to celebrate IOTA's 40th Anniversary Year took place at Friedrichshafen Ham Radio at the end of June, as reported on page 6 last month. The IOTA Committee could not offer an IOTA operation there but did the next best thing and held IOTA's birthday party afloat on Bodensee (Lake Constance), chartering one of the lake's famous steamers on the Saturday evening for a buffet dinner cruise to Lindau Island down the coast. It was something of a challenge organising it at distance and gauging likely take-up but in the end the committee was delighted to see a completely full boat with over 130 enthusiasts including family members. Among the guests were the President, Jeff Smith, MI0AEX; the General Manager, Peter Kirby, G0TWW; DARC representatives Hans-Jürgen Bartels, DL1YFF, and Hans-Heinrich Ehlers, DF5UG; and Wayne Mills, N7NG, representing the ARRL and DXCC. And what must be a record of some sort, 11 of the 130+ on board were amateurs from Guernsey!

Committee Chairman Martin Atherton, G3ZAY, organised a number of quizzes which went down very well. The stand up challenge for 'activated most new, ie previously unnumbered, IOTAs' was won by Bernhard, DL2GAC, possibly better known as P29VMS and H44MS - although he had lost count of the exact number! And the joint winners of the 'activated most IOTAs' were Alain, F6BFH, and Gus, DJ8QP, with 56 each! Quite a few others on board came close. A quick tally of new ones activated by those present pointed to well over 100 with significant contributions from Joe, I2YDX; Martin, G3ZAY; Nando, IT9YRE; Jim, K9PPY; Roberto, IK2WXZ, and Hans, DF5UG, as well as those previously mentioned.

During the evening there were plenty of reminiscences. Mention was made of Geoff Watts who founded the IOTA Programme in late 1964. Roger, G3KMA, read out a letter received in May from Geoff's son Hedley, G0BBV, and daughter Barbara thanking him for a copy of the new *Directory* and expressing their appreciation of the way that the programme had been developed. To quote: "Geoff would have been 'over the moon' at the way you have expanded IOTA throughout the world." Coincidentally, the *Directory* had reached them on the eve of the anniversary of their father's death 10 years ago.

The occasion was blessed with marvellous weather, an excellent meal and pleasant musical accompaniment throughout. A thoroughly enjoyable event.

GATWICK 2004

The next opportunity to celebrate IOTA's 40th is at the RSGB HF and IOTA Convention at Gatwick over the weekend of Friday 22 to Sunday 24 October. A special programme is being organised for the IOTA stream that includes 'Onwards to 50 Years', a keynote presentation on possible major new programme developments by the IOTA Committee including a link into Logbook of The World. In addition there will be presentations during the weekend on recent island operations by 3B9C (how could we miss that?), T33C and OX/DL2VFR, as well as videos of the VI5WCP and VI5BR Australian DXpeditions. The highlight of the weekend will be a Gala Dinner on the Saturday. Don't miss this event [see page 69 for further details - *Ed*].

FIRST VHF AWARD

We are very pleased to be able to announce the issue of the first VHF / UHF IOTA 100 Islands Award to Arne Nilsson, SM7AED. Arne made all his contacts on 50MHz. Readers active on the band may be interested in the continental breakdown: EU 45, AF 13, AS 9, NA 20, SA 5 and OC 9! Yes, it can be done.

Hearty congratulations to Arne. Your scribe is at 96 worked since July 2001 with a breakdown of EU 57, AF 11, AS 7, NA 14, SA 5 and OC 2. Still some way to go to get the cards in... ♦

IOTA 2004

SEPTEMBER & OCTOBER 2004

There are numerous counters for premium points. Look for island groups in the US, the Caribbean and South America.

NOVEMBER 2004

NA-036	VE7	Vancouver Island
NA-051	VE7	Queen Charlotte Islands
NA-065	W7	Washington State North group
OC-027	FO	Marquesas Islands
OC-044	VP6	Pitcairn Island
OC-046	FO	French Polynesia, Windward Islands

DECEMBER 2004

OC-013	ZK1	Rarotonga Island
OC-019	KH6	Hawaiian Islands
OC-030	KH4	Midway Islands
OC-040	ZK2	Niue Island
OC-045	KH8	Tutuila Island
OC-048	ZK3	Tokelau Islands
OC-067	FO	French Polynesia, Leeward Islands
OC-083	ZK1	Aitutaki group
OC-097	5W	Samoa Islands

Table 1: Some of the regularly activated island groups counting for premium points during September to December 2004. For further information on this current activity programme, see the CDXC website.

NEW REFERENCES

AF-096	3X	Guinee-Maritime Province North group (Guinea)
AS-170/Pr	R0I	Shelikhova Bay group, Magadanskaya Oblast (Russian Federation - Asia)
AS-171/Pr	4S	Sri Lanka's Costal Islands (Sri Lanka)
OC-266	VK6	Western Australia State (North Coast) Centre group (Australia)

Pr = Provisional

WEB SEARCH

RSGB IOTA Programme	www.rsgbiota.org
IOTA Manager's website	www.g3kma.dsl.pipex.com
CDXC	www.cdxc.org.uk

RSGB IOTA PROGRAMME, PO BOX 9, POTTERS BAR, HERTS EN6 3RH
E-MAIL: IOTA.HQ@RSGB.ORG.UK

By Bob Treacher, BRS32525

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The results of last year's SWL Challenge are published, plus all the rest of the SWL news.

Time to get ready for 2004's CQWW SWL challenge

The statement in the last column about the SWL Challenge being withdrawn is only true with regard to the WPX Challenge. The CQWW Challenge in October and November remains. The 2003 results are reproduced here and were circulated to those entrants who provided return postage. Although the number of entries seem to diminish year on year, all participants thoroughly enjoy the contest weekends. This year's rules can be found on the Internet (see 'Web search' below). I had thought of withdrawing the CQWW Challenge as well, but it was quite clear from comments with your logs how much you all enjoy it, so it continues. The standard of logging for the 2003 Challenges was very good indeed and all entrants followed the rules which made checking the logs so much easier. Congratulations to the section winners.

QSL HABITS

By the time that this column appears, all direct 3B9C SWL QSL requests either direct to my address or to the 3B9 PO Box will have been cleared. As I write this in early July, I have checked almost 500 reports against the 3B9C log. The FSDXA website said that three consecutive loggings were required in order to qualify for a card. However, some reports were just of one QSO made by the 3B9 team. It really is ludicrous that listeners should not be able to adhere to this with an expedition making in excess of 100,000 QSOs. I have been generous in most cases this time but in future if the instruction is to log three consecutive QSOs, then you will not get a card from me if you don't. As the 3B9C team have qualified the SWL QSL 'rules', others will follow suit. If doubt had not been cast on some SWL QSLing habits - through this column and in discussion with others - I think it unlikely that this 'rule' would have been employed, although I have for many years been advising listeners to report more than one QSO when sending SWL reports.

Graham M5AAV, apart from being the Society's M5 series QSL Manager, handles cards for G6PZ, GB6MD, TX4PG, ZK3SB and Z21KF. He has also noticed the disturbing trend of getting SWL reports that do not correspond with the log. He was quick to point out that they were not reports from British SWLs, but any SWL who takes his loggings from the *DX Cluster* and submits a QSL card saying that he 'heard' the station in QSO is one too many and gives the rest of us a bad name. These recent experiences have led Graham to the view that asking listeners to report on more than one QSO is good practice, which he hopes will put an end to suspicious 'Cluster loggings'.

SWL DECLINE?

Referring to the July column, I am pleased that Howard, G7ESM / M3IOM, challenges my comments about the decline of SWLs. He offers an alternative view, thinking that most amateurs, including himself, now seem to spend more time listening than transmitting. There can be no doubt that the more time spent listening before picking up a microphone, the better. Not only will the operating skill be better, the person will have a greater knowledge of propagation and band conditions.

He recently went on a business voyage to the Indian Ocean on a freighter, and took his lightweight ham gear with him, intending to work stations not normally audible from the UK. However, his plans were thwarted by the ship's regulations which would not allow 'unauthorised' transmissions from the vessel. Whilst he was disappointed, he wasn't too unhappy because he could still listen to, and log, lots of stations which he would not normally have heard. He even plans to QSL the stations he heard with a photo QSL of the ship.

Tom Read, BRS180710, considers that it is certainly the case that the Foundation licence has created new interests for many who used to spend more time as SWLs. He went for the full licence in 2001, but the effect was the same, and most of his SWLing hours have been replaced by Summits On The Air activating or chasing. He considers that SWLs are still out there, and he knows of many non-licensed listeners to 144MHz frequencies in the north-west, but they and others would probably call them scanner enthusiasts rather than SWLs. Tom knows that many listeners are still addicted to the broadcast bands. There are many in the British DX Club and they have no amateur aspirations. And of course, there are still the more well-known SWLs that crop up from time to time, like Peter Rayer, G-13038, and Chris Gibbs, BRS47426. Tom provides some interesting SWL news about SOTA which I'll cover next time.

BAND REVIEW

Robert Small's, BRS8841, view of the month of June was that "it was hardly exciting". The bands had been a combination of mid-summer blues and low sunspots culminating in the DX being quite hard to find. The high HF bands had been very poor, with only a few EU stations by Sporadic E. 14 and 18MHz had been the best bands for DX, but even here there had been little on in the middle of the day to cause any interest. 7MHz had provided 5Z4DZ, TU2/F5PTM, HJ4OBA/1, NP3XF and VK6WC. Nothing to get too excited about on 30m either, but UK/JI2MED, CO2CI, PJ2/PB2T and OJ0J found their way into his log. 14MHz was best early and late in the day. Highlights were ZA5A, RV6ASX/P (EU-185), SX9A/94, D44AC, TA1ED/0 (AS-098), SY8DX, OH0I/OJ0, 6Y5SI, NQ4I/AM, KH6ZM, NP2I, D90HC, RI0KM (AS-089), RI0IMA (AS-170) and RW3DTB/0 (AS171).

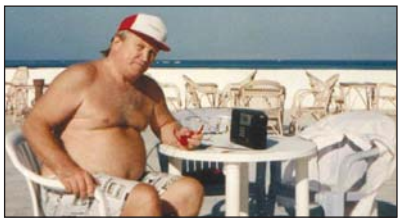
CQWW SWL CHALLENGE RESULTS 2003

SSB

Single operator

Pos	SWL	Mults	28	21	14	7	3.5	1.8	SCORE
1	GW-5218	538	108	102	108	99	71	50	883,396
2	ONL383	516	105	101	106	90	72	42	804,960
3	BRS8841	436	94	77	88	80	51	46	524,944
4	OE-527	397	87	83	80	75	49	23	454,962
5	DO5HCS	409	80	82	68	78	59	42	445,401
6	RS95258	308	62	56	67	46	45	32	252,560
7	F-14846	276	51	51	62	42	46	24	175,536
8	NL-290	253	26	41	59	64	44	19	159,137
9	DE0WAF	182	38	33	25	31	31	24	144,872
10	DH2URF	215	39	37	38	37	33	31	98,040
11	BRS31976	114	64	0	0	0	0	50	34,884
12	ZL-2001	75	26	18	31	0	0	0	23,625
13	R3D-204	109	0	36	31	23	19	0	17,985
Multi-multi									
1	I5-1990	426	101	94	79	66	49	37	513,756
Multi-single									
1	BRS91529	570	115	102	111	93	83	66	997,500
CW									
Single operator									
1	ONL383	548	101	110	101	104	81	51	907,488
2	DO5HCS	442	79	71	78	66	48	24	488,188
3	BRS8841	377	59	74	73	71	54	46	380,393
4	DH2URF	379	62	76	73	77	49	42	378,621
5	SU/OK2BOB/SWL269	63	47	70	59	25	5		340,285
6	DE0RFE	357	83	72	58	60	43	41	315,945
7	DE0WAF	51	14	9	5	11	6	6	11,577

Multi-multi, Multi-single: no entries in 2003.



SU/OK2BOB/SWL operating in the CQWW Challenge last year from Egypt.

FINALE

I really have run out of space this time. Apologies for not having the space to reflect the news and views of Wyn, GW8AWT; Douglas, BRS54163, or Alan, G0RLW. ♦

WEB SEARCH

Rules, CQWW SWL Challenge 2004
www.rsgb.org/membersonly/swlchallenge

By Tim Kirby, G4VXE

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Contest

This month Tim Kirby previews RSGB and international contests taking place in September, and looks at the success of some UK participants in overseas contests.

The Dorking and District Radio Society station, G3CZU/P, during VHF NFD in 2004.

Contest Calendar

HF Contests

Date	Time	Contest	Mode	Bands	Exchange
4/5 Sep	1300-1300	RSGB SSB Field Day	SSB	3.5-28	RS+SN
4/5 Sep	0000-2400	All Asian	SSB	1.8-28	RS+Operator Age
11/12 Sep	0000-2400	Worked All Europe	SSB	3.5-28	RS+SN
18/19 Sep	1200-1200	Scandinavian Activity	CW	3.5-28	RST+SN
18/19 Sep	1600-0700	Washington Salmon Run	CW/SSB	1.8-50	RS(T)+Country
25/26 Sep	0000-2400	CQWW RTTY	RTTY	3.5-28	RST+CQ Zone (14)
25/26 Sep	1200-1200	Scandinavian Activity	SSB	3.5-28	RS+SN

VHF Contests

Date	Time	Contest	Mode	Bands	Exchange
4/5 Sep	1400-1400	RSGB 144MHz Trophy	ALL	144	RST+SN+Locator
5 Sep	1100-1500	RSGB 144MHz Backpackers	ALL	144	RST+SN+Locator
7 Sep	2000-2230 Local	RSGB 144MHz Activity & Club Championship	ALL	144	RST+SN+Locator
14 Sep	2000-2230 Local	RSGB 432MHz Activity	ALL	432	RST+SN+Locator
19 Sep	0900-1300	RSGB 70MHz	ALL	70	RST+SN+Locator+QTH
21 Sep	2000-2230 Local	RSGB 1.3GHz/2.3GHz Activity	ALL	1.3G/2.3G	RST+SN+Locator
28 Sep	2000-2230 Local	RSGB 50MHz activity	ALL	50	RST+SN+Locator

On HF, the highlight is the SSB field day on 4 / 5 September - a great event for clubs to take part in and to include both established and newer contest operators. The All Asia SSB contest takes place the same weekend, which should guarantee good activity (and a little confusion) from Asia.

The excellent Worked All Europe SSB contest is on 11/12 September. In 2004, the Worked All Europe DX Contest is celebrating its 50th anniversary. Back in 1955 the first WAEDC was initiated by Rudi Hammer, DL7AA. To celebrate this special event, DARC, the German National Society, have created the 'Worked All Europe Super Bowl' a lottery with 50 prizes to be won, so it's even more worthwhile entering this year.

On 18 / 19 September, there's another European contest well worthy of support, the Scandinavian CW Activity Contest with the corresponding SSB event on 25 / 26 September. The Washington Salmon Run - you saw the prizes available last month - runs on 18 / 19 September.

Perhaps the biggest RTTY contest of the year takes place on 25 / 26 September, the CQWW RTTY contest. If you've been trying the data modes in the Club Championships, as I know many of you have for the first time, this would be a great opportunity to work some new countries on RTTY. Give it a go and do let me know how you get on.

The biggest VHF event this month takes place on 4 / 5 September: the 144MHz Trophy. Co-ordinated around Europe this usually provides some interesting contacts even in flat conditions. The final 144MHz Backpackers event of 2004 takes place on 5 September. On 19 September, the 2nd 70MHz contest takes place.

OVERSEAS CONTEST RESULTS

It's good to see two leading entries from the UK in the results of the **2003 ARRL 10m Contest** published recently. Congratulations to Steve, GW4ALG, who made 4th place world-wide in the CW only, QRP category and to Nigel, G3TXF, who also made 4th place world-wide but in the CW only, High Power section. Great results, particularly at this stage in the sunspot cycle.

Thanks to Roger, G3SXW, for alerting me to the results, just published, of the 10th **European HF Championship** in 2003. This contest seems to be ever-growing in popularity. The results are too long to publish in full here, but I've tried to dig out the UK participants from the tables (apologies, in advance, if there are any omissions). In the Low Power Mixed Mode section, congratulations to Lee, G0MTN, who was placed 15th. Steve, G0CKP, was the highest-placed UK entrant in the High Power CW section, at 17th, with G3VHB, G3LZQ and MM0DFV/P also listed. G3SXW, G4IIY, G4BUO, G4DDX, G3LHJ and G4KXG are all shown in the Low Power CW section. Keith, GM4YXI, takes 2nd place in the Low Power SSB section, with G3VAO in 14th place and M5RIC also listed.

In the same booklet come the results of the 6th **Slovenia Contest Club RTTY Contest** 2003, which again shows plenty of UK participation, more evidence of the growing interest in data-modes contests in the UK. GM4FDM is listed in the Single Operator, High Power section as is GW5NF. UK entrants in the Single-Operator, Low Power section are GU0SUP, G0MTN, G3LHJ, G7MMF, G3URA, G4EDR, G4EMT, M5AEX, GU6EFB, G7TMU, M5RIC and M3DXL. G6OKU took 10th place in the Multi Operator, Low Power section. ♦

2nd SLOW SPEED CUMULATIVES, 2003

There was about the average number of entries and stations on the air during the five sessions, with a few new calls. There were three clubs that took part this time: Reading ARC with operators G0VQR, G8FIF and M1CYL; Meirion ARC using GW4LZP and the Midland Contest group with operators M0BLT and M0CDL. There were several M3s active during the contest but none sent in a entry.

Congratulations to the leading club, Reading ARC. In the full licence section, first was Mick Puttick, G3LIK, and second was Dick Sellen, G3YAJ. Leading 'First Timer' was Stephen Cocks, G4ZUL.

Derrick Webber, G3LHJ

Pos	Call	1 Sep	9 Sep	17 Sep	25 Sep	2 Oct	Totals
1 *	G3LIK	200	205	-	+	250	655
2 *	G3YAJ	200	205	+	+	225	630
3	G3RSD	-	210	185	-	200	595
4	G4EBK	205	170	+	-	215	590
5	G4BLI	190	-	155	195	+	540
6	G2HLU	180	+	170	-	165	515
7 *	Reading club	-	130	145	-	145	420
		-	(G8FIF)	(G0VQR)	-	(M1CYE)	
7	G0IBN	-	160	90	105	-	355
8	G4CVA	-	115	130	+	110	355
8	GW4LZD club	+	100	105	+	150	355
9	G0VYR	145	165	-	-	+	310
10	G3ZRJ	-	205	-	-	95	300
11	G0RPX	85	120	85	-	-	290
12	GI0RQK	+	+	80	105	95	280
13	G0FYX	+	+	90	105	80	275
14	G4PTE	+	75	85	-	110	270
15	M5HFD club	70	-	-	75	105	250
16	G0BON	65	-	80	-	90	235
17	G3ZDD	80	-	+	70	80	230
18 *	G4ZUL	-	+	55	55	75	185
19	G0WWD	-	-	55	55	50	160
20	M5ALG	-	-	-	65	90	155
21	PA0FEI	-	-	-	-	25	25

* = Certificates. + = Checklog. Thanks also to G3EAO, GM3UM and GX3NJA for their checklogs.

AFFILIATED SOCIETIES SSB CONTEST 2004

Posn	Club	Contributing Stations			Score
1*	Lichfield ARS 'A'	G3VHB	G4XUM	G3NAS	8970
2 c	De Montfort University ARS 'A'	G8VHI/P	G4EOF	G3ORY	7870
3 c	Lichfield ARS 'B'	G3NKC	G3NLY	G3SJJ	7820
4	Cray Valley RS 'A'	G4BUO	G4DBL	G3RCV	6820
5	Hadley Wood CG 'A'	G0IDA	G3ZVW	G6BOX	6360
6	Newbury & DARS 'A'	G3SVD	G3KLH	G3RVM	6190
7	Grimsby ARS 'A'	G3TBK	M0AJT	G3RSD	6130
8	Sutton & Cheam RS 'A'	G4CWH	G3WHK	G4ERW	5990
9	Chesham & DARS 'A'	G0ODQ	G3XZG	G3RXQ	5540
10	Bristol CG 'A'	G3WBV	G3XSV	G3YHV	5340
11	GM DX Group 'A'	GM6NX	GM3JKS	GM3YOR	5100
12	Horsham ARC 'A'	G4HRS	G4TPO	G3ZBU	4920
13	Hadley Wood CG 'B'	G4KZD	M5BXB	G7TWC	4790
14	Contest Cambria	GW4BLE	MW5EPA	-	4660
15=	Echelford ARS 'A'	G0VDZ	G3KKQ	M0SAR	4550
15=	Newbury & DARS 'B'	G3NVO	G3ZGC	G4PSU	4550
17	Cray Valley RS 'B'	M3CVN	G3JJZ	G3SXE	4370
18	Maidenhead & DARC 'A'	G4WJS	G3RGK	G3CJY	4290
19	Dragon ARC	GW0GEI	GW3BUX	GW8IZR	4210
20	Harlow & DARS	G3UEG	G6UT	-	4190
21	Horndean & DARC 'A'	G3LIK	G4FBS	G0MBQ	4100
22	Crawley ARC 'A'	G3VKW	G3YSX	G3KAU	3860
23	Farnborough & DARC	G3HEJ	G4UEL	G0VYR	3780
24	Cambridge University Wireless Society	G6UW	M0BLF/P	-	3740
25	Addiscombe ARC	G3UFY	G3WRR	G3VYI	3500
26	Torbay ARS 'A'	G3LHJ	G3SNU	G4VTO	3410
27	RNARS Colchester	G3YAJ	G3YEC	G4KNM	3340
28	Grimsby ARS 'B'	G4EBK	G0IIQ	M0BZU	3050
29	Contest Cumbria	G3JYP	G3IZD	-	3000
30	Stratford-upon-Avon & DRS 'A'	G3XZO	G0MRH	G0VYE	2950
31	Northampton RC	G3GWB/P	M0LXT	M0LKB	2930
32	Wythall CG 'A'	M0COP	M0AEJ	G0EYO	2910
33	South Manchester R & CC	G0LZL	G3SVW	G3SHF	2880
34=	RAFARS Waddington 'A'	G3SET	G0TQJ	G0RAF	2760
34=	Reading & DARC	G0VQR	G4ELY	-	2760
36	Cray Valley RS 'C'	G4DFI	G0WLF	G3NPS	2640
37	Harwich ARIG	G0CGE	G3YYZ	M0ZZO	2630
38	Harwell ARS	M0DDT	M0CUL	G0THY	2390
39	Stevenage & DARS	G4DDX	M3JUH	M0DAL	2310
40	Echelford ARS 'B'	G0JSH	G4PRI	G6PMT	2290
41	Newbury & DARS 'C'	G3LLK	G4FON	G4TPH	2260
42	Central Notts Scout ARC	G4LPD	G0GDU	-	2200
43	Norfolk ARC 'A'	G4ARN/P	G4DYC	G7SOZ	2100
44	Horsham ARC 'B'	G3SWC	2E0VIN	M3GCR	2090
45	De Montfort University ARS 'B'	M5ZAP	-	-	2080
46	Cheltenham ARA	G3NKS	G4PDQ	-	1940
47	Colchester RA	G4KTI	G3FIJ	2E1GUA	1910
48	Milton Keynes ARS 'A'	M0RPM	M0TIF	G4TZR	1880
49	Maidstone ARS	G3TRF	G4EMC	-	1870
50	Martlesham DX & CG	G4PIQ/P	-	-	1780
51	Bristol CG 'B'	M1EBV	M0MAT	-	1720
52	Basingstoke ARC	G3XNI	M0AEU	-	1650
53	Flight Refuelling ARS	G0WAL	G4POF	-	1630
54	RAFARS Devon	G3LUW	-	-	1620
55	Cockenzie & Port Seton ARC	MM0CPS	MM0SRU	-	1410
56	Torbay ARS 'B'	G0WWD	G4VUD	G3VBIT	1330
57	Grimsby ARS 'C'	G2DWB	M1BYQ	G7BRZ	1200
58=	Echelford ARS 'C'	G3TDR	G3WWT	G3JUL	1170
58=	GM DX Group 'B'	GM4AFF	GM0CLN	-	1170
60	Southdown ARS	G0TYJ	G0UAI	-	1120
61	Glenrothes & DARC	GM4AQO	GM3YBQ	MM0MUL	1080
62	Bolsover ARS	G4AGE	M3CFP	-	1060
63	Milton Keynes ARS 'B'	G3HIU	M0BZK	M0MBO	1050
64	Chesham & DARS 'B'	G0VFW	-	-	1020
65	Three 'A's Contest Group	G3TXF	-	-	980
66	Taunton & DARC	G0EYR	-	-	950
67	Sutton & Cheam RS 'B'	G1POK	-	-	940
68	Gloucester ARES	G3MA	-	-	890
69=	RAFARS Cosford	GW0JEQ	-	-	770
69=	Wythall CG 'B'	G0NES	M0MCX	G6KMQ	770
71=	Horndean & DARC 'B'	G0ASZ	G8BLH	-	730
71=	Verulam ARC	G3VER	-	-	730
73	RAFARS Waddington 'B'	G0SWO	G0NWY	-	670
74=	Crawley ARC 'B'	G6RC	-	-	550
74=	Maidenhead & DARC 'B'	G3TWG	-	-	550
76	Worthing & DARC	G4SLE	-	-	460
77	RNARS Rosyth	MM0WPM	-	-	430
78	Stratford-upon-Avon & DRS 'B'	G3OOQ	G4EZT	-	390
79=	RNARS Birmingham	G3TZM	-	-	370
79=	RNARS Portsmouth	G3OZY	-	-	370
81=	Cray Valley RS 'D'	G0BRV	-	-	210
81=	Norfolk ARC 'B'	M0DFF	-	-	210
81=	RNARS London	G8IB	-	-	210
84	Milton Keynes ARS 'C'	M0AIJ	-	-	160
85	Newbury & DARS 'D'	G6FOP	-	-	140
86	Torbay ARS 'C'	G8XST	-	-	70

* Flight Refuelling ARS Trophy. c Certificate of Merit.

The same three teams occupy the podium as did so last year, the only change being that, while all around them managed fewer QSOs than in 2003, the De Montfort University ARS 'A' team managed to find 30 more contacts between them and so relegate Lichfield 'B' to third position. Lichfield 'A' remain unassailable, however, and secure the Flight Refuelling ARS Trophy for another year.

In the individual listings, G3VHB receives the RSGB Lichfield Trophy as overall leader and G4XUM the certificate for the Runner-up. G8VHI/P (De Montfort University 'A') takes the certificate for third place, breaking the Lichfield stranglehold. M3CVN receives the award for the highest-placed Foundation licence entrant and 2E0VIN the award for highest-placed Intermediate licence-holder. Congratulations also to M0TDG (operating G6UW) whose faultless log containing 202 QSOs really deserves better recognition than just these few words.

Entries were down about 5% this year - rather disappointing considering the number of new full licence-holders available to support their clubs. Only four M3s took part in this event compared with 18 in 2003. The fact that one of the references to the event in RadCom gave the wrong date may have contributed here, and apologies are tendered to those affected.

Log submission was generally good. Those arriving on paper were (thankfully) small both in number and size, helping to keep typing to a minimum. The others were mostly in Cabrillo or RSGB format, with the usual few in Excel, Word, Works, etc. Only one binary file proved to be unreadable and had to be returned. (Please note - any text file is preferable to a paper log!)

Nine Cabrillo logs were received where the data was corrupt, part of the Serial In field having been overwritten by the RS In field. When these were returned, eight were resubmitted satisfactorily in RSGB format, but in one case the original data was no longer available and the log had to be excluded. The moral of this story is: look at your files before you submit them!

My comments last year regarding the lack of 'Soap Box' comments from competitors appear to have borne fruit. There were far too many this year to acknowledge them all here, but all have been noted and will be considered by the HFCC where appropriate.

Steve Knowles, G3UFY

Individual scores

Posn	Callsign	Score	Power
1 *	G3VHB	3120	C
2 c	G4XUM	3030	C
3 c	G8VHI/P	2930	C
4	G3NAS	2820	C
5	G3NKC	2810	C
6	GW4BLE	2770	C
7	G4ERW	2720	C
8	G3ZVW	2710	C
9	G4BUO	2650	C
10	G3TBK	2590	C
11	G3NLY	2570	C
12	G3ORY	2530	C
13	G3UEG	2480	C
14	G3SJJ	2440	C
15	G4EOF	2410	C
16	G3GWB/P	2360	C
17	GW0GEI	2190	C
18	G0VQR	2180	C
19	G3RCV	2150	C
20=	G3KLH	2120	C
20=	G3UFY	2120	C
22=	G4HRS	2110	C
22=	G3RXQ	2110	C
24=	G4WBV	2100	C
24=	G3SVD	2100	C
26	M5ZAP	2080	C
27	G4WJS	2060	C
28	G0ODQ	2050	B
29=	G3XSV	2020	B
29=	G4DBL	2020	C
29=	G6UW	2020	C
32=	G3RVM	1970	C
32=	G0VDZ	1970	C
32=	G3VKW	1970	C
35	GM6NX	1940	C
36	G3WHK	1910	C
37	G3LIK	1900	B
38	MW5EPA	1890	C
39	G3NVO	1860	C
40	M0AJT	1850	C
41	G0IDA	1830	C
42=	G6BOX	1820	C
42=	G3HEJ	1820	C
44	M5BXB	1790	C
45	G4PIQ/P	1780	B
46	G3JYP	1740	C
47	M0BLF/P	1720	C
48	G6UT	1710	C
49	G3RSD	1690	C
50	G3TRF	1660	C
51	G4TPO	1640	B
52	G4KZD	1630	C
53=	G3LUW	1620	C
53= c	M3CVN	1620	A
55=	M0COP	1610	C
56=	M0DDT	1610	C
57	G4FBS	1600	C
58	GM3YOR	1590	B
59=	G3ZGC	1570	C
59=	GM3JKS	1570	C
61	G3JJZ	1560	B
62	M0SAR	1530	B
63=	G0LZL	1440	C
63=	G3LHJ	1440	B
63=	G3XZO	1440	C
66	G3XZG	1380	B
67=	G3YAJ	1370	B
67=	G7TWC	1370	C
69=	G3SNU	1360	C
69=	G4CWH	1360	C
71	G3NKS	1340	C
72=	G4RGK	1330	B
72=	G3SET	1330	B
74	G0GDU	1280	C
75=	G3YSX	1260	C
75=	G3IZD	1260	B
75=	G4DDX	1260	C
78	G3YHV	1220	C
79	GW8IZR	1210	C
80=	G3SXE	1190	B
80=	M1EBV	1190	C
82	G4EBK	1180	C
83	G3ZBU	1170	B
84	M0CGE	1150	C
85=	G4DFI	1140	B
85=	G0IIQ	1140	C
87	G4PSU	1120	C
88	G3KKQ	1050	B
89=	G0WLF	1040	C
89=	G3SWC	1040	C
91	G4UEL	1030	C
92	G0VFW	1020	C
93	G3YEC	1000	B
94	G3TXF	980	C
95	G4KNM	970	C
96	G0EYR	950	C
97=	G1POK	940	B
97=	MM0CPS	940	C
99	G0VYR	930	C
100=	G4LPD	920	C
100=	G0WAL	920	B
102	GM4AFF	910	C
103	G4CJY	900	B
104=	G3MA	890	B
104=	G3LLK	890	C
106=	G4DYC	880	C
106=	G0JSH	880	C
108	G3XNI	870	B
109=	G3SHF	850	B
109=	G4AGE	850	C
109=	G4FON	850	C
112=	G3YYZ	820	C
112=	G3WRR	820	C
114	GW3GUX	810	B
115	G4ARN/P	800	C
116 c	2E0VIN	790	C
117=	G4PRI	780	B
117=	M0AEU	780	C
119	GW0JEQ	770	C
120=	G4KTI	760	C
120=	G0MRH	760	C
122	G3VYE	750	C
123=	G0TYJ	730	B
123=	G3VER	730	B
123=	G3FIJ	730	C
123=	M0BZU	730	C
127	G0TQJ	720	C
128=	G4POF	710	B
128=	M0RPM	710	B
128=	G0RAF	710	B
131	M0AEJ	700	C
132=	M0ZZO	660	C
132=	M0CUL	660	C
134	G3WWT	640	C
135=	M0TIF	630	B
135=	G3KAU	630	C
135=	G6PMT	630	B
138	G4VTO	610	B
139=	G0MBQ	600	C
139=	G0EYO	600	C
139=	G4PDQ	600	C
142	G3SVW	590	B
143=	G4VUD	580	C
143=	M3JUH	580	A
143=	G4ELY	580	C
146	G0WWD	570	B
147	G3VYI	560	B
148=	G6RC	550	C
148=	G3TWG	550	C
150	G4TZR	540	C
151	M0MAT	530	C
152	G4TPH	520	C
153=	G2DWB	490	C
153=	GM3YBQ	490	B
155	G3TDR	480	B
156=	G3HIU	470	B
156=	G0NES	470	C
156=	MM0SRU	470	C
156=	M0DAL	470	B
160=	G4SLE	460	B
160=	G3NPS	460	C
162=	MM0WPM	430	B
162=	G0ASZ	430	B
164=	G0SWO	420	C
164=	2E1GUA	420	C
164=	G7SOZ	420	C
167=	M1BYQ	390	C
167=	G0UAI	390	B
169=	G3OZY	370	B
169=	G3TZM	370	B
171	M0BZK	360	C
172=	M0LXT	320	C
172=	G7BRZ	320	C
174=	GM4AQO	300	B
174=	G8BLH	300	B
176=	MM0MUL	290	B
176=	G4EZT	290	C
178=	M3GCR	260	A
178=	GM0CLN	260	B
180=	M0LKB	250	C
180=	G0NWY	250	C
182	M0MBO	220	B
183=	G8IB	210	B
183=	G4EMC	210	C
183=	G0BRV	210	B
183=	M3CFP	210	A
183=	M0DFF	210	C
183=	M0MCX	210	C
189	G3BIT	180	B
190	M0AIJ	160	A
191	G6FOP	140	C
192	G0THY	120	B
193	G3OOQ	100	C
194	G6KMQ	90	C
195	G8XST	70	B

* RSGB Lichfield Trophy.
c Certificate of merit.
Checklogs received with thanks from G3VQO, G4JQL, M1GXL.

Power:
A: Declared Power <= 10W
B: Declared Power 10W - 100W
C: Declared Power => 100W
(or no power declared).

By Norman Fitch, G3FPK

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VHF / UHF

News of some impressive propagation on 6m and 2m, plus a report on a VHF DXpedition to Iceland in this month's 'VHF/UHF' column from Norman Fitch.

In the 30 days to 14 July the daily 10.7cm solar flux averaged 99.5 units, slightly up on last month's value. The minimum figure was 78 on 5 July and the maximum was 138 on the 14th. The highest SESC sunspot number was 142 on 20 June, the minimum was a mere 17 on 8 July and 17 new regions were recorded. Geomagnetic activity was low and only on six days did the A-index at Fredericksburg reach double figures with a maximum of 15 on 29 June. On 8 July it dropped to 1.

MOONBOUNCE

The EME fraternity has lost one of its best-known 23cm operators Peter Riml, OE9PMJ, who died on 7 June at the early age of 54. His station OE9XXI must surely be in the logs of most who operate on 23cm, the band on which he achieved the first Worked All Continents certificate. His technical articles on microwave filters, transverters, antenna designs and easy-to-build dishes have been translated into many languages. Peter will be sorely missed and we extend our condolences to his wife Reinhilde, OE9YTV, whose e-mail address is reinhilde.riml@aon.at A full obituary can be found on OE9ERC's web page - see the list.

The following items are from the July *432 and above EME News* edited by Al Katz, K2UYH, and these files can been downloaded in .pdf format from the website - see the list. There was a surprise expedition to the Åland Islands over the 12/13 June activity weekend but the group, signing OH0/OH3MCK, had problems on 2m and never did find out why they couldn't hear anything on the band. The 23cm set-up was 200W to a 1.8m dish, which brought the completion of four skeds with K2UYH, DJ9YW and OE9ERC on JT44 mode and OZ4MM*. Receive problems were caused by an oscillating PA which was not completely disabled on receive.

Peter Blair, G3LTF (IO91), had a sked with the OH0 group copying them at 'M' level and had several CW

This is Peter Riml, OE9PMJ, one of the leading 23cm EME operators, who died on 7 June at the age of 54.

'chat type' QSOs with Howard Ling, G4CCH (IO93) on 23cm. On 25 June on 70cm he completed with LU7DZ for initial 380 and SP6JLW and on 23cm with OZ6OL* and G4CCH*. Next day on 23cm he worked W2UHI*, OZ6OL* and I5PMK*, who was echo testing, for #207.

Stuart Jones, GW3XYW (IO71), reports slack activity on 13cm, the only QSO being with HB9SV* on 12 June. On 23cm he has re-installed his IMU feed. He has given up on receiving e-mails due to repeated spam attacks and now accepts skeds by telephone; his number is in the EME Directory - see the list.

The next suggested activity weekend (AW) is 11/12 September when London latitude stations will have 31.7 hours of Moon time. The declination varies from +23.48° to +16.64° and the signal degradation referred to perigee ranges from -1.76dB to -1.52dB. The 144MHz sky temperature varies from 222K to 200K and the 432MHz figure is 16K.

David Anderson, GM4JJJ, has announced that his *MoonSked* software is now available for the Linux OS as well as for Macintosh and Windows. The program has so far been validated with RedHat 9, Fedora Core 2, Mandrake 9.2 and SuSE 9.0. To quote, "Besides providing data for tracking, it appears to do everything you can think of including maps, optimum sked times, built-in station directory, Doppler, polarity calculations, losses, noise, etc" Full details and download are on his website - see the list.

VHF NFD

Very few contributors mentioned VHF National Field Day over the 3/4 July weekend but is seems that tropo conditions were pretty flat leading Bryn Llewellyn, G4DEZ (JO03), to suggest, "I think there should be a fixed station single operator section... just to get the number of entrants up again. I've never given points away in such a poorly activated contest." Well, there's nothing to stop fixed stations working the portables but perhaps the carrot of awards for leading fixed stations might create more activity. Any comments?

Bob Harrison, G8HGN (JO01), made 19 contacts on 2m with stations in 12 grids and seven countries, ODX being DK0ES (JN48) at 736km. He found it quite a struggle on 70cm and heard no real DX, ODX being PE1EWR (JO11) at a mere 214km. Martin Hall, GM8IEM (IO78), heard just three stations on 2m only working GI4GTY/P (IO74). Clive O'Hennessy, GM4VVX/P (IO85UB), was QRV on 4m but reports fewer GMs out this year but that activity sounded good "down south" hearing a serial number 60 being given. Using 10W he completed with GM6VXB (IO97), G3JYP (IO84), MM0CPS/P (IO85), GM3HAM/P and GI4KSO (IO74) and G3UKV/P (IO82). And that's about it.

ICELAND AGAIN

As last year, Keith Tatnall, G4ODA, this time accompanied by Paul Bradfield, G1GSN, operated from Iceland in the 11-23 June period. 2m conditions were very poor, and in spite of his permitted 500W and a 12-ele Yagi, only three contacts were completed. They faired better on 6m Es and in a 20min opening to southern England on the 11th worked 20 stations from IP14. From HP85 on the 14th 24 QSOs were made with GM and EI to ON stations over a 30min period. Next day from a very good site in HP75 a 70min opening resulted in 98 contacts with DL, EH, EI, F, G, I, ON, PA and 9A stations.

From 0925 on the 19th in IP16 another 214 QSOs were made mainly with G stations and a few near continentals. Later on, while mobile on their way north, a further 10 stations were worked. From IP26, just 2.5km south of the Arctic Circle, another 66 QSOs were completed in the afternoon of the RSGB Trophy Contest. 12 QSOs were made from IP15 on the 22nd, some while mobile driving over glacial sand, lava fields and unbridged rivers only accessible by 4x4 vehicles. Later that day from IP35 seven contacts were made with SM stations plus one with an OH next day before boarding the ferry on the way back to Shetland. From 27 June to 2 July 112 QSOs were made from a poor site on Foula (IP80).

This is Keith Tatnall's, G4ODA, mobile station set-up just 2.5km south of the Arctic Circle in Iceland on 19 June in IP26. The Yagis are for 2m and 6m and that's Paul Bradfield, G1GSN, standing by the vehicle.

BAND REPORTS

50MHz

First the good news from the Principality of Andorra is that all the resident amateurs are now licensed to operate on the band. C31JI, near Andorra la Vella, is now QRV and C31HK is still on the band listening a lot.

John Palfrey, EH7IT (IM87), has been taking full advantage of Es propagation and was up to 209 grids by 7 July. The June highlights included GM4NFC (IO75) and TF8GX (HP84) at 3267km on the 14th, 5B4FL (KM64/3190km) on the 18th, LZ2PHP (KN33) on the 24th, ES5EQ* (KO39) and VO1BHK (GN08) his first North American QSO on the 25th and 3A2MW (JN33) on the 28th. In July in a big trans-Atlantic opening he worked into grids FN11, 31, 32, 41, 42, 53, 74 and 84 between 1220 and 1325. On the 5th, 1300-1322, US stations in FM04, EL98, EM73, 70 and 83 were worked ODX being K5UR (EM35). Gotaways were PJ7M and ZP4EIT who were on the noise floor. The 7th, 1130-1200, brought more W and VE contacts when K1SIX* (FN43) was up to S9. John is now up to 51 countries and has added 142 grids since installing a 5-ele Yagi in March.

Kevin Jackson, M0XLT (IO83), lists 19 days from 18 June to 11 July in which he made 370 QSOs during some excellent openings using 100W of SSB to a tri-band collinear antenna 6m AGL. He highlights CN8, HB0, IH9, LZ, SV, T7, 4U and 7X countries contacted. Chris Colclough, G1VDP (IO92), proves that you don't need a dedicated 6m antenna to work DX. He uses a half-size G5RV matching it to his FT-897 through an MFJ-949E ATU, this set-up producing 22 good QSOs in the 15-28 June period. These included TF/G4ODA (IP16), OH3XR (KP11), YL2LW (KO26), CQ14HZE (IM57), T77EB (JN63) and LY1CX (KO25).

Ken Punshon, G4APJ (IO83) was QRV in the RSGB Trophy Contest on 15/16 June and picked up a few continentals in DL, OK, S5 and 9A. He also added some more districts and worked into GD, GM and GW. The 10/11 July weekend brought QSOs with OZ1SKU (JO56), LY1CX, IH9/I2AND (JM56), DL9MS (JO54), YL2GC (KO26), F6GPT (IN94) and EH9IB (IM85).

G4DEZ has worked a lot of Es and on 8 July contacted a couple of 4Z4s and OJ0VR along with over 50 others in various countries including UR4UC (KO40) and UT5UKY (KO50) and next morning three more Ukrainians in KO40, 50 and KN77. Tim Kirby, G4VXE, has been operating mobile while commuting to and from work in Oxfordshire using an IC-706 and a quarter-wave mag-mount antenna. On 14 June he heard the OY6SMC and CN8MK beacons. In a big opening next day he copied lots of DL, SM and SP stations, two of whom he worked, as well as CT3FT, TF/G4ODA/P and at one stage a GM in IO99. On an apparently dead band on the 17th his CQ call resulted in a contact with IW4BET. He's usually QRV on 50.150MHz 0700-0725 and 1830-1900 *local* time and would welcome a call from anyone who hears his CQs.

Ted Collins's, G4UPS (IO81), reports from 15 June through 12 July run to eight A4 pages and the only days when nothing much happened were 17, 20, 21 and 30 June. First the trans-Atlantic openings in which he heard VE1YX* at 1734 on 15 June working Europeans at S9. At 2016 on the 25th the VO1ZA beacon peaked to S6 and VE1YX was heard working Europeans. At 2129 W9JN* was copied working 9H1XT followed by K7BV* working a GW3 with fade-out at 2140. At 2046 on the 27th he worked W1UF* (FN41) then K7BV/1* (FN31) but by 2157 the Ws had faded out. Coming to July at 2034 on the 1st J79KV* (FK95) was DXCC 186 and a new grid. VE1YX* was heard working a GW at 2202 on the 3rd and at 1920 on the 4th J79KV* was calling CQ with no takers and he worked PJ7M* at 2130. At 2203 on the 8th he worked K7BV/1* again.

Next the European Es and there is only space to pick out a few of the highlights from the scores of QSOs Ted made with '+' indicating a new grid. In June LX3DX (JN39) on the 15th followed by TF/G4ODA (IP16+) on the 19th, LA8BCA* (JP41+) and ES/OH3BHL (KO07+). On the 23rd T77GO (JN63), 7X0AD* (JM16); the 25th CT14HZE (IM57), 9A80ADE (JN75) and SV1DH* (KM27); the 26th EH9IB and ZB2EO* (IM75); the 27th 5B4AGY (KM64), 4Z4TL* (KM72), UX1DC (KN18), UY5HF (KN66+) and 5B4FL*. In July on the 1st SV2GNC* (KM10); the 2nd EH6AZ (JN29+) and 4U1ITU* (JN36); the 5th 3A2MW*; the 8th 4Z4KX* (KN72); the 10th YO9IE (KN34+) and CN8UN/P (IM62+) and on the 11th CQ7M (IM67).

Steve Burrows, M5BXB (IO91), lists 27 new grids bringing his total to 450. He hoped to be QRV as OK8XB (JN99) for a couple of week from 25 July as previously reported. June was a good month for Mike Price, G6HOU (IO91), who was QRV portable from the Lizard Point (IN79) during the UKSMG's contest over the 5/6 weekend. Before it started he worked into EH8 (IL18) at 2507km. For four hours from 1236 he completed QSOs with stations in CT, EH, EI, HV, I, IH9, OE, S5, SV, YO, YU, 9A and 9H. Next day he made his first MS QSO with DL1EJA (JO31). From home in IO91 in the 22-27 period he added CU, EH6, T7, T9 and 7X to his country tally finally working 5B4AGY at 3203km and on the evening of the 27th his ODX so far was W1FC (FN41) at 5192km. Since last Christmas he has worked 40 DXCC entities in 131 grids.

On an apparently dead band on 26 June GM4VVX worked 7X0AD, who was calling CQ, for a new DXCC and grid and later on Clive got a few more new grids in the Ukraine. July brought QSOs with OM3BH (KN19), OH3XO (KP41), UT5DA (KN18), UT5JAJ (KN64), EH4DS/M (IN80), LZ2CM (KN13) and EH7YA (IM97) all new grids

GM8IEM has been working via Es most days since mid-June and on the 15th Martin lists LY1CX, OH6YF (KP20), ES2RW (KO29), SM0LQB

ANNUAL VHF/UHF TABLE - JAN TO DEC 2004

	50MHz		70MHz		144MHz		430MHz		1.3GHz		Total
Call	Dist	Ctr	Dist	Ctr	Dist	Ctr	Dist	Ctr	Dist	Ctr	Points
G4DEZ	66	58	38	10	87	13	38	12	14	2	338
G6TTL	3	23	-	-	38	7	17	7	-	-	95
G4APJ	13	22	-	-	31	5	11	3	-	-	85
M0XLT	19	39	-	-	15	3	2	1	-	-	79
G3FIJ	17	3	8	1	24	5	13	4	1	1	77
G8RWG	-	-	-	-	18	6	-	-	-	-	24

The District Codes are the 124 listed on page 56 in the January 2003 RadCom. Up to 6 different GI stations and up to 3 different GM stations in each Scottish district may be counted. Countries are the current DXCC ones plus IT9. The deadline for the next issue is 7 September.

(JO89) and OH3XR. The 23rd brought IH9/I2AND and IT9JLG (JM68) and the band was open to Iberia on the 24th, 27th and 28th. CT3FT (IM13) was worked on 3 July and next morning EH8BPX (IL18) was his ODX so far at 3422km. On the 8th, 1835-1953 he worked 35 stations in nine countries and 25 grids in a big pile-up. 10 July started with a few contacts into mid-Europe and later the opening moved south bringing QSOs with IT9ZVJ (JM76) and IH9YMC (JM56). Just after 1630 there was a "spectacular opening" to the south of England and further afield when he worked 35 stations including CT3FT. Next morning saw another big pile-up of northern German stations followed by another one to the south of England. 64 QSOs were made including SP9FPP (KN09), SV1DH and SV1EN (KM18).

Dan Lee, MW1MFY (IO81), lists some fine DX. On 26 June J79KV for a claimed GW first and on the 27th W1JJ. In July on the 2nd SO1A; the 3rd CU3EQ, PJ7M for another GW first and from 2038 K7BV, K1SIX, NG4C, 5T5SN, VO1PJN, W1FC, K4PI, K5AND and K6EID were contacted. Next day brought N3DB, KP4EIT and YV4DDK. The 6th was an excellent day the evening resulting in QSOs with KP4/N1TKK, 9Y4AT, V44KJ for another GW first, WP4NIX, KP4EIT, NP3CW, WP4NEG and FM5WD. At 1413 on the 10th Dan was the only UK station worked by YA1RS.

70MHz

Claudio Ciorovan, YO4FYQ (KN44), says that he has a permit to operate on 4m with 5W to a 5-ele Yagi. At the time of editing it's uncertain if this applies to all Romanian amateurs but G4DEZ worked YO2IS* at 1400 on 9 July. On the 8th Bryn worked four 9As and an S5. GM4VVX mentions a few brief openings to the Balkans and on 15 June 9A3AB was a new country and Clive heard S59MA and S51DI. On 8 July he worked S59MA* and in very short skip Es on the 10th he contacted G3YSK (IO91), G3VLP, EI7GL (IO51) and M0YET* (IO80).

144MHz

Ian McCabe, G0FYD (IO83), was on the edge of an Es opening on 27 June when at 1427 he worked IS0KEB (JN40) for grid 295 and then UR5TW (KN39) on CW and SSB at 2118km. On 2 July in just 20s he completed with IS0CAK (JM49) at 1352. From 1132 on 24 June Geoff Grayer, G3NAQ (IO91), worked EA9IB then EA5GPC, EA5AFP and EA5EZJ all in IM98 and 7X0AD. On the 27th from 1418 he contacted UT3BW (JN79), US5WU (KO20), 9A8A (JN96) and 9A2SB (JN95). G4APJ was QRV in the UKAC on 6 July when G0KZG/MM (JN04) was a new grid.

G4DEZ worked G0KZG/MM (JN04) for his 200th grid. On 8 July Bryn made Es QSOs with four Italians in JN71, 72 and 80 and with a 9A in JN83.

G8HGN heard the Ukrainian stations on 27 June but failed to make any QSOs. At 1900 on 5 July Bob landed grid 207 thanks to G0KZG/MM (JO15). He was QRV in the UKAC on 6 July and made 53 QSOs with stations in 20 grids and seven countries for a total claimed score of 193,240 points. ODX was DC6BB (JO33) at 531km. On the 11th around 1724 he copied weak EA7s in IM86 and 87. On 27 June MW1MFY made Es contacts with UT3BW and US5WU from 1409.

SIGN OFF

Quite an eventful month but there were no reports of UHF activity. Thanks to Neil Clarke, G0CAS, for the May copy of *SunMag* and to the UKSMG for the July issue of *Six News*. The copy deadline for November is quite early at **7 September** and for December it's **12 October**. My telephone answering and fax machine is on 020 8763 9457 and my CompuServe ID is g3fpk ♦

WEB SEARCH

OE9ERC website	www.oe9erc.com
432 and above EME News:	www.nitehawk.com/rasmit/em70cm.html
EME Directory	www.dl4eby.de/
GM4JJJ (MoonSked s/w)	www.gm4jjj.co.uk/MoonSked/moonsked.htm

Technical feedback

ELECTRICALLY-SMALL TRANSMITTING LOOPS
(*RadCom*, June/July 2004)

It's a great shame that this very informative two-part article by Jack Belrose, VE2CV, was marred by his insistence on pushing his conjugate match theory for tuned power amplifiers, when there was no need for it to be included. It has created serious errors in the article in this case. The apparent bandwidth of a narrow-band antenna, when driven by a tuned power amplifier, is determined mainly by the interaction between the reactances of the antenna and power amplifier tuned circuit as the transmitter is tuned off the resonant frequency of the antenna, rather than by the real part of the apparent output impedance of the amplifier. The power amplifier is no longer presented with the same load when it is tuned off the antenna resonant frequency and, since the output impedance of a tuned power amplifier is determined partly by the load it sees, it no longer has the same output impedance that it did at the antenna resonant point. If you assume that the broader field strength bandwidth of a narrow-band antenna is due only to the loading effect of the real part of the output impedance of the power amplifier, then your assessment of the output impedance will be greatly in error.

This is, in reality, all academic, because the measurement of bandwidth by SWR is not affected by the source impedance of the transmitter. The SWR is determined by the load presented by the loop to the transmission line. If the match to the transmission line at the resonant frequency of the loop is perfect, the true -3dB bandwidth of the loop in the actual environment in which it's working can be estimated by measuring the 2:1 SWR bandwidth, and then multiplying it by 1.4. VE2CV's use of an operational bandwidth is fine as a comparative means of assessing loops, but when it comes to working out R_{as} from the reactance and Q of the loop, by definition it is the -3dB bandwidth that has to be used. Using the 2:1 SWR bandwidth directly, or reducing it (as VE2CV did) to allow for something that doesn't occur, causes serious errors in the calculations of the real radiation resistance and the loop loss.

If VE2CV cares to work out the radiation resistance correctly, he will find that it is 1.72 times the free space value, which is a far more credible value for a loop very close to real ground than the value he gives, in view of the fact that it is radiating in one hemisphere, only. Also, the loop loss includes an additional 3.65dB, most of which is due to induction loss in the ground beneath the loop. VE2CV would have seen this if he hadn't been so intent on making his experimental figures fit the *NEC-4D* simulation results. It appears that even this version of *NEC* cannot deal with real ground when the loop is so close to the ground!

Dave Gordon-Smith, G3UUR

By Don Beattie, G3BJ

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

IARU Region 1 Executive Committee meeting

IARU Region 1 Secretary Don Beattie reports on the Region 1 Executive Committee meeting that took place recently in Sofia, Bulgaria.

PHOTO: DF5UG.

Members of the Region 1 Executive Committee and guests in Sofia. Left to right K1ZZ, 6W1KI, DF5UG, HB9JOE, JJ1OEY, ON6WQ, G3BJ, LA2RR, YV5BPG, PB2T, 5Z4MR and LZ1US.

The management of the affairs of each of the three IARU Regions is in the hands of a small team elected from the Region's Member Societies, generally called the 'Executive Committee' (EC). EC work is carried out principally by e-mail, but once each year, the Committee meets to review progress and agree strategies. For Region 1 (the Region covering Europe, Africa, Middle East and North Asia), the 2004 EC meeting has just taken place in Sofia, Bulgaria, and in this edition of 'IARU', I will cover some of the issues discussed at that meeting.

EC meetings are attended by the EC members, plus an invited representative of each of the other two Regions, and the US-based International Secretariat.

HOUSEKEEPING

As is inevitable, part of the meeting covered housekeeping and procedural matters. In Sofia these related to:

♦ The formal adoption of a revised Constitution for Region 1, following the successful postal vote of Region 1 Member Societies at the end of last year. This Constitution brings Region 1 up to date, and *inter alia* allows e-mail voting on issues requiring Member Society agreement.

♦ A review of the budget and budgeting process for the following year.

♦ A review of the progress in developing the new IARU Region 1 website, which has now been operating for a year.

♦ Formal appointment of a deputy to support the IARU Monitoring System Co-ordinator, who has significant work commitments at the present time.

♦ Agreement to the structure for the next triennial Region 1 Conference, scheduled for Davos, Switzerland, in September 2005. The event will be shorter than in previous years, to make it more cost-effective for Member Societies.

♦ A review of the strategy for the Region 1 Emergency Communications Co-ordinator, and the relationship with the newly appointed Emergency Communications Coordinator for IARU Worldwide.

♦ A review of the way in which Region 1 should handle the problem of inactive national societies. It has become clear that although nominal membership of Region 1 includes some 90 national societies, up to a dozen or so may be inactive or even non-existent. Strategies for handling this situation were agreed.

More significantly, perhaps, the EC spent significant time discussing two important areas for amateur radio in the region, developing countries, and WRC07.

SUPPORT FOR DEVELOPING COUNTRIES

The Region 1 'STARS' programme (Support To the Amateur Radio Service) is funded principally by Member Society subscriptions, and provides funds and material to establish amateur radio programmes in the less developed countries of the Region. A review took place at the EC of the priorities for the STARS programme for the next two years, together with strategies for running Amateur Radio Administration Courses (ARAC) and Amateur Radio Development Programmes (ADP) in appropriate parts of the Region. Together these initiatives have the objectives in the relevant countries/areas of:

♦ Creating a climate of awareness and support amongst telecommunications authorities towards amateur radio

♦ Supporting those who are charged with running national amateur radio societies, in their relationships with the administration, and with their members

♦ Supporting, protecting and stimulating the growth of amateur radio activity.

The EC agreed priority areas for running ARACs and ADPs and for STARS, and assigned responsibility and funds to make sure this happened. The work will be conducted jointly by Region 1 and the International Secretariat of the IARU, drawing on material and experience from previous programmes around the world.

WRC

A review took place of the further actions needed to follow through the decisions of WRC03 - particularly in respect of 7MHz and the new Article 25 of the *Radio Regulations*. It was noted that several countries in Region 1 had already gained access to the additional 100kHz at 7MHz.

It seems only a moment since the last World Radio Conference (2003) but preparations are now well advanced for the next Conference, scheduled for 2007. The Agenda has been defined for some time, and so everyone is aware of the issues that will be up for discussion. Of particular interest to the Amateur Radio Service are the following agenda items:

♦ Item 1.13: to review the allocations in the HF bands between 4 and 10MHz, taking into account new modulation techniques and the spectrum requirements for HF broadcasting;

♦ Item 1.15: to consider a secondary amateur allocation in the band 135.7 - 137.8kHz.

Item 1.13 specifically excludes revisiting the decisions at WRC03 on 7MHz, but clearly the 4 - 10MHz spectrum is of particular interest to radio amateurs.

The EC also discussed other areas of potential interest to the Amateur Radio Service, and agreed several actions to assess Member Society support for specific initiatives in the run-up to WRC07.

OTHER ACTIVITIES

The opportunity also was taken to schedule other meetings whilst the EC was in Sofia. Representatives of the EC met with the Bulgarian Government, to give support to the local national society, BFRA, and Radio Bulgaria conducted in-depth interviews with members of the EC and International Secretariat, for one of its regular programmes. BFRA also played host to the EC one evening, which gave EC members the opportunity to meet many Bulgarian amateurs socially. Amateur radio is very much alive in Bulgaria, and the spirit of international friendship was warmly extended to the EC during its visit. ♦

WEB SEARCH	
IARU Region 1	www.iaru-r1.org

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Microwave

G4DDK reports on activity during the first two RSGB 5.7 and 10GHz Cumulative contest events of 2004, and reminds us of the new arrangements for receiving *Scatterpoint*, the successor to the RSGB *Microwave Newsletter*.

PHOTO G4PBP

The 60cm prime focus dish used on 5.7GHz by G4PBP. This is a commercial Stella Doradus dish and feed, modified by Russ to optimise its performance within the 5.7GHz amateur band. The masthead transverter and power amplifier can be seen beside the dish.

I am pleased to have been asked to write the 'Microwave' column for *RadCom*, taking over from Simon Lewis, GM4PLM/DL4PLM, who has now re-located to Germany. It will not be easy to follow in the footsteps of my illustrious predecessors, but I will be giving it my best effort.

In my column, I plan to cover activity on the amateur microwave bands, technical progress and report on some of the major events of interest to microwavers.

The *RadCom* editor has indicated his willingness to expand the column if there is sufficient material to be covered. That will, of course, depend on input from you, my readers. Where appropriate, I plan to complement the column with further information on my web page, the URL for which is given above.

BAND ACTIVITY

There were no major openings on the microwave bands in the UK during the May to mid-July period, although conditions have been far from flat, with a period of slightly enhanced propagation around the May bank holiday weekend. Rain scatter within the UK has been slightly below expectations with most 10GHz scatter contacts reported taking place in the 200 to 300km range. A period of stormy weather around the summer solstice provided some good rain scatter with signals on 5.7GHz showing strong Doppler spread. The 5.7GHz personal beacon of G4LOJ (JO02) was received over a very wide beam angle at my home location near Felixstowe (JO02) on 21 June. Although such 5.7GHz rain scatter has been widely reported by UK microwave operators for several years, this was the first time I personally had positively identified it.

The first leg of the joint 5.7GHz and 10GHz Cumulative contests were held on 23 May. Propagation conditions were reported as normal-to-poor by several correspondents. During the contest Russ, G4PBP (IO82), reports working 11 stations on 5.7GHz with a best contact distance of 277 km to G4ALY (IO70). Russ runs a solid-state 13W amplifier to a 60cm dish. He comments that conditions from the midlands into continental Europe were not very good, but ON4IY/P (JO20) was occasionally copied at good strength via aircraft scatter. However, the signal bursts were too short to achieve a full two way QSO. Tests with several French and Dutch stations also failed, although brief snatches of signal were copied but, again, not well enough to complete the contact. The 5.7GHz band can provide some fine DX, even under non-enhanced propagation conditions, and Russ feels his station is capable of contacts to over 500km, where the other station is similarly equipped.

I have been very impressed by the number of rain scatter contacts being made on 5.7GHz, particularly since the efficiency of the scatter mode is much less than at 3cm for a given size of raindrop. I will be returning to this subject in a later column.

10GHz continues to be popular both with portable operators and home stations. The availability of 5W to 10W amplifiers means that contacts in excess of 200km are now common under non-enhanced conditions and contacts greater than 400km regularly workable with the help of rain scatter or tropospheric enhancement.

At least 40 stations were reported to be active during the day, with serial numbers in the mid 20s being given by some stations by early afternoon.

During the second 5.7/10GHz cumulative on 20 June, activity was observed to be slightly lower than in the May event, although this may be due to the relative remoteness of this QTH compared with the more normal north-south axis of operation in the UK. However, there were plenty of stations active to keep the day interesting. G3PHO/P (IO93) on Houndkirk Moor was still working stations into the early evening as was GW8AWM/P (IO81) who was putting a fine 10GHz signal into this QTH. I was particularly pleased to work G3PHO/P (IO93) on 5.7GHz with my 200mW for a new grid square on this most interesting band. The distance was 243km.

That's it for the band reports in this issue. As I receive input from you over the next few months I will expand the reports to cover other bands, and I would especially like to include details of activity on 23cm and 13cm.

RSGB *MICROWAVE NEWSLETTER*

Just a reminder that from 1 July the RSGB *Microwave Newsletter*, edited by Peter Day, G3PHO, has changed its title to *Scatterpoint*, and is now available through the UK Microwave Group.

MARTLESHAM (ADASTRAL PARK) MICROWAVE ROUNDTABLE

This popular event takes place over the weekend of 14/15 November. For further details take a look at the UK Microwave Group web page.

INPUT TO THE RSGB MICROWAVES COLUMN

A column such as this depends on input from you, the readers, in order to remain topical. It is also a great place to exchange information on operating, ideas on technical development and advice on up-coming microwave related events. Please send your information by e-mail or post to the addresses above. ♦

WEB SEARCH

UK Microwave Group www.microwavers.org
Contest information 2004
www.g3pho.free-online.co.uk/microwaves/rules2004.html

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By Jeremy Boot, G4NJH

Email: g4njh2@ntlworld.com

Thinking of using amateur radio on your trips abroad? G4NJH gives some tips on where to look for details of how to do it and where there may be pitfalls for the unwary

Operating abroad

I am sure that all readers are aware that, from 1 January 2004, the functions of the Radiocommunications Agency are now dealt with by Ofcom. So if you haven't yet looked at the Ofcom website, it is a good idea to do so. The opening page says, "Ofcom is the regulator for the UK communications industries, with responsibilities across television, radio, telecommunications and wireless communications services."

RECIPROCAL LICENCES

The original reason for looking at the site at all was to consider reciprocal licences and find an update to the list of countries where our licences are accepted without the need for applying to the country in question. We tend to take this privilege for granted for the countries we are most likely to visit. But it doesn't seem to me very long since I had to apply for the French licence (F0GSC) and declare the import of radio gear to a confused and reluctant port officer at Dieppe who only wanted to know "how far it would go." Even the US – steeped as it is in bureaucracy – now allows reciprocity under CEPT T/R 61-01. The guidance on reciprocal licensing is on the RSGB site in the members' pages. Be warned though, you can't get a reciprocal licence against a UK Foundation or Intermediate licence.

OTHER COUNTRIES

I wondered what one would do to find out what arrangements applied to other countries and found by chance that it is possible to list most of the National Radio Societies through the www.gopbi.com pages. The URL is complex (aside) but you can easily navigate yourself to Hobbies/Electronics/Ham Radio/Organisations. Given that list, do some exploration.

Let us take **Kuwait** for starters: how do you (can you) get a licence? It's all there. See the pages of KARS (9K2RA). It shows you some of the sights of the country and the conditions for applying for a licence. Go then to Japan JARL and read: "whereas no radio station licence is granted to any person who does not have the Japanese nationality (Article 5 of the Radio Law). With regard to an amateur radio station, however, the aliens are able to obtain its licence in this country (same Article as the latter)." The higher your wattage, the more you pay for the licence. Some sound eastern logic there, I suppose.

CARIBBEAN CRUISE?

For your Caribbean Cruise, try Trinidad and Tobago (9Y4TT). "The reciprocal license is one class and available only to the USA General Class or equivalent." That should include us. Although not specifically about amateur radio, see also the smart Trinidad 3 Radio site. Lots of pictures of the locality. Looks wonderful. See also the note from the Minister of Tourism.

INDIA AND THE FAR EAST

An Indian licence might prove a harder nut to crack. VK2BV writes on his site "Don't even think about it - it takes Indian nationals 12 months from passing exams to actually getting a licence, what with the security checks and bureaucracy. On the other hand, try to contact a club there and you will be taken back 50 years to the days of home-built valve rigs and equipment. They still need to prove solid CW experience before getting an SSB HF licence. But they are extremely hospitable people."

I looked for some Indian sites and came upon the interesting pages of Sandeem, VU2MSY, in Assam, who includes the Indian licence regs and mentions the five different classes of licence and lists the various radio societies. Read his page on suggested licence changes. You will be surprised. It seems at present there is no mobile operation allowed, no digital modes, no 80,40, 30 and 6m, no CW HF easements, and so on. I cannot verify these facts, I am just quoting his site.

Fiji, on the other hand, continues

Page of the Kuwait Amateur Radio Society

VK2BV, is less daunting. "I did all that – sent a copy licence – and, upon check-in at the resort, I had my 3D2RS licence! Not only that, a day later a man from the Ministry called us at the resort to check that I got it! Very efficient and caring. I was extremely impressed."

FINAL WORD

A final word about these articles. I was taken to task some months ago by a reader for not including a particular web page. But what I hope to do is to give you not just lists of URLs but to whet your appetite on any subject of the month by reference to what has caught my eye: perhaps because it is amusing, or knowledgeable, or helpful. Some pages will be even of marginal value or off-topic. You judge.

What does strike me each month is how lucky we are to be in a hobby with so many aspects to explore. The Internet is an excellent medium for adding to our knowledge and interest. Don't be afraid to explore for yourselves. That's where the fun starts. ♦

WEB SEARCH

Ofcom	www.ofcom.org.uk
RA (legacy) pages	www.ofcom.org.uk/static/archive/ra/rahome.htm
RSGB members	www.rsgb.org/membersonly/index.htm
List of national societies	http://tinyurl.com/4vtjt
KARS	www.kars.org/
JARL	www.jarl.or.jp
Trinidad and Tobago	www2.carib-link.net/~ttars/
3 Radio Trinidad	www.theboca.com/whitepages/radio.htm
VK2BV pages	www.vk2bv.org/w_recip.htm#F12A
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The Yearbook Information Directory pages are viewed as PDFs which are read by the Acrobat Reader program which is included on the CD. New for this year is the inclusion on the disc of some really useful amateur radio shareware / freeware. Whether or not you have the RSGB Yearbook, you should get a copy of Callseeker Plus 2005 for your PC!

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By John Heath, G7HIA / M3BBX

Chestnuts, Desford Lane, Kirkby Mallory, Leics LE9 7QF.

E-mail: g7hia@amsat.org

Multiple-launchers – the way ahead?

G7HIA discusses the family of satellites launched from the Dnepr booster, and AMSAT-Echo in particular. Radio amateurs will be asked to participate in the Shadow Project next year.

At the time of writing, in early July, AMSAT *Echo*, OSCAR 51, has been in orbit for just a few days. For the latest information, visit the AMSAT North America website. Here you can download the latest telemetry-decoding program for *Echo*, which works with your PC sound-card and a program called *AGW Packet Engine*. This is a 'software TNC', widely used throughout the world and available for downloading off the web. *Echo*'s telemetry beacon is on 435.150MHz ± Doppler shift, and the packet data stream is sent at 9K6 baud. Many modern radios have 9K6 capabilities via a dedicated 6-pin mini-DIN socket on the back of the rig. This gives direct access to the FM discriminator output.

You will need to use this socket, as the regular audio outputs from the speaker or mic sockets will not work with 9K6 data transmissions. Mini-DINs are tricky to solder, so I can take this opportunity to share a handy tip with you [as did Ian White, G3SEK, in his 'In Practice' column, p48, May 2004 – *Ed.*]. Don't try to solder one, buy a PS/2 computer keyboard extension cable, cost around five pounds (Radio Shack part No 260-149A or Maplin PQ33L Keyboard M-M 2m). These cables may also be available from your local computer store. You will get about 2m of cable terminated with a 6-pin mini-DIN plug at each end. For the ultimate in low-cost approach, however, snip the plug and wire off an old PS/2 mouse.

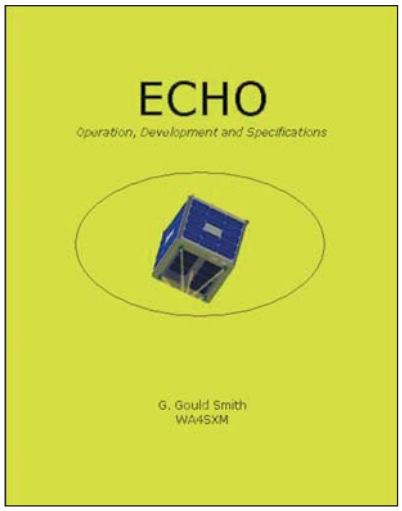
ECHO, THE BOOK

Written by G Gould Smith, WA4SXM, this book has everything you need to know about AMSAT-*Echo*. I got my copy of Echo – *Operation, Development and Specifications* from Martha at the AMSAT North America office.

I placed the order by e-mail with my credit card details. If you prefer not to put those details in an e-mail then send Martha a fax on 001 301 608 3410. When you buy items from AMSAT, you are helping to support the design, building and launching of amateur radio satellites.

MULTIPLE LAUNCHES

Echo was just one of eight satellites launched by the Dnepr booster, a converted Russian ICBM known in the west as the SS-18. These multiple-launches are an interesting phenomenon and we are likely to see more of them as the technical capability of very small satellites increases. *Demeter* was the largest satellite of the eight at 125kg, then *Saudisat-2* at 35kg. The remaining were around 15kg with *Unisat-3* and *Echo* both weighing in at 12kg. The other factor favouring multiple launches is economics.



The new book: Echo – *Operation, Development and Specifications* – available from AMSAT-NA (see text).

Eight satellites sharing the launch implies that each 'passenger' gets a reduced-cost ride, making access to space more affordable. The launch bill for *Echo* was just $110,000.

The satellites tend to move apart after release as they feel the effects of atmospheric density, bombardment by solar particles and the effects of gravity. With different masses and surface characteristics, each will react slightly differently. Although deployed more or less together, when I checked the predicted pass-times for my location just eight days later, I found that *Unisat-3* and one of the *Saudisat*s were already 73 minutes apart.

ECHO'S 9K6 BEACON

Traditionally, satellites have carried Morse code beacons which are easy to hear and identify by ear. Not so with *Echo*, which uses 9K6 packet for its beacon signal.

The transmissions are FM and you might see a result on your S meter, but the sound will be lost in the FM background noise. The best way is to switch to USB. Tune around 435.150MHz and you should hear a steady hiss which is quite noticeable as you tune through it. At the time of writing, there is regular and deep QSB on the signal, indicating that the satellite is tumbling in orbit. Ground controllers will stabilise the satellite as part of their commissioning before releasing the satellite for use.

SHADOW PROJECT UPDATE

'Shadow' is the plasma experiment due to fly in the *ISS*, possibly early next year. The *ISS* will generate a plasma stream and then transmit a beacon signal using packet radio. Ground stations, ie radio amateurs, are invited to monitor the data stream from the beacon and report their results to the researchers for analysis. Our data will enable a study to be carried out on the way that plasma affects the absorption and refraction of radio signals. New *Windows*-based software, *beacwin*, written by Gennady Typichev, RA3XB, is now available for downloading from the TsNIIMASH website. Follow the links to 'Shadow Experiment'.

ERRORS AND OMISSIONS

Apologies to Mike, G3LGR, whose call sign I got wrong, and to EB3GND, whom I missed in my item on G0SFJ's trip to Riga. ♦

WEB SEARCH

More information about Dnepr	www.kosmotras.ru
AGW Packet Engine	www.raag.org/sv2agw/inst.htm
Setup guide for AGWPE	www.qsl.net/soundcardpacket/
TsNIIMASH	www.tsniimash.ru
AMSAT-NA	www.amsat.org

Note that the files on the AMSAT website are now a couple of versions old. This website is always the source of the latest versions of the files http://tinyurl.com/5alq2

By Trevor Brown, G8CJS

E-mail: chairman@batc.org.uk

Another balloon test by G1MFG ♦ ATV on the water at the Friedrichshafen Hamfest ♦ New logic for GB3ZZ ♦ ATV in space

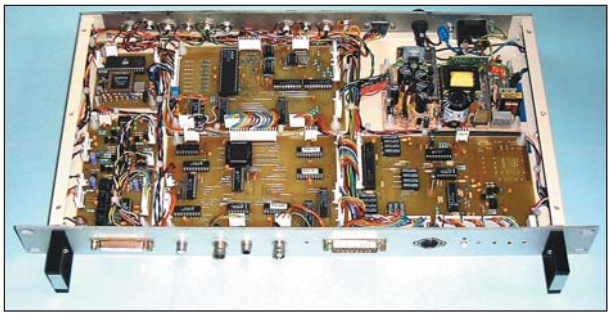
ATV

Last year, Giles Read, G1MFG, had a successful launch of a TV-camera equipped with a high altitude balloon. Giles is going to try for another launch on Sunday 12 September from the Farnborough area. His pictures will be transmitted under a non-amateur licence between 2.45 and 2.55GHz with vertical polarisation. If all goes well, it might be possible for modest equipment to receive pictures up to 100 miles away. G1MFG hopes to be able to relay live pictures via GB3FT, GB3HV, GB3AT and possibly GB3BH. It may be able to relay to further repeaters if enough linking stations can be organised.

FRIEDRICHSHAFEN 2004

There was a surprising number of microwave and ATV offerings at Friedrichshafen this year. In particular, there were demonstrations of digital ATV from Adacom, which was showing the SR-Systems DATV transmitters, and DARC/AGAF which was showing its own equipment.

The AGAF transmitted DATV in DVB-S standard from a boat with 1W output and a 12dB antenna on 13cm to the hill Pfaender near Bregenz, Austria over a maximum distance of 46km (from the island of Mainau). The transmission, converted to 23cm, was re-transmitted to the AGAF booth in the Ham Radio exhibition hall A1. There were some interference problems between the 13cm receiver and the 23cm transmitter on the hill; a low-pass filter on 23cm attenuated the harmonics on 13cm, and decoupling the 13cm antenna from the 23cm antenna helped a lot, with the result that the conversion could be done without any distortion. Another problem was the correction of the radiation direction of the 13cm antenna when the boat moved, in particular in the vicinity of the various harbours but, after some training, the man on the boat performed a good job.



The GB3ZZ repeater logic.

Elsewhere in the rally, there were at least half a dozen vendors of ATV equipment. The well-known Comtech modules were used as prime movers for a number of systems, which included multipliers for the 5.7 and 10GHz bands. Lots of different microwave amplifiers were on display, as were microwave aerial systems from companies such as Wimo and Spazialantennen.

There were component suppliers galore. One stand seemed to have a complete range of all the RF modules that Mitsubishi had ever produced; another was selling Motorola 23cm 20W bricks for 25 Euro apiece. Alternatively, someone in the flea market had some 23cm 500W (yes!) valve power amplifiers for a very reasonable 450 Euro (£300). Other hard-to-find parts were also there in abundance, ranging from the sublime to the ridiculous; even two or three stands were offering crystal sets, including genuine cat's-whisker detectors!

The DATV route from a boat on Lake Constance to the Friedrichshafen Hamfest site. (DJ8DW)

GB3ZZ MAKEOVER

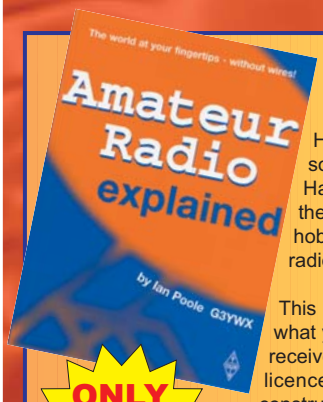
The Severnside ATV repeater, GB3ZZ, is about to get new logic, designed and built by Brian Kelly, G6BWX. The new unit is built into a 1U unit, and provides an 8 x 4 video input switch – one output for broadcast, one for monitoring, one for feeding a digitiser and one for feeding the sync detector. Also an 8 x 2 audio input switch – one output for broadcast, one for monitoring. One video/audio input and one video/audio output are opto-isolated as is the data control I/O port, so there is no ground loop to the control computer. The new logic runs entirely under its own processor or, by plugging an external computer in to a front panel socket, control is passed to it. All data in and out is in a simple 56Kbaud serial protocol, so any external computer can be used. It has an on-board test card generator with 16 selectable test cards. An audio identification and on-screen caption overlay generator is built in. Sixteen fully-isolated control lines provide for driving other equipment on the site, and there is an infra-red command port and switched mains output for controlling a VCR. See the ATV projects website for more details.

SPACE – THE FINAL FRONTIER

Those of you who have been monitoring Ben Jocket's ATV satellite transmissions may have recognised Graham Shirville, G3VZV, making his pitch for having ATV aboard ARISS in his June transmission. The original lecture was presented at the BATC BGM at Shuttleworth, and recorded and edited by Brian Kelly. Graham's idea has also raised eyebrows in Germany, and Prof Dr Uwe E Kraus, DJ8DW, has been in contact. Uwe is the brains behind the AGAF DATV modules, and through him we are hoping to have a European DATV standard and, perhaps through this project, the standard may be enlarged to cover space. Uwe needs some help in getting the DATV modules space-proofed, if anyone out there can help. ♦

WEB SEARCH	
Severnside Repeater Logic	www.atv-projects.com

BEGINNERS



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2000, RSGB, paperback 210 by 146 mm, 146 pages

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1st Edn, 2000, RSGB, paperback,
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This book takes the reader through setting up an efficient amateur radio station, which equipment to choose, installation, and the best antenna for your location.

2002 Edn, RSGB, paperback, 240 x 175mm,
128 pages, ISBN: 1-872309-75-5

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Practical Antennas for Novices
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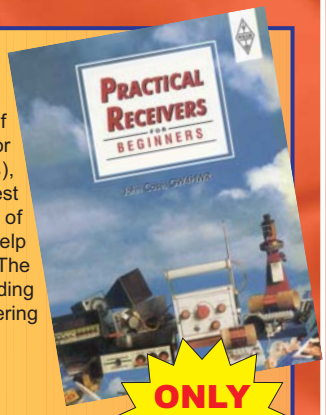
1st Edn, 1994, RSGB, paperback, 183 by 243,
52 pages, ISBN: 1-872309-11-9

£7.99 plus p&p non members

Practical Receivers for Beginners
By John Case GW4HWR



This book contains a selection of easy-to-build receiver designs suitable for amateur bands (including microwaves), together with simple 'fun' projects and test equipment. The theory and practice of receiving techniques is also outlined to help with understanding the circuits presented. The book will be of value to anyone who is building receivers for the first time, or who is considering moving up to microwaves.

1st Edn, 1996, RSGB, paperback,
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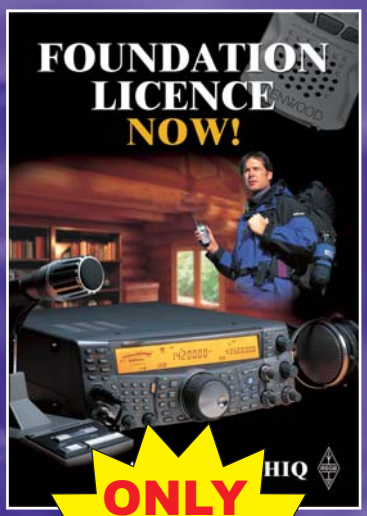

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By Alan Betts, G0HIQ

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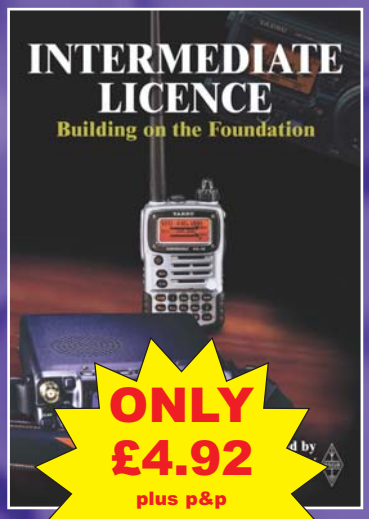
Making this a very useful addition for every radio amateur beginner.

2002 Edn, RSGB, paperback,
297 x 210mm, 36 pages,
ISBN: 1-872309-80-1



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Intermediate Licence
Building on the Foundation

Edited by Steve Hartley, G0FUW

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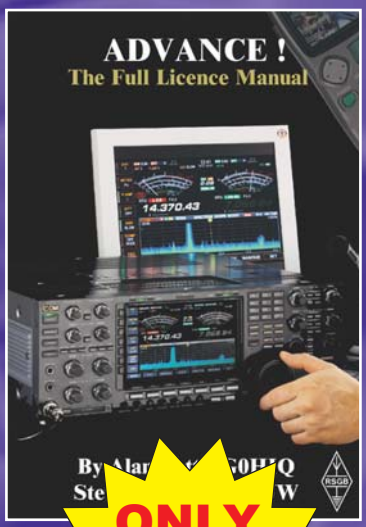
The book is broken down into manageable half-hour worksheets and contains practical exercises along with plenty of helpful advice and safety tips. This is the course workbook for the Intermediate Licence, and as such contains all the information covered during the 20 hours recommended for the course. This is the ideal book for every Intermediate Licence student.

1st Edn, 2003, RSGB, paperback,
210 by 297 mm, 80 pages.
ISBN: 1-872309-81-X



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1st Edn, 2004, RSGB, paperback,
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5B4AGC QTH for sale. Luxury villa near Paphos, Cyprus. Complete with 60ft H/duty Versatower & Hygain TH-11DXX antenna, Create rotator etc. Great DX location – 10-band DXCC, sunshine, low taxes, active radio community. Very high spec villa with all mod cons. 1500ft ASL with fantastic views and take-off. Price 375k CYP. Full details on website www.pafos.info

6m QRO station. FT-920 with high-stability TCXO, £790. SSB Electronic Super Amp SP-6, £50. DCW-15A sequence controller, £50. Henry Radio 2004A 1kW linear modified for 6m with coaxial relays, £950. All exc cond. Buyer inspects and collects. Martyn, G0GMB, 01908 560 026 (Stony Stratford).

70cm/2m tcvr TS-780 good cond, £325. 4CX250B valves, £10 each. 70cm tuned line, £15. Two coaxial relays 400W, £15 each. SSB Electronic GaAsFET preamp LNA-145, £65. HF 200W tcvr JST-245 as new cond, £1050. Buyer inspects and collects. Martyn, G0GMB, 01908 560 026 (Stony Stratford).

A collection of 48 miscellaneous used and new boxed radio valves. Offers for whole lot or a selection to G3UJG, QTHR. For full list send SAE.

A three-bedroomed detatched house within close walking distance of town centre, backing onto memorial park. Only five miles to coast and sandy beaches and eight miles to Norfolk broads. Selling with fully-approved 17.75m tilt-over telescopic Westower together with four-element HF aerial & all fittings, £320,000. Full particulars G4RTH, 01692 406 923 (North Walsham, Norfolk). E-mail: ron.hamstead@carefree.net

A4S aerial 4-ele 10-15-20m. As new, complete, £400 ono. G0SZV, 01924 512 712 (Heckmondwike). E-mail: jong0szv@msn.com

BARGAIN HF antenna clearence: Hygain 204BA-S. 4-ele 20m monoband Yagi. Forward gain 6.0dBd, F/B 15-28dB, 26ft Boom. Weight 50lb, £250 (currently configured as 3-ele wide-spaced, computer-optmised), £150. Tennadyne T7 7-ele 18-32MHz log periodic. Forward gain 6.2dBd, F/B 15-25dB, 18ft boom, weight 33lb, £250. Undoubtedly the best aerial setup I have ever used but, sadly, too much loading for my tower/rotator. Both in exc cond and incl coax baluns. Buyer collects only. 15 miles W of Peterborough (A1), and 30 miles from M1 off A14/A605. 01832 273 123, 07832 273 123 (Barnwell, E Northants). E-mail: g3xfa@aol.com

CUSHCRAFT –X7 triband 7-ele beam, £250. Cushcraft-A3WS/A103 30/17/12m 3-ele, £250. Fritzel FB-53 30/20/15/10m 5-ele, £180. All dismantled and boxed. Graham, G3SGC, QTHR, 01493 661 003 (Gt Yarmouth).

DRAKE R-4A rcvr with 10 extra crystals, £150. Trio R-1000 rcvr, £80. Lowe SRX-30D Wadley loop rcvr, £40. Bose QC-1 noise cancelling headphones, £120. Plus p&p or can deliver within 100 miles Oxford. Stef, RS159119, 07879 435 267 (Oxford). E-mail: stef@altera.com

DUAL-band 70cm / 2m fixed or mobile tcvr, Yaesu FT-2700RH. Exc cond. RF output 25W / 3W selectable. Fitted with voice synthesiser readout. Particularly useful for operators with visual difficulties. Man, original mic, mobile mount and Heatherlite mic with remote control box incl. Buyer may call, examine and test, £150 postage included. Monty, G0OWO, 020 8904 6171 (Harrow). E-mail: montylevy@hotmail.com

FT-817, little used, standard accessories, boxed; sell £350 or exchange with cash for K2, IC-703 or IC-756. Racal manpacks for sale, all gwo with accessories: Syncal 30, £320, Squadcal, £220, Minical, £110, all with accessories. John, G3GTJ, 01963 240 319 (Castle Cary, Somerset).

FT-840, £350 ono. Going QRT. Also SEC-1223 PSU, £25. Prefer buyer collects. D Dhuglas, 0141 781 4378, evenings (Glasgow).

FT-840, boxed, man, FM board, WARC bands, £395. Ideal EME, MML.2.200W switched PA and pre-amp, £275. BNOS 160W linear c/w lead for TR-9130, £225. TNC PK-88, £50. HF to 2m HX-240 tvtr – 2.5W or 10W input, £150. G8TSE, 0151 639 2553 (Cheshire).

FT-901DM, FTV-901R, three modules fitted, 6, 2, 70cm. FC-902 ATU, £300 no split. FT-200 less mic, £75. Barlow-Wadley XCR-30 + FM, £75. Eddystone 840C, £50. Buyer collects. Ted, G8HLJ, QTHR, 0151 632 0614 (Hoylake).

GAP 'Eagle' DX-6 multi-band vertical antenna, covers 40 to 10m (inc WARC bands less 30m). Built in radials (3) complete, gwo. Buyer must collect from Hertford area (weight about 10lb), price nominal. Offers? G3VLU, 01992 537 106 (Hertford). E-mail: g3vlu@del.pipex.com

HYGAIN AY-620 HF vertical, 6, 10, 12, 15, 17, 20m. Efficient quarter-wave stubs (no traps or coils). Exc cond, photo available. Box, man, £130 plus postage. G0EOL, 01606 594 205 (Winsford).

HYGAIN Explorer 14 beam antenna. 10-15-20m. Heavy duty stainless steel fittings. BN-86 balun, Beta multi match, £200 ono. 01264 393 290 (Andover). E-mail: william.brown980@ntlworld.com

ICOM 730 8-band HF tcvr for fixed or mobile use. Man and power lead incl, £230 ono vgc. G0LPW, 01483 415 072 (Godalming). E-mail: g0lpw@btopenworld.com

ICOM 756, 6 years old, fitted SSB and CW filters. Exc rig with man, orig packaging, £860. 07890 950 461 (Birmingham). E-mail: vwhile@aol.com

ICOM IC-735, £350. FT-100 HF,2 ,70, 6, £450. Mizuho PL-14 amp, £60. MFJ-969 ATU, £120. Mizhuho KX2 ATU, £60. FRG-100, £225. Yaesu FMP-1 message processor for FT-736R, brand new, £65. FT-901 FM unit new, £45. Electronic keyer for IC-735, £60. FL-63A filter, £50. IC-706 CW filter, £50. FT-100 power lead new, £15. Yaesu power lead, £12. G450 rotator & cable, new, £250. SGC Powerclear DSP speaker unit, £125. Mirage B320G 200W amp, £250. FRV-8800 VHF converter module for FRG-8800, £65. IC-706MkIIG, £560. Ameriton ICP-240 inrush current protector, new, £65. AOR 1000 scanner, £90. FT-1000MP, hardly-used boxed as new, £1050. Complete set of filters for FT-1000MP, £275. Tone encoder for IC-735, £20. IC-735 hard-bound service manual, £20. G0NMP, 01953 884 305 or 07970 214 039 (Norfolk).

KENWOOD 2000B HF, £200. Kenwood TH-78E 144/430 FM dual-bander, very little used, £275. 01535 609 130 (Keighley).

KENWOOD TS-440 clean cond. Just serviced by Castle Electronics, £350 ono. G3NMZ, QTHR, 01582 613 501 (Luton). E-mail: g3nmz@ntlworld.com

KENWOOD TS-50 HF tcvr 10, 50, 100W perfect, used very little, fitted 500Hz CW filter, £350 cash. 01384 892 858 (Stourbridge).

KENWOOD TS-850SAT. Exc cond, boxed / mans. Recent service and new lithium battery, £475 ono. Kenwood SP-31 spkr, never used still in box, £45 ono. Or buy both items for £475. Kenwood low-pass filter plus 1kW dummy load, £10 each + p&p. G0PZM, QTHR, 01287 653 708 (Guisborough). E-mail: nick@byron4s.freeserve.co.uk

KENWOOD TS-950SD DSP tcvr, boxed, man, clean, gc, £800. Weight 24kg, buyer collects. Marconi TF-2008 AM/FM sig gen 10kHz-510MHz, £60. Fred, G1OPZ, 01373 834 483 (Bath).

MASPRO TV modulator MDE 450B. Also Satel TV rcvr PRK-12 950-1750MHz. Both 19-inch rack mounting. Offers? Prefer buyer collects. G3XNK, QTHR, 01747 850 397 (Shaftesbury). E-mail: kidd.net@boltblue.com

MINT Ten-Tec OMNI-V, extra filters, 1.8kHz, 0.5kHz, narrow IF 1.8kHz, FM board. Matching 961 PSU, man, Ten-Tec hand mic, £525 ovno. 0161 477 6702 (Stockport). E-mail: john@mckae.freeserve.co.uk

PRO-SIS-TEL rotator type PST-2051 with brand new type D controller, £300. TH-7DX 7-ele tribander, £150. Versatower P-40 with base, winches and head unit, £250. Prefer buyer collects. G3OGQ, 01925 267 553 (Warrington). E-mail: g3ogq@aol.com

SILENT KEYS

We regret to record the passing of the following radio amateurs:

DK6IW	Mr A Torossian	
F9ST	Mr J Zimmermann	
G0GOL	Mr C H Newton	
G0MZI	Mr S A Fox	
G1MFR	Mr R J Rackstraw	
G3ACR	Mr H C Harrison	
G3IEW	Mr R Halls	05/06/04
G3IGW	Mr M G Whitaker	29/06/04
G3JFH	Mr T Russell	05/07/04
G3LEI	Mr D E Mills	
G3RDU	Mr R B Palk	25/05/04
G3XNI	Mr W J Hopkins	28/06/04
G4EYP	Mr P Brown	04/05/04
G4INO	Mr G Morris	20/07/04
G4JIA	Mr J Marshall	01/03/04
G4MHO	Mr Wainwright	21/06/04
G4MRT	Mr E W F Malone	07/06/04
G4NAO	Mr G Mullender	20/05/04
G4ULR	Mr R Skinner	18/06/04
G6JY	Prof F Farmer	16/07/04
G6LD	Mr I C I Lamb	16/06/04
G7MHT	Mrs J C Fowler	18/03/04
G7UDG	Mr R Gunn	
G8SRH	Mr J C Wigley	27/07/04
GI5TK	Mr A R Irwin	01/06/04
GI8AYZ/MI0AYZ	Mr I Kyle	23/07/04
GM3ZEA	Mr W Dickie	30/06/04
M0AXI	Capt L A Rayner	16/03/04
MI5BUG	Mr A Moucka	17/06/04
RS10817	Mr R Baker	23/06/04
RS10906	Mr C H Adams	15/06/04
VK2EW	Mr W Webster	20/06/04

CONGRATULATIONS

to the following, whom our records show as having reached 60 years' continuous RSGB membership this month:

60 years

RS8896	Mr J Crabtree

50 years

G3JUL	Mr G C Voller
G3KAY	Mr R J Lang
G3LSQ	Mr P J Aitchison
RS20353	Mr A A Kendall

SHACK clearance, all mint cond. TS-830S, £375 delivered. Low-use high-power 2m Discovery linear, £950 delivered. Also, unused new 88-ele 2m Parabeam, £80, no offers. Trev, G2KF, 07974 892 179 (Cornwall).

SILENT key sale (G3IGW). TS-930, £500. TS-870S, £795. TS-440SAT, £300. CapCo ATU 3000D, £175. Linear Amp UK Challenge II linear, £950. FC-902, £150. FP-107 PSU, £100. Jim Fish, 01484 654 650 (Huddersfield).

SILENT key collection (G3LMP). Magazines for free collection: PW, Jan 86 – Jan 00; RadCom, Jan 84 – Jun 00; RSGB Bulletin, Jan 66 – Dec 66; Family Tree, May 85 – Sep 99; Which?, Feb 85 – Dec 99. Also sig gens, FRG-7 rcvr, NGX-5 rcvr, old oscilloscopes, parts, valves, etc. Offers? Nick. E-mail: page.home@ntl world.com

TENNADYNE T-8 log periodic, 13-32MHz 2 years old, original box, can be shipped, £400. Daiwa 4-way antenna switch, £40. Carr extra. 01352 771 520 (Mold). E-mail: gw3tmp@tiscali.co.uk

TEN-TEC Orion 565. This fabulous tcvr, as new, used mainly for measurements, £500 below list at £2000, plus carriage to good home. G3OGQ, QTHR, 01925 267 553 (Warrington). E-mail: g3ogq@aol.com

VARIOUS Microwave Module items. 432MHz SSB tvtr, £85. Linear amp 432/100 10W in 100W out, £150. High performance 144MHz converter, £15. Daiwa CN-460M cross-needle SWR/Power meter, £40. 2m 4-section low-pass filter, £10. Kam Plus dual multimode TNC, £65. FET dip oscillator made from kit as per Radio Communication Handbook 6th edition, page 15-13, £30. Drake 2880 down-converter for 2400MHz new, unmodified complete with new crystal to change IF to 144-146MHz, and modification articles, £45. Icom microphone SM-20, new, unused, £55. McElroy radio telegraphy transmitting key, 1936 model mac-key, £55. Ex RAF key 1940, 10F/2533, £25. G3KWK, 01527 541 502 (Redditch). E-mail: g3kwk@tiscali.co.uk

VERSATOWER SP-40, inc post, winches and rotator cage. Socket not provided but may be fabricated inexpensively or existing post could be directly buried, £280. Peter, G3ZSS, 01252 783 124 (Farnham). E-mail: peter@g3zss.co.uk

WATSON PSU 30A W-30AM, £75 with box. 2 x 20ft fibreglass masts, collapse to 5ft, £95 the pair. Windom 80 special, 18 months old in g/cond, £40. MFJ headphones, £10. Buyer pays postage or collects. M0IWC, QTHR, 01964 530 464 or 07960 634 672 (Hornsea). E-mail: msaunders113@hotmail.com

YAESU FT-1000MP MkV Field. New Feb 04. Box, man, original packing, £1350. Matching MD-100A8X desk mic, £80. FH1 remote control keypad, £24. YH-77STA lightweight stereo headphones, £30. MLS-100 12W comms speaker, £20. All pristine, boxed. G0EOL, 01606 594 205 (Winsford).

YAESU FT-1000MP, dual VFO tcvr. Boxed, man, vgc, bargain, £1000. Chris, G3NHL, QTHR, 01326 377 233. E-mail: g3nhl@tiscali.co.uk

YAESU FT-817, inc mic, 6m, 2m, 70cm, antenna, Ni-Cad battery pack and charger, case and strap. As new cond, £360. Martin, M0SSO, 07870 603 605 or 01706 299 594 (Oldham).

YAESU FT-897 multimode 100W HF-UHF portable / base rig, incl LDG-897 auto ATU and 2 No internal Nicad batteries and charger also to incl Sidekick mobile antenna, £900. Stephen, 2E0SAR, 0151 677 7757 (Greasby, Wirral). E-mail: steveferrie@fsmail.net

WANTED

12V plug or plug and lead for Grundig Satellit 1400 professional rcvr. Like 2-pin figure-8 power inlet, only rectangular. G0SIU, QTHR. E-mail: bm.durrant@ntlworld.com

18 set wanted please. Can collect or arrange collection. Keith, G4AQJ, QTHR, 0121 474 2182 (Solihull).

2m module for Kenwood TM-741E or broken TM-741E IF 2m module intact. Walter, G3JKV, QTHR, 01306 884 359 (Dorking). E-mail: blanch@pncl.co.uk

AP-3297 Postal & Telegraph Directory. State year/cond. Whatever happened to SEM, Union Mills, IoM? Their Tranzmatch circuit diagram required. G0DIC, (Boston). E-mail: rafixter@lineone.net

B7G valve bases, chassis mounting type, unused if possible. HC6 crystal sockets. KW-2000 series bits and pieces, or complete units, any cond. G3WCE, QTHR, 01692 538 794 (North Walsham).

COLLINS KWM2, cond not important, anything considered. Also want B79 valve bases (not paxolin), HC6 crystal sockets. G3WCE, QTHR, 01692 538 794 (North Walsham). E-mail: g3wce@supanet.com

DISABLED fan of old days seeks pre-1970 QSL cards, magazines and log books etc. Mike, 8 Windsor Road, Reydon, Southwold, Suffolk IP18 6PQ.

EDDYSTONE 830, 880, or EA-12 rcvrs. AVO Mk3 or type 160 valve tester. BC-348 RF coils and W/C switch. 01637 875 848 (Newquay). E-mail: sunbeam@thersgb.net

G2DYM Dipole / balun. Comparison with other similar antennas appreciated. G0KCB, 01449 672 726 (Suffolk). E-mail: david.beckley@freebie.net

IC-2KL 500W linear c/w IC-2KLPS & man. Must be in good working order. John, G0AZZ, Not QTHR, 020 8391 2639 (Chessington).

JST-245 tcvr. If yours is lying idle, then sell it to me! Top price for top example. Roger, G4GXM, QTHR, 01462 453 001 (Hitchin). E-mail: electra@whsmithnet.co.uk

KANTRONICS packet TNC wanted. Prefer later version KPC-3, but all considered if price reasonable or would swap for my PK-232 full HF+VHF data TNC (Packet, AmTOR, RTTY, etc) if yours is good enough. Paul, G4XTA, 07990 744 270 (Penrith). E-mail: g4xta.paul@tiscali.co.uk

REPLACEMENT for original drive type 35 on 1155 rcvr, replacement is drive slow motion, type 13. Roger, GW3SMY, QTHR, 01492 545 325 (Colwyn Bay).

SILENT key clearout or just not needed. I collect QSL cards for their historic interest, preferably from periods before 1970. Please don't throw them away. I can collect or arrange collection. Tony, G4UZN, 01132 693 892 (Leeds). E-mail: g4uzn@qsl.net

TRIO DS-20 PSU, Trio MC-30S or MC-35S mic. Jack, G3MEY, QTHR, 01249 701 715 (Corsham). E-mail: g3mey@hotmail.com TS-950SDX in exc cond, also SP-950, DRU-2 TL-922, SM-230. Tim, G4YBU, 020 8393 9691 (Epsom). E-mail: timprice@pridecatering.co.uk

TW Communicator by Tom Withers, top band AM any cond about 40 years old. John, GW4FOI, QTHR, 01639 642 942 (Neath).

VINTAGE ham radio gear: Codar, Collins, Drake, Eddystone, Heathkit. KW, Yaesu etc from the 1950s, 60s and 70s. Especially looking for KW-4B VFO, KW-160, Eddystone ext S-meter and spkrs. Please let me know what you can help me with. Paul, G4CCZ, 01932 342 927 (Woodham). E-mail: g4ccz@6metres.com

YAESU FT-101ZD in good working cond. Also non-working FT-101ZD for spares. Can collect up to 100miles. Andy, G7CFX, 01264 335 718 (Andover).

EXCHANGE

ALL or part of my marvellous Morse key and paddle collection of 17 unique pieces for a top of the range laptop or tcvr. May split (for lower spec tcvr/laptop). Anton, M0EDX (Birmingham). E-mail: mw0edx@yahoo.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 only QSL Bureau sub-manager for special event station callsigns is as follows: GBxAAA-MZZ – Mike Evans, 322 Heol Gwyrosydd, Penlan, Swansea SA5 7BR, e-mail mw0cna@ntl world.com. Will organisers of special event stations please ensure that they lodge plenty of envelopes with their sub-manager?

1 Sep	GB2AIP: Alfreton In the Park. LHV2 (G0OKD)
	GB6LOP: Liberation of Paris. LH2 (G0BXV)
4 Sep	GB150NRL: 150 yrs Nth Ronaldsay L/House. LH (GM0OYU)
	GB2EFF: Epping Forest Festival. TQ394949. LH2 (G0TOC)
	GB3EFF: CANCELLED. LH2 (G0TOC)
	GB5LOW: Lowes Open Day. LH2 (G0IYZ)
5 Sep	GB4TRG: Telford Rally Group. 27 (M0BAV)
	GB8CH: Cannon Hall. TLHV27 (M0MHY)
6 Sep	GB2CH: Christie Hospital. LH2 (G0JNJ)
8 Sep	GB6LOP: Liberation Of Paris. LHV2 (G4WYG)
10 Sep	GB6OMG: Operation Market Garden. 13k North of Grantham. LH (G4CUO)
11 Sep	GB2BOB: Battle of Britain. TLHV2 (G4EVY)
	GB2LL: Langford Lodge. LHV2 (GI0OUM)
	GB5HW: Heage Windmill. LH (G0IYZ)
16 Sep	GB2ATC: Air Training Corp. 2 (G4PSH)
	GB6LOP: Liberation Of Paris. LHV2 (M0BTY)
17 Sep	GB60AE: Airborne Engineers. LH (G4AKQ)
18 Sep	GB0BSR: Bedfordshire Steam Rally. LHV27PS (M0AAZ)
	GB0YAA: Yorkshire Air Ambulance. LHV27 (G0SNV)
	GB2HEN: Henham Steam Rally. LH (M1TWO)
20 Sep	GB2RUT: Richmond Upon Thames (Scouts). LH27P (G4SNT)
21 Sep	GB2LI: Lundy Island. TLHV2 (G3YBT)
22 Sep	GB2VK: GB to Australia. (MW0SEC)
25 Sep	GB2SJS: St Johns' Sidcup. LH2 (G8OPA)
	GB4BRA: Beacons Rockets and Alarms. LH2 (G0MWU)

RALLIES

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.

5 SEPTEMBER 2004

ANDOVER RAC Wildhern Autumn Boot Sale - Tangley Village Hall playing field, Wildhern, on A343 N of Wildhern (maps available on www.arac.co.uk). OT 10am, £1. C, TI via G0ARC on 145.550MHz. Terry, G8ALR, 01980 629 346, g8alr@ukgateway.net

Telford Rally – RAF Cosford Aerospace Museum, on A41, one mile south of jn 3, M54. OT 09.30 / 10am. Admission free, CP free, TI on 145.550MHz. Bob, M0RJS, telford-rally@somervilleroberts.co.uk

11 / 12 SEPTEMBER 2004

49th Weinheim VHF Convention – Karl Kübel Schule, Bensheim. LEC, FM, TS, CP, CBS. [www.ukwtagung.de]

12 SEPTEMBER 2004

SOUTH NORMANTON, ALFRETON & DARC Amateur Radio Car Boot Sale – Market Street Community Centre Grounds, The Village Hall, Market Street, South Normanton. Five mins from M1 jn 28, and A38. OT 10am. C, CBS. Russell, G0OKD, 01773 783 394, russel.bradley@ntlworld.com, or Mike, M0RMJ, 01949 876 523, mike.jeffs@ntlworld.com

Vintage Valve Technology Fair – Haydock Park racecourse, nr Wigan, on A49, 5 minutes from jn23, M6. OT 9.30am, £2. CP free. Up to 200 stalls selling vintage comms, domestic, military receivers, Hi-Fi, gramophones, telephones, valves, vinyl. Trevor, 01274 824 816. [www.myciunka.supanet.com/VVTF2003 (case-sensitive)]

19 SEPTEMBER 2004

LINCOLN SWC Hamfest – Newark Showground, at jn of A46, A1 and A17 at Newark. OT 10am, £2. All rally favourites, plus craft, classic cars, fly-in by WWII Auster V reconnaissance plane, FAM. Baz, 01636 612 440, m3dmv@btopenworld.com [www.hamfest2004.secretbunker.org.uk]

26 SEPTEMBER 2004

SOUTH WALES RADIO GROUP Radio & Computer Rally – Bridgend Recreation Centre, Bridgend. OT 10am, £2. CP free, TS, B&B, LB, C, FAM. David, MW0DVM, 01443 686 281.

SUFFOLK DATA GROUP Five Ss Rally – Raceway Centre Green, Foxhall Stadium, Foxhall Road, nr Ipswich. OT 9.30, £1, accompanied under-14s free. TS, CBS, RSGB, C, CP free, TI on 145.550MHz. Peter, G8HUE, 01473 631 313, peter@sdgrally.org

WORTHING & DARC Mini-Rally – Newhaven Fort Museum, E Sussex. OT 10.30am, £5. CP free, B&B, C, TS, FAM, TI via GB2NFM on 145.550MHz. Roy, G4GPX, 01903 753 893, roy.bannister@ntlworld.com [www.wadarc.org.uk]

1 / 2 OCTOBER 2004

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

1 – 3 OCTOBER 2004

WACRAL 2004 Conference – Slavanka Christian Conference Centre, Southbourne, Dorset. Geoff & Jan Grundy, 01323 721 352, g4yjw@wacral.org

3 OCTOBER 2004

BELGIUM Amateur Radio & Computer Rally – Hall 'La Louvière Expo', La Louvière, access direct from motorway 50km S of Brussels. OT 9am. FM, TS from UK, Holland, Germany & France. Michel, ON7FI, 0032 64 849 596.

9 OCTOBER 2004

G QRP CLUB Mini-Convention 2004 – St Aidan's Church Hall, Manchester Road, Rochdale. OT 10am, £1. Traditional-style rally, components, junk & kit vendors – no new equipment or computers! LEC, 'Pie & Peas' lunch. g3rjv@gqrp.co.uk

10 OCTOBER 2004

GREAT LUMLEY AR & ES Rally – Great Lumley Community Centre, Front Street, Great Lumley, nr Chester-le-Street, Co Durham, just off the A1. OT 10.30, £2 (accompanied under-14s free). Radio, hobbies, model club, electronics, computers, satellites and component stalls. CP free, C, B&B, TI. Nancy, 0191 477 0036 or 07990 760 920, nancybone2001@yahoo.co.uk

National Vintage Communications Fair - Hall 11, National Exhibition Centre, Birmingham. OT 10.30am, £5, under-14s free. 300 stalls, vintage wireless, valve amplifiers, classic hi-fi, gramophones, records (shellac 78, vinyl and CD), early TV, etc. Exhibition '100th Birthday of the Thermionic Valve'. Terry, 07947 460 161, info@nvcf.org.uk [www.nvcf.org.uk]

17 OCTOBER 2004

BLACKWOOD & DARS Rally – Newport Centre, Newport, 1 mile from jn 25A, M4 (jn 26 travelling W to E). OT 10.30 / 10.45am, £1.50. CP free, TI, TS, SIG, LB, C, DF, WIN, B&B. George, 2W1JLK, 01495 724 942, or Dave, GW4HBK, 01495 228 516.

HORNSEA ARC Annual Rally – Floral Hall, Hornsea. OT 10am. B&B, etc. Richard, G4YTV, 01964 562 498, g4ytv@aol.com

22 - 24 OCTOBER 2004

RSGB International HF & IOTA Convention (HFC2004) – Europa Hotel, Gatwick. LEC, 136kHz – 50MHz, IOTA 40th Anniversary, demonstrations. John, G3WKL, hfc2004@rsgb.org.uk [www.rsgb.org.uk/hfc]

24 OCTOBER 2004

GALASHIELS & DARS Annual Rally – The Volunteer Hall, St John's Street, Galashiels. OT 11am. TS, B&B, C. Jim, GM7LUN, 01896 850 245.

6 / 7 NOVEMBER 2004

18th North Wales Radio, Electronics & Computer Show – North Wales Conference Centre, Llandudno. OT 10am. Jenny, MW0BET, 01492 549 413. [www.nwrs.org.uk]

7 NOVEMBER 2004

24th North Devon Radio Rally – Holsworthy Memorial Hall. OT 10am. B&B etc. G8XMI, 01409 241 202.

14 NOVEMBER 2004

Kempton Park Rally – Paul, M0CJX. [m0cjx@ntlworld.com]

SOUTH YORKSHIRE REPEATER GROUP Great Northern Hamfest – Metrodome Leisure Complex, Queen's Road, Barnsley. Less than two miles from jn 37, M1. Five minutes' walk from train and bus stations (follow the brown 'Metrodome' signs from all directions). OT 10am, £2.50. DF, TS, SIG, B&B. Ernie, G4LUE, 01226 716 339 or 07984 191 873.

4 DECEMBER 2004

ROCHDALE & DARS Traditional Radio Rally – John, G7OAI, 01706 376 204 (eve), radars@mbc.co.uk [www.mbc.co.uk/radars]

5 DECEMBER 2004

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

WEST MANCHESTER RADIO CLUB Red Rose Winter Rally – Steve, 01942 895 198. [www.wmrc.org.uk]

21 - 23 JANUARY 2005

CONTEST CLUB FINLAND 10th Anniversary – [www.qsl.net/ccf/]

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SteppIR Fluidmotion Antennas (RadCom review Feb 04)

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Vine now stocks OPTIBEAM from Germany (RadCom review Aug 03)

Radcom's reviewer described the antenna as "the best of the best" We are pleased to offer the full Optibeam range for those who prefer traditional aluminium antennas.Models available for WARC, traditional HF bands, HF + 40m, etc. Contact us for more details for the *Mercedes-Benz* of multi-element HF antennas.

ACOM 1000 *HF+6m* Amplifier (RadCom review March 01)

- **Up to 1kW output**
- **160-6m inc WARC**
- **Matches up to 3:1 SWR loads**
- **Easy-Tune aid**
- **Fully protected**
- **LCD Display inc PEP metering**
- **Mil-spec quality**

This amplifier, and the automatic 2000A, were described by Peter Hart as "**highly recommended**", and "**beautifully constructed and engineered**". These extremely well-made and reliable units are the choice of operators who require RELIABILITY as well as HIGH POWER. Here are a few user comments about the ACOM 1000 - "I am really glad and delighted that I made this choice as it has lived up to all my expectations and more !!" (GI4MMJ) - "I worked for many years in the scientific instrument business, and in my opinion, this equipment is of that standard." (G3IOE) "Superb" (G0CHQ) "It's very quiet with almost no fan noise and a silent changeover relay....A very well built and civilized amplifier". (EI6IZ) Check our website for pictures, specs and many other complementary user comments.

ACOM 1000 (160-6m) is now back in stock at £1,599. ACOM2000A automatic 2KW no-tune (160-10m) £4,295. ACOM 1006 (6m) £1,299

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New - HF mini-beam

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The last word

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Plug purist

From: Tony Crake, G0OVA

At the recent McMichael rally one of my idle purchases was a pair of N-type male connectors for the suspiciously el-cheapo price of £3. Well, they looked OK, but when I got them back home and had a closer look I was sadly disappointed as they turned out to be shoddy fakes intended to deceive. The tolerances were a joke and the centre pin a funny little wobbly thing sitting in a little bit of bendy plastic (not the usual two discs of PTFE).

These were worse by far than any of the poor old PL259 plugs mentioned on these pages. I see nothing wrong with a good old '259' *providing it works in your system.* Test your cable run with a dummy load, stick 100 watts on it and if the 259 does not actually get hot then fine, much better I assure you than the two nasty objects in my 'rogues gallery'.

At rallies one can often find ex-TV broadcast '259s' (known as 'Fs' and 'Es' in the business) - these have high quality PTFE centres and a very solid construction. OK, some are made for vision cable, not RF coax, but I generally find a way to fix it!

However, the best RF connectors for 10.3mm cable is the 'C' type, rarely mentioned in ham radio. A solid male / female pin system, much better than any 'N' type, and no nasty threads to cross or fill up with muck. Also, I have used them as EHT connectors as they are somewhat similar to the PT100 system. Westlake sometimes stocks them new and secondhand.

PL259 / N types? Rubbish! If you profess to be a 'plug purist' - and there are a lot of you out there judging by the letters - go get some 'C' types!

Signal reports

From Michael O'Beirne, G8MOB

I agree with Walter Blanchard, G3JKV ('The last word' August 2004), that RST reports have become meaningless and ought to be modified sensibly to report the accuracy of the intelligibility and signal strength, in that order. Giving a 599 report is a charming politeness but is rarely an accurate assessment.

Intelligibility and signal strength rarely correspond and vary with the level of QRM and QSB. An S2 report on a quiet band might be highly intelligible, as it often is on 2m. An S9 signal on 80m against an S8 QRM level might be very difficult to understand. In any event, modern AGC systems are often so good that one can hardly tell without glancing at the S-meter whether the signal input level is 5µV or 500µV.

I recommend the age-proven NATO VP standard signal quality report of "OK", "difficult" or 'unworkable". This could be followed (if need be) by the signal strength as shown on the S-meter. Professional receivers and some modern amateur transceivers achieve reasonably constant calibration throughout the bands. Such a report might not massage the egos of some operators but would be of much interest to the more sensible ones.

From: Alastair Wang

. . . I fully agree that the signal reporting system which we use needs radical overhauling. Can I suggest that we use the system which is already in use by pilots and air traffic controllers, and is very much along the lines suggested by G3JKV. All signal reports consist only of a report of readability, which is surely the most relevant information, using the following scale:

Readability/Meaning
1/Unreadable
2/Readable now and then
3/Readable but with difficulty
4/Readable
5/Perfectly readable.

This, as suggested by G3JKV, would get rid of the totally superfluous parts of our current RST system and provide a report with some relevance to today's world.

Radio amateurs an example

Bruno Zijp, PA3AGR

The cry that was placed in 'Helplines' in the June *RadCom* for a little manual for the Tektronix 585 worked extremely well:

a. G0EZA, who had lost my e-mail address, found it again there.

b. Three amateurs, one of them in ON, offered help. G0HZU photographed the pages of the booklet and sent it on a CD. I made booklets out of that material and now PA0CGA and I are very happy and a lot more clever!

Radio amateurism is obviously still working and in fact is an example for the rest of the world! Thank you.

Time to get real on spectral purity

From: Giles Read, G1MFG

I recently read with interest the Code of Practice for RSGB VHF / UHF / SHF Contests. In it, operators are requested to "aim to keep all in-amateur band spurious radiation, including noise modulation, to a level of -100dB relative to the wanted signal". Let's put that in perspective for a moment. A station running legal-limit 400W into a 20dB gain antenna will have an ERP of 40kW. Spurii 100dB down will have an ERP of 4 microwatts. Assuming 2m and using an average receiver with a 20dB gain antenna, these spurii will be virtually undetectable at a range of 10km. And that's assuming the aerials are pointing at each other and the receiver has the necessary dynamic range to resolve a signal 100dB down a few kHz away from the main blast. In practical terms, with aerials pointing away from each other, the requirement could easily be relaxed by 40dB.

I'm fortunate that I have access to a lot of juicy test equipment not available to the average ham. Yet none of my spectrum analysers are comfortable measuring a dynamic range exceeding about 70dB. How is the average amateur expected to demonstrate compliance? Knowing how HF-centric the RSGB is, it's interesting to note that there is no comparable spectral purity stipulation for equipment used in HF contests. Just as well, really: Peter Hart's review of the Ten-Tec Orion (*RadCom* June 2004) stated that its transmitter third-order intermod performance was as poor as -22dB and its harmonics -52dB. Even the latter is a factor of more than 50,000 times worse than the requirement at VHF. I'm not suggesting the Orion is particularly

bad, merely that it was the most recent *RadCom* review and thus probably represents the state of the art at HF. I would point out that this performance is before the user connects a badly overdriven amplifier tuned to give as big a reading as possible on the power meter, harmonics be damned. A poorly-adjusted PA can mean you transmit appreciable power on several bands simultaneously, and splatter everywhere else in between. We've all heard it.

So, come off it RSGB. Either put the same -100dB requirements on HF operators or compromise and put meaningful, achievable and measurable limits on both. And then how about making stations measure and prove their spectral purity as a condition of entering a contest?

[*Andy Cook, G4PIQ, VHF Contest Committee Chairman, responds*: "In fact a spurious 100dB down at 10km distant with the system Giles lists would be very audible at just about just under S8 referenced to a notional 'standard' VHF S-meter with S9 at 5µV. While very strong signals do cause receivers to overload, receivers tend to deal with just one very strong signal on the band rather better than they deal with multiple such signals because blocking dynamic range is much higher than the spurious free dynamic range. Indeed, some radios have in excess of 140dB blocking dynamic range. This means that - while a few spurii may appear in the receiver - it doesn't collapse completely until signals are much stronger than this level.

"It is the very low background noise and high antenna gains possible at VHF that actually make wide spaced receiver and transmitter performance much more critical at VHF than at HF. No-one is ever likely to complain about a spurious 100dB down at HF since it really will be buried in the noise floor very quickly, but wideband noise at 100dB down from a VHF station can make the band very difficult to use for nearby stations. Local oscillator phase noise in both the receiver and transmitter, along with broadband transmitter noise, are the real scourges of VHF equipment performance. A simple -100dBc requirement is really too loose. We will consider revising the guidance to give a relationship between spacing from the main signal and the level of suppression required.

"Yes, measuring this stuff is hard, but the information is available in reviews. It's usually the transceiver that sets noise floors and these measurements exist in Peter Hart's reviews and the ARRL reviews. Looking in detail at these reviews and then thinking about applying the equipment in a big VHF contest environment can be a sobering experience - there is a world of difference between the best and the worst."]

Contesters' operating standards

From: Tony Fletcher, M0PKD

I write on a very popular topic, can you first explain to me why as a CW operator I am ostrasised? The amount of contests run on HF seem to be ever increasing and I feel many hams who work all week and want to use their expensive rigs, turn on and then turn off again because operating procedures go out the window. Stations start by finding a clear frequency then call QRL? or for SSB check first to see if the frequency is clear, then proceed to call. A few minutes later half way through an exciting rare DX QSO you find contest stations just jumping all over the frequency.

Can you explain what the purpose of contests are, as I feel a less than honest report is given, no name or QTH are exchanged, and in no way do they promote or encourage people to come into amateur radio. The recent introduction of the Foundation licence was to put bums on seats to allow ham radio to continue here in the UK, but I feel contests are having a more positive opposite effect.

[Complaints against contesters are raised after virtually every major contest, but the very fact that literally thousands of operators *want* to take part in contests means that there is very considerable support *for* them. I fail to see why M0PKD should feel ostracised by being a CW operator - he complains about contesters' operating standards, but contests take place on all modes. With thousands of operators wanting to operate in a contest there is obviously far greater activity than during non-contest periods. With more activity there will be far fewer clear frequencies available, so it is not surprising if some degree of interference takes place. No-one condones the practice of transmitting on top of an existing contact - *deliberate* interference - but likewise some degree of interference must be tolerated: no-one is entitled to an absolutely clear frequency either during a contest or at any other time. Contrary to M0PKD's assertion, very many newcomers to amateur radio, including youngsters and Foundation licensees of all ages, are encouraged into amateur radio by the competitive side of the hobby - *Ed.*]

What's in a name?

From Steve Cook, G4ANA

In the August issue, both G4BUO ('Improving your speed') and G4MDU ('A Morse code speed calibrator') remind us that the convention is to use the word 'PARIS' in defining words per minute. Can anyone tell me why, since the code is precisely the same length, we do not use the word 'MORSE'?

Harmonics

From Philip Brown, G3WUZ

Many years ago I complained to the RA that I could detect what appeared to be a pop broadcast station in the 80 metre band. I was given the standard reply that we do not have exclusive rights to 80 metres and that the amateur service is not protected. Because the interference was intermittent and only on one frequency I accepted this at the time. I deduced that the problem originated from the old BBC transmitter at Washford Cross now being used by Virgin Radio on 1215kHz.This is approximately 16 miles from me mainly over a sea path and the third harmonic at 3645kHz appears at intervals, sometimes so suddenly as to suggest that some human agency is involved rather than only atmospheric conditions at that distance.

Last Sunday some stations on the GB2RS pre-news net on 3643kHz were inaudible due to the interference which read 9+20dB and being AM spread plus and minus 5kHz from 3645. Whilst I accept that this a shared band and at times we have to accept USB 'fishphone', there is no provision for any broadcast stations. I continued to complain to the RA [now Ofcom - *Ed*] and in January this year I had a visit from two gentlemen who agreed that there was evidence of both second and third harmonics and that they would have to take readings at a prescribed distance from the transmitter.

Subsequently I had a telephone call to say that the station in question is licensed to radiate at a power of 100kW, but no suggestion that any action could be taken. I have no idea if anything can be done about this but it does seem ridiculous that a powerful commercial organisation can operate in this way with impunity.

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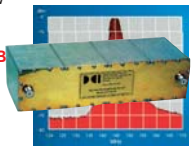

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