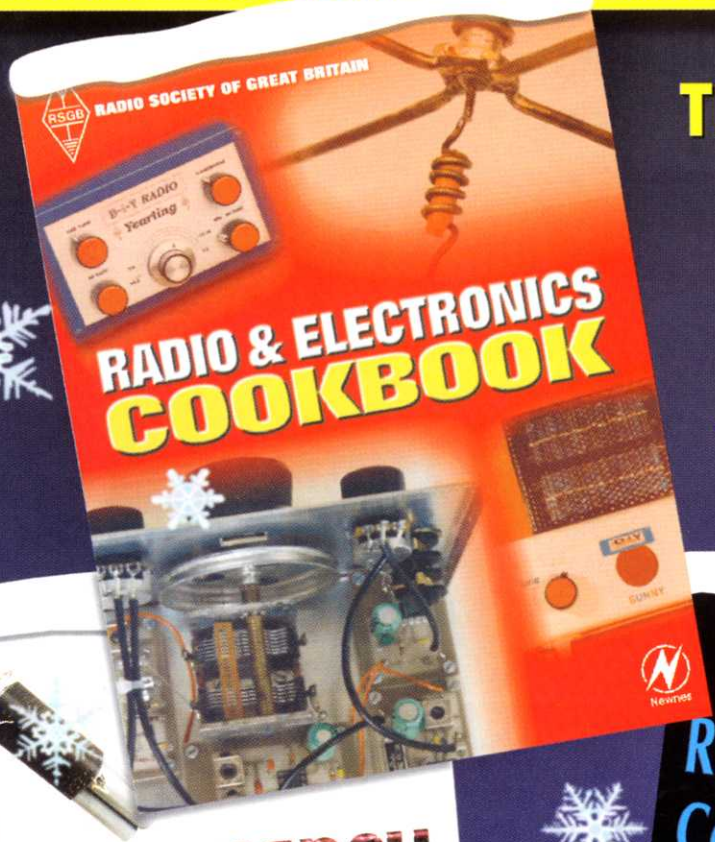
WIN! a trip to Friedrichshafen

RadCom

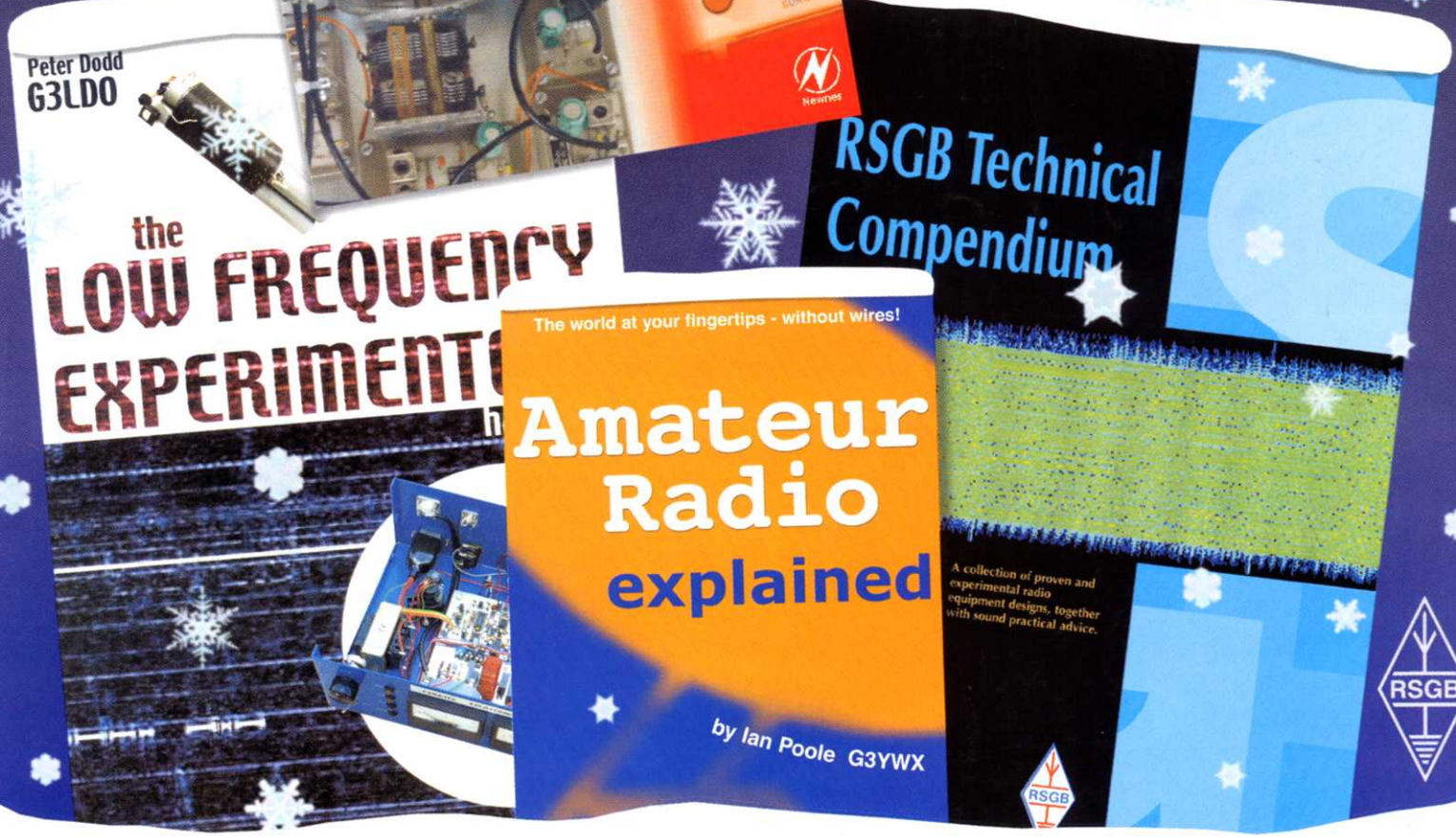
www.rsgb.org

£3.95 Volume 76 No 12 ♦ December 2000 Radio Society of Great Britain



The Future of Amateur Radio Licensing - Your Input Required

APRS - What is it and What Does it Do?



NEW RSGB BOOKS FOR CHRISTMAS

e-mail: sales@wsplc.com

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MasterCard

22 Main Rd, Ho

FT-1000MP Mk-V (inc PSU) 200W HF All Mode Transceiver

YAESU
Choice of the World's top DX'ers

Buy with confidence from
Yaesu's largest UK dealer

We have it in stock
And the ability to service it!

The new 200W FT-1000MP MkV from Yaesu has become the new "industry standard". It is the result of Yaesu listening to feedback from customers about the FT-100MP and incorporating the best as well as new features. Class A operation is making the Mk-V make its mark on the aiwaves with its signal purity.

FT-817 QRP Transceiver

Demo in Stock!

FT-817 QRP Transceiver - Demo model in our showroom

Arriving shortly, the diminutive size of this 5W 160m to 70cms radio will enable you to operate anywhere. All-modes and a very advanced specification are housed in a compact enclosure. Come and see it or send for colour leaflet.

IC-910 VHF/UHF Transceiver - Coming Soon

IC-910 VHF/UHF Transceiver - Coming Soon

The new IC-910 from Icom will shortly be available. 100W on 2m and 75W on 70cms, plus the option of 1.2GHz. Well placed to take advantage of satellite operation, you can simultaneously operate 2 bands at once.

TS-2000 Multi Band Multi Mode Transceiver - Coming Soon!

Kenwood promise a top performance 160m - 23cms transceiver. Full details are in our latest catalogue and product release is expected fairly shortly.

C-150 144MHz (2m)FM Handheld Transceiver

Scoop Purchase!

The C-150 offers full coverage of 2m with up to 5W output when used with 13.8V supply. Supplied with a 6 x AA battery box, it can be used with dry or ni-cad cells. 20 memories and tone burst, plus extended receive coverage, make this an ideal radio to have in the car or brief case. And at our new low price it represents amazing value. Price includes carry strap and antenna plus instruction manual and 12 months warranty.

£69.95 Plus £6.00 Carr.

YAESU FT-840 160-10m

£599 Plus £7.50 Carr.

Look at our new low price for this 100W radio. Impossible to fault, it just goes on and on! But stocks limited at this price.

24-Month FREE Warranty on Yaesu

ICOM IC-756PRO 1.8 - 52MHz 100W

£2199 Plus £7.50 Carr.

You've read the rave reviews, and you have seen our recommendation on the web site. This radio with its amazing receiver and digital filtering, also includes auto ATU and real-time spectrum scope. A great DX rig.

YAESU FT-847

160m - 70cm All Mode

£1329 with switch mode power supply

£1199 Plus £7.50 Carr.

SCOOP!

The FT-847 has firmly established itself as a true all-band, all-mode transceiver. Loved by the VHF & UHF operators, and superb for satellite operation, it also offers great HF performance. We have sold more than any other dealer, which says a lot about our reputation and our price. **Phone for free leaflet today.** And remember, our stock is genuine UK, not modified overseas models!!

YAESU FT-1000MP AC

160 - 10m All Mode

SAVE

£1799 Plus £7.50 Carr.

19.4% APR Available

If you are looking for the rig with every feature including dual receive - then look no further!

It has stood the test of time and used by the worlds top DXers and DXepeditions. Its excellent receiver combined with its superior transmitted signal makes this a natural choice for the HF enthusiasts.

YAESU FT- 920AF

HF 160m-6m-100w

SAVE

£1099 Plus £7.50 Carr.

Includes full DSP and internal ATU. High tech receiver with dual tuning controls. Uses many of the FT1000 MP features but at a more attractive price. Full break-in on CW and includes a data port for TNC.

ICOM IC-746

160m - 2m All-mode

£1395 Plus £7.50 Carr.

Your chance to purchase one of the most popular "all-band, all-mode" transceivers at a very competitive price. The IC-746 offers 100 Watts output on all bands and has a receiver performance to match.Limited stock at this price.

ICOM IC-706IIG 160 - 70cm All Mode

£1099 Plus £7.50 Carr.

SCOOP!

Still a firm favourite with mobile operators and those who want a compact all-mode, all-band station. Phone for latest leaflet.

KENWOOD TS-570DG

160 - 10m All Mode

£849 Plus £7.50 Carr.

19.4% APR Available

Probably the most underestimated transceiver on the market. Don't be fooled by the low price, the TS-570 has one of the best receivers around. One of the best buys if you want top HF performance on a budget.

D COMMUNICATION

RETAIL MON-SAT 9.00-5.30pm

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Fax:01702 205843
Enquiries: 01702 206835
01702 204965

ckley, Essex, SS5 4DS

Orders only: 08000 73 73 88

ADI AT-600
Dual Bander Airband Rx

£199 Plus £6.00 Carr.

* 2m & 70cm Handheld
* 5W Output on 13.8V DC
* Full CTCSS & 12.5/25kHz Steps
* 110 Alphanumeric Memories
* 29 Programmable Functions
* DTMF Keypad & AM Airband
* Ni-cads & AC charger

KENWOOD TM-D700E
2m / 70cm Data Mobile

£429 Plus £7.50 Carr.

SAVE

Just arriving, this new model has built-in TNC, port for GPS, Data connector for SSTV, RTTY etc., CTCSS/DCS, Switchable TX/RX deviation, Dual receive, Wide receive option, Detachable head unit, 50 Watts on 2m, 35 Watts on 70cm, 200 memories, Alpha tag memo capability and a lot more. And who has the best price? - look no further!

HOKA Software
The Secret's out!

We are now the UK distributors. As used by governments, it can decode just about any form of data transmission on HF and VHF. Simply connect between PC and RX audio. Can be loaded on any number of PCS. This is a very advanced programme.

£349.95 Plus £6.00 Car.

C-150 2m Handy

* 2m Handheld
* 5W Output on 13.8V DC
* 1750Hz Tone Included
* 25 / 12.5kHz Steps
* 20 Memory Channels
* Wideband Receive
* Uses 6 x AA cells (not inc.)

£99.95 Plus £6.00 Carr.

£269 Plus £6.00 Carr.

YAESU VX-5R

* 6m / 2m / 70cm Handheld
* 5W Output on 13.8V DC
* CTCSS Encode / Decode
* 25 / 12.5kHz Steps
* Auto Repeater Shift
* AM Airband Receive
* Lithium Cells & Charger

YAESU FT-50R

* 2m / 70cm Handheld
* 5W Output on 13.8V DC
* CTCSS Encode / 1750Hz tone
* 25 / 12.5kHz Steps
* 30 Memory Channels
* AM Airband Receive
* Ni-cad Cells & Charger

£169 Plus £6.00 Carr.

SAVE C-408 70cm Handy

£69.95 Plus £6.00 Carr.

Previously £89.95

CTCSS
Repeater Shift
Digital Display
12.5 / 25kHz Step
20 Memories
230mW Output
Uses 2 x AA

NEW

Optoelectronics
CD-100 MULTICOUNTER

Reads Frequency & Codes

Range: 10MHz -1GHz
Memory: 100 Channels
Decode:
CTCSS, DCS, DTMF, LTR.
Power: Internal ni-cad battery
Charger included

£379.95 Plus £6.00 Carr.

KENWOOD TH-D7E

£259 Plus £6.00 Carr.

* 2m & 70cm Handheld
* 6W Output on 13.8V DC
* CTCSS & 1750Hz Tone
* Built-in Packet Modem
* 200 Alphanumeric Memories
* DTMF Keypad & AM Airband
* Ni-cads & AC charger

YAESU FT-90R Can you believe the size?
2m/70cm Dual Band

SAVE

£299 Plus £7.50 Carr.

The tiny dimensions of the FT-90R from Yaesu, are hard to believe. Yet it produces 50W on 2m and 35W on 70cm. Auto repeater shift on UK channels and switched 12.5 / 25kHz deviation, make this a number one choice.

ADI AR-147
AM Airband Receive

£199 Plus £6.00 Carr.

* 2m 50 Watt Mobile Airband Receive
* Full CTCSS Encode / Decode
* 81 Memories 25 / 12.5kHz Steps
* Keypad microphone & Mounting Kit

SCOOP!

YAESU FT-11R
2m Handheld

£119 Plus £6.00 Carr.

Another find in a warehouse! Brand new, boxed with AC chargers and ni-cad packs. 75 Alphanumeric memories, AM airband rx mod possible. Last selling price £249! Very limited stocks.

GARMIN GPS-III Plus

Detailed maps of UK and Europe plus street data upload feature via PC. Great value. Sits easily on the dash board and gives extremely comprehensive data including GB National Grid. Powered by AA cells or external 13.8V.

£349 Plus £6.00 Carr.

ICOM IC-2800H
In Full Colour

£395 Plus £7.50 Carr.

* 2m & 70cm Mobile
* Colour TV Screen
* Full CTCSS and 1750Hz Tone
* 50W 2m 35W 70cm

Includes FREE Remote head cable.

ICOM IC-207H

£259 Plus £7.50 Carr.

* 2m / 70cm
* 50W / 35W
* 180 Memories and 7 Tuning Steps
* Detachable Head Unit / Clear Display
* Microphone, Mounting Bracket etc.

KENWOOD TM-G707E

£259 Plus £7.50 Carr.

* 2m and 70cm
* 50W and 35W
* Full CTCSS
* 180 Alphanumeric Memories
* Detachable Head with Amber Display

YAESU FT-8100R

£349 Plus £7.50 Carr.

* 2m and 70cm
* 50W and 35W
* Wideband RX AM & FM 208 Memories
* 7 Tuning Steps DTMF Remote Front panel
* Very compact, supplied with all hardware.

KENWOOD TM-V7E

£339 Plus £7.50 Carr.

* 2m / 70cm Mobile
* 50W 2m, 35W 70cm
* Clear LCD Readout
* CTCSS & DTMF
* 8 Frequency Steps & 280 Memories
* Includes Microphone & Mounting Bracket

WATERS & STANTON

FREE MFJ CATALOGUE-Just Phone!

BEWARE of grey imports. All MFJ products should have serial numbers and U.K Warrenty cards issued by us.

MFJ-969 300W ATU

£169.95 Plus £7.50 Carr.

160 - 6m Wire, Coax or Balanced

Includes VSWR / Power Meter, Ant. Selector, PEP feature, Roller Coaster Tuning

1.8 - 30MHz ATUs		
MFJ-989C	3kW roller coaster - metered	£299.95 C
MFJ-986	3kW Differential - metered	£289.95 C
MFJ-962D	1.5kW T-match - metered	£239.95 C
MFJ-949E	300W + load - metered	£139.95 B
MFJ-948	300W - metered	£119.95 B
MFJ-934	ATU + artificial ground	£139.95 B
MFJ-941E	300W compact - metered	£89.95 B
MFH-945	1.8 - 50MHz mobile	£99.95 B
MFJ-901B	300W no meters	£75.95 B
MFJ-16010	200W random wire - no meter	£44.95 B
VHF Models		
MFJ-921	144MHz 200W - metered	£69.95 B
MFJ-924	430MHz 200W - metered	£69.95 B
MFJ-903	50MHz 200W no meters	£49.95 B
MFJ-906	50MHz 200W - metered	£79.95 B

Carriage charges:
B = £6.00 C = £7.50

SGC-230 Smart Tuner

£329.95 Plus £7.50 Carr.

Covers 1.6 - 30MHz and handles 3 - 200W. Designed for end fed wires, just connect to 12V and feed with RF via coax. Can be mounted outside or at top of mast.

Microset Amplifiers

All FM/SSB with GaAsFET pre-amps and RF switched. 13.8V DC powered.

R-25	2m 1-4W in / 30W max out	£84.95 B
RV-45	2m 3-15W in / 45W max out	£95.95 B
R-50	2m 1-7W in / 50W max out	£89.95 B
SR-100	2m 4-25W in / 100W out	£169.95 B
SR-200	2m 10-50w in / 200W max out	£299.95 B
VUR-30	2m/70cms 1-5W in / 20/30W out	£199.95 B
RU-20	70cms 3-15W in / 20W max out	£119.95 B
RU-46	70cms 3-15W in / 45W max out	£165.95 B
RU-432-95	70cms 6-12W in / 95W max out	£499.95 C

WCN-3 Adaptor. For all transceivers using SMA connector. Converts to BNC **£3.95 A**

Speaker Mics. QS-112

Including Yaesu and Icom 4-way jack.

QS-112-Y Yaesu **£16.95**
QS-112-K Kenwood **£16.95**
QS-112-Y4 4-way **£16.95**

Phone if in doubt about suitable model.

£16.95 Plus £2.00 Carr.

Hands-Free Mobile Mics.

£42.95 Plus £2.20 Carr.

Comes complete with PTT switch box for mounting on gear lever. Head/shoulder band makes for easy wear. Models for almost every transceiver. Phone for confirmation of model number to suit your rig.

Cushcraft Ham Radio Antennas

MA5B Mini-Beam

£299 Plus £7.50 Carr.

2 El. on:	20m, 15m 10m	
Gain:	3.6dB, 4.8dB, 5.3dB	
F/B	10dB, 12dB, 22dB	
Dipole:	17m and 12m (0dB)	
Power	1.2kW (2:1VSWR)	
Boom:	2.2m	
Element	5.2m	
Radious	2.7m	

A3-S	10-15-20m 8dB 2kW 3 el. 4.27m boom	£389.95 D
A-743	10/7MHz kit	£129.95 C
A4-S	10-15-20m 9dB 2kW 4 el. 5.84m boom	£469.95 D
X7	10-15-20m 13dB 2kW 7 el 5.48m boom	£549.95 D
X9	10-15-20m 14dB 2kW 9 el 8.5m boom	£799.95 D
R-6000	6 - 20m vert.	£299.95 D
R8	6-40m vert 8.7m	£399.95 D
TEN-3	10m 3 el.	£159.95 D
D4	10-40m 10.92m 2kW rotary dipole	£259.95 D
D3	10 - 20m 7.86m 2kW rotary dipole	£189.95 D
XM240	40m 2 el	£569.95 D
XM520	5el 20m	£629.95 D
XM515	5 el 15m	£359.95 D

Phone for catalogue.

MFJ-269 Analyser

160m - 70cm On-site Antenna Analyser.

£299.95 Plus £6.00 Carr.

MFJ-259B 1.8 - 170MHz £229.95

Imagine being able to plug into your antenna or feed line and make meaningful adjustments on site. Or be creative and turn hours into minutes and ideas into antennas! Read what RadCom says and make your own mind up. One of the best investments you will ever make!

Heil Audio

Appointed by Heil as UK Distributor

Proset-4	H'phone/boom mic	£129.95
Proset-5	H'phone/boom mic	£129.95
Micro-4	Lightweight ver.	£99.95
Micro-5	Lightweight ver.	£99.95
AD-1	Cables Y. K. or I	£14.95
HM-10-4	Stick mic	£69.95
HM-10-5	Stick mic	£69.96
CC-1	Cables Y. K. or I.	£25.95
HC-4	Spare insert	£32.95
HC-5	Spare insertt	£32.95

You can convert your mic to Heil by simply purchasing HC-4 or HC-5 insert.

WM-2000 Desk Mic.

NEW

"The best ham radio mic we have ever tested"

£89.95 Plus £6.00 Carr.

The WM-2000 microphone is supplied with a ready-wired lead to match your choice of radio. It has three levels of compression and a 4-band graphic response control panel. This really is a high quality unit that will out perform manufacturers mics. Features included variable output level, VU meter and PTT/ LOCK buttons. Outputs are available for up to three different radios.

Avair AV-600

£59.95 Plus £6.00 Carr.

1.8 - 525MHz VSWR Meter 5/20/200W scales. Dual sensors, PEP reading. More accurate than built-in meters.

The Toughest Japanese Rotators

These are tough rotators that weigh almost twice as much as similar priced units and have great turning capacity. Made by Create of Japn, they will handle 4 element HF yagis with ease. Our own Create model has been on our roof for 12 years turning a 4-element HF beam. We wouldn't use anything else!

RC5-1 Standard control box, OK for 4-el Yagis - needs 7-core cable **£349.95C**

RC5-3 Control box features pre-set or manual control. Otherwise the same as RC5-1 above **£449.95 C**

MC-2 Lower mast clamps **£49.95 B**

LINEAR AMP UK Amplifiers

British made Amplifiers with a Pedigree

Full Range Stocked

Challenger	HF 2 x 3CX800 AT 1.5kW out	£2095 D
Explorer	HF 2 x 3-500ZG 1.3kW out	£1595 C
Hunter	HF 1 x 3-500ZG 750W out	£1195 C
Hunter	6m 1 x 3-500ZG 800W out	£895 C
Ranger	HF 4 x 811A 800W out	£895 C
Discovery	2m 1 3CX800 400 - 1KW out	£1395 C

NEW **W-40SM** 40 Amp Switch Mode

£149.95 Plus £6.00 Carr.

Digital display, 3 - 15V rated at 40 Amps continuous. Fully protected and very low noise. Ideal for a wide variety of ham applications. Light weight of 3.5kg and measuring 220 x 110 x 300mm Fixed 13.8V switch.

NEW MFJ-Cub QRPers

The MFJ Cub **single band transceivers** are small enough to sit in the palm of the hand. They provide up to **2 Watts CW output** (variable to mWs), have **full break-in** and on-air sidetone.

Available ready **built or as a half kit.** The kit version has all the surface mounted components installed. You only need to add the larger items, knobs and case.

Kit £89.95 Built £139.95

Models available for 80m, 40m, 30m, 20m and 15m. Includes cabinet and controls.

Postage £6.00

Carolina Windoms

CW-80 Special

Just 66ft long yet covers 80m - 10m. It will out perform a G5RV and give lower angle of radiation because of the 10ft vertical section which is forced to radiate. It will handle 1.5kW

£89.95 Plus £7.50 Carr.

Other Models (all with low angle radiator stub)

CW-160	160 - 10m 171ft long	£109.95
CWS-160	160 - 10m 133ft long	£99.95
CW-80	80 - 10m 133ft long	£84.95
CW-40	40 - 10m 66ft long	£79.95
CW-20	20 - 10m 34ft long	Plus £7.50 Carr. £77.95

80-40-20m Mini Dipole

The "80 plus 2" Mini - Dipole was designed by our Director, Peter Waters, G3OJV. Just 52ft long, it uses linear loading - no tuned traps. It can be directly fed without ATU and also operates at 2.5:1 VSWR on 15m. Amazingly efficient, it handles 400 Watts and is balun fed. Erect it as an inverted V and it takes up less than 40ft of space. If you have a small garden, don't miss out on the LF bands anymore. **£79.95** Carr. £6.00

Power Supplies

SEC-1223

13.8V PSU

23 Amps - 3.2lbs!

£99.95 Plus £6.00 Carr.

Back In Stock

Beware of cheap noisy supplies that have poor filtering & construction!

Lighter than an IC-706 and about the same size! The **SEC-1223** switch mode power supply delivers 23 Amps at 13.8V Thermo fan cooled, it measures just 57 x 177 x 190mm. Will power all 100W rigs and can be changed for 115V AC

WATSON

UK's top selling power supplies.

£89.95 Plus £7.50 Carr.

Watson power supplies guarantee the very best performance and value for money. Tried and tested, they have been submitted for independent laboratory testing for safety and electrical performance.

W-3A	3 Amp fixed supply.	£22.95
W-5A	5 Amp fixed supply	Plus £6.00Carr. £29.95
W-10AM	10 Amp variable supply	£59.95
W-25AM	25 Amp variable supply	£89.95
W-30AM	30 Amp variable supply	Plus £7.50 Carr. £119.95

Compact 10 Amp Switch Mode PSU

The W-10SM is small enough to fit in a brief case. Measuring just 230 x 100 x 65mm, it's ideal for 50 Watt mobile's etc. Over voltage and current protection.

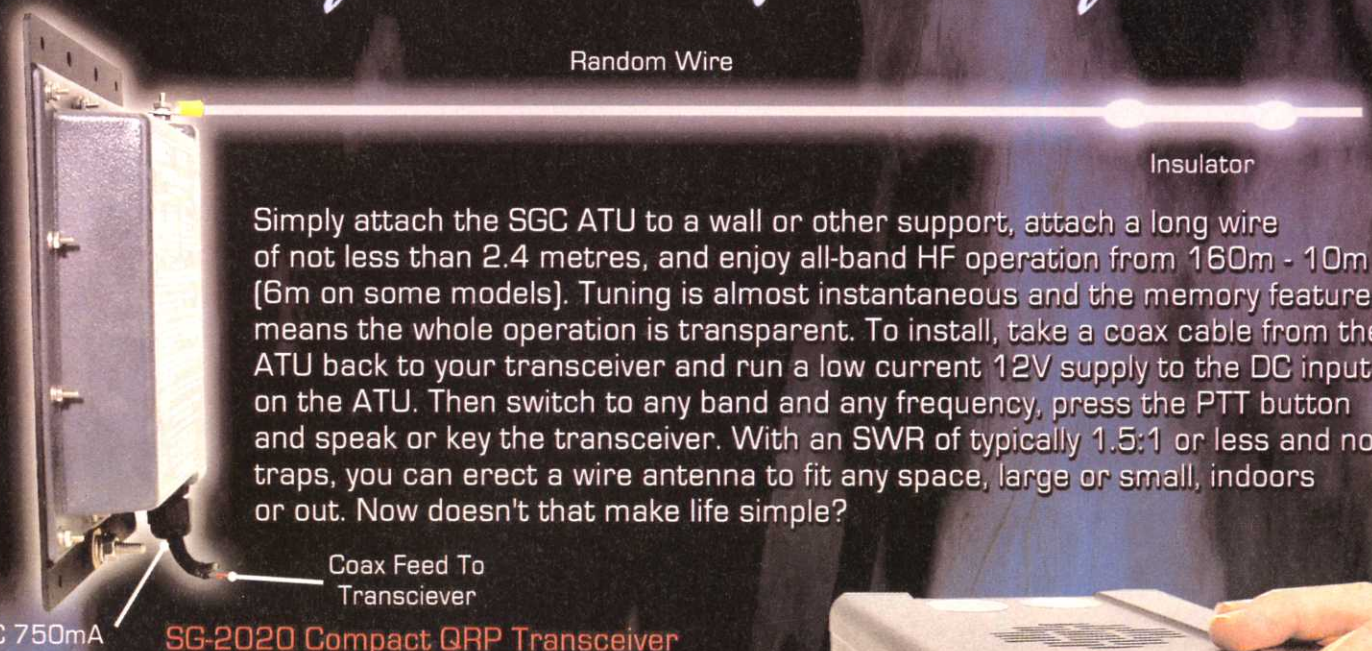
£49.95 Plus £6.00 Carr.

Order Details on inside Front Cover

SGC
NO COMPROMISE COMMUNICATIONS

Making Life Simple

All bands from a simple end fed wire



A T U

Simply attach the SGC ATU to a wall or other support, attach a long wire of not less than 2.4 metres, and enjoy all-band HF operation from 160m - 10m (6m on some models). Tuning is almost instantaneous and the memory feature means the whole operation is transparent. To install, take a coax cable from the ATU back to your transceiver and run a low current 12V supply to the DC input on the ATU. Then switch to any band and any frequency, press the PTT button and speak or key the transceiver. With an SWR of typically 1.5:1 or less and no traps, you can erect a wire antenna to fit any space, large or small, indoors or out. Now doesn't that make life simple?

SG-2020 Compact QRP Transceiver

£649
carriage £6.00

1.8 - 29.7MHz Transceiver
0.5 - 20W SSB & CW
Tx 3 Amps max.
Rx 200mA approx.
RF clipping with VOGAD
100Hz display resolution
10Hz tuning steps
Wide selectivity range
Size: 150 x 65 x 177mm
Weight 680g.

£369
carriage £6.00

SG-230 Auto ATU

1.6 - 30MHz
3- 150 Watts
Tune time: 10ms
Input: SO-239
Output: Ceramic terminal
Supply: 12 - 14V 750mA approx
Fully weatherproof
Size: 406 x 305 x 76mm

£389
carriage £6.00

SG-231 Auto ATU

1.0 - 60MHz
3- 100 Watts
Tune time: 10ms
Input: SO-239
Output: Terminal post
Supply: 12 - 14V 750mA approx
Fully weatherproof
Size: 292 x 242 x 43mm

£369
carriage £6.00

SG-237 Auto ATU

1.8 - 30MHz
3- 100 Watts
Tune time: 10ms
Input: SO-239
Output: Terminal post
Supply: 12 - 14V 300mA approx
Fully weatherproof
Size: 178 x 229 x 38mm

U.K Distributor

Waters and Stanton PLC, Spa House, 22 Main Road, Hockley, Essex, SS5 4QS
Telephone: 01702 206835 Fax: 01702 205843 E-mail: sales@wsplc.com Web: wsplc.com

KENWOOD

TS-2000 'The Millennium Communicator'

Kenwood has developed an All-band, All-mode Transceiver that features a smart metallic-grey design with large LCD and represents a breakthrough in HF performance. It creates an immediate impression of being sophisticated, solidly reliable and superbly suited for the new millennium.

Top-Band to 23cm, all-mode

independent 144/440MHz sub-band reception (AM/FM modes only), simultaneous reception on two bands is possible! The transceiver is equipped with an IF DSP for main-band use (AF DSP for sub-bands). TS 870 technology has thus been adopted for all-mode applications - VHF and UHF as well as HF.

This one transceiver covers the HF/50MHz/144MHz/440MHz/1200MHz bands (SSB, CW, FSK, FM and AM modes), with output of up to 100 watts (440MHz: 50 watts, 1200MHz: 10 watts). Since it is equipped with Packet cluster information, so vital for HF operations, can be displayed on the LCD. Moreover, this data can be used for automatic tuning, though it is not possible to connect with a node station using the internal modem.

The new TS-2000 will be available from ML&S, the largest retailer of Kenwood in the UK. **Estimated RRP: £1999**
or without 23cm option: £1699

You can only view this exciting new product from Kenwood at the ML&S Open Day on Sunday 26th November
Stock will be available in January 2001 - deposits being taken NOW!

TEL: 0208 566 1120
e-mail:
sales@MLandS.co.uk

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Suppliers of Communications Equipment

FAX: 0208 566 1207
Web site:
hamradio.co.uk

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

Call 0208 566 1120 today or visit hamradio.co.uk

Front Cover:

New RSGB books for Christmas. The perfect present for the radio amateur - or aspirant radio amateur - in the family. See pages 26 / 27 and page 41 for more details. Merry Christmas!

RadCom
Radio Communication

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

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December 2000

Contents

News and Reports

Technical Features

Down To Earth - Amateur Radio From The Ground Up

Regulars

RADIO SOCIETY OF GREAT BRITAIN

THE NATIONAL SOCIETY WHICH REPRESENTS UK RADIO AMATEURS

Founded in 1913 incorporated 1926. Limited by guarantee
Member society of the International Amateur Radio Union

PATRON: HRH PRINCE PHILIP, DUKE OF EDINBURGH, KG, KT

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

Headquarters and registered office:
Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JE
Telephone: 0870 904 7373 - Members Hotline and book orders
Fax: 0870 904 7374.
Web Site: http://www.rsgb.org **WebPlus**, the members-only web site: www.rsgb.org/membersonly. Use your callsign in lower case as the user name, and your membership number (see *RadCom* address label) as the password.

QSL Bureau address:
P.O. Box 1773, Potters Bar, Herts EN6 3EP
E-mail addresses:
sales@rsgb.org.uk (books, filters, components, membership & general enquiries)
GB2RS@rsgb.org.uk (club news items)
RadCom@rsgb.org.uk (news items, feature submissions, etc)
AR.Dept@rsgb.org.uk (Morse tests, beacons, repeaters, GB calls, licensing)
IOTA.HQ@rsgb.org.uk (Islands On The Air)
GM.Dept@rsgb.org.uk (managerial)

General Manager and Company Secretary:
Peter Kirby, MIMgt, MISM, G0TWW
Treasurer: Ken Ashcroft, FCA, FCMA, G3MSW

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Details of the Society's volunteer officers can be found in the RSGB Yearbook 2000.

Annual Subscription Rates

Home Corporate	**£38.50**
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HamClub (under 18)	**£14.50**

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Special arrangements exist for blind and disabled persons. Details are available from RSGB HQ. Membership application forms are available from RSGB HQ.

Telephone 0870 904 7373
Fax 0870 904 7374
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All calls to the RSGB are charged at National Rate

The RadCom Leader

Time Flies - When You Are Enjoying Yourself!

A TYPICAL GREETING at this time of year is "December already, where has the year gone?" Of course each year seems to get shorter the older you get, but we all know that isn't really the case. There are still 12 months and 365 days. Well, from my point of view, this year seems to have flown by. Perhaps that's because it has been extremely busy, with lots of new projects coming on line or taking shape for the future.

What have we seen this year? Well, we have seen the introduction of Internet linking, the RSGB RAE Satellite test centre scheme, an extension to the Greetings Message facility, Project Millecom, and, as I write this, the launch (scheduled any day now) of the Phase 3-D satellite and the first QSOs from the International Space Station.

Internally the Society has been carrying out a review of its own organisation and in the New Year we roll out the newly restructured Council and Regional organisation.

We have also embarked on a widespread consultation of a new licensing structure for the United Kingdom post WRC2003. Even at this early stage these discussions could lead to the introduction of a new Foundation licence to encourage more people into the hobby.

Also this year we introduced 'Council on the March'. This has lead to more visits to clubs and societies up and down the country by Council members and myself than at any time in the Society's recent history.

At this time of year we all tend to reflect on the past. It's that autumn / winter 'thing': log fires, warm jumpers, snow at Christmas. Talking to members, I'm often told how good things were, and "isn't it a shame that things have to change" or that amateur radio is in decline. Well, I'm coming around to the idea that amateur radio isn't in decline. Things have been a little quiet of late, but perhaps that is only natural after 80 years of reasonably fast development. I like to think that we have all been just 'resting' and that we are now ready to fight back against all the modern pressures that have been affecting our hobby in recent years. Certainly if you look at what has been going on this year and what is planned for the future it does not paint a picture of a hobby in decline.

This year has been a lot of fun; next year will be even better. Thank you as always for your continued support and may I take this opportunity to wish you and your families a peaceful Christmas and a prosperous New Year.

Peter Kirby, G0TWW
General Manager

Geoff Brown, GJ4ICD, Receives Top Scouting Honour

Jersey's Jamboree on the Air a Big Hit

THE SCOUTS' ANNUAL Jamboree on the Air, or 'JOTA', took place over the weekend of 21 / 22 October, when numerous special event stations were activated by and for Scout groups around the world. One such was GB0JSA on Jersey, which was organised by Geoff Brown, G4ICD (formerly GJ4ICD). Three stations were put on the air, including one on Geoff's favourite band of 6 metres. Happily, the JOTA weekend coincided with some good conditions on '6', and Geoff reports the station generated a 'pile-up' of stations from South Africa. He also added nine new DXCC countries to his already impressive 6m total.

Nevertheless, 6m apart, the highlight was the exchange of near-perfect slow-scan TV pictures with the station at Scout headquarters in Geneva, HB2S.

Scouting is very big in Jersey and this was reflected at GB0JSA, with a total of over 500 visitors to the station, and more than 100 attending the Saturday evening buffet. Jersey's Assistant Commissioner, Mr Phil Roberts, said he was very pleased with the event and described it as the best JOTA to have taken place in Jersey. Much to Geoff's surprise, he was presented with the Scouts 'With Thanks' award, the highest in the Scouting world, for his past and present services to Scouting in Jersey.

Top: GB0JSA. Left: Slow scan TV picture from HB2S. Right: Geoff's medal.

RA Issues New G Prefix

THE Radiocommunications Agency gave special authorisation to the North of Scotland Contest Group to operate as GZ7V from the Shetland Islands in the *CQ* World Wide DX phone contest at the end of October. It is expected that the prefixes GZ and MZ will be made available to all holders of the special short contest callsigns when operating from the Shetland Islands, although this is yet to be confirmed. The Shetlands count as a separate 'country' multiplier in the *CQ* World Wide and the Worked All Europe contests, although they count only as Scotland for the DXCC award. The 'Z' in the prefix stands for Zetland, the name of the main island in the Shetlands.

Whatever Next

FROM NEXT MONTH we will be starting a new column in *RadCom*, called 'Whatever Next'. Compiled and written by former *RadCom* editor Steve White, G3ZVW, 'Whatever Next' will cover the latest developments in wireless communications, electronics, and amateur radio technology. Steve says he already has a number of very interesting items for the first column, but he would also be grateful to readers if they send him interesting snippets or press cuttings about new technology, or if they simply let him know what subjects they would like to see covered in the new column. Write to: Steve White, G3ZVW, 31 Amberley Road, London N13 4BH, or e-mailsteve.white@rsgb.org.uk

Council on the March

CLUB VISITS have been arranged by RSGB President Don Beattie, G3OZF, at the Chelmsford ARS on 5 December and by Council Member Richard Horton, G3XWH, at the Keighley ARS on 21 December.

Authors Wanted!

COULD YOU WRITE a book about radio or electronics? If the answer is "Yes", drop us a line. You don't have to write perfect English or draw immaculate diagrams - we'll sort those out - you just need to know your subject. There are thousands of pounds in royalties waiting for the author of the next RSGB best-seller. If this appeals to you, simply send a synopsis of the book you would like to write, preferably with a sample chapter, to: Publications Manager, RSGB, Lambda House Cranborne Road, Potters Bar, Herts EN6 3JE or e-mail: publications@rsgb.org.uk

One Small Step for Amateur Radio

AMATEUR RADIO IS ABOUT to mark an historic milestone. Operation from amateur radio's first permanent foothold in space - the International Space Station - is expected to start imminently. The Expedition 1 crew - Commander Bill Shepherd, KD5GSL, and Russian Cosmonauts Sergei Krikalev, U5MIR, and Yuri Gidzenko - blasted off on 31 October from Baikonur Cosmodrome in Kazakhstan and were scheduled to arrive on board the ISS a couple of days later for their four-month stay in space.

Two American callsigns have been issued for amateur radio operations as part of the Amateur Radio on the International Space Station (ARISS) programme: NA1SS will be used on board the ISS, while NN1SS will be for ground-based ISS communications from Goddard Space Flight Center in Maryland. A Russian callsign, RZ3DZR, and a German callsign, DL0ISS, have also been issued for use aboard the ISS.

The ARISS equipment was already aboard the ISS awaiting the crew's arrival. It includes VHF and UHF handheld transceivers, a packet TNC and a specially-developed headset. Initially the equipment will be installed in the ISS Zarya module and this will only allow operation on 2m FM and packet. The frequencies to be used and operating schedules are still to be determined. Eventually, the ARISS team anticipates multi-band, multi-mode operations, including regularly-scheduled school group contacts.

Council Highlights

IN THIS ARTICLE we summarise the more significant issues considered by Council in its last two meetings, in July and October 2000. Whilst not intending to be a verbatim summary of the discussions, we hope members will find the information of help in understanding some of the issues currently under discussion. Members will appreciate that Council meetings cover a wide range of issues, and only a selection of the more significant can be covered here.

Financial

Council reviewed the financial position on the Society at each meeting. The result for the year ending June 2000 was moderately satisfactory. However, financial pressures continue, and Council reluctantly agreed that the losses being experienced in *Radio Today* could not be allowed to continue. Considerable effort had been expended to improve the availability of *Radio Today* in newsagents, but the distribution arrangements for 'minority interest' publications were working against the Society. Council agreed that the publication should close, but that the Society should retain both the intellectual property and the rights to the title.

Council noted that the Management Committee was tracking lapses in membership and new joiners very closely, and following up lapsed memberships individually.

Council also agreed the budget for 2000 / 2001 which showed a projected break-even, although there was little contingency.

Governance of the Society

Council has discussed in several meetings ways of improving the effectiveness of the Society's organisation, and in particular the structure of the Board and improved links with the membership. Resulting from these discussions are the proposals to be discussed at the December 2000 AGM for new Memorandum, Articles and Bylaws, so introducing a new structure for Council and the Board. Council has also discussed possible ways in which portfolios might be allocated to Board members under the new structure.

The Future of Amateur Radio

Council has discussed the implications of the likely removal at WRC 2003 of Morse as a requirement for an HF amateur licence. A vote at the IARU Region 1 conference in September 1999 in favour of a paper setting out proposed new amateur operator qualifications had apparently not been followed through by the Region's executive in its approach to CEPT, and Council discussed the implications of this for the Society. Council noted, however, that the IARU Administrative Council (the global Council of the IARU) had adopted the same Lillehammer paper as its position on operator qualifications. Council also noted that at the Region 3 Conference at Darwin in August 2000 there was an overwhelming majority vote in favour of the removal of Morse from the amateur operator requirements for an HF licence.

Against this background, Council authorised a sub-group to prepare initial outline proposals for the possible shape of a future licence structure after WRC 2003, and subsequently authorised exploratory discussions with the RA on these. It was agreed that details of the Society's thinking should be published on the web site and in *RadCom*, and comments invited from UK amateurs [see pages 54 / 55 - *Ed*].

Council discussed the formation of an *ad hoc* specialist group to consider the future form that amateur radio might take in the next decade or so. New technologies and changing social patterns require Council to form a view of what amateur radio might look like in the future. Actions have been authorised to set up this group to advise Council.

Council has reviewed data from POCM which shows the pattern and age profile of existing and new amateur licensees, together with data on the declining number of RAE candidates. Council will be using these data in developing its strategies to promote amateur radio. Apart from any changes to licence structure, Council is planning a demonstration vehicle (to be gifted to the Society), which would be used at schools and other locations where amateur radio could be promoted. Presentations are also to be developed which could be used with non-amateur radio audiences. Council is also reviewing the editorial strategy of *RadCom* to ensure the correct balance in content. Council also noted the opportunity for a TV documentary on amateur radio, and this is being followed up with the relevant production company.

Radiocommunications Agency

Council regularly reviews the progress of issues under discussion with the RA. In addition to discussions on future licensing, these issues currently include, or will shortly include:

- Discussion on specific EMC issues
- Applications for new frequencies for specific research projects
- Discussion on emergency communications provisions in the licence
- Packet mailbox and repeater licensing agreements
- Discussion on planned and recent Gazette notices
- Further extension of internet linking facilities
- Improvement in Novice privileges.

EMC

Council receives regular reports on the developing threat to amateur radio from new wideband data systems over telephone or power lines. The Society is actively seeking to influence relevant standards here, to try to ensure that amateur spectrum is as far as possible unaffected by the introduction of such systems. Council also receives regular reports on particular EMC cases where the freedom of an amateur to continue to transmit is seriously threatened. The Society will give support in such cases where it is warranted.

Member Services

Council has discussed improvements to the members' web site, and further resource has been agreed to manage this site.

Other Issues

Council also included discussion on the following issues in its last two meetings: The future strategy for GB2RS, the National Space Centre at Leicester and its opportunities for amateur radio and names of recipients for Council awards and cups for 1999 / 2000.

Don't forget: RSGB 2000 Annual Meeting 2 December 2000 at Harrogate Ladies' College
(see Nov *RadCom* p 12 for details)

MemAds - Help Us to Help You

MEMBERS' ADVERTISEMENTS is a very popular feature in *RadCom* and probably provides the most efficient way of selling, buying or trading your personal amateur radio equipment. However, many ads arrive in a form that makes it difficult to input them correctly on to the page. *Please* write legibly, please only use abbreviations which are well recognised and please *do* include punctuation - often a complete lack of punctuation can make an advertisement very difficult to understand or even alter its meaning altogether.

Air Cadets' Diamond Jubilee

THE AIR CADET Radio Society has obtained the callsign GB60ATC for the whole of 2001 to celebrate the Diamond Jubilee of the Air Cadets. The callsign will be allocated to one station at a time and coordination of this role is being carried out by Ray Degg, G0JOD. Further details will become available on the www.GB60ATC.fsnet.co.uk web site in due course.

President Takes Up Baton for Another Year

AT THE RSGB Council meeting in July, Council voted unanimously in favour of the Society's current President, Don Beattie, G3OZF, serving a further year in office. Mr Beattie accepted the decision and thanked Council for its continued support. Mr Beattie is only the second President since the early 1950s to serve for two consecutive years. The last two-term President was Ian Kyle, GI8AYZ, who was President in 1997 and 1998. From January 2002, if the proposed new Memorandum and Articles of Association are adopted by the membership, Presidents will automatically serve in office for two years.

Phase 3-D: Latest Launch Date

THE PHASE 3-D amateur radio satellite is now scheduled to go into space from the European Spaceport in Kourou, French Guiana, on 14 November. Launch agency Arianespace delayed the launch date of the Ariane-5 Flight 135 from a tentative window on 31 October.

New ML&S Store Opens

MARTIN LYNCH & Sons are to open a new store and retail showroom entirely dedicated to amateur radio at 128 Northfield Avenue, Ealing, a short distance from the main ML&S store at 140 - 142 Northfield Avenue. The official opening takes place on **Sunday 26 November** with a party and 'mega giveaway' opening sale. Martin himself will be working at the new store full time, having employed new staff to run the scooter business. The telephone numbers and e-mail addresses remain the same.

RAE Papers Made Available

ALL POTENTIAL radio amateurs and RAE tutors will be interested to hear that the May and December 1999 Radio Amateurs Examination papers have now been made available by City & Guilds. The papers cost £5.00 for both papers plus £2.50 P&P and can be ordered from C&G Sales Section on tel: 020 7294 2468.

John's DXpedition Rig

John Dunnington, G3LZQ (left), was the lucky winner of a new Yaesu FT-100 HF / VHF / UHF mini-mobile transceiver in the raffle at the RSGB HF and IOTA Convention in October. He was presented with his prize by Yaesu UK's Managing Director Bob Ives, G3MSL. John has kindly said that he would be pleased to loan out the FT-100 to individuals or groups wishing to put on a DXpedition such as an IOTA island operation, although he wishes to remain the custodian of the transceiver. Please contact G3LZQ QTHR if you wish to take advantage of this offer. Proceeds of the raffle go towards the RSGB HF DXpedition Fund, which provides sponsorship to DXpeditions.

WACRAL Millennium Conference

WACRAL'S ANNUAL Conference for the millennium year was presented as a house party at the De Montfort Hotel in Kenilworth over the weekend of 21 - 24 September. To mark the occasion, a special dinner was held at which the guest of honour was Hilary Claytonsmith, G4JKS, RSGB 1999 President, who was also invited to open the conference with a special lecture on the history and development of the Society.

John Corbett, G3TWS, President of WACRAL, presents Hilary Claytonsmith, G4JKS, with a memento of the evening.

Organisers Geoff and Jenny Peterson, G4EZU, had arranged a full programme of Christian fellowship and amateur radio events, including a technical presentation by Dr David Palmer, G4PFX, of PGS Christian Communications, on his low-cost satellite e-mail system for supporting mission and aid work in the developing countries, plus an impressive audio-visual lecture by Sqn Ldr Mike Cole, of the Peace and Hope Trust, featuring the use of light hovercraft for relief work in the remote areas of Papua New Guinea and Nicaragua.

Members visited the Leicester Show at Donington Park and, during their AGM, were joined briefly by VK4FA and K3KPC via Internet video phone and Paltalk, which later led to a full demonstration of these communication systems as complementary and useful supporting systems to amateur radio.

'Do Angels drive Tractors?' was the title of a talk by Ted Moreman, G2BZT, on his long-distance fundraising walk in aid of the El-Shaddai homes for street children in Goa. He has already raised £10,000. The millennium Sunday service was lead by Rev Fred Swainthorpe, a retired missionary to Africa.

The WACRAL 2001 conference is scheduled for 12 - 14 October in Bournemouth. Full details can be obtained from G4EZU, QTHR, tel: 01474 533686.

Obsolete Equipment Manuals

THANTS TO G3UGF of Northern Communications and G Wooster, G3YVF, the RSGB National Amateur Radio Library at RSGB HQ has recently been donated circuits and manuals of obsolete test equipment and transceivers etc. These are available for inspection in the library on Mondays and Thursdays. The list of manuals, circuits and other documents is too long to be published here, so please ring HQ before visiting for availability.

Another New Membership Benefit

THE RSGB IS pleased to introduce yet another new benefit of membership. The Society has negotiated a special deal with Days Inn hotels to allow members to stay at any of their hotels throughout the land - from Glasgow to Basingstoke and Bridgend to Stansted - at the very special rate of £35 per room per night. The offer is applicable on Friday, Saturday and Sunday nights, and until 31 March 2001. To take advantage of the offer, send an SASE to 'Days Inn Offer', RSGB HQ, Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JE. You will be sent a Days Inn Privilege Card free of charge. The card lists the locations of all 21 participating hotels around the country.

Improved Membership Benefits During 2000

THE YEAR 2000 has proved a busy one at the RSGB when it comes to new membership benefits. An extensive range of new activities has surfaced during the course of the year aimed at making the membership fee better value than ever. Most people are aware of the main benefits they receive for their annual fee, such as *RadCom*, the QSL bureau service etc, but have you noticed all the new benefits members now receive? In 2000 the Society launched the following:

Improved Book Service

Although the RSGB has offered an on-line book service for some time the web site has received major improvements, making it now much easier to use. The site has been improved with new layouts for books and products and an easy-to-use push-button interface for ordering. Even the security of the site has been enhanced though a Java encrypted system to protect the details of people using the book service. The service also allows a new and easier system to renew membership, also with a simple push-button interface.

RSGB Web Plus

This new service is part of the ongoing development of the RSGB web site for members only. The site is designed to give members instant access to products and services which are part of their membership fee. RSGB logos are available to download, GB2RS is published here first, 48 hours in advance of general publication, and the bandplans are on the site. There are many new features in this section and all free of charge to members.

RSGB 'Mega Books'

This has been developed as a major supplement to the new book site in that it offers virtually every book on offer in the UK *at a 15% discount* from the retail price (some exceptions apply). The range is absolutely huge with over 250,000 books available. The system offers a fully automated delivery direct from the warehouse, at an across-the-board discount, not just those few selected titles.

theRSGB.net

The Society is now offering members an Internet service. thersgb.net offers free sign-up, free access, free web space and, most importantly yourcall@theRSGB.net as an e-mail address. This area has even more planned for 2001 so is very much the space to watch.

But I haven't got a computer . . .

Even though the efforts of 2000 have been very much web-based, the Society has not forgotten those members without computers. The RSGB 'Mega Books' service of 15% off any book is not just a preserve limited to those with computer. A call to the RSGB sales desk can obtain exactly the same service. The trained staff can access the exact book you want and tell you the availability, price and delivery while you wait.

Days Inn Discounts

The newest benefit, announced elsewhere in this issue, is a privilege rate for Days Inn hotels. Whilst away visiting family and friends a member can now get a room for only £35 in 21 locations up and down the country.

Morse Camps

For those who haven't passed their Morse test, the RSGB is offering heavily-subsidised courses to get those important speeds. The camps take place over a weekend and two full days of intense training only costs members £15 plus the Morse Test fee.

In addition to all these services, the RSGB still offers the traditional benefits of membership: Members Ads, Planning Advice, EMC Advice, Insurance, RSGB Credit Card, Contests, Awards etc. All the 'behind the scenes' activity of the Society also shouldn't go unnoticed - negotiations with the RA and government are still being done on behalf of all UK radio amateurs.

2000 has proved a big year in adding extra value for the membership fee and the RSGB is working to make it even better value in 2001. The RSGB is committed to improving your membership benefits further next year and is already working on a number of new schemes. Another case of 'watch this space'. . .

Your Country Needs You!

RADIO AMATEURS played a vital role during WWII and your country needs you again. The need is at Bletchley Park, where the predecessor of the first computer, known as 'the Bombe', is being recreated. For this, around 100 'old technology' metal rectifiers are desperately needed. The rectifiers are no longer made, but could well exist in members' 'junk boxes'. The type needed is a selenium rectifier made by STC, code H18-8-1, 60mA in forward direction. Although a sample doesn't exist, it is likely to be long, with about eight 'fins' or metal plates and probably light grey in colour. Anyone able to donate supplies of these or a close equivalent is invited to write to Martyn Hart, the Bombe Rebuild Team Supplies Co-ordinator, at 25 The Warren, Gravesend, Kent DA12 4DA.

Chess Over the Air

BRIAN DAVISON, M0ETO, would like to hear from other radio amateurs who are also chess players. He and Mick, M5AFT, regularly play games of chess over the air, using Morse code to give the coordinates of the square to which the pieces should be moved. Anyone in this country or overseas who wishes to join in may contact Brian at 50 Gorsehill, Beacon Lough East, Gateshead, Tyne and Wear NE9 6SJ in order to set up an initial contact.

QSL Bureau

A REMINDER that, if you wish to receive QSL cards via the RSGB bureau system, it is *your* responsibility to ensure that you lodge some stamped, self-addressed envelopes with the QSL Bureau Sub-Manager appropriate for your callsign. Different sub-managers make different arrangements, but they are quite within their rights to destroy your cards after a certain period if they do not receive any method of delivering the cards to you! The QSL Bureau at RSGB Headquarters is constantly receiving pleas from sub-managers to ask members to supply them with envelopes for the delivery of cards. Specifically, would amateurs in Wales please note that all 2C-prefix callsigns are dealt with by Graham Morris, M0AXO, regardless of whether they are Novice callsigns or the special prefix used to celebrate the formation of the Welsh Assembly. Graham is holding many cards for 2C stations which he hopes to be able to deliver.

An article on the use of the QSL Bureau can be found on page 119 of the *RSGB Yearbook 2001*, which also contains a complete list of all the sub-managers.

£2 Coin to Commemorate Marconi Centenary

THE ROYAL MINT is to issue a new £2 coin to commemorate the centenary of Marconi's first wireless transmission across the Atlantic. The signal was transmitted from Poldhu in Cornwall to St John's, Newfoundland, in December 1901. Taking radio waves as the coin's theme, the design highlights the impact of Marconi and radio on 20th century communications.

The £2 coin, which will be released on 1 January, was unveiled in October in the highly appropriate surroundings of Broadcasting House in London. The guest of honour at the unveiling ceremony was Marconi's daughter, Princess Elettra. The new coin is the first to be issued following a public consultation on the design. Over 13,500 people gave their opinions.

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(Length 7' approx)
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(Length 7' approx)
AMPRO 17 mt.....**£16.95**
(Length 7' approx)
AMPRO 20 mt.....**£16.95**
(Length 7' approx)
AMPRO 30 mt.....**£16.95**
(Length 7' approx)
AMPRO 40 mt.....**£16.95**
(Length 7' approx)
AMPRO 80 mt.....**£19.95**
(Length 7' approx)
AMPRO 160 mt.....**£49.95**
(Length 7' approx)
AMPRO MB5 Multi band 10/15/20/40/80 can use 4 Bands at one time (length 100").....**£65.95**

Dual band mobile antennas

MICRO MAG 2 Metre 70 cms Super Strong 1" Mag Mount (Length 22").....**£14.95**
MR 700 2 Metre 70 cms (¼ & ⅝ wave) (Length 20") (⅜ fitting).....**£6.99**
MR 700 2 Metre 70 cms (¼ & ⅝ wave) (Length 20") (S0239 fitting).....**£9.99**
MR 777 2 Metre 70 cms 2.8 & 4.8 dBd Gain (5/8 & 2x5/8 wave) (Length 60") (3/8 fitting).....**£16.95**
MR 777 2 Metre 70 cms 2.8 & 4.8 dBd Gain (5/8 & 2x5/8 wave) (Length 60") (SO239 fitting).....**£18.95**
MR 750 2 Metre 70 cms 5.5 & 8.0 dBd Gain (¼ & 3 x ⅜ wave) (Length 60") (SO239 fitting).....**£38.95**

Single band mobile antennas

MR 214 2 Metre ¼ wave (⅜ fitting).....**£3.99**
MR 214 2 Metre ¼ wave (SO239 fitting).....**£5.00**
MR 258 2 Metre ⅝ wave 3.2 dBd Gain (⅜ fitting) (Length 58").....**£12.95**
MR 650 2 Metre ⅝ wave open coil (3.2 dBd Gain) (Length 52").....**£9.95**
MR 775 70 cms ⅝ wave 3.0 dBd Gain (Length 19") (SO239 fitting)..... **£14.95**
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MR 641 6 Metre loaded ¼ wave (Length 56") (⅜ fitting).....**£13.95**
MR 644 6 Metre loaded ¼ wave (Length 40") (⅜ fitting).....**£12.95**
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Tri band mobile antennas

MR 800 2 Metre 70 cms 6 Metres 5.0, 7.9 & 3.0 dBd Gain (¼, ⅜ & 3 x ⅝ wave) (Length 60") (SO239 fitting).....**£39.95**

½ Wave Vertical Fibre Glass (GRP) Base Antenna 3.5 dBd
(without ground planes)

70 cms (Length 26").....**£19.95**
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SQ & BM Range VX 6 Co-linear:- Specially Designed Tubular Vertical Coils individually tuned to within 0.05pf (maximum power 100watts)

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SQBM100*Dual-Bander.....**£36.95**
(2 mts 3dBd) (70cms 6dBd) (Length 39")
BM200 Dual-Bander.....**£39.95**
(2 mts 4.5dBd) (70cms 7.5dBd) (Length 62")
SQBM200* Dual-Bander.....**£47.95**
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(2 mts 6.8dBd) (70cms 9.2dBd) (Length100")
SM1000 Tri-Bander.....**£49.95**
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BM1000 Tri-Bander.....**£59.95**
(2 mts 6.2dBd) (6 mts 3.0dBd) (70cms 8.4dBd) (Length 100")
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***SQBM1000/200/100/500** are Stainless Steel, Chromed and Poly Coated. Full 2 year Warranty on these Antennas.*

2 metre vertical co-linear base antenna

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BM55 4 X 5/8 wave Length 1002 10 dBd Gain.....**£69.95**

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(Boom 83") (Gain 12.5dBd).....**£54.95**

Yagi Beams
All fittings Stainless Steel

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(Boom 63") (Gain 10dBd).....**£34.95**
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(Boom 125") (Gain 12dBd).....**£44.95**
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Complete with 25 mts of enamelled wire, insulator and choke Balun Matches any long wire to 50 Ohms. All mode no A.T.U. required. 2 "S" points greater than other Baluns.

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About the Morse

When Martin Lynch and his team thought of the Morse Camp idea over a year ago, little did we think that so many of you would want to be involved and more to the point, be one of the many who have passed at one of the organised events.

Unlike other retailers who simply 'jump on the band wagon' trying to cash in on genuine financial and personal involvement by ML&S in getting projects like this off the ground, please remember who really cares about the future of this unique hobby.

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A big thank you to all the CDXC members who purchased their new mkV from me at the recently sponsored Yaesu & ML&S HF Iota Convention. This fabulous new product is now available from stock (albeit in limited numbers). If you would seriously consider investing in yet another milestone from Yaesu then call your favourite dealer today. The one who really understands your H.F. requirements.

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TS 870 technology has thus been adopted for all-mode applications - VHF and UHF as well as HF.

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APRS® – an Introduction

*by Ciemon Dunville, G0TRT **

G0TRT's smallest APRS station.

JUST MENTIONING PACKET radio is probably enough to convince many readers to skip this article, but please have patience and you'll learn that packet has been reborn in the UK under the new guise of APRS.

WHAT IS IT?

APRS STANDS FOR 'Automatic Packet Position Reporting System', and is the brainchild of Bob Bruninga, WB4APR. A tracking and messaging system was the original idea; to be able to see the location of a fixed or mobile station, on a map, and 'chat' in real time with any station on the frequency, without any prior knowledge of the network.

WHY?

The US RADIO Amateurs' Emergency Network is well and truly integrated with national systems and APRS cuts back on the "Where are you?", "What are you doing?" and "How many people are there?" type of call. APRS does this easily, and because it runs on a computer, the need to write out paper logs is greatly reduced. Of course, the use of APRS is not restricted to emergency situations, it can be used for events (talk in), fox hunting, DX spot plotting and day-to-day activities.

* *g0trt@amsat.org*

I know where I'm going: APRS in abundance - Kenwood TH-D7E, Garmin Street Pilot GPS, Kenwood TM-D700E. (G6NHU)

HOW DOES IT WORK?

ONE OF THE fundamentals of APRS is that it uses un-connected communication ie one-to-many instead of one-to-one. For example, to pass a one-line message from station A via station B to station C, on a connected network, takes 12 transmissions. With an un-connected system it takes just four. Obviously, this drastic reduction of on-air time makes for a much more efficient system.

Unlike the Bulletin Board System (BBS), there are no nodes, just digipeaters; if used correctly, reliable long-range communications are capable using multiple hops. This gives a truly all-informed real-time network.

THE PROTOCOL

ALL INFORMATION should be passed in one transmission so, to keep transmission time to the absolute minimum and thus ensure maximum efficiency, while also propagating information over the required area, is quite some feat. This is especially so when you realise that APRS can be used to send the following:fixed position; mobile position; four types of message; weather; status; objects; system power, height and gain etc.

Obviously, all this cannot be sent in one 256-byte packet, but each one of the above transmissions needs a recognised, on-air protocol. Here are two examples:

Fixed Station

```
=5207.40N/00057.06W-PHG3260
```

This tells me that the station is located at latitude 52° 07.40" North, longitude 000° 57.06" West. It is showing a house icon on the map, it has the ability to send and receive messages, it is using 10 watts into an omni-directional antenna which has 6dB gain and is at 40m above average terrain.

Weather Report

```
!041230/5207.40N/
00057.06W_c000s015g025t045
r100p200P150h40b10132
```

This tells me that the weather station is located at 52° 07.40" North, 000° 57.06" West. The system is an Ultimeter200 weather station and has no messaging capability. The weather report is timed at 1230 on the 4th of the month. The wind is from the north at 15 knots, gusting to 25 knots. The temperature is 45°F. Rainfall: 1 inch in the last hour, 2 inches in the last 24 hours, 1.5 inches of rain since midnight. The humidity is 40% and the pressure is 1013.2mb.

The Garmin Street PIlot - typical of the range of systems available with NMEA output (see text). (G6NHU)

WHAT CAN IT DO?

WITH APRS, the following can be sent:

Beacons – your position, be it fixed or mobile. It is possible to indicate the type of station, anything from a Scout to a space shuttle including a car, bike, truck, school - the list is long.

Course and speed – for dead reckoning.

Power, Height and Gain - for frequency co-ordination by plotting circles on the map for each station.

DF Report – for foxhunting, or interference location.

Weather – including rain, pressure and humidity. Various weather stations can be linked directly to APRS to automatically send the information.

Objects – it is possible to send object reports for such things as accident locations, rallies, meetings, and the list is limited only by your imagination.

Status – used to inform of the station's current activity or something similar. A lot of stations put their best on-frequency DX here, others use it to put a point of contact, be it a BBS, phone number or email address.

Messages – All APRS messages are instant, as soon as you press send, it goes. The beauty of these messages is that they are real time and as such it is possible to have large, round-table discussions with as many stations as you like. It is also possible to send Bulletins, which are messages that are transmitted a couple of times an hour for a day, these might be used to notify people of a large accident that has blocked a major road. Announcements can also be made, these are long-term messages, transmitted every couple of hours for a number of days; they could be used to let users know the local standards or point of contact for information.

Queries – There are various queries that you can ask of another station, giving status, position, stations heard etc.

DXCluster – APRS is very useful for the *DXCluster* user. By listening on the cluster frequency, APRS picks up spots and plots them on a world map; all the spot information is available on various pages and the beauty is that you never have to transmit, keeping cluster frequency loading to a minimum. Some software can be used to retune the radio and turn the beam automatically.

So, APRS is a *very* capable system and is incredibly configurable.

WHAT DO I NEED?

SOUNDS RATHER interesting? Well, it is not going to cost you an arm and a leg to have a go. As has become the norm nowadays, there are several ways of setting yourself up. APRS is no different; all you need is a packet station, which includes a computer, TNC and a radio. Of course, operation can be achieved using Baycom boards or sound cards or using the latest radios that have TNCs and APRS built in, but they are not essential.

So, you've got your TNC and computer connected up and running at 1200 baud on 144.800MHz (the UK's dedicated APRS frequency). It is possible to use an ordinary terminal program to see the packets and decode them manually; it is an excellent way to learn about APRS. To appreciate the finer points of APRS, you need some APRS software. Without doubt, the

most widely-used software in the UK is *UI-View* written by Roger Barker, G4IDE, but there is software available also for DOS®, Windows®, WinCE®, Linux®, Macintosh®, PalmOS® and probably more. This is all available via the Internet and some links are given at the end.

TRACKERS

MOBILE STATIONS have already been mentioned; these are commonly known as trackers, as they enable you to track them. A tracker is made up of a GPS receiver, a TNC and a radio. Once again, there are various types of setup:

GPS – This is a receiver which provides National Marine Electronics Association (NMEA) data for location information. Many receivers are available but, to be used with a tracker, it must have a data port and the ability to send NMEA data through that port. 'Pharos' is a very small GPS receiver, just a little bigger than a box of matches, but it has no display, so this is not particularly useful if you want to be able to see information.

At the other end of the scale, the Garmin 'Street Pilot' is a top-of-the-range system that gives you a street map and as much information and data as you could possibly want.

TNC – Any TNC used as a tracker must have GPS parameters otherwise it cannot be used. The 'Picopacket' is a very small and capable system that is widely used for small lightweight setups.

Radio – In a developed APRS network (the UK net is still very young) a handheld radio is all that is needed but, while the network here is developing, any mobile radio will do; obviously, greater power will enable you to be tracked at extreme ranges.

The advent of the Kenwood TH-D7E and TM-D700E radios has helped with trackers by having the TNC built inside the radio. This keeps the bulk, weight and cost of a tracker down. Be under no illusion, these are incredibly capable radios and well worth the money. There are two basic types of tracker - dumb and smart. A dumb tracker is one that does nothing but send its position report, whereas a smart tracker will have the ability to send and receive messages etc, just as a full-blown APRS station can.

Tracking assets can be invaluable; anything can have a tracker strapped to it, from an ambulance/fire engine/police car through a car/bus/train, to a search and rescue helicopter or search team. There is a ham in the US who is working on a tracker for his dog; he uses it for search and rescue duties! The idea is that he can see on a map the area that has been covered; this is done in real-time, automatically rather than with continuous voice updates.

THE REST OF THE WORLD

WHEN BOB BRUNINGA devised the APRS system, his intention was "to make it a real-time local (tactical) communications system that could be used anywhere, at any time, with no prior knowledge, and would allow everyone in an area to communicate. But this emergency-response design objective naturally is only needed less than 1% of the time.

"As amateurs experimented with it and began putting up fixed networks for routine operations the other 99% of the time, it became obvious that it had the potential for a great wide-area (low-bandwidth) global system."

And so the world-wide APRS network began. Here's how.

IGATE (Internet GATEway)

AS POCKETS OF ACTIVITY built up, vast distances needed to be covered to keep the real-time aspect of APRS alive. Realistically this is impossible on RF, so a system called APRServe was developed using the Internet; it is a computer that deals purely with APRS Internet information. IGATEs are APRS stations that are connected to APRServe, they take all transmissions from RF and pass them to the server. This, in turn, sends them to all IGATEs that are connected.

This has given APRS some serious potential, both good and bad. At the moment there are normally in the region of 1500 to 2000 stations being processed by APRServe, and all of their position reports, messages and objects can be sent from the Internet to RF. Obviously, that would be catastrophic and so IGATE SysOps have to regulate what, if anything they send to RF. This is generally a couple of 'exotic' positions intended to promote the IGATE's existence.

What it *has* done, is to enable anyone within range of an IGATE to communicate with anyone else in the world who is also in range of an IGATE.

Of course, the information gathered at APRServe can be further utilised. www.findu.com is a database of all info that is passed to APRServe and there are some incredible things that can be done with databases. It is also possible to have a look at APRS activity through the Internet, which has real potential in a disaster situation. Have a look at 'Live APRS data' at www.mb7uiv.co.uk

When information from both these sources is used together, it is possible to see the history of a location in terms of RF, weather and stations, while also getting real-time data. This is very powerful and useful for radio amateurs.

REMOTE AREA OPERATION

IT IS EASY to talk of accessing the world-wide APRS network, but what if there is no network where you operate? There have been fairly extensive tests using the satellite SO-35 as a digipeater, all of which have proved that it is possible to access the satellite using a dual-band handheld with a half-wave vertical antenna [provided that such operation is not attempted from the centres of large towns - *Ed*].

If satellite operation is possible, all that is then required is a dedicated APRSat and ground stations (position gateways) linking APRSat to APRServe, thus completing the network.

SUMMARY

APRS IS AN AX25 packet radio communications package, enabling messaging and tracking of assets. It relies upon the GPS network and a robust protocol to provide real-time information over a world-wide network.

FURTHER READING AND USEFUL WEB SITES

APRS Tracks, Maps & Automobiles by Stan Horzepa, WA1LOU, available from RSGB Books

http://go.to/APRSUK – the author's web page, covering APRS basics, including digipeating and unproto path presentation.

www.mb7uiv.co.uk - IGATEs in the UK, by Keith, G6NHU.

http://web.usna.navy.mil/~bruninga/aprs.html - The Bob Bruninga, WB4APR, homepage.

www.packetradio.org.uk - The *UI-View* homepage of Roger Barker, G4IDE. ♦

If you don't want a display, the size collapses to that of the Pharos GPS system (see text). (G6NHU)

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PicATUne - the Intelligent ATU

*Part four, by Peter Rhodes, BSc, G3XJP **

THIS MONTH concludes the construction phase with the building of the case, the logic board, the system wiring and the capacitors.

BUILDING THE CASE

THE POLYSTYRENE CASE comprises four sides, each 8cm high - and a top and bottom cover. The sides are glued together with polystyrene cement. The top and bottom covers are not built until after final test. They have a 5cm external lip all round and are clamped together by bolts passing outside the enclosure.

Allow at least a 1mm tolerance gap all round the RF deck and cut the four side panels accordingly. I used 244 x 80mm and 222 x 80mm, both twice. I butt-jointed the corners and also cut in a 14mm square fillet half way up each side at each corner. With hindsight, this latter was probably not too good an idea, because it adds another environmental leak risk, but at the time I was unsure of the bonding strength and wanted to add more rigidity. I suggest you simply glue in a 10mm square fillet to each internal corner. The component side of the RF deck rests on these, secured with M3 nylon nuts and screws as required.

Using emery, remove the polished finish from the polystyrene where it is to be glued; ensure you allow for the joints to be butted the right way round. Glue together the sides, firstly into two pairs of Ls, including the gusset and, when set, into a square. Do not attempt it in one go! A polyethylene bag over a finger tip helps to draw out a clean fillet and ensures there are no gaps either internally or externally.

Radius the corners of the RF deck and fit to the case, with the component side resting on the gussets. At this stage, RFC1 can be bonded to the board, clearing the gusset.

Make up some means of housing some silica gel. **Fig 19** shows a suggested approach. It is mounted above RL17 on the casing wall. The nylon gauze referred to in the caption is the engineering term for a lady's tights.

Take two pieces of PCB about 3 x 1cm and solder them at right angles to the board to pick up the track to the antenna and counterpoise terminals. Drill a pilot hole right through the case and the PCB for each terminal - about 2cm from the board face. Drill pilot holes for the input and output sockets, for the coax lead to the dummy load and for the silica gel chamber.

Remove the board and drill the holes fully. For the SO239 sockets, I first used a 19mm flat wood bit - from the outside - to a depth of about 1mm. Although SO239s nominally fit a 4mm thick panel, you only get the backing nut on about half a turn and, in any event, you also need to allow some depth for waterproofing compound later.

Refit the board and fit all the external connectors, dry at this stage. Wire up the output SO239 socket to the output terminals using some 2mm wire. Wire up the input socket using 2mm wire to link the washer to the board ground - and a small length of RG58 for the inner.

Cut a piece of single-sided PCB (87 x 78mm) for the base of the logic board. It also clamps up on the gusset in the logic board corner. Place it hard into the corner on the component side, copper side facing out. Mark positions for four holes which will foul neither the logic board assembly nor the earthy plates of C9-C11. Cut six pieces of polystyrene about 1cm square to use as spacers and drill four of them and the holes in the board at 4mm diameter. Glue the spacers to the board using the two undrilled ones to provide even spacing over C9-C11. Secure the base to the RF board using M3 nylon screws and nuts - and clamping up on the corner gusset. Run a short, heavy ground link from the base plate to the hole provided on the RF sense section.

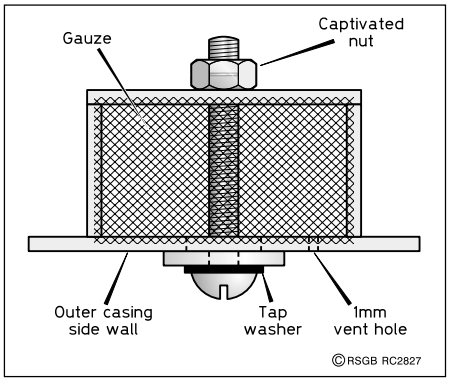

Fig 19: Suggested silica gel chamber construction - approx 25 x 12mm - made from polystyrene with nylon gauze bonded over the two open sides. The nut is bonded with epoxy resin to captivate it (liberally grease thread with DC4 first). The access hole in the casing is about 5mm and is sealed with an external polystyrene 'washer' and some bathroom sealant. The screw is sealed with a tap washer. The vent hole ensures that any breathed air passes through the silica gel.

Fit the dummy load to its heatsink with some heat transfer compound. Then mount the heatsink to some polystyrene sheet with nuts and bolts. Glue the polystyrene to the casing and when set, make off the coax lead on the dummy load.

Fit a length of RG58 from RL21 to the input end of the L-match. The braid should be grounded at both ends. To this end, I soldered a short stub of PCB at right angles to the main board to pick up the connection to the 'earthy' end of the L-match capacitors - and made off the braid of the coax to this stub.

BUILDING THE LOGIC BOARD

ANY PCB TECHNOLOGY can be used for this board. A technique [7] for using an iron-on etch resistant mask produced directly from the artwork, described by Ed, EI9GQ, is particularly appropriate.

Referring to **Fig 20**, the holes for transistors Tr1-Tr21 should be drilled 0.6mm; the remainder at 0.7mm. Lightly countersink the holes on the ground plane side. Having drilled the board, I masked the ground plane side with spray paint and then used indelible pen for the tracking.

The only critical element is the 0.1in pitch lines to take SK1. These all line up on one or more of the holes so, using a piece of strip-board as a guide, you should have no trouble. For the finer tracking around the BC517 transistors, I penned in additional horizontal lines at right angles to the wanted tracks and then used a scalpel blade to remove the ink and restore the gap between the holes. It is also worthwhile casually filling in any larger unused areas. This helps to achieve an even etch and reduce etchant consumption.

Having etched the board and cleaned it, make up the three vertical side panels from some double sided PCB - about 25mm high. Note the T-junctions where they meet, ensuring that both faces of the sides are grounded. Seam-solder the internal and external corners and mount the logic board about half way up the partition, soldering the edges of the ground plane.

Populate the board, fitting firstly the four through-board links, C24, C51, C53,

* Danvers House, Wigmore, Herefordshire HR6 9UF.
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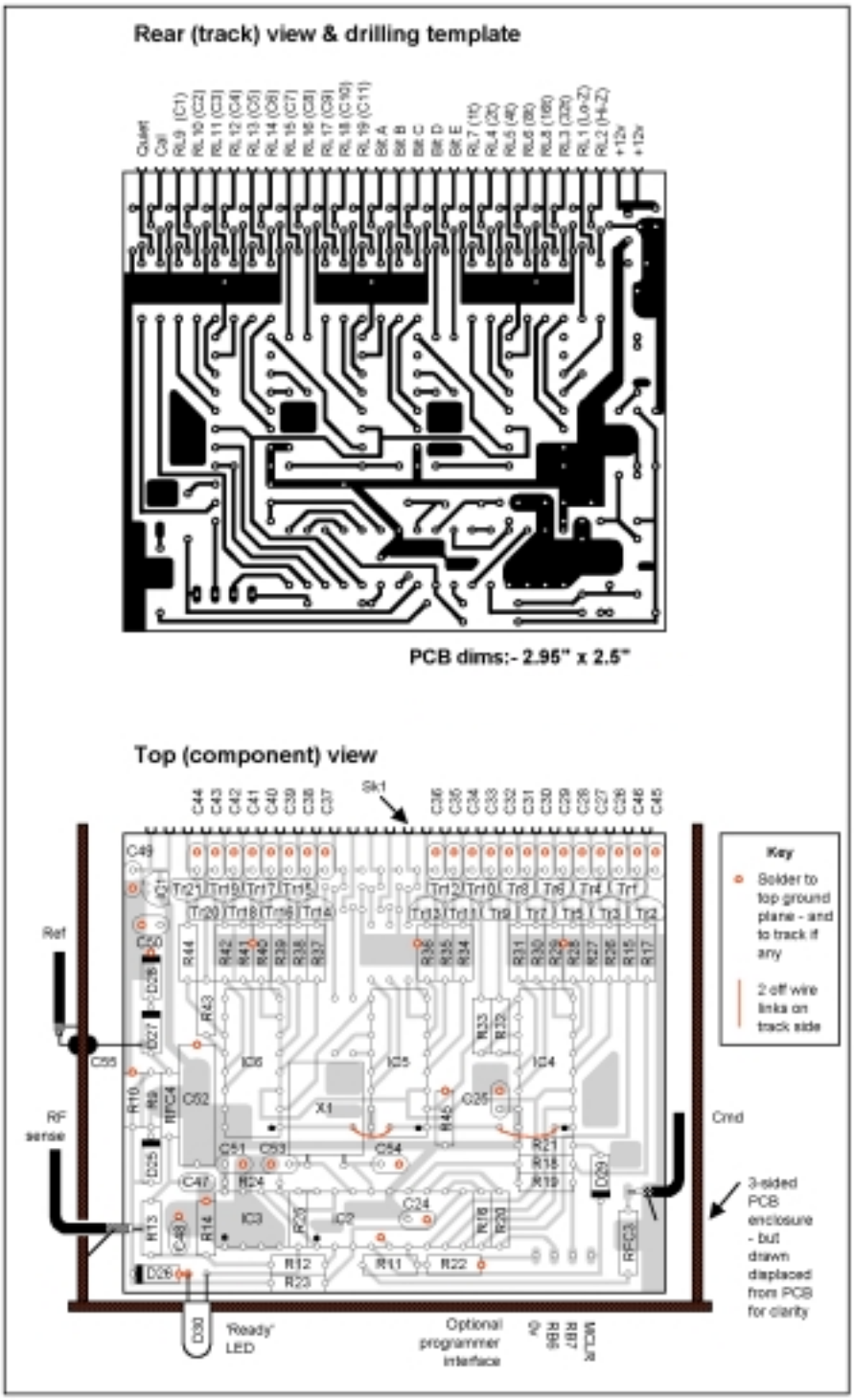


Fig 20: Logic board PCB. This is a double-sided PCB with the component side of the board completely unetched, providing shielding and ground connections. Note four through board links adjacent to R40, R36, R28 and pin 5 of IC2 - which bring ground through to the track side of the board. The PCB is shown etched for the optional bit outputs - but illustrated unpopulated.

C54, R24, R25 and then the IC sockets.

Cut the tails on SK1 so that they are as long as possible, consistent with both not touching adjacent track, and mounting SK1 hard up to the board edge. Solder quickly into place without melting the insulation. Fit all other components and the two links on the track side. The earthy ends of C24, C26-C46, R45 and C54 are soldered to the ground plane only and do not pass through the board. Depending on the size of your decoupling capacitors, C26-C46 may be better fitted diagonally. X1 lies flat on the board to reduce height.

Soldering in the transistors needs a steady hand. You may find it easier to leave short tails on their leads on the copper side (especially the grounded emitter lead) - and solder them to the track a short distance from the holes.

Make off the three flying leads as illustrated. The RF sense lead is wired in miniature coax; the Cmd and Ref lines preferably in miniature audio cable. They are routed in/outside the enclosure as illustrated and made off under the board. Do not fit IC4-IC6 in their sockets at this stage.

TESTING THE LOGIC BOARD

AT THIS POINT it is possible to verify basic operation of the PIC and its memory. After the usual checks, connect a short 'antenna' to the inner of the RF sense lead and loosely couple it to your receiver antenna - on one of the LF bands. Plug in IC2 and IC3 and then apply 12V to the board - between the +12V pins and ground.

Immediately on powering up, you should be greeted with the following message in CW: **HI de PicATUne AR K**

The text of the message has been read from memory verifying that the PIC and memory are at least basically functional. At the end of the message, the 'Ready' LED should light.

If you enjoyed that, try dabbing the inner of the Cmd lead on and off IC4 socket, pin 16 (+5v) - simulating the operation of your Command Switch. You should hear **M U S I C** which is the main menu. Its significance will be fully discussed later. Suffice it at this stage that you hear the CW message. Should you hear actual music, then something is badly wrong.

RELAY WIRING

FIRSTLY, YOU NEED a mating connector to fit SK1 on the logic board.

I 'manufactured' a free plug by soldering a 28-way SIL plug (PL1) to a piece of 0.1in pitch stripboard. The stripboard is 28 strips wide by 4 holes high with the SIL plug at one edge, the opposite edge copper cut back to avoid earthing - and with the wires soldered to the middle of each strip. The purpose of the stripboard is to add some marginal mechanical strength and to give you something to push against when mating with SK1.

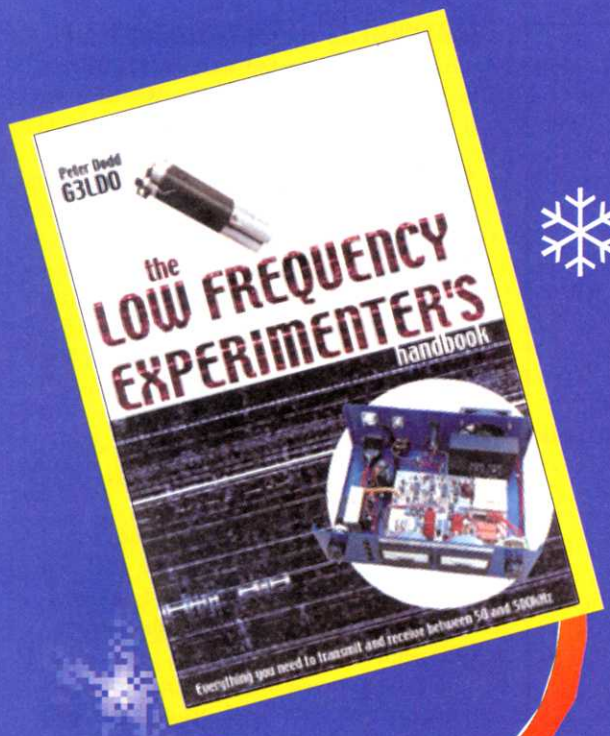
The relevant tracks for the relays are routed to a central location on the main PCB. I used SIL plugs and sockets to make off wire leads on the component side, but it is an unwarranted luxury. You might as well just solder the wires directly to the board, since there is a connector at the other end of the leads anyway.

Either way, cut 20 lengths of hook-up wire, 17cm long and bare both ends. Some colour variety is useful. Make off all the leads on the main PCB. Use one wire for the common +12V lead.

I then passed all 20 leads through an old PA balun core to tidy them together and perhaps offer some reluctance to RF. I would doubt if it does much. With the logic board assembly tack soldered in position and PL1/SK1 lightly mated, start from the RL9 (C1) end of the connector

29

XMAS SPECIALS



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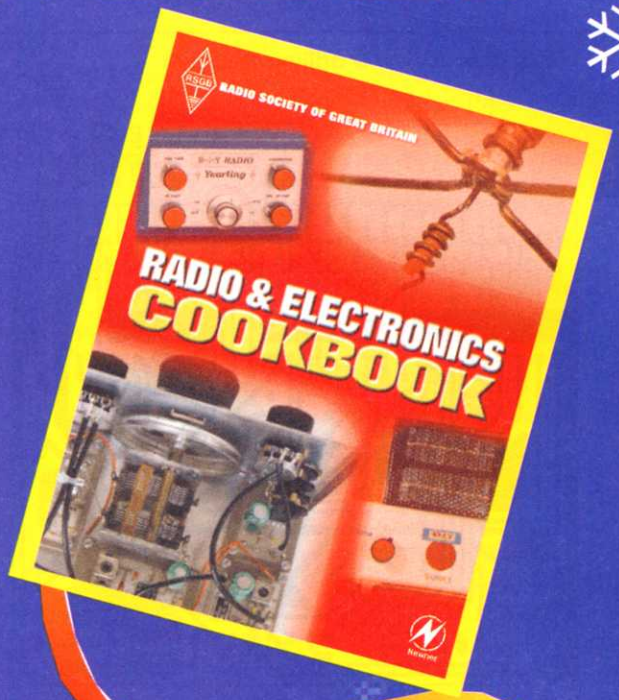

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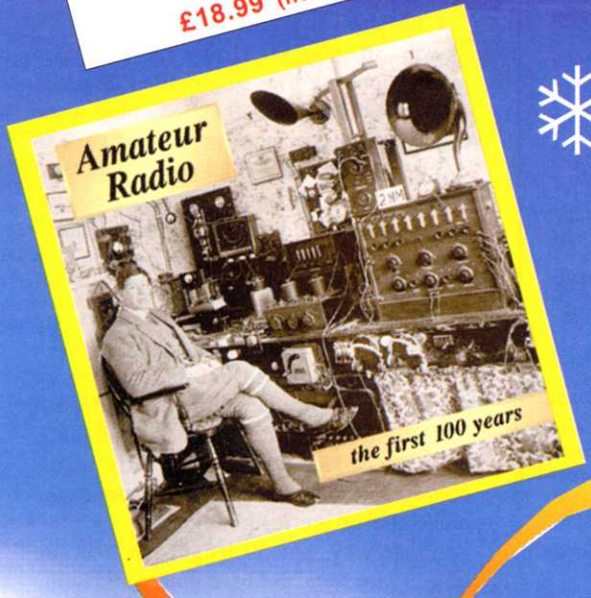

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(the shortest lead). Use a continuity meter to locate the correct lead, cut it to length (with little excess) and make off its end on PL1. Proceed along the plug, remembering to leave a 5-pin gap near the middle (bits A-E). Note also that the relays are not in any 'obvious order' and it is vital to get this right first time. Subsequent diagnostics if you get your wires crossed will be next to impossible, so check and check again. At the same time, check that all the protective diodes are fitted the right way round. You will be left with one wire, the common +12V feed to the relays. Leave this free at this stage, as it is needed for capacitor building.

BUILDING THE CAPACITORS

THESE ELEVEN CAPACITORS are built up on the copper side of the board. As a preliminary, finish cutting and drilling the clamp plates for C3-C11. Trial-fit them all at the same time and, using an indelible pen, write 'C3', 'C4' etc on each plate so that subsequently you will always fit the same clamp plate the same way round.

Introduction

The two smallest capacitors, C1 and C2, are air-spaced. The remainder use a polyethylene dielectric as illustrated in **Fig 21**.

Now for the science bit. Although the capacitor values follow the binary series 1, 2, 4 .... 1024pF, you must not attempt to build to those values. This is because two forms of stray capacitance will conspire to foil you. There are general strays which you can observe just by watching a capacitance meter while waving your hand around inside the casing. Every effort has been made to minimise these, but there is an irreducible minimum which you get between any two lumps of conductor in the same box. Then there are the insidious switched strays. These are mostly the capacitances across the open relay contacts in series with the capacitors. These strays have the interesting property of progressively disappearing as the relay contacts are closed - and largely don't even exist until the capacitors have been built.

The build process described here removes potential errors from both these sources, provided only that you stick to this simple rule:-

The measured value of any one capacitor when switched in on its own must always be greater than the measured value of all its smaller-valued capacitors when switched in at the same time.

For example, C4 must be greater than (C1+C2+C3). Note that (C1+C2+C3) is not the sum of their individual values. It is the single value of them acting collectively which, because of the strays, is different.

The rule arises because when the software sends out the bits to demand an increase or decrease in capacitance, it has to assume that the opposite has not actually happened! Doubtless this sounds complicated, but in practice it is very simple. The process and rule were hard won - and if you don't observe them your ATU may well not work. So don't abuse them.

Setting up

Before starting the build, my general advice to you is to have a good clean-up and vacuum thoroughly. You don't need clean-room conditions or to pressurise your shack positively but, conversely, the dielectric properties of the odd dog hair are somewhat unpredictable.

Establish three distinct working zones. One for handling the polyethylene, one for the brass shim and one for assembly. In the latter, stand the ATU on its edge, having first removed the logic board, its base plate and ground link.

Make up a test lead with an eleven-way (or more) SIL socket - all pins joined together - and connect it to the negative lead of a 12V supply. Connect the positive supply lead to the common +12V feed to the relays. Note that you can now energise any one relay by mating this socket at right angles to PL1 - or you can energise any consecutive number of relays at the same time - by mating the connectors in the usual way but with an appropriate offset. The 'rule' is falling into place.

Connect your capacitance meter, one lead to the counterpoise terminal, one temporarily soldered to the bus-bar running along the capacitor switching relay bank. In the polyethylene zone, set up a cutting surface at least 30cm square. Glass over newsprint (to give optical contrast) is ideal and old kitchen worktop works well. Do not use grained wood. Use some anti-static cleaner if you have some.

Remove the polyethylene bags from their box and cut off about the first five which will have been marked by the freezer ties provided - and return them to kitchen stock. Never attempt to tear bags along the dotted line. Cut them with a sharp blade only - or sharp scissors for coarse work. Never use the portion of the bag with the white contents and date label, or the hard crease at the edges of the bag. Always inspect by eye and reject any film with obvious inclusions. I never found any! Small creases and stretch marks are OK.

Apply a film of DC4 grease to the glass. Squeeze out about 1cm from the tube and spread it using a flexible spatula. The long edge of a credit card is ideal. Try to get the grease film even and just wetting the surface.

Cut some strips of polyethylene about 70mm wide. Lay one film thickness on the grease. Now apply a wetting layer of grease to the film and it should become practically invisible. If not, there are probably two layers of film and an air gap. Lay a further layer of film on top - roughly aligned - and grease that also. Repeat for a third layer. That establishes some base stock of dielectric with three layers of film. You are now ready to trim the dielectric to size - which is done most easily when greased first. Trim the strip width down to 40mm (long edges roughly parallel) - which is the size needed for C7-C11.

In the brass zone, you need the brass shim stock, a 4mm drill, some soft wood, fine wet-and-dry and a vice, together with some cleaning solvent (I used cellulose thinners) and a lint-free rag. To cut the brass use either a pair of tin snips or buy a cheap pair of scissors from the market and be prepared to write them off.

To drill a hole in the shim, mark the hole by eye, clamp it in the vice and drill against a soft wood backing. Do not attempt mass production, because you will end up with mass of twisted shim instead.

The order of events is to cut the plate, drill the hole, radius the corners, rub down flat any sharp edges (most of them) and clean. The size of the plate, all right angles etc can be judged perfectly well by eye. Anything more subtle is a waste of time and you will be there for weeks.

General technique

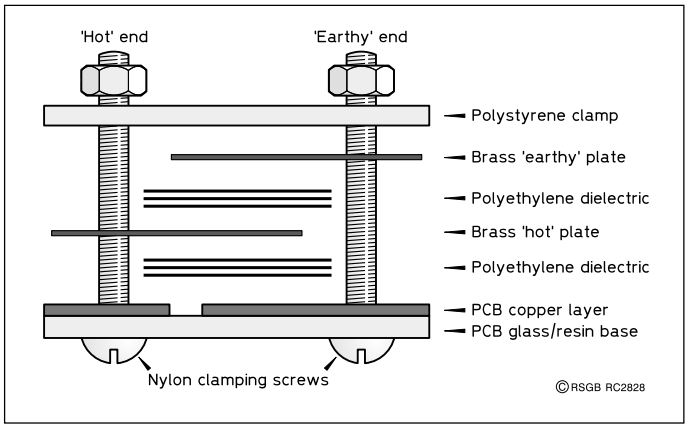

Fig 21: Generalised form of capacitor construction for C3-C11. Note that the PCB copper always forms one earthy plate. This is therefore a 3-plate capacitor (ie 2 layers of dielectric). Three layers of polyethylene film are illustrated per dielectric layer. The brass plates are soldered to each other and/or the PCB copper layer at their respective ends.

See **Fig 22** for a view of the finished result. The film width is cut to clear the two clamping holes. Use the clamping plate to judge the other dimension. Lay one edge of the film into the capacitor, line everything up and 'roll' it into place. Smooth out any wrinkles or bubbles with a finger tip.

Then prepare a plate. Line it up with a screw through the hole and press it onto the dielectric. It should stick to the grease. Quickly tack-solder it at the screw end. Press the centre with the plastic end of a screwdriver to get a rough measurement. Proceed applying alternate layers of dielectric and plate (alternate ends). When you get close to the desired value, apply the clamping plate before taking a measurement. The clamping plate is secured with M3 nylon screws and nuts. Torque them up finger-tight only on the nut or you will strip the thread. When you get near to the desired value, go over the top and then trim back the final plate - unsoldered to start with. Also consider slipping in an extra layer of film to pull the value back somewhat.

Coarse build sequence

The main purpose of this step is crudely to build up the larger capacitance values (not observing the 'rule' yet) - so that the strays are established. At switch on, you should be looking at about 15-20pF of residuals.

C1 and C2 are air-spaced and it is easiest if these are crudely built first. Cut a full sized plate for C2 (about 27x12mm) and solder it to the 'hot' end with about 20mm overlap on the copper ground plate. Slide a piece of 2mm wire between the plates and use it to bend the shim so that the plates are roughly parallel and about 2mm apart. Repeat for C1, but with a shorter plate giving only about 8mm overlap.

Now for the big ones, starting with C9, 10 and 11. These can share common dielectric layers, at least to start with. They could also share shim ground plates, but the latter is more trouble than it's worth.

Energise RL17 (C9) only and build up C9, C10 and C11 - applying the same number of plates to each - until C9 measures about 200-300pF. Clamp up C9.

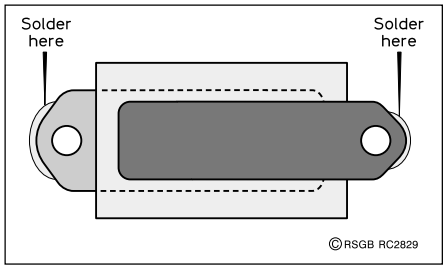

Fig 22: PCB plate construction, plan view. The critical parameters are:- (1) the plate corners are arbitrarily radiused; (2) the dielectric is larger than the plate overlap zone by at least 3mm in all dimensions; (3) the cut edges of the plates are rubbed smooth; (4) the plates are different widths so that the long edges are not aligned. Thereafter, the absolute size and shape of the plates are completely unimportant.

Capacitor	Alone	Cumulative
None	17	17
C1	18	18
C2	19	21
C3	22	25
C4	26	33
C5	36	50
C6	55	86
C7	94	162
C8	164	311
C9	320	615
C10	624	1228
C11	1251	2472

Table 1: Format of table for building capacitor bank - and my achieved values, in pF.

Energise RL18 (C10) only and build up C10 and C11 - applying the same number of plates to each - until C10 measures about 500-600pF. Clamp up C10 and C11.

Energise RL15 (C7) only and build up C7 and C8 - applying the same number of plates to each - until C7 measures about 50-80pF. Clamp up C7 and C8.

Trim some 3-layer dielectric to 25 x 70mm and lay it across C3-C6. Without soldering them, add one full sized 'hot' plate each to C5 and C6 - one full width, half length plate to C4 - and one half length, half width plate to C3 - clamping up each one in turn.

You now have some sort of capacitor bank with the larger values (C6-C11) under-sized and the smaller values somewhere near. A good start.

Fine build sequence

From now on, **observe the rule**! Draw up a table along the lines of **Table 1**. Date-stamp it for your records. The table also shows the actual values achieved on my capacitor bank. For each row, the 'Alone' column is the value of a single capacitor. The 'Cumulative' column shows the value of that same capacitor - and all the smaller ones - all engaged at the same time.

The 17pF value represents the minimum capacitance achievable - and 2472pF is the maximum value with the full bank engaged. The theoretical maximum is just over 2000pF, so there is 400pF of excess - ie a useful safety margin - in there somewhere. I doubt that it would be possible to build an air-spaced variable to this specification.

So, applying the 'rule', the 'Alone' value of every capacitor must be greater than the 'Cumulative' value in the previous row. Obviously, the 'Alone' and 'Cumulative' values in the first two rows must be equal.

The next question is, if the value must be greater, how much greater? The answer for the smaller values is definitely 1pF. For the larger ones, some 2-5%, but not critical. You are trading-off gaps in the capacitance range if you add too much - versus the risk of breaking the 'rule' if there is any drift.

If you look at my C8, you will see that it observes the rule, but needs watching since if there is any drift the rule is at risk. By inspection, the safety margin could be improved by slightly reducing C7 and/or C6, and by increasing C8 by about 5pF. In the event, C8 drifted a few pF higher after a few days of use (they never drift lower) and all was well.

The 'Alone' value is measured by mating the connectors at right angles. The 'Cumulative' value by in-line mating with the appropriate offset. In this case, always measure the voltage across the relay coils to make sure they are all energised, since with the connectors gently mated, it is possible to miss some.

Start at the top of the table and work down. C1 needs to be 1pF more than your base residual value. Bend the plate to achieve this. Write in the actual measured value. Then C2 needs to be 1pF more than C1. Again, bend the plate of C2. With both C1 and C2, you shouldn't let the gap fall below about 2mm or there is some risk of subsequent flashover.

Now energise both C1 and C2 and write the result in C2 'Cumulative'. Add 1pF to it and pencil it in as the target for C3. Energise C3 alone and achieve the target with the clamping plate fitted, erring on the high side if anything - and write in the achieved 'Alone' value. Now energise C1 and C2 and C3 - write the result in C3 'Cumulative' and the result plus 1pF as the C4 target - and so on - until you finish C11.

Some tips and observations

- If you get too much grease on the dielectric, the capacitor will tend to drift higher in value over time as the excess grease distributes - and ultimately gets squeezed out of the edges.
- One approach to speeding up this drift, if it is serious, is to clamp up the capacitor with metal screws and nuts and leave it overnight. This is good practice at the end of a day's work anyway - and then just touch up the values next morning.
- Otherwise, regard the clamp plates as mere dust covers. Ideally, the capacitance value should not change with or without the clamp plates irrespective of the applied torque. These are not compression trimmers! In practice, and especially on the higher values, you can indeed alter the torque to trim the value by a few pF.
- Another trick is to apply a few extra layers of dielectric to the middle of the clamp plate - to increase the pressure on the plate overlap zone.
- Revisit the capacitors after about a week and repeat the full set of measurements. Correct any serious drifts and keep good records

so you can spot any trends. One of mine had moved quite a lot and I actually had to remove a whole plate to get it back. The others had barely moved at all. Thereafter there has been no significant movement - and believe me, it has seen a lot of use.

- You need to form a judgment as to how often you need to check the values but, in my experience, once they settle down, they stay settled. Whatever happens, if it all works, don't touch it!
- Once you are happy, run a small drop of epoxy resin under an edge of C1 and C2 to hold the spacing - and apply some non-setting thread-locking compound to the M3 screws.

COMPLETING THE WIRING

BEFORE REFITTING the logic board, take the opportunity to fabricate a top cover. Use either brass shim with external lips or oversized double sided PCB. Drill a small hole for D30 in the top cover (to let the light escape!) and orient the LED. Do not fit the cover at this stage.

Refit the logic board base and its earth lead. Place the logic board assembly in position and solder it to the bottom plate at no more than three points. Connect up the three flying leads and the Cal and Quiet leads to the sensor section, and a short link to the two +12V pins.

Dress the longer leads along the casing wall, next to the dummy load. Fit a spark gap across the two output terminals, either across the coax output socket or externally to the casing. Adjust it for a few thou gap at this stage - and you are ready to go!

If you want to improve the theoretical Q of L1, you may want to consider cutting out the one- and two-turn links from L1 and replacing them with small coils at right angles to L1, soldered directly to the relay terminals. I have been unable to measure any benefit in practice.

COMMISSIONING

AT THIS POINT the entire project is built and fitted - with the exception of IC4-IC6, cover plates and environmental sealing. Connect a 100Ω 2W carbon resistor across the ATU antenna and counterpoise terminals. Connect your Tx/Rx via your SWR bridge to the Command Unit with 50Ω coax. Run a further length of 50Ω coax from the Command Unit to the RF input connector of the ATU. Put your transceiver on one of the LF bands. Connect the supply (13-14VDC) to the Command Unit.

Immediately on powering up the Command Unit the Quiet and Cal relays will energise and you should hear the greeting message as previously described. The relays will then de-energise and the 'Ready' LED will light.

Phasing T1 and T2

Power off PicATUne. Connect a high impedance voltmeter or oscilloscope to the Ref line at C55 (the feedthrough), looking for a few hundred mV DC. Switch on PicATUne and *only* while it is sending the greeting message, apply about 10 watts of carrier on 80m. The voltmeter should read 150mV or less. If substantially more, swap over the winding leads of either T1 or T2 (but not both) and repeat.

Your SWR head is now sensing reflected (as opposed to forward) power.

Using PicATUne's menus

The operation of your Command Switch depends on the type of switch fitted. If a toggle or slide switch, a command is issued by changing it to the opposite position. If a non-latching push button, then a press and immediate release is required. For the sake of brevity the term 'Press the Command Switch' should be read as 'Issue a command according to the type of switch fitted'. So, without further ado, press the Command Switch.

The relays will energise again and you will hear **M U S I C** which is the main menu. Its significance will be fully discussed later.

Transmit a brief carrier at about the 2-watt level. Note that there is some reflected power and that the 100Ω resistor gets hot. This verifies that the transmitter is connected through to the dummy antenna.

On key-up, PicATUne may well respond with **X K** continuously repeated, which simply means it has searched for a prestored matching solution and, not surprisingly, has failed to find one. Acknowledge and cancel any XK sequence by pressing the Command Switch.

Now for a menu selection command. At this stage you are being invited to test the system by rote and not to understand much about what is going on. That will follow.

So, press the Command Switch to bring up the main **M U S I C** menu again - and as you hear the second (or first) dash of the **M** press the Command Switch again. PicATUne will respond with **R M**, which means "Roger, got your command, **M** was selected". **M** will be continuously repeated. For your interest, you have now entered the 'Match from Scratch' mode.

Transmit a carrier at about the 5-10W level (in bursts of no more than 3 seconds) and note that your SWR bridge shows something close to 1:1 SWR. This verifies Quiet Match operation - with the vast majority of the transmitter power being routed to PicATUne's dummy load - and not to the dummy antenna. On each key-up, PicATUne will send **M** continuously which means, again - not surprisingly - that you have not been transmitting long enough for it to find a matching solution. Given that IC4-6 are not yet fitted, it never stood much chance! Press the Command Switch to cancel the M sequence.

On the sockets for IC4 and IC6, connect one end of a jumper lead to pin 16 (+5V) and then dab the other end on pins 4-7 and 11-14 in turn. One relay should energise each time, and it might be wise to check it is the correct and only one. Repeat for IC5's socket, but for pins 4-6 only. Do not proceed if there are any issues here.

All being well, power off, wait a few minutes, fit IC4-6 in their sockets and power back on again. And now for the next tune...

Matchmaker, matchmaker™

... make me a match! Get back to repeated **M**s as just described, but this time when you supply a carrier, let PicATUne actually find the match for your 100Ω dummy antenna. During this process you will hear an amazing rattling of relays, much like a Gatling gun. When the relays all start to bang on and off at about 1Hz - and the Command Unit LED is flashing at the same rate - key up and PicATUne will send you **R K**. Your first match achieved!

Then transmit a brief burst of carrier and note that the SWR is acceptable. The power is being matched into your dummy antenna at this stage and it will heat - and maybe overheat if you are not quick.

If you experience anything unusual here, monitor the Ref line (at C55) using an oscilloscope with a high impedance probe, set to DC using 200mV sensitivity and the timebase on 10ms/division. As PicATUne searches for a match, you should see a triangular waveform moving up and down on a varying DC pedestal. The DC level represents the reflected power and PicATUne is attempting to minimise it.

At the end of the matching process - and after key up and down again - it should go to the lowest value you (and it) observed.

As a final confidence test, power off, wait 20 seconds and power on again. After you hear the greeting, supply a brief burst of carrier. PicATUne should leap to the matching solution - as soon as you key up.

CORRECTION

In Part 1, the efficiency example at the bottom of p17 relates to a 5Ω resistive load, not 50Ω as stated.

NEXT MONTH

THE SAGA CONCLUDES with architectural considerations, the operator interface, and some installation ideas.

REFERENCE

[7] http://www.qsl.net/ei9gq/

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Newcomers' News

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

Lots of news this month so without further ado it's off to Lincolnshire.

POACHER ON THE BAND

IN THE OCTOBER column I mentioned that a special event station can be a great way to introduce newcomers to the hobby. Bill Felton, G3XZF, knows this only too well and set up GB00LP (Lincolnshire Poacher) on the Lincolnshire Showground. He operated the station for a whole week and was visited by over 200 Scouts, Guides and their leaders.

The shack consisted of a small tent about 5m square. With a simple inverted-V antenna and a vertical mounted over 10 radial wires, over 300 contacts were made with stations in Europe, North and South America, Australia and New Zealand. Quite an achievement for a demonstration station.

Star 'guest' operator was Emma, 2E1HWN. Working under Bill's watchful eye she added some real DX QSOs to 'the Poacher's' log and her own DXCC tally. In return for her efforts Emma was presented with a shack clock courtesy of Icom (UK). Well done Emma and Bill!

Graeme, 2E1HVL/P, gives his dad, Jeff, 2E1HVK/P, a chance to operate (see 'What a Team!')

WHAT A TEAM!

QUITE OFTEN sons follow in their father's footsteps but it is not so common to find father and son keeping step with each other. One such family team is Jeff, 2E1HVK, and son Graeme, 2E1HVL, who passed the NRAE together and have been out operating portable on 144MHz SSB. Don Lamb, G0ACK, of the Radio Society of Harrow sent in their picture and also sent some interesting information about Novice antenna antics (see this column next month). It's amazing how a bit of height and a directional antenna can turn the simplest station into a DXpedition. Roll on Backpackers' 2001!

Emma, 2E1HWN, receiving her shack clock from the Lincolnshire Poacher himself, Bill Felton, G3XZF (see 'Poacher on the Band').

MORE CHANGES?

The removal of the minimum age for a full amateur licence was a great step forward and by now you will probably have seen the proposals for possible changes to the examination and licensing systems for radio amateurs. However, as this column is aimed at newcomers, and as the future of the hobby is approaching something of a crossroads, I think some repetition can be forgiven. In case you haven't come across the proposals I will outline them in brief for you.

The Radiocommunications Agency have posted their ideas on their website at www.radio.gov.uk and these include the idea of a new 'Foundation' licence. The licence would be available following minimal training but would limit users to commercial VHF equipment with a maximum of 25 watts output and a vertical dipole antenna. The anticipated removal of the requirement for a Morse code qualification would lead to the creation of 'Intermediate' and 'Advanced' classes of licence to replace the current Novice, A/B and Full classes. Comments on these proposals should be sent by e-mail to: amcb@ra.gsi.gov.uk For those without access to the Internet, copies of the proposals can be obtained from, and comments sent to, the Amateur Radio Section, Radiocommunication Agency, Wyndham House, Marsh Wall, London, E14 9EX.

The second set of proposals has been put forward by Richard Horton, G3XWH, from RSGB Council. I am sure that you will have read of these proposals in *RadCom*, or heard them mentioned on the GB2RS news broadcasts, but you can read them in detail on the RSGB website at www.rsgb.org

These proposals also include a new 'Foundation' licence based on self-teaching under the guidance of any licensed amateur with 'compulsory' and 'optional' modules. This is a radically different approach than the RA's examination proposals but the main difference to the RA's licensing proposals is that the bands and power levels for the new Foundation would be the same as the current Novice licences. There is also a suggestion that there should be two more classes of licence, roughly equating to the current A/B (100 watts) and Full (400 watts), with a possible fourth class enabling stations to run a kilowatt, subject to site approval and enhanced proficiency in EMC topics.

Comments on these proposals should be sent to Richard at G3XWH@rsgb.org or by fax to 0870 904 7374. Alternatively you can send them to the General Manager at RSGB headquarters, e-mail: gm.dept@rsgb.org

Please take time to look at both sets of proposals and make your views known. There is always a furore after any change as you can very rarely please all the people all the time. However, this is a good opportunity for you to have your say *before* any changes are made. ♦

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

Down To Earth

The Voices

Part Six, by Gordon L Adams, G3LEQ *

IN PART FIVE of my series on '*The Voices*', I began the story of the secret government activities at Orford Ness on the Suffolk coast. On this occasion there are no rabbits that glow in the dark, but it is quite possible that thousands of seagulls did so. Furthermore it looks as if our radio voices have found another island to share with a load of guano!

BIGGER AND BIGGER BANGS

DURING AUGUST 1940 'Lord Haw Haw', broadcasting from 'the Voice of Germany', claimed that the Luftwaffe had totally destroyed both the Martlesham Heath and Orford Ness air strips, in spite of the fact that there was no evidence of this. Bombs and aeronautical weapons continued to be developed on Orford Ness until the middle 1950s. However, in 1953 the Atomic Weapon Research Establishment (AWRE) at Aldermaston installed a field testing station on the Ness. Here they constructed six strange pagoda-shaped laboratories of extremely heavy reinforced concrete. In the event of an accidental explosion, it was hoped that the concrete pagoda roof would smother any dangerous emissions as the walls collapsed. Apparently they were developing the igniters for the British atomic bombs. The AWRE left the site in 1971, without having brought the roof down on their heads.

OVER THE HORIZON RADAR?

Not only were British atomic weapons being developed in the 1950s, but a massive effort was being put into the development of Intercontinental Ballistic Missiles (ICBMs) on both sides of the 'Iron Curtain'. Early detection of approaching ICBMs was crucial, and the Ministry of Defence sponsored some research into Over The Horizon Radar (OTHR) systems. Initially a high power radio ranging experiment was set up at the Crowborough (Ashdown Forest) 'Aspidistra' site (see part one of 'The Voices' in June 2000 *RadCom*). The transmitter was connected to a highly directional rhombic antenna system. Investigations were carried out to ascertain whether missiles travelling over the Pacific, as well as Europe, might be detected.

At about the same time the Americans set up an experimental ionospheric OTHR system in the state of Maine on their eastern seaboard. Ironically, the radar transmitter site was called Moscow Caratunk, whilst the receiving system was located at Columbia Falls. Highly accurate synchronisation was achieved using the Loran C navigation system. The American installation was known as CONUS-B which was an acronym for Continental United States Backscatter. Later in 1965, two Russian scientists, Kabanov and Oestrov, published a paper in the Soviet press entitled *Back Scatter Ionospheric Sounding*, which suggested that the Soviets were thinking along the same lines!

COBRA MIST

AS A RESULT of this work, the governments of the UK and the USA found a new purpose for the Orford Ness site. However, before work could start, a total of 379 old bombs were cleared from the area stretching north from Pigpail Sluice to Lantern Marshes (see **Fig 4**). This included 188 which were found to be live and which were destroyed *in situ*. In August 1967 a local newspaper had carried a story that a Radio Research Station was to be built there. Quite soon contractors moved in and a huge concrete block building was constructed. Then a massive forest of 189 fibre glass masts and guys was erected supporting 18 antennas, each 2040ft long. These spread out in a fan shape at 8° 40' intervals over a total of about 150°, and tilted like a vast cobweb east-north-east towards Russia. Underneath the antennas, at ground level, was spread a metal mesh earth mat covering an area of some 135 acres and leading directly into the North Sea. The water surface therefore acted as an additional gigantic reflector.

A military landing craft called *Eden* was used to get most of the materials on to the Ness. By 1972 the construction was complete and local people reported being startled by what appeared to be electrical discharges and lightning-like flashes coming from the antenna wires. There were also reports of interference to TV and radio reception in the area. It is hard to envisage how a high-tech 'receiving' station could be responsible! In the meantime, the Ministry of Defence had reoccupied its old World War I buildings and RAF Orford Ness was declared to be in residence. The project was named 'Cobra Mist', but its true purpose was not revealed. It was known that the Radio Corporation of America (RCA) represented the main electronics contractor, and many Americans appeared around Orford for the first time. Indeed, it was not unusual to see groups of American and British technicians enjoying a pint in the nearby Crown & Castle hotel. Then, after an extremely sudden decision, the whole operation was closed down at midnight on 30 June 1973. The cost to the US government had been around £20-million and to the British government £1.375-million. A

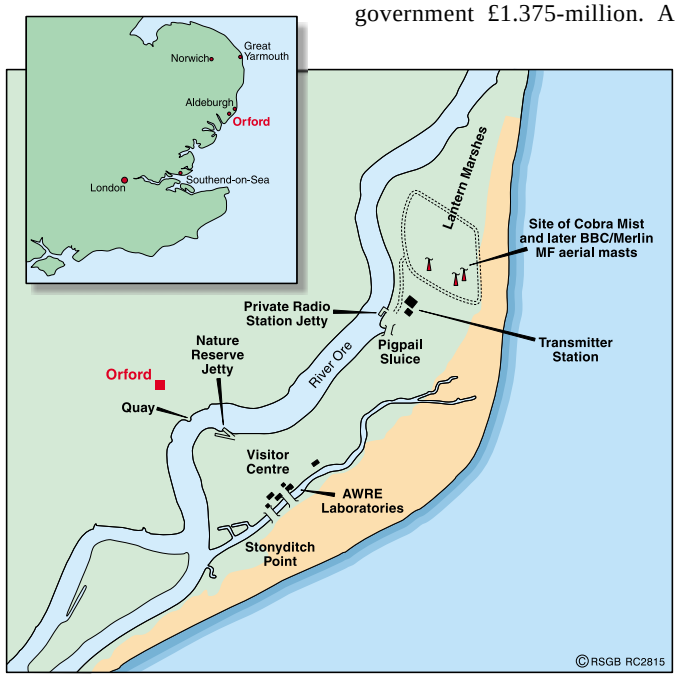


Fig 4: Map of the area around the village of Orford in Suffolk, showing Orford Ness, the site of the BBC transmitters and former AWRE site.

* 2 Ash Grove, Knutsford, Cheshire WA16 8BB.

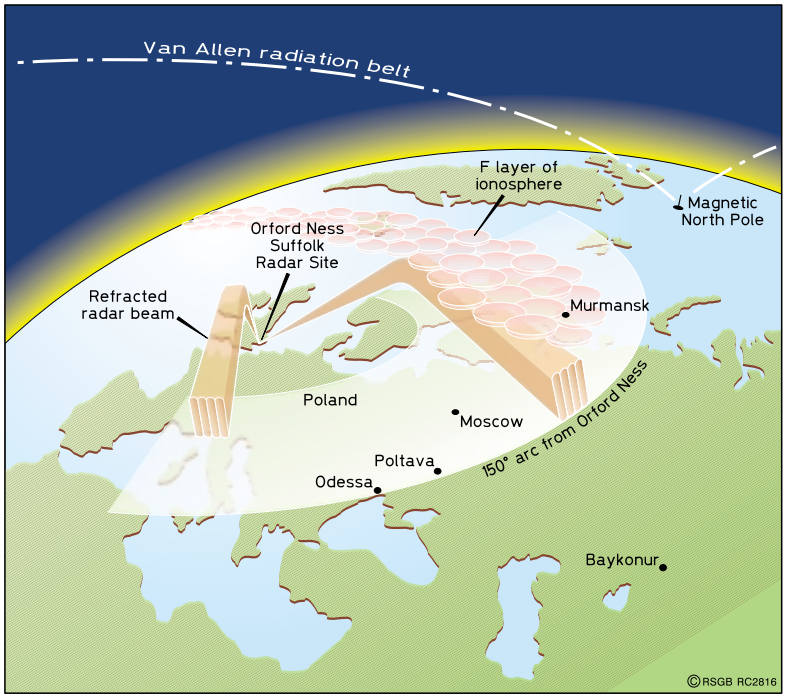
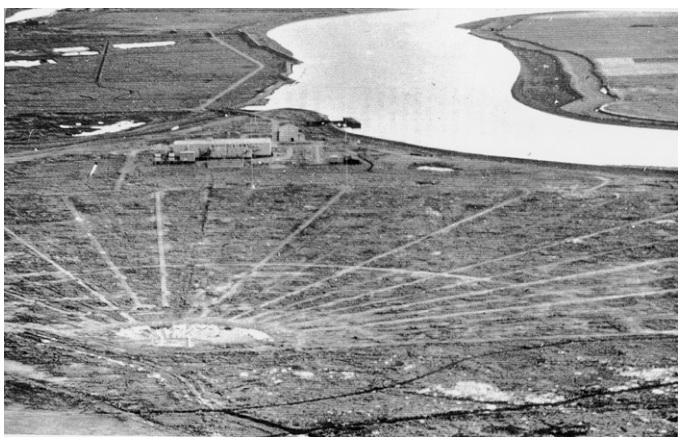


Fig 5: Showing the typical range of Orford's over the horizon radar.

total of £34-million worth of equipment had been installed, and 450 people were employed at the site. With the closure, just about 40 local people were offered alternative work at the nearby USAF Bentwaters airbase.

BATTLE OF THE WOODPECKERS?

IN RESPONSE to a question in the House of Lords, the Defence Secretary Lord Carrington denied that the closure of the establishment had anything to do with a deal struck up between the USA and the Soviet Union. However, it was suggested that the Russians were now able to jam successfully the West's latest military radio equipment. It had been announced at the time of its construction, that the installation was part of a system of radio surveillance monitoring of Eastern bloc military radio communications. It was even claimed that it could overhear the radiotelephone calls being made by members of the Soviet government as they travelled in their limousines across Red Square. Subsequently it was stated that earth satellite systems could do the job much better. "What job?" one is tempted to ask. However, radio cognoscenti felt that 'Cobra Mist' was more likely to have been an over the horizon radar system (OTHR), similar to the Russian 'Woodpecker' (so named because of the loud 'toc toc' noise created in communications receivers), which first made its appearance in the 1970s. Certainly, the long wire antennas mounted relatively close to the ground were consistent with end fire, highly directional radiation patterns; whilst the 150° fan shape would have covered Icelandic waters right down to the Black Sea (see **Fig 5**). The same specification would also apply to antennas used for receiving the reflected or echo pulses. The Russian OTHR operated between 6MHz and 23MHz, putting out pulses, at 100 millisecond intervals, of up to 400 Megawatts of power from four locations, including Poltava in the Ukraine. With such an ionospheric radar system based on Orford Ness, using double hop propagation plus back scatter, a detection range of nearly 6700km (say to Irkutsk in Siberia) could be achieved - enough to extend the oft-quoted four-minute warning of an ICBM attack by a substantial amount.



The radial antennas of Cobra Mist, showing the cobweb-like structure and its location between the river and sea. The river jetty in the centre of the picture is at Pigpail Sluice (see map).

THE FINAL CRUMP

ON 21 JUNE 1980 the local newspaper in the Orford area reported that their MP, Mr John Gummer, was to ask the Defence Secretary Mr Francis Pym if explosives were being taken currently on to Orford Ness. Mr Pym replied that the military were merely getting rid of old bombs; but in a letter to the MP, the Army Minister Mr Barney Hayhoe admitted that the Ness was being used as a training ground for bomb disposal. He also estimated that this would go on for another six years.

If you have followed the plot so far, you will have noted that Orford Ness started transmitting the BBC's European Service using 50kW in 1974. This 50kW transmitter had previously been used in Francistown, Bechuanaland (now Botswana) to broadcast to Ian Smith's breakaway Southern Rhodesia (now Zimbabwe).

Later, in 1978, the power was increased to 500kW by employing two 250kW transmitters which were transferred from Crowborough under the aegis of the Foreign and Commonwealth Office.

It was at this time that the 600kW 'Aspidistra', in its underground bunker at Crowborough on Ashdown Forest, was finally closed down. Today, the transmitters at Orford Ness are operated by Merlin Communications International Limited and the communications links with London are maintained by Crown Castle International Incorporated of Warwick.

The latter company, whose head office is in Houston, Texas, bid for the BBC's transmission facilities in 1994 and secured everything within the UK, except the transmitters carrying the BBC's World Service. So there you have it; the BBC's biggest voice in the UK is not really theirs at all. They just provide the programmes now. Apparently there is not even a link with the Crown & Castle Hotel in Orford.

If you are a 'twitcher' and you would like to view the birds on Orford Ness, I understand that Merlin Communications provides a ferry service to the southern portion of the Ness. You will be counted on board, allowed three-and-a-half hours to do what you can with your binoculars around the visitor centre, and then you will be counted back on to the ferry. This part is now a National Trust site. Visits to the transmitter building are not allowed. At the last count there were two engineers and a cleaning lady there on the ground floor. What goes on in the two underground levels is nothing to do with us!

In part 7 of The Voices, Gordon Adams will elaborate on the convoluted history of 'The Voice of Britain', otherwise known as 'Sharq al-Adna' in the Middle East. ♦

Down To Earth

An Introduction to Resistors

By Ian Poole, G3YWX *

RESISTORS ARE some of the most widely used electronic components. Many millions are produced and used each day. This is hardly surprising because virtually every electronic circuit uses a resistor in one form or another. Yet, despite their widespread use and their essential rôle in electronic designs, they are taken for granted and, beyond some of the basic facts, little is seen and written about them.

INSULATORS AND CONDUCTORS

DIFFERENT materials conduct electricity in different amounts. This is dependent upon the atomic structures within the material and the ease with which electrons can detach themselves from their parent atoms. In some materials, there is a constant but random movement of electrons from one atom to the next. If an electric potential is applied across the material then there will be a general drift of electrons in a particular direction, some electrons flowing into the material and others flowing out. Naturally the same electrons that flow in do not flow out. It is the general drift of electrons that gives rise to the actual current flow. Materials that are able to conduct electricity are called conductors.

Not all materials have electrons available to conduct electricity. In some they are tightly bound into the atomic structure and there is very little random movement of electrons. Accordingly these materials are unable to conduct electricity and are called insulators.

RESISTANCE

IN A CONDUCTOR it is found that the level of drift, or current flow, is dependent upon various properties of the material. Such properties as the availability of electrons, the area across which the current flows, and the length of the material all have an effect.

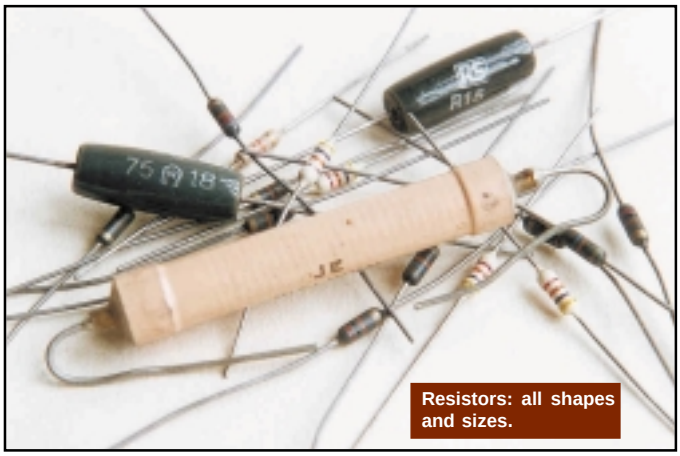
This means that each different conductor will have its own resistance. The resistance of a component is measured in ohms and this is usually denoted using the Greek letter 'omega' (Ω). Resistance is essentially the opposition to a current flow. One ohm (1Ω) is defined as the resistance of a component which will allow a current of one amp (1A) to flow when it has a potential difference of one volt (1V) applied across it.

While many resistors have a few ohms' resistance, most have much higher values, often many thousands or even millions of ohms. To prevent having to write very long numbers, the prefixes k for kilo (or thousands) and M for mega (or millions) are used. In other words, a resistor of 1kΩ is a one thousand ohm resistor.

Sometimes, when these values are placed on circuit diagrams or in component lists, the omega symbol is left out and the multiplier prefix is used to replace the decimal point. This is intended to improve clarity because decimal points can easily be misread or become obscured. In other words a 3.3kΩ resistor would be written as 3k3.

Colour	Band 1 1st Fig	Band 2 2nd Fig	Band 3 3rd Fig	Band 4 Tolerance
Black	0	0	10^0	
Brown	1	1	10^1	1%
Red	2	2	10^2	2%
Orange	3	3	10^3	
Yellow	4	4	10^4	
Green	5	5	10^5	
Blue	6	6	10^6	
Violet	7	7	10^7	
Grey	8	8	10^8	
White	9	9	10^9	
Gold			10^{-1}	5%
Silver			10^{-2}	10%
None				20%

Table 1: The resistor colour code.



Resistors: all shapes and sizes.

POWER RATING

WHILE THE RESISTANCE is obviously the most important resistor parameter, there are others that are also important and must be considered.

Power dissipation is one. It is found that, to *push* current through a resistor, energy is expended and, as a result, heat is produced. This results in a temperature rise in the component. The power dissipated is proportional to the voltage across it and to the current flowing through it.

In many electronic circuits, the levels of heat are very small, but in others they are much greater. The amount of heat that is dissipated has a large bearing on the type of resistor to be used. Where there are large levels of heat dissipation, larger resistors capable of handling the heat must be used. A physically larger resistor will have a larger surface area from which the heat can be transferred into the surrounding air. In some instances resistors may be made so that they can be bolted down to some metalwork, such as a heatsink, to enable the heat to be removed more effectively.

The power rating of a resistor is important. If too much heat is dissipated in the resistor, the temperature rise will be very high, and damage may result. Accordingly, a power dissipation is quoted for resistors. It is measured in watts, and a typical resistor may have a quarter-watt dissipation rating, meaning that it can safely dissipate up to a quarter of a watt. This is the maximum rating and it is good design practice to run a resistor at considerably less than its maximum rated value.

* 5 Meadway, Staines, Middlesex TW18 2PW.

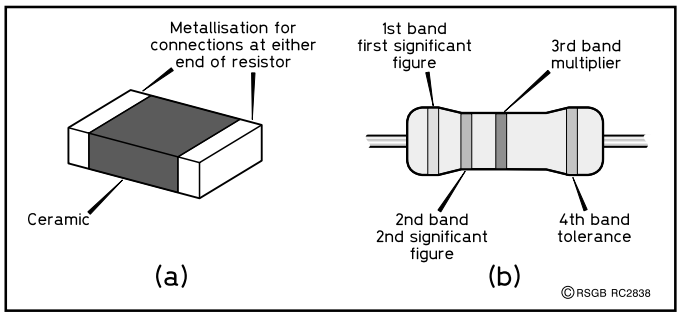


Fig 1: (a) a surface-mounted resistor; (b) resistor colour codes.

OTHER PARAMETERS

WHEN LOOKING at resistors there are several other parameters that may be encountered. The first of these is the tolerance. Unfortunately, it is not possible to make resistors with exactly the resistance value required. Instead, a range or 'tolerance' is specified within which the actual value should fall. For example, a 1000-ohm resistor with a 5% tolerance has a range of ±50 ohms and the actual value could have a value anywhere between 950 and 1050 ohms.

Another figure that can be quoted is the temperature coefficient. It is found that the value of a resistor will change slightly with temperature. The actual amount of variation depends upon the type of resistor and to some extent the manufacturer and the process he uses to make it. The variation is generally quoted in parts-per-million (ppm) per degree Celsius. In other words, a 1000-ohm resistor with a specification of 250ppm/°C would change by 0.25 ohms for every 1°C change in temperature. This figure is normally found from the manufacturer's data sheet.

RESISTOR TYPES

THERE ARE MANY TYPES of resistor to choose from. Each has its own characteristics and sometimes the choice of resistor can have a bearing on the operation of the circuit.

Carbon film resistors were popular some years ago. They were made of a mixture of carbon and a binder as the resistive element and this was enclosed in an insulating tube. Although widely used, their values were not very stable and provided a typical temperature stability of around 1200ppm/°C. It was also found that they could change their value permanently after being soldered. Additionally, they were found to be very noisy. This results from the granular structure of the carbon used in their manufacture, and they should never be used in a circuit where noise performance is important.

Today, the metal oxide film type is the most widely-used leaded type (ie having leads). It consists of a metal oxide film that is deposited onto a small ceramic cylinder. The value is trimmed to the required value by cutting a helical groove into the film. Its performance is far superior to the old carbon types both in terms of temperature stability and noise performance. Typically, their temperature stability is around 250ppm/°C and they are available in sizes ranging from 0.25 watt up to 6 watts.

One of the first types of resistor to be made was a wirewound resistor. It is mainly used today where high powers need to be dissipated. It consists of wire with a relatively high resistance wound on a former. Some high quality types are wound on a ceramic formers that are covered with vitreous or silicone enamel to protect the winding. Wirewound resistor types are only available in lower resistance values and are not suitable for RF applications because the coiled wire has a significant inductance.

Surface-mount resistors are also available. They are widely used in mass-produced products and consist of small rectangular blocks that do not have leads. For connections they have metallised areas at either end of the component as shown. The components are placed on the boards and solder applied around the metallised areas to make the connection. See **Fig 1(a)**.

COLOUR CODE

FOR ANY RESISTOR it is important to have a way in which its identity can be indicated and read. There are several ways in which this can be done. On some of the larger wirewound resistors, the value in figures can be printed onto the component. However, the smaller resistors, like those most commonly encountered, are colour-coded as shown in **Fig 1(b)** because they can be read at whatever angle the resistor is mounted, and coloured rings are more resistant to being removed by handling etc. There may be three, four or sometimes even five rings. These rings have values as shown in **Table 1**. The first two indicate the significant figures in the value. The second is a multiplier and shows the power of ten to which the significant figures must be multiplied. If a resistor had the rings red, red and orange, these would correspond to the values 2, 2, 3, indicating a resistance of 22×10^3 or 22,000 ohms. It can be seen from this that the third ring corresponds to the number of zeroes after the significant figures.

The fourth ring (if it is present) shows the tolerance, indicated as a percentage. Many resistors today are either 2% or 5%. This means that each value will be within 2% or 5% of the stated value. Years ago, most resistors were only 20%, although even today, tolerances of this order are quite acceptable for many situations.

Surface-mount resistors are only occasionally marked with their values. When a value is marked, it will be printed on the component as three figures - the two significant figures and the multiplier. No further figures are given - the component is too small. The resistors are normally supplied on a reel and the value is marked on the reel itself. If the resistors are taken off the reel, it is imperative not to mix them up with other values.

THE 'E' SERIES

ONLY SPECIFIC or 'preferred' values of resistor are made. The resistor values are calculated to allow for the tolerance, and the series is named according to the number of values in a decade of resistance. The E3 series has three values in a decade, namely 1, 2.2, 4.7. This allows for a tolerance of 40%. Other ranges are also available as shown in **Table 2**. It is found that resistors from the E3 range will also appear in the E6 range, and those from the E6 range will also appear in the E12 range and so on. Most resistors that will be encountered will appear in the E12 range. Those from the E24 range are considerably less common, and are normally needed only for special requirements.

E6 Series								
1.0	1.5	2.2	3.3	4.7	6.8			
E12 Series								
1.0	1.2	1.5	1.8	2.2	2.7	3.3	3.9	4.7
5.6	6.8	8.2						
E24 Series								
1.0	1.1	1.2	1.3	1.5	1.6	1.8	2.0	2.2
2.4	2.7	3.0	3.3	3.6	3.9	4.3	4.7	5.1
5.6	6.2	6.8	7.5	8.2	9.1			

Table 2: The preferred values of resistance for the E6, E12 and E24 series.

SUMMARY

WHILE THE RESISTOR may not appear to be the latest in technology, it is nevertheless a vital component in the electronics and radio industry. Being such a crucial element, it will be with us as long as electronics itself. ♦

eurotek

edited by **Erwin David,** G4LQI*

THE CURRENT DISTRIBUTION along a λ/4 vertical, bottom-fed against earth, has the shape of a cosine, see **Fig 1**. The power radiated equals the current at the

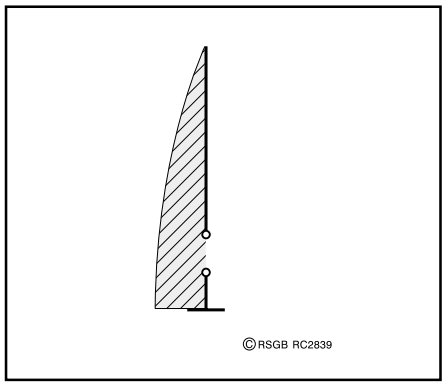


Fig 1: The current distribution along a quarter wave vertical antenna has the shape of a cosine. The cross-hatched area is a measure of the radiation resistance.

feed point squared times the radiation resistance R_{rad}. The interesting thing in Fig 1 is that the cross-hatched area is a measure of R_{rad} (see below). On 136kHz, λ/4 would be 551m, so, expressed in wavelengths, our amateur antennas are very small. This means that only the uppermost part of the radiator in Fig 1 plays a role and, as a good approximation, the current increases linearly from zero at the top to maximum at the bottom, see **Fig 2(a).**

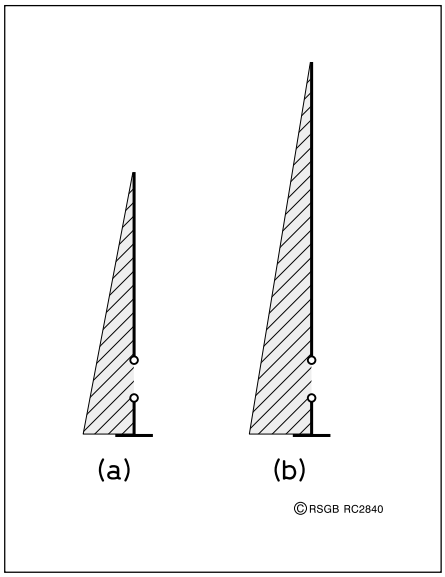


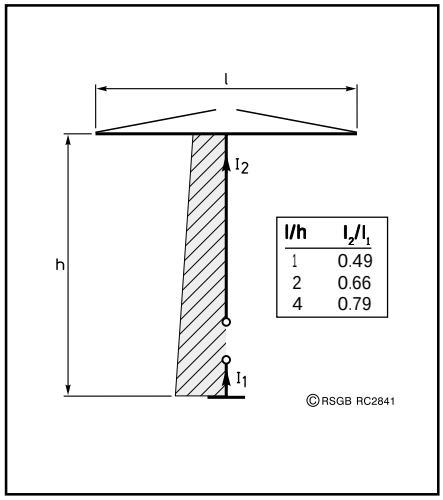
Fig 2: (a) Current along a very short (ie in wavelengths) vertical antenna increases linearly from top to bottom. The radiation resistance is proportional to the square of antenna height, as shown by the bigger cross-hatched area (b).

We want R_{rad} to be as high as possible. One way is to increase the height of the antenna. The cross-hatched area, and thus R_{rad}, increases with the square of the height, as

***Dick Rollema, PA0SE**, has studied the **top loading of 136kHz antennas** by computer modelling and by measuring his own antenna. He draws some generally-applicable conclusions and also presents the empirical findings of **ON7YD** and **G3AQC**.*

Fig 2(b) shows. R_{rad} can thus be doubled by increasing the antenna height by a factor of only $\sqrt{2} = 1.414$.

Another way of increasing R_{rad} is a capacitive top-load, as exemplified by a T-antenna, shown in **Fig 3**. This tends to make the current distribution along the vertical part, which does the radiating, approach linearity. Fig 3 shows that, with a top size of twice the height, the current at the top of the radiator is nearly 80% of the value at the



l/h	I_2/I_1
1	0.49
2	0.66
4	0.79

Fig 3: A capacitive top-load increases the current in the antenna and also makes it approach linearity, as can be seen from the table.

bottom, and little is gained by further increasing the top size.

It is the total length of wire in the top-load and not its shape that counts, so the wire could also be on one side of the vertical leg (inverted-L antenna), or the top could consist of a number of wires in parallel and connected together and to the radiator at its top. Computer modelling shows that in this case it is also the total length of wire in the flat top that counts, provided that spacing between wires is no less than about 1m.

An important conclusion is that the best a capacitive top-load can achieve is a quadrupling of R_{rad}, which happens when current distribution along the radiator is uniform from bottom to top, so the effect of even a very large capacitive top-load is never greater than can be achieved by doubling the height of the vertical.

The effect of a small capacitive top-load can be increased by inserting a coil between the top end of the radiator and the load, **Fig 4**. The length of the vertical part has been set to 10m, which is about the maximum feasible for many amateurs. The capacitive top-load is assumed to consist of 10m of wire, shown here as 2 x 5m (T-antenna). Computer modelling shows that, in order to obtain a uniform current distribution along the vertical part, the coil must have a inductance of about 20mH. R_{rad} will be nearly 32mΩ, the same as would be achieved by doubling the height of the radiator to 20m, but a coil of this size is not realistic. The photograph shows the coil PA0SE uses in his shack to tune and match the antenna to the transmitter. It consists of four 1m lengths of 125mm PVC drainpipe bolted together, close-wound with some 200m of insulated wire and weighing 11.4kg. Still, its inductance is *only* 4.4mH. Imagine what a 20mH coil would look like at the top of a mast! Also, the self-capacitance of the coil could easily be higher than that of the top-loading wires, thus defeating its purpose. Assuming a Q of 300, the loss resistance of the 20mH coil would be 57Ω. As will be seen in **Fig 5,** this could easily double the total loss in the antenna system and thus defeat the purpose of the top loading coil. Conclusion: top-loading coils are not practicable for amateur 136kHz antennas.

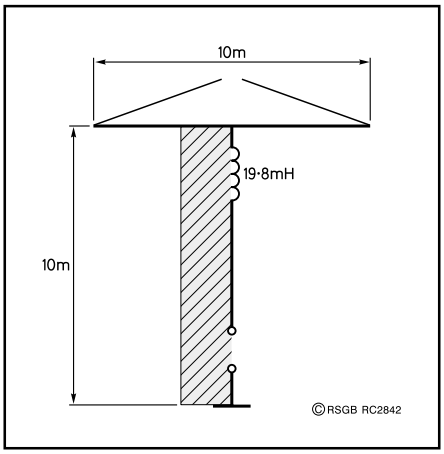


Fig 4: An antenna with a coil between the top of the vertical radiator and the top-loading wires.

Top-loading wires not only increase R_{rad}, they also raise the capacitance of the antenna against earth. That means the bottom-loading coil for tuning and matching can be smaller, with corresponding lower power loss in its ohmic resistance.

EQUIVALENT CIRCUIT

A T-ANTENNA SYSTEM with a 10m vertical radiator and a top of 2 x 10m, both of 16SWG copper wire, is represented by the

** 22 Island Wall, Whitstable, Kent CT5 1EP.*
E-mail: eurotek.radcom@rsgb.org.uk

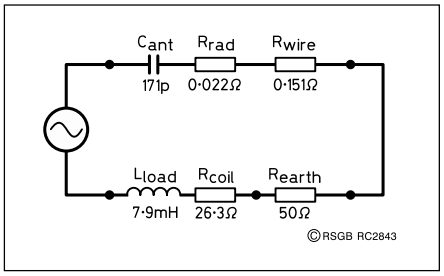


Fig 5: Equivalent circuit of a typical amateur antenna system for 136 kHz. The T-antenna has a 10m vertical part and 20m horizontal top.

circuit of Fig 5. The computed impedance at the feed point is a resistance of 0.173Ω in series with a capacitive reactance of -6793Ω. The resistive part consists of R_{rad} = 0.022Ω plus 0.151Ω resistance of the wires. To resonate the system, the coil must have an inductive reactance of +6793Ω, ie an inductance of 7.9mH. Assuming a Q of 300, the coil has a loss resistance of 6793/300 = 26.3Ω. The third contribution to the total resistance comes from the earthing system; it depends on the location, but 50Ω is a typical value. As only R_{rad} represents power radiated, the overall efficiency is η, such that:

$$\eta = \frac{0.022}{0.022 + 0.151 + 26.3 + 50} \times 100\% = 0.029\%$$

If the transmitter delivers 100W, only 29mW will be radiated.

Because, in the formula for efficiency, R_{rad} is the only factor in the numerator whilst in the denominator R_{rad} is part of a sum including much larger figures, efficiency is *almost* proportional to R_{rad}, so it always pays to make R_{rad} higher. But, as the earth resistance is often the largest factor in the denominator, it is also profitable to improve the earthing system whenever possible.

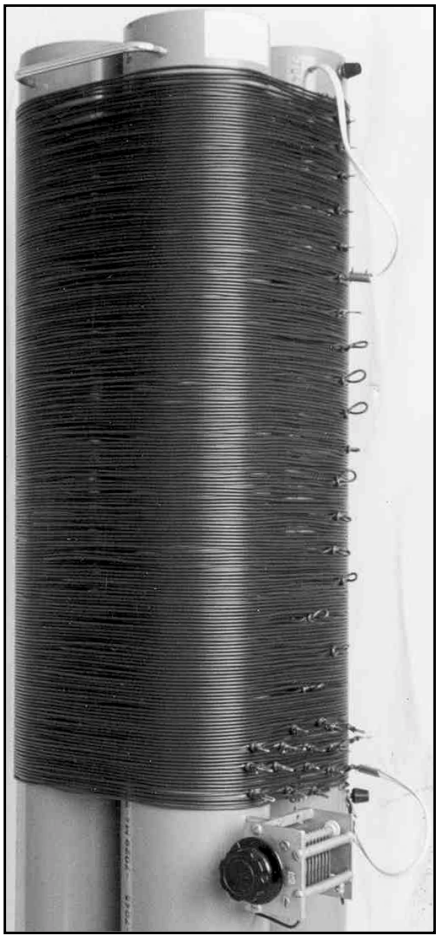
PA0SE successfully uses his doublet of 2 x 20 m with 11m open-line feeder into his attic shack (see 'Eurotek' May 2000) where the loading/matching coil is located. For 136kHz, the feeder wires are strapped together. The bottom end of the coil is connected to the central heating system. The central heating piping carries the RF current down to earth and so forms part of the antenna. At ground level, this piping is connected to the mains, which is the only earth connection used.

Measurement has shown the earth resistance to be about 21Ω. Compared with what other amateurs claim, this seems a pretty low value. The high water table, less than 1m down, may explain the low resistance.

The analysis of antennas with top loads was done using a computer program which assumes a perfect earth for calculating the impedance of the antenna. In a real situation, environmental factors play a role. Two amateurs have reported experiments that illustrate this statement.

Rik Strobbe, **ON7YD**, added a 2mH top loading coil (Fig 4), half the inductance required to resonate his system, the other half of that inductance remaining at the bottom. According to computer simulation, the increase of signal due to the coil would only be 0.3dB but, in practice, an improvement of 3 - 4dB was noted. Rik explains: "The inductive top loading reduces the voltage on the vertical part by about 50%, the voltage on the top load remaining the same. The voltage reduction on the vertical part results in much less radiation from the vertical, just heating surrounding trees!"

Over ideal earth only, the total length of the top load wires counts, not its shape, provided that parallel wires are at least 1m apart. However, Lawrence Mayhead, **G3AQC**, has found that top wires in different directions result in a lower earth resistance than parallel wires. Lawrie thinks the 'footprint' of the top load is important. The area over which the capacitive currents from the top load reach the ground should be made as large as possible. Lawrie also found that top load wires need not to be straight, they can be zig-zag, as long as the ground underlying the wires does not overlap. This reduces the area required for the antenna system.



The 4.4mH coil used by PA0SE to tune his antenna to 136kHz. The coil former is 1m long!

These notes show that computer modelling is a very useful tool, but its limitations must always be kept in mind. ♦

● Jim, EI4HH, is looking for a copy of the circuit diagram of the **Yaesu FT-480R** 2m transceiver. All expenses reimbursed. Tel: 00 353 1 296 2047. E-mail: holohaj2@hotmail.com

● Steve, G0HMN, needs a photocopy of the manual for a **Lowe FX1 Dip Meter**. All costs will be reimbursed. G0HMN, QTHR. Tel: 01482 795 646 or g0hmn@carbon15.karoo.co.uk

● Paul, G3PVT, is looking for pin-out details of the microphone plug for the **Yaesu FT-2700RH**. G3PVT, QTHR. Tel: 01603 898 715.

● Did you purchase a **Sony midi hi-fi** with remote control at the **Kings Lynn Rally** this year? If so, Paul, G3PVT, has the service manuals. G3PVT, QTHR. Tel: 01603 898 715.

Helplines FOR MEMBERS

● Dick, M0CGN, is looking for a source of **vacuum thermocouples** for RF voltmeters. M0CGN, QTHR. Tel: 020 8399 8787.

● Bernard, G3VD, is l;ooking for a 4c/o relay for the **Yaesu FT-200** transceiver. Its circuit identity is RL101 AE3254, 5300-16000, and it plugs into a chassis socket. G3VD, QTHR. Tel: 01489 577 686.

● Dave, MW1DUJ, is seeking a microcomputer circuit board for a late **Racal RA1792** with backlight and bite. Your price paid. MW1DUJ, QTHR or mw1duj@aol.com or 01554 775 790.

● Steven, M0AIR, would like to hear from anyone who has experience of building or modifying the **White Rose Radio**, the design for which was published in *RadCom*, February 1990. M0AIR, QTHR. Tel: 01730 895 309.

● Joe, G3EUS, seeks takers for three unbound **handbooks for the BC348 receiver**, and one for the **BC221 frequency meter**, covering 20 models. He is offering these free! G3EUS, QTHR. Tel: 01462 433 390.

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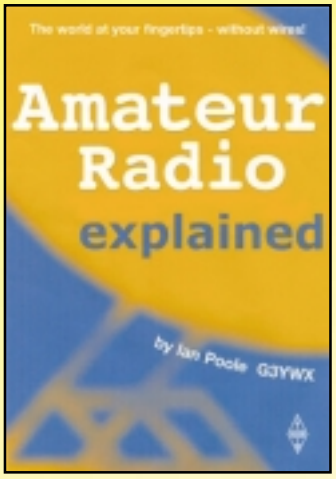

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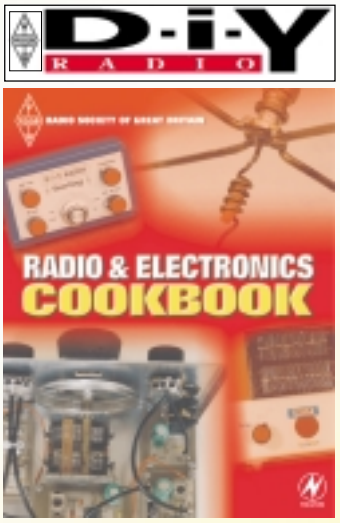

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The Millennium VHF NFD

*by Martin Platt, G4XUM**

IN 1999 THE VHF Contests Committee invited the majority of clubs and contest groups to participate in a survey to determine the format of VHF NFD for the millennium year. The response was excellent and the committee used the feedback to amend the rules in line with the wishes of the masses. Although difficult, the need to incorporate the 50MHz band with its high activity, whilst maintaining an interest in the higher bands, was our goal. This was coupled with a reduction in power levels for the Restricted Section. The number of bands and operating hours was also decreased for the Low Power section in order to encourage some of the smaller, new and re-born clubs and groups to take part in what is the premier club event in the VHF calendar.

The advent of the split 50 / 70MHz format was risky in that the higher bands might suffer, and if we are being honest, 1296MHz has certainly seen a migration away this time.

From comments received it seems that generally we have gone some way to achieving our desired format, but it remains to be seen whether the present set of rules needs a further 'tweak' to maintain harmony amongst our participants. We would very much appreciate your continued input and support as we move towards setting the rules for next year's event.

ON THE BANDS

AS EXPECTED, 50MHz provided much of the excitement this year, with very high levels of activity coupled with the fact that Sporadic E (Es) was present throughout much of the event in most parts of the country. Extra excitement was brought in the shape of extensive Es openings on 144MHz as well. In fact, this mode seemed to favour the more northerly and western areas, with a long opening on the Sunday morning. Cover sheets were full of comments regarding the many LZ, YU, YO, OK and OM stations and ER6A/P (Moldova) was known to have worked at least 100 NFD stations!

Above: The De Montfort University ARS group. Top of page: Author Martin Platt, G4XUM, 'working the Es' from GD0EMG/P on 144MHz.

*c/o VHF Contests Committee, PO Box 2399, Reading RG7 4FB.

1296MHz

Low Power

Callsign/P	Loc	Score	Norm	QSO	Pwr	Ant	Best DX	km
G5BK*	IO81XW	14107	1000	64	25	1.8m dish	DG1KJG	649
G4BRA*	IO80ST	8495	602	37	25	6ft dish	PA0EZ	553
G3OHM	IO82XJ	8395	595	46	25	55ele	DF0HS/P	577
G8ATD*	IO92XA	6904	489	35	25	56ele	DK2MN	501
G6KWA	JO02CE	3564	253	21	15	56ele	GM0FRG/P	516
G8TB*	IO91XH	2945	209	33	20	54ele	G4NKC/P	239

Open

Callsign/P	Loc	Score	Norm	QSO	Pwr	Ant	Best DX	km
M1CRO	JO01PU	28073	1000	96	100	8x23ele	DK0FLT	677
G3SDC	JO02TG	16703	595	65	60	1.8m dish	DG5FEB/P	582
G0FDZ	JO01LD	15189	541	63	300	1.5m dish, 55Y	GM0FRG/P	637
GM0FRG	IO75FI	10906	388	28	400	4x49ele	G4LIP/P	656
G0EYO	IO92BJ	2313	82	27	25	55ele	GM0FRG/P	407
G8SRC	IO91CL	1546	55	16	10	19ele	PA6NL	411
G8KBH*	IO83NU	716	26	4	10	2x19ele	G4BRA/P	339
G3SAD*	IO91TW	578	21	11	100	2x23ele	G3OHM/P	125

Restricted

Callsign/P	Loc	Score	Norm	QSO	Pwr	Ant	Best DX	km
G3UAX	IO91GI	9734	1000	52	100	2m dish	DK2MN	608
G4NKC*	IO82NN	8504	874	43	100	66qly	DF0HS/P	636
G4JTJ	IO92TI	6425	660	37	25	6ft dish	DF7JS	504
GM8PNN	IO85XT	1493	153	6	80	1.6m dish	G5BK/P	437

432MHz

Low Power

Callsign/P	Loc	Score	Norm	QSO	Pwr	Ant	Best DX	km
G3NJA*	IO80DQ	8259	1000	37	25	21 Y	GI4LKG/P	435
G0ROC	IO83VP	5097	617	34	10	18 PBM	PA6NL	464
G1ZMS	IO90WV	4954	600	46	25	13 Y	GD0EMG/P	476
G6IVR	IO90CV	4322	523	22	25	17 Y	GM3HAM/P	544
G4IVH	IO92UK	3076	372	22	25	29Y	EI7M/P	440
G0ARC	IO91FH	2830	343	34	25	21 Y	GD0EMG/P	380
M5VHF	JO02PW	1683	204	7	25	9 Y	DK0HN	432
G4VFK	IO93NF	686	83	5	1	9 Y	GD0EMG/P	272
GW6ZMD*	IO82KW	425	51	5	10	17 Y	ON7GI	523
G4WLL	IO94KH	412	50	3			GD0EMG/P	234

Open

Callsign/P	Loc	Score	Norm	QSO	Pwr	Ant	Best DX	km
G3SDC	JO02TG	73403	1000	327	400	4x20Y, 4x17Y	OK1KZE/P	889
GD0EMG	IO74PD	59365	809	177	400	4x28Y, 4x21Y	DK0HN	850
M1CRO	JO01PU	58907	803	178	400	4x21Y	DL8GCL	803
G1DNY	IO90JO	41669	568	147	200	2x21Y	DL8OBU	797
G0FBB	JO01LD	19046	259	79	350	32Y, 21Y	DK0FLT	684
GM3HAM	IO85SS	12813	175	49	250	27QL	PA6NL	602
G8ZTT	IO83PF	12009	164	76	45	2x21Y	PA6C	611
GM0FRG	IO75FI	8145	111	21	200	4x21Y	G4LIP/P	656
G7WAC	IO92BJ	8041	110	40	60	21Y	PI4GN	598
G0PPO	JO01DH	7779	106	63	100	19Y	F1CVU/P	931
G6GS	IO91TF	6560	89	54	75	2x21Y	GM3HAM/P	523
G6RSE	JO01EN	5500	75	41	100	2x21Y	PI4GN	487
GW4BRS	IO81IR	4873	66	25	25	9Y	PA6NL	510
G1KHX	IO81PH	3860	53	24	50	48Y	PA6NL	477
G8XNH	IO70MM	1667	23	10	100	MBM 88	PA6NL	652
G7HOA*	IO83PH	1382	19	19			EI7M/P	288

Restricted

Callsign/P	Loc	Score	Norm	QSO	Pwr	Ant	Best DX	km
G4BRK*	IO81XW	32481	1000	135	100	21 Y	DL0GTH	903
G3FJE*	IO92XA	20961	645	107	100	28 Y	DL0PVP	633
G3ZPB*	IO91XH	19940	614	109	100	21 Y	DL0GTH	761
G4BRA*	IO80ST	17587	541	77	100	21 Y	PI4GN	700
G3WOI	IO91GI	16826	518	95	90	MBM 88	PI4AJS	587
G8BNE	IO92TI	15601	480	67	40	21 Y	DF0CI	736
M5ARC	JO02HR	11305	348	47	50	21 Y	DF0CI	674
M5ALE*	IO91KG	10610	327	74	50	21 Y	DF2VK	612
G8HSG	IO93PW	8967	276	52	80	19 Y	PI4AJS	544
G4RMD*	JO02BA	7620	235	40	50	17 Y	DF0CI	699
MW1AXW	IO82LQ	6392	197	46			PA6NL	493
GI4GTY	IO74AI	6379	196	27			PA6NL	721
GM8BDX	IO85XT	6338	195	26	100	21 Y	PA6NL	587
G8SRC	IO91CL	5658	174	36	50	28 Y	PI4GN	626
G6BUT*	JO01BT	5295	163	44	25	18 Y	EI7M/P	478
G7ASF	IO92HE	3734	115	33	25	Quad T'stile	GM3HAM/P	405
G8RDP*	IO83NU	3029	93	17	80	19 Y	G4LIP/P	634
M1DLT*	IO92SD	2236	69	25	40	19 Y	EI7M/P	450
MM0CPS	IO85RU	1745	54	13	50	21 Y	G1DNY/P	590
G4WBC	IO93TK	401	12	3	80	19 Y	GD0EMG/P	295

Listener

Callsign	Loc	Score	Norm	QSO	Pwr	Ant	Best DX	km
RS177448	JO01AL	912	1000	15	912	19 Y	G4BRK/P	152
BRS32525	JO01AL	286	314	6	286	19 Y	G3WOI/P	105

An asterisk (*) by the callsign indicates an entry in the Mix and Match section.

144MHz

Low Power

Callsign/P	Loc	Score	Norm	QSO	Pwr	Ant	Best DX	km
G4IVH	92UK	47710	1000	149	25	17Y	YO4ATW	2198
G8NJA*	80DQ	45767	959	150	25	17Y	YO8KOF	2135
G8EVY	02CE	31438	659	115	25	17Y	YO8KOA/P	2096
G1WAC	92BJ	30772	645	108	25	17Y	ER6A/P	2205
G0IVR	90CV	29660	622	98	25	12Y	LZ2AB	2224
G3ZMS	90WV	28660	601	152	25	9Y	OM0R	1463
G4WLL	94KH	25794	541	61	25	5ZL	LZ1KWT	2353
G0ARC	91FH	22747	477	92	25	9Y	ER6A/P	2178
G3LRS	92IO	16960	355	94	25	17Y	YR4R	2250
M5VHF	02PW	15134	317	32	25	9Y	ER6A/P	1998
G3RSC	92FM	14891	312	92	25	10Y	DF0OL	699
MM0BQI	85NR	10770	226	36	8	13Y	F1CVU/P	701
G0AKH	70SM	9222	193	37	25	7ZL	G0OLE/P	457
G8IGQ	93NF	8409	176	57	20	5Y	F6KCP/P	675
G3VFD	01BI	8012	168	42	15	9Y	DF0OL	565
G4ETW	82XP	7470	157	103	25	10Y	ON5PJ	498

Open

Callsign/P	Loc	Score	Norm	QSO	Pwr	Ant	Best DX	km
GD0EMG	74PD	260879	1000	597	400	4x15Y, 4x9Y	LZ1KWT	2567
M0BAA	90JO	253092	970	674	400	2 x 4 x 10Y	YO8KOA/P	2180
GM4ZUK	86RW	231489	887	335	400	4 x 13Y	LZ1KWT	2553
G0VHF	01PU	195228	748	521	400	2 x 15Y	YO8KOA/P	2018
G0TPH	02TG	146009	560	424	250	2x9Y, 15Y	YO3DMU	1999
G0FBB	01LD	105490	404	347	400	2 x 17Y	YU1HFG	1866
G3ZTT	83PF	83523	320	349	400	2 x 17Y	YO7AQF	2198
G3SAD*	91TW	81434	312	331	100	4 x 5Y	LZ1JY	2043
G3ZME*	82NN	80513	309	338	400	18Y	YO8KOF/P	2086
G8SRC	91CL	73213	281	299	400	2 x 17Y	OM3KDX/P	1725
G6BUT*	01BT	58640	225	244	200	2 x 13Y	YO4ATW	2159
GM3HAM	85SS	55811	214	172	400	17Y	LZ1KWT	2494
G4RSE	01EN	42759	164	209	100	18Y	LZ1ZP	2112
G3GHN	01DH	38601	148	250	100	19Y	DL8GCL	700
G7RTL*	92WF	32025	123	130	80	4 x 9Y	YO4FXP/P	2016
GW4BRS	81IR	29847	114	140	400	2 x 17Y	ER6A/P	2299
G4ATH*	83NU	29573	113	141	300	19Y	YO2II	1939
G8WSM	81PN	28829	111	101	100	17Y	LZ2FO	2069
G4ADV	70MM	25830	99	105	400	2 x 8/8Y	GM4ZUK/P	731
GM0FRG	75FI	24140	93	82	400	2 X 17Y	M0BAA/P	602
G7HOA*	83RN	15007	58	92	0	0	HG9VHF	1719

Restricted

Callsign/P	Loc	Score	Norm	QSO	Pwr	Ant	Best DX	km
MM0CPS	85RU	138645	1000	194	100	17Y	LZ1KWT	2503
G4ERP*	81XW	91020	656	323	100	12Y	YR4R	2289
M5ARC	02HR	86025	620	224	100	13Y	YO3DMU	2078
G3WOI	91GI	73441	530	268	100	19Y	ER6A/P	2172
G3WGC	91UT	71644	517	301	25	14Y	YO5BEU	1857
G4ARL*	92XA	65839	475	273	100	12Y	LZ1ZP	2125
G6LX*	91XH	58596	423	290	90	19Y	YO5OKH/P	1751
G4VMX	92TI	56762	409	176	100	16Y	YO3RO	2132
G0OLE	93PW	55844	403	202	80	17Y	LZ1KWT	2313
GM0BRS	85XT	52723	380	113	100	14Y	LZ5Z	2340
GI4GTY	74AI	48861	352	166	100	18Y	F6KPQ/P	718
G3TCR*	91KG	44126	318	232	100	17Y	DF0WB/P	667
G4FUH	93QN	34832	251	148	100	14Y	YO5ODU	1821
G3CZU*	91SD	27783	200	114	100	13Y	LZ2AB	2136
G3ASR	02BA	24380	176	75	40	21Y	ER3RC/P	2141
GW3SRT	82LQ	23751	171	188	0	0	OM8R	1674
G6PNB	81TL	20926	151	107	100	14Y	DK0BN	734
GW0WZZ*	82KW	13540	98	103	50	17Y	ON7GI	523
G1NCR	83SJ	11166	81	105	100	6Q	F5JLQ/P	483
G2ASF	92HE	10551	76	96	25	2 x T'stile	GM4ZUK/P	534
G4WBC	93TK	7994	58	39	100	17Y	EI7KRC/P	436
G6BRA	80ST	2673	19	13	100	17Y	GM3HAM/P	551

Listener

Callsign	Loc	Score	Norm	QSO	Pwr	Ant	Best DX	km
BRS32525	01AL	15857	1000	39	0	9Y	ER6A/P	2068
RS177448	01AL	9243	583	55	0	9Y	ER6A/P	2068

Checklogs: YO5CFI, UX0FF, YO4ATW, T90A, ER6A/P,PE1EWR, G3MEH, G7ITU, M1DPZ/P.

An asterisk (*) by the callsign indicates an entry in the Mix and Match section.

Even the 70MHz band didn't escape the fun, with several S5 (Slovenian) stations appearing in the logs of some stations in the north. However, the east European broadcast stations took their toll, rendering the band impossible at times for some entrants.

The 432MHz and 1296MHz bands were reported to be very quiet this year with none of the tropo ducting that had been prevalent for some entrants in previous years. The level of activity was well down this year on 1296MHz. Conditions didn't really help, but most people thought that the new rules contributed to the lack of activity.

Certainly, the format made the event more tactical and from the initial logs it wasn't easy to see which the best route would be. It was certainly possible to achieve a good normalised score on 23cm without assembling a significant station.

ADJUDICATION

THE COMMITTEE IS now making significant progress with the computerised adjudication software and our thanks go to Mike, G0GJV, for his work in this area. The vast majority of this year's logs could be checked this way due to the quantity of electronic format

70MHz

Low Power

Callsign/P	Loc	Score	Norm	QSO	Pwr	Ant	Best DX	km
G8OHM	IO82XJ	10830	1000	76	25	6	GM3TAL/P	413
G3LHJ*	IO80DQ	9804	905	45	24	9	GM3HAM/P	571
G4BRA*	IO80ST	9280	857	50	25	6	MM0CPS/P	561
G3LVP*	IO81XW	8082	746	65	25	8	MM0CPS/P	437
G2DPQ	IO92XA	6205	573	46	20	10	GI3PDN/P	472
G4IUZ	JO02BA	5959	550	47	25	7	GI3PDN/P	481
G3TWG*	IO91PO	5031	465	34	25	4	MM0CPS/P	488
G5UM	IO92IO	4786	442	34	25	4	MM0CPS/P	370
G0ROC	IO83VP	4769	440	36	20	4	G4ZYA/P	345
G0ARC	IO91FH	4238	391	29	20	4	GM3HAM/P	499
G4WAC	IO92BJ	4170	385	35	25	7	EI7M/P	333
G2XV	JO02CE	3266	302	28	10	5	GD0EMG/P	393
G3XNI*	IO91KG	1250	115	8	25	5	GD0EMG/P	401
M5VHF	JO02PW	668	62	3	10	3	GD0EMG/P	418

Open

Callsign/P	Loc	Score	Norm	QSO	Pwr	Ant	Best DX	km
GD0EMG	IO74PD	29008	1000	93	160	2x8,2x7	GJ3YHU	575
G4ZYA	IO90JO	20822	718	97	150	13	GM3TAL	621
GM3HAM	IO85SS	15232	525	48	160	11	G3LHJ/P	571
G3ORY	JO02TG	12240	422	57	160	8+2x3	EI7M/P	571
G4WSM	IO81PH	11276	389	61	90	6	GM4AFF	612
G3PJX	IO91TF	9250	319	52	70	8	EI7KRC/P	534
G0VHF	JO01PU	8927	308	46	100	2x5	GI3PDN/P	558
G4ZTT	IO83PF	7097	245	45	20	4	G3YJX/P	338
G3YJX	IO70MM	5887	203	26	?	?	G3ORY/P	496
G6RC	IO91VC	5013	173	35	16	8	GM3HAM/P	540
G4RFC	JO01DH	3967	137	34	100	4	GD0EMG/P	461

Restricted

Callsign/P	Loc	Score	Norm	QSO	Pwr	Ant	Best DX	km
GI3PDN	IO74AI	19757	1000	61	100	6	G0VHF/P	558
MM0CPS	IO85RU	13031	660	38	70	8	S51DI	1641
G3UKV*	IO82NN	12415	628	71	100	8	GM4AFF	473
G0SWL	IO93PW	10029	508	57	80	6	EI7M/P	434
GW1MVL*	IO82KW	7449	377	53	40	3	GM3TAL	344
G3SRC*	IO91XH	7194	364	51	100	6	MM0CPS/P	531
G3SAD*	IO91TW	7158	362	60	100	8	GI3PDN/P	459
M5ARC	JO02HR	6730	341	39	100	5	EI7M/P	501
G4FOH	IO92TI	6410	324	46	35	5	EI7M/P	435
G0RTL*	IO92WF	6259	317	41	50	5	EI7M/P	454
G6BUT*	JO01BT	5459	276	42	25	4	GI3PDN/P	495
G4GEE	IO92HE	3766	191	37	10	2xt/stile	GM3HAM/P	405
GM0BPY	IO85XT	1057	54	6	100	dipole	G4ZYA/P	582

Listener

Callsign	Loc	Score	Norm	QSO	Pwr	Ant	Best DX	km
BRS32525	JO01AL	1940	1000	18		dipole	GD0EMG/P	435
RS177448	JO01AL	476	245	13		dipole	G4WAC/P	166

50MHz

Low Power

Callsign/P	Loc	Score	Norm	QSO	Pwr	Ant	Best DX	km
G8OHM	IO82XJ	205698	1000	220	25	6Y	JY4NE	3795
G0ROC*	IO83VP	125456	610	113	20	4Y	4X6ON	3784
G1ZBJ	IO80DN	120568	586	116	20	3Y	4X6ON	3460
G0GMC	IO90WV	85469	416	80	25	3Y	4X6ON	3532
G5UM	IO92IO	76895	374	66	25	5Y	LZ2DP	2206
G4OXD	IO92XA	75236	366	73	20	7Y	LZ2CC	2085
G3WKX*	IO91PO	79239	385	78	25	5Y	JY9NX	3679
G6IVR	IO90CV	72569	353	65	20	3Y	LZ2CC	2169
G3RSC	IO92FM	60147	292	59	25	3Y	YT1ZZ	2055
MM0BQI	IO85NR	36547	178	30	25	3Y	EH7TU	2052
G7LNV	IO93NF	26633	129	20	10	5Y	YT1Z	2042

Open

Callsign/P	Loc	Score	Norm	QSO	Pwr	Ant	Best DX	km
GD0EMG	IO74PD	370564	1000	332	400	(2x7Y) x2	JY4NE	4033
G0RDI	IO90JO	301101	813	335	400	6Y	JY4NE	3672
GM3HAM	IO85SS	190568	514	205	400	9Y	CN8KD	2436
G3GRS	JO01LD	189562	512	168	400	5Yx2+XDIP	7Q7RM	8153
GW4BRS	IO81IR	170200	459	151	100	2Y	4X6ON	3771
GM0FRG	IO75FI	154236	416	102	400	6Y	7Q7RM	8786
G4WSM	IO81PH	130123	351	140	90	5Y	JY9NX	3775
G6ZTT	IO83PF	122369	330	100	100	2x3Y	9H1XT	2349
G4RFC	JO01DH	100401	271	103	100	4Y	LZ2PP/P	2134
G5LK*	IO91VC	75287	203	82	100	5Y	YU1EXY	2633
G6XJC	IO70MM	58250	157	41	100	6LPY	SV1EPP	2654
G8SRC	IO91CL	58023	157	59	100	5Y	LZ2DF	2202
G5RS	IO91TF	56158	152	54	100	5Y	LZ2DF	2099

Restricted

Callsign/P	Loc	Score	Norm	QSO	Pwr	Ant	Best DX	km
MM0CPS	IO85RU	229658	1000	170	100	6Y	Z22JE	8775
G4BRA*	IO80ST	216785	944	186	100	8Y	JY4NE	3763
G3NVO	IO91GI	193568	843	194	100	5Y	4X6ON	3637
G3ZME*	IO82NN	179824	783	149	100	5Y	7Q7RM	8435
G0CDB*	IO80DQ	173659	756	154	100	5Y	4X6ON	3765
G4IUZ*	JO02BA	158735	691	147	100	6Y	JY4NE	3644
M5ARC	JO02HR	135966	592	119	100	5Y	4X6ON	3570
G7DOR*	IO91SD	130496	568	124	100	3Y	4X6ON	3564
G6BUT*	JO01BS	124850	544	114	100	5Y	4X6ON	3557
GI3PDN	IO74AI	121221	528	81	100	5Y	7Q7RM	8718
G4GEE	IO92HE	119896	522	154	100	2xT'stile	5B4AGC	3526
G0WRC*	IO92BJ	113671	495	96	100	5Y	LZ4A/P	2255
G3SAD*	IO91TW	89693	391	84	100	7Y	LZ2PP/P	2195
M0RCA	IO91XH	78562	342	76	100	6Y	5B4AGC	3155
M0CJJ*	IO91KG	77496	337	88	100	5Y	LZ2DF	2151
G0RTL*	IO92WF	73010	318	54	100	5Y	4X6ON	3592
G6GMW*	IO83NU	64292	280	50	50	4Y	JY9NX	3906
GW1MVL*	IO82KW	63864	278	83	100	4Y	LZ2DF	2335
G0SWL	IO93PW	63273	276	48	80	6Y	LZ2PP/P	2281
G7HOA	IO83PH	54201	236	45	N/A	N/A	LZ5Z	2257
G4WBC	IO93TK	19790	86	17	100	5Y	9A16D	1677

Listener

Callsign	Loc	Score	Norm	QSO	Pwr	Ant	Best DX	km
BRS32525	JO01AL	97494	1000	78	0	VERT	4X/OE1GZA	3545
RS177448	JO01AL	46765	480	45	0	VERT	LZ2DF	2080

entries. Of course, we do still accept good old-fashioned paper logs, but ask wherever possible to generate 'e-logs'. Paper logs have to be input manually in order for the software to be of use to us and this eats up valuable adjudication time. Our thanks this year go to Steve, G4AEQ (50MHz); Pete G4CLA (70MHz); Andy G4PIQ (144MHz); Peter G4MJS (432MHz); and Roger G4BVY (1296MHz) for their time and efforts.

BITS 'N' PIECES

WITH THE ADVENT OF electronic entries, it is rather disappointing that there are few comments received nowadays. One of the most interesting parts of adjudication was to read (and have a giggle) at some of the comments and escapades written on the cover sheets. The few comments received were mainly aimed at the weather, which produced rain in the south on Saturday, which slowly spread up the country. The rain seemed to return as usual just in time for the packing up process.

The Northern Lights operating from a site last used in NFD in 1991 forgot how treacherous things could be after a downpour and managed to get their hire van well and truly stuck in the soggy heather. A car brought in to rescue fared no better. Finally a Land Rover was summoned which saved embarrassment all round.

The Parallel Lines CG probably won't forgive me for printing the fact that their new generator expired within the first four hours, leaving them with no option to pack up and head for home.

NOW THE RESULTS

WELL, THE NEW format certainly changed the way the awards were distributed this year, with no fewer than four new names appearing on trophies for the first time. Congratulations to Splinters CG for a narrow win in the Restricted Section, South Birmingham RS for a well-deserved win in the Low Power section after many years of trying. The G5BY Trophy heads down to the South West this year with Torbay ARS taking the honours. In Scotland, the Lothians RS take the Tartan Trophy this year. The Northern Lights, after a couple of years of inactivity in this event, returned to take the Surrey Trophy by a convincing margin. ♦

Overall Results

Low Power Section

Club	50	Score	70	Score	144	Score	432	Score	1296	Score	Total
South Birmingham RS	G8OHM	1000	G8OHM	1000	-	-	-	-	G3OHM	595	2595
Mid Sussex ARS	G0GMC	416	-	-	G3ZMS	601	G1ZMS	600	-	-	1616
Itchen Valley ARC	G6IVR	353	-	-	G0IVR	622	G6IVR	523	-	-	1498
G4IVH	-	-	-	-	G4IVH	1000	G4IVH	372	-	-	1372
Cambridge & DARC	-	-	G2XV	302	G8EVY	659	-	-	G6KWA	253	1213
Andover ARC	-	-	G0ARC	391	G0ARC	477	G0ARC	343	-	-	1211
Leicester RS	G5UM	374	G5UM	442	G3LRS	355	-	-	-	-	1171
Sutton Coldfield ARS	G3RSC	292	-	-	G3RSC	312	-	-	-	-	605
GM4WLL	-	-	-	-	G4WLL	541	G4WLL	50	-	-	591
Heathfield CG	G1ZBJ	586	-	-	-	-	-	-	-	-	586
G4NRG	-	-	M5VHF	62	M5VHF	317	M5VHF	204	-	-	583
Jim Martin	MM0BQI	178	-	-	MM0BQI	226	-	-	-	-	403
Siemens ARC	G7LNV	129	-	-	G8IGQ	176	G4VFK	83	-	-	389
Hitchen CG	G4OXD	366	-	-	-	-	-	-	-	-	366
G0AKH	-	-	-	-	G0AKH	193	-	-	-	-	193
Ysbyty Ystwyth, St Olaves G School		-	-	-	G3VFD	168	-	-	-	-	168
Willenhall & DARS	-	-	-	-	G4ETW	157	-	-	-	-	157

Mix and Match Section

Club	50	Score	70	Score	144	Score	432	Score	1296	Score	Total
Torbay ARS	G0CDB	756	G3LHJ	905	G8NJA	959	G3NJA	1000	-	-	3621
Cheltenham ARA	-	-	G3LVP	746	G4ERP	656	G4BRK	1000	G5BK	1000	3403
Bracknell ARC A	G4BRA	944	G4BRA	857	-	-	G4BRA	541	G4BRA	602	2944
Telford & DARS	G3ZME	783	G3UKV	628	G3ZME	309	-	-	G4NKC	874	2594
Shefford & DARS	-	-	G2DPQ	573	G4ARL	475	G3FJE	645	G8ATD	489	2183
Rochdale & DARS	G0ROC	610	G0ROC	440	-	-	G0ROC	617	-	-	1667
Wythall RC "A"	G0WRC	495	G4WAC	385	G1WAC	645	G7WAC	110	-	-	1635
Surrey Radio Contact Club "A"	-	-	G3SRC	364	G6LX	423	G3ZPB	614	G8TB	209	1609
Harlow & DARS	G6BUT	544	G6BUT	276	G6BUT	225	G6BUT	163	-	-	1208
Basingstoke ARC	M0CJJ	337	G3XNI	115	G3TCR	318	M5ALE	327	-	-	1098
Stevenage & DARS	G3SAD	391	G3SAD	362	G3SAD	312	-	-	G3SAD	21	1086
Maidenhead & DARS	G3WKX	385	G3TWG	465	-	-	-	-	-	-	850
Dorking & DARS	G7DOR	568	-	-	G3CZU	200	M1DLT	69	-	-	837
Wrexham ARS CG "A"	GW1MVL	278	GW1MVL	377	GW0WZZ	98	GW6ZMD	51	-	-	804
Far Canal & RTL CG	G0RTL	318	G0RTL	317	G7RTL	123	-	-	-	-	757
TCARS	G6GMW	280	-	-	G4ATH	113	G8RDP	93	G8KBH	26	512
Crawley & Reigate	G5LK	203	G6RC	173	-	-	-	-	-	-	376
Salop ARS	-	-	-	-	GW3SRT	171	MW1AXW	197	-	-	368
Widnes & Runcorn ARC	G7HOA	236	-	-	G7HOA	58	G7HOA	19	-	-	312

Open Section

Club	50	Score	70	Score	144	Score	432	Score	1296	Score	Total
The Northern Lights	GD0EMG	1000	GD0EMG	1000	GD0EMG	1000	GD0EMG	809	-	-	3809
Blacksheep, Victory & Friends	G0RDI	813	G4ZYA	718	M0BAA	970	G1DNY	568	-	-	3068
Villa CG	-	-	G0VHF	308	G0VHF	748	M1CRO	803	M1CRO	1000	2859
De Montfort University ARS	-	-	G3ORY	422	G0TPH	560	G3SDC	1000	G3SDC	595	2577
Windmill CG	G3GRS	512	-	-	G0FBB	404	G0FBB	259	G0FDZ	541	1716
The Lothians RS	GM3HAM	514	GM3HAM	525	GM3HAM	214	GM3HAM	175	-	-	1428
Mid Cheshire ARS	G6ZTT	330	G4ZTT	245	G3ZTT	320	G8ZTT	164	-	-	1059
Highland CG	GM0FRG	416	-	-	GM0FRG	93	GM0FRG	111	GM0FRG	388	1008
Weston Super Mare ARS	G4WSM	351	G4WSM	389	G8WSM	111	G1KHX	53	-	-	903
GM4ZUK	-	-	-	-	GM4ZUK	887	-	-	-	-	887
Swindon & DARC	G8SRC	157	-	-	G8SRC	281	G8SRC	174	G8SRC	55	666
Clifton ARS	G4RFC	271	G4RFC	137	G3GHN	148	G0PPO	106	-	-	662
Barry ARS	GW4BRS	459	-	-	GW4BRS	114	GW4BRS	75	-	-	649
Guildford & DARS	G5RS	152	G3PJX	319	-	-	G6GS	89	-	-	560
Newquay & DARS	G6XJC	157	G3YJX	203	G4ADV	99	G8XNH	23	-	-	482
South Essex ARS	-	-	-	-	G4RSE	164	G6RSE	75	-	-	239
Wythall RC "B"	-	-	-	-	-	-	-	-	G0EYO	82	82

Restricted Section

Club	50	Score	70	Score	144	Score	432	Score	1296	Score	Total
Splinters CG	G3NVO	843	-	-	G3WOI	530	G3WOI	518	G3UAX	1000	2891
Cockenzie & Port Seton ARC	MM0CPS	1000	MM0CPS	660	MM0CPS	1000	MM0CPS	54	-	-	2713
Lagan Valley	GI3PDN	528	GI3PDN	1000	GI4GTY	352	GI4GTY	196	-	-	2077
Wisbech AR&EC	M5ARC	592	M5ARC	341	M5ARC	620	M5ARC	348	-	-	1901
North Beds Gentlemens CG	-	-	G4FOH	324	G4VMX	409	G8BNE	480	G4JTJ	660	1874
Goole R&ES	G0SWL	276	G0SWL	508	G0OLE	403	G8HSG	276	-	-	1462
Edgware & DRS	G4IUZ	691	-	-	G3ASR	176	G4RMD	235	-	-	1102
CARSCOG Gearboxers	G4GEE	522	G4GEE	191	G2ASF	76	G7ASF	115	-	-	904
Border ARS	-	-	GM0BPY	54	GM0BRS	380	GM8BDX	195	GM8PNN	153	782
Welwyn Hatfield ARC	-	-	-	-	G3WGC	517	-	-	-	-	517
G4FUH	-	-	-	-	G4FUH	251	-	-	-	-	251
West Bromwich Central RC	G4WBC	86	-	-	G4WBC	58	G4WBC	12	-	-	156
North Bristol ARC	-	-	-	-	G6PNB	151	-	-	-	-	151
North Cheshire ARS	-	-	-	-	G1NCR	81	-	-	-	-	81
Bracknell ARC "B"	-	-	-	-	G6BRA	19	-	-	-	-	19

Listeners

BRS32525	-	1000	-	1000	-	1000	-	1000	-	-	4000
RS177448	-	480	-	245	-	583	-	314	-	-	1622

The Northern Lights Contest Group's impressive antennas. From left: 70cm 4x28, 4x21; 144MHz 4x9, 4x15; 50MHz 2x7 on trailer tower; 2x7 on scaffold mast.

inpractice

by **Ian White,** G3SEK*

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REMOTE ATUs

G3XJP's INNOVATIVE 'PicATUne' intelligent ATU and G3LDO's new Backyard Antennas *book highlight how remote ATUs can make many ordinary antennas work better, and make 'stealth' antennas possible in difficult situations.*

ONE OF THE PROBLEMS with HF antennas in difficult situations is that you often can't put up one of the textbook antennas that match easily to 50W coax. Instead you're forced to use some 'random' length of wire which will need an ATU. If you're in real difficulties and have to use a 'stealth' antenna, the ATU often needs to be in some inaccessible location: G3XJP mentioned the loft, and another classic situation is outdoors at the base of a disguised vertical antenna.

Even if you're not forced into using a remote ATU, you should also consider it for good technical reasons. Most HF antennas will work well on several bands, but the impedances they present on many of those bands will be far from 50Ω.

For doublet antennas, the classic solution is to use open-wire feeder all the way back to an ATU in the shack, but a more effective alternative can be to move the ATU out nearer to the antenna. This is particularly true if your house supports one end of the doublet, because a remote ATU allows you to drop the open-wire feedline straight down to an ATU on the ground. Running coax along the ground from the ATU back to the shack is much lower-risk for RF interference than running open-wire parallel to the antenna.

For multi-band vertical antennas and inverted-Ls without traps or gadgets, an ATU at the base is a necessity for efficient operation. The new *Backyard Antennas* book from Peter Dodd, G3LDO, shows an example [1] of an inverted-L antenna with a remote ATU at the base of the mast (**Fig 1**). This configuration is far lower-risk for RFI than bringing the 'hot' end of the wire into the house. As another example, my antenna for the middle HF bands is a plain vertical whip, 10m high. At present I'm using an ordinary T-match ATU at the base, in a waterproof fibreglass box with a lift-up lid (actually an old motorcycle pannier box). For tune-up I use an MFJ-259 SWR Analyser, although it isn't really necessary to do this every time; it could be done equally well in one session using a low-power transmitter and an SWR meter. If you carefully mark the control settings on the ATU for each band, eg by using different-coloured dots from a set of felt-tip pens, you can very quickly reset the controls to change bands.

These simple antennas can be very effective if you put in enough ground radials, but a manually-operated remote ATU is inconvenient. Having to go out into the garden definitely inhibits changing bands. This is where a remote-controlled ATU comes into its own. It doesn't have to be an automatic ATU - you can build something very simple for yourself, and it's a very good project to try. Some years ago, G3UCE described a remote-controlled ATU (**Fig 2**) that is pre-tuned for each band [2], and then band-switched by relays over a multi-wire control cable. G3UCE's system is a modified parallel-tuned circuit, and has the advantage of requiring only one relay per band, but it is hard to design and can take some time to set up experimentally (*Backyard Antennas* gives the details).

These days, you can get some very useful design help from your computer. G4FGQ's popular program ENDFEED.EXE [3] calculates typical feed impedances for HF verticals and inverted-Ls, and indicates what T- or L-network parameters you're likely to need. The L-network is hard to beat for simplicity. One adjustable inductor and one preset variable capacitor will match any impedance when connected in the right configuration. For example, the L-networks needed for a '10m up, 10m along' inverted-L as in Fig 1 are shown in **Table 1**. There are always two alternative L-network arrangements that will give the same impedance transformation, but on the lower frequencies only one of these may be practicable. The advantage of Networks A and B in Table 1 is that the rotor of the variable capacitor is grounded, which is constructionally more convenient than Network C. The component values cannot be predicted precisely, because they depend very much on local ground conditions and the construction of your antenna, but the values from ENDFEED should be a good basis from which to start.

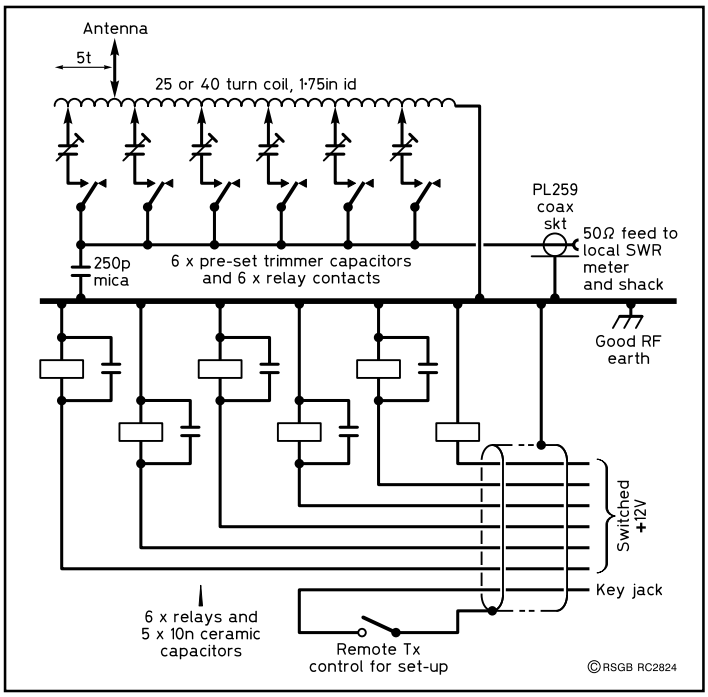


Fig 2: A simple remote multi-band ATU by G3UCE.

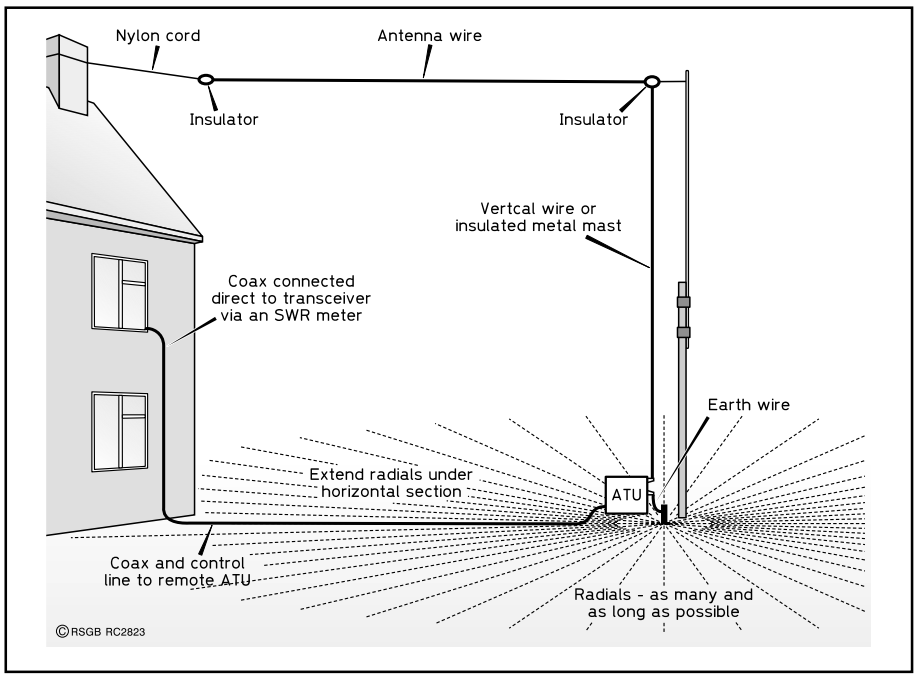


Fig 1: A base-fed inverted-L using a remote ATU is far better than the traditional 'long wire' fed at the 'hot' end. Use plenty of shallow- buried radial wires for higher efficiency, especially on the lowest band.

* *52 Abingdon Road, Drayton, Abingdon, Oxon OX14 4HP.*

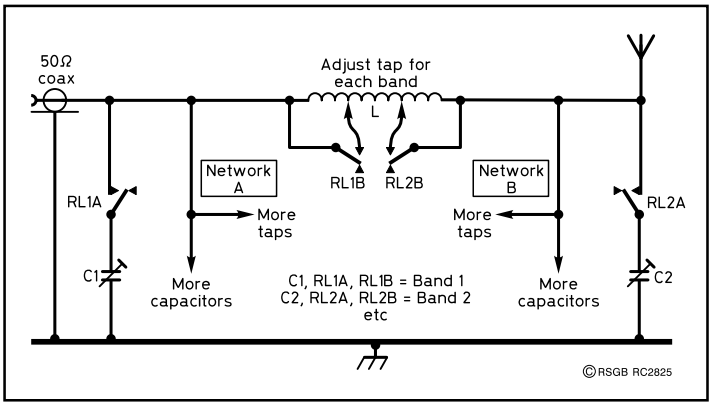


Fig 3: Ideas for a manually-adjusted L-network remote ATU. You pre-set the coil tap and the capacitor for each band, and then energise the appropriate relay for each band.

The L-networks can be built as a single inductor with switched taps and switched capacitors, or you can switch between individual networks for each band. To design the necessary inductors, use G4FGQ's program SOLENOID.EXE [3]. The 'PicATUne' circuit diagram [4] shows how all the switching can be done with single-pole relays. The only difference is that in a manually-adjusted system you would find the appropriate coil taps for each band by experiment. You would need two relay contacts per band (**Fig 3**). Depending on your power level and any size limitations, you could use either two separate relays (eg the ones that G3XJP recommends) or a single large double-pole relay. However, you don't need a junk-box full of wide-spaced variable capacitors - in fact you can get away with using none at all. Simply use a temporary variable capacitor to set up each network, and replace it with fixed capacitors once you have established the correct values for each band. Open-circuited coax stubs are a good way to make high-voltage capacitors for the higher bands (50Ω solid polyethylene coax of any size has a capacitance of 30pF per foot). The setup technique is to try a value of inductance, and sweep the capacitance for a dip in SWR. Then try another inductance value and see if the minimum SWR gets better. Finally you should be able to find just one value of inductance and one value of capacitance that together give a perfect match. Fortunately, none of these matching networks needs to be exact, and in any case the SWR will change across each band. If your transceiver has an auto-ATU that can cope with SWRs up to about 3:1, it will easily handle any minor errors and variations.

Physical construction of a remote ATU can be very simple. For use outdoors, or even in the loft, the complete ATU doesn't have to be compact and nice-looking (out of sight, out of mind). You can use more space, hefty surplus components and 'ugly' construction techniques that can actually give better RF performance. For example, a good basis would be a large sheet of copper-clad PC board, which is easy to cut and drill, makes an excellent RF ground and can be soldered easily (even outdoors). It may look cheap and cheerful, but it probably performs better than anything else you might use. In the loft, your remote ATU doesn't even need a box; outdoors, the box hides any 'ugly' features. The box itself needn't be anything special, as long as it's waterproof. Wood or plastic is better than metal, because good shielding isn't necessary outside the house, and insulating materials avoid eddy-current losses. Often you don't need insulators, just holes in the bottom of the box. As a minimum, leave a small hole at the very bottom of the box to avoid condensation collecting.

The control unit in the shack is very simple: just a single-pole multi-way switch to feed DC out to the appropriate relays for each band. Note how G3UCE provides an extra wire and a switch to control the transmitter during set-up (Fig 2). Almost any kind of multi-core cable will do for the control line, and it probably doesn't have to be screened.

An auto-ATU such as the 'PicATUne' or one of the commercial versions is obviously more versatile than a manual remote ATU, because it doesn't have to be set up all over again if you change the antenna configuration. Still, I hope I've shown you that the manual options for a remote ATU are equally effective. You may view a remote-switched ATU as a staging-post to a fully-automated system, or you may find it completely satisfactory. The most important thing is to make the decision to move the ATU out of arm's reach, and out to the antenna itself. It opens up so many more possibilities!

REFERENCES

1. *Backyard Antennas* by Peter Dodd, G3LDO. See RSGB Books, p87.
2. 'Bring Back the End-fed' by L B Uphill, G3UCE, *RadCom*, February 1989.
3. Follow the links from the 'In Practice' Web site, or ask a friend to download the programs for you.
4. 'PicATUne - the Intelligent ATU' by Peter Rhodes, G3XJP. The RF circuit diagram is in *RadCom*, October 2000, p21.

THANK YOU!

FINALLY, THANKS to everybody who has sent in letters and e-mails during the past year. Although it isn't possible to reply to everybody individually, 'In Practice' exists to pass on *your* practical experience as well as my own. This is a seasonal opportunity to say how grateful I am for all your questions, comments and brilliant ideas. Happy holidays and best wishes for 2001. ♦

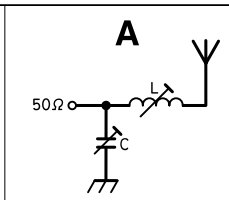
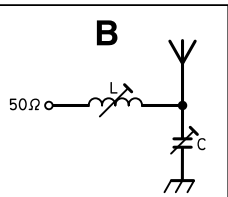
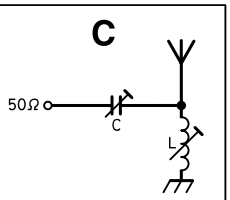
L-networks:			
Band, MHz	**Network Options**	**C, pF**	**L, μH**
3.5	A	700	1.1
7	B C	65 61	8.3 9.2
10	B C	73 120	2.1 1.8
14	B C	50 50	2.5 2.8
18	B C	60 90	0.9 1.0
21	B C	40 40	1.5 1.8
24	B C	35 55	0.8 0.7
28	B C	30 30	1.1 1.3

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Table 1: Typical L-network values for a '10m up, 10m along' inverted-L, generated by G4FGQ's program ENDFEED. Regard these as starting values for setting-up.

If you have new questions, or any comments to add to this month's column, I'd be very pleased to hear from you by mail or e-mail. Please remember that I can only answer questions through this column, so they need to be on topics of general interest.

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Win! A Trip to Friedrichshafen

Visit Europe's Biggest Amateur Radio Exhibition, Courtesy of the South Yorkshire Repeater Group and the RSGB!

ONCE AGAIN, the South Yorkshire Repeater Group is organising a coach trip to Friedrichshafen in southern Germany, to coincide with *HamRadio 2001*, Europe's largest amateur radio exhibition and convention. This year, we are pleased to offer all RSGB members the chance to win a place on the trip, worth £349, in our exclusive competition.

HAMRADIO 2001

THE FRIEDRICHSHAFEN HAMFEST is Europe's largest gathering of radio hams. The vast indoor 'flea market' is *the* place to find those elusive bits. Ex-NATO Racals rub shoulders - for once - with Russian transmitters. Exotic gear from every corner of Europe - at prices that will surprise you. Haggling is friendly and fair, by the way.

At the show you will see the very best in amateur radio and computer gear. Not simply from German companies, like Rhode & Schwartz, but from a host of international companies. Kenwood, for instance, is always there in force (last year visitors to the Hamfest got to see the new Kenwood HF - 23cm radio months before it was shown in the UK).

And don't forget, visit the Hamfest and Friedrichshafen and you will also get a continental lakeside holiday thrown in! Friedrichshafen is just a few miles from the Austrian and Swiss borders, on the shores of Lake Constance, known as the Bodensee. It's surrounded by mountains and within easy reach of dozens of pretty little resorts. Both Friedrichshafen and neighbouring Lindau are

elegant towns on the lake, with open air bars, restaurants and a host of historic buildings.

BOOK YOUR TRIP

THE RSGB / SOUTH YORKSHIRE Repeater Group Friedrichshafen HamRadio 2001 trip costs £309 per person, based on two sharing. This includes travel by luxury coach to and from your pick-up point in England to Lindau, bed and continental breakfast in a double room at the Hotel am Holdereggenpark (pictured below left) in Lindau, and coach travel to and from the Hamfest on the Friday, Saturday and Sunday.

For a single room, the cost is £349 per person; or for a larger double room with double bed plus a settee-bed the cost is £349 pp. There is a triple room available with double and single beds at £309 pp. Accommodation is also available in more basic guest houses with shared facilities at £229 pp based on two sharing (note that separate twin beds cannot be guaranteed), or £269 pp for a single room.

To book your trip, contact Ernie Bailey, G4LUE, tel: 01226 716339 or 0778 7546515; or visit the South Yorkshire Repeater Group's web site at www.syrg.co.uk and follow the links. Last year around 20 people had to be turned away as the coach was already fully booked, so please don't delay your booking in the hope that you might win the competition. If you are the lucky winner, your money will of course be refunded!

PS: Ernie is also organising a trip to the Dayton Hamfest in Ohio, USA, in May 2001. There are a few places still available: please contact Ernie for full details. ♦

Admission charges to the Hamfest: Day ticket DM12, three-day pass DM25, catalogue: DM6 (2000 prices). Opening hours: Friday and Saturday 9.00am - 6.00pm, Sunday 9.00am - 4.00pm.

FRIEDRICHSHAFEN *HAMRADIO 2001* TRIP ITINERARY

During your stay for the Friedrichshafen *HamRadio* show, you will spend six nights bed and breakfast in the Hotel am Holdereggenpark or at a guest house in the town of Lindau. There are a limited number of rooms booked in the hotel and guest houses which are available on a first come, first served basis. The hotel and guest houses are a 10-minute walk away from picturesque Lindau Island.

The coach departs Barnsley in South Yorkshire on **Monday 25 June 2001** at 3.00pm, picking up *en route* in time for an evening channel crossing. You will arrive in France early morning, and travel via Belgium, Luxembourg and the Black Forest to your destination of Lindau, on the Bodensee, arriving **Tuesday** about 2.00pm. There will be stops for refreshments at motorway services in Belgium and Germany *en route*.

Tuesday 26 to Thursday 28 June 2001 are three free days. There are around 37 different organised coach trips from the island and over 10 boat trips.

Friday 29 June, Saturday 30 June and Sunday 1 July: The coach departs the hotel for the Hamfest at 9.30am, and returns to the hotel at 4.30pm.

Monday 2 July: The coach departs Lindau at 9.00am to return to Calais to catch the midnight crossing to Dover. Drop-offs as arranged. Arrive Barnsley early morning of **Tuesday 3 July**.

COMPETITION TIME

Look at the three questions below. Write your answers on **a postcard or the back of a sealed envelope** (no letters accepted) and send them to: Friedrichshafen Competition, RSGB HQ, Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JE. Don't forget to include your own name and address! The closing date is first post on **Monday 31 January 2001**.

Questions

1) On which lake is Friedrichshafen located?
2) What is the name or the town and the island where the tour stays?
3) Which four countries (excluding England) will the coach travel through to arrive at its destination?

HINT: if you are unsure of any of the answers, re-reading the article above will help!

Only one entry per RSGB member (multiple entries will be disqualified). No other correspondence can be entered into. All entries will become the property of the RSGB; please state on your entry if you do *not* wish to receive further promotional material or offers from the RSGB. Employees of the RSGB are not eligible to enter. The winner will be the first **correct** entry drawn at random. The draw will take place on 31 Jan 2001.

The Future of Amateur Radio Examinations - Part 2

*by Richard Horton, G3XWH**

MY FIRST ARTICLE (*RadCom* February 2000) ended with an exhortation to register your opinion on the statement that ". . . the RA should seriously consider a new initiative to reform the current RAE and NRAE syllabuses to turn them into practically-based courses where operation under supervision during training is a positive requirement . . ." This produced an unprecedented response for a *RadCom* article with over 120 e-mails and faxes, many several pages in length and containing detailed suggestions.

The overwhelming majority opinion expressed was in favour of such a change and it was clear that most believed that WRC 2003 would act as a suitable catalyst for an overhaul of our licensing system plus methods of assessment.

FLAEF

RSGB PRESIDENT Don Beattie, G3OZF, set up FLAEF (the Future Licensing And Examination Forum), which I was asked to chair. Current full members include: Dave McQue, G4NJU, EVP; Peter Kirby, G0TWW, General Manager; Robin Page-Jones, G3JWI, EMC Committee and Council Member; Geoff Dover, G4AFJ, Council Member; Julian Gannaway, G3YGF, LAC Chairman; Anthony Vinters, G0WFG, STELAR Chairman and Head of Science, Rishworth School; Alan Wright, G0KRU, STELAR Vice Chairman and Head of Technology, the Hewitt School.

Our remit was to produce a paper for Council which could be used as the basis for exploratory discussions with the Radiocommunications Agency (RA) before presenting the outline to UK amateurs for comment and further input. The paper was to provide a framework of licence classes plus assessment methods which incorporated feedback from the e-mail and fax responses plus input from the forum members.

FOUNDATION LICENCE

THE FIRST PART of the process was duly completed by spring of this year, with Council approving an outline discussion document which was then passed to the RA with the request for a meeting to discuss the issues raised. Just prior to the document being sent, the RSGB received from the RA a proposal for a Foundation Licence class which could be introduced before WRC 2003. Fortunately this coincided with a FLAEF meeting at which the RA document was tabled and discussed. The forum's view was that the RA was to be commended for promoting the concept of an accessible Foundation licence class but that the restriction of VHF operation plus the sole use of 'commercial equipment' was far less desirable than the Society's view that any new Foundation licence should encourage the spirit of 'self training and construction' plus giving access to the HF spectrum.

The forum felt strongly that as there was obviously a will on the part of the RA to introduce the Foundation licence in the short term, there be a response from the RSGB which would be capable of rapid implementation. Thus the 'Foundation Certificate in Amateur Radio' was postulated as a possible solution as a bridging structure leading to HF access at Foundation level pre WRC 2003.

FOUNDATION CERTIFICATE

IT IS SUGGESTED that we implement a 'Foundation Certificate in Amateur Radio'. This would include two essential components:

- A tested knowledge of the Morse code alphabet in order to comply with current international regulations to allow HF access.
- Operation under the supervision of a licensed amateur to allow the essential practical thrill of amateur radio on the air.

What might such a certificate include? If the candidate already has a pass in the RAE / NRAE it is proposed that on gaining the Certificate, they be granted a 10W Foundation class licence, ie all bands. Possession of the Certificate alone would allow operation under supervision, as during the Certificate course. The working group has drafted an example of a competency-based 'workbook' for use by the candidate and instructor.

It is proposed that licensed amateurs could act as instructors but that assessment would be carried out by registered Novice instructors and verified by a Senior Novice instructor. When operating under supervision, it is proposed that the instructor's callsign be used together with an appropriate suffix. On gaining the Foundation licence, a new callsign from a different series would be allocated. It is believed that this bridging solution will be capable of rapid implementation and will satisfy the desire for an attractive 'hands on' introduction to the hobby and lead smoothly into the longer term proposed licence structure.

The RA then informed the Society that it wished to receive feedback on its own Foundation Licence proposal from the amateur community as soon as possible and hence it intended to publish its paper on the Web within the following few days.

In view of this development, the decision was taken to publish the Forum's outline on the RSGB Web pages so that amateurs could have the opportunity to compare and comment on the two proposals. Thanks to Dr Bob Whelan, G3PJT, a condensed version of the text was available on the Society's web pages within 24 hours of the decision to publish being taken.

SUMMARY OF PROPOSALS

THE 'SHELF LIFE' of our licence qualifications has been 20+ years to date and hence any licence structure planned now must seek to be as 'future proof' as possible and be based on current education and assessment best practice. This is a very important principle, 'quick fixes' rarely work and especially not in the area of qualifications.

Future qualifications should be based upon competency-based education and assessment. The aim should be to produce a 'competent and safe' amateur motivated towards "self training in Radio Communication".

The 'competent' element implies constructional and operational abilities, as well as basic theory centred around a 'need to know about' approach. In a sense we are saying that a hands-on, 'learning by doing', approach is likely to lead to higher levels of interest.

The 'safe' element refers to EMC knowledge, necessary licence conditions, as well as electrical safety plus general non-interference principles with regard to other spectrum users.

Both education and assessment processes should be as practically based as is feasible with assessment fully integrated into the education process.

By way of example, the practical, constructional element should be based on an established, relevant and simple project which will produce an affordable but useful end product, eg the construction of a QRP transceiver, an item of instrumentation like a GDO, an antenna or even some software.

One of amateur radio's strengths over the years has been its great variety of specialised interests. This variety needs to be reflected in the candidate's preparation to hold a licence. We believe, therefore, that whilst the safe element, including as it does such topics as EMC, regulations etc should be a compulsory element, the competency element should reflect the candidate's personal interests. There should therefore be a number of possible ways this part should be covered.

However, actual amateur radio operation under the supervision of a licence holder should be an integral part of all training courses. There are two aspects to this, the first is the maintenance of the level of interest of the candidate but the second is to provide an opportunity for every radio amateur to work to bring new radio amateurs into the hobby.

** 7 Carlton Road, Harrogate HG2 8DD.*

LICENCE STRUCTURE

IT APPEARS PROBABLE that the ITU may abandon the Morse requirement for access to HF at WRC 2003, leaving us with a *de facto* two-tier structure from the present five tiers: Novice A, Novice B, Full Class A, Full Class B, and the new Class A/B. A number of influential administrations have introduced no–Morse, full spectrum access, licences recently and therefore this process is already under way.

My working group discussed the problem of the number of future tiers at length and concluded that moving back from two to three tiers, would make little logical sense and would certainly not attract new entrants at that stage. Hence, a two-tier structure was deemed the preferable option, ie:

- Foundation
- Full

FOUNDATION LICENCE

THE KEY ELEMENTS of the Foundation licence are as follows. You will see we have incorporated the principles outlined above, and in particular have retained the hands-on, practical idea we discussed above. Broadly, the Foundation licence would include:

- 10W power limit on all current Amateur Radio bands
- Practically-based training course
- Operation under supervision as an integral part of the course
- Construction of a simple kit
- Modular route, eg six modules from 12, with a mixture of compulsory modules, eg licensing conditions and EMC and 'chosen by the candidate' (elective) modules, eg the project or specialist areas
- Possible exemptions from certain modules to be available, eg GCSE science counts as the DC module.

Compulsory Foundation Modules

As described earlier, the safe part of the qualification will cover those topics which a radio amateur needs to know in order to operate within the international and national regulations without causing interference to others.

It should provide the basic knowledge for the resolution of interference problems even though this is unlikely, but not impossible, at the Foundation licence power levels. In addition the basic knowledge of radio and electronic theory would be covered, together with practical station operation.

The safe part then would be covered in compulsory modules, such as:

- licence conditions
- electrical and RF safety
- EMC
- station operation under supervision
- DC theory
- AC theory
- propagation
- RF generation / detection.

Elective Foundation Modules

The elective modules, selected by the candidate, could cover topics such as:

- further construction (antennas, interfaces etc)
- specialised techniques (TV, satellite, digital etc)
- Morse code
- software and interfacing
- more advanced RF techniques (Tx and Rx)
- contesting under supervision.

Again, the emphasis would be on 'learning by doing', as far as possible.

Foundation Licence Assessment

The assessment method would be by using a course taskbook in which the compulsory and the selected modules would be covered. The modular course taskbook would be signed off by the tutor when the required competency has been reached. The validation / moderation procedures to check tutor assessments including visits to centres would make use of the existing RSGB instructor network. This would be supplemented with oral assessments, for example on licence conditions.

FULL LICENCE

THE FULL LICENCE would not need to include topics covered in the Foundation licence assessment process. In summary:

- equivalence to current Class A licence, ie 400W all bands
- the Foundation licence course would be a pre-requisite to entering for a full licence as this would be where all practical components would be assessed
- the higher level competency assessment could take the form of a revised and shorter syllabus RAE model since there would be no need to include the Foundation elements.

TWO OR THREE TIERS?

THE RSGB working group considers the two-tier model simpler and more logical. However, there are those who favour three tiers, with one level between Foundation and Full. If a three-tier structure were favoured, differentiation could be based on power as with the current M5 / Class A licence, eg:

- Foundation 10W
- Intermediate 100W
- Full 400W.

This would complicate the assessment structure and the criteria would require careful thought. Alternatively, the third tier could be an Extra Class licence on top of the recommended Foundation/Full structure with a high-power permit (subject to site approval), ie 1kW. In such cases some form of enhanced proficiency would be required, eg on EMC topics via examination or interview.

In order to make the Web information concise, some of the detailed appendices to the report were omitted from the Web pages and this included the diagram showing how it was felt current licence classes could be 'grandfathered' to the new structure post WRC 2003. This is presented in **Fig 1** below.

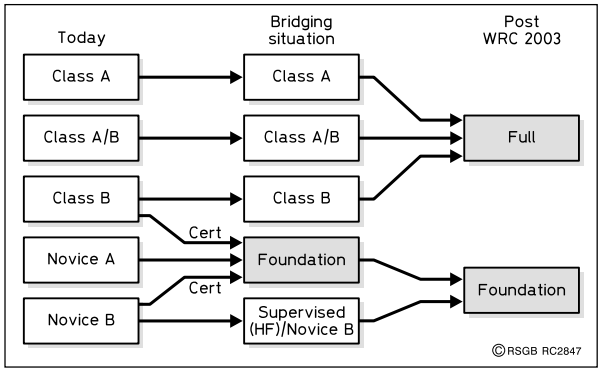

Fig 1: How the current licence classes could be 'grandfathered' into the proposed new licence structure, post WRC 2003.

FEEDBACK REQUIRED

PERHAPS BECAUSE THE announcement of the proposals on the RA and RSGB Web pages was not seen by a wide audience, the volume of responses coming into the published e-mail boxes was disappointingly low in the week following publication. A GB2RS news item boosted these somewhat, but at the time of writing, some three weeks after publication, my e-mail total is under 50% of that received from the February 2000 *RadCom* article. That said, the balance of the response is very different, with very polarised opinions expressed. Whilst there appears to be relatively little support for the RA's concept of a VHF 'commercial equipment' Foundation class, there is a strong voice opposed to change in any form. Another section of opinion believes that the forum proposals do not go far enough, others suggest that all assessments should be made much more technically demanding with at least one writer who believes that a Degree / PhD in an appropriate discipline be considered as the minimum qualification!

It is clear that we need much more input on this vital topic before proceeding to concrete proposals and implementation. We are only the custodians of this amazingly diverse hobby of ours and it is our responsibility to leave it in a vibrant and stable state for future generations of radio amateurs.

Please take just a little time to consider the points raised in the RA and Forum proposals and send in your comments and suggestions to g3xwh@rsgb.org.uk (or fax to 01423 871027) by the New Year. Hopefully we may then be in a good position to represent a majority opinion to the RA in future discussions. ♦

RSGB Annual Meeting

Saturday 4 December, 1999

Royal Society of Chemistry, London

THE MEETING WAS in three parts: the Annual General Meeting as required by the Companies Act, an Extraordinary General Meeting and an informal Open Meeting. Only the formal meetings are described here.

Minutes of the 73rd Annual General Meeting of the RSGB

THE PRESIDENT, Hilary Claytonsmith, G4JKS, introduced the rostrum party as: K Ashcroft, G3MSW, Treasurer; D Beattie, G3OZF, President Elect and P Kirby, General Manager and Company Secretary.

Council Members present were: R Biddulph, M0CGN; G Dover, G4AFJ; P Essery, G3KFE; R Horton, G3XWH; J Layton, G4AAL; D McQue, G4NJU; T Menzies, GM1GEQ; R Page-Jones, G3JWI; P Sheppard, G4EJP; F Stewart, G0CSF and I Suart, GM4AUP.

Apologies for absence had been received from the following members: MI0AYZ, GI3USS, G3RZP, G3UZN, G7FUM, G4GVV, G4DMP, G4CCA, G3PFR, G0RDI, 2E1AQS, G5KW and G0MRF.

The President announced that there were more than 50 members present [actual number 84] so the meeting was quorate.

The requirement to read the notice convening the meeting was waived by agreement of those members present.

Minutes of the 72nd Annual General Meeting

These had been published with the December 1999 *RadCom*.

J Bluff, G3SJE, said that the reference to "Articles of Memorandum" should have referred to "Articles of Association". The President said that had been noted.

The motion to confirm the Minutes was proposed by P Sheppard, G4EJP, seconded by P Essery, GW3KFE, and carried.

Accounts of the Society

Item 2 on the Agenda was to receive and consider the accounts for the year ending 30 June 1999, and reports of Council and Auditors.

The General Manager read the Auditors' Report which had been circulated to members with the November 1999 edition of *RadCom*.

The Treasurer then presented the Accounts and invited questions from members.

H Bellfield, G3SBV, noted that the consumable stock had dropped to £51 from £3195 the previous year and asked for an explanation. The Treasurer replied that the Society was no longer capitalising consumable stock into the balance sheet as this was poor accounting policy. Mr Bellfield said he accepted this answer.

2000 Council

The President announced the names of those members elected to serve on Council from 2000.

The results were as follows:

Election for three Ordinary Members

R Whelan, G3PJT, G Adams, G3LEQ, and G Dover, G4AFJ, were elected unopposed.

Election for Zone F

P Maile, MI0BME, 37 votes; J Smith, MI0AEX, 57 votes.

J Smith was declared elected.

Scrutineers

The President thanked the election scrutineers for their dedication and hard work. He then took the names of several members present who were prepared to volunteer as scrutineers for the next election.

Auditors

The last agenda item was to reappoint the auditors, KMPG, and to authorise Council to fix their remuneration.

The motion was proposed by the President, seconded by R Horton, G3XWH, and carried on a show of hands.

The President closed the AGM at 2.20pm.

Minutes of the Extraordinary General Meeting of the RSGB

THE PRESIDENT read out the Special Resolution as follows.

That the Articles of Association of the Company be altered in the following manner:

Article 65 to be amended to read Article 65a.

Addition of a new Article 65b to read: "The Council, or a committee of the Council, may agree to hold meetings by electronic means such as by telephone, either by conference connection(s) or by a series of telephone conversations, by the use of video conferencing facilities or by exchange of facsimile transmissions and addressed to the Secretary. The views of the Council, or a committee of the Council, as ascertained by the above means shall be treated as votes in favour of or against a particular resolution. A resolution passed at any meeting held in this manner and signed by the Chairman, shall be as valid and effectual as if it had been passed at a meeting of the Council (or, as the case may be, of that committee) duly convened and held.

"Any meetings conducted by any of the above means may be deemed to be held in the location either where the majority of the Society's Council Members are physically situated, or where the Chairman is physically situated, or as determined by the Council Members at the meeting itself. of the business of the Council shall be eleven, although in respect of meetings conducted by any of the above means, the Directors need not be present in the same physical location of the meeting to be quorate."

The Resolution was proposed by P Essery, GW3KFE, and seconded by R Snary, G4OBE.

J Bluff, G3SJV, said he was not against modern means being adopted but he felt that "a series of telephone conversations" was not equivalent to a meeting. He urged members to reject the Resolution.

The President emphasised that the idea was to use the facility on occasions when, for instance, something had to be agreed in a short timescale. It was not intended to replace meetings.

The Treasurer added that the "meetings" referred to were not meetings in the conventional sense, but a vote on matters already discussed at a meeting. He conceded that the Article could have been clearer but it was worded that way for technical reasons.

Mr Bluff accepted that this was Council's intention but was concerned at the possible abuse of the facility by a future Council.

The General Manager added that the wording had been on the advice of the Society's solicitors.

The President Elect said that Council had had the same concerns as Mr Bluff. The wording called for Council or a committee to agree such a facility in advance, and if they believed it would be abused they would not agree to it. The need for the Article had been highlighted by some practical problems during the year.

There being no further comments, the President called for a vote. The Resolution was carried on a show of hands.

The President then closed the meeting.

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2m	11ele (boom 156"/12.7dBd)	£69.95
2m	5ele crossed (boom 64"/9dBd)	£69.95
2m	8ele crossed (boom 126"/11dBd)	£89.95
4m	3ele (boom 45"/7dBd)	£44.95
4m	5ele (boom 128"/9dBd)	£59.95
6m	3ele (boom 72"/7dBd)	£54.95
6m	5ele (boom 142"/9dBd)	£69.95
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QT-627 GF 50/144/70, 2.15/6.2/8.4dBi (2.4m)	£69.95

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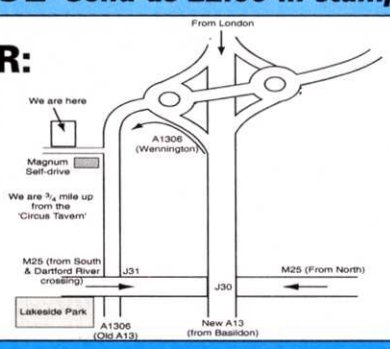

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technical topics

by **Pat Hawker**, G3VA*

TX MONITOR AND INTERFERENCE SNIFFER

A USEFUL PIECE of test equipment has been described by Drew Diamond, VK3XU, in 'A simple transmission monitor and interference sniffer' (*Radio-ZS*, February 2000, pp26-7, reprinted from *Amateur Radio*, of unknown date). VK3XU points out that "by regulation an SSB signal should not have excessive splatter, hum, noise, FM, and the transmitted voice should be undistorted. Digital modes should be without excessive clicks, chirp, hum or ripple, noise and thumps, and CW Morse should not be too 'soft' or too 'hard'. Yet some amateurs seem reluctant to report transmission faults to offending stations, perhaps for fear of getting into an argument or causing ill-feeling ("no QSL for him - he gave me a T8!").

"To get a true idea of our transmission quality, the best approach is to monitor it in the shack … without having to rely on (perhaps inaccurate) reports from other stations. A spare receiver may give a pretty good idea, but sometimes the local signal simply cannot be reduced enough to get a true picture. The signal is just too strong and overloads the receiver causing various distortions. And if no spare receiver, what to do?"

VK3XU's answer to this problem is a handy gadget for checking transmission quality in the form of a simple, untuned-input, direct-conversion receiver capable of monitoring 3.5, 7, 14, 18, 21, 24 and 28MHz SSB and digital modes (including Morse, RTTY and packet): **Fig 1**. As a bonus, the compact battery-operated unit can be used as an effective sniffer of electrical-interference sources around the home. While sensitive enough to detect weak signals, its sensitivity is controlled by adjustment of the 5-kilohm potentiometer right at the front end, so that large signals may be effectively reduced to a suitable level. Clearly this is improved if the unit is effectively shielded in a metal enclosure. VK3XU's was built in a die-cast box measuring 95 x 120 x 56mm. The unit draws about 10mA from the 9V battery.

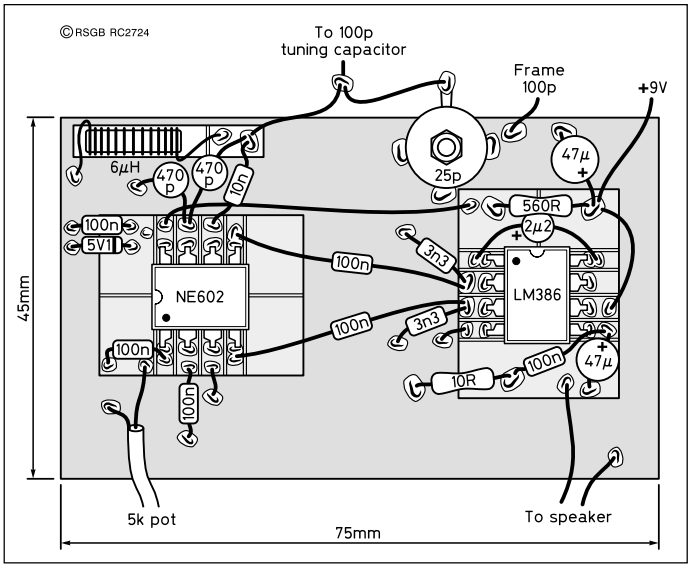

Fig 2: Component board layout for the VK3XU signal monitor using 'paddyboard' construction.

The well-known NE602 balanced mixer chip is configured as a product detector to form a simple direct-conversion receiver. The simple internal oscillator tunes from about 3.5 to 4MHz with the component values shown, using harmonics of the oscillator to receive signals on HF bands to at least 32MHz. VK3XU used a 'paddyboard' style of construction [see October's 'TT', p64 - *Ed*] with a suggested layout shown in **Fig 2.** Care should be taken to ensure good stability of the VFO and ease of tuning by the use of a good slow-motion drive or vernier. 470pF styroseal or dipped mica capacitors should be used for the Colpitts oscillator feedback, the trimmer should be air-spaced, eg a beehive type. The 6µH toroid inductor should be mounted on an insulated substrate (eg a small pad-board of rectangular PC material).

For signal monitoring, VK3XU suggests using a 40mm diameter coil of three turns of hook-up or enamelled wire fitted to a coaxial plug. He prefers this to a plain piece of wire that will usually provide too great a signal level for critical monitoring and will be affected by body- and hand-capacity whereas a loop will be largely immune to these undesirable effects. It is important not to overload the monitor since too strong a signal will tend to 'pull' the oscillator frequency.

For use for signal or interference sniffing, use a plain wire pick-up antenna, initially about 1m long. The wire may be draped over one shoulder. Walk around the suspected area looking for an increase in signal strength, using the sensitivity control to reduce the level when approaching the source. Finally, use the monitoring pick-up coil that should allow you to identify the culprit, be it touch lamp, computer, TV set, faulty thermostat, appliance controller etc.

When modified by using a tuned input circuit and additional audio-filtering, the unit could form a reasonably effective 'fun' receiver.

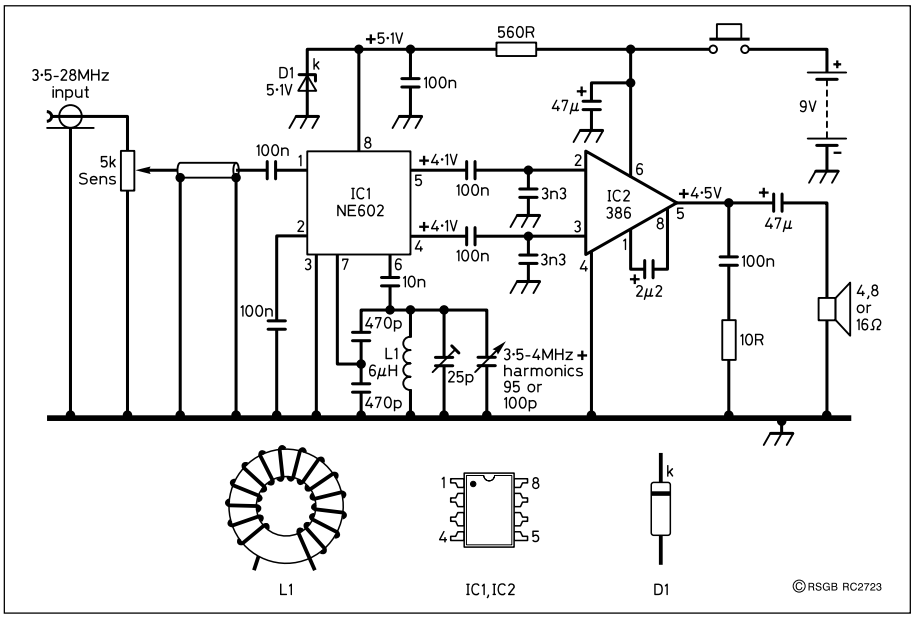

Fig 1: Circuit diagram of VK3XU's simple signal monitor and interference sniffer. The 6µH oscillator coil comprises 33 turns of 24-gauge B&S (0.6mm) enamelled copper wire on an Amidon TS50-2 (red) toroid core.

SWALLOW THAT TV - BUGS & ALL!

THE NATIONAL MEDIA took quite a lot of interest in the announcement (*Nature*, 25 May 2000, p417) of the development, by the Israeli firm of Given Imaging Ltd in conjunction with Dr Paul Swain of the Royal London Hospital, of a new type of painless endoscopy. This for the first time allows painless endoscopic imaging of the whole of the small bowel. It involves the use of a miniature wireless capsule endoscope small

* *37 Dovercourt Road, London SE22 8SS.*

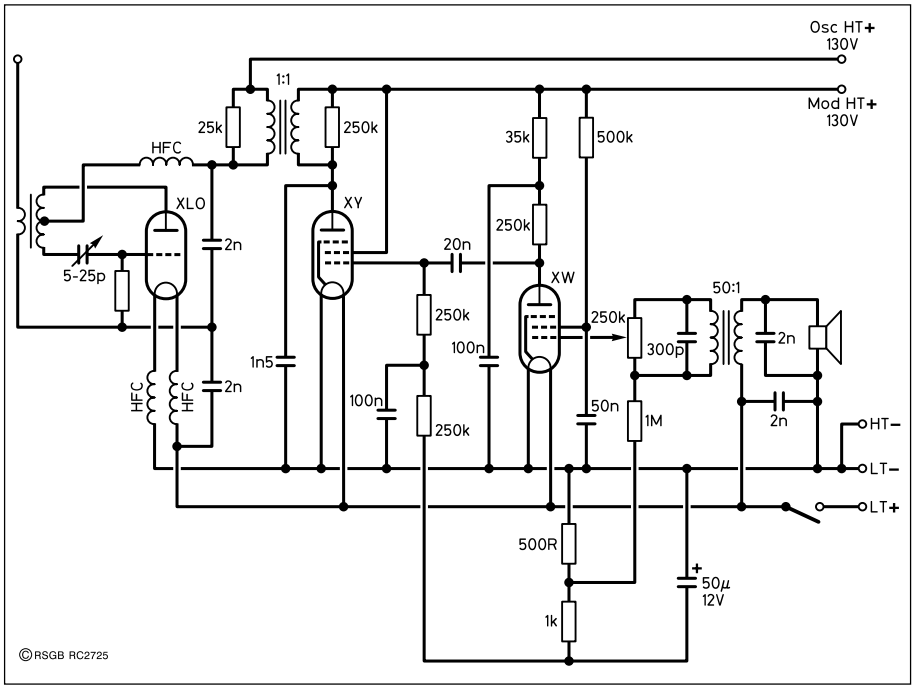

Fig 3: Circuit diagram of the VHF battery-operated Radio Pick-Up ('bug') unit carried in a leather brief case. It was designed in the early 1940s before the era of miniaturisation.

enough to be swallowed and which has already been tested on 10 human volunteers. In effect the endoscope comprises a tiny battery-powered UHF TV vision transmitter complete with its own lighting system. This, together with a small recorder worn on the body, provides up to 5-6 hours of continuous recording of the images of the human bowel transmitted over a distance of a few inches. During this time the patient is free to continue his daily routine and is not confined to a hospital environment. The capsule (11 by 30mm) is small enough to be swallowed without discomfort and has no external wires, fibre-optic bundles or cables commonly found in endoscopes.

The letter to *Nature* states: "The design of the video capsule was made possible by progress in the performance of three technologies: complementary metal oxide silicon (CMOS) image sensors, application-specific integrated circuit (ASIC) devices and white-light-emitting-diode (LED) illumination… The addition of a buffer amplifier on each pixel reduced the output noise that was initially associated with CMOS image sensors and has allowed CMOS chips to achieve an image quality comparable to those of charge-coupled-device (CCD) image sensors, but using much less power. Advances in ASIC design allowed the integration of a very small video transmitter of sufficient power output, efficiency and bandwidth into the capsule. Synchronous switching of the LEDs, the CMOS sensor and the ASIC transmitter minimise power consumption. By careful design of the optics, we were able to eliminate internal reflections that are a common problem when the illumination and imager are incorporated under the same dome."

Even in these days of micro-miniaturisation, the development of an image transmitter the size of a large pill must strike us as pretty remarkable. Of course, Hollywood has familiarised us with the tiny audio 'bug' capable of carrying speech to a recording van outside a building. The compact radio-microphone dates back to at least 1947 when Reg Moores, G3GZT, as a London theatrical agent/performer living in Brighton, developed his 27-30MHz 'Telesonic' microphone and demonstrated it on the BBC TV *Inventors' Club*. In 1949, his re-developed 60-80MHz radio-microphone was successfully demonstrated to Geoffrey Palmer at the Brighton Ice Rink. The result was the operational use of two belt-carried radio-microphones in 'Aladdin on Ice' at the Sports Stadium Ice Rink, Brighton during the Christmas 1949 season, including a smaller unit worn by Maisie Brown who was wearing a skin-tight costume. Modified ex-RAF R1481 receivers were used feeding into 120-watt Vortexion amplifiers. The transmitter comprised a self-excited Colpitts oscillator anode-modulated with a two-stage AF amplifier and moving-coil microphone.

Recently, in the course of examining some Security Service (MI5) files now in the Public Record Office, I found details of an even earlier but basically similar 'Microphone Briefcase' unit clearly intended for secretly recording interviews or discussions with suspects. This appears to have been developed quite early in WWII, before the availability in the UK of miniature components other than the Hivac range of midget valves. These were developed in the 1930s primarily for use in hearing aids. It was almost certainly the first 'purpose-designed' radio-bug in the UK and possibly in the world.

The transmitter was carried in a 12 x 16 x 2-inch leather briefcase with a standard PO carbon microphone insert concealed behind the name card in the centre-front of the case. It comprised a self-excited VHF oscillator, amplitude-modulated by a two-stage audio amplifier using a bulky 1:1 transformer. The HT came from four 67.5V Minimax B batteries, two used for the oscillator and two for the audio amplifier. A 2V, 7Ah accumulator supplied the low-tension filament supply and the carbon microphone current. A 50:1 microphone step-up transformer was used,

A Hivac XLO valve was used as a series-tuned 104MHz oscillator (**Fig 3**). This valve proved "very suitable especially after the base was removed and not more than 5mA-anode current was drawn". The audio amplifier used Hivac XW and XY valves. An absorption meter using a 6.3V, 0.3A lamp glowed with an anode current of 4mA at 130V. The modulator unit was built on a metal chassis measuring 6.25 x 2.5 x 1.25in with provision for the oscillator unit to be bolted in position. When assembled, the complete transmitter measured 9.5 x 2.5 x 1.25in deep: **Fig 4**.

This equipment was developed by a small technical unit within MI5's B3 Section which comprised four Post Officers released to the Security Service for the duration, with a laboratory at 'Scotswood', Arkley, close to the 'Box 25' headquarters of the Radio Security Service (MI8c). The files do not disclose whether the prototype equipment was put into production. However, it is claimed that this UHF Microphone Pick-Up had "a range of several hundred yards, at which point the signals could be recorded on a receiver set up specially, or one contained in a van" - less when left in steel-framed buildings in built-up areas.

The small technical section (B3E) examined and reported on the clandestine transmitters taken from German radio-agents captured in the UK, often as a direct result of the RSS Abwehr intercepts or the Double Agents run by Colonel 'Tar' Robinson of B1A division with the aid of RSS operators including Ronnie Reed, G2RX, Stan Reisen, G5SR, and Russell Lee, G6GL. It also built various items of equipment of possible use to MI5 including the radio briefcase and an ingenious 'Panograph' unit.

The Panograph consisted of a superhet radio receiver which was automatically and repeatedly swept through the 3.5 to 8.5MHz band in about 56 seconds. The sensitivity was adjusted so that only a particularly powerful (ie local) signal would, through relays, mark a paper drum moving at about 0.04-in per hour and indicate the time and approximate frequency of the transmission. The intention was that the Panograph unit would

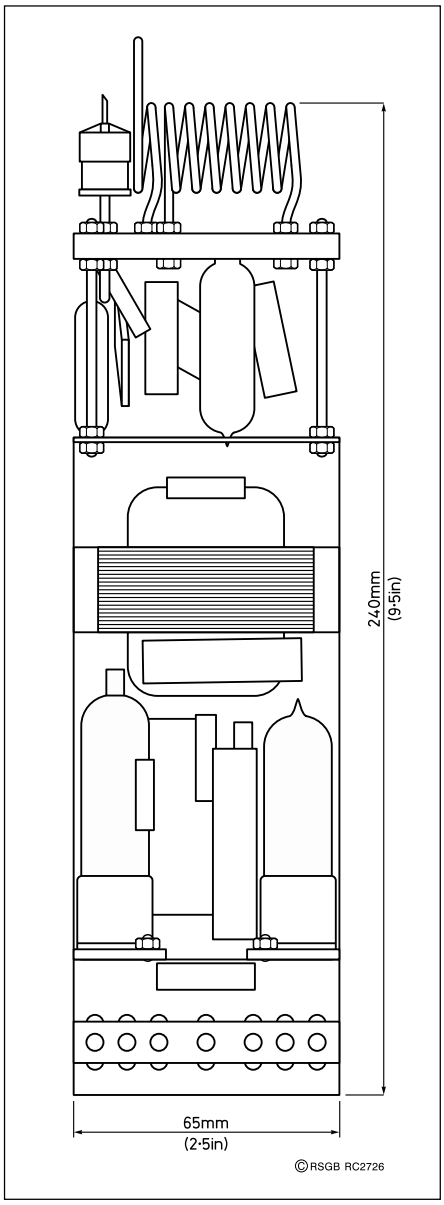

Fig 4: Layout of the VHF Radio Pick-Up unit. The oscillator unit was built separately and bolted on to the audio section. The Hivac midget oscillator valve was removed from its normal base for improved operation at 104MHz.

be left unattended close (within about 100 yards) to a house in which it was suspected that an illicit transmitter was being used, avoiding the need for continuous human monitoring.

A prototype Panograph was made and final versions constructed by the GPO at Dollis Hill and by RSS. Tests were carried out using a Whaddon Mk VII/2 transmitter (6V6 crystal oscillator with about 7.5W output connected to a 65ft horizontal antenna about 16ft high). A 6ft vertical antenna was used for the superhet receiver. The system seems to have worked satisfactorily during tests at 'Scotswood', despite the need to minimise the effect of a transmitter with 250W output only half-a-mile away. The slow-moving drum made it difficult to record the frequency precisely and errors of up about 200kHz were noted. Again it is not clear from the files whether operational use was ever made of the Panograph.

In co-operation with the GPO Radio Branch, the section also designed and built two mobile D/F and intercept units including recording facilities for investigations outside the scope of the RSS mobile units. However, this caused difficulties between B3 and RSS, and the units were eventually handed over to RSS.

TUNABLE TOROIDS

THERE ARE several advantages given by permeability tuning, not least the virtually-consistent Q throughout the frequency sweep. In the amateur radio field, permeability tuning was exploited by Collins Radio in many of their excellent post-war receivers such as the 75A-series in the 1950s and their later S-line transceivers. Permeability tuning was also used in several car-radio broadcast receivers made by such firms as Radiomobile in the 1950s [and in the excellent Quad hi-fi FM tuners in the 50s and 60s - *Ed*], and commonly in television receivers.

The usual technique was mechanical, moving ferrite or dust-iron cores into and out of fixed inductors. But even then, a few designers took advantage of electrical techniques to change the permeability of the cores by magnetic means. Jack Hardcastle, G3JIR, suggests that it is time to look again at these techniques, both at LF (136kHz) and at HF, and shows how they can be applied to toroid-type cores. He writes:

"The renewed interest in the LF and VLF bands has so far passed me by. Not having acres of garden in which to erect antennas has de-motivated me for building equipment for either 73 or 136kHz. However, I have been intrigued by the particular problems of making tunable circuits at these unfamiliar frequencies. Space considerations rule out the large diameter, multi-tapped inductors and variometers so beloved by our predecessors. Lack of availability rules out very large variable capacitors. So what are the alternatives?

"It seemed to me that the most fruitful avenue to explore was to use relatively-low impedance circuits and to devise some means of varying the inductance. The obvious way to do this is to use a cylindrical coil of wire and to insert a rod of iron dust or ferrite (*à la* ferrite rod antenna). This has indeed been done in the past, notably in the RAF's T1154 transmitter and in the Collins S-line equipment. Both these used a linear motion to control the tuning cores, a technique that is difficult to emulate without considerable mechanical engineering resources. However, it was felt that a rotary motion could be more readily implemented, so tests were carried out using a pair of ferrite E-cores: **Fig 5.**

"So that the variable inductor could be readily tested it was built into a Hartley test oscillator: **Fig 6.** It was found that rotating one E-core through 90 degrees resulted in a change of frequency from 157kHz to 232kHz. I must confess that I never actually made a mechanical drive to perform this rotation, but at its simplest I could visualise it being comprised of an epicyclic slow motion drive with one of the cores cemented to a rod attached to the drive.

"Another, fairly obvious, way of changing the effective permeability of the ferrite cores is to increase the air-gap between them, but there is also a more subtle approach. If an external magnetic field is applied to a ferrite core, it drives the material towards saturation, lowering the permeability as it does so, thereby raising the oscillator frequency.

"The use of an external magnetic field to lower the permeability of ferrite cores is a well documented technique: Pressman and Blewett, '300-4000kHz electrically tuned oscillator', *Proc IRE*, January 1951, pp74-77; M G Scroggie [ex-5FX], 'An unconven-

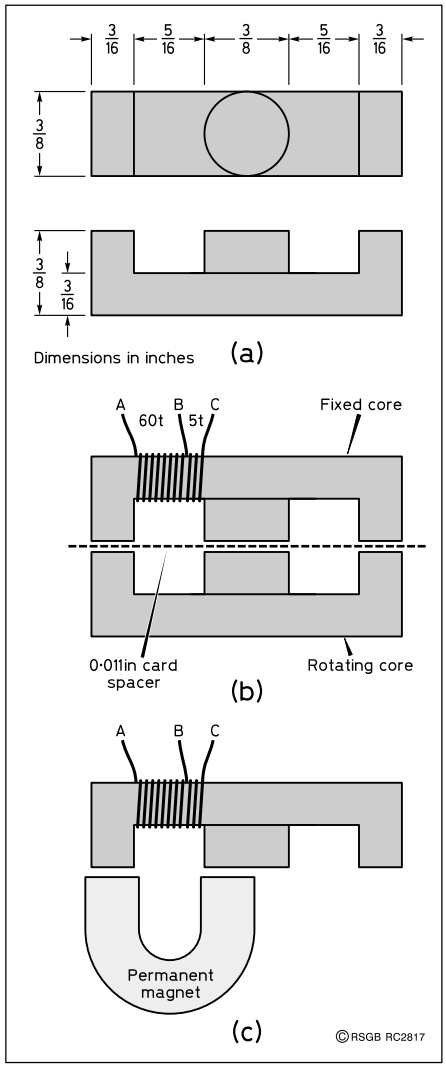

Fig 5: G3JIR's tunable ferrite E-cores. (a) Dimensions of the ferrite E core particularly suitable for low-frequency applications. (b) Assembly of a pair of E-cores in which variable permeability is achieved by rotating one of the cores. (c) How one E-core can be replaced by a permanent magnet.

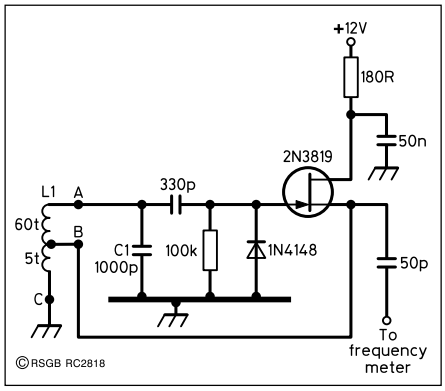

Fig 6: Test oscillator used to measure the frequency range produced with variable permeability achieved by the various methods.

tional FM receiver', *Wireless World*, June 1956, p258; T W G Calvert, 'Ferrites for FM', *Wireless World*, October 1957, p505; A E Ford and J S White, 'An insertion loss display and recording equipment for the frequency range 50kHz to 8MHz', *POEEJ*, October 1960, pp145-50. The technique was used, before semiconductor tuning diodes were available, to make wobbulators and to apply automatic frequency control.

"In all these cases, the magnetic field was produced by an electromagnet so that a swept frequency could be produced. However, for tuning a resonant circuit manually, the same result can be produced using a permanent magnet: **Fig 5(c).** For instance, in the above test circuit, it was found that bringing a strong horseshoe magnet near to one of the E-cores (ie with one core removed), the frequency could be increased from 243kHz to 421kHz.

"It is also possible to use this technique to tune inductors wound on toroids (as noted by M G Scroggie, *op cit*). By applying the magnetic field generated by a relay coil to a coil wound on an FT50-30 ferrite toroid **(Fig 7)**, the oscillator frequency can be swept from 421kHz to 1MHz, when the relay current was increased from zero to 117mA. In practice, it is not normally required to tune over such a wide range, so the system is not as power-hungry as it appears at first glance.

"So what is the significance of this technique to radio amateurs?

- It allows resonant circuits to be tuned over a very wide range, particularly at very low frequencies. This bias towards the low frequency end of the spectrum is a consequence of having to use materials of lower permeability at higher frequency. This limits the potential for reducing the effective permeability by whichever of the above means is used.
- It provides an alternative to a variable capacitor as a means of manual tuning.
- It provides an alternative to a varactor diode as a means of electrical tuning. More speculatively, it may be a means of reducing phase noise in oscillators in synthesisers. Because varactor diodes are also a noise source, any means of eliminating them from a circuit is an advantage to a designer. It remains to be seen whether ferrite materials are a significant source of noise, comparable with that of a varactor".

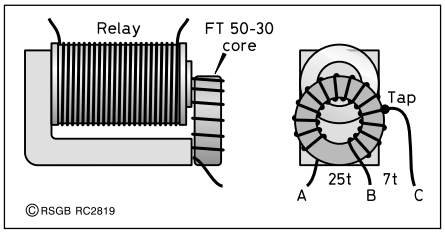

Fig 7: How an electromagnetic relay can be used to vary the permeability of an FT50-30 toroid for MF and HF applications. C1 in Fig 6 = 100pF in this case.

HERE & THERE

APOLOGIES TO a number of readers who have sent along interesting material which, unfortunately, has had to be held over due lack of space.

MICHAEL O'BEIRNE, G8MOB, draws attention to the attractively-priced professional test equipment currently being offered by such firms as Anchor Supplies Ltd of Nottingham (0115 986 4902). He is acquiring a Racal 9475 rubidium frequency standard priced at £155 offering an accuracy of a few parts in 100,000,000,000 at 10MHz with three output sockets at 1MHz.

J ROBERT ASHLEY, a retired university lecturer in electrical engineering, suggests in 'Are Power Lines Unsafe?' (*IEEE Spectrum*, July 2000, pp21-23) that although years of research have not answered this question in terms of magnetic fields, electric fields from about 32-400kV/m need further investigation. He concludes: "When measuring electric fields above 1kV/m, I now intend to wear a type of metallic mesh hot suit to protect myself... I would be personally opposed to my grandchildren attending a school where, in getting to the school building, they would walk in an electric field above 1kV/m… After over 20 years of well-meaning effort, we still do not at all understand the biological effects of exposure to magnetic or electric fields generated by power lines. I think research that continues to look mainly at time- and space-averaged magnetic fields amounts to flogging a dead horse. The real need is for epidemiological studies that use other, to my mind more significant, measures of exposures – the peak intensity of electric fields."

THE LARGEST steerable, single-dish radio telescope ever built has finally been dedicated at Green Bank, West Virginia – and may prove to be the last of these giants ever to be built. Radio astronomers now concentrate more on large arrays of smaller radio-telescopes. The new 110-metre-diameter Green Bank Telescope has a unique reflective dish that sends its collected radio waves to an associated tower offset from the dish, and thus not obstructing the 'view' of the dish. Accuracy of the profile is such that it is hoped the dish will prove usable up to about 100GHz (3mm). An engineering feat, but completed six years behind schedule and millions of dollars over budget. All a very long way from the first ever radio-telescope erected in 1938 in his back yard by an eminent DXer Grote Reber, W9GFZ, and still preserved at the Observatory of which he later became Director.

JOHN ALLISON, G0LYY, was interested in reading the report of G3KSU receiving the local MW broadcast transmitter on headphones alone ('TT' August 2000, pp54-55). He writes: "In 1945-46 I was at the Signal Section at 28 Bomber OTU, Wymeswold (Wellingtons), later 108 Transport OTU (Dakotas). We had one room packed with examples of both British and American airborne equipment. By placing the tip of the standard headset plug on to any metal part in the room, one could hear the BBC Home Service. Rightly or wrongly I put this down to the insulated sections of the plug forming a capacitor which, with the coils in the headphones, produced a tuned circuit. I'd be interested to hear a better explanation."

ACCORDING TO an article 'Radio Blast' by Justine Mullins (*New Scientist*, 19 August 2000, pp34-37) a mathematician, Gerard Foschini, at Bell Laboratories, New Jersey, has come up with an idea that should enable communications engineers to overcome the basic limits to channel capacity formulated 50 years ago by Claude Shannon. Apparently, the idea is to use multiple reflections and digital processing to enable more than one stream of digital information to be transmitted in the same channel. At the receiving site, the small differences in timing resulting from the different reflected paths enable processors to separate out the two streams. The system has been designated BLAST (Bell Labs Layered Space Time). It is claimed that Foschini and his colleagues are now busy turning BLAST from a neat lab trick to a full-blown commercial reality. "Every day our understanding increases," he says, "It has tremendous potential."

HARRY BROOKE, G3GJV, noted the items in the April 2000 and November 1999 regarding the use of a home-made loop in conjunction with an NHS hearing aid to improve reception of amateur signals, television etc, by the hearing-challenged. He writes: "I use a simple method that others may like to try. I use the small earpiece, as supplied with portable radios, placed just behind my hearing aid, which is set in the 'telephone' position. To reduce the size of the earpiece, cut off the projection that normally fits in the ear, and away you go. Only a very low input is required." ♦

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- Two VFOs + memory operation mode
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EJ34U CTCSS £19.95
EJ35U CW filter.....£49.95

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

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  50MHz - 54MHz
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EMS-14

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- Freq. 3.5 - 30MHz *(Min. 3 mtrs wire/whip)*
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- Power 200W PEP
- Fully weatherproof
- Fast automatic matching

An automatic antenna tuner that matches your transceiver to a random wire, mobile whip, vertical, inverted L or dipole antenna.

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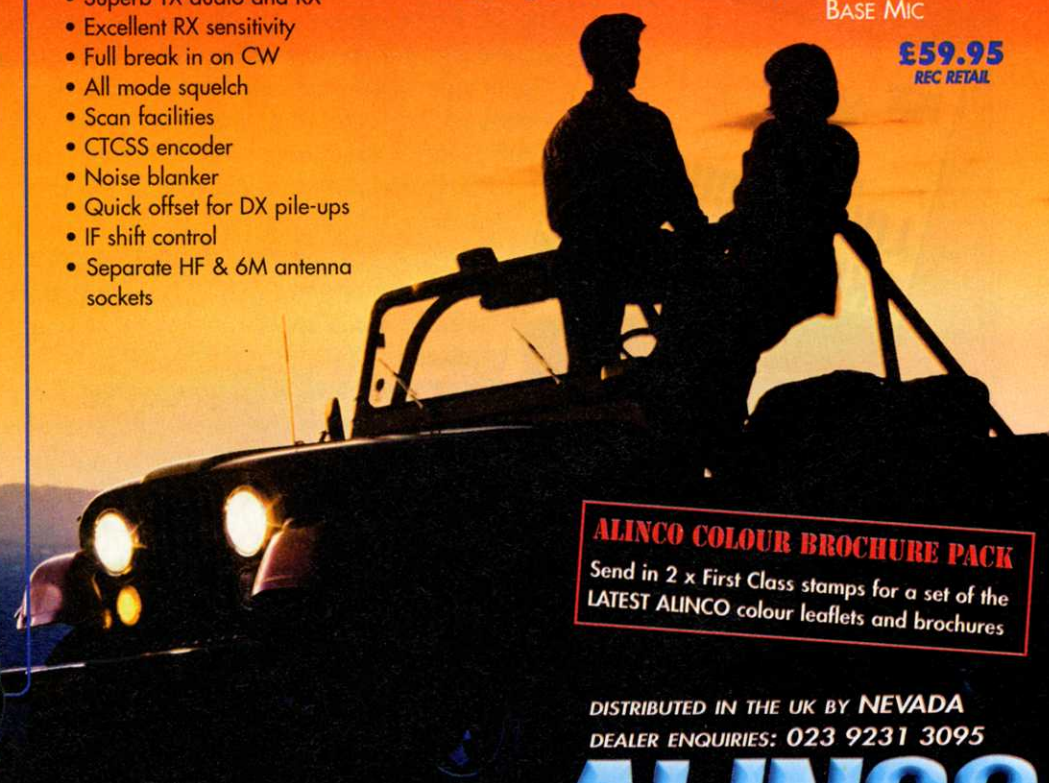

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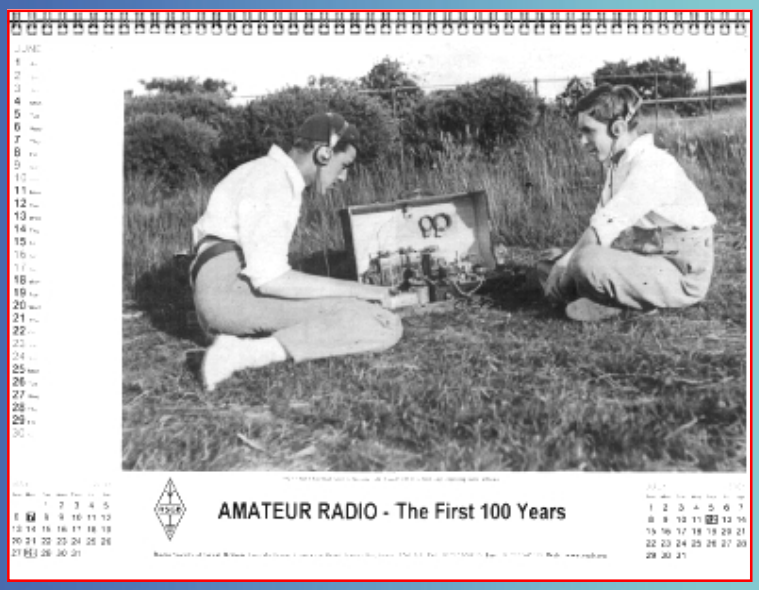

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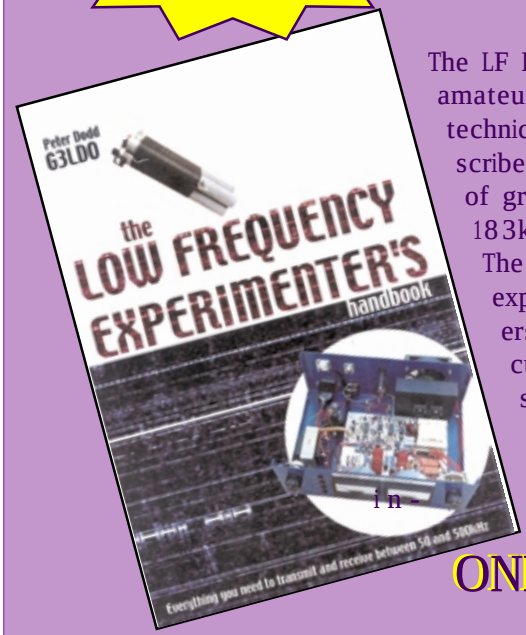

The Low Frequency Experimenter's Handbook

The LF Experimenter's Handbook has been written to meet the needs of amateurs and experimenters who have an interest in low power radio techniques at frequencies below 200kHz. Most of the techniques described are targeted at those using the 136kHz band, but they are also of great interest to readers in New Zealand and Australia with their 183kHz band and the Lowfers in the USA on 180kHz.

The bulk of the material in this book comprises contributions from experimenters world wide and covers antennas, propagation, receivers, transmitters, special modes and test equipment, and also discusses some applications such as communication with caving enthusiasts.

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RSGB Members wishing to place an advertisement in this section must use the official form incorporated on the label carrier of Radio Communication. This will prove membership and must be for the current month. No acknowledgment will be sent. Ads not clearly worded, or which do not comply with these conditions will be returned. If an ad is cancelled no refund will be due. An advertisement longer than 60 words will be charged pro rata. Trade or business ads, even from members, will not be accepted. Traders who wish to use this facility must send a signed declaration that the items for sale are part of, or intended for, their own personal amateur station. The RSGB reserves the right to refuse ads, and accepts no responsibility for errors or omissions, or for the quality of goods for sale or exchange. Each advertisement must be accompanied by the correct remittance, as a credit card payment, cheque or postal order made payable to the Radio Society of Great Britain. Please note that because this is a subsidised service to members, no correspondence can be entered into. Licensed members are asked to use their callsign and QTHR, provided their address in the current edition of the RSGB Yearbook is correct. RS members will have to provide their name and address or telephone number. Please include your town and phone number in the free boxes provided to assist readers. Advertisements will be placed in the first available edition of *RadCom.*

The closing date for copy is the first day of the month prior to publication, eg the deadline for the March issue is 1 February.

Warning: *Members are advised to ensure that the equipment they intend to purchase is not subject to a current hire purchase agreement. The 'purchase' of goods legally owned by a finance company could result in the 'purchaser' losing both the goods and the cash paid.*

FOR SALE

EDDYSTONE 830-7 with plinth speaker, revalved, serviced, man incl, best offer over £200. Prefer buyer inspects or RV by arrangement, due to weight. Jim McGowan, M5AIP. 01708 340 304 (Romford).

FILTERS, one MFJ tunable DSP filter, tunable for Pactor Amtor HF packet CW SSTV/fax etc, £140. One Maplin notch filter full details in Maplins article. 01263 712 372 (Holt). E-mail: deang3fnt@aol.com

HP 54602B 150MHz quad-channel storage oscilloscope as new, cost new over £2500, sell for £1200 ono. Yaesu FT-920 mint cond only 1 year old, all accessories and boxes, will accept £700, no offers. G0SMN. 01782 316 500 eves (Stoke on Trent). E-mail: tonym@tonymckenzie.com

ICOM IC-706MkII with DSP, voice synth, SP-21 speaker, SM-20 mic, OPC-581 separation cable, plus mounting brackets, all boxed as new, selling altogether, £650. Carl, GW0LKA. 01633 615 637 (Newport, Gwent).

ICOM PCR1000 computer rcvr 0.5-1300MHz all modes, DSP module fitted, fully checked Icom UK April 2000, £195. MFJ 969 ATU, £90. Standard C510A dualband h/held, extended receive, £80. All immac cond, boxed, ovno, insured delivery at cost. 01423 874 451 (Harrogate).

NEW surplus equipment. All unused and boxed. Tokya HL-100B 100W HF linear amplifier set for 21/28MHz, but can be altered, £60. Yaesu FL-2235 35W amplifier with charger and PA system, 134/150MHz, £25. 3 VHF h/helds for 2m conversion, £15 each. Yaesu FTH-2009 6-channel, SMC 317L6 6-channel and Midland LMR70-152B 4-channel. G0DFA, QTHR. 01243 586 838 (Bognor Regis). E-mail: dfall@globalnet.co.uk

YAESU FT-757GX tcvr c/w FC-757AT autotuner and FP-757HD heavy duty power pack. All mans and mic. CAT interface, CW auto-keyer built in. Exc cond, £485. Carriage and packing at cost. 0121 453 3111 (Birminham area).

45FT ex-military, portable, sectioned mast, complete, exc cond, £50 ono. G4AZH. 01788 832 985 (Rugby). E-mail: martin.bushnell@which.net

ADMIRALTY wireless h/books 1938 vols 1&2, £20. RS catalogues boxed 1995, £5. Airmec AF sig gen, £15. Telequipment DM64 d/beam scope with probes, £65. Pair of Leak FL12 amplifiers, £75. Leak Trough-Line tuner, £25. Leak Stereo 30 (spares only), £12. G4FZG, QTHR. 01242 256 295 (Cheltenham).

ALTRON CM-35 3-section 35ft tilt-over mast, retracted height 15ft and 35ft extended, c/w head unit, standard post and ground socket and base post. Mast dismantled, buyer collects, £150. 01273 483 333 (Lewes). E-mail: g4owt@btinternet.com

AMERITRON linear amplifier type 811X, 1.8 to 28MHz, £550 ovno, buyer collects. 6m 3-ele beam, unused, boxed, £40. Bob, M0BEU. 01209 843 849 (Redruth).

AOR 8200 Mk2 h/held scanner with case, PC cable, stand and software, 3 months old, worth £500, selling for £320. 01963 370 279 eve (Templecombe). E-mail: littleorchard11a@aol.com

AVAILABLE again due to timewasters. Yaesu FT-1000MPAC, 1998 model, extra filters, MD-100 mic, original packaging, mint cond, £1325 ovno. 01892 662 931 (Crowbridge, Sussex).

BRISTOL QTH exc VHF, UHF, microwave. 3-bed detached open views over common. Mast with full planning, 64ft south-facing rear garden £207,500. View agents wwwhaighandsons.co.uk G1HIA, QTHR. 0117 975 6988 (Bristol).

COLLINS KWM2A tcvr plus 30L1 linear, mans, no mods, exc. Kenwood TS-50 little used, boxed, sensible offers. Simon. 02380 394 912 (Southampton).

COMPLETE radio station, £1800. Going QRT, good reason. FT-847 mint, £1000. PS 30A, £50. Icom SP-21 speaker, £50. MFJ-949E deluxe Versatuner, £100. All boxed, keys, aerials, duplexer, triplexer, switches, cables, plugs, rotators, alloy poles. G0IWB, QTH. No split, buyer collects. 01480 812 966 (Huntingdon).

CUSHCRAFT A4S + 40m add-on kit, £280. Cushcraft A3WS + 30m add-on kit, £250 buyer collects. Kantronics KPC-4, £90 including post. GM0SXQ. 01339 883 366 (Lumphanan).

CUSHCRAFT AP8A – eight-band trapped vertical incl WARC bands, virtually new and originally cost £249 – yours to collect for £150. Exc cond, genuine reason for sale. G3MSV, QTHR. 01395 568 259 eves (Devon). E-mail: pointerman@lineone.net

FAIRHAVEN RD-500 superb all-mode rcvr 0-1750MHz, £525. AR-8200 all-mode scanner 530kHz to 2040MHz, £200. 01852 200 237 (Argyll). E-mail: willy@kilmelford.freeserve.co.uk

FLYAWAY tcvr TW-100 2-30MHz all modes, digital readout, solid state, 125W out, built-in ATU contained in alum case, £600. G3PTN, QTHR. 0113 265 4644 (Leeds). E-mail: zygic@btinternet.com

FT-100 4 months old, hardly used, 2 year warranty, £650 ono. Avair AV-600 SWR meter, £30. Watson 25A PSU, new, £75. 2m 5-ele beam, 6m 3-ele beam, £20 each. 01235 769 596 (Wantage). E-mail: cjcarter1968@hotmail.com

FT-101ZD in superb cond, redundant by acquisition of FT-840. CW filter installed, SP-901 speaker, YD-148 desk mic, h/book, spare new 6146W/12BY7 PA/DVR valves. Moderate careful use, smokeless environment, £320 ovno. Instrument case 19? x 17½ x 10½, suitable linear/rcvr, £30. HAM/INT MM-2 10m/28MHz tcvr, £50. Johnson roller-coaster 35-turns/counter, £20. QQVO3/10, £5 each. QQVO3/20A £7.50 each, QQVO6/40 £10 each, new stock. All plus carriage, at cost. 01242 524 217 (Cheltenham).

FT-102 FM board, SSB filters, modified amtor etc, plus FC-102 ATU with relay pack, FF-501 low pass filter and stand mic, boxed, £425. ST-5 and Toni-Tuna, £45. Kantronics KAM version 6 and h/books, perfect, £105. Maplin notch filter, £15. Lowe absorption meter, new, £15. Leader ATU 80-10m, 250W, £60. Maplin analogue multi-meter as new, £20. SRB-4 satellite rcvr squarial, offers. 0117 964 0665 (Bristol). E-mail: garybooth@onetel.net.uk

FT-107 HF tcvr all-band 100W, FP-107 PSU, FTV-107 transverter fitted 2m, all vgc, boxed with mans £350. Call after 6pm. 01757 212 441 (Selby).

FT-736 6/2/70, vgc, £750. Paul. 01920 871 639 (Ware).

HF tcvr, Kenwood TS-530S all-band exc cond, clean non-smoker rig, matching mic, man, circuits, full output power, digital readout, collect, £200. 01789 297 158 (Stratford Upon Avon). E-mail: dex@g4abs/worlonline.co.uk

HP Draftpro A1 plotter, gc, £200. Roland DPX2000 flat-bed plotter c/w stand, £250. Houston Instruments DP60 plotter, £200. G1RLD. 01386 793 175 (Inkberrow). E-mail: dgrb@aol.com

HUNTER linear amplifier, new 3-500ZG with soft start, recently aligned by Linear Amp UK, with spec sheets, £500 ono. 01708 373 366 (Hornchurch, Essex). E-mail: martin.foster@itn.co.uk

IC-735 wasted in my shack, £350, gc, needs a good home. Ian, QTHR. 01530 244 078 (Leicester). E-mail: ian.teager@virgin.net

ICOM 211E all-mode 2m tcvr, £115. Icom 451E all-mode 70cm tcvr, £115. 01435 883 248 (Heathfield, Sussex). E-mail: brian@g3gsi.freeserve.co.uk

ICOM IC-271H 2m 100W base station. Good contest rig, as new cond, boxed, £350. Grant, G4ILI, QTHR. 01452 855 339 (Cheltenham). E-mail: cratch@lineone.net

ICOM IC-735 owners mobile/mount never used, £15. IC-EX 243 electronic keyer, £35. Kenwood TM-732 dualbander extended receive, exc cond, 12.5kHz, £245. BNOS 2m 10-100W linear, FM/SSB switched, pre-amp, output LEDs, £95. Tokyo Hi-power 70cm linear, switchable GaAsFET preamp, 60W, £85. Transverter MMT 144/28MHz all mode, 10W, £45. 70cm 19-element Tonna, £30. Icom IC-740 all-mode HF tcvr, exc rcvr, £395. Masthead antenna switch, £10. Generator to mains, safety switch, silver plated contacts, £25.Icom rubber duck VHF/UHF, £10.Wanted Icom-SP20 fitted speaker. KW-107 supermatch ATU, 10/15/20/40/80, in-built dummy load Ez-match SWR/Watt meter, operating instructions, £95. Microset VUR-30 dual band linear for h/portables, input 1-5W, out 35W, GaAsFET preamp, all-mode SSB/FM with info, £135. Kenwood TM-733, never used dual bander, £395. Icom IC-PS15 PSU boxed, man, £95. Astatic USA Hi-Z dynamic two 10DA-L mic heads, one T-UG9 disk stand 300-3000Hz, SSB response, £35. Cushcraft R7000 spare traps just £40. SSB electronics mast head pre amp 12V switch, 'N' types, info, £25. Densei DM-307P pre amplified mic, £10. Icom IC-SM5 desk mic Electret mic, £35. Cushcraft 2m conversion changing Ringo 2 x ? to 3 x ?, increasing gain, £10. KW-101 HF/SWR meter, forward/reflected switch, £20. AEC-50A 2m power SWR meter, 100W, £20. Icom IC-7000 all mode scanner, £475. 2m rubber duck, £7.50. Cushcraft R-7000 traps spare set (4) traps only, £40. 70cm 9-ele beam, £15. Jaybeam 70cm 4 stacked dipoles, as new, info sheet, ideal repeater etc, £150. Icom IC-PS 15 PSU, boxed, £95. Station wave monitor scope, SSB CW AM (like Trio), £175. HF low pass filter to 30MHz, £15. 01328 710 641 (North Norfolk).

ICOM IC-746 virtually unused, boxed, complete, £895. Icom IC-290E 2m multi mode mobile, boxed, immac, £195. Postage at cost. G4RNI. 0191 438 4066 (Gateshead). E-mail: nordsee@ntlworld.com or nordsee220@ntlworld.com

ICOM ICB-1050 10m FM, working, untested: Pye Europa x2, Pye Cambridge x2, Stornophone 700, Maxcom 4E, £100 the lot. 01383 410 405 (Inverkeithing, Fife). E-mail: russell_whitworth@hotmail.com

ICOM T81E quad-band handie, as new, boxed etc, £200 or exchange, cash either way, for HF rig. G0TCX. 01952 415 451 (Telford). E-mail: xtc99@madasafish.com

INDEX Labs QRP-Plus, HF bands, SSB/CW 5W tcvr, £275. Like new, original box. GM3JKS, QTHR. 01465 821 128 (nr Newton Stewart). E-mail: frank@knockycoid.demon.co.uk

JRC NRD-535 boxed, Lowe-modified RTTY ECSS, £800. 02380 452 782 (Southampton).

KANTRONICS KPC-9612 dual-port dual-speed packet modem (TNC), new, unused, but no instructions, hence £50. PK-232MBX, latest firmware, leads, man, £100. 01243 586 838 (Bognor Regis). E-mail: dfall@globalnet.co.uk

KENWOOD 742 6/2/70 three-band mobile, new, boxed, £395. Kenwood 751 2m multimode mobile, £250. Collect or carriage extra. 01276 475 338 (Bagshot). E-mail: pfhutchinson@x-stream.co.uk

KENWOOD 850SAT, exc cond, hardly used, been checked by reputable firm, nothing needed doing, c/w mans, boxed, £650. 01306 887 057 (Dorking).

KENWOOD MC-60a desk mic, mint, £60 c/w box/man. Kent straight key £18. Datong auto/RF speech processor, £20 mint. Alan. 07759 821 742 (Plymouth). E-mail: alhart@portables1.ngfl.gov.uk

KENWOOD TS-140S, PS-33 PSU, MFJ-949E ATU, MFJ-1796 6-band vertical, unused, all mint, boxed, could split, £700. Yaesu FT-290R Mk2 mint, unused, £220. 01454 416 979 eve, w/ends (Thornbury).

KENWOOD TS-50, w/s man, gc, £400. ADI 200 handie, £80. ADI 400 handie, £80. Trio 2400 handie with mains stand, £80. Nevada roller-coaster ATU, 1kW, £100. Marconi sig gen No18, £50. VTVM TF 2604, £25. Deviation set TF-934, £50. Cossor scope CDU-150, 35MHz, £40. Realistic Scanner Pro 26, 1.3GHz, £100. G1OPZ, QTHR. 01373 834 483 (Frome).

KENWOOD TS-520S + digital readout, external VFO 520. Microwave Modules transverter 28/144MHz. All vgc, £225 ono. 01482 667 630 (North Humberside).

KENWOOD TS-530S, £200. Kenwood 70cm-30W TM-441E, £150. Kantronics KPC-3, £80 ono. 486 PC ideal for packet, £70. 486 PC 2xHDD Windows 95, £100. AEA PK88 TNC, £80. 30ft tilt-over mast, £150. Daiwa cross-needle meter, £25. 70cm colinear, £25. Pump up mast, £80 (pneumatic). Star LC dot-matrix printer, £30. Baycom modem, £30. AKD 7003 (70cm), £100 ono. Various CB's 2/7/81. Yaesu FT-102, £175. Homebrew 2-tone oscillator, £10 gwo. Fred, G4VVQ, QTHR. 01245 233 566 (nr Chelmsford). E-mail: rushead@lineone.net

KENWOOD TS-530SP, hambands, WARC, dig-display, pristine 2.8 & 1.8 filters, operating & workshop mans, £230 includes delivery charge. MFJ-259B HF/VHF SWR analyser 1.8 to 170MHz, £160, includes delivery. Phone evenings only. 01435 864 803 (Heathfield). E-mail: g4awj@thersgb.net

KENWOOD TS-830S tcvr, AT-230 tuner, SP-230 speaker, MC-50 mic, DFC-230 frequency controller, exc cond, £350. G4ORD, QTHR. 01384 257 798 (Dudley).

KENWOOD TS-850SAT tcvr 1.8kHz SSB filter fitted, £750. DSP-100 sig proc unit, £250. PS-52 PSU, £100. All three items, £1000. Ext speaker SP-31, £40. Desk mic MC-85, £70. All boxed, c/w mans and cables. Purchaser collects or pays carriage. G0SWF, QTHR. 01202 821 813 (Verwood).

KENWOOD TS-850SAT with PSU, very little use, £650. Kenwood TL-922 linear exc cond, £700. Kenwood TS-680S exc cond, £450. Verticals: GAP as new, £300; HF5, £75; WARC 3-band, £50; HF3 10-15-20, £50. All gwo, ono, delivery possible. 01865 371 670 (Oxford). E-mail: boblimehouse@lucent.com

KENWOOD TS-850SAT, exc, boxed, mic, mans, leads, plugs as originally supplied, little used, £700. Barry, GM4GIF. 01436 678 646 (Helensburgh).

KENWOOD TS-870 plus Palstar 30A PSU, immac cond, prefer buyer inspects and collects, £900. DX7 vertical, £120. G4OER. 01673 849 470 (Market Rasen).

KENWOOD TW-4000A 2m/70cm dualband tcvr, FM toneburst, adjusted 12.5kHz, base or mobile, h/book + bracket for mobile, £150 + postage. Peter. 01723 355 071 (Scarborough).

MARCONI Transocean SSB WT/RT transmitter 400W, c/w 24V inverter, rejector unit, all mans, h/set. All solid state except PA, £350 ono. Collins KWT6 HF radio system, c/w mans, 1kW HF 1.5-31MHz tcvr rack-mounted, £750 ono. Drake R4B + T4XB with MS4 + HB PSU, works well, £300 ono. All items carriage extra. Peter. 01642 289 093 after 6pm (Middlesborough). E-mail: g4hsb@grecobrothers.co.uk

MILITARY valve radios, Russian 19 set c/w faulty PSU, phones and cords, £100. WS3B c/w canvas satchels, £100. C12 complete station, excluding ATU, £125. C13 complete station with ATU and mounting brackets, £300. After 7pm or w/ends, Chas. 01775 766 398 (Spalding).

MOVING house. (1) Acom 2000A linear amplifier, automatic tuning, approx 50 hours standby, less than 10 hours on transmit, £2600, ie £1000 off new price. (2) Cushcraft X7 beam 2 yrs old, will assist with dismantling, £299. (3) 90ft galvanised tower in 9 sections, vgc, £350. (4) 55ft tilt-over mast in 10ft sections and one of 15ft, new HD guy ropes tensioners, shackles, etc. 2 sets, will

CONGRATULATIONS

To the following whom our records show as having reached fifty or sixty years' continuous RSGB membership this month:

50 years		*60 years*	
G3DXJ	Mr T H Holbert	G3GRO	Mr D Atter
G3GWR	Mr A G Stormont		
G3HES	Mr K G Pugh		
G3JTI	Mr FWJ Broomfield		
GD3HDL	Dr S E Kelly		

stand any storm, £350. (5) 45ft extendable mast in 3 sections, currently mounted on top of item 4 above separate ground post, £250. (6) Variacs 20A movements in case, no knobs, hence £50 each. Ditto 15A £35 each. (7) 2 M7 2m 13-ele beams and matching network and cables used on test only and stored inside, as new, £250. (8) Light duty rotor and cable, £175. (9) Heavy duty rotor, Tail Twister, as new, £380. (10) MFJ 3 kW rated Versatuner unused, £250. (11) Racal UHF freq meter type 9917, £45. (12) Hewlett-Packard 431C power meter with probe, £55. (13) Telequipment scope D1011, double beam, £85. (14) Textronix 547 + 3 for spares, £75. (15) Telonic Inst Sweep Gen model 2003, 100 to 500MHz and 800 to 1500MHz, currently using item 13 as readout instrument, £195. (16) Polyscope IV SWOB-4 with workshop man, some work needed, hence £95. (17) Various old radios to clear, £5 each. (18) Ski exercise machine, new, never used, £100, cost £275. (19) Semi-professional photographic equipment, several backdrop screens, 2 mains-powered flash heads and stands, light meter, umbrellas, Canon T90 camera with 70-210mm zoom lens, tripod etc, the lot, £450. (20) His Master's Voice automatic 1 gramophone, with two sound boxes, electric motor for turntable and record-changing mechanisms, 42½in wide. Similar listed in Lyle antique catalogue 1996 page 584, hammer price at Christie's 1995, £2090 to good home. Regret due to time limit I can only assist with dismantling of masts etc, and load onto transport, but not pack many parcels. Professional transport is available at reasonable prices. GW0ALR, Carmarthen (near end of M4 motorway). Mobile until end Nov. 07970 212 020, tel 01267 222 445 & fax. 01267 234 113 (Carmarthen).

NATIONAL NC-303 amateur band rcvr, gc, £175. MFJ-989C ATU, new, £180. KW Viceroy SSB 80W AM 40W transmitter, complete, instruction books, gc, £75. Datong FL-3 multimode filter, £40. Yaesu ATU FC-420, new and complete, £40. G0AQH. 01273 454 108 (Brighton).

P60 Versatower, fully dismantled with AR40 rotator, control unit and mast bearing, cubical quad antenna for 20 15 and 10 with boom, £450. G4FCA. 01886 880 335 (nr Malvern).

QTH for sale, very good to USA etc on HF and 6m. Detached three bedroom country cottage near Bangor, Gwynedd, £79,950 ono. Chris, GW4BZD. 01248 602 244. (Bangor, Gwynedd). E-mail: gmbarnes@globalnet.co.uk

RACAL frequency meter 9915H, £200. T2X Tailtwister, £350. Diamond SX100 SWR meter, £90. Slow start mod-kit for TL-922, £25. Ditto kit SB220. Heil HM-10 cable with stand, £12. Top section Versatower, £35. Ditto, £30. Collins remote control with fittings, £15. Aluminium tubes new, phone details. Tubes 4X150A, transformer 1kW 110-230V + 5-5V, new. MFJ-259 analyser, £200. All perfect, age demands sale. 01386 41951 (Evesham).

RACAL MA1966 antenna rotator interface unit, £60. Racal RA17 HF rcvr with man, £150. Racal RA117 HF rcvr, mint cond with man, £475. Plessey PV14C rcvr multicoupler, £50. Nigel, G0UGD. 01323 486 822 (H), 01327 357 824 (W). (Eastbourne).

RACAL RA17, £150. Yaesu FT-101, £150, vgc. Yaesu FT-757GX, £300 exc. Hamm rotator, £80 good. 023 8086 8426 (Southampton).

REALISTIC DX-200 rcvr, £30. Tektronix scope 533A, £20. Philips M3230, £20. Eagle 4 Jason sine square gens, £10 each. Muirhead audio freq analyser, £20. AVO component comparator, £20. Sony all-transistor TV, £20. Memotech computer MTX512, £10. Ferguson monitor, £5. Pair speakers, £5. TV 12in, £15. 020 374 9070 (London).

RECEIVERS Icom IC-R70, £240. Yaesu FRG-8800 plus VHF, £250. Carriage paid. G3JAX, QTHR. 01243 574210 (Bosham). E-mail: metcomm@msn.com

SHACK clearance - new 086 computers, 486SX25, BBC Master, BBC B, ZX81, RF generator, inductor, modems, auto ATU, phone for list, buyer collects. 020 8851 7266 (Eltham).

SHACK clearance, phone, e-mail for detailed list, many bargains rcvrs, tcvrs, PMR, transverters, test equipment etc. 01473 314 151 (Ipswich). E-mail: julien@pjiredale.freeserve.co.uk

SILENT key sale, G0FMH, remaining items. Yaesu FT-203, £30. Delcom 6010, £30, both adjusted deviation. PK-232MBX, £180. 6146B,s £8. G0RYR. 01285 655 613 (Cirencester). E-mail: tim@ballinger9.freeserve.co.uk

SILENT key sale. Trio 940S, £450. SM-220, £20. SP-930, £35. LF 30A, £20. HP 201 SWR meter, £40. HS-5 no PHS, £10. MC-60 KNO, £30 MC-55 (6P), £15. All-wave AVO, £20. CapCo magnetic loop 80-40 LF loop, loop 20-10 HF loop controller box, £150. ISO loop, £150 MMS 2 Morse sender, £25. KNO PS-20, £15. G3WKF, QTHR. (St. Austell). E-mail: g3wkf@aol.com

SONY ICF-2001D FM/LW/MF/SW PLL synthesized rcvr, exc portable HF, sideband, 32 memories, man, £135. Yaesu FT-470 dual-band 2m/70cm h/held tcvr, £125. R1155A rcvr with internal mains PSU, £70. WS 62 Set MkII, with some spares, £75. WS 19 Set MkII with 12V power unit, £85. BBC 'B' computer, disc drive, joystick, programmes, £60 Vaga-Taxan dot-matrix printer, £25. Advance Electronics sig gen 100kHz-100MHz, £60. Advance OS-240 oscilloscope, £50. 020 8393 9691 (Epsom, Surrey).

STRUMECH BP-60 heavy duty 60ft (16m) Versatower with antenna bearing and coax brackets etc, base-mounted factory-painted green; assembled but never used; delivered cost was £1346 - todays value £1900, in exc cond, buyer dismantles and removes, £750 ono. Photographs available. 01706 211 339 (Rawtenstall, Lancs).

TRIO TR-9000 all-mode 2m tcvr, gc, boxed, £100. Trio R-1000 rcvr, gc, boxed, £50. 01252 870 861 (Yateley). E-mail: mick.pawley@lineone.net

TS-830 HF WARC bands, man, mic, £250. Azden PC-5000 2m FM mobile, 5-25W, mic, man, boxed, £65. 024 7672 1930 (Coventry). E-mail: pjsolman3@ntlworld.com

VARIOUS Pye PMR mans. Ring for list, £5 each. Tait T375 rcvr, £80. Schlumberger Stabilock 4011 test set, offers. 01354 741 168 (March, Cambs).

VHF QRT. FT-8100 dualband 2m/70cm tcvr, 50W FM, £275. Tiny-2 packet TNC, £100. DCI 2m bandpass filter, £60. Diamond X-300 2m/70cm fibreglass colinear 3.1m overall, £75. All exc cond with mans, cables, boxes, extras, plus postage. Offers. Ian, GM3LGU, QTHR. 01620 825 639 (Haddington). E-mail: rpryd@netscapeonline.co.uk

YAESU FT-100, five months old, boxed, man, little used, perfect cond, extra power lead. 01460 73315 (Crewkerne). E-mail: nixona35@yahoo.com

YAESU FT-726R 2m/6m base tcvr virtually unused, fitted extras. Alinco DX-70TH HF/6m boxed as new. Looking for £450 each. 01383 721 523 (Dunfermline). E-mail: j.hilton1@ntlworld.com

YAESU FT-847 as new, boxed £850. Yaesu FT-730R 70cm FM, £80. Wanted BNOS 180W 2m linear amp. 01204 697 023 (Bolton). E-mail: g0mrl@ic24.net

YAESU FT-900 general coverage rcvr, internal ATU, Collins filter, mint cond, £595. Also MD-100 desk mic, £65. 01702 540 023 (Southend). E-mail: dpolli2712@aol.com

YAESU FT-901 HF tcvr, £225 ono. FT-290 Mk1 all mode tcvr, £125 ono. Revex W570 1.6-1300MHz SWR/power meter, £75 ono. Epson photo PC-600 digital colour camera including software, leads & man, £185 ono. Black Star meter 600 5-600MHz frequency counter, £50. Daiwa PS 140 II PSU, £25. 01473 425 798 (Ipswich).

YAESU VX2-R dual band 2m/70cm miniature h/held tcvr, boxed with man and charger, as new, £115. Shaun, G8VPG. 01225 873 098 (Bristol).

WANTED

CRYSTAL sets and early valve radios wanted: all old equipment, valves, etc is of interest. Jim, G4ERU, QTHR. 01202 510 400 (Bournemouth).

PANDA Cub AM transmitter, also AR88 LF tuning dial. Peter. 0161 743 9544 or 0161 629 9498 (Swinton). E-mail: peter.nilan@btinternet.com

WANTED HF tcvr – QRP rig considered. What do you have? G8GYB, QTHR. 01580 892 637 (Staplehurst). E-mail: robin@vesma.com

AR88 mains transformer wanted. Alvin, M0BRX/G6DTW. 01372 277 945 (Ashtead). E-mail: a.challen@onmail.co.uk

AUTOMATIC antenna tuner AT-850 for Kenwood TS-850. (Lincoln). E-mail: matthew.coulter@btinternet.com

COLLECTOR of WWII airborne radio and radar, seeking units containing magnetrons, waveguides, complete or parts. £100 offered for good examples of TR3151, TR3159, TR3191, TR3523, TR3529, TR3530, TR3548, TR3555. Keith Strong. 01784 253 990 (Ashford, Middx). E-mail: cstrong@cix.co.uk

FT-980 wanted in (almost) any cond for spares. Phil, G0HSS. (Hitchin). E-mail: philhss@breathemail.net

HALLICRAFTERS SX28A or SX28 valve rcvr, preferably unmodified, in gc. Will exchange also. 0208 505 7207 (Essex). E-mail: petereperera@aol.com

HANDBOOK or copy for Trio Kenwood 2400. Costs covered if copied; also FP-700 NV-26D. G6PVA. 0121 604 8056 (Solihull, Birmingham).

ICOM IC-737 or IC-738 or IC736 wanted. Must be in as new cond. John, G0SDF, QTHR. 020 8397 7931 eve (Chessington). E-mail: john@homebrew.free-online.co.uk

MARCONI HR-101 (Eddystone 910), Mimco 3873A (Eddystone EM34), Eddystone 960, any cond, need not be working. 01686 630 255. (Montgomery). E-mail: forwyn@aol.com

OPERATING manual for Trio TR-9130 2m all-mode tcvr or photocopy. All expenses paid. James, G4NAA, QTHR. 01642 318 449 (Middlesborough).

PAIR of audio output transformers for push-pull valve operation. Minimum 20W rating. G3WCE, QTHR. 01603 250 910 (Norwich).

PAIR of good-quality audio output transformers for push/pull valve operation, 20W rating or more. G3WCE, QTHR. 01603 250 910 (Norwich).

PLESSEY ICs - one each of SL610C, SL640C, SL622C, please contact with your price. Derek, G0VCB, QTHR. 01327 352 865 eves (nr Towcester). E-mail: 100775.2164@compuserve.com

RACAL battery box for Syncal30 TRA931 manpack. Your price paid. Can arrange collection. Stuart. 0161 973 8876 (Manchester). E-mail: stuart.furbank@btinternet.com

SILENT key clearout or just not needed, wanted for research project, QSL accumulations, old call books etc, can collect. 0113 269 3892 (Leeds). E-mail: g4uzn@qsl.net

SKANTI AC power supply unit P8250. 01851 810 241 day (Isle of Lewis). E-mail: donmor@madasafish.com

WANTED CW filters (2 off) for FT-101ZD, reasonable price paid, Robert B Kerr, GM4FDT. 01349 852 332 (Invergordon).

YAESU FT-767GX with extra modules or any other make of base tcvr with HF and 6m bands. 0191 567 0257 (Sunderland).

EXCHANGE

CUSHCRAFT AV4 vertical aerial, 40m to 10m, sell or p/exchange. Require HF beam 20m or tri-band three- or four-elements. 01570 422 425 (Lampeter). E-mail: eric.fedw@cwcom.net

OLD *RadCom* magazine collectors' attention please. *T&R Bulletin* July 1925 to December 1935, odd issues any cond. Many duplicates available of later *RadComs SWMs* etc. Send me your wanted list. Also prepared to start a collectors' net on 80m. Harry, G3NGX. 01491 872 919 (Reading).

Club NEWS

APPLEDORE & DARC

11, Christmas Party. Brian, 01237 473 251.

BANGOR & DARS

6, Talk 'Old Bangor', by Ian Wilson. Mike, GI4XSF, 028 4277 2383.

BARRY ARS

5, Video Presentation - to be announced; 12, On the air and Morse code practice; 1, Christmas Buffet at Sully Sports & Leisure Club. Tickets from Brian, GW3WBU. Rich, GW4BVJ, 01656 658 830.

BLACKMORE VALE ARS

5, Talk 'Air Ambulance', by Irvin Morris; 12, Quiz; 19, On-the-air night & CW class. Tony, G0GFL, 01258 860 741.

BRACKNELL ARC

13, Christmas Cracker Quiz. Baugh@compuserve.com

BRAINTREE & DARS

4, Christmas Party; 18, Results of the G3PEN Construction & BARSCOM Front Cover competitions. Keith, M0CLO, 01376 347 736.

BRISTOL RSGB GROUP

11, Grand Christmas Party. Martyn, G3RFX, 0117 973 6419.

BROMSGROVE ARS

12, Night on the air; 19, Drink and chat in Lickey End Social Club Lounge. B Taylor, G0TPG, 01527 542 266.

CAMBRIDGE & DARC

15, Christmas Club Party. Bob, G0GVZ, 01223 413 401.

CHELMSFORD ARS

5, Visit by RSGB President - Don Beattie, G3OZF; 7, Christmas Dinner at The Beehive, Great Waltham. David Bradley, M0BQC, 01245 602 838.

CHESHUNT & DARC

6, Members' Forum. David, M1DGS, 01920 463 746.

CHESTER & DRS

12, Christmas Social; 19, Construction Contest. Bob, G4CMI, 01244 378 699.

CHICHESTER & DARC

5, Christmas Party; 19, Free

evening. Graham, G0WSD, 01243 788 292.

CORNISH RAC

7, Christmas Party at Perranwell Football Club. Robin, G0MYR, 01209 820 118.

COULSDON AMATEUR TRANSMITTING SOCIETY

11, Annual General Meeting. Steve, G7SYO, 01737 354 271.

COVENTRY ARS

1, Talk 'Frequency Management', by Paul, G4IEV; 8, Night on the air, Novice class, CW practice; 15, Christmas Social; 22, Night on the air, Novice class, CW practice; 29, Christmas Open Evening. John, G8SEQ, 024 7627 3190.

CRAY VALLEY RS

7, Mince Pie Night; 21, Christmas Meal. Bob, BRS32525, 020 8265 7735 after 8pm & weekends.

DENBY DALE (PIE HALL) ARS

6, Talk 'Ale, Rail and Radio', by Roy Benbow; 20, Christmas Party. Tony, G4LLZ, 01484 318 750.

DERBY & DARS

6, Junk sale; 20, Christmas Social in the club room. Martin, G3SZJ, 01332 556 875.

DORKING & DISTRICT RS

1, Annual Dinner. Venue TBA; 19, Christmas Social. John, G3AEZ, 01306 631 236.

DUNDEE ARC

12, Lecture - 'Operation Overlord - The Enigma Connection Allied Invasion of North West Europe', by Kennedy McConnell CEng, FIEE. Donald, GM0PIV, 01382 455 771.

ECHELFORD ARS

14, Christmas Party. Robin, G3TDR, 01784 456 513.

FAREHAM & DARS

6, Talk 'Signal Generators', by Andrew, G0AMS; 13, Night on the air; 2, Mince pies and five-minute talks. Steve, G7HEP, 01329 663 673.

FARNBOROUGH & DARS

13, Film. Norman, G0VYR, 01483 835 320.

FELIXSTOWE & DARS

3, December Fixed & AFS Contest; 4, RAE; 11, Christmas Video & Mince Pies. Paul, G4YQC, 01394 273 507.

GLOUCESTER AR & ES

4, RF analyser demonstration; 11, On the Air - 160/80 metres; 18, Christmas buffet. Tony, 01452 618 930, office hours.

GOOLE RES

1, Christmas Lecture at the Courtyard Centre, Goole; 8, Winter junk sale at the Courtyard Centre; 15, Christmas Dinner at the Barnes Wallis Inn; 22, Christmas raffle and fund raising night at the Barnes Wallis Inn; 29, GRES 'Big Night Out' from 8pm at the Barnes Wallis In; Richard, G0GLZ, 07867 862 169.

GREAT YARMOUTH RC

8, Christmas Party. Tony, G3NHU, 01493 721 173.

GRIMSBY AR

7, Party Night; 14, RoPoCo Contest on 2 metres; Brian, G4DXB.

HALIFAX & DARS

19, Christmas Buffet and Quiz. Ray, G0PMU, 01274 600 297.

HAMBLETON ARS

13, Club Social Evening. John, G0VXH, 01845 537 547.

HARWICH AMATEUR RADIO INTEREST GROUP

13, Annual General Meeting and Christmas Party with Quiz. Eugene, G4FTP, 01206 826 633.

HODDESDON RC

5, Morse tuition and Open Forum evening; 19, Christmas Social. Don, G3JNJ, 020 8292 3678.

HORNDEAN & DARC

5, Club Social Evening (and mince pies!). Stuart, G0FYX, 023 9247 2846.

HORNSEA ARS

6, QRP, G0DEB; 13, Antenna Farm prep, G4YTV; 20, Party. John, G0TPS, 01964 562 258.

HORSHAM ARC

7, Annual General Meeting. David, G4JHI, 01403 750 228.

HULL & DARS

1, Talk by G1WTP. Jonathon, G7DBL, 01482 493 425 or 07867 880 402.

ITCHEN VALLEY ARC

8, Yet more Morse Pies with Sheila, G0VNI. Pete, M0CFQ, 023 8034 5052.

KEIGHLEY ARS

7, On the air night; 14, Christmas Buffet and Grand Draw; 21, Talk by Richard Horton on satellite communications; 28, Free & Easy. Ian, M1BGY, 01274 723 951.

KIDDERMINSTER & DARS

5, Christmas Social Evening; 19, Wyre Forest Packet Radio User Group (WyrePAK) discussion meeting with Tony, G1OZB. Phil, G4SPZ, 01299 403 025.

KILMARNOCK & LOUDOUN ARC

12, Bright Sparks Quiz & social evening. Steven, GM4OSS, 01560 483 800.

LEICESTER RS

11, Quarterly Open Meeting; 18, Mince Pies & Sherry. A T Wann, G0TNI, 0116 263 0947.

LEISTON ARC

5, Christmas Dinner. John, G0FSP.

LOTHIANS RS

13, RSGB - Tommy Menzies, GM1GEQ. John, GM7REG.

LOUGHBOROUGH & DARC

5, Computer problems evening; 12, Christmas Fun Quiz; 19, Pre-Christmas drink - Venue TBA. Chris, G1ETZ, 01509 504 319.

LOUGHTON & EPPING FOREST ARS

1, Talk on maps; 15, Christmas Meal. Marc, G0TOC, 07803 023 501.

MAIDENHEAD & DARC

7, Club Quiz & Constructional Contest; 13, Quiz v Bracknell ARC at Bracknell. John, G3TWG, 01628 525 275.

MAIDSTONE YMCA ARS

1, Social evening; 8, RAE - receivers; 14, RAE - transmitters. John, G0RHO, 01622 832 259.

MAXPAK

4, Celebrating Christmas. Ron, G6LRD, 01922 684 496.

MID-CHESHIRE ARS

6, HF on-the-air night; 20, Wine & cheese tasting evening; 25, Christmas net. Mike, G6GAK, 01606 784 795.

MID SUSSEX ARS

1, Christmas Quiz; 15, Season's Greetings Around the World - on-the-air evening. Sue, G6YPY, 01273 845 103.

MID-WARWICKSHIRE ARS

12, Christmas meeting & party. Bernard, M1AUK, 01926 420 913.

MORECAMBE BAY ARS

5, Christmas Meal; 19, Christmas Drink & Seasonal Felicitations. Brian, G0RDH, 01524 424 522.

NORFOLK ARC

6, Night on the air - Construction - Morse Practice; 20, Night on the air - Construction - Morse Practice. John, G0VZD, 01953 604 769.

NORTH BRISTOL ARC

8, Quiz Night; 15, Christmas Party. David, G0GHM, 01275 790 448.

NORTH WAKEFIELD RC

7, On-the-air evening; 14, Construction evening; 21, Ghost stories evening; 28, Do as you please evening. Brian, G4OOC, 01977 790 396.

NORTH WALES RRC

14, Last Supper - wine and food. Ted, GW0DSJ, 01745 336 939.

OXFORD & DARS

14, Christmas Buffet & Millennium Christmas Quiz. Dave, G3BLS, 01865 247 311.

PAISLEY (YMCA) ARC

13, Ham fun night. Jim, GM3UWX.

QRZ AR GROUP OF SUSSEX

8, Club quiz evening; 22, Club project evening. Stuart, M0CHW, 01435 863 020.

SILVERTHORN RC

15, End of the Millennium Party - Part 2. David, G0KHC, 020 8504 2831.

SOUTH BRISTOL ARC

13, Christmas Social with Muriel, G4YZR; 20, On-the-air night; 27, Greetings from GX4WAW. Len, G4RZY, 01275 834 282.

SOUTH DORSET RS

6, Christmas mince pies, eyeballs & chinwags. John, M0BQO, 01305 832 057.

SOUTH NOTTS ARC

6, Christmas quiz; 13, On the air HF & VHF; 20, Sherry & mince pie evening; 22, Christmas Dinner - at the Flying Horse, Kegworth; 25, Club Christmas net 1200 on 2m. 01509 672 846.

SOUTHDOWN ARS

4, The boys in blue - Glynn Burton, M0CHO. Glynn, M0CHO, 01323 765 731.

STEVENAGE & DARS

5, Talk 'So You Think You Are Capable', by Ken, M1DDA; 12, Grand Christmas Party. Peter, 2E1CRK, 01462 637 404.

STOCKPORT RADIO SOCIETY

13, Annual General Meeting; 20, The Stockport Radio Society Christmas Party. David, M1ANT, 0161 456 7832.

STRATFORD-UPON-AVON & DRS

11, Team Challenge - Build a Crystal Oscillator; 2, Christmas Greetings on air at 11am. David, G6FEO, 07970 148 204.

SURREY RADIO CONTACT CLUB

4, Christmas talks. Berni, G8TB, 020 8660 7517.

SWANSEA ARS

7, Annual General Meeting in College House followed by a Buffet; 21, SARS Christmas Dinner & social evening. R Williams, GW4HSH, 01792 404 422.

SWINDON & DARC

7, Home Brew PCBs - Deryck, G3YKC; 14, Club Christmas Dinner; 21, Inter-Club Fun Quiz. Den, M0ACM.

TELFORD & DARS

6, On-the-air evening; 13, Christmas Dinner. Usual venue. 20, Real on-the-air evening with mince pies plus! Mike, G3JKX, 01952 299 677.

THORNTON CLEVELEYS ARS

4, Video evening; 11, Auction of Silent Key's equipment; 18, Christmas Party. Jack, G4BFH, jack@duddington.fsnet.co.uk

TORBAY ARS

15, Buffet, quiz, special Christmas meat draw and Christmas draw. Anna, SWL, 07879 840 304.

TROWBRIDGE & DARC

5, Christmas Party & Presentation Night; 19, Farewell 2000. Ian, G0GRI, 01225 864 698 evenings & weekends.

VERULAM ARC

2, RSGB Annual General Meeting at Harrogate Ladies' College; 12, G8VER on 145.350MHz net; 18, Bunfight; 25, G8VER on 145.350MHz net; 31, G8VER on 145.350MHz net. Walter, G3PMF, 01923 262 180.

WAKEFIELD & DARS

5, Rally meeting; 12, Talk 'The RNLI', by G1JQG (with film); 19, Christmas social event. John, G7JTH, 01824 251 822.

WEST SOMERSET ARC

5, Annual quiz. Alan, M0AOJ, 01643 707 207.

WESTON-SUPER-MARE RS

4, Constructors' Competition; 18, Chairman's Christmas Party. Doug, G0WMW, 01934 629 160.

WHITEHAVEN ARC

14, HF night on the air; 21, Christmas quiz & social night. Norman, M0CRM, 01946 692 462.

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 by *RadCom*, *Radio Today* and GB2RS, so information only needs to be sent once.

Club News is a service for clubs and societies affiliated to the RSGB. The announcements are intended to notify non-members and potential members of your club of specific events, therefore 'informal', 'committee meeting', 'natter night' and 'ragchew evening' etc will not be included. Basic, unchanged details about RSGB-affiliated clubs are published annually in the *RSGB Yearbook*.

WIDNES & RUNCORN ARC

1, Annual General Meeting; 15, Christmas fun. Mince pies and hot grog! Martin, G4LUQ, 01928 714 843 or Dave, G1PIX, 01928 591 401.

WORTHING & DARC

6, Discussion evening; 13, Christmas quiz & social night; 2, Club Awards & Party. Roy, G4GPX, 01903 753 893.

Rallies & Events

25 NOVEMBER 2000

ROCHDALE & DARS Traditional Radio Rally – St Vincent de Paul Catholic Church, Caldershaw Road, off A680, approx 2 miles W of Rochdale. Follow orange arrows from M62 jn 20. Note: this is taking place on a Saturday! OT 10.15/10.30am, £1, C. John, G7OAI, 01706 376 204 (evenings).

25/26 NOVEMBER 2000

LONDON Amateur Radio & Computer Show – Lee Valley Leisure Centre, Pickett's Lock Lane, Edmonton N9. OT 10am, £3 (£2.50 concessions), TS, B&B, SIG, CP free, DF, CS, FAM, LB, C, MT (two photos needed). 01923 893 929.

26 NOVEMBER 2000

BISHOP AUCKLAND RAC Rally – Spennymoor Leisure Centre. OT 10.30/11am, £1, (accompanied under-14s free), TI on S22, CP, B&B, C, LB, MT (two photos needed). Mark, G0GFG, 01388 745 353 or Brian, G7OCK, 01388 762 678.

2 DECEMBER 2000

RSGB 74th ANNUAL GENERAL MEETING – Harrogate Ladies' College, North Yorkshire. AGM at 11am – lunch – Open Forum at 2.30pm – evening Dinner. Tickets for the Dinner available by phoning RSGB HQ, 0870 904 7373, ext 11 or 12, or e-mail gm.dept@rsgb.org.uk

21 JANUARY 2001

OLDHAM ARC Rally – Queen Elizabeth Hall, Civic Centre, West Street, Oldham. OP 10.30/11am, TS, B&B, MT (two photos needed), TI on S22, C, LB. Geoff, 01706 846 143.

28 JANUARY 2001

HORNCASTLE Amateur Radio, Electronics & Computer Fair - The Old School, Cagthorpe, Horncastle, Lincolnshire. OT 10.30am, 50p, C, MT (two photos required). 01526 860 320 or 07778 274 535.
LANCASTRIAN Rally - **CANCELLED** for this year only. G0GVA, 01772 621 954.

4 FEBRUARY 2001

SOUTH ESSEX ARS 16th Mobile Rally – The Paddocks, Long Road, Canvey Island (at the southern extremity of the A130). OT 10.30am, C, CP free, DF. Brian, G7IIO, 01268 756 331 or briang7iio@yahoo.com

11 FEBRUARY 2001

10th NORTHERN CROSS Radio Rally - Thornes Park Athletics Stadium, Wakefield, W Yorkshire. Just out of town on the Harbury Road. Easy access from M1 jns 39 and 40 - well signposted. OT 10.30/11am, TI on 2m and 70cm, B&B, MT (two photos required). John, G7JTH, 01924 251 822 or rally@sandalmagna.demon.co.uk or www.sandalmagna.demon.co.uk/rally/
CAMBRIDGE & DARC Radio Rally & Car Boot Sale – New venue: Lordsbridge Arena, Wimpole Road, Barton. M11 jn 12, A603, follow signs. OT 10/10.30am, £1.50 (£1 for OAP/disabled) children free, CP free, C, B&B, CBS under cover, TI on S22. G0GKP, 01954 200 072.
HARWELL ARS Radio & Computer Rally - Didcot Leisure Centre, Mereland Road, Didcot, five miles form the A34. Ann, G8NVI, 01235 816 379 or AnnStevens@compuserve.com

17 FEBRUARY 2001

THE REDDISH RALLY - St Mary's Parish Hall, Reddish, Stockport. OT 10am. John, G4ILA, 0161 477 6702.

25 FEBRUARY 2001

SWANSEA ARS Radio & Computer Show – Swansea Leisure Centre on the A4067 Swansea to Mumbles coast road. OT 10.30am, £1.50, children 50p, TS, B&B, SIG, C LB. Roger, GW4HSH, 01792 404 422.

11 MARCH 2001

WYTHALL RC 16th Annual Radio & Computer Rally - Chris, G0EYO, 0121 246 7267, e/w, or fax 0121 246 7268 or e-mail chris@g0eyo.freeserve.co.uk

18 MARCH 2001

BOURNEMOUTH RS 14th Annual Sale – Olive or Frank, 01202 887 721.
NORBRECK Amateur Radio, Electronics & Computing Exhibition – Peter, G6CGF, 0151 630 5790.

25 MARCH 2001

BARRY ARS Welsh Amateur Radio Exhibition – Brian, 029 2083 2253.

8 APRIL 2001

CAMBRIDGESHIRE REPEATER GROUP Annual Rally - 01462 683 574.

21 APRIL 2001

CORNISH RAC International Marconi Day - Robin, 01209 820 118. Web site www.users.globalnet.co.uk/~straff

21/22 APRIL 2001

LONDON Amateur Radio & Computer Show – Alexandra Palace, Wood Green, N22. New venue! 01923 893 929.

22 APRIL 2001

HARROGATE Radio, Computer & Electronics Rally – Gerald, G0UFI, 01765 640 229 or e-mail g0ufi@qsl.net
YEOVIL 17th QRP CONVENTION – D Bowden, M1WOB, 01935 414 452.

7 MAY 2001

DARTMOOR RC Rally – Ron, G7LLG, 01822 852 586.

13 MAY 2001

THREE COUNTIES Radio & Computer Rally – John, 01527 545 823.

20 MAY 2001

DRAYTON MANOR Radio & Computer Rally - Peter, G6DRN, 0121 443 1189 (evenings).

8 JULY 2001

SUSSEX Amateur Radio & Computer Fair – Ron, G8VEH, 01903 763 978 or 01273 417 756 (office hours).

21 JULY 2001

CORNISH RAC Radio Rally & Computer Fair - Robin, 01209 820 118.

21/22 SEPTEMBER 2001

LEICESTER Amateur Radio Show – Geoff, 01455 823344, fax 01455 828273, or e-mail g4afj@argonet.co.uk

3/4 NOVEMBER 2001

NORTH WALES RRC Rally 2001 – Muriel, GW7NFY, 01745 591 704. Club web page www.nwrrcw.org.uk

KEY

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

SILENT KEYS

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

F5JUD	Mr A Krulls	25/09/00
G0HXX	Mr J N Mackinnon	11/09/00
G0NIB	Mr R Lucking	16/09/00
G0SMV	Mr I C Murray	09/10/00
G1EYL	Mr M S Spurr	06/10/00
G1NNC	Mr GFT Huntley	
G2FDF	Mr W F Limehouse	05/10/00
G2JT	Mr P Jones	20/09/00
G3BOR	Mr D W Hudson	12/10/00
G3GAD	Mr G A Day	23/09/00
G3IBK	Mr TRW Trowbridge	03/09/00
G3IDZ	Mr G Neville	24/08/00
G3NCL	Mr R Ray	16/10/00
G3WWO	Mr B Rose	/08/00
G4KLQ	Mr E A Balley	09/10/00
G4RKQ	Mr B R Mason	
G6EME	Mr I R Dorian	
G7HBJ	Mr D R Stevens	09/06/00
G7JOD	Mr P Pegram	12/10/00
G8VEL	Mr E G Cawkwell	
GM3FAO	Mr A F Davidson	30/09/00
GM4ISY	Mr J Keir	01/09/00
GM7AWY	Mr JHR Bodle	/09/00?
M0AWK	Mr T Suggitt	05/10/00
RS172275	Mr L Beddowes	13/09/00
RS20495	Mr A E Philp	21/09/00

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; 70 = 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.

4 Dec	GB2ACR: Air Cadets Rochester. Wainscott, Kent. LH (G4EVY)
9 Dec	GB2DX: DX. Nr. Ormskirk, Lancs. H (G4NXG)
17 Dec	GB5MC: Morse Campaign. Cambridge. L (G3PJT)
18 Dec	GB2APL: Anvil Point Lighthouse. Swanage, Dorset. LH (G0WZK)

RadCom Helplines FOR MEMBERS

● Max, G3BSK, is searching for the operating manual for a **Yaesu FT-77**, to buy or photocopy. All expenses will be paid. G3BSK, QTHR. Tel: 0121 744 4671.

● John, G0FRO, is looking for information/circuit details on the **Wavetek Signal Generator model 3001**. G0FRO, QTHR. Tel: 01235 832 871.

● Frans, PA3DDN, has a **General Radio RF Bridge type 1606B**, which has noisy initial balance controls. Can anyone advise him? He can be contacted by e-mail (pa3ddn@amsat.org).

● Terry, G0UIO, urgently needs a manual for the **HP LaserJet IID** (with PostScript cartridge), as used in newsletter production. He will cover any expenses. G0UIO, QTHR. Tel: 01223 572 226, or e-mail g0uio@ntlworld.com

● Ivan, G4WIA, is looking for an original **Kenwood box and polystyrene packing for a TS-570**, for safe shipping to the US. He can collect if necessary. G4WIA, QTHR. Tel: 01480 461 331 after 6pm.

● Alan, G3MBL, has a **Kenwood TS-440S** with a faulty notch filter. The control gives a slightly "higher pitch" at each end of its travel. G3MBL, QTHR. Tel: 01284 827 379.

● Jim, G3HJF, is refurbishing an ex-WD **Clarke pump-up mast**, and would like to buy, borrow or photocopy the User Manual. He will reimburse any expenses. G3HJF, not QTHR. Tel: 01452 862 655.

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

CLASSIFIED ADVERTISEMENTS

Classified advertisements 58p per word (VAT inc.) minimum 14 words £8.70. All classified advertisements must be prepaid. Please write clearly. No responsibility accepted for errors. Latest date for acceptance is 1st month prior to publication.

Cheques should be made payable to RSGB. Copy and payment to:

Jan Forde, Lambda House, Cranborne Rd, Potters Bar, Herts EN6 3JE.

Tel: 0870 904 7377 Fax: 0870 904 7378

E-mail: adsales@rsgb.org.uk

FOR SALE

ALUMINIUM TUBE. Heavy-duty (scaffold) tube approx. dimensions 20' long 2" dia. $^{11}/_{64}$" (4.5mm) wall thickness, 20' and 10' lengths available @ £1.80 + VAT per ft. C.W.O. Rusper Hire (Crawley) 01293 87 1621 office hours only.

COMTEK 4 square control unit new plus 4 Collins 36' verticals. £100. Palomar noise bridge. MFJ 207 SWR analyser. Trapider grid dip meter. £20 each. All with manuals. Phone 0118 969 3284. Reading area.

CONNECTORS for Andrews LDF4/50 and 5/50 - £9 each N Plugs and Sockets - CWO - Westlake,Clawton, Holsworthy, Devon EX22 6QN

E-TYPE TRAP DIPOLE 10-160m fits 28ft garden. Full sized anti-TVI models, traps,baluns, info SAE. Aerial Guide £2.00. R. Holman G2DYM, Uplowman, Devon EX16 7PH. 01398 361215 anytime.

FOR SALE 40 foot tilt over mast £200. G0DMA 01909 730332 Worksop.

FULL COLOUR QSL CARDS now available, plus our low cost, superior designed, conventional QSL cards, personal designs our speciality. LSAE for samples:- The Standfast Press, 5 South Drive, Inskip, Preston PR4 0UT.

G4TJB QSL CARDS printed to your specification, send large SAE for samples and full product list. Unit 6, Worle Industrial Centre, Coker Road, Worle, Weston-Super-Mare BS22 0BX. Tel/Fax: (01934) 512757

LANDWEHR VHF/UHF MASTHEAD PREAM- PLIFIERS, 2 metre 145MAS £150 and 70cm 435MA £155 plus £4.50 p&p. Write, phone, fax or email for leaflet.Qualitas Radio, 23 Dark Lane, Hollywood, Birmingham B47 5BS. Note new telephone numbers: 0121 246 7267. Fax: 0121 246 7268. Email chris@g0eyo.freeserve.co.uk

LIMITED SPACE ANTENNA 160-10 metres 84' overall with 76' of balanced feedline £59.95 plus £5.00 P&P. Choke Baluns Std model £36.85, Yagi Model £37.45 (state boom size) G5RV £28.50 all inc. P&P. Amidon Cores, limited stocks available. Send SAE for full details of all the above. Ferromagnetics, P.O. Box 577, Mold, Flintshire CH7 1AH

OSCILLOSCOPES. Iwatsu SS7802 DC to 20MHz, 2CH+external trigger input, 3 traces. Cursor measurement values ON-SCREEN. £185 inc carriage & VAT. See www.idtuk.com/testgear.htm for details or call 0191 491 0800.

PROGRAMMED PROMS AND EPROMS FOR PMR EQUIPMENT, Details, S.A.E.: Atlanta Communications (RC), PO Box 5, Chatteris, Cambridgeshire PE16 6JT.

SPECTRUM ANALYSERS HP8590 series DC to 22gigs as new can demonstrate. Also some other electronic test equipment. Tel: 0208 9080271.

THE RIG REVIEW is a diskette with details of 720 rigs and receivers. Unravel those readers advertisements. It costs £7.00 post free from Twrog Press - see following:
QSL CARDS - Gloss or Tinted cards. SAE for samples to Twrog Press, Penybont, Gellilydan Blaenau, Ffestinlog, Gwynedd LL41 4EP. E-mail:- twrog@hotmail.com
Web:- twrogpress.co.uk.

QSL CARDS - High Quality but low prices. Personal designs including SWL. Fast service. SAE for samples: Adur Village Press (G4BUE), Highcroft Farmhouse, Gay Street, Pulborough, West Sussex RH20 2HJ. Telephone: 01798 815711

QUALITY PRE-USED EQUIPMENT. The UK's largest stock. Special Service and consideration for purchase of deceased amateur equipment. Essex Amateur Radio Services. Telephone 01268 752522

THE RF KIT CATALOGUE. Send 2 x 2nd class stamps or browse www.rf-kits.demon.co.uk. Hands Electronics, Tegryn, Llanfyrnach, Dyfed SA35 0BL Tel: 01239 698427

MISCELLANEOUS

CALL IN ON THE 'GOOD NEWS' CHRISTIAN NETS! Every Sunday at 8am on 3747kHz and around 7047kHz and 144.205 at 3pm sharing Christian fellowship over the air. Info from WACRAL, 51 Alms Road, Brixham, South Devon TQ5 8QR Tel: 01803 854504

UT7CT SHACK RENTALS: Use of shack, car and translator. Airport transfers, meals and tours included, £70 per day. Full details at www.qsl.net/ut7ct or Box 322, Cherkassy 18000, Ukraine.

BRING & BUY

AUCTION ADVERTISE YOUR SURPLUS EQUIPMENT at www.bringandbuy.cjb.net using the free auction, no commission. Or long term classifieds section at low fixed cost, wants posted free.

COMPUTER SOFTWARE & HARDWARE

SD - EI5DI's CONTEST LOGGERS. HF £25.00, VHF £25.00, both £39.00. Paul O'Kane, 36 Coolkill, Dublin 18. (00353 1295 3668) www.ei5di.com

SHACKLOG 5.3 - Probably the most popular UK written and UK supported logging software. £32.00. With IOTA add-ons £42.50. SASE + disk for demo copy. Alan Jubb, G3PMR, 30 West St., Gt Gransden, Sandy SG19 3AU. 01767 677913. www.shacklog.co.uk

HOLIDAY ACCOMMODATION

BED & BREAKFAST/FOOD. Scotland, north coast GM0EXN, Cliff Top HF & Internet. Tel: 01847 851774
Email: accommodation@btinternet.com.
Web address: http://www.btinternet.com/~bandb.farnorth/index.html

CRICCIETH, NORTH WALES. Bed and Breakfast. Seaview all rooms. Pennyfarthing 01766-522744,
e-mail: pennyfarthing@psilink.co.uk

NORTH WALES, CARAVAN, BUNK HOUSE, CAMPING. Elevated site. Use of shack and beam antenna. Open all year. Rural setting. "Tynrhos", Mynytho, Pwllheli LL53 7PS (01758 740712).
TYNRHOSDIVING@BTINTERNET.COM

WANTED

VALVES WANTED - NEW AND BOXED. KT66 GEC £35. KT88 GEC £60. EL34 Mullard £27. EL84 Mullard £4. EL37 Mullard £27, DA30, DO30, PX25, all at £120 each. PX4 Globe Shape £70, DA100 GEC £150. ECC83 Mullard £5. GZ32 and GZ34 Mullard £10, ECC32 and ECC33 Mullard £15, B65 Metal Base £8. 53KU Bulbous £8. Other types wanted. Please send a SAE for free list. Old valved radio and test equipment also wanted. COLOMOR (ELECTRONICS) LIMITED, Unit 5, Huffwood Trading Estate, Brookers Road, Billingshurst, West Sussex RH14 9RZ. Tel: +44 (0) 1403 786 559 Fax: +44 (0) 1403 786 560

I BUY, SELL EXCHANGE AMATEUR RADIOS OLD OR NEW. Cash waiting 9am-6pm daily. Phone Dave G3RCQ 01708 374043 or E-mail g3rcq@supanet.com for further information, or write G3RCQ, 9 Troopers Drive, Harold Hill, Romford, Essex RM3 9DE

BUSINESS CARD SECTION

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While the publishers will give whatever assistance they can to readers having complaints, under no circumstances will the magazine accept liability for non-receipt of goods ordered , late delivery, or faults in manufacture. Legal remedies are available in respect of some of these circumstances, and readers who have complaints should address them to the advertiser or should consult a local Trading Standards Office, or a Citizens Advice Bureau, or their own solicitor.

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HF

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

MY DX HIGHLIGHT of the month was un doubtedly working KH6ND/KH5 (Palmyra Island) on 10m CW one evening. As it turns out, this wasn't a one-off. The following evening he was even stronger. So it pays to keep an eye on the bands and, of course, to check the beacons even if you can't actually hear any signals (in the case of the Pacific, it may simply mean that there is currently no one active, rather than there being no propagation).

On a sadder note, I was very sorry to hear of the recent passing of John Kay, G3AAE. John was on both the DXCC and IOTA Honour rolls despite never having used a linear, and his operating was always of the highest standard. ZL3QN also passed away in August. Roger Brown, G3LQP, had maintained a regular sked with him for the past 25 years or so, which resulted in around 4200 QSOs over that time!

DX NEWS

PER, LA3FL, WAS expecting to start a six-month work contract with the North Norwegian Weather Bureau on Bear Island and Hopen Island on 17 November. He will stay on Bear Island (EU-027), which has a population of nine, for three months. Next Per will transfer to Hopen Island (EU-063), which has a population of four, in January, returning home in May. He plans to take a small rig and be active as JW3FL in his spare time.

The German team which operated recently as 5V7VJ from Togo and XT2OW from Burkina Faso did a great job, working the UK on all HF bands plus 6m. Unfortunately, both callsigns were re-issues, having been used by previous operators (in the case of 5V7VJ, by Andy Chadwick, G4ZVJ, just a month or so earlier). Care should therefore be taken with the QSL routes. QSLs for 5V7VJ until 20 September go via G4ZVJ, QSLs for 5V7VJ after 4 October, as well as for the XT2OW operation, go via DL7DF (see last month's QTH Corner). QSLs for XT2OW in February 1999 go to F5RLE.

Sadly, the Agalega Island (3B6RF) expedition which should have hit the bands during October, was cancelled, due to unexpected elections in Mauritius which took place middle of September. Officials of the new Mauritius Government asked the group to postpone the expedition for two to three weeks for security reasons, but this meant that the ship was no longer available and, in any case, many of the expedition members were unable to reschedule their leave arrangements. The team is working to a possible new date of May 2001 but, at the time of writing, the team members were very much focused on practical matters of cancelling flights, getting equipment shipped back to Europe for safe-keeping, etc. Such is life, but this obviously came as a shock to all concerned, especially after the massive investment of time and money which had gone into making the operation possible.

The latest on the D68C Comoros DXpedition (see last month) is that Yaesu have kindly agreed to make available six of the new FT-1000MP MkV transceivers, along with a similar number of Quadra VL-1000 linears. Two FT-920s, and two FT-900s will also be taken. Martin Atherton, G3ZAY, will be the chief pilot, keeping in daily contact with the team. By the time this appears in print, a container with some three tonnes of equipment will be on its way to Moroni, ready for the team's February arrival.

Charly, K4VUD, will be in Bhutan in early December and was hoping to take along some more operators, with the focus very much on working the low bands. For the first time, the authorities have approved the use of 1000 watts, rather than the usual 100 watts, which should help a lot on LF.

Bill, W7TVF, will be active from Niue Island as ZK2VF until 10 December. He will operate all bands, with a priority to Europe, Africa and South America on the low bands during their greyline.

Dan, N6PEQ, is reported to be heading off to the Pacific Ocean, with first stop Fiji as 3D2CQ from 16 to 20 December. Then it will be the South Cook Islands as ZK1PEQ from 20 December to 6 January, where he hopes to operate from both Rarotonga and Aitutaki Islands. Equipment will include an FT-847 into a dipole and vertical on 10 through 80. His home page is at http://www.dxer.com/n6peq QSL to his home call.

DX INFORMATION SOURCE

PETER, BRS-96106 (ex-MP4BIM Bahrain Island 1970 - 71) runs what he calls a Newsdesk, which brings together HF news from a wide variety of sources, for those of you who don't want to have to subscribe to, and read, many different e-mail lists or reflectors. Information is available at www.egroups.com/group/petes-dx-newsdesk - or you can subscribe by sending a blank e-mail to: Petes-dx-newsdesk-subscribe@egroups.com

DXCC AND RELATED ISSUES

AT A JULY meeting of the ARRL Board of Directors a number of matters were discussed which are of interest to HF DXers. Firstly, that the 12 and 17 metre DXCC awards will be added in January 2001, to round out the program of single-band awards. Secondly, that work continues on specifying a system for electronic QSLs. Thirdly, that the Membership Services Manager has been tasked with studying the possibilities for managing a QRP DXCC. Fourthly, that the ARRL Board has approved expenditure of $1.025m to develop a new IT platform for ARRL HQ to support such services as electronic QSLing, member web access to DXCC records, nearly real-time updates of DXCC listings, and expanded, detailed contest listings. Finally, that the Board agreed to put the League's muscle behind an international effort to secure a 300kHz exclusive assignment in the vicinity of 7MHz, ready for the next World Radio Conference in 2003. Incidentally, DXCC awards listings are no longer printed in *QST*. Instead, they are provided on the ARRL web site in Adobe PDF files. Look for them at http://www.arrl.org/awards/dxcc/ All forms, rules and the DXCC List can be found there. Send questions and / or comments to dxcc@arrl.org The DXCC List is also available for $3 from ARRL Publication Sales.

Wayne Mills, N7NG/1, from Membership Services Department reports that the current turnaround for DXCC applications is about eight weeks. They are working overtime to reduce this.

WRTC AWARDS

THE SLOVENIAN CONTEST Club has announced the list of awards for working WRTC stations (see G3SXW and G4BUO's article in October *RadCom*). Congratulations to Fred, G4BWP, for making second place in the world. Four other UK stations feature in the results including GM3POI (8th), G3TXF (9th), G3VHB (12th) and GB5HQ. All five worked all 53 WRTC stations during the event.

RSGB President Don Beattie, G3OZF, operated from the Comoros in September during a reconnaissance trip for the big D68C DXpedition planned for February next year.

LIGHTHOUSE EVENT

THE LIGHTHOUSE Christmas Lights event takes place between 18 December and 2 January. This is a special event, not a contest, and you do not have to operate from a lighthouse in order to participate. All bands and modes. Call CQ Lighthouse or CQ/LH. Amateur Radio Lighthouse Society (ARLS) members give out callsign, ARLS membership number, name, and state or province (if in North America). Non-members give callsign, name, and state or province. A certificate is available for working 10 or more lighthouses/ships or five or more ARLS member stations. Send log info to ARLS, PO Box 2178, Cinnaminson, NJ 08077. Include a 9x12in SAE and $1 for return of certificate. More details are available from Jim, K2JXW, at weidner@waterw.com

CONTESTS

THE BIG INTERNATIONAL contest this month is the ARRL 10-Meter Contest on 9 / 10 December. Last year's event attracted a good number of UK entries (Call, Score, Class, Power): G3FNM 22712 AA, G0WMW 251316 AB, G6QQ 147250 AB, MM0BQI 29400 AB, GW0VSW 936 AB, G8D (G3SJJ op) 601794 AC, G3TMA 431298 AC, G3WGN 323990 AC, G0AEV 329588 BB, MM0BYC 57316 BB, GM0JKF 37800 BB, G0NWY 30384 BB, G4NXG 16206 BB, GI0OUM 9400 BB, M0/KC5ICY 3364 BB, MU0C (G0OFE op) 482516 BC, GM0FCO 475904 BC, G4OJH 363780 BC, GM4HQF 82360 CA, G4FDC 54812 CA, G3SXW 289500 CB, GW3NJW 276916 CB, G3LHJ 110208 CB, GW3SYL 104748 CB, G3RSD 34944 CB, 2U0ARE 18544 CB, G4ZME 15996 CB, G3ZEM 746760 CC, G5G (G0LII op) 661360 CC, G2QT 269212 CC, GM3CFS 206488 CC, G3UFY 73200 CC, M5X (G0IVZ, G4TSH ops) 1841456 D, GI0SRM (+GI0SFX) 251472 D, M5W (G0MTN, M0CQK, M0COP, G0EYO ops) 130560 D. Class: A=Mixed mode, B=Phone only, C=CW only, D=Multioperator). Power: A=QRP, B=Low Power, C=High Power.

The ARRL 160m Contest takes place the previous weekend (2 / 3 December). However, there were no UK entries in the 1999 contest.

Talking about 160, the next Stew Perry contest will be held on 30 / 31 December. The results for the 1999 Stew Perry 160 Meter Contest have been posted at http://jzap.com/k7rat/stew.html and the complete rules for this year are available on the same site.

In the 1999 Ukrainian DX Contest, UK scores included: Single-op all-band G4OGB 468632 pts, GM4SID 438288, GW3SYL 327502, G3RSD 229774, G3VQO 111228, G0VQR 94939, G3UFY 16290; single-op 10m GM0NTL 13733; single-op 20m GM3CFS 64728; RTTY G0PCA 15921; SWL BRS44395 236034.

In the 1999 Croatian Contest, UK scores were (asterisk indicates low power): Single-op all-band G0JQN 200825, G4OGB* 177896, G3RSD* 64890, G3UFY 3708, G3ULT/P* 2340, G3SXW 1246; QRP G4FDC 636; single-op 15m G0LII 27984, GM3CFS 20548, G0MTN* 4344; single-op 20m G0VQR* 12600.

In the European Spring Sprint

HFF-LayerPropagationPredictionsForDecember 2000

	7.0MHz	10.1MHz	14.0MHz	18.1MHz	21.0MHz	24.9MHz	28.0MHz
Time	000001111122	000001111122	000001111122	000001111122	000001111122	000001111122	000001111122
(UTC)	024680246802	024680246802	024680246802	024680246802	024680246802	024680246802	024680246802
*** Europe							
Moscow	999975458899	999986588999	....888899..	....98899...	....99999...	....99999...	....9999....
*** Asia							
Yakutsk	44432...3555	645.41135556	6...54...5..	....4.....	....	....	....1.....
Tokyo	...1111.1332	2.1.....1453	....33.....	....42.....	....3.....	....	....1.....
Singapore	1.....1111	21.....122	.....22..	....11122...	...111124...	....234...	....11.....
Hyderabad	53.....2444	541....14444	.....1346..	....32345...	....33345...	....33356...	....63556...
Tel Aviv	88751...6888	87.841248887	....866788..	1...8778881.	....88788...	....8878.1..	.....878....
*** Oceania							
Perth	.........1.	.....1...3	.....1..	.....4..	....1.234...	....11225...	.....21.4...
Sydney	....	.....11.1.	....11.14..	.....14...	...1.1.34...	....2233....	....2.34....
Wellington	.....1....	....	....5546571.	...176578...	.....668....	.....8871...	.....888....
Honolulu	..1.......	..1.2..12...	.3....2.33.1	....1....41.	....	....	....
W. Samoa	....	..1.......	.....33344..	.....4345...	....1.555...	.1........	.....44....
*** Africa							
Mauritius	32.....1.33	331.....33	..11....2331	....211133..	....323454..	....324445..	....33..56..
Johannesburg	22.....112	334.....32	34.2...12433	4...3211444.	....3322444.	....433335..	....43...5..
Ibadan	6655.....656	6675.1..1666	66..53246666	....6555666.	....5557888.	....867787..	....877777..
Nairobi	444.....2444	554....14545	...4..12455.	....444466..	....555566..	....5554....	...1.....
Canary Isles	88897.1.4888	999984418998	.9..88788999	....8888999.	.....8888...	.....88889..	.....88889..
*** S. America							
Buenos Aires	33321.....1	444.3.....3	....4.....34	...141.1234.	..1.5323344.	.....344..	....1...44..
Rio de Janeiro	5544.....4	55554....125	....5.....56	53223566	....5444456.	.....44.55..	.....5..
Lima	33331.....	434.4.....	....411.....	....43...12..	.....1122..	.....2233..	.....13334..
Caracas	565541....15	666.611..126	1..114..145.	..1..543456.	.....14455.1	.....5566..	.....5566..
*** N. America							
Guatemala	445531.....	545.521....2	1.6.643.113.	.....4334..	.....445..	.....555..	.....55...
New Orleans	44443.....2	455.53.1.114	.....32.1..	.....444.1	.....1455..	.....456..	.....66...
Washington	66564.1..146	675.64...467	.77...435677	.....6567.1	.....567..	.....66...	.....66...
Quebec	66565.1.1366	766.64..2566	1.....55677.	.....6677..	.....66781.	.....788..	.....88...
Anchorage	44444...2344	355.52.34455	.....544.5..	....	1	.....1.....	....
Vancouver	34411.....12	244.31..4423	.....44..	.....44..	.....54..	....	....
San Francisco	12433..1....	344.4111....	134..4.3422.	.....441.	.....44..	.....51..	.....5...

Key: The numbers in the table represent S-meter reading on the average amateur rig, whilst colours represent availability. When the predictions are expected to be 67-100% certain, the numbers are blue; when 33-66% certain, red; when less than 33% certain, black.

The RSGB Propagation Studies Committee provides propagation predictions on the Internet at www.g4fkh.demon.co.uk The page is updated weekly. The provisional mean sunspot number for October 2000 issued by the Sunspot Data Centre, Brussels, was 100.1. The maximum daily sunspot number was 164 on 2 October and the minimum was 57 on 10 October. The predicted smoothed sunspot numbers for December, January and Februaryare respectively: (SIDC classical method – Waldmeier's standard) 117, 115, 113 (combined method) 126, 126, 127.

WARC BANDS TABLE 2000

Sorted this month by 24MHz totals

	10MHz	18MHz	24MHz	Total
G0NXX	152	168	164	484
G3SXW	160	187	147	494
M0BIB	18	50	120	188
G4UCJ	97	113	90	300
G3YVH	73	97	82	252
G4AFI	28	69	80	177
G3WGV	84	119	77	280
GM3IBU	0	0	63	63
G3ING	41	57	45	143
GW0VSW	21	20	40	81
MU0FAL	103	69	39	211
GM4OBK	32	52	38	122
M0CAL	0	29	37	66
G3WP	48	42	33	123
G0TSM	21	18	32	71
G4YWY/M	0	46	30	76
G4KHM	77	92	27	196
G4OBK	18	35	26	79
G0VLC	24	37	21	82
G4FVK	2	17	21	40
MM0BQI	20	23	20	63
M5AFA	0	11	16	27
M0CNP	5	21	11	37
G4ERP/M	0	47	0	47

28MHz COUNTRIES TABLE, 2000

Sorted this month by Mixed totals

	CW	SSB	Mixed
M0BZQ	28	230	252
G4DUW	180	220	243
M0BIB	18	218	226
G0TSM	88	194	221
G0VHI	0	205	205
M0CTQ	0	192	192
G3SXW	174	0	174
G0CAS	1	169	170
G0NXX	164	0	164
G3MDH	0	153	153
G4MUW	0	150	150
MM5AJN	0	139	139
G4UCJ	123	0	123
G3WGV	116	0	116
G3YVH	-	-	108
G4IDL	100	0	100
GM4CHX	0	93	93
GI4XSF	-	-	92
G0CGV	81	32	89
M0CAL	0	86	86
MU0FAL	72	0	72
MM0BQI	23	57	71
G0KDS/M	0	60	60
G4ERP/M	0	60	60
G4OBK	51	6	55
G0URR	-	-	53 (RTTY)
G0NCS	-	-	48 (PSK)
G3WP	48	0	48
GM0FNE	-	-	48 (RTTY)
M0CNP	0	45	45
G4FVK	-	-	44
GU0SUP	-	-	42 (RTTY)
G4YWY/M	-	-	41
M0ASJ	-	-	41
G3ING	-	-	37
GW0VSW	27	11	33
GM4OBK	31	1	32
M5AFA	-	-	22

9 BAND TABLES No 36

MIXED MODE CALL	1.8	3.5	7	10	14	18	21	24	28	TOTAL
G3KMA	245	297	326	309	333	325	332	310	325	2802
G4BWP	234	301	332	313	333	327	332	302	316	2790
G3XTT	227	273	315	275	332	302	326	283	300	2633
G3GIQ	143	243	302	258	333	312	330	285	320	2526
GW3JXN	171	244	286	263	322	303	302	271	276	2438
G3TXF	126	226	283	255	322	270	319	234	289	2324
G4OBK	140	198	257	253	321	285	300	270	275	2299
G3TBK	118	230	265	232	320	273	303	246	269	2254
G3YVH	123	152	251	272	315	306	296	261	263	2239
G3WGV	106	183	250	267	295	272	283	249	254	2159
G3IFB	54	219	285	213	320	236	304	223	282	2136
GM3PPE	148	210	246	261	306	243	268	214	224	2120
G3LAS	82	174	204	206	292	275	293	265	265	2056
G3KMQ	59	203	263	199	320	226	277	231	239	2017
G3IGW	128	197	311	233	282	238	243	110	220	1962
G3NOF	5	125	131	0	331	295	330	260	304	1781
G5LP	63	215	277	187	304	101	268	30	219	1664
G3VKW	43	148	192	77	314	150	305	140	287	1656
G0JHC	1	29	145	175	209	264	279	259	290	1651
G4PTJ	5	146	173	32	305	159	302	70	257	1449
G4NXG/M	24	57	132	0	286	179	267	164	242	1351
G4UCJ	28	75	175	117	207	140	179	132	163	1216
M0AWX	43	109	109	0	238	154	200	148	157	1158
GM4OBK	39	95	130	68	161	110	149	110	179	1041
G4FVK	40	76	100	54	180	100	175	61	156	942
G0LRX	1	84	122	0	224	31	242	14	210	928
MM0BQI	39	53	96	41	145	65	126	49	107	721
AVERAGE	**90**	**169**	**220**	**168**	**283**	**220**	**271**	**192**	**247**	**1861**
CW ONLY										
G3KMA	239	276	322	309	332	319	329	297	313	2736
G3XTT	217	241	301	275	302	275	297	248	270	2426
G4BWP	204	210	280	312	263	289	257	260	209	2284
G3TXF	126	217	281	255	317	268	313	233	274	2284
GW3JXN	168	208	266	263	295	289	284	242	246	2261
G0NXX	163	225	269	276	288	277	264	244	254	2260
G3WGV	108	185	254	271	302	279	295	255	261	2210
G3SXW	93	195	246	238	312	251	293	212	266	2106
G4OBK	127	171	243	253	283	267	261	251	243	2099
G3YVH	122	141	239	266	298	278	264	228	237	2073
G3NOH	48	124	204	254	301	284	289	243	248	1995
G3LAS	80	83	177	206	233	227	244	220	216	1686
G5LP	63	209	276	187	287	100	256	29	201	1608
G3VKW	35	73	131	77	194	108	187	96	148	1049
GM4OBK	31	77	113	68	133	93	128	94	127	864
G4PTJ	0	33	93	32	130	46	123	34	90	581
AVERAGE	**114**	**166**	**230**	**220**	**266**	**227**	**254**	**198**	**224**	**1899**

NEXT DEADLINE: 8 January 2001. Prepared by G3GIQ 8 October 2000

contests, SSB scores were G0MTN 52, G6QQ 29, G4BUO 20 and CW scores G4BUO 158, G4TSH 80, G4OGB 80, G0MTN 77, G6QQ 60, G3VQO 19.

In the PACC 2000 contest, UK results were: M-Op GB5TT* 5440, S-Op G2HLU* 11713, G3AEZ-11426, G3RSD-9604, M0AEK-7995, G4OGB-6063, G3UFY-3120, G0MTN-2704, G0TTM-2380, G2VJ-363, GM3CFS*11368, GM3KLA-6360, GW3SYL*10505. *= Certificate winners.

In the ARRL RTTY Roundup 2000, UK scores included (Call, score, Power: A=Low power, B=High Power): MM0BYC 39672 A, G0KRL 23868 A, M0CFV 22720 A, GU0SUP 9856 A, G0URR 2628 A, GW4JBQ (+GW4VXE, GW5NF) 98700 B, GW4KHQ 59682 B, GI4KSH 16698 B.

In the 1999 CQWW Phone results I managed to omit GM7V's multi-multi score of 18,798,580, a new Scottish record. Congratulations. And talking about CQWW contest records, you will find them posted at http://www.cqww.com/ssbrec.htm for SSB, and similarly for CW. These records are based on entries from 1947 onwards.

TABLES

NOT LONG NOW to increase those table scores before year end. For 2001, I feel a change of direction is appropriate, as the tables have been running in their present form for several years now and the 10m table in particular is less relevant while we are at the peak of the cycle (even if it doesn't always feel that way!) For 2001, I propose to drop both the WARC and 28MHz tables, and replace them with a single DXCC table, with your totals of countries worked, regardless of band. I suggest three columns - SSB, CW and Mixed. However, I will also be very happy to receive entries for RTTY and PSK31. Some notes about your station will also be welcome, because it's often more revealing to see what the more modestly-equipped operators manage to achieve, in contrast to the 'big guns'. Start date 1 January and, as always, no QSLs required. Purely an honour system; simply send me your current in-year totals in time for each month's deadline (as per the cut-off date given at the end of the column).

THANKS

MY THANKS TO all who have provided information, and to all of you for your support during the year. Very best wishes for the festive season to each and every one of the readers of this column. 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 **February** issue by **23rd November.** ♦

CONTEST

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COMPUTING SEEMS to be part of most things these days and of course, contesting is no exception. Indeed, it now seems hard to imagine that we used to write up whole contests, such as CQWW, longhand. In many of the larger contest stations, computers have been a necessity for some time. For smaller stations and those who haven't had the opportunity, perhaps, to get hold of a computer cheaply, things have only recently started to change.

I had an interesting letter from Jim, GM3CFS, recently. He asked if I knew of any books which might serve as an introduction to computing for him. He felt that the *Computers in the Shack* publication was a little advanced just for now and was looking for a good book to start off with. I confess that I was a little flummoxed about what to recommend – although I have often found that the '*Dummies*' series of books provides a good entry level to most aspects of computing. Has anyone else got any recommendations for someone starting out with computers? I'd suppose that the platform of choice here would be Win32 operating systems – and yes, I do know all about the growing amount of software available for Linux! But it's probably not what I would feel comfortable recommending to a beginner.

Of course, the fact that the computing field changes so rapidly can put some people off. Actually, I find that is what makes it all exciting! Some of you may have read about the introduction of high-speed Internet services in this country. BT, under the product name Openworld, have launched a service, which should be around 10 times faster than a conventional 56k modem. The service uses a system known as Asymmetric Digital Subscriber Line (ADSL). Whilst the service is currently fairly expensive, I suspect that it may find its way into a number of amateurs' homes as part of their connectivity to work or something similar. A number of other providers, including Freeserve, are also offering ADSL packages to their subscribers. One of the nice things about the ADSL service is that you are constantly connected to the Internet. No need to dialup a connection – the service is always there. This starts to provide some very interesting possibilities – such as accessing the DXClusters through the Internet where there is rather more bandwidth to play with than on a 1200 baud radio link. Many DXClusters are already accessible via the Internet and indeed, many of them are linked this way. Software such as IK4VYX's DXTelnet will prove ideal for this purpose. All being well, Internet connectivity may be more reliable than some of the existing links, which seem to struggle in the major contests. It will be interesting to see how the greater availability of 'on-tap' access makes more multiplier information available to contesters. Neither would I be surprised to see realtime status displays appearing on the web, showing, for example, what frequency the run station is on – what the running score is and so on. Many rules prohibit the making of skeds by non-amateur means, so any systems would have to be wary of this restriction.

Low Power Contest, July 2000

CONGRATULATIONS to G6KQ/P (G3RPB) for obtaining the most points in sections A and B, for winning section B and the Houston-Fergus trophy *and* for having a perfect log. Congratulations also to G3OZF for winning the 1930 Committee Cup in section A, G4OGB for section C and G4ARI/P for winning the Southgate Trophy in section D. Conditions varied over the UK with the southeast being favoured for European stations, with the south midlands coming in close. The south in general was favoured over the north, where the advantage was again on the east coast. 80m was very quiet, especially in the afternoon, and in some places was dogged by QRN. 40m was very active and the top stations had gained the advantage of working a high number of DL stations. There were a couple of stations running 5 watts who entered in the 10-watt section. However, if they had dropped down to 3W I'm sure they would have received a higher position in the new 3W section. Thanks to Chas, GW3SB, for the checklog.

Dave Mason, G3RXP

Low Power Contest, 2000

Section A Portable 10W

G3OZF	1347
G3HEJ	1052
G3FFH	709
G0KZO	680
G0VQR	595
G0MTN	472
G4XPE	460
G3EAO	355
G0KRT	270

Section B Portable 10W

G6KQ/P	1395
G4FOX/P	1227
G5KN/P	1079
G2CP/P	646
G3YRC/P	172

Section C Fixed 3W

G4OGB	846
G3VIP	790
G2HLU	745
G4DDX	578
G4BLI	322

Section D Portable 3W

G4ARI/P	1154
GM3JKS/P	937
M5MDX/P	925
G2AA/P	887
G0IGP/P	765
G4HRC/P	746
G4AYM/P	572

May 144MHz Contest 2000

THIS YEAR'S event saw a drop in the number of entries and in the number of stations active, with QSOs and scores well down on last year. In the Multi-Operator Section a change of callsign this year for the Victory Group seems to have done the trick, leapfrogging the Five Bells Group into first place. In the Single Operator categories the SO section was won by G4IVH who went out portable this time (although only a mile from home!) while G3MEH made a successful swap to the 24 hour Fixed Section and G0ODQ headed the 6 hour section. G4HGI receives the fixed station 25W single antenna award.

If the comments in the logs are anything to go by, conditions were dominated by QSB, even over quite short distances. I have included all the comments from the logs on the results page for this contest on the VHFCC website.

Pete Lindsay, G4CLA

May 144MHz Contest, 2000

Section SF

Pos	Call	Loc	QSO	Mults	Points	Total	Best DX	Loc	Dist	Power	Ant
1	G3MEH	IO91QS	292	89	62513	5,563,657	F5LRL	JN26MV	680	400	2x10
2	G7RAU	IO90IR	205	53	70170	3,719,010	EA3TI	JN11DO	1051	400	2x9
4	PE1EWR	JO11SL	73	38	18114	688,332	G4ADV/P	IO70MM	604	80	10
3	G4HGI	IO83PL	81	51	11031	562,581	F6CBH	JN19BH	572	25	11
5	G1TWS	JO01HO	42	34	5462	185,708	G4ADV/P	IO70MM	408	25	11
6	G3YJR	IO93FJ	20	19	3504	66,576	G4ADV/P	IO70MM	396	60	Yagi

Section 6S

Pos	Call	Loc	QSO	Mults	Points	Total	Best DX	Loc	Dist	Power	Ant
1	G0ODQ	IO91NQ	81	60	12,667	760,020	GM4CXM	IO75TW	525	120	11
2	G4APJ	IO83UP	21	21	4,471	93,891	G4ADV/P	IO70MM	392	25	9
3	G0GJV	IO91OK	31	22	3,513	77,286	F6CBH	JN19BH	314	100	9
4	G4XPE	IO92GU	20	20	3,469	69,380	GM4IJJ	IO86GB	379	10	10

Section M

Pos	Call	Loc	QSO	Mults	Points	Total	Best DX	Loc	Dist	Power	Ant
1	G4MJS/P	IO90JO	531	108	178,919	19,323,252	DH1NHI	JO50VF	921	400	4x19,2x9
2	G4SIV/P	JO03AD	487	102	166,315	16,964,130	DB8TA/P	JN48AB	798	400	6x12,2x12
3	G4ZAP/P	JO02QV	425	86	142,511	12,255,946	DK1FG	JN59OP	773	400	4x12,4x9,17
4	G0VHF/P	JO01HW	433	104	114,915	11,951,160	F/G8MBI	JN04FT	792	400	4x9,2x9
5	G3PIA/P	IO91FN	387	102	90,489	9,229,878	GM0HTT	IO89JC	845	350	2x17
6	G0TPH/P	IO92JM	275	94	54,260	5,100,440	F8ALX	JN06RN	690	200	2x9,15
7	G8SRC/P	IO91CL	254	82	55,966	4,589,212	DG7FEQ/P	JO40RV	786	400	2x17
8	G0DLR	JO01EI	176	77	31,493	2,424,961	GM4CXM	IO75TW	598	400	15
9	G4ADV/P	IO70MM	125	58	26,556	1,540,248	GM4IJJ	IO86GB	624	400	8/8
10	G3YNN/P	JO00DX	81	42	8,093	339,906	GM4WLL/P	IO85NR	568	25	8
11	GX7WAC/P	IO82XI	14	10	0,868	8,680	G4MJS/P	IO90JO	203	25	Collinear

50MHz Trophy Contest, 2000

MANY OF the competitors experienced thunder and lightning at some time during this contest. In contrast, a handful of stations commented on the nice warm, dry weather!

Activity levels were high during the contest with heavy QRM being experienced by many stations.

Congratulations to the Blacksheep Contest & DX Group for winning the Multi-operator section (and the Telford Trophy), G0AEV for winning the Single operator fixed station section (and the Six Metre Cup) and to GM7AFE/P for winning the Single operator portable section. In the 6-hour section, MM5AJN emerged in first place. BRS32525 was the only SWL entrant and wins this section.

Ian Pawson, G0FCT

50MHz Trophy 2000

Multi-operator section

Pos	Group	Callsign	Locator	QSO	Score	Mult	Total	Best DX	km	Power	Ant	Equipment
1*	Blacksheep C & DX G	G8T	IN79JX	673	657584	204	134147136	VE9AA	4469	400	2x6Y	2xJST245
2*	Northern Lights CG	MD6V	IO74QD	560	475446	180	85580280	EH8BPX	3016	400	4x7+3x6Y	IC756PRO+FT650
3	Five Bells CG	G5B	JO03AD	630	398650	177	70561050	RK6CZ	2945	400	2x6Y+4x5Y	TS950SDX
4	Villa CG	G0VHF/P	JO01HW	326	217326	123	26731098	LZ1KWT	2153	300	2x6Y	FT847
5	Bracknell ARC	G6BRA/P	IO80ST	264	205789	115	23665735	EA8/EH5CPU	2747	300	8Y	FT920
6	Cockenzie & Port Seton ARC	GM2T	IO85RU	227	227623	103	23445169	EA8/EH5CPU	3249	100	6Y	IC706
7	Swindon & DARC	G8SRC/P	IO91CL	269	152258	96	14616768	YO4AUL	2390	100	5Y	FT736R
8	Stevenage & DARS	G8SAD/P	IO91VW	140	144451	95	13722845	TR8XX	5792	100	7Y	FT847
9	Telford & DARS	G3ZME/P	IO82SM	127	118673	80	9493840	LZ6L	2354	100	5Y	IC706
10	GM0F	GM0F	IO86ST	92	111386	68	7574248	EA8/EH5CPU	3348	200	5Y	FT847
11	Dacorum ARS	G7RIH	IO91RR	115	70540	60	4232400	LZ1KG	2301	80	5Y	HT-106
12	Bromsgrove ARC	G0RMG/P	IO82XG	125	56813	59	3351967	LZ4A	2254	400	6Y	IC746
13	Tiverton SW ARC	G4TSW	IO80FV	87	14432	59	851488	ON4ANT	559	100	5Y	IC746

Single Operator Fixed, 24 Hours

Pos	Callsign	Locator	QSO	Score	Multiplier	Total	Best DX	km	Power	Ant	Equipment
1*	G0AEV	IO81WL	217	182069	111	20209659	OD5SB	3566	100	7Y+HB9CV	IC706
2*	G3MEH	IO91QS	191	134449	88	11831512	YO4CIS	2332	70	5Y	IC736
3*	G4HGI	IO83PL	108	108166	78	8436948	UU7J	2950	25	4Y	TS780+TVTR
4*	PE1EWR	JO11SL	87	90181	64	5771584	SV8DTD	2245	20	3Y	TS680S
5	G1ZBJ	IO80EN	63	74652	55	4105860	EA8/EH5CPU	2685	100	5Y	FT847
6	GM0HBF	IO67IN	46	74940	40	2997600	EH8BYR	3220	100	HB9CV	TS690S
7	MM0BQI	IO85KX	62	57764	45	2599380	LZ1KDP	2401	90	5Y	IC746
8	M1DUD	JO02QC	47	56363	46	2592698	LZ1KWT	2111	2.5	3Y	FT690R
9	MU0FAL	IN89RL	35	37432	37	1384984	YO7LXT	2070	100	5Y	FT920
10	M1DUT	IO80EO	36	37566	34	1277244	EA8/EH5CPU	2689	70	5Y	IC706
11	G7FBD	IO81RM	36	22972	27	620244	9H1XT	2203	100	3Y	FT847
12*	2E1GDB	IO83SB	11	10929	12	131148	9A9AA	1901	10	6LP	FT690R
13	G7NBE	IO92GS	21	3967	15	59505	9A6A	1707	100	5Y	IC706

Single Operator Open 24 Hours

Pos	Callsign	Locator	QSO	Score	Multiplier	Total	Best DX	km	Power	Ant	Equipment
1*	GM7AFE/P	IP90KF	103	142531	58	8266798	9A4U	2037	100	6Y	FT707+TVTR
2*	G8WSM/P	IO81MH	150	91694	80	7335520	EA8/EH5CPU	2780	100	5Y	FT920

Single Operator Fixed, 6 Hours

Pos	Callsign	Locator	QSO	Score	Multiplier	Total	Best DX	km	Power	Ant	Equipment
1*	MM5AJN	IO86LP	83	114971	67	7703057	LZ2DF	2483	90	5Y	IC746
2*	MM5AHO	IO87LN	65	89411	44	3934084	YU7FU	2148	100	6Y	FT847
3	G6FQZ	IO91JR	75	41329	43	1777147	EA8/EH5CPU	2878	150	5Y	FT736R
4*	GU6AJE	IN89RL	26	22323	33	736659	YO8KOF/P	2057	25	5Y	IC202+TVTR
5	G4APJ	IO83UP	19	27367	26	711542	9A9AA	1924	15	5Y	FT736R

SWL

Pos	Callsign	Locator	QSO	Score	Multiplier	Total	Best DX	km	Ant	Equipment
1*	BRS32525	JO01AL	144	101877	69	7029513	LZ1KG	2254	V	ICR70+CVTR

* = certificate winners

1st 50MHz Contest, 2000

MOST ENTRANTS found things quiet, conditions flat with QSB and very little DX around. GD0EMG again defied the odds, taking full advantage of their QTH being in an excellent location to work all of the active UK stations and making some scatter QSOs into Italy. GW4ARC/P submitted a good log and commented on the poor band conditions and weather. Entries continue to rise in this event and the deregulation now allows portable entries, which quite a few people took advantage of. It is nice to see that stations located in the more remote parts of the country are able to take part and do well in this event and our congratulations go to Steve, GW0GEI; Stan, M1CJN/P, and the Northern Lights, GD0EMG. Once again I have to ask - where are the Novices? Let's hope we can attract some more for next time.

Martin Platt, G4XUM

1st 50MHz Contest, 2000

Pos	Call	Score	Loc	QSO	Mult	Power	Antenna	Best DX	Km
			Multi Operator						
1	GD0EMG	8560308	IO74QD	212	127	400	2X7	IV3GBO	1554
2	GW4ARC/P	2426474	IO82IW	143	103	100	7	DL1EJA	663
3	GW5NF/P	1184742	IO81KR	110	78	100	3	ON4ANT	511
4	G7RIH	919776	IO91RR	94	78	160	5	G0PWE	390
5	G6BUT	658409	JO01BS	81	67	100	5	GD0EMG	413
6	G1WAC	467108	IO92BJ	62	62	100	5	ON4ANT	449
7	M1AXW/P	207480	IO82NR	54	38	100	5	G0GCI	284
			Single Operator, Fixed Section						
1	GW0GEI	1578992	IO73TG	100	82	400	8	GM3WOJ	501
2	G3VOF	1254064	JO01CN	108	85	200	6	GD0EMG	434
3	G4DEZ	1045602	JO01IN	104	67	400	5	GD0EMG	458
4	G6FQZ	516288	IO91JR	65	64	150	5	GD0EMG	353
5	G3MEH	501072	IO91QS	74	66	100	5	GD0EMG	377
6	G4HGI	310440	IO83PL	62	52	25	4	G4DEZ	314
7	G1KHX	182476	IO81MI	35	38	90	5	M1CJN/P	340
8	M0COP	151085	IO92BK	34	41	100	5	GD0EMG	264
9	G0GCI	129132	JO01ED	25	36	100	4	GD0EMG	474
10	G8ZRE	121212	IO83NE	34	37	10	5	G1YLE	303
11	G7NBE	69049	IO92GS	18	29	25	5	GD0EMG	260
12	G4APJ	67487	IO83UP	18	31	15	5	G1YLE	293
13	G7FBD	18139	IO81RM	18	17	100	3	GD0EMG	324
			Single Operator, Others Section						
1	M1CJN/P	1033073	IO94KH	80	67	100	4	ON4ANT	530
2	M0AFC/P	494816	IO84SA	76	56	25	5	ON4ANT	573
3	M0BAO/P	141024	IO80PT	38	32	100	4	GD0EMG	392
4	G0WJR/P	29678	IO81UN	20	19	-	-	GD0EMG	327

HF Championship 1999

Pos	CALLSIGN	2nd 1.8	21/28 SSB, CW		IOTA	COM	ROPOCO 2, 1		CUMUL	7MHz DX	1st 1.8	TOTAL
1	GM3POI	1000	-	1634	-	1906	931	-	2000	-	1000	8471
2	G0IVZ	895	-	-	-	2677	913	879	-	1169	-	6533
3	G2AFV	503	-	83	63	1019	1000	764	1563	255	550	5800
4	G2HLU	560	-	119	39	1292	787	779	1338	156	517	5587
5	G4OGB	608	-	-	153	771	891	766	1502	-	581	5272
6	G3GLL	-	-	-	-	1696	805	852	1690	131	-	5174
7	G3VYI	695	-	148	-	936	834	790	507	567	669	5146
8	G4RCG	724	-	-	-	-	865	794	1970	531	-	4884
9	G4IIY	513	-	550	-	1530	-	727	1442	-	-	4762
10	GW3NJW	438	-	475	65	1086	-	802	1244	134	465	4709
11	G4BUO	-	-	-	497	3000	586	600	-	-	-	4683
12	G3HZL	440	-	-	6	607	913	552	1330	62	609	4519
13	G0JQN	613	-	-	101	-	965	741	1372	-	644	4436
14	G3LIK	311	-	212	-	1301	-	771	1228	-	193	4016
15	G3LHJ	-	-	553	188	1295	810	744	-	125	-	3715
16	G3IZD	421	-	-	-	-	403	744	1498	-	586	3652
17	G3TBK	-	-	1481	-	2122	-	-	-	-	-	3603
18	G3SXW	-	-	343	24	1242	948	846	-	-	-	3403
19	G3VHB	-	1309	2000	-	-	-	-	-	-	-	3309
20	G3JJG	-	-	-	-	1043	913	748	574	-	-	3278
21	G3RSD	-	-	135	81	996	-	-	1481	145	413	3251
22	G4BJM	350	-	-	-	1201	-	1000	270	51	370	3242
23	G0IGP	-	-	50	26	363	713	533	1057	67	213	3022
24	GW3SB	-	-	-	-	697	650	598	1020	15	-	2980
25	G4CXT	668	-	-	-	-	-	-	1495	253	520	2936

HF Championship 1999

UNFORTUNATELY some errors crept into the table, so together with our apologies for the errors, we have pleasure in presenting the revised tabulation showing the leading 25 stations, which was where the errors made the most impact.

CONTINUED ON PAGE 82

VHF/UHF

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

APART FROM some good auroral propagation, activity during the past month has been disappointing. With the British Isles, and much of Western Europe, being battered by deep depressions and weather fronts, not to mention severe flooding, tropospheric propagation was poor. This time last year the 6m band produced a fine opening to South America but until mid-October this has not recurred.

All times are UTC unless stated otherwise and ODX means best DX. An asterisk (*) denotes a CW contact. QTHR signifies that the operator's address is in the current *RSGB Yearbook*, (DE), (LD) etc after a callsign denotes the postal area and (JN45) etc is the Maidenhead grid.

REPEATER NEWS

DAVE BURDETT, G7MFW, edits the Kent Repeater Group's *Newsletter* and the September edition comprises eight A5 pages. It is mostly devoted to the AGM, which took place on 9 June. The KRG is responsible for seven repeaters, GB3KN and KS on 2m and GB3CK, EK, NK, RE and SK on 70cm. The post of secretary was still vacant, so if you would like information about the KRG, contact Treasurer John Wellard, G6ZAA (QTHR), whose e-mail address is krg@zetnet.co.uk

The Gloucestershire Repeater Group's September *Newsletter* runs to four A4 pages. The recent licence changes, which came into force on 8 September, are discussed. There is a brief reference to work carried out on the GB3CG 2m voice repeater, the remaining reports being concerned with mailboxes, nodes and the GB3CCX 10GHz beacon. Chairman Nick Negus, G6AWT, edits the *Newsletter*. Details of the GRG can be obtained from the secretary Graham Nye, G8URP (QTHR), whose e-mail is grg@tyndale.demon.co.uk and there is a website - see the panel.

The Autumn *Newsletter* of the Cambridgeshire Repeater Group comprises 36 pages. There is a table showing technical information about the group's assorted voice, data, TV and packet repeaters, packet links, and a membership list. Phil Richardson, G8MLA, has a 13-page article entitled 'The Keyfob Issue' and the problems that the UHF Corby repeater GB3CI had on its original site. All went well until August 1998 when some people in the adjoining college car park complained that they could not open their car doors with their keyfobs when it was transmitting. All sorts of experiments were tried to overcome the problem but without success.

A new site was found at Corby Power Station. This move required a lot of paperwork and build effort culminating in the repeater's installation by six members on 1 April 2000. This article is well illustrated with nine photographs. Details of the CRG can be obtained from Treasurer Roger Carder, G7SRK (QTHR), whose e-mail address is rcarder@virgin.net and there is now a website - see the panel.

Mike Stevens, G8CUL, the Chairman of the South Oxfordshire Repeater Group, reports that on 29 September 70cm repeaters GB3DI and GB3OX were finally linked using in-band linking. With the two transmitters only 150kHz apart, this is no mean feat! Mike says, "The linking is active all the time, in effect giving a large coverage area repeater with two input and two output frequencies. The whole operation is transparent to the user, with the only obvious difference being that a station going into GB3OX will get an 'X' at the end of his over, but one going into GB3DI will get a 'D'; this 'X' or 'D' being heard from *both* repeaters. This useful feature does mean that users can tell which repeater other users are transmitting to at the end of their over. The main repeater control system is the G8CUL logic with firmware update to interface to the linking control system. Initial on-air tests are showing that the system is performing well with a few minor 'features' yet to be ironed out." If you would like more information Mike's e-mail address is mpstevens@iee.org

As reported in the GB2RS news broadcast on 1 October, the GB3IW international Internet gateway became operational (QRV) on 15 September. Users who connect to the 70cm GB3IW input on 434.700MHz (RU248) will now be able to connect to any part of the world. By using two locally controlled independent gateways connected to the repeater, VK, ZL and Pacific area stations are now able to talk to stations in VE, W and American territories. The gateway is open during the evenings and will be open at weekends during free telephone line-time periods.

Initially thought to be a 'first', Tony Whitaker, G3UKL, the keeper of the Sheffield repeater GB3US on UHF channel RU240, reports that dual gateway Internet operation has been implemented on it on by G3ZHI and G4NJI for over six months. This has not been on a regular basis, single gateway operation being the norm. However, since operation started there has been an approximate three-fold increase in activity on the repeater, so helping to win the 'use or lose' battle. This could be an excellent way of attracting the younger generation because of the obvious connection with computing.

PUBLICATIONS

THE AUTUMN ISSUE of the quarterly magazine *VHF Communications* includes at least three articles of interest to VHF / UHF practitioners. Gerhard Schmitt, DJ5AP, describes low-pass filters for the 2m and 70cm bands, well illustrated with diagrams, tables and photographs. Wolfgang Borschel, DK2DO, writes about Circulators and Ring Hybrids, again well illustrated.

'Internet Treasure Trove' by Gunthard Kraus, DG8GB, is a useful collection of sites covering many topics of interest to amateur radio operators. These include digital signal processing, antenna topics, microwave data, coaxial and dielectric resonators and ceramic filters. There are links

MORE AURORAS

GEOMAGNETIC ACTIVITY STARTED at 'unsettled' on 2 October and peaked at 'severe storm' level on the 5th with the Ap index reaching 96. At such a level major auroral propagation is expected and duly occurred. The following notes refer to 2m.

Stefan Heck, LA0BY (JO59FW), mentions a number of aurora 'spots' on the DX Summit on the 4th from as far south as OE and HB9, 1800 - 2000, but all he heard was beacon SK4MPI very weakly. So he concludes that the event must have been to the south of his QTH.

Next day Stefan worked about 30 stations including, on CW presumably, EU2SM, EW2FD, OK1VMS, SP8UFT, LY2BUU and RW1AW. He heard EI4CL at a beam heading (QTE) of 300º. He heard DLs working 9A1CAL and lots of UA3s but nothing in JO59. From 1400 - 1600 the QTE was 30º, but from 1600-1730 it was 340º.

David Butler, G4ASR (HR), took early retirement at the end of September so was able to operate from 1435 to 1811 on the 4th working 11 stations in DL, G, GM, OZ, PA and YL3AG* (KO26) at 1819km. From 1453-1711 next day he completed 34 QSOs in 24 grids on CW with stations in DL, EI, F, G, GM, HB9, LA, OK, ON, PA and YL3AG again. The grids ranged from JO70 in the north to IN96 in the south and IO63 in the west to KO26 in the east. Jamie Ashford, GW7SMV (NP), worked into GM, DL and PA on both days, GM4VVX (IO78) giving him a new grid.

Coming now to 6m, Kim, OZ5IQ (JO65), found the 5 October event to have been a fine opening. He worked stations in DL, ES, G, LA, OH, OK, ON, OZ, PA, SM, SP and OY. He asks if anyone worked further south than OK? GW7SMV again worked into GM on both days and MM1EWA (IO67) was another new grid. So, these auroras seem to have made up for an otherwise disappointing month.

This is Gabriel Sampon Duran, EA6VQ, a keen EME operator and author of the excellent *VQLog* software.

to all these sites from the magazine's website - see the panel. Andy Barter, G8ATD, edits *VHF Communications*, which is published by KM Publications, 63 Ringwood Road, Luton LU2 7BG; tel / fax: 01582 581051. Address subscription queries to vhfsubs@vhfcomm.co.uk

Issue 3/2000 of the quarterly *DUBUS* magazine comprises 100 pages and the only item in the 'Technical Reports' section is devoted to a 2.3GHz transverter. The EME section includes the usual band news, with reports on the ninth Italian EME meeting and the OX2K expedition. There is an interesting section on 'EME tomorrow?' to which I'll refer in the Moonbounce section.

There are the usual sections on 6m operation, tropo, Es, auroral and MS activity, plus the Toplists covering all bands from 50MHz to 241GHz. The UK agent for *Dubus* is Roger Blackwell, G4PMK (QTHR), the e-mail address is dubus@marsport.demon.co.uk and there is a website - see the panel.

PROPAGATION

THE AUGUST ISSUE of the *Six and Ten Report* starts with six pages of 10m data. Es on 6m seemed to be above average for August and may have been helpful in providing the first hop for transequatorial propagation (TEP). There are tables showing the incidence of Es openings to Europe, North Africa and the Atlantic islands. Under the heading 'DX Propagation' the tables show paths to 3C, 5R, 7Q, 9J, FR, JA, LU, PY, V5, Z2, ZD7, ZD8 and ZS. Although solar flux levels were described as disappointing, Es provided linking to TEP to countries south of the geomagnetic equator on 19 days. There are sections on auroral, MS and tropo events and the usual page of solar and geomagnetic data. Solar flux was reasonably constant averaging 163.1 but never reaching 200.

The *Report* is an activity of the RSGB's propagation Studies Committee (PSC), and is edited by Steve Reed, G0AEV, and Prof Martin Harrison, G3USF. Subscription inquiries should be addressed to Steve (QTHR) whose e-mail address is g0aev@explore.force9.co.uk

Daily solar data (DSD) can be downloaded from the Internet via the Space Weather site, which has links to many other sites. The data covers the 30 days up to the date you log on. From 15 September, the solar flux peaked at 232 units on the 22nd falling to 140 by 10 October. It rose slightly thereafter and was 161 on the 15th and 16th. The dedicated website is in the panel.

METEOR SCATTER

THE MAIN MS event this month should be the Geminids shower, which should be active between 7 and 15 December, with optimum results in the 13 / 14 period. The OH5IY program suggests the peak around 2200 on the 13th with a Zenithal Hourly Rate (ZHR) of 107. The radiant is above a mid-UK horizon for about 20 hours from 1630 and reflections are 50% above average for about 30 hours. Last year's results were quite satisfactory.

The last shower of the year will be the Ursids, probably peaking around 0700 on the 22nd with a ZHR of 10. This shower is available all day and reflections are 50% above average for about 12 hours although the north / south path for this stream is not very effective.

MOONBOUNCE

AS MENTIONED EARLIER, Issue 3/2000 of *DUBUS Magazine* included comments about the future of EME operation by Bernd Wilde, DL7APV. He points out that for the past 20 years, we are still doing EME the same way. So, we have more power, better preamps and antennas, but CW remains the predominant operating mode. He mentions previous discussions on Moon-Net about low power EME by Mark, EA8FF, and suggests that it is well worth a read. He covers polarity misalignment, circular sense keying (CSK), frequency and time accuracy, dealing automatically with Doppler shift, forward error correction (FEC) and message lengths.

Leif, SM5BSZ, writes that low-level EME is quite easy nowadays and that you just have to get enough frequency stability to use a bandwidth of 0.1Hz. He reports on successful tests on 2m with KK7KA who was only running 50W to a 2.1λ Yagi - Leif was using four 14-ele Yagis. He used an FFT program to produce a 'waterfall graph' with 0.1Hz resolution and, after compensating for frequency drift, was able to locate Stewart's 25W signal on it.

Howard Ling, G4CCH (IO93), has not made any changes to his 23cm station and everything seems to be in good shape. He has checked the calibration of his tracking system with the sun and has measured sun noise at 17.5dB when the solar flux was 154 units. The 23 / 24 September weekend resulted in 36 CW QSOs with high activity from Japan but he was disappointed that many regu-

LOCATOR SQUARES TABLE

Starting date: 1-1-1979

Callsign	50	70	144	430	1296	Total
G0JHC	770	25	48	4	-	847
GJ4ICD	753	1	267	121	79	1221
G3IMV	641	20	616	125	53	1455
G0FYD	502	1	259	10	-	772
GW6VZW	488	-	146	6	-	640
G4DEZ	485	18	256	81	67	907
GW7SMV	461	-	179	-	-	640
G0FIG	460	-	385	94	-	939
G0EVT	416	14	292	77	16	815
GU7DHI	415	-	85	14	-	514
G4RGK	409	-	345	233	78	1065
G8TOK	329	31	133	55	29	577
GU6AJE	311	13	32	-	-	356
G0GCI	279	19	99	39	-	436
G1UGH	270	-	130	16	-	416
G8XTJ	247	-	137	-	-	384
G7CLY	238	-	221	13	-	472
2U0ARE	238	-	18	12	2	270
G3FIJ	236	29	105	50	23	443
GM1ZVJ	235	-	-	-	-	235
GW3EJR	233	-	-	-	-	233
G6TTL	220	-	133	90	27	470
G1EFL	219	-	64	-	-	283
G0ISW	170	-	80	22	-	272
G0ISW	162	-	80	22	-	264
G4APJ	155	-	44	20	-	219
G8GNI	139	15	46	18	-	218
G4FUJ	57	17	19	4	5	102
MM0BQI	44	-	18	1	-	63
G4ZHI	39	-	238	32	-	309
G3FPK	30	-	246	-	-	276
G4YTL	-	50	490	72	-	612
G3XDY	-	33	246	170	120	569
G4OUT	-	23	107	-	-	130
EA7IT	-	-	90	-	-	90
M0CNP	-	1	31	12	-	44

No satellite, repeater or packet radio QSOs. If no updates received for a year entries will be deleted. Band of the month is 50MHz. Next deadline is 15 December.

lar USA stations weren't QRV.

He is now up to 122 initials - stations worked for the first time - and has worked 28 DXCC countries in six continents and 19 US states. New stations were JA8IAD, JA7BMB, ON5RR, W1QC, JA8ERE, DF3RU, I0UGB and DC6UW. He has added some 'Real Audio' files on his website - see the panel.

DXPEDITION

A TEAM OF German amateurs made a trip to the relatively rare Scilly Isles (IN69UW) in September and became QRV on the 16th on 6m, 2m, 70cm, 23cm and 3cm. Nearly everything went to plan. On MS they completed 28 sked and 30 random QSOs, all on CW except for I8MPO on SSB. On tropo 110 contacts were made. They completed 21 QSOs on 6m and were surprised at what can be worked on tropo. They had a short opening to Africa on their last day, the 23rd.

Activity on UHF was low but they made 33 QSOs on 70cm but only five on 23cm. Thanks to Oliver Prinz, DK1CM, for this information. His fellow operators were Fred Siegmund, DH5FS, who was the organiser and licence holder, Steffen, DH1DM, who took all the photos, Michael, DG0OPK, who was the 23cm operator and Jens, DH0LS, who was on 70cm. The QSL address is DH5FS, Saarbruckener Str10, D-01189 Dresden, Germany, and you can find a very full account, with logs, on Oli's website - see panel.

USEFUL WORLDWIDE WEB SITES

GRG	http://www.gb7lgs.demon.co.uk/grg/
CRG	http://www.gb3pi.org.uk
VHF Comms	http://www.vhfcomm.co.uk
DUBUS	http://www.dubus.org
Solar data	gopher://solar.sec.noaa.gov/00/latest/DSD
G4CCH	http://www.g4cch.co.uk
DK1CM	http://www.qsl.net/dk1cm

INDIVIDUAL NEWS

THERE IS SO little news this month that I have dispensed with the band reports. Ken Punshon, G4APJ (BL), was only QRV for a short time in the 432MHz and Up contest on the 7 / 8 October weekend but few signals were audible to him on 70cm. He got a "QRZ?" from F6KPL but completed with G1GEY (DH) on the difficult trans-Pennine path. Ken is looking for skeds on 70cm and his e-mail address is Ken.Punshon@compaq.com

Martin Pochner, DL1KAV*, is QRV from 1515 on 144.060 with 3W from JO30RJ if anyone would like to listen for him. Martin.Pochner@t-online.de is his e-mail address. Colin Ranson, G8LBS (IP), reckons you don't need horizontal antennas to work DX on 6m. In 1999 he used a 3-ele horizontal Yagi at 30ft AGL and worked a lot of DX. This year, using a half-wave vertical at 45ft AGL he worked just as much plus JX7DFA, OD5PN, ZA/N7NBC and EH8s.

On 6m Dez, 5B4/G0DEZ (KM65WB), worked AH6TM* on 9 October at 1058 at RST559 both ways using 75W to a collinear antenna. He didn't give his grid but Dez thinks he is in Hawaii. Does anyone know for sure? GW7SMV heard 5N9EAM/8 at 1640 on 20 September but couldn't get through the southern European QRM. On 3 October Jamie worked CT1FMX (IM59) at 1453 and the best QSO was with XT2OW (IK92) at 1522 on the 12th for DXCC country number 102. QSL via DL7DF.

SIGN OFF

THAT WRAPS IT up for this month. The **February** deadline is a very early **1 December** (because of Christmas) and the **March** date is **12 January**, when I'll need your final Annual Table scores. My answering / fax machine is on 020 8763 9457 and the CompuServe ID is g3fpk. Have a nice Christmas and, rather than nodding off in front of the TV, why not have a go in the Christmas Cumulatives on 26 - 29 December? ♦

CONTINUED FROM PAGE 79

1.8MHz CW Contests - Rules 2001

REGRETTABLY, THE RULES for the two RSGB 1.8MHz events were omitted from the 2001 *Contesting Guide* published in the October *RadCom*. The good news is that this was a genuine mistake and that the events *will* take place! Here are the rules for the events.

1.8MHz CW Contests - Rules 2001

Competitive with some long haul DX available. There will be other European 1.8MHz contests running at the same time, increasing activity and interest. A challenging band for antennas and receiving skills.

The RSGB General Rules for HF Contests apply to this event.

Please note these are 2 separate events

Dates:

1st event 10 / 11 February 2001

2nd event 17 / 18 November 2001

Time UTC: 2100-0100

Frequency: 1820 - 1870kHz Mode: CW

Exchange: RST + serial number & district code

1. Sections: Single-operator entries. (a) UK (b) Overseas including EI

2. Scoring: Section (a), 3 points per contact plus a bonus of five points for the first contact with each UK District worked and the first contact with each Country outside the UK worked. Section (b), 3 points per contact plus a bonus of five points for the first contact with each UK District worked. Overseas stations may only work UK stations.

3. Awards: 1st The Somerset Trophy to the leading UK station. 2nd The Victor Desmond Trophy to the leading UK station. (d) The Maitland Trophy to the Scottish entrant with the highest aggregate number of points in the 1st and 2nd events.

National Field Day 2000 - Low Power Section

DUE TO AN error in the calculation of scores in the Low Power Section of NFD (see *RadCom* November 2000, p30), the Torbay Amateur Radio Society A station, G3NJA/P, was listed in second place when in fact the team won the section by a margin of 266 points. They are therefore the winner of the Reading QRP Shield for 2000. Our belated congratulations to Torbay and many apologies for the error.

Dave Lawley, G4BUO, HF Contests Committee

Pos	Group	Call	160	80	40	20	15	10	QSOs	Points
1	Torbay ARS A	G3NJA/P	37/284	72/274	93/325	93/326	72/257	38/264	405	1730
2	Bracknell ARC	G3WGV/P	62/480	102/376	126/436	50/185	21/71	2/16	363	1564
3	Stratford on Avon &DRS	G0SOA/P	29/217	46/180	126/431	71/239	24/92	6/40	302	1199
4	Stevenage & D ARS	G3SAD/P	27/208	16/62	72/254	42/153	27/97	17/117	201	891
5	De Montfort Univ ARS B	G0TPH/P	-	4/16	68/258	-	51/173	19/118	142	565
6	Stockport RS	M5MDX/P	-	-	49/163	32/100	12/38	2/16	95	317
7	Torbay ARS B	G3RMA/P	-	-	18/57	39/115	19/65	-	76	237
8	Lowestoft ARC	G3OEP/P	-	-	35/112	20/68	3/8	-	58	188

CONTEST CALENDAR

HF Contests

Date	Time	Mode	Contest
1-3 Dec	*2200-1600*	*CW/SSB*	*ARRL 160Meter Contest*
2-3 Dec	*1800-0200*	*RTTY*	*TARA RTTY Sprint*
9-10 Dec	*0000-2359*	*CW/SSB*	*ARRL 10Meter Contest*
16-17 Dec	*1400-1400*	*CW*	*Croatian CW Contest*
26 Dec	*0830-1059*	*CW*	*DARC Christmas Contest*
30-31 Dec	*1500-1500*	*CW*	*Stew Perry Topband Challenge*

VHF Contests

Date	Time	Mode	Contest
1 Dec	1900-2130	ALL	RSGB 432MHz Cumulative
3 Dec	0900-1700	ALL	RSGB 144MHz AFS
6 Dec	1900-2130	ALL	RSGB 1.3/2.3GHz Cumulative
16 Dec	1900-2130	ALL	RSGB 432MHz Cumulative
26 Dec	1400-1600	ALL	RSGB 50/70/144/432MHz Christmas
27 Dec	1400-1600	ALL	RSGB 50/70/144/432MHz Christmas
28 Dec	1400-1600	ALL	RSGB 50/70/144/432MHz Christmas
29 Dec	1400-1600	ALL	RSGB 50/70/144/432MHz Christmas
31 Dec	0900-2100	ALL	RSGB All Microwave Bands

The full rules of RSGB HF and VHF/UHF contests were published in the RSGB Contesting Guide in October 1999 *RadCom*. Brief rules for non-RSGB contests, which are listed in italics above, can often be found in the 'HF' and 'VHF/UHF' columns. The HF and VHF Contest Committees both have web sites from which comprehensive details are available. These are www.g4tsh.demon.co.uk/HFCC/index.htm and www.blacksheep.org/vhfcc

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SWL

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MICK TOMS, BRS31976, my son Simon, RS177448, my daughter Clare, RS102891, and I manned the UK SWL stand at the Society's HF and IOTA Convention on 14 / 15 October. It was the third time that we provided an SWL presence at the country's premier HF gathering. Apart from the SWL stand, there were lectures and exhibits that would have interested listeners who like chasing DX, have an interest in IOTA or like experimenting with antennas. However, no other listeners visited the event. *Why?*

The event provides the perfect opportunity for listeners to meet other SWLs as well as providing an opportunity to listen to a wide variety of lectures. The day visitor rate of just £5 is good value, considering what is on offer. This year, there were three lecture streams. On the Saturday, you could have taken in talks about 9G5MD and IOTA, as well as catching the latest from ML&S, visited special event station MB2HFC, met some of the country's top DX operators and still have had time to buy Mick and me a pint!

The SWL stand displayed a wide range of SWL QSL cards; an impressive array of low band (7 and 3.5MHz) QSLs; examples of SWL magazine articles; an IOTA article specially written for the UK SWL stand by Robert Small, BRS8841; details of the rules and results of the CQWW SWL Challenge; a list of useful web-sites; and the Dos and Don'ts of QSLing.

The rather unusual QSL from Yan Barbier, F-11556, one of France's top SWLs.

The Society has been pleased to have an SWL exhibit at the Convention in recent years – I think it is about time a few listeners came along and found out what you've been missing.

LIGHTHOUSE ACTIVITY

STEVE, G0SGB, now has a free award that listeners can apply for based on hearing him operating from lighthouses around the country. Each separate activity means a specially-produced colour card of the lighthouse. The award will also be in colour and will include 10 'thumbnail' photographs of the lighthouses featured in the SWLs award claim. The award is also available to our licensed colleagues.

To qualify, you need to hear Steve operating from any 10 different lighthouses. Claims should be sent to Steve at 91 Kilnhurst Road, Rawmarsh, Rotherham, South Yorkshire S62 5QQ. You can visit Steve's web-site for further details at http://www.g0sgb.freeserve.co.uk

DX NEWS

BAND CONDITIONS were rather indifferent during late September and early October, with several days of very poor HF conditions due to aurora and an A index as high as 68. If you were in the right place at the right time, there was some DX on offer, but at other times DX was hard to find. Robert Small, BRS8841, managed two new countries on 30m in the shape of DU1/DK3GI and HQ0R from Honduras. 20m highlights for Robert were 8Q7XX, CO8OTA, C91RF/P and 5V7VJ. On 17m he was pleased to hear FG5XC, while on 15m ZD9ZM was a new one.

Little time was spent on the bands here. All I have to show for September activity is A52FH on 20m, A51AA on 40m, and 9M0F on 80m! October started a little better with 5V7VJ, XU7ABD, HF0POL, 9M6NXT, VK0MM, YJ0AWL and XT2OW in the log.

Call	1	2	3	4	5	6	7	Total
NL-7280	14758	0	14520	0	9760	16016	16128	71183
OM3-27707	0	15480	20952	2426	0	12464	12056	63378
NL-7403	8208	4176	9240	4104	0	8736	4108	38572
NL-290	3706	0	7980	3472	5104	5832	6440	32534
GW-5218	8264	0	0	0	0	12144	10164	30592
OE1-0140	1496	1952	6942	0	3960	5270	5742	25300
ONL-383	0	5268	18252	0	0	0	0	23520
F-11734	2258	0	2868	2730	1466	4277	6528	20127
F-17789	0	754	4030	0	2472	4588	4930	16774
NL-12089	5610	0	9424	0	0	0	0	15034
LYR-794	0	0	0	309	0	2266	8618	11193
NL-11976	0	1749	3962	538	3766	0	0	10025
NL-11099	1974	0	3900	204	440	3360	0	9878
NL-9723	250	1540	2871	1068	853	355	423	7360
BRS-88921	0	0	2835	0	0	1528	2266	6629
I1-14016	0	0	1742	0	0	2392	1368	5502
PA-3342	0	0	0	0	0	3422	0	3422
G0IBI	0	0	0	0	0	593	804	1397
PY2-80124	0	551	0	0	0	0	0	551
OE-2272	0	0	317	24	0	0	0	341

Table 1: Results of the Dutch-organised SLP competition for SWLs.

E-QSLS

A few months ago, I asked for your comments on the sending of SWL reports by e-mail. Some interesting and supportive comments were received, especially from Roger, G3SXW, but news of e-QSLs has largely overtaken your comments.

A new Internet QSL service has been established at www.eQSL.cc It is available to all SWLs and quite a few listeners have already taken advantage of the system and had QSL replies.

I would encourage you to visit the site, register and give it a try. The webmaster is in the process of setting up an eQSL DXCC award, and there might well be eWAS, eWPX awards, too.

The new service might well put the postman out of business, but from first comments it would seem to be a way of speeding up the processing of QSL cards. To register you need to go to http://www.eqsl.cc/qslcard/ and follow the instructions. Devise your own QSL card, and away you go!

I will be interested in further comments. Some may find this innovation a quicker way of obtaining QSL cards, but remember there is still a place for the direct QSL with return postage and, of course, the traditional card sent via the bureau.

SLP

THE RESULTS after seven parts of the Dutch-organised SLP competition are shown in **Table 1**. The seventh and final part was during the *CQ* WW contest.

And finally, all that remains is to wish all SWLs a very Happy Christmas and a healthy and prosperous 2001. ♦

At the recent RSGB HF Convention, Bob Treacher, BRS32525, was presented with the Metcalf Receiving Trophy (for the 21/28MHz Contest overall SWL winner) and the Powditch Receiving Trophy (for the best score on 28MHz) by RSGB President Don Beattie, G3OZF.

SWL WEB SITES

SWL

http://swarl.listbot.com
www.swl.net/oe1002419/
www.uba.be
www.multimania.com/f11556
http://f11556.ctw.net

Callsign Directories

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www.buck.com/cgi-bin/do_hamcall
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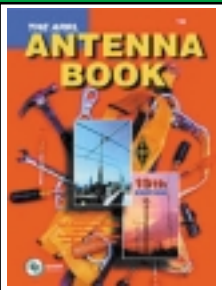

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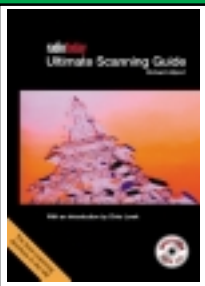

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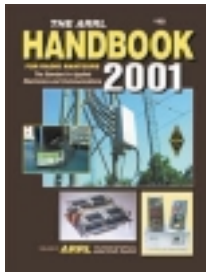

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This seventh edition has been revised, with several chapters being extensively re-written to incorporate the latest technical innovations and techniques. A new chapter has been included forming a practical guide to becoming operational on the new 73 and 136 kHz bands.
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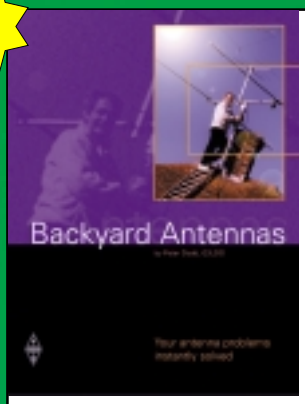

2 Backyard Antennas

Radio amateurs and shortwave listeners all want to chieve the very best from their HF and VHF equipment. Receivers and transmitters are available to professional standards, but very few people have the real estate to erect the sort of antenna used by a commercial radio station. Antenna guru Peter Dodd explains how, by using a variety of simple techniques, it is possible to achieve very high performance from a compact antenna. Also detailed is how to make an antenna efficient on several bands at once.

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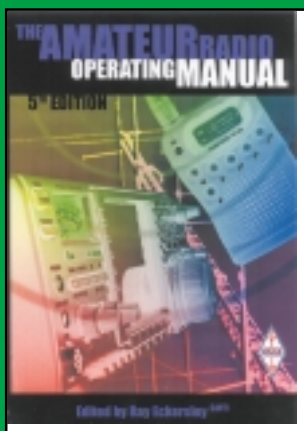

3 The Amateur Radio Operating Manual

This fifth edition has been extensively revised and enlarged. It features a completely new section on organising a DXpedition station.This book is essential reading for any amateur radio operator. It describes operating techniques invaluable for enjoying amateur radio to the full. The Amateur Radio Operating Manual is an invaluable aid to any operator, whether newly licensed or highly experienced. No amateur radio station is complete without it.

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4 Technnical Topics Scrapbook 1995-99

'Technical Topics' is by far the most successful regular column in the RSGB's journal RadCom and we are pleased to present the article's pages in this handy book. 1998 saw the 40th anniversary of the column, written since 1958 by Pat Hawker, G3VA. Pat continues to make 'Technical Topics' a fascinating collection of circuit ideas, antenna lore, component news and scientific discussion, all at the most practical level. If you have an interest in radio and electronics, you will find this book a fascinating read.

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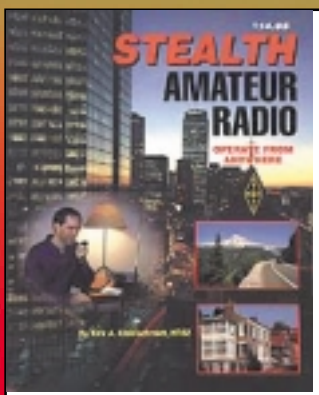

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PE1DCD portable as received over a 160km North Sea path on 10GHz by G8GTZ/P.

FOR SOME YEARS Bob Platts, G8OZP, has successfully held regular skeds with portable stations in Holland exploiting ducting phenomena across the North Sea from a site near Bridlington using 10GHz wide-band equipment, as part of his annual holiday. Several stations were active on the Dutch coast and many two-way contacts have resulted with relative ease. The ducts act as an almost-perfect waveguide and signals are very strong. This year, G8GTZ and G7JTT joined in the fun from a site near Dungeness in Kent. An indication as to how close the duct was to the surface of the sea was when a large container ship passed by the path on its route to Rotterdam when signals disappeared for a few minutes. The signal then returned so strongly that G7JTT could resolve pictures just using a hand-held LNB. with no reflector. The group is considering other possible paths to exploit next year, possibly across the Irish Sea or English Channel and would be like to hear from others who may be interested. Skeds can be set up and the appropriate conditions will then be ordered!

10GHz TRANSMITTER TECHNIQUES

IN THE MAIN, ATV transmitters for 10GHz have been based on Gunn diode oscillators modulated by varying the supply voltage. This produces up 10mW which, as many enthusiasts have found, is ample for completing line-of site contacts on this band. It is simple and effective, the short-term frequency stability being acceptable for portable operation; for longer periods of home-based operation with wide thermal drift, frequent retuning becomes a chore. With the availability of the inexpensive synthesised Com-tel modules from G1MFG or F1GE, many enthusiasts are investigating multiplier techniques from fundamental frequencies in the region of 1250 or 2500MHz. Available ready-built from PE1CMO in Holland are a set of multipliers which produce 300mW and upwards at 10GHz when driven with 200mW at 1250MHz. The multipliers are choke-fed with DC superimposed on the feed coax, similar to the technique used for feeding satellite LNBs in domestic receivers. This makes the units ideal for mast-mounting, hence eliminating unacceptable feeder loss at 10GHz, but some attention is essential regarding weather-proofing. With this order of power becoming available on the band, we are likely to see an increase in home-based operation. Details of the range of units offered can be found on his web site (http://home.planet.nl/~pe1cmo). Rene Stevens, PE1CMO, can also be contacted via e-mail (pe1cmo@wxs/nl) and he will reply in English.

CONTEST NEWS

RICHARD Parkes, G7MFO, contest organiser for the BATC received only five logs from stations operating in the UK during the 'International' in September, although over 40 stations were known to be active. It appears that the best of the conditions were in the south of the country, but overall they were pretty flat. Further details of future ATV contests are available in *CQ-TV*, the quarterly magazine of BATC or direct from Richard. His address is correct in the RSGB *2001 Yearbook*.

REPEATER NEWS

A MOST WELCOME proposal for a new ATV repeater has been received from Northern Ireland. Allocated callsign GB3TX, this is the first amateur TV repeater to be proposed for the province and the first outside England and Wales, apart from the brief existence of GB3GT in Glasgow some years ago. There are restrictions in the licence conditions booklet BR68 regarding unattended 23cm operation in Northern Ireland, but the Radiocommunications Agency has agreed to look at the possibility of permission in this case. The location is to be near Carrickfergus, Co Antrim, where many portable stations have successfully worked in the past. The output frequency is proposed as 1316MHz and an Alford slot antenna promises to give coverage of much of the Belfast area extending to Larne, Downpatrick and Lisburn. Indications suggest that it might also be receivable in parts of Galloway in Scotland. Further details can be found at the RMC web site (www.coldal.org.uk), or from the keeper, Alan Stewart, GI6IXD

GB3CT was built and operated by Jack Darby, G4TVC, some years ago in Crawley, Sussex. Jack has returned to ATV and reports a resurgence of interest in re-activating the repeater. The hardware has been re-installed in the Crawley Amateur Radio Club Headquarters and some 14 local stations have expressed interest and are presently operational on both 70cm and 24cm. The group intends to re-submit an application soon.

QRO on 24cm

UNTIL RECENTLY, the generation of any more than 20 watts or so with sufficient bandwidth for FM ATV in the 24cm band has been the province of valve amplifiers. Creating great interest at rallies and exhibitions during the summer has been the prototype of a new amplifier producing up to 72 watts by GH Engineering. This uses four of the popular Mitsubishi M57762 black brick modules on a special PCB and heatsink. Available initially as a mini-kit, GH Engineering can be contacted via their web site (www.ghengineering.co.uk) or by phone on 01256 869 603.

AND FINALLY...

REQUESTS regularly come regarding "just how can I get started on ATV?" In the *2001 RSGB Yearbook* a new ATV primer gives a start to those wanting to learn more about this fascinating section of our hobby and it is available now from RSGB publications. Also included are details of all operational ATV repeaters and band plans. As ever your correspondence, whether from beginners or old hands, is most welcome and especially your pictures. E-mail contributions are welcome at the address above. ♦

The GH Engineering 23cm 72-watt solid-state linear.

EMC

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THE RSGB EMC Committee web site was originally set up by Robin Page-Jones, G3JWI. Our new 'web master' is the EMC Membership Services Administrator Charles Elliott, G4UJW, who is a volunteer like the rest of the Committee. Charles has further developed the web site and it has moved to a new location. It can be reached via a link from the main RSGB web site (www.rsgb.org) or directly (www.qsl.net/rsgb_emc/).

Our web site contains the following topics:

- Introduction
- EMC Committee News
- Information on Filters
- EMC Leaflets
- EMC Co-ordinators
- EMC Committee Guestbook

The 'EMC Leaflets' section contains online copies of our set of information leaflets, which has recently been updated. A new sheet on TV distribution amplifiers has been added. Printed copies are available on request from the Amateur Radio Department at RSGB HQ. The current list of leaflets is given in **Table 1**.

ADSL UPDATE

ADSL (Asymmetric Digital Subscriber Line) service is now available for customers on many BT telephone exchanges in the more densely populated areas of the UK. Another company, Video Networks Limited, is offering a video-on-demand and subscription TV service called 'Home Choice' via BT telephone lines using ADSL. ADSL can also offer a high speed 'always connected' Internet access service without the need to dial up. There are also proposals to offer 'voice over IP' (Internet phone) type services using ADSL.

ADSL transmits RF along the telephone line, in addition to the existing analogue service, which can be used as normal. There are some EMC issues to be considered, however.

There was an article in *The Times*, 16 September 2000 entitled "BT plans meet with interference", which stated:

"British Telecom's plans for a nationwide rollout of high-speed Internet services have come under an unprecedented attack from the entire UK radio industry, which fears that the planned network will cause interference to millions of radio listeners.

"The BBC and commercial radio have both written to the Government expressing concern with the planned rollout after testing by their engineers found that high-speed ADSL lines - used for fast Internet access and video-on-demand services - could cause interference with both medium-wave and long-wave services."

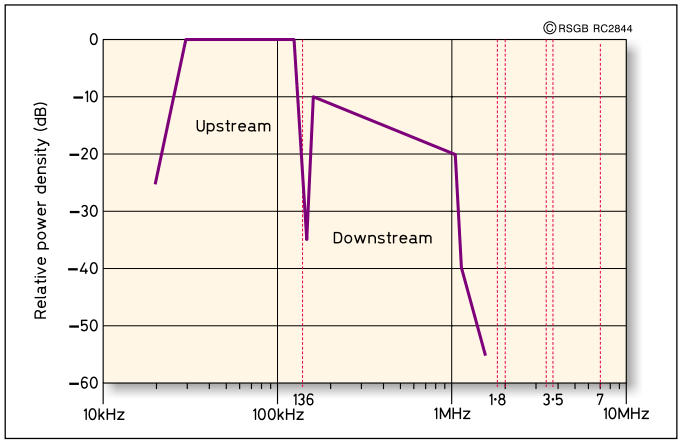

Fig 1: A typical frequency spectrum for current UK ADSL systems as seen at the customer's premises.

The article ends with the following paragraph:

"But BT said that it did not believe there was a problem. It said the ADSL equipment was manufactured to a world standard and that extensive market research after a commercial ADSL trial in West London had thrown up no evidence of interference."

There are several points worth mentioning in connection with the alleged lack of interference complaints. First, the exact locations of the customers involved in the trial were not made public. Secondly, the field strengths of most medium-wave broadcast stations in the trial area are fairly strong, so interference would be less likely than at the edge of the service area of the broadcast transmitter. Thirdly, the emissions from the ADSL trial systems sound exactly like white noise. If radio listeners notice an increase in background noise level, they would probably associate it with a weak signal or poor reception conditions rather than man-made interference.

In May 2000, the Radiocommunications Agency asked for responses to their Regulatory Impact Assessment on the draft standard MPT1570 (parts A and B). This draft standard relates to the use of radio frequencies to transmit signals over 'material substances'. This covers transmission over all types of cables including telephone pairs and coaxial cable.

The RSGB EMC Committee submitted a response to this Impact Assessment. Details are currently on the EMC Committee web site under 'EMC Committee News'.

What about interference to amateur radio reception? **Fig 1** shows the typical spectrum for ADSL in the UK, as seen at the customer's premises. The 'upstream' direction, from the customer to the exchange uses frequencies in the range 25 - 130kHz. and the 'downstream' direction from the exchange to the customer uses about 150kHz - 1.1MHz. The 'downstream' signal suffers increasing loss at higher frequencies and the maximum usable frequency may be reduced on longer lines.

Although the ADSL 'band plan' offers some protection to the 136kHz amateur band, there could still be some noticeable noise emissions from ADSL in this band. Although the ADSL sub-carrier frequencies should not be audible in any other amateur bands, there is a possibility of RF emissions from other parts of an ADSL installation, particularly the data cable from the Network Terminator (NT) to the computer or TV set-top box, **Fig 2**.

At the moment, we do not know how immune ADSL is likely to be in the presence of amateur HF transmissions. If there are breakthrough problems, possibly from the 1.8MHz or 3.5MHz band, special filters may be required.

The EMC Committee would be very interested to hear of any cases where ADSL is affected by amateur transmissions or causes inter-

Number	Title	Description
EMC 01	Radio Transmitters and Domestic Electronic Equipment	A general EMC information sheet for neighbours about breakthrough on TV, radio, hi-fi, etc
EMC 02	Radio Transmitters and Home Security Systems	An information sheet for neighbours or alarm installers about RF triggering of intruder alarms
EMC 03	Dealing with alarm EMC problems - Advice to RSGB members	Advice to members on how to deal with RF triggering of an intruder alarm
EMC 04	Locating sources of interference to amateur radio reception	Advice to members on how to identify and find sources of RFI in amateur bands
EMC 05	Radio Transmitters and Telephones	An information sheet for neighbours about RF breakthrough on telephones
EMC 06	Automotive EMC for Radio Amateurs	Advice to members on installation of mobile amateur radio equipment in vehicles
EMC 07	Protective multiple earthing (PME)	Advice to members who have their electricity supply wired on the PME system
EMC 08 (New)	TV Distribution Amplifiers	An information sheet for neighbours and TV aerial installers about solving breakthrough problems on home TV distribution amplifiers

Table 1: A list of the EMC Committee's Information Sheets.

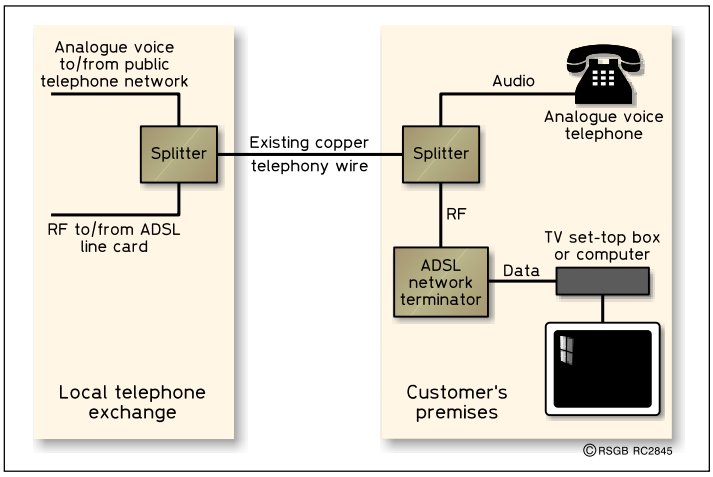

Fig 2: The principle of ADSL. Existing copper telephone lines are used for two completely separate services - analogue voice telephony and high speed data.

ference to amateur reception. We are also keeping a close watch on the development of a new system, VDSL which would use frequencies up into the HF spectrum. For further information, see the ADSL Forum (www.adsl.com).

TV DISTRIBUTION AMPLIFIERS (Part 1)

THE USE OF home TV distribution amplifiers with four or more outputs is becoming more common. Unfortunately, many of these are broad-band VHF/UHF types which can be susceptible to blocking by amateur transmissions, particularly on 50MHz or 144MHz. Part 1 gives the background information about these amplifiers. A future 'Part 2' is planned with details of how to solve breakthrough problems using filters. A new information sheet, EMC08, has been prepared on this subject.

Fig 3 shows the response of a typical VHF/UHF TV distribution amplifier in relation to amateur bands, FM and TV broadcast bands. Most users do not use the FM capability at all, so a UHF TV-only type would be a better choice. Where the FM capability is used with a Band 2 FM aerial connected, it may not be easy to get the FM and TV signal levels right and this can result in patterning on the TV picture or buzzing on the FM sound. It can also result in a system which is wide open to picking up amateur transmissions on 144MHz, particularly as the gain at VHF may be higher than at UHF. Even a watt or so from a 144MHz hand-held can cause blocking, the TV screen going blank.

Even where the Band 2 coverage is required, the Band 1 coverage can cause problems by picking up nearby 50MHz amateur transmissions. The 40 - 88MHz coverage serves no useful purpose in the UK as Band 1 TV broadcasting was closed down when the 405-line TV service ended in 1984. Perhaps someone should tell the manufacturers of these amplifiers!

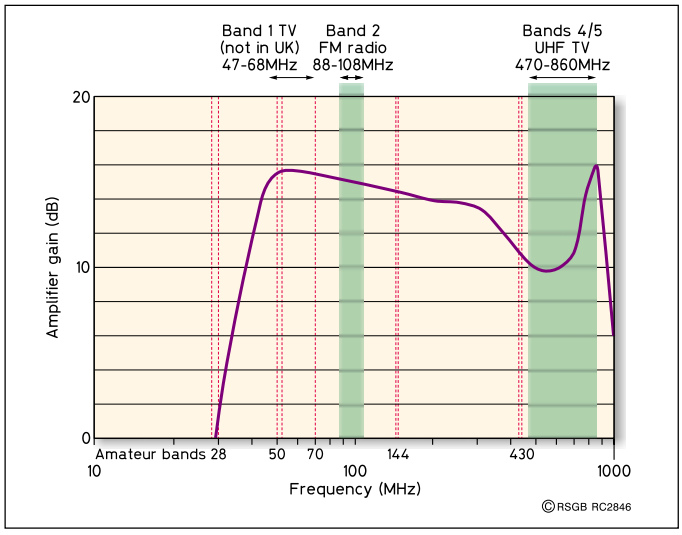

Fig 3. The response of a typical broad band VHF/UHF TV distribution amplifier in relation to amateur bands, FM and TV broadcast bands.

VARIABLE SPEED DRIVES

FOLLOWING THE ITEM in October's 'EMC' about Pulse Width Modulation (PWM) motor drives, Peter, G8JVW, has sent some information about these and other types of equipment. This shows just how EMC-unfriendly switch-mode power supplies can be, particularly multi-kilowatt industrial types. It also underlines the need for a new EMC standard for radiated emissions below 30MHz from such equipment when actually installed.

The company that Peter operates installs a small number of PWM variable speed industrial AC motor drives into control panels supplied to end users. Generally, the drives have optional filters listed as extras which Peter's company fits as standard. However, in Peter's experience, these filters reduce RFI getting back onto the mains, but have little effect on the radiated energy, as most of this comes from the motor cables. Peter has found that the RF interference radiated at around 7MHz can be greatly reduced by applying good installation practice and the odd modification.

He always uses 'SY'-type screened mains cable for the wiring from the control panel to the motor, with bonded glands both ends. Screened cables are also used inside the control panel, again with good bonding. All termination boxes need to be bonded, including the motor terminal box that often has a cork or rubber gasket.

Peter has noticed that a lot of similar units are installed by other companies with no screening on the cables or with RF earth-bonding practices that he regards as poor. He reports that a few end-users have had a bad experience with EMC problems and are now prepared to pay for the improvement.

Peter also provided details of another industrial item that he

A typical broad-band TV distribution amplifier covering 40 - 860MHz.

came across with RF emissions that he regarded as excessive. This was a 4kW switch-mode charger for fork lift truck batteries, imported by a leading UK traction battery company.

The unit was called a 'Powertech Plus' high-frequency charger and claimed conformity to 89/336/CEE and 93/68/CEE plus harmonics to NF EN 61 000-3-2. This charger put so much high-frequency ripple back onto the mains that it reportedly caused instability in other power supplies connected to the same mains supply.

A few crude oscilloscope measurements on the mains showed a 20kHz ripple content of about 9V RMS. Using an IC-706 on 7MHz, 200m from the factory, it was very easy to tell when the chargers were charging as the noise level changed by about 1/3rd of full scale. The units were individually wired back to the distribution board with 25mm^2 cable and were next door to the 1MVA sub-station. The mains RFI filter inside the chargers was smaller than the unit in a domestic washing machine.

After some chasing around, Peter found that a well-known French tyre company had the same units installed at a site in France and had suffered problems with HF noise affecting a government radio station nearby. Without telling the UK importers this, he challenged them over the EMC problem and said he was considering having the units tested for EMC compliance. Within seven days, all the switch-mode units were changed (14 in all) for new conventional non-switch-mode chargers. ♦

IARU

TIM HUGHES, G3GVV
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THE ELEVENTH IARU Region 3 (Asia and Australasia) Conference was held in Darwin from 28 August to 1 September. Representatives of 16 Region 3 Societies attended, together with the President and Vice President of IARU (W4RA and VK3ADW), the Chairman and Secretary of Region 1 (PA0LOU and G3GVV), the Chairman and a Director of Region 2 (VE3CDM and LU2AH), and the Chairman, Secretary and Directors of Region 3 (ZL2AMJ, JA1KAB, HL1IFM, JJ1OEY, 9M2SS). Also there were the Region 3 Intruder Watch Coordinator VU2UR; Beacon Coordinator ZL2NN; Secretary Assistant JA1TRC, and IARU Monitoring System Coordinator ZL1BAD.

WORKING GROUPS

THE CONFERENCE functioned through three main Working Groups, dealing with Policy, Technical and Operational matters, and WRC-2003 respectively. Working Group 1 was chaired by ZL3QL, with Debby Morgan, ZL2TDM, acting as Secretary, or 'Scribe', as noted in the report. The first part of the meeting was devoted to consideration and approval of resolutions of the Administrative Council. The importance of the harmonisation of licence qualifications and examinations was considered, with particular reference to TR61.01 and TR61.02 initiated in Region 1 by CEPT, and in Region 2 by CITEL with its International Amateur Radio Permit.

In Australia, an Internet-based correspondence course for the radio amateurs examination has been produced, interactive with a tutor over the Internet. Its purpose is to promote amateur radio, and general interest in electronics and communications.

A proposal for the use of the LF bands for amateur radio was largely supported. STARS*** (Supporting Amateur Radio, Region 3) Working Group, as in our own Region, is concerned with the promotion of amateur radio both in schools and in countries where there is little activity.

Working Group 2 had Grant Willis, VK5ZWI, as its Chairman and Jamie Pye, ZL2NN, as Scribe. It dealt at length with band planning in relation to guard bands for beacon frequencies; band plans for 50MHz, 144MHz and repeaters; and resolved that a more efficient use of the data mode segment of HF bands could be achieved, bringing this matter to the attention of Region 1. Another topic for consideration by our Region was the discussion on the 144MHz bandplan in relation to satellite and space communication. EMC and the appointment of a Region 3 EMC Coordinator, the Monitoring System, International Beacons, Data Transmissions, and ARDF were all reviewed.

It was interesting to note that this Working Group made a recommendation that when publicising amateur radio, member societies should focus more on the differences between the Internet and amateur radio, including the community and emergency service (particularly important in a Region where national disasters are a regular occurrence), field days, ARDF, self training and the self-reliance aspects, rather than the more traditional aspects of our hobby.

WRC2003 MATTERS

WORKING GROUP 3 had VK3ADW as its Convenor, with K1ZZ as Secretary, its terms of reference being to consider matters relating to WRC2003. It reaffirmed the IARU objective of an exclusive world-wide amateur services allocation in the vicinity of 7MHz, of not less than 300kHz. Following extensive discussion, it recommended that Region 3 societies seek, as an interim measure, the reduction of all Morse testing speeds to 5WPM, with a policy of the removal of Morse testing as an ITU requirement for an amateur licence on frequencies below 30MHz.

More than 50 delegates attended the Conference, including G3OZF representing the RSGB. The deliberations and discussions which took place over five days cannot be reported in full in a summary such as this. All present were unanimous in their praise of the preparation and organisation by the Wireless Institute of Australia, and particularly the Darwin Amateur Radio Club. Members of the latter worked tirelessly from the moment we arrived until we departed; Spud Murphy, VK8ZWM, and Grant Willis, VK5ZWI, deserve special mention. So too does Peter Naish, VK2BPN, the WIA Federal President, who was elected to the Board of Directors of Region 3; by a happy coincidence a photograph of him (when he lived in England with the call G3EIX) appears on p12 of the October 2000 *RadCom*.

The continuing involvement of RSGB members as volunteers in IARU matters must include the names of long-serving Ron Roden, G4GKO, the Region 1 Monitoring System Coordinator; and Professor Martin Harrison, G3USF, the International Beacon Coordinator. At the Region 1 Conference 1999, G3OZF was appointed chairman of the Financial Advisory Group. ♦

The IARU Administrative Council in Darwin. Left to right: Front row: ZL2AMJ, W4RA, PA0LOU, G3GVV. Middle row: VK2BPN, VE3CDM, W4RI, VK3ADW, JJ1OEY. Back row: W6ROD, K1ZZ, LU2AH.

DATA

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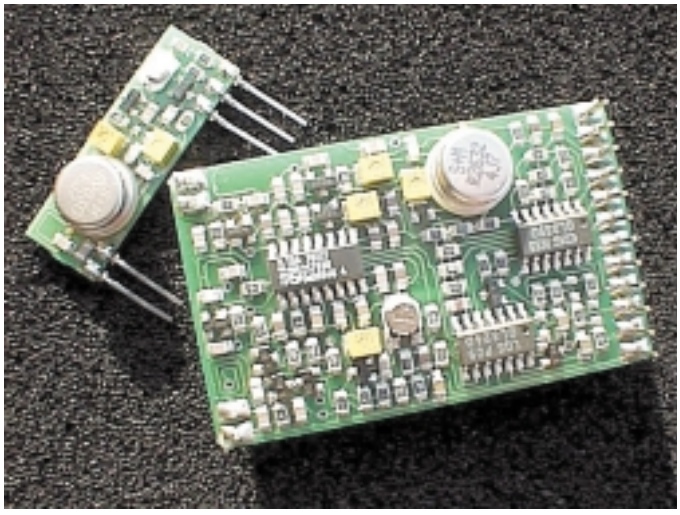
I AM STILL not receiving much input from readers for inclusion in this column. Can I have anything you think readers will be interested in, please? Experiments in data communications, modems, software, hardware - anything!

One item that *does* arrive regularly is *Fourpack*, newsletter of the Packet Repeater Group of the same name located in the Gloucester area and edited by Nick, G6AWT. This group is closely associated with the Gloucestershire Repeater Group. When the existing installation work is completed, they will be concentrating on improving the network and by upgrading older systems such as the Kidderminster and Gloucester trunk.

HIGH-SPEED PACKET

IN THE LATEST edition of *VHF Communications* (www.vhfcomm.co.uk), a simple TNC for megabit packet radio links is described by S53MV. This has been developed to fill the gap for a high-speed interface for modern PCs. The popular TNC2 type hardware in use now will not go much beyond 76800b/s and more recent TNCs lack software support

The unit by S53MV is designed for radio links operating at rates up to 1.2Mb/s, although it communicates with the host computer via the COM port operated at its highest practical speed of 115200 baud (b/s). This usually creates the real bottleneck as the host PC cannot handle the data flowing at this rate, but the solution was to design a simple TNC that properly buffers the data from the PC and handles all the AX25 protocol formatting to make optimum use of both links. A simple design based on a 68HC000 processor with external fast RAM and ROM and easy-to-get components is described, which fills the special needs for high-speed data links. Several references for suitable high-speed radio and modem equipment are also given in the article.



A 433 MHz Transmitter / Receiver pair made by Radiometrix suitable for simple Data Communications experiments. Their web site (www.radiometrix.co.uk) gives full details.

9600b/s MODEM

CHARLES, G4GUO, has been trying to send 9600b/s data transmission over normal VHF radio channels with a standard transceiver. He has been experimenting with adaptive equalisers and Trellis-code modulation, and has succeeded in generating a modified version of the telephone standard V32 waveform that can be used on a conventional FM radio. This does not need DC coupling to transfer 9600b/s, the disadvantage being that a strong signal is needed; it requires about 21dB S/N to operate error-free - that equates to an almost fully-quieting FM radio.

VERY SIMPLE DATA EXPERIMENTS

I HAVE RECENTLY been playing with some low-power UHF radio transmitter and receiver modules for a commercial radio remote control project. These licence-free modules operate on a centre frequency of approximately 433MHz and the transmitter radiates about 2mW - the licence-free operation also dictates a fixed transmit antenna. They can transmit data at rates at least up to 20kb/s, frequently higher, using either ASK or FSK by direct modulation of the transmitter.

As these operate within an amateur band, we are quite justified in using these modules with external antennas and RF amplification to give a more useful coverage range. As the frequency is determined not by a crystal, but by a surface acoustic wave (SAW) resonator which can only set the carrier to an accuracy of a few hundred kHz or so, and the bandwidth of the FSK is rather wide with typically 20kHz shift, we need to be careful not to cause QRM to other band users. However, in spite of their shortcomings, these modules could provide a useful route to simple short-range datacomms experiments, provided that they are not used for transmitting continuously with 100-watt amplifiers! The input to the transmitter and receiver output are at 0-5V TTL levels and can be connected directly to a computer or simple logic. A wide range of modules from different manufacturers is available from both Farnell and RS Components and their catalogues give more details. Be careful not to buy the 418MHz variants for uses under the amateur licence.

In fact, the data rate of some versions of these modules will support digitised voice, making for straightforward experiments with this medium. The fact that the modules (used properly) are approved for licence-free operation also means they could form part of a training package for schools or RAE classes introducing modern radio communication techniques.

FUNDAMENTALS

THE SIMPLE HAMMING error correction code described last time introduces quite a high overhead of bits of data to correct single bit errors, and for this reason is not used very often in that form. A better error detection and correction scheme is to apply Block Error Coding. Here, a block of data is split into a square of rows and columns. If we take, say, 64 bits of data, these can form 8 rows each of 8 columns. A parity check is then made over each column and each row plus the parity bits themselves – a total of 17 parity checks and hence 17 extra check bits per block of 64. A single-bit error now shows up as three parity errors, one in the columns, one in the rows and the overall bit. By looking at the intersection of these check errors, the bit in error can be quickly identified. **Fig 1** shows this diagrammatically. With this very simplistic approach, once again a few bits in error can be reliably corrected, any more errors will probably be detected but their location in the block cannot be determined and the whole 64/81 bits of information will have to be thrown away. This can be overcome with more complex mathematics than simple parity checking will allow, so that several errors can be corrected in each block. The popular BCH and Reed Solomon codes used for modern data transmission over RF links are block-orientated codes, but both these techniques require considerable processing power to do the matrix mathematics needed for the correction.

The main disadvantage of block error detection alone is that, for most RF links, bit errors do not occur one at a time. Rather, errors tend to occur in bursts knocking out a block of many bits together, followed by a long period of relatively error-free transmission. ♦

	C1	C2	C3	C4	C5	C6	C7	C8	P1
R1	0	1	0	1	0	1	1	1	1
R2	0	0	0	1	0	1	1	0	1
R3	0	0	0	1	1	1	0	1	0
R4	0	1	0	1	0	1	1	0	1
R5	0	1	1	1	0	0	0	1	0
R6	1	0	1	0	1	1	1	0	1
R7	0	0	0	0	1	0	1	0	0
R8	1	0	1	1	0	1	0	0	0
P2	0	1	1	0	0	0	1	1	0

Fig 1: Transmitted bits for a block error checking scheme, showing how parity checks on rows and columns of data can point to bit errors. Even parity is used with P1 / P2 containing parity check digits on the rows and columns respectively. A bit error in the highlighted position (R4 , C5 - red) will be shown up by the receive parity checks failing in this row and column (green), so allowing correction.

COMING SOON

IN BRITAIN'S BEST SELLING RADIO MAGAZINES

Practical Wireless

- Philips Pronto - a wireless remote control system reviewed
- **Rob Mannion G3XFD** gets to grips with the SGC SG-237 a.t.u.
- **Ed Taylor N0ED** 'post' us his quarterly 'letter from America'
- **Brian Kendal G3GDU** takes a look at the prelude to RADAR
- **David Butler G3ASR** presents his antenna workshop session

Short Wave Magazine

- Roger Bunney's Satellite TV Special
- Racal's Classic RA17 is given the John Wilson treatment
- Free Nevada Communications Catalogue
- Win A WorldSpace Digital Radio Receiver
- All your Favourites...Scanning, Decode, Airband...

Radio Active

- Mega 3rd anniversary prize draw – over £1800 worth of prizes
- New AOR AR8600 reviewed
- War time secrets from Bletchley Park
- On test – Icom PMR446 radios
- More DXing on the Internet
- Radio Active goes to the BCBC radio forum

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the last Word

21st Century Ham?

It seems that for many years the RSGB has been searching for ways to attract new members. However, there is one age group which has surely been neglected for a long time. I'm speaking of the 21 - 30 year olds, many of whom are working in the buoyant telecoms industry but who are not attracted to amateur radio in its present form.

Looking through recent issues of *RadCom* it's not difficult to see why. Columns such as 'EMC' are informative and relevant, but so many technical features are really little more than a re-hash of material from 20 or more years ago. In a word, most of the technical articles lack innovation, and even the news pages rarely report anything in the field of technology. The average RSGB member could be forgiven for thinking the mobile phone hadn't yet been invented! I'd like to see adverts in *RadCom* from the semiconductor companies rather than just the 'black box' merchants. And a review of some of the evaluation boards they produce for their latest 'wonder chip'. We are living in exciting times in the field of RF communication, with techniques such as GPRS giving more efficient use of the radio spectrum.

Let's rekindle the real amateur radio spirit and make it relevant to the 21st century.

Paul Lovell, G3YMP

[*I don't think anyone could accuse the 'PicATUne' article currently running in* RadCom *of not being innovative. I would be pleased to receive reviews from readers on any equipment,* providing *it is relevant to amateur radio, and not just electronics. And we would be delighted to receive adverts from semiconductor companies or indeed any company that wishes to advertise in a magazine read by many tens of thousands of individuals with a proven committed interest in radio, electronics and communications* - Ed.]

Praiseworthy Voices

Just a line to put on record appreciation of 'The Voices' series by Gordon Adams, G3LEQ. This is far and away the most interesting series of articles to appear in *RadCom* for as long as I can remember.

It is highly interesting, factual, and of great historical value, and the first attempt I have seen anywhere to put on record exactly what was happening on the airwaves within our own life-span.

I am sure that I am not the only one who hopes these installments will continue until Gordon Adams' pen runs dry, and that there will be other articles like it.

Not being technically minded myself, the greater part of RadCom has in the past gone unread. Us DXers get the news a long time before it appears in 'HF', and *Sprat* can take care of the others!

Tony Quest, G4UZN

Pirate Activity?

The last time I was on the air was 12 November 1997 but today I received from the QSL bureau a small number of QSL cards from various countries claiming that I had made QSOs since the above date. Perhaps it would be of interest to members to know that a pirate is using my callsign, G0IOV.

W G Ellis, G0IOV

[*'Pirate' activity is certainly one explanation, but mishearing a callsign - eg G0IOV instead of, say, G0IOB on SSB or G0SOV on CW - mislogging a callsign, or miscopying a QSL from the log - eg G0IOU, are also all possible explanations* - Ed.]

Clubs on the Web

I recently had reason to search for information about amateur radio clubs and societies. While I found the list of societies and contact addresses on the RSGB web site useful, I was less than impressed with the general lack of detailed information about amateur radio clubs and societies readily available on the Internet.

Could I suggest, as a matter of urgency, that all clubs and societies have an up-to-date e-mail contact address on the RSGB web site? May I also suggest that clubs and societies, wherever possible, have their own web sites? The site needs to be simple, to allow access by all web browsers, and the information presented needs to be comprehensive. As a minimum, I believe the following should be available:

- E-mail contact addresses
- Dates and times of meetings
- A map showing where meetings are held
- External events the club or society is associated with
- A list of special interests the club or society supports
- A 'welcome page' specifically for anyone interested in, but unfamiliar with, amateur radio
- A list of those meetings which have time specifically set aside to welcome new and prospective members.

Additionally on the 'welcome' page there could be e-mail addresses of local members willing to answer questions that persons unfamiliar with amateur radio might ask. These members would also provide initial, informal contact with prospective members, thereby ensuring that newcomers know someone from the club before venturing to a meeting. This would go some way to alleviating the isolation sometimes felt by new and prospective members who visit clubs without knowing anyone there.

As the RSGB wishes to encourage young people into the hobby and young people increasingly turn to the Internet for information, clubs and societies ought to provide web sites as soon as possible.

Philip Cadman, G4JCP

[*The RSGB web site includes details of all 627 Affiliated Societies. Any club that wishes to have the e-mail address of the contact person and / or a link to their own site from the RSGB's pages should send these details by e-mail to sales@rsgb.org.uk* - Ed.]

Morse Improvers Net

I passed the 5WPM Morse test in September at the Harrogate 'Morse Camp'. The weekend was well organised, friendly and even enjoyable! Now after 40-plus years in the hobby, and holding a G8 call for 28 years, I can operate on HF which is great fun.

I am trying to improve my Morse speed with the aim of taking the 12WPM test before it disappears. I want to practice on the air but that means asking people to slow down. During the last few weeks I have managed a few CW QSOs with some very patient people.

Everybody has been very supportive but I was wondering if there is a need for a slow speed net. Maybe an M5 / Novice net would be useful? Does one already exist?

Colin Shaw, M5FRA (and G8FRA)

[*It is hoped to start a slow-speed net precisely as suggested by Colin in the near future. This will, of course, be reported on GB2RS news, on the Internet site at www.rsgb.org and in* RadCom *as soon as details become available* - Ed.]

Contests - Again

Once again the bands have been completely obliterated by amateurs yelling their heads off from band edge to band edge. Even when I called "CQ, no contest please" I was called and asked for a number. What is it that drives less than 30% of the world's amateurs to behave in this fashion?

One wouldn't mind, but why does the competition have to be an all-band rave? And why do we have so many during the year? I fully believe that contests will be the downfall of band allocation, because I would like someone to explain to me how a contest increases the 'self-learning' of the individual.

As you may have gathered, I do not like contests, but far be it for me to say we should not have any. It obviously turns certain people on, but I do think consideration should be given to those of us who only have the weekends to go on the air. Would not it be better to restrict the contest to one band at a time, or to one day and not two? Or even arrange them during the week? Since I was licensed in 1970 the number of contests has more than doubled.

Why cannot all the countries get together for one great contest and not organise their own bit of 'band bedlam' on different dates? If the RSGB cannot propose something more conducive to amateur radio - because contests were never part of the real amateur's hobby - then the hobby will gradually die away. Action should be taken now to reduce - not encourage - this menace.

D Bedford, G4ABS

[*Unfortunately Mr Bedford's letter had to be edited to fit the available space, but contesters and anti-contesters alike will recognise his arguments, which appear after major contests each year and which have been aired in* RadCom *on many occasions. The counter-arguments are also the same each time:* no *contests are all-band (none include the three WARC bands); when there is a major contest on CW, non-contest contacts can be made on SSB (and* vice versa*); when there is a VHF contest the HF bands are contest-free (and* vice versa*). There are very few weekends in the year when the bands are* full *of contest activity, as most of the national events attract relatively little activity. We often hear the phrase "use or lose", yet many of the VHF/UHF bands see little activity - certainly compared with adjacent commercial bands - except during contests; far from being "the downfall of band allocation" it may be contests that ensure the survival of these bands* - Ed.]

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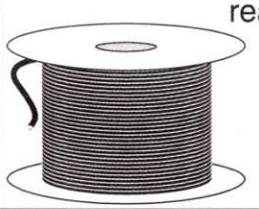

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INDEX TO VOLUME 76 *JANUARY TO DECEMBER 2000*

The rules for all RSGB contests were in the *2000 Contesting Guide* published with October 1999 *RadCom*. VHF NFD Rules are on p79 of April 2000 *RadCom*.

(see also Awards and Trophies, and *SWL* column)

VHF / UHF / MICROWAVE

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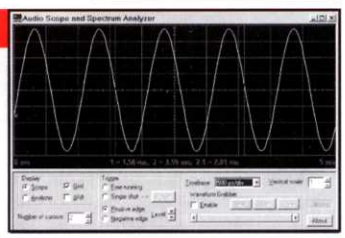

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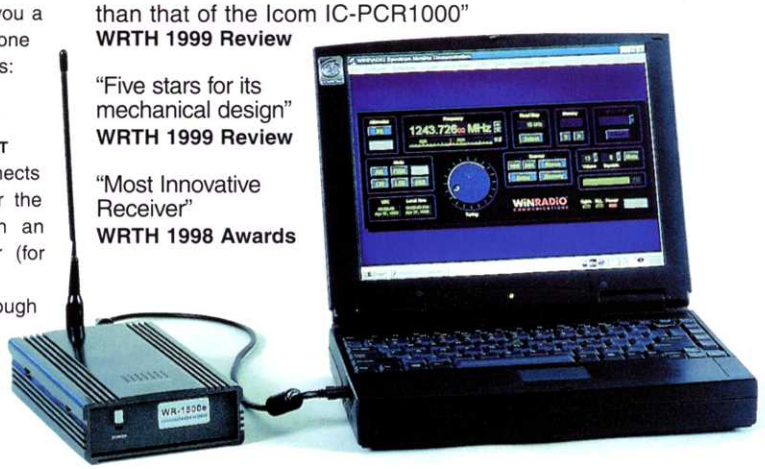

Model Name/Number	WR-1000i & WR-1000e	WR-1550i & WR-1550e	WR-3100i & WR-3100e
Construction of internals	WR-1000i/WR-1550i-3100iDSP- Internal full length ISA cards		
Construction of externals	WR-1000e/WR-1550e - 3100e - external RS232/PCMCIA (optional)		
Frequency range	0.5-1300 MHz	0.15-1500 MHz	0.15-1500 MHz
Modes	AM,SSB/CW,FM-N,FM-W	AM,LSB,USB,CW,FM-N,FM-W	AM,LSB,USB,CW,FM-N,FM-W
Tuning resolution	100 Hz (5 Hz BFO)	10 Hz (1Hz for SSB and CW)	10 Hz (1Hz for SSB and CW)
IF bandwidths	6 kHz (AM/SSB), 17 kHz (FM-N), 230 kHz (W)	2.5 kHz(SSB/CW), 6 kHz (AM) 17 kHz (FM-N), 230 kHz (W)	2.5 kHz(SSB/CW), 6 kHz (AM) 17 kHz (FM-N), 230 kHz (W)
Receiver type	PLL-based triple-conv. superhet		
Scanning speed	10 ch/sec (AM), 50 ch/sec (FM)		
Audio output on card	200mW	200mW	200mW
Max on one motherboard	8 cards	8 cards	6-8 cards (please ask)
Dynamic range	65 dB	70 dB	85dB
IF shift (passband tuning)	no	±2 kHz	±2 kHz
DSP in hardware	no - use optional DS software		YES (ISA card ONLY)
IRQ required	no	no	yes (for ISA card)
Spectrum Scope	yes	yes	yes
Visitune	yes	yes	yes
Published software API	yes	yes	yes (also DSP)
Internal ISA cards	£299 inc vat	£369 inc vat	£1169.13 inc
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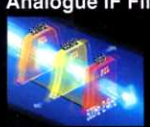
Today's Premier class operators demand the best RF weaponry available. Yaesu's exciting new MARK-V FT-1000MP answers the call, with an expanded array of receiver filtering, 200 Watts of power output, and Class-A SSB operation capability for the cleanest signal on the band. Enhanced front-panel ergonomics saves you precious seconds in a DX or contest pile-up. Yaesu HF design and manufacturing know-how ensures that no short-cuts have been taken in our effort to bring you the best HF transceiver money can buy. For more QSOs in your log, and more awards on your wall, there is only one choice: the MARK-V FT-1000MP from Yaesu!

I. IDBT: Interlocked Digital Bandwidth Tracking System

The IDBT feature greatly simplifies operation by matching the bandwidth of the DSP (Digital Signal Processing) system to the net bandwidth of the 8.2 MHz and 455 kHz IF stages. The IDBT system monitors the settings of the SHIFT and WIDTH controls, and automatically sets the DSP bandwidth to match the user settings within the net bandwidth of the Analogue IF Filtering.



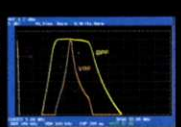
IDBT: A Breakthrough in Selectivity!

II. VRF: Variable RF Front-End Filter

Protecting the MARK-V's receiver components from strong out-of-band signals, the VRF system acts as a high-Q "Preselector," located between the antenna and the main bandpass filter networks, providing additional RF selectivity on the 160-20 meter Amateur bands for multi-operator contest teams, DX-peditions, or for operation near MW/SW broadcast stations.

10-pole Collins® Mechanical SSB Filter

VRF Features Large, High-Q Coils and High-Quality Relays



VRF Typical Bandpass Response (3.5 MHz)

III. 200 Watts of Transmitter Power Output

Utilising two Philips® BLF 147 Power MOSFETs in a 30 V push-pull configuration the MARK-V's Transmitter generates up to 200 Watts of the cleanest RF Power output available thanks to the conservative design of the PA Section.

Philips Power MOSFETs

High-Speed Automatic Antenna Tuner

IV. Class-A SSB Operation

Exclusively available on the MARK-V FT-1000MP , a press of a front-panel button engages Class-A SSB operation of the transmitter, at a power output level of 75 Watts. Class-A operation produces incredibly clean signal quality, with 3rd- order IMD suppressed 50 dB or more, and 5th- and higher-order products typically down 80 dB or more!

Class A 75 W PEP IMD

V. Multi-Function Shuttle Jog Tuning/ Control Ring

The immensely-popular Shuttle Jog tuning ring, which is concentric with the Main Tuning Knob, has a new look in the MARK-V: it now includes the activation switches for the VRF (left side) and IDBT (right side) features, so you don't have to move your hand position to activate these important circuits during contest or pile-up situations!

Access VRF and IDBT Features via Shuttle Jog Dial

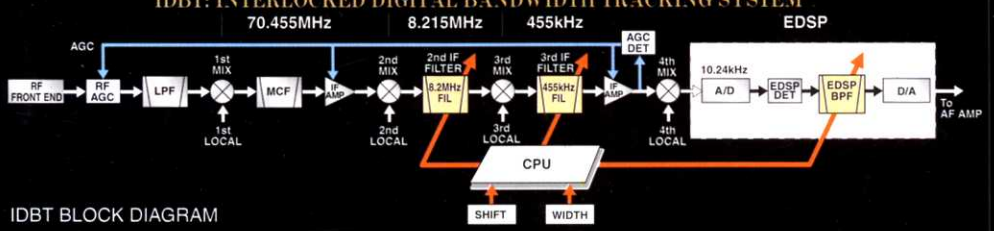
DC 30 V / 13.8 V Power Supply FP-29

Photo shows optional MD-100A8X **Deluxe** Desk Microphone

HF 200 W All-Mode Transceiver

MARK-V FT-1000MP

IDBT: INTERLOCKED DIGITAL BANDWIDTH TRACKING SYSTEM



IDBT BLOCK DIAGRAM

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