Guide to the Leicester Amateur Radio Show

# RadCom

www.rsgb.org

£3.95 Volume 76 No 9 ♦ September 2000 Journal of The Radio Society of Great Britain

## Peter Hart reviews four top handhelds

## Build the PicATUne

## Spurs striker visits HQ

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We've created the UK's most spacious amateur radio showroom, with comfortable surroundings and plenty of space to sit down and try any radio of your choice. There are no compromises. Imagine sitting in comfort, with coffee and tea on call, and being able to play with whatever rig takes your fancy. Experience the widest range of accessories ever displayed. Browse through an amazing variety of items dedicated to radio communicatoions.There's only one truly dedicated Ham Store!



NEW 2000 SQ. FT. SHOWROOM


YAESU Choice of the World's top DX'ers


£799 Plus £7.50 Carr.

## FT-100

This diminutive HF transceiver will pump out 100 Watts of RF power from 1.8 - 50MHz ham bands. It will also give you 50 Watts on 2m and 20 Watts on 70cm. The removable head makes it easy for car installation, yet it is just as much at home when used for base station operation. There's a choice of extra CW filters and a front-end performance that matches many rigs costing much more.

Modes: SSB CW FM AM
Receive Range: 100kHz - 970MHz
Power HF & 6m : 100 Watts
Power 2m: 50 Watts
Power 70cm: 20 Watts
Memories: 300
Head Unit: Remote option
Bandwidths: 6kHz to 60Hz
Output 1: HF - 6m
Output 2: 2m - 70cm
Size: 160 x 54 x 205mm
Weight: 3kg.

YAESU FT-840 160-10m

£599 Plus £7.50 Carr.

A firm favourite, this 100W radio is an ideal rig for those on a budget. Impossible to fault, it just goes on and on!

**24-Month FREE Warranty on Yaesu**

ICOM IC-756PRO 1.8 - 52MHz 100W

£1959 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 SAVE
160m - 70cm All Mode
£1329 with switch mode power supply

PRICE MATCH


£1249 Plus £7.50 Carr.

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
19.4% APR Available

SAVE

£1795 Plus £7.50 Carr.

*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


£1349 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


£Phone Plus £7.50 Carr.

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


£825 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.

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MasterCard VISA

## 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

## SAVE
## C-408
## 70cm Handy
*Previously £89.95*

£69.95 Plus £6.00 Carr.

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

## SPECIAL
## 2m Handheld 2 Watts out

£29 Plus £6.00 Carr.

This is a 2 - channel crystal controlled radio working on S-20 and S-22 found in a warehouse in an unopened crate! Includes battery box for 6 x AA (not supplied) and BNC telescopic antenna. These are for simplex use only. Great value at this silly price.
Order code: ComTalk-2

## 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!

## GARMIN
## GPS-III Plus

£359 Plus £6.00 Carr.

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

NEW

## Optoelectronics
## CD-100 MULTICOUNTER

**Reads Frequency & Codes**

£379.95 Plus £6.00 Carr.

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

## ICOM
## IC-2800H
**In Full Colour!**

£310 Plus £7.50 Carr.

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

Includes FREE Remote head cable.

## 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

## 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

## ICOM
## IC-207H

£245 Plus £7.50 Carr.

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

## C-150 2m Handy

£99.95 Plus £6.00 Carr.

* 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.)

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

SAVE

£309 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.

## KENWOOD
## TM-G707E

£259 Plus £7.50 Carr.

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

£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-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.

## YAESU
## FT-50R

£199 Plus £6.00 Carr.

* 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

## 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

## 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

E & OE

W&S
Waters & Stantons PLC

**FREE MFJ Catalogue** - Just Phone!
BEWARE of grey imports. All MFJ products should have serial numbers and UK Warranty cards issued by us.

# MFJ
FREE CATALOGUE

Every Model Stocked

## MFJ-969 300W

£169.95 Plus £7.50 Carr.

160 - 6m Wire, Coax or Balanced

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

## MFJ-949E 300W ATU

£139.95 Plus £6.00 Carr.

160 - 10m Wire, Coax or Balanced

Includes VSWR / Power Meter, Ant. Selector, PEP feature, Built-in Dummy Load

## MFJ-948 300W ATU

£119.95 Plus £6.00 Carr.

160 - 10m Wire, Coax or Balanced

Includes VSWR / Power Meter, Ant. Selector, PEP feature, Built-in Balun, 12v Illumination

## MFJ-901B 300W ATU

£75.95 Plus £6.00 Carr.

160 - 10m Wire, Coax or Balanced

## MFJ-962D 1.5kW ATU

£239.95 Plus £7.50 Carr.

160 - 10m Wire, Coax or Balanced

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

## MFJ-986 3kW ATU

£289.95 Plus £7.50 Carr.

160 - 10m Wire, Coax or Balanced

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

## MFJ-989C 3kW ATU

£299.95 Plus £7.50 Carr.

160 - 10m Wire, Coax or Balanced

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

## MFJ-269 Analyser

160m - 70cm On-site Antenna Analyser.

£299.95 Plus £6.00 Carr.

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

| | | |
|---|---|---|
| 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 |

Phone for carriage

NEW

## WBB-3 Wideband Mobile Antenna

3.5 - 30MHz No Gaps!
Remote Tuning - Low WSWR
Rated to 400W
*Change band without leaving the car seat.*

* Max Height Approx 2.7m
* 2" diameter coil
* Weather shroud
* Single 3/8" bolt fixing
* Impedance transformer
* Remote control box
* Cable harness
* 50 Ohm Feed

| | | |
|---|---|---|
| WBB-3 | Antenna | £295.00 |
| WUMB | Chassis bracket | £15.95 |
| WC-160 | 160m coil | £44.95 |

Carriage £7.50

## 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.

## Telescopic Masts

**Much Stronger than Alloy Poles!**

NEW

We are now able to supply a range of telescopic tiltover masts, galvanised to BS729. These masts are extensively used for commercial purposes and built to a very high standard. Heights available from 7.6m to 12m extended. Models for wall mounting or post mounting are included. The post mounted versions tilt-over and are supplied with a socket for mounting in concrete. Models are available to support antennas from VHF to HF tribanders.

| | | |
|---|---|---|
| AAM | **7.6m** Wall mount (VHF & Mini HF) | £250 (£30) |
| AAM | **10m** Wall mount (VHF & Mini HF) | £295 (£35) |
| TML | **7.6m** Self supporting (VHF & Mini HF) | £340 (£35) |
| TML | **9.2m** Self supporting (VHF & Mini HF) | £415 (£40) |
| TMS | **10.7m** Self supporting (HF 3 el beams) | £579 (£52) |
| TMS | **12m** Self supporting (HF 3 el beams) | £659 (£57.50) |
| TMS | **10.5m** (3 section) (HF 3 el beams) | £659 (£52.50) |

Price in brackets are carriage charges. Delivery is normally 3 - 5 days from date of order. We suggest you discuss your requirements with us by phone to make sure that you choose the right model for your needs.

***Phone or write for full information and drawings***

NEW

## MMT-1 Mobile Martching Unit

A wideband ferrite transformer to match the low impedance of a mobile whip to 50 Ohm coax cable. Particularly essential on 80m and 40m. Covers 3.5MHz - 24MHz. Rated at 400W pep.
**£19.95 post £2.00**

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.

Just 66ft Long!

**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 | £77.95 |

Plus £7.50 Carr.

## PacComm TNCs from USA

| | |
|---|---|
| Tiny-2 1200bps | £149.95 |
| PicoPacket 1200bps | £139.95 |
| Spirit-2 9600bps | £259.95 |

Plus £6.00 Carr.

The lovely little PicoPacket even permits APRS with your mobile transceiver. Phone for leaflet.

## Power Supplies

£99.95 Plus £6.00 Carr.

**SEC-1223**
**13.8V PSU**
**23 Amps - 3.2lbs!**
**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

## LINEAR AMP UK Amplifiers


£895 Plus £7.50 Carr.

**UK Ranger 811H (illustrated) £895** Plus £7.50 Carr.
* 1.8 - 30 MHz. 800 watts output
* Drive: - 10-100W * Built in Power Supply

**British made Amplifiers with a Pedigree**

## 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.

## MFJ CUB QRP Transceivers

NEW

**Ready Built or Kit**

Models for 80m, 40m, 30m, 20m, & 15m

| | |
|---|---|
| **Kits** | **£89.95** |
| **Built** | **£139.95** |

Everything you need to build these lovely little 1 Watt CW rigs. Includes direct sidetone monitoring and QSK. Surface mounted components pre-installed on board, so building is very fast. Can't wait? Purchase a ready-built and tested model.

## MFJ-910 Mobile Matcher


£24.95 Plus £2.00 Carr.

***Get your VSWR down***

***Radiate more Power***

HF mobile whips have very low impedances, particularly on 160m, 80m and 40m. Feeding direct with 50 Ohm cable results in high VSWR with poor power delivery from solid state radios. Insert this matcher and get low VSWR and maximum transfer. Our own Peter Waters, G3OJV/M, uses one. Works like magic!

NEW

## W-40SM 40 Amp Switch Mode

£149.95 Plus £6.00 Carr.

Digital display, variable ouitput rated at 40 Amps continuous. Fully protected and very low noise. Ideal for a wide variety of ham applications. Light weight makes it easy to transport.

**Order Details on inside Front Cover**

# In a Changing World It's Time To.....

# CHANGE

## HF 1.8MHz-30MHz 100W
## TS-570DGE


SSB- CW-AM-FM
Internal ATU
DSP Filtering
CW Audio Filtering & Auto Tune
46 Programmable Features

## VHF/UHF 50W/35W
## TM-D700E


TNC Built-in (1200/9600bps)
DX cluster monitoring.
Wide/Narrow Channel Ready
Remote Display Head. Cable Supplied
GPS Terminal (NMEA) For APRS operation
Full Dual Band Operation VHF/UHF

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# Icom Specials at ML&S

***The IC-756PRO contains new and improved features of great interest to serious HF operators and DX enthusiasts.***

## IC-756PRO

### HF+50MHz, 32bit DSP transceiver

- ***32-bit, Floating-point, IF DSP*** - *this refined level of processing improves noise reduction and provides auto-notch functions.*
- ***5-inch TFT Colour LCD*** - *a first in a HF transceiver! This LCD provides a wider viewing angle and increased level of information, without cluttering the display area. The following information can be displayed:-*
  - *Dual frequency display*
  - *Memory frequency & memory name*
  - *IF filter bandwidth*
  - *RTTY tuning indicator and received characters*
  - *Real-time spectrum scope*
  - *Voice memory/CW memory keyer contents*
- ***Digital Voice Memory*** - *4 channels are assigned for transmit and 4 for receive, with up to 15 seconds recording in each.*
- ***Digital Twin-Pass Band Tuning*** - *digitally narrows the pass-band width at the DSP to efficiently eliminate interfering signals. Operating the PBT within the DSP allows sharper, superior pass-band width characteristics.*
- ***Real-time Spectrum Scope*** - *selectable sweep ranges, ±12.5kHz, ±25kHz, ±50kHz, ±100kHz.*
- ***Dual-watch*** - *receive two signals on the same frequency band simultaneously. Monitor a DX station while operating on another frequency!*
- ***AGC Loop Operation*** - *IF filter and notch circuits are included in the DSP loop, giving a wider dynamic range.*
- ***Digital IF Filter*** - *with 51 selectable bandwidths. To operate in PSK31 and other digital modes, it is possible to set the bandwidth for the SSB filter to 50Hz.*
- ***Low Distortion, RF-type, Speech Compressor*** - *with selectable transmit bandwidths of 2.0kHz, 2.6kHz, and 2.9kHz.*
- ***Built-in RTTY demodulator/dual-peak APF*** - *an RTTY demodulator and decoder circuit is built-in. Two peak frequencies can be selected by setting the shift width for RTTY operation. Received data is shown on the LCD.*

**ML&S SPECIAL PRICE**

**£1949**

ALSO AVAILABLE ON FINANCE WITH NO DEPOSIT AND 36 PAYMENTS OF £72.44. APR 21.9%

**The Icom PW-1**

The ultimate companion for the IC-756PRO

**Ring for latest price.**

## IC-2800H

### Save a massive £210!

Even ignoring the large easy to read colour TFT screen, the IC-2800 is a pretty cool piece of kit. The build quality for one is in a different class to the rest and employed at home or in the car, its doubtful if we will ever sell you another dual bander. (that's pretty tough on us).

**ML&S SPECIAL PRICE**

**£339**

ALSO AVAILABLE ON FINANCE WITH NO DEPOSIT AND 24 PAYMENTS OF £18.63. APR 21.9%

**MARTIN LYNCH & SONS**

**140-142 NORTHFIELD AVENUE, EALING, LONDON W13 9SB**

**FAX: 0208 - 566 1207** **WEB SITE: WWW. www.hamradio.co.uk** **E-MAIL: sales@MLandS.co.uk**

Martin Lynch can also offer finance terms up to 48 months with no deposit. We welcome your part exchange against any new (or used!) product, provided its clean and in good working order. Call the Sales Desk today. APR: 21.9%. Payment protection is also available up to 36 months. All units are brand new and boxed and offered with full manufacturers RTB warranty. All prices quoted for cash/cheque or Switch/Delta card. No additional charges for credit cards. Martin Lynch is a licensed credit broker. Full written details are available on request. Finance is subject to status. E&OE. £10 p&p on all major items.

ML&S is an authorised dealer and has workshops on-site, inspected and certified by Icom U.K.

## Front Cover:

The PicATUne intelligent ATU, by Peter Rhodes, G3XJP. The four VHF/UHF handheld transceivers reviewed by Peter Hart, G3SJX. Tottenham Hotspur's new contest-winning striker, Sergei Rebrov, UT5UDX.


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*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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**49 Pull-out Guide to the Leicester Amateur Radio Show**


September 2000

# Contents

## News and Reports



## Technical Features



## Down To Earth - Amateur Radio From The Ground Up



## Review



## 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.

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**Zone A:** P R Sheppard, DipOS, FinstSMM, G4EJP
**Zone B:** J F Layton, G4AAL
**Zone C:** F C Handscombe, G4BWP
**Zone D:** D W McQue, G4NJU
**Zone E:** E P Essery, GW3KFE
**Zone F:** J D Smith, MI0AEX
**Zone G:** T W G Menzies, RSSA, GM1GEQ

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

## Annual Subscription Rates

| | |
|---|---|
| ***Home Corporate*** | **£38.50** |
| ***Overseas Corporate*** | **£38.50** |
| ***Corporate (Senior Citizens)*** (Applications should provide proof of age at last renewal date) | **£29.50** |
| ***Corporate after 50 years membership*** | **50% DISCOUNT** |
| ***Corporate after 60 years membership*** | **FREE** |
| ***Family member*** (Must reside with existing member. Does not include *RadCom*) | **£14.50** |
| ***Student Members*** (Applications should include evidence of full-time student status) | **£24.50** |
| ***Affiliated Societies (UK or Overseas)*** (including *RadCom*) | **£22.50** |
| ***HamClub (under 18)*** | **£14.50** |

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

Telephone 01707 659015
Fax 01707 645105
Website www.rsgb.org



# Moving Forward

IN THE JUNE *RadCom* we outlined our thinking about the future structure for management and governance of the Society. We asked for your comments, and we have received a number of inputs. For these were are very grateful. By far the majority of those commenting were in favour of the changes we proposed, recognising that our links with the clubs and our members need to be strengthened and our management structure made more efficient.

Now we are moving into the formalisation of the changes. We will be setting out in the November *RadCom*, as we are required to do under Company law, the full Memorandum, Articles and Bylaws we propose should replace those that exist at present. The drafting of these has been a major effort, and we have worked hard to keep the legal costs to a very minimum. This has involved members of the Management Committee taking much of the drafting load upon themselves, and I am very grateful to them for their work. Our specialist external legal advisors have reviewed the resulting documents and declared themselves fully satisfied.

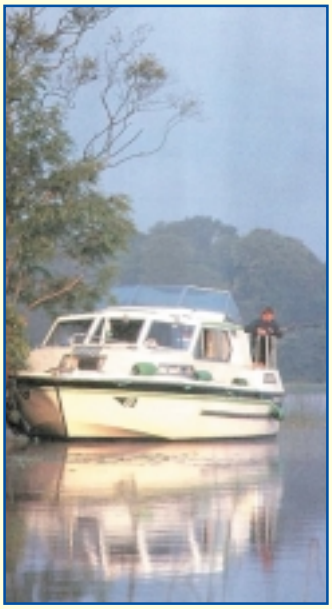
In terms of transition to the new arrangements, Council has two options. Firstly, to assume that the new arrangements will be accepted at the AGM in December and to structure the Council elections for this year with that in mind. Alternatively, we could run this year's Council elections to the current arrangements and take a further year to put in place the new structure.

Council has reviewed its position and decided that even within the existing articles, we can operate with a smaller Council (the Articles simply state a maximum size), so we will be reducing the number of ordinary members of Council to six from January 2001. These Council members will carry 'portfolios', as described in the June *RadCom*. We will be appointing the full number of seven Zonal members of Council under the existing articles and, when hopefully the new Articles are formally approved, Council may then co-opt additional members to form the Regional Council referred to in the June articles. Any appointment of additional Regional Council members will then be put to the vote in December 2001.

I hope members will feel that it makes sense to move as swiftly as we are able under our current Articles, and that you will feel able to support your Society in the changes it plans when we ask for your vote in November.

***Don Beattie, G3OZF, President***

## Shannon River Run, 2000



**Fishing for DX: the scenery is superb, anyway!**

THIS FAMOUS event will be taking place in September of this year. It is a coordinated clubs/societies event open to all. A tentative date of the weekend of 22-24 September has been set, but this is still under consideration. 10 or 12 boats from different clubs are expected to be involved.

It is planned to activate as many WAI squares and counties as possible along the Shannon, mainly on 2m and 80m, but also on all the other bands. There will be certificates to be awarded to stations who work all the boats, the boat that works the best DX, and many other prizes too! Up-to-date information is posted on the web site (homepage.eircom.net/~shannonriverrun)

## JOTA Looms

The annual Scouts and Guides Jamboree on the Air (JOTA) takes place on 21/22 October. Information packs will be available from RSGB HQ for all participants. Groups using a GX or similar prefix instead of a GB call are asked to inform HQ.

*UT5UDX strikes-up rapport with staff at RSGB*

# Spurs' Striker Visits RSGB HQ

AS BEFITS ANY keen radio amateur abroad, Sergei Rebrov, UT5UDX, was quick to pay a visit to the country's national radio society, the RSGB. His visit was on Thursday 3 August, and set the seal on what is hoped will be a continuing contact between Sergei and the RSGB.

Sergei is the striker for whom Tottenham Hotspur Football Club has just paid a transfer fee of £11m to his former club, Dynamo Kiev, in the Ukraine.

His prowess as striker with his former club is unquestioned - he became the first player to score 100 goals in the Ukrainian League, scoring 18 goals in 20 matches.

No-one would question his radio skills either - he won the single-operator section of the IOTA contest in 1997.

He looks forward to operating from England with a new callsign. Enquiries to the Radiocommunications Agency revealed that the callsign M0UDX had already been allocated, however.

**At home: Sergei, UT5UDX, in the GB3RS shack.**

Living in a hotel at the moment, he looks forward to settling into his own home. In his characteristic self-effacing way, he admitted that "All I need to do now is to set up my own radio station and I'll be very happy," a sentiment with which we can all identify.

We all hope that Sergei, in his high-profile role as soccer star, can bring an awareness of amateur radio to a whole new audience - football fans everywhere.

## *Images from* RSGB Hamfest 2000

# It's 12-tonne Pie Time!

SINCE 1 AUGUST, the Denby Dale Amateur Radio Society has been operating Special Event station GB2DDP to draw national and international attention to the *Denby Dale Pie 2000* event.

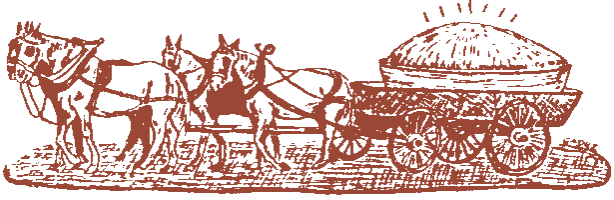
The Pie festivities date back to 1788, and involve the making of a world-record-breaking meat and potato pie which, this year, will weigh 12 tonnes. The great day will be 2 September, when the baking, parade and consumption of the Pie will take place.

The whole weekend is devoted to maintaining a carnival atmosphere, with a vintage car rally, fairground entertainments, a craft show, a shire horse display, a mini assault course and bouncy castles featuring in the activities - and that's just Saturday! Sunday is a concert and family day, with music filling the major portion of the 12-hour event.

The Denby Dale ARS is making a determined effort this year to raise the profile of amateur radio in Yorkshire, having activated three windmills in the National Mills weekend earlier this year. A link with Pie history is provided by one member of the society, G3ABS, who took part in the 1928 Pie festivities.

Some 50,000 people are expected to be there this year, and there will be TV and radio coverage of the event.

"Pie, mushy peas, chips and gravy, please..."



# Repeater News

## GB3DW

The Arfon Repeater Group has announced that GB3DW is fully functional in repeater mode as of 20 July. It is located near Criccieth in north Wales, and operates on 145.6625MHz (a 12.5kHz channel).

Coverage reports are welcomed by the repeater keeper Brian, GW4KAZ, and can be made to any member of the ARG Committee.

## GB3CF

The Leicester Repeater Group's 2m repeater, GB3CF, is back on air following routine maintenance and conversion to 12.5kHz channel spacing.

A major project to install new cable ducting and waveguides is now under way. Reception reports and offers of assistance are welcomed. The Group Chairman is John, G7RXS, who can be contacted on 0116 284 1517.

## GB3CJ

The RSGB Repeater Management Committee is pleased to be able to report that the UK's first 10-metre repeater, GB3CJ in Northampton, was licensed by the Radiocommunications Agency on 7 July 2000. This was a revision of the licence granted in 1999, when the repeater group concerned requested use of transposed frequencies compared with conventional repeaters in the rest of the world. Within days of testing, and after many complaints from the USA, the group requested site- and frequency-changes, and these have now been agreed.

The repeater now uses two sites linked using the 13cm band. The input and output frequencies are 29.540 and 29.640MHz respectively. Operation should commence as soon as the final installation is completed, and will be announced in due course on GB2RS.

The Radiocommunications Agency has indicated that it is prepared consider further applications for 10 metre repeaters once GB3CJ has proved itself.

# RSGB VHF AWARDS

## Summary of Award Recipients for July

### 50MHz:

| | |
|---|---|
| 25 squares: | MM1ALC, G6BFP, G1ZBJ, GM3WKZ |
| 50 & 75 squares: | GM3WKZ |
| 300 squares: | G4DCJ |
| 10 countries (2-way): | G1ZBJ, GM3WKZ, |
| 20 countries: | G6BFP, GM3WKZ |
| 25 countries (DX): | GM3WKZ |
| 75 countries: | G4DCJ |

### 70MHz:

Senior: ..... G3MEH

### IARU 2000:

G1ZBJ, M0CBM, M1DUT

Details of all VHF, UHF and Microwave awards can be obtained from Tony Jarvis, G6TTL, Dovecote Farm, Patman's Lane, Friskney, Boston, Lincolnshire PE22 8QJ, or from www.argonet.co.uk/users/tonyg6ttl/awards/awards.htm

# First North American 136kHz QSO

VA3LK and VE3OT have made the first north American 2-way contact on the 136kHz band. At 1400 UTC on 22 July they used extremely slow CW to cover a distance of 431km. VA3LK ran about 70 watts RF into an antenna 65m high and VE3OT ran 200 watts into a 16m high inverted-L. The stations are being gradually improved in the run up to November's trans-Atlantic tests. Further details are available via the RSGB web site.

**The VE3OT transmitter, utilising an old Hewlett-Packard cabinet.**

# December's RAE

ENTRIES MUST BE with the City and Guilds by the 1st of November from anyone wanting to enter for the Radio Amateurs' Examination on Monday the 11th of December. Students who are part of an organised course will almost certainly be entered by their instructor. External candidates should contact their local examination centre by the middle of October at the latest, to give the centre time to process their entries and send them to the City and Guilds by 1 November. Late entries are difficult to process, and also carry a substantial surcharge.

# PSK31 *et al*

THE RSGB VHF Committee has recommended the following frequencies for use with PSK31 and other similar emergent narrow-and digital modes:

6m band ..... 50.385MHz;
4m band ..... 70.085MHz;
2m band ..... 144.085MHz;
70cm band ..... 432.085MHz.

These frequencies should be regarded as centres of activity, with operation ±5kHz.

- *Mir* is to be permanently manned, beginning next year, as the world's first truly-commercial orbiting space station. Its amateur radio future is uncertain.

# Station X Twinned with Camp X

ON SUNDAY 9 July, Dave McQue, the RLO for Zone D, attended a ceremony in the library of the mansion at Bletchley Park Museum. This was to celebrate the twinning of the Milton Keynes Amateur Radio Society (MKARS) and the North Shore Amateur Radio Club (NSARC) of Oshawa, Ontario, Canada.

This follows the successful special weekend of contacts between Bletchley Park (Station X) and Camp X in Oshawa on 6-8 May 2000, re-linking the two sites. Camp X and Bletchley Park were linked during the war by a Hydra system and all contacts between both countries came through the two sites. The Camp X Historical Society is in the process of establishing a museum dedicated to those who worked there and to the SOE agents who were trained there.

It was said that the link between the two sites was never lost, only put on temporary hold. Now it has been re-established permanently with the twinning of the two clubs.

**Left to right: Dave White, G3ZPA, MKARS; Sarah Collins, VE3ZQS, NSARC; Sir Philip Duncombe, Chairman of the Bletchley Park Trust; Dave McQue, G4NJU, RLO for Zone D; Verdun Webley, G0RKV, Chairman of MKARS; Bill Collier, G0TGU, MKARS; Matt Preston, M0BUP, MKARS. (Photo: M0AIJ)**

# Up and Down - Ten Times

GB2RS LISTENERS may remember the advanced warning given of Alan Cope's valiant aim to climb one of the mountains on the Isle of Skye ten times in one day.

Bein na Caillich is a 2,400ft mountain near Broadford, Skye, and Alan started his attempt at 3.15am on 15 July. He ended his tenth round trip at 7.30pm, having covered a distance almost equivalent to an ascent of Mount Everest!

A Special Event station, GB0BNC, was established to monitor Alan's progress and to publicise his efforts, hoping to raise funds to improve leisure facilities in South Skye.

104 stations were worked, but conditions on all bands were poor, due to solar activity. The equipment was an IC-706 and switched-mode power supply run from a small generator. GM3VLB's 'fishing rod' vertical antenna allowed the station to be set up where there were no convenient trees. The ground plane wires were prone however to nibbling by the Highland Cattle and sheep!

**The 'base camp': GB0BNC situated within easy reach of sustenance during the vigil.**

# Nominations for G5RP Trophy

THE G5RP TROPHY is an annual award to encourage newcomers to HF DXing. It is awarded for making recent rapid progress in DXing, which only newcomers have the scope to do. However, the award is not limited to youngsters or the newly-licensed - the DX bug can bite at any age and after many years of experience.

Seasoned HF DXers are able to reward and encourage newcomers by nominating an up-and-coming DXer for this award. Your nominations for the 1999-2000 award are needed now.

The trophy is awarded jointly by the Vale of White Horse Radio Society and the RSGB HF Committee, and will be presented at the RSGB International HF and IOTA Convention on the 14th and 15th of October 2000.

Nominations should be sent to Fred Handscombe, G4BWP, c/o RSGB HF Committee, or by email to g4bwp@rsgb.org.uk or by post to Sandholm, Bridge End Road, Red Lodge, Bury St Edmunds, Suffolk IP28 8LQ, to arrive no later than 10 September.

# UI-View Demo

KENWOOD UK has announced that Roger Barker, G4IDE, author of the popular software *UI-View* and *WinPack*, will be on the Kenwood stand at the Leicester Amateur Radio Show.

He will be demonstrating the operation of *UI-View*, and it will be possible to see the program used in conjunction with the Kenwood TM-D700E dual-band mobile/data transceiver.

The Leicester Amateur Radio Show will be held at Castle Donington on 22/23 September.

# CW Practice Tape Improvements

IN THE September 1999 *RadCom*, p12, the offer of tailor-made Morse practice tapes was made as an experiment. Since then, over 200 tapes have been supplied to RSGB members. Tapes have been generated covering the range from 5WPM to 55WPM.

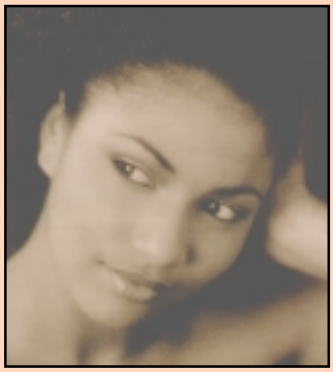
The formats available include over 1000 of the QSO type as used in the Morse test, plain language (with or without signals), callsigns only, numbers only, old GB2RS scripts, etc. The tapes are provided by George Allan, GM4HYF, Coordinator of the RSGB Morse Practice Service.

If you want 90 minutes of intensive practice at a particular speed, send him a blank C90 cassette, and include the speed and format required, together with a return-addressed envelope or a label and stamps. His address is 22 Tynwald Avenue, High Burnside, Rutherglen, Glasgow G73 4RN.

He has tripled his capacity and is confident that tapes can be generated within a matter of days.

# Sponsored Event

THE LOUGHTON and Epping Forest Amateur Radio Society has now re-scheduled its GB4PL Special Event from mid-July to 9/10 September. Being sponsored on a 'per QSO' basis, it will be contributing towards the £20,000 total needed to purchase comfortable and functional prosthetic fingers and toes, amputated as a result of meningitis, for a local 15-year old girl, Patsy Levick. The club's Secretary is Marc Litchman, G0TOC, who can be contacted during the evenings on 020 8502 1645.



**Patsy Levick**

## Chasing WAB?

Hal, ZS6WB, has pointed out that not all Worked All Britain chasers are in the UK, and asks that QSL cards from the UK should contain WAB information. Of the UK cards he has collected over the last two sunspot cycles, less than half contain this information. He is currently aiming for the WAB Silver Award, requiring 200 WAB areas, but still has 70 to go, hence his plea.

● Maltby and District Amateur Radio Society is moving *back* to its old venue – the Centenary Hall, Clifford Road, Hellaby near Rotherham. Meetings are held on Friday evenings between 7.30 and 9.30pm. For details contact Keith, G1PQW, QTHR, on 01709 798098 or by e-mail: g1pqw@pobox.com

● From 25 July 2000, CT1DRP and CT1DRP/1 have been licensed to operate in the 135.7 - 137.8kHz band on a secondary basis and with a maximum ERP of 1W. The licence is valid until 3 November 2001. This is the first CT licence for LF.



# SAQ Alternator *Too* Keen to Run Again!

PERFECT WEATHER on 2 July drew crowds of people from far and near to the Grimeton 'Great Radio Station'in Sweden, and it was filled with more than 300 people when the transmitter was started at 0815 UTC.

Bengt Dagås, Former Head of SAQ told us: "Everything seemed to be OK and, for about 10 seconds, we had aerial current. Then the speed regulation collapsed, the electric motor was subjected to the full voltage and its speed increased. As a result, no transmission was possible at the scheduled times of 0830 and 0845 UTC.

"We tried for some time to locate the error. There was no smell, no smoke, no broken rectifiers and no bad connections. At last we realised that there must be a short-circuit somewhere under the floor in the 75-year-old cabling from the alternator to the tuned circuit for speed regulation.

"A temporary cable was laid across the floor and the alternator was started again at 1140. The problem was solved, and the transmissions at 1230 and 1245 UTC went according to schedule. About 100kW was delivered to the aerial and around 10kW of that was radiated almost omnidirectionally.

**Some of the 500 people who flocked to see the leviathan transmitter SAQ in action again. (Photo: Alexander Benson)**

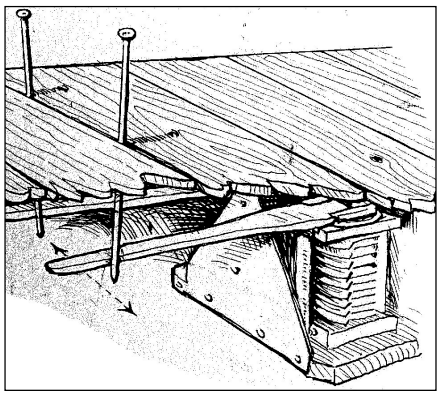
"The radio amateurs in their Special Event Station, SA6Q, worked well. 263 QSOs were made within a few hours, and we have so far received more than 50 reports by e-mail, telephone and letter from Europe and the USA.

"So, in spite of the problems, the day was a success, with about 500 visitors looking and listening to the old transmitter, listening to lectures on old long-wave transmitters and visiting a small touring exhibition of broadcasting from the Telemuseum in Stockholm.

"We thank all listeners for their reports and hope to be able to repeat this open-house transmission annually in memory of Ernst Alexanderson, the great inventor and designer of the SAQ alternator."

# G6SN Exploits to be Retold at IEE

AN IEE lecture is to be given by Ralph Barrett, G2FQS, at Savoy Place on Monday 30 October. The subject is 'Hidden Broadcasts', and includes a description of the radio receiver made by Captain Ernest Shackleton, G6SN, in Oflag 9 A/Z at Rotenburg-am-Fulda. It was hidden under the floorboards and operated by knitting needles through cracks in the floor, as the illustration shows. This receiver will be described in the lecture and will be on show.



**The tuning mechanism of the covert receiver made by G6SN. (Imperial War Museum)**

G6SN was highly involved with amateur radio in the 1930s, being instrumental in producing the Second Edition of the *Amateur Radio Handbook* in 1940.

The lecture is being held in the main lecture theatre at 6.30pm. Admission is free and open to members and non-members.

# RSGB Council Vacancies

COUNCIL'S DECISION to reduce the number of ordinary members from eight to six starting from January 2001 (see the President's Leader on p8), means that there will be no vacancies for ordinary members this year.

There will, however, be two Zonal vacancies. The first is in Zone C, where Fred Handscombe, G4BWP, is currently serving as a co-opted member due to the untimely death of Fred Stewart, G0CSF. The second is in Zone E (Wales) where Paul Essery, GW3KFE, has to stand down after completing six years in office.

Full details of how to nominate someone can be found on p11 of the August *RadCom*. Prospective candidates should be aware that nomination forms must be returned to RSGB HQ no later than 1 October.

***P A Kirby, G0TWW***
***Company Secretary***
***1 August 2000***

## NSSC Spawns Amateur Radio Club

A NEW AMATEUR radio society has been formed at the National Space Science Centre in Leicester. The NSC-ARS comprises radio amateurs and experienced satellite operators from the Leicester area.

It will work with the NSC to promote amateur radio, radio in space exploration and radio astronomy. The NSC-ARS is actively looking for commercial sponsors, and their web site is www.nsc-ars.fsnet.co.uk

# MOONRAKER

www.amateurantennas.com

## Tri-Bander Beam

**TBB3** 3 Element 6mts, 2mtr, 70cms, Boom Length 1.1mts, Longest Element 3mts, 5.00 dBd Gain. ..... **Price £65.95**

## HB9CV 2 Element Beam 3.5 dBd

**70cms** (Boom 12") ..... **£15.95**
**2 metre** (Boom 20") ..... **£19.95**
**4 metre** (Boom 23") ..... **£27.95**
**6 metre** (Boom 33") ..... **£34.95**
**10 metre** (Boom 52") ..... **£64.95**

## Halo Loops

**2 metre** (size 12" approx) ..... **£12.95**
**4 metre** (size 20" approx) ..... **£18.95**
**6 metre** (size 30" approx) ..... **£24.95**

## ½ Wave Vertical Fibre Glass (GRP) Base Antenna 3.5 dBd

*(without ground planes)*

**70 cms** (Length 26") ..... **£19.95**
**2 metre** (Length 52") ..... **£22.95**
**4 metre** (Length 92") ..... **£34.95**
**6 metre** (Length 126") ..... **£44.95**

## G5RV Wire Antenna (10-40/80 metre)

All fittings Stainless Steel

| | FULL | HALF |
|---|---|---|
| Standard | £22.95 | £19.95 |
| Hard Drawn | £24.95 | £21.95 |
| Flex Weave | £32.95 | £27.95 |
| PVC Coated Flex Weave | £37.95 | £32.95 |

## Inductors

Convert your g5rv half size into a full size with only a very small increase in size. Ideal for the small garden. ..... **£21.95**

## Best Quality Antenna Wire

*The Following Supplied in 50 metre lengths*

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

## Traps

10 metre trap ..... **£21.95**
15 metre trap ..... **£21.95**
20 metre trap ..... **£21.95**
40 metre trap ..... **£21.95**
80 metre trap ..... **£21.95**

## Baluns

**MB-1** 1:1 Balun ..... **£23.95**
**MB-4** 4:1 Balun ..... **£23.95**
**MB-6** 6:1 Balun ..... **£23.95**

## Crossed Yagi Beams

All fittings Stainless Steel

**2 metre 5 Element**
(Boom 64") (Gain 7.5dBd) ... **£64.95**
**2 metre 8 Element**
(Boom 126") (Gain 11.5dBd) ..... **£84.95**
**70 cms 13 Element**
(Boom 83") (Gain 12.5dBd) **£54.95**

## Mounting Hardware

ALL GALVANISED

**6" Stand Off Bracket**
*(complete with U Bolts)* ..... **£6.00**
**9" Stand off bracket**
*(complete with U Bolts)* ..... **£9.00**
**12" T & K Bracket**
*(complete with U Bolts)* ..... **£10.95**
**18" T & K Bracket**
*(complete with U Bolts)* ..... **£14.95**
**24" T & K Bracket**
*(complete with U Bolts)* ..... **£16.95**
**1¼"x 5' Heavy Duty Aluminium Swaged Poles** *(set of 4)* ..... **£19.95**
**1½"x 5' Heavy Duty Aluminium Swaged Poles** *(set of 4)* ..... **£29.95**
3-Way Pole Spider for Guy Rope/wire ..... **£3.95**
4-Way Pole Spider for Guy Rope/wire ..... **£4.95**
1½" Mast Sleeve/Joiner ..... **£8.95**
2" Mast Sleeve/Joiner ..... **£9.95**

## Vertical Fibre Glass (GRP) Base Antennas

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

**BM100 Dual-Bander** ..... **£29.95**
(2 mts 3dBd) (70cms 6dBd) (Length 39")
**SQBM100*Dual-Bander** ... **£39.95**
(2 mts 3dBd) (70cms 6dBd) (Length 39")
**BM200 Dual-Bander** ..... **£39.95**
(2 mts 4.5dBd) (70cms 7.5dBd) (Length 62")
**SQBM200* Dual-Bander** **£49.95**
(2 mts 4.5dBd) (70cms 7.5dBd) (Length 62")
**BM500 Dual** - Bander **Super Gainer** ..... **£49.95**
(2 mts 6.8dBd) (70cms 9.2dBd) (Length100")
**SQBM500 Dual - Bander Super Gainer** ..... **£59.95**
(2 mts 6.8dBd) (70cms 9.2dBd) (Length100")
**SM1000 Tri-Bander** ..... **£49.95**
(2 mts 5.2dBi) (6 mts 2.6dBi) (70cms 7dBi) (Length 62")
**BM1000 Tri-Bander** ..... **£59.95**
(2 mts 6.2dBd) (6 mts 3.0dBd) (70cms 8.4dBd) (Length 100")
**SQBM1000* Tri-Bander** ... **£69.95**
(2 mts 6.2dBd) (6 mts 3.0dBd) (70cms 8.4dBd) (Length 100")
***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

**BM60** ⅝ Wave, Length 62", 5.5dBd Gain ..... **£49.95**
**BM65** 2 X ⅝ Wave, Length 100", 8.0 dBd Gain ..... **£69.95**

## Reinforced hardened fibre glass masts (GRP)

1½" Diameter 2 metres long .. **£16.00**
1¾" Diameter 2 metres long .. **£20.00**
2" Diameter 2 metres long .... **£24.00**

## Guy rope 30 metres

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

## 70cms vertical co-linear base antennas

**BM33** 2 X 5/8 wave Length 39" 7.0 dBd Gain ..... **£34.95**
**BM45** 3 X 5/8 wave Length 62" 8.5 dBd Gain ..... **£49.95**
**BM55** 4 X 5/8 wave Length 1002 10 dBd Gain ..... **£69.95**

## Multi purpose antennas

**MSS-1** Freq RX 0-2000 Mhz, TX 2 mtr 2.5 dBd Gain, TX 70cms 4.0 dBd Gain, Length 39" ..... **£39.95**
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All fittings Stainless Steel

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(Boom 63") (Gain 10dBd) ..... **£34.95**
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(Boom 125") (Gain 12dBd) ..... **£44.95**
**2 metre 11 Element**
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(with 3/8 base fitting)

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*(Length 7' approx)*
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## Single band mobile antennas

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**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**
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**MR 775** 70 cms ⅝ wave 3.0 dBb Gain (Length 19") (⅜ fitting) **£12.95**
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| TOKYO SAGRA 600 | 2M 700W AMP 2 x 4C x 250R | 799.00 |
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| COM ICPCR100 | COMPUTER BASED SCANNER AM/FM | 149.00 |
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| JRC NRD535/LOWE | HF RECEIVER + LOWE MODS | 829.00 |
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| YUPITERU MVT9000 | HANDHELD SCANNER | 249.00 |
| YUPITERU VT125 II | AIRBAND SCANNER | 99.00 |
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### ACCESSORIES

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|---|---|---|
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| AMDAT ADC60 | FREQ STANDARD CLOCK UNIT | 99.00 |
| AMTRON UK552 | FREQUENCY COUNTER | 69.00 |
| DATONG PC1 | HF CONVERTER | 59.00 |
| ICOM SM6 | BASE MICROPHONE | 35.00 |
| JRC CFL243W | BWC UNIT FOR NRD 535 | 99.00 |
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| TIMEWAVE DSP9+ | DSP FILTER | 125.00 |
| TONO Q-550 | TERMINAL UNIT | 125.00 |
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| HYGAIN 205BA | 20M 5 ELEMENT MONOBANDER | 149.00 |
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| CF-360A | 1.3-30MHz/49-470MHz SO239/PL/PL | £37.95 |
| CF-530 | 1.3-90MHz/125-470MHz SO239/PL/PL | £39.95 |

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| ARX2B | 2m Ringo Ranger II | £59.95 |

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| A3WS | 12, 17m 3 el. Yagi | £299.95 |
| A743 | 30/40m add on A3S | £129 £99.00 |

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| | | |
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| ARX6 | 6m Ringo ranger 7.3m 5.5 dBi | £199.95 |
| AR6 | 6m Ringo 3.1m 3 dBi | £59.95 |

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| DJ496TA3 | UHF FM H/Held | inc. nicads & charger | £TBA |
| DJC1 | VHF Pocket | inc. Lithium Ion Battery | £99.95 |
| DJC5 | Dual Band Pocket H/Hinc. Lith Ion Battery | | £189.95 |
| DJG5EY | 2/70Cms FM D/Band (CTCSS) inc nicads & charg | | £289.00 |
| DJS11E | VHF Handheld | 340mW 430-440Mhz | £99.95 |
| DJS41C | UHF Mini H/H | 500mW 430-440Mhz | £99.95 |
| DJV5 | UHF/VHF D/Band H/Held inc nicads & charg | | £199.00 |
| DJV5EDS | VHF/UHF Dualband FM Transceiver - Ltd Ed | | £189.95 |
| DJX10 | H/H Scanning Rcvr 0.1 - 2000Mhz no gaps | | £295.00 |
| DJX2 | Handheld Scanning Rcvr 522KHz-1 GHz | | £239.95 |
| DR135E | VHF FM H/Held TX 50W w/optional TNC | | £235.00 |
| DR140E | 2M FM Mobile Transceiver 50 Watt | | £219.95 |
| DR150E | 2M FM Mobile Transceiver 50 Watt | | £279.95 |
| DR605E | 2/70Cms FM Dual Band Transceiver 50W | | £299.00 |
| DR610 | 2/70 Cms Deluxe Dualband TX 50 Watt | | £399.00 |
| DRM06T | 6M FM Mobile Transceiver 20 Watt | | £249.95 |
| DX701 | Commercial Style HF Transceiver 100W | | £599.00 |
| DX70TH | HF + 6Mtr Transceiver Transceiver 100W | | £599.00 |
| DX77E | Desktop HF Transceiver 100 Watt | | £599.00 |

### ALINCO ACCESSORIES

| | | |
|---|---|---|
| EME11 | Earphone/Mic VOX/PTT for DJ-F/S/180/580 | £39.95 |
| EME12 | H/Set+Sgl H/Ph S11/41/190/191/490/G5/V5 | £39.95 |
| EME13 | H/Set w VOX/PTT DJ-V5 S11/41/180/190/191/491/G5 | £39.95 |
| EME15 | Tie-Pin Mic w VOX for V5 S11/41/180/280/191/491/G5 | £45.95 |
| EME16 | Tie Pin Mic & Earpc for DJ-C1/C4/V5/DJ195 | £10.95 |
| EME17 | Earphone Mic for DJ-C4/C1/V5/DJ-195 | £24.95 |
| EME2 | Earphone Mic DJC1/C4/C5 | £18.95 |
| EME4 | Earphone Mic with PTT for DJ-560 | £19.95 |
| EME6 | Earph for S11/41/180/ DJ280/190/191/491/G5/X10 | £10.95 |
| EMS11 | DTMF Mic for DR130/140 | £39.95 |
| EMS12A | DTMF Microphone for DR130/430/150 | £44.95 |
| EMS14 | Desktop Microphone for DX70 & DX77 | £59.95 |
| EMS3 | DTMF Mic For DR599/590 | £64.95 |
| EMS42 | Dynamic Mic for DX70 | £32.95 |
| EMS45 | DTMF Microphone DR140/605 | £39.95 |
| EMS46 | Replacement Microphone for DR140/605 | £29.95 |
| EMS47 | Spkr Mic w/Vol Cont S11/41/180/190/191/491/G5 | £19.95 |
| EMS49 | Speaker Mic for DJ-C1/C4 | £22.95 |
| EMS50 | Speaker Microphone for DJ-C5 | £24.95 |
| EMS51 | Spkr Mic for S11/41/180/190/191/491/G5 | £24.95 |
| EMS52 | Replacement Mic (EMS46) for DR605 | £29.95 |
| EMS53 | Replacement Mic 8 Pin for DR610/DRM06 | £29.95 |
| EMS54 | DTMF Microphone for DR140/DR605 | £39.95 |
| EMS55 | DTMF 8 Pin Microphone for DR150/DR610 | £39.95 |
| EMS5A | Replacement Microphone for DR150/DR610 | £29.95 |
| EMS8 | Remote Control Speaker Mic for DJ-G5 | £29.95 |
| EMS9 | Speaker Microphone for DJ-V5 & DJ-195 | £32.95 |

### ICOM

| | | |
|---|---|---|
| 706MKIIG | DSP HF/UHF/VHF Base Transceiver | £899.00 |
| 746 | HF/6M/2M Base Transceiver | £1,395.00 |
| 756PRO | HF + 50Mhz DSP Base Transceiver | £2,099.00 |
| AT180 | Automatic ATU for IC706 | £379.95 |
| IC-718 | HF Transceiver multimode 101 Memories | £699.99 |
| SM20 | Desk Microphone | £120.00 |
| SP21 | Loudspeaker for 756 | £71.67 |
| T81E | Handheld TX 6m 2m 70cm 23cm | £369.00 |
| UT106 | DSP Unit | £79.95 |

### YAESU

| | | |
|---|---|---|
| FT1000MP | MARK V All mode HF Transceiver | £1,999.00 |
| FT100D | Multi Band TX HF plus 6/2/70cms | £TBA |
| FT1500M | VHF Mobile TX 50W TX 144-146 RX 137-174 | £229.00 |
| FT2600M | VHF Mobile Transceiver 60W 144-146MHz | £249.00 |
| FT8100RC2 | Dualband VHF/UHF Mobile QR Front | £349.00 |
| FT847 | All Mode Transceiver HF/6/2/70 | £1,349.00 |
| FT90R-C2 | Mobile Transceiver 144/432Mhz 50W | £369.00 |
| FT920 | HF Transceiver with 50MHz | £1,249.00 |
| VX1R | Dualband Compact Handheld | £169.00 |
| VX5R | 3 Band Transceiver | £299.00 |
| QUADRA | 1kW Solid State Linear Amp & Power Supply | £3,599.00 |

### YAESU ACCESSORIES

| | | |
|---|---|---|
| MD100A8X | DSP Enhanced Base Mic | £110.00 |
| MF1A3B | Boom Mic (use SB-10) | £34.00 |
| MH12A2B | Hand Speaker/Microphone | £33.00 |
| MH19A2B | Earpiece/Tie Clip Mic | £22.00 |
| MH26D8 | Speaker Mic w/ Toneburst | £48.00 |
| MH34B4B | Speaker Mic for FT10/40/VX10 | £27.00 |
| MH35A2B | Handheld Speaker Mic | £34.00 |
| MH37A4B | Earpiece Mic for FT10R/40/VX10 | £22.00 |
| YH1 | Headset with Boom Mic | £31.00 |
| YH2 | Headset with Boom Mic | £27.00 |
| YH77STA | Stereo Headphones Lightweight | £56.00 |
| XF117A | AM Filter 6kHz for FT100 | £88.00 |
| XF117C | 500Hz CW Filter f/FT100 | £98.00 |
| YF110CN | 455kHz 250Hz CW Filter | £106.00 |
| YF110SN | 455kHz/2.0KHz SSB N.Filt | £95.00 |
| YF112C | 2nd IF CW 500Hz Filter | £84.00 |
| YF114CN | 8.2Mhz 250hZ CW Narrow | £84.00 |
| YF114SN | 8.2MHz/2Khz SSB Filter Narrow | £84.00 |
| YF115C | 455kHz/500Hz CW Filter | £99.00 |
| YF115S-02 | 2.7Khz SSB Filter FT847 | £99.00 |
| YF116A | 6kHz AM Filter for FT920 | £49.00 |
| YF116C | 500Hz CW Filter for FT920 | £49.00 |

### KENWOOD

| | | |
|---|---|---|
| THD7E | 2m/Dual Band Transceiver with TNC | £259.00 |
| TMD700E | Dual Band Mobile Transceiver with TNC | £469.00 |
| TS570D | HF DSP Transceiver | £799.00 |

### GARMIN GPS

| | | |
|---|---|---|
| 00217 | StreetPilot UK RX w/Atlantic Intl Database | £499.00 |
| 00275 | StreetPilot ColorMap UK RX w/Atlantic Intl | £629.00 |
| 10226 | 16 MB Blank Datacard | £110.45 |
| 10263 | Map Source CD ROM | £76.38 |
| GPS111+ | H/Held Portable Mapping System | £349.00 |
| GPS12 | Portable Receiver | £129.95 |
| GPS12CX | RXr with European City Point Database | £239.00 |
| GPS12map | Map Receiver w/Atlantic Database | £329.00 |
| GPS12XL | Receiver + European City Point Database | £189.95 |
| GPS48 | Receiver + European City Point Database | £209.95 |

### PMR446

| | | |
|---|---|---|
| ALINCO DJSR1 | PMR 446 H/H Transceiver | £89.95 |
| GOODMAN GPMR114 | Tracker PMR 446 (Pair) | £99.99 |
| MOTOROLA HANDI-PRO | Euro 446 Vox Handi-Pro | £199.00 |
| MOTOROLA TA200 | Blue/Yello Talkabout Euro 446 | £79.95 |
| MUTICOM PRO | PMR446 H/held TX | £169.00 |

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### WIRE ANTENNAS

| | | |
|---|---|---|
| PALSTAR G5RVF | G5RV Full Size (80-10m) Flex Weave | £34.95 |
| PALSTAR G5RVF/E | G5RV Full Size (80-10m) Economy Model | £27.95 |
| PALSTAR G5RVH | G5RV Half Size (40-10m) Flex Weave | £24.95 |
| PALSTAR G5RVH/E | G5RV Half Size (40-10m) Economy Model | £24.95 |
| PALSTAR WIN4010 | 40-10 Mtr Windom Antenna | £49.95 |
| PALSTAR WIN8010 | 80-10 Mtr Windom Antenna | £59.95 |

### MOBILE ANTENNAS

| | | |
|---|---|---|
| PRO AM PHF10 | 10m Mobile Whip 3/8 | £19.95 |
| PRO AM PHF12 | 12m Mobile Whip 3/8 | £19.95 |
| PRO AM PHF15 | 15m Mobile Whip 3/8 | £19.95 |
| PRO AM PHF160BE | 160m Mobile Whip 3/8 | £54.95 |
| PRO AM PHF17 | 17m Mobile Whip 3/8 | £19.95 |
| PRO AM PHF20B | 20m Mobile Whip 3/8 | £19.95 |
| PRO AM PHF30 | 30m Mobile Whip 3/8 | £19.95 |
| PRO AM PHF40 | 40m Mobile Whip 3/8 | £22.95 |
| PRO AM PHF6B | 6m Mobile HF Antenna | £19.95 |
| PRO AM PHF80B | 80M Mobile Whip | £24.95 |
| OUTBACKER 040 | Spring Base Complete | £69.95 |
| OUTBACKER 100 | Outbacker 80-10 Mob (6ft) | £159.00 |
| OUTBACKER 195 | Perth Plus (HF + 2/6M) | £179.00 |
| OUTBACKER OBS8 | (2 Split) HF Mob. Antenna | £169.00 |
| OUTBACKER OTR | Outrunner 9Ft(160-10m) Mobile | £169.00 |
| YAESU ATAS100 | Active AntTuning System | £249.00 |

### HF ANTENNAS

| | | |
|---|---|---|
| FORCE 12 C31-XR | Multi-band HF Yagi 3el/20 4el/15 7el/10 | £1,095.00 |
| TITANEX V160AFS | 5Kw Ant Tuning Unit for 160/80/40 Mtrs | £365.00 |
| TITANEX V160S | 87ft Titanium Vertical Ant | £575.00 |
| TITANEX V80S | 67ft Titanium Vertical Ant | £399.00 |

### ANTENNA ACCESSORIES

| | | |
|---|---|---|
| PALSTAR B400/4 | Balun 4:1 400W (3-30Mhz) | £23.95 |
| PALSTAR B400/6 | Balun 6:1 400W (3-30Mhz) | £23.95 |
| PALSTAR DL1500 | Dummy Load | £59.95 |
| PALSTAR DP300 | DiPole Centre (with Feeder Clamp) | £5.99 |
| VEC DL2500 | 2.5kw RF Dummy Load | £179.95 |
| VEC LP30 | 1.5kw Low Pass Filter | £59.95 |
| MOONRAKER MTP40 | 40 Metre Traps | £21.95 |
| MOONRAKER MTP80 | 80 Metre Traps | £21.95 |
| MFJ 259B | Digital VSWR 1.8/170 Mhz | £229.95 |
| MFJ 269 | HF/UHF/VHF Analyser | £299.95 |
| MFJ 912 | Remote Balun Box | £39.95 |
| MFJ 914 | Auto Tuner Extender | £59.95 |
| NIE CX201N | 2 Way Switch N (0-1Ghz) | £26.95 |
| 30 Ft Retractable | Lightweight Mast | £69.00 |

### ANTENNA TUNERS & METERS

| | | |
|---|---|---|
| PALSTAR 300LCN | 300W Cross Meter Tuner | £139.95 |
| PALSTAR AM30 | Active Antenna Matcher | £69.95 |
| PALSTAR AT300 | 150 Watt Antenna Tuner | £99.95 |
| PALSTAR WM150 | 3Kw HF/VHF SWR Meter | £59.95 |
| MFJ-989C | 3Kw Roller Antenna Tuner 1.8 to 30 MHz | £299.95 |
| SGC SG230MK2 | 150 Watt Auto A.TU | £329.00 |
| SGC SG237/PCB | HF-VHF PCB Smartuner | £219.95 |
| VEC VC300M | 300W Mobile Tuner | £121.95 |

### ROTATORS

| | | |
|---|---|---|
| YAESU G1000DXC | Rotator 1100kg/cm w/p.set | £599.00 |
| YAESU G450C | Ant Rotator w/25m Cab | £379.00 |
| YAESU G650C | Ant Rotator Med. Duty | £499.00 |
| AR300XL | Lightweight Rotator | £46.00 |

### MORSE KEYS

| | | |
|---|---|---|
| HIMOUND HK705 | Morse Key | £29.95 |
| HIMOUND HK708 | Deluxe Morse Key | £39.95 |
| MFJ 418 | Morse Code Tutor | £69.95 |
| MFJ-557 | Morse Key and Oscillator | £29.95 |
| VEC CK200 | Curtis Auto CW Keyer | £59.95 |

### COMMUNICATIONS RECEIVERS

| | | |
|---|---|---|
| JRC NRD345 | HF Comms Receiver | £399.00 |
| JRC NRD545G | DSP SW Receiver | £1,299.00 |
| JRC NVA319 | Extension Speaker | £159.00 |
| JRC ST3 | Communication Headphones | £69.95 |
| ICOM R75 | Communication Receiver 0.03-60 MHz | £699.99 |
| YAESU FRG100 | SW Comms RX 50KHz-30MHz w/o AC adaptr | £369.00 |
| ICOM-R8500 | Wideband Comms RX | £1,289.00 |

### POWER SUPPLIES

| | | |
|---|---|---|
| DM330MVZ | Power Sup 32A Max Switch Mode + mter | £119.95 |
| PALSTAR PS04 | 2-4Amp 13.8V PSU | £19.95 |
| PALSTAR PS06 | 4-6Amp 13.8V PSU | £29.95 |
| PALSTAR PS15 | 12-15A 13.8V PSU | £59.95 |
| PALSTAR PS30M | 30A Variable Voltage PSU | £99.00 |
| PALSTAR PS50 | 40-50A 13.8V PSU | £169.95 |
| SAMLEX 23A | Switch Mode PSU | £99.95 |

### SCANNING RECEIVERS

| | | |
|---|---|---|
| YUPITERU | | |
| MVT3300 | H/Held 66-80,108-170, 300-407, 806-1000 | £129.00 |
| MVT7100 | H/Held Scanner 530kHz-1650Mhz 1000mem | £199.00 |
| MVT7300 | H/Held Scanner 531Khz-1320Mhz 1000mem | £269.95 |
| MVT9000MkII | H/Held Scanner 531-2039Mhz 1000mem | £369.00 |
| YAESU VR500 | Handheld Scanning Receiver | £299.00 |
| MAYCOM | AR108 VHF Airband Scanning Rcvr | £69.95 |
| ICOM R2 | H/held Scanning RX 500Khz - 1310MHz | £139.00 |

### ZX YAGIS

| | | |
|---|---|---|
| ZX 10-2 | 2 Element 28Mhz Beam 6.3dB Gain | £88.00 |
| ZX 10-3CL | 3 Element 28Mhz Beam 9.1dB Gain | £115.95 |
| ZX 10-3DX | 3 Element 28Mhz Beam 10.3dB Gain | £121.95 |
| ZX 10-4CL | 4 Element 28Mhz Beam 11.4dB Gain | £156.00 |
| ZX 10-4DX | 4 Element 28Mhz Beam 12.0dB Gain | £156.00 |
| ZX 10-5CL | 5 Element 28Mhz Beam 12.1dB Gain | £181.50 |
| ZX 12-3 | 3 Element 24Mhz Beam 9.1dB Gain | £123.93 |
| ZX 12-4 | 4 Element 24Mhz Beam 11.4dB Gain | £156.95 |
| ZX 15-2 | 2 Element 21Mhz Beam 6.3dB Gain | £112.00 |
| ZX 15-3 | 3 Element 21Mhz Beam 9.1dB Gain | £149.00 |
| ZX 15-4 | 4 Element 21Mhz Beam 11.4dB Gain | £185.00 |
| ZX 17-2 | 2 Element 18Mhz Beam 6.3dB Gain | £123.95 |
| ZX 17-3 | 3 Element 18Mhz Beam 9.1dB Gain | £156.95 |
| ZX 17-4 | 4 Element 18Mhz Beam 11.4dB Gain | £189.95 |
| ZX 20-2 | 2 Element 14Mhz Beam 6.3dB Gain | £146.40 |
| ZX 20-3 | 3 Element 14Mhz Beam 9.1dB Gain | £197.95 |
| ZX 20-4 | 4 Element 14Mhz Beam 11.4dB Gain | £255.95 |
| ZX 20-5 | 5 Element 14Mhz Beam 12.1dB Gain | £320.00 |
| ZX 30-2 | 2 Element 10Mhz Beam 6.3dB Gain | £165.00 |
| ZX 30-3 | 3 Element 10Mhz Beam 9.1dB Gain | £184.50 |
| ZX 6-2 | 2 Element 50Mhz Beam 6.2dB Gain | £48.95 |
| ZX 6-3 | 3 Element 50Mhz Beam 9.1dB Gain | £81.95 |
| ZX 6-4 | 4 Element 50Mhz Beam 11.4dB Gain | £99.95 |
| ZX 6-5 | 5 Element 50Mhz Beam 12.1dB Gain | £114.95 |
| ZX 6-6 | 6 Element 50Mhz Beam 12.5dB Gain | £147.95 |
| ZX GP3 | 10/15/20 Metre Vertical Antenna | £59.95 |
| ZX GP3W | 10/18/24Mhz Vertical Antenna | £69.95 |
| ZX MINI 2000 | 3 Element Mini Beam 14/21/28Mhz | £199.95 |

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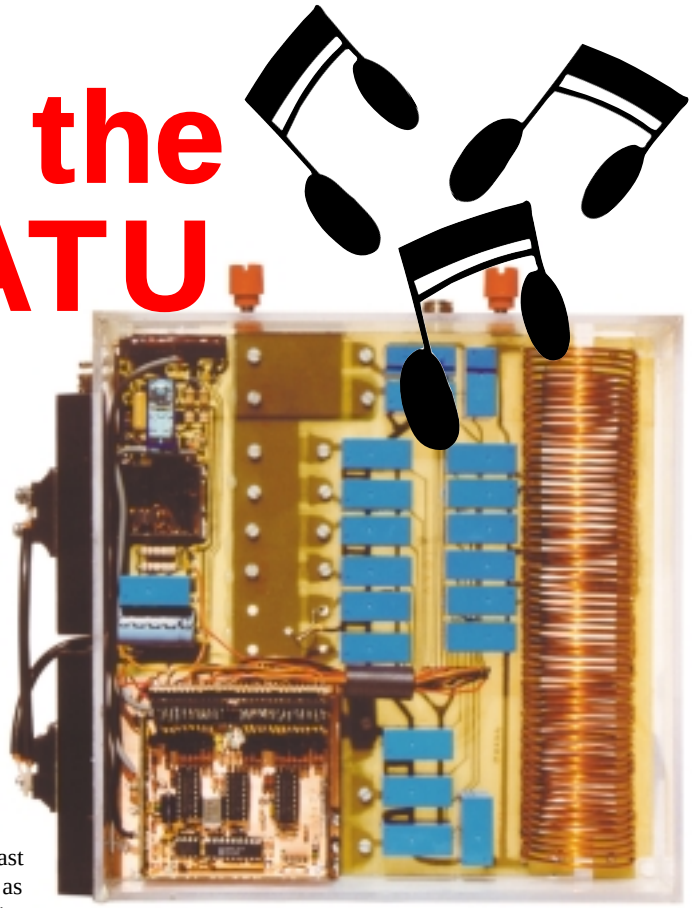
Lead Feature

# PicATUne - the Intelligent ATU

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



AN AUTOMATIC ATU is not for the merely lazy - though it does indeed offer delightful convenience. Its great virtue is that it allows the ATU to be placed where it will do the most good - and that is often not in the shack. Equally, given a remote ATU capability, many choices of antenna and feed point become much more realistic in the average domestic setting.

## TARGET ENVIRONMENT

MOST OF US are limited in our ability to exploit a nine band HF Tx/Rx by the lack of a nine band antenna. Equally, few of us have the ability or desire to erect nine monoband antennas. Some, perhaps, but not nine. So a reasonable length of wire represents a realistic and effective approach for at least casual use - if it can be effectively fed and matched. **Fig 1** is pretty representative.

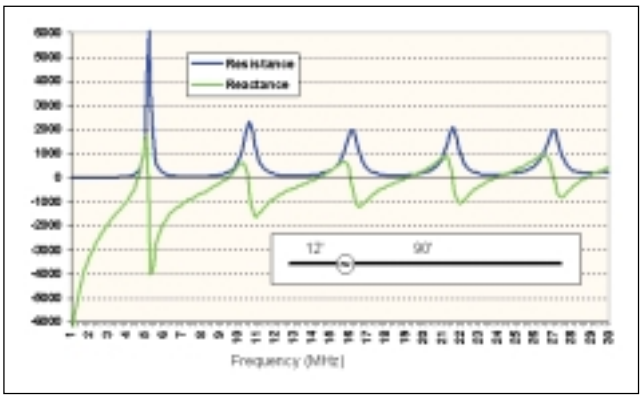



**Fig 1: Typical end-fed wire with 'short' counterpoise. In this case: 90ft long with a 12ft counterpoise - using 1mm wire – 30ft high over average ground. Plot of feedpoint resistance and reactance (Ω) - versus frequency (MHz).**

I would argue that the most common domestic garden in the UK is most naturally amenable to end-fed antennas. That is, with the house typically at the front of the plot (not in the middle) and any other support, natural or otherwise, more often available at the far end than in the middle.

If, like me, the centre of your antenna coincides with the centre of the back lawn, then feeding in the centre is simply not a viable option - not least because the weight of even the lightest feeder drags down the wire at just the point where you want the most height. Secondly, one way or another, the feeder run ends up parallel to the antenna, with the consequent likelihood of imbalance. And, most of all, because it is domestically unacceptable to both ourselves and our neighbours.

Having said that, there is nothing the matter with a good multi-band doublet.

## THE END FED OPTION

END FEEDING BRINGS a different set of issues, but at least the wire is light, tight, as high as the supports permit - and as invisible as any single wire can ever be. Now there is a choice. Do you bring the end of the antenna to the shack - or move the shack near to the end of the antenna?

The former inevitably runs a critical part of the antenna past masonry, piping and mains wiring, with all the attendant risks of noise pick-up and TVI. The latter implies a bedroom or loft shack which may or may not suit you - and presents the additional problem of finding a good multi-band RF earth. Most critically, both result in high antenna voltages in the shack, with all the usual problems of RF feedback. Faced with these two choices I have, in the past, tried both. Today, with the benefit of that experience, I would reject both. It is very difficult to make either work well.

## BUT THE REMOTE ATU...

THIS GIVES YOU a third option, you can leave the shack where it is. Instead of bringing the antenna to a shack-bound ATU, you can take the ATU to the end of the antenna - and feed coax from the shack to it.

Given a choice, why would you put an ATU in your shack anyway? Only to be able to get at the knobs. Its logical place is up near the antenna, where the matching process should be carried out. This is only a realistic strategy if the ATU is automatic. Nobody wants to be scrambling around in the loft every time you change bands.

## WHY BUILD ONE?

WELL, WHY NOT? There are a number of commercial auto-ATUs on the market, but all the ones I have seen are necessarily over specified for amateur needs - and attract a proportionate price.

Firstly, you don't need general HF coverage - only the HF amateur bands. Secondly, you don't need to match every possible antenna length at every possible frequency. You only need to match your antenna at the time - and it greatly reduces the cost and stress on the ATU if you are prepared to prune your antenna lightly to avoid truly diabolical lengths.

## THE LESSONS OF HISTORY

THIS CONSTRUCTION project was originally chosen for development on the grounds that the hardware side would be easy and all the serious effort could go into the PIC software - after all, an L-match only has two significant components. Well, 18 months later and it wasn't quite that simple!

I will share with you some of the development fun, since it applies to the design of any ATU.

The first prototype was built in a PCB enclosure with the 'hot' capacitor plates etched on the inside of the casing. The coil was a rather feeble offering on PVC tube. It appeared to work brilliantly; that is, it would find a match close to unity SWR for most lengths of wire on most frequencies. But there was a small problem. All the bands seemed pretty dead and signal reports were well down when compared to the same antenna through a commercial 3kW manual T-match.

**Danvers House, Wigmore, Herefordshire HR6 9UF.*
*E-mail: pirhodes@aol.com*

I woke up one morning realising that I was missing the whole point; that the design objective of merely matching antennas was flawed and that the real problem was to match antennas *efficiently*. What annoyed me most was that I had allowed basic RF engineering practice to be masked by the advertising claims of most ATU manufacturers - who differentiate their products on the basis of power handling and the range of antennas that they can match… and I was blindly following.

To cut to the end of the story, with the benefit of hindsight, it is time to declare 'XJP's Axiom for ATUs' (so called only because Peter got there with his Principle before I did).

XJP's Axiom states that "An ATU constructed of poor quality components is more likely to provide a *better* match to your Tx/Rx than one constructed of good quality components." Now the dictionary will tell you that an Axiom is self-evidently true. This one is self-evident only when you have examined the evidence.

Crudely, it arises because poorer quality components accept, absorb and dissipate 'forward' power as heat - leaving less to go back as 'reflected' power.

Try the following test. Take about 100m of the worst quality 50Ω coax you can find. Make it even worse by puncturing the sheath at frequent intervals and leave it out in the rain until the braid has seriously corroded. Wind it up, put it in a box with some connectors and label it "Automatic ATU". Advertise it as a 100W instantly-tuning auto-ATU which will match any antenna at any frequency - and you should make a quick (albeit brief) fortune. I assure you it will present a pretty good match to your Tx on all bands - no matter what antenna (if any) you put on the output.

You could achieve much the same effect with a 20dB attenuator, so what objective test would you apply to differentiate such a device from the real thing - since both will meet the advertising claims? You simply have to consider not the match itself but also the efficiency of the match - and this is down to the quality (literally Q) of the components used. Low Q components absorb the power you feed to them, dissipating it as heat; and in extreme cases they can absorb so much power that there is none remaining to reflect; and your measured SWR will be immaculate.

Although that is an extreme, all ATUs exhibit this feature; it is only a matter of degree. When you purchase one, automatic or otherwise, you are relying on the RF engineers winning the battle with their marketing colleagues by specifying high Q (typically high cost) components. If they don't, then the ATU can achieve a significant percentage of its advertised matching range by simply tuning into itself and getting hot. And if you

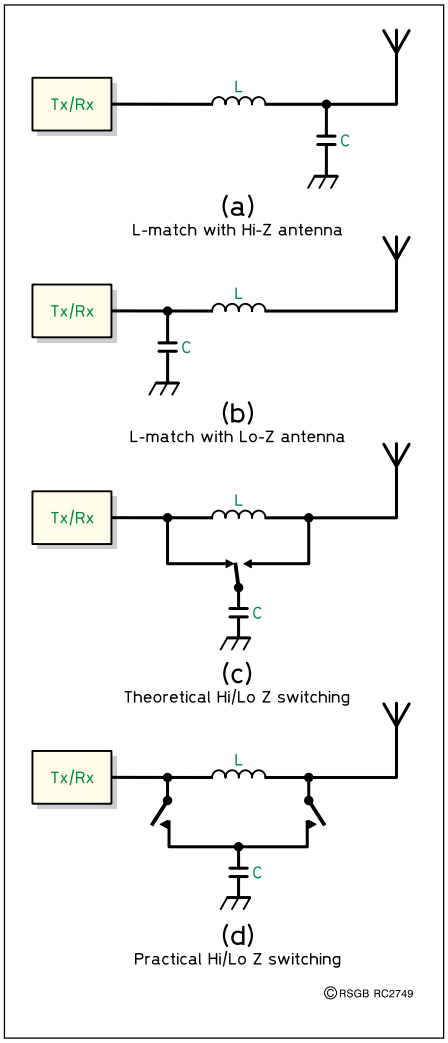



**Fig 2: Basic L-match configurations. Both the L and C values are variable or switchable.**

really stress it, it will literally melt. Remember you only need a 1dB insertion loss to dissipate 20% of your power.

The light dawned for me when I looked at a program called 'TL.exe' by R. Dean Straw, N6BV, distributed with the 1997 *ARRL Handbook*. This has a utility that models the performance of various ATU configurations, modelling real world components of specifiable Q. It allows you to explore the limits, producing virtual smoke instead of the real thing. Note that it does not use the standard formulae for T, L and Pi networks found in many reference books - which usually assume lossless components and purely resistive loads.

As an example, try tuning up a 50Ω resistive load on 1.8MHz using a T-match with a 200pF output capacitor. Even if you specify good quality components (big fat coils, wide-spaced variables etc), nearly half your power (43%) will be dissipated in the ATU. If you arbitrarily halve the Q of the inductor and capacitors, the loss rises to 62%. At 400W input, the coil alone would be dissipating about 200W at over 8A circulating current with nearly 3.5kV across it. Something's got to give!

After development was complete, Tony Preedy, G3LNP, published his eye-opening feature [1] on how to fix a £250 ATU for a mere two pence - by converting it to have an L-match option. This is compulsive and compulsory reading. Indeed, in the previous example, if you used an L-match instead of a T-match - using components of identical Q - then the loss would be less than 2%, rising to 3.5% for the half-Q example.

XJP's Axiom was applying with a vengeance on my first prototype. The PCB capacitors (fibreglass dielectric) have a hopeless Q and the coil was not much better. But despite having a limited number of discrete L and C combinations, it would match most anything! Finally and fortuitously, it melted.

## SOME RF ENGINEERING

CHASTENED BY this experience, and already well over budget, I fixed on the L-match configuration with switched elements as per **Fig 2(d)**. Of the serious alternatives, the Pi never gives a more efficient match but sometimes uses more convenient values; and the T will match a wider impedance range for a given L and C range - but often at the expense of appalling internal losses.

Switching the C values removes the greatest objection to the L configuration, namely that you need a very wide capacitance range. In practice a 20-2000pF variable with a rating of several kV is hopelessly impracticable. For this reason, driving variable elements with stepper motors was ruled out - also on the grounds of cost and the time to drive to a prestored solution.

Two relays are used to switch impedance, since this reduces the voltage breakdown risk in practice. It also allows two 'straight through' modes; one with optional series L,

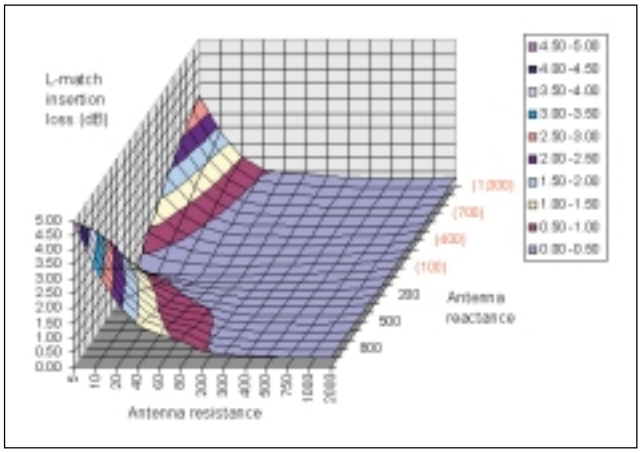



**Fig 3: Projected L-match insertion loss as a function of antenna feedpoint impedance.**

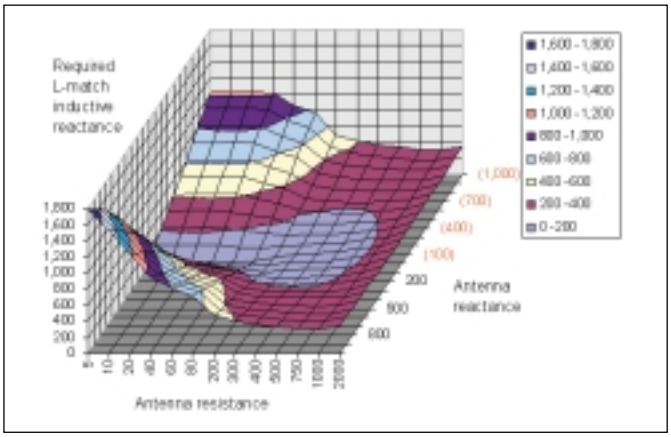



Fig 4: Required series inductive reactance to match antenna impedance.

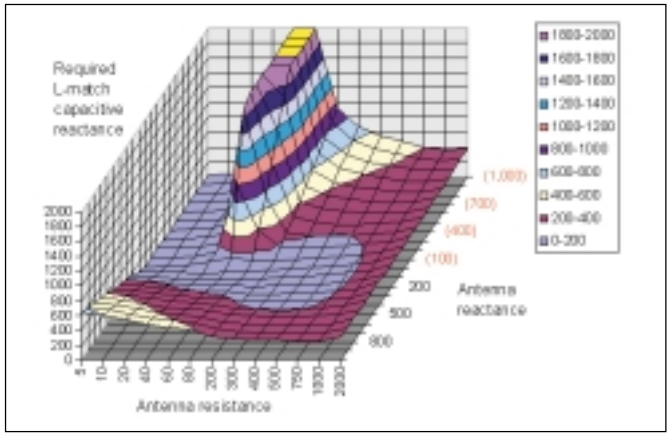



Fig 5: Required shunt capacitive reactance to match antenna impedance.

and one with optional shunt C. These are invaluable in matching antennas that are already near resonance.

For scoping purposes, I built a spreadsheet model of an L-match. The task is not trivial, since solving the equations for real components with loss must be iterative. This model allowed me to visualise behaviour by plotting some graphs - which produce some strange shapes that you might not instinctively expect from two passive components. This is called 'getting your mind round the problem'.

The design process, as ever, is circular. What L and C range do I need? What breakdown voltage do I need? What is available... and what can I afford? And anyway, just what is the feedpoint impedance of an end-fed wire?

I could find nothing useful in any of my reference books - so EZNEC was used to plot Fig 1 showing a typical scenario. It is typical in the sense that you can scale it to different sizes and still produce the same general results. Namely, the most difficult region is at and below half-wave resonance - where the feedpoint resistance falls to a low value and the reactive component becomes increasingly negative - ie capacitive. Ultimately, if you want to use a very short antenna on a low frequency, even if you can match it, losses are likely to be high - and no amount of matching will improve an intrinsically poor antenna.

Now the search was on for relays that would have low C across the contacts, low C from contacts to the coil and, most of all, the ability to withstand some serious kV across the open contacts. Oh, and handle several amps. If cost is a consideration, then I do not think such relays exist. This is not to say you may not pick something up in a junk sale, but for a reproducible design, I could find nothing. So I went the other way and purchased the cheapest relays I could reliably source and modified them to suit the application. Removing the normally closed contacts opens the gap, and wiring the two contact sets in series results in about a net 1.5kV rating.

Originally my relays were of the type where the rocker arm is an integral part of the contact. Since this form of relay has about 8pF between the contact set and the coil, you can see that it doesn't take many such relays - even with no capacitors - before you have more C than is required on the HF bands. So avoid these.

Now for the capacitors. High voltage, high Q capacitors are rightly an extraordinary price - so given a need for obscure values it was an easy early call to build them. Fortunately, polyethylene is a good dielectric and cheaply available. The issue here is that most polyethylene film is repeatedly recycled nowadays, so there are risks of contamination. My first attempt was with 12 thou packaging film, sandwiched between two PCB plates. It worked well, but when it did fail (I had included some copper swarf between the plates) the monolithic nature of the construction meant I had to rebuild the whole capacitor bank to effect a repair. With this film, inclusions were easily visible to the naked eye. Worse, the physical size of the capacitor bank meant the smallest residual value was about 50pF, which is somewhat excessive.

I then tried rolling layers of aluminium foil and polyethylene into cigar shapes. The capacitor values were unstable. The issue here is that the rolling process requires the layers to travel a different distance (differing diameters), so that varying amounts of air were trapped in the sandwich.

Next came multiple parallel flat plates with a polyethylene dielectric. Firstly I used aluminium foil plates, but the inevitable transition joint to copper gave problems. Being unable to source copper foil (which might be better if you can find some), I finally settled on brass shim which is cheaply and widely available.

The dielectric is made from multiple layers of thin film, on the grounds that if there are any inclusions they are less likely to coincide. I found that freezer bags from a well know

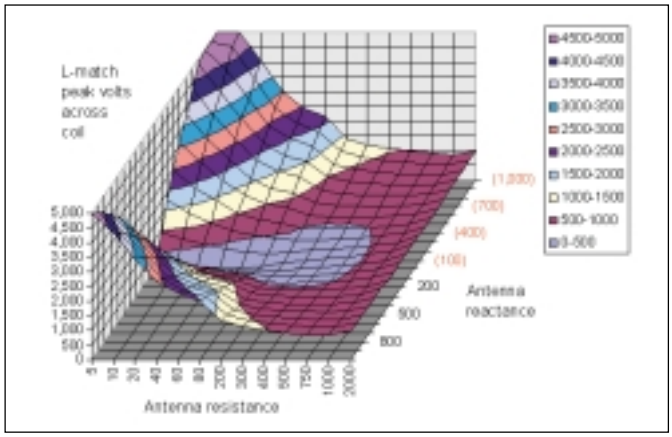



Fig 6: Peak voltage across coil - and its associated relay contacts when open - for 200W input. Low resistance loads are difficult unless resonant (ie low reactance also). Anything over 1.5kV is unrealistic.

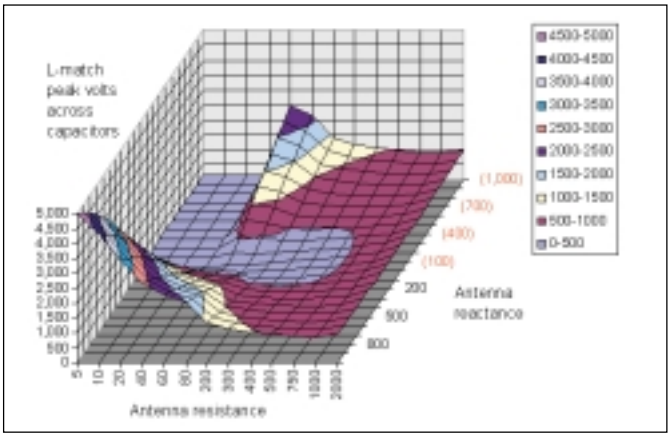



Fig 7: Peak volts across capacitors and their associated relay contacts when open - for 200W input. Note the risk zone when feeding a 50Ω antenna near resonance.

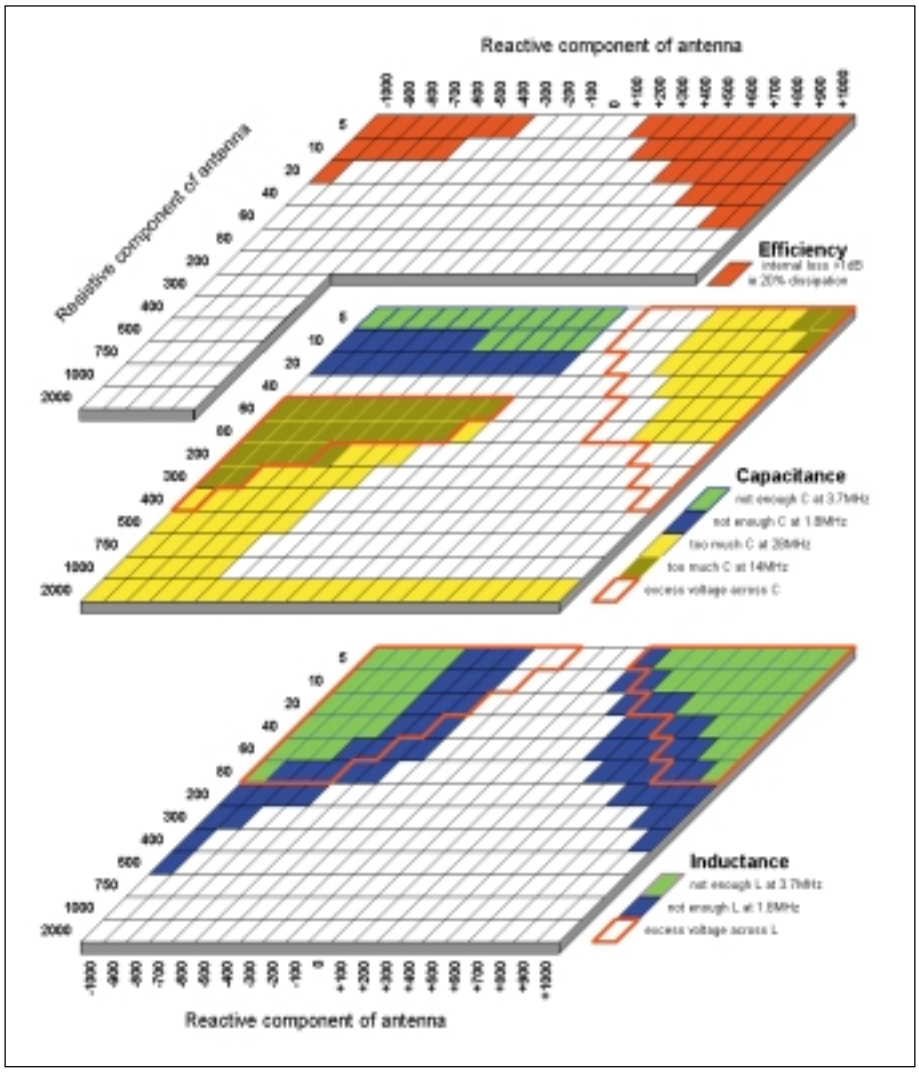



**Fig 8: Summary of L-match tuning limits for low-pass configuration (ie series L, shunt C and with the C switched from one end of the L to the other for best match). Note the resistive component axis is simply a collection of useful values and the scale is strictly non-linear. Parameters used are: Capacitance range, 20-1500pF; Inductance range, 0.1-30µH. The Q of the coil and the capacitors are both assumed to be 200. Voltage limits used are 1kV across the capacitors and 1.5kV across the coil (and their respective switching relays) for 200W input power.**

supermarket have just the right properties - with no visible inclusions. The capacitors are given a 400% safety margin (6kV rating), wetted with DC4 grease to exclude air. They have performed extremely reliably, and if there should ever be a failure each of the eleven capacitors can be individually rebuilt.

Polyethylene is a high Q dielectric at HF. Not quite as good as PTFE, but better than mica, most ceramics and not least, about 100 times better than epoxy resin glass fibre [2]. My thanks to David, G4FQR, who did a lot of the materials science research.

## APPLYING REALITY

ARMED WITH A set of parameters that could be achieved in practice at a reasonable cost, these were plugged into the L-match model to explore the limits. All ATUs, auto and otherwise have limits, it's just that they are not always quoted.

All the graphs assume $Q_L$ and $Q_C$ of 200. These are close to the values I measured at 10MHz. The Q falls with increasing frequency, but there again, at higher frequencies you tend to need less of both L and C. In all cases, the L-match impedance switching configuration is that which produces minimum loss. All the graphs can be viewed for a specific frequency, by converting the reactance values to their L and C equivalents using the usual formulae.

**Fig 3** predicts the insertion loss, showing that the difficult zone is at low resistances, especially when combined with high reactances of either sign. It also shows that inductive reactance is marginally more difficult to handle than capacitive. If you mentally plot the risky zones onto Fig 1, you will see that bigger losses can be expected at lower frequencies - especially below resonance. But there again, the real Q will be higher there also.

**Fig 4** and **Fig 5** are basically used to see just how much L and C range is needed. The corner of the plot both below 50Ω antenna resistance and with negative reactance uses the low-Z configuration. It demonstrates the need for wild capacitor swings when feeding a near 50Ω load and is probably why ATUs with no straight-through capability do not fit coax output sockets.

**Fig 6** and **Fig 7** explore the flashover risks. In practice the relays themselves are the limiting device, not the coil and capacitor banks. As an insurance against any damage under fault conditions or if straying into the flashover zones, a spark-gap is fitted. Conversely, there are many antenna impedances which would allow full legal limit with no issues.

All of these graphs are summarised in **Fig 8**. To reiterate, this graph is not peculiar to 'PicATUne'; it applies to any L-match with the L/C range and Q values quoted.

The general approach is to produce a 'balanced design', ie one which covers most of the situations most of the time - and if it is unsuitable for some antenna impedance on the basis of exceeding any one parameter then it might as well fail on as many parameters as possible. In other words, there is no point in adding extra C to widen the matching range on 160m if the power dissipation would be excessive anyway. To take that very example, as a result of this graph and practical experience I increased the maximum C to about 2,400pF.

We leave this section with the haunting question: 'What is the power rating of your present ATU?' Well... it depends! Absolutely on the load you are matching and somewhat on the internal losses you (or it) are prepared to tolerate. There can never be a simple answer.

## PICATUNE FEATURES

THE BASIC ATU configuration is an L-match with more than a quarter of a million relay switched L, C and Z combinations. In addition it has 64 series L or 2048 shunt C possibilities in 'straight through' mode. It is rated at 200W for most antennas and substantially more for some. It will match end fed, coax fed and (with a balun) balanced antennas - at any frequency in the nine amateur HF bands only - to 50Ω. Optional outputs also allow you to automatically switch antennas as a function of which band you are on.

### 'RESTORE FROM BEFORE'

In normal operational use, all you do is transmit the first letter of your callsign on SSB - or a Morse dot - and 'PicATUne' will apply your pre-stored matching solution. It's that simple.

### 'MATCH FROM SCRATCH'

Obviously the matching solutions have to be discovered and remembered in the first place. This training process requires about 15 seconds of steady carrier at about the 5-10W level on any given frequency.

'PicATUne' remembers up to 1,000 potentially different solutions - which works out at one every 5kHz over the whole HF amateur spectrum.

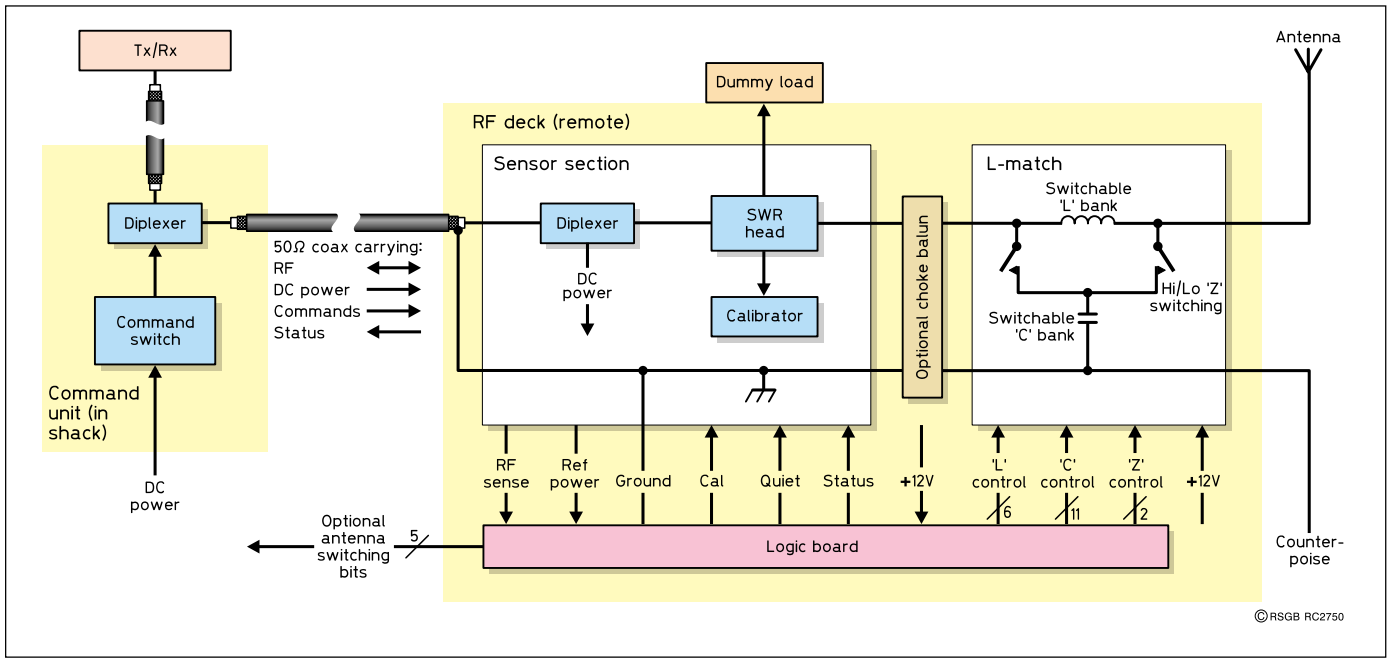



**Fig 9: PicATUne block diagram. The optional choke balun may be omitted if only unbalanced antennas are contemplated.**

Actually 'Restore from Before' is even simpler than described above, since 'PicATUne' will search out the solution for the *nearest* frequency within the band, thus removing the necessity for training on every possible spot frequency. Equally, you can train at more frequent intervals if your antenna tuning is 'sharp'.

As a matter of policy, 'PicATUne' will never start looking for a new solution unless explicitly told to. When so commanded, 'PicATUne' will always look for the best possible match. Specifically, it will not settle for an 'acceptable' solution if a better one exists - even though this may take longer.

### QUIET MATCHING

An auto-ATU is particularly prone by its nature to generate tuning carriers. On social grounds, it was considered irresponsible not to design to minimise these. When 'Matching from Scratch', 'PicATUne' uses a 'quiet tune' approach to attenuate the radiated signal by some 25dB, thus saving stress on your Tx, ATU and fellow amateurs.

## PHYSICAL CONSTRUCTION

'PicATUne' comprises two enclosures (see **Fig 9**):-

1. The Command Unit - which goes in the shack. It contains few components, the critical one being a simple push-button switch - the Command Switch - for controlling the ATU.

2. The ATU itself - mounted remotely - which contains the RF deck (L-match and the relays to switch it), the control logic, an SWR head and a dummy load.

These two enclosures are connected only by the 50Ω coax feeder. All commands to the ATU and status information back - as well as DC power and RF - are multiplexed on the coax, thus minimising installation complexity.

The remote ATU is housed in a polystyrene case which, in my case (if you'll pardon the pun) is sealed against the UK climate. The issue here is to make it air-tight. Waterproof is not enough, since if it breathes moist British air, condensation will occur. Mine is also painted white (externally) since it faces south. This helps to keep temperatures down and prevent UV degradation. It is your decision how much effort and money you want to spend on environmental protection.

The use of polystyrene (absolutely not metal) is critical to the RF performance.

## OPERATOR INTERFACE

YOU COMMUNICATE with 'PicATUne' using a single push on the Command Switch - while your transceiver is on receive. 'PicATUne' replies with a menu of choices - sent to your receiver in CW. Each choice consists of one character. A choice is picked from the menu by pressing the Command Switch during or immediately after the sending of the desired character.

'PicATUne' also communicates status information using CW - on request.

## YOUR CONTRIBUTION

BESIDES BUILDING 'PicATUne', you will need to supply an HF Tx/Rx, an SWR bridge, 13-14v DC at about 1.5 amps, the antenna itself and a suitable length of 50Ω coax feeder from the shack to the remote ATU. Your Tx should be capable of delivering 5-10W of steady carrier for extended periods. (NB, this project is not suitable for SWLs, since you need to transmit and radiate to use 'PicATUne'.)

## WHAT'S IN A NAME?

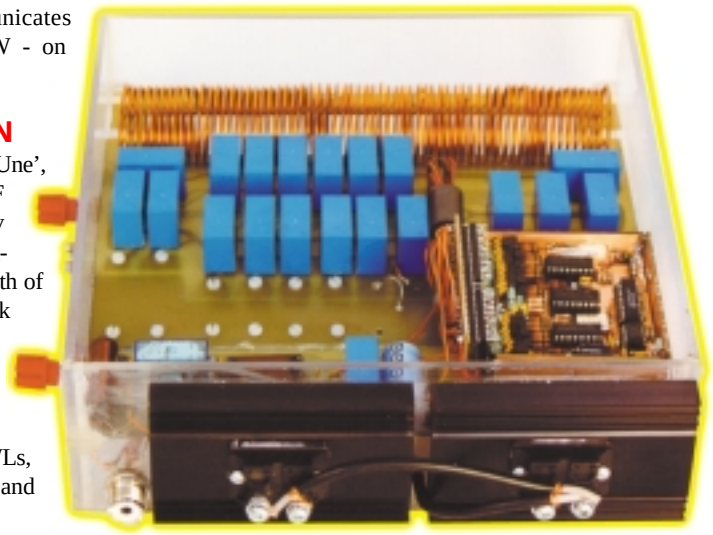
BEFORE WE FILL the columns of 'The Last Word' with the semantics of 'ATU' versus 'ASTU' versus 'AMU', let me declare that 'PicATUne' no more tunes your antenna than any other ATU, it only matches it. So, my apologies, but you have to agree that 'PicASTUne' is not a very catchy name!

## BETA TESTING

THIS PROJECT WAS built by Alan, G3TIE; David, G4FQR; and Keith, G3OHN; before publication - in order to verify the drawings and to demonstrate reproduceability. You can proceed with confidence!

## REFERENCES

[1]'Save Your Tuner for Two Pence', Tony Preedy, G3LNP, *RadCom*, May 2000.
[2] *Radio Data Reference Book*, GR Jessop, G6JP; and RS Hewes, G3TDR; published by RSGB. ♦



# *RAE, Novice and Morse Courses*

## Midlands

● **Derbyshire LEA** will be running an **RAE** course and examination starting 12 September 7-9pm at the Chapel Adult Centre, Long Lane, **Chapel** SK23 0TQ. For further information contact the centre on 01298 812968.

● **Murray Park Community School**, Murray Road, **Mickleover** in Derby, will be offering an **RAE** course on Wednesday evenings, 7-9pm, starting in September. For details contact the tutor Frank, G4MLL, on 01332 512080.

● **Sandwell ARC** will be running courses for the **RAE** and **NRAE** in September at its headquarters in Broadway, **Oldbury**, West Midlands. The courses will be held on Thursday evenings at 7.30pm, commencing on 14 September. Enrolment is on the previous Thursday. The club is also a registered examination centre. For more information contact Martin, G2BXP, on 0121 552 4902 or Archie, G4OJJ, on 0121 532 7039 or Clive, G0TVR, on 0121 429 6061.

● **Stratford-upon-Avon & DARS** is holding **Morse** and **RAE** classes. Morse classes are normally held before meetings on the 2nd and 4th Mondays of each month at the Home Guard Club, **Tiddington**. Further details on the RAE course are available from John, G8HJS, on 01789 295257 or David, G6FEO, on 07970 148204 or by fax on 01926 642858.

● **Tile Hill College** in Tile Hill Lane, **Coventry** will be running an **RAE** course on Thursday evenings 6.30-9.30pm for 30 weeks. Disabled students are welcome, and external students (ie those not taking the course) should contact the college to find the closing date for exam entry. The tutor is Michael, G4GHJ. Successful candidates can enrol for the **Morse** code examination at 5 or 12 words per minute. Contact the college on 024 7669 4200.

● John, M1DVT, will be running continuous courses for the **NRAE** in the **Stoke-on-Trent** area. His next course begins on Tuesday 5 September, aimed at the December exam. You can contact him on 01782 533370 or e-mail m1dvt@qsl.net Course information is also available on www.qsl.net/m1dvt

● **Stoke-on-Trent ARS** is currently holding an **NRAE** course at its premises in **Newcastle-under-Lyme** on Thursday evenings, beginning 8pm. Only a few places are available. For more details contact Leigh, M1CZK, on 01782 264729 after 7pm.

## Northern Ireland

● **Foyle & DARC** will run an **RAE** course from September. Contact Ronnie, GI0WYO, on 01504 342636 for details.

## South East and East Anglia

● **Colchester RA** will offer **RAE** and **NRAE** courses leading to the examinations in May and June 2001, respectively. They will be held at the St Helena School in Sheepen Road, **Colchester**, commencing on 12 September at 7pm in Room 22. For further details contact Frank, G3FIJ, on 01206 851189.

● **Dover RC** will be running an **NRAE** course on Wednesdays at 7pm at the Boys' Grammar School in **Dover**, beginning in October. The club is a registered RAE, NRAE and Morse examination centre. For details contact Jim, M1BKI, on 01304 852773.

● **Lowestoft & DARC** will be running an **RAE** course on Wednesdays from November, leading to the May 2001 examination. For details contact Phil, G0JSG, on 01502 585448.

● **Newstead Wood School for Girls**, Avebury Road, **Orpington**, Kent will be the venue for an **RAE** course which begins on Monday 11 September, 7.30-9.30pm. Enrolment is at Bromley Adult Education College, Widmore Centre, Nightingale Lane, **Bromley**. Further details are available from the tutor Alan, G0HIQ, on 01689 831123.

## North of England

● **Carlisle College** will be holding an **RAE** course from November. For further details contact the college on 01228 819000.

● **Houghton-le-Spring ARC** is currently holding an **RAE** course which started on Wednesday 23 August. It is being held weekly at the Dubmire Royal British Legion Club in **Fencehouses** at 8pm. The club also offers examination facilities as part of the RSGB Satellite Centre scheme. For further details contact the tutor Foster, G0ABF, on 01915 844673.

● **Keighley ARS** will be running an **NRAE** course starting in September in preparation for the exam in December. In January 2001 an **RAE** course begins, leading to the May 2001 exam. Both courses take place on Monday evenings at the KARS Training Group HQ, Ingrow Cricket Club in **Keighley**. For further details contact Ian, M1BGY, on 01274 723951 or e-mail ian@m1bgy.freeserve.co.uk

● **Liverpool & DARS** will be starting **RAE** and **NRAE** courses on Tuesday 5 September at 7pm in the Churchill Club, Church Road, **Wavertree** in Liverpool. For details contact Ian, G4WWX, on 01517 221178.

● **North Cheshire RC** runs **RAE** and **NRAE** classes, and enrolment will take place on any Sunday from 10 September until the end of November for new entrants to both classes. The club premises are at **Morley Green**, near Wilmslow. For details contact Gordon, G3LEQ, on 01565 634560.

● **South Yorkshire Repeater Group** is currently running **RAE** and **NRAE** courses. The next RAE course begins in December 2000 and the next NRAE course in May 2001. The venue is the Valley Community Centre, St John's Road, Cudworth, **Barnsley**. For details contact Ernie, G4LUE, on 01226 716339 or e-mail ernest.bailey1@virgin.net You can also visit the web site www.syrg.co.uk

● **Warrington Collegiate Institute** will be running weekly **RAE** courses from Thursday 14 September, starting at 7pm. Enrolment can take place any weekday in September, October or November at the college's Winwick Road campus. Contact the tutor Gordon, G3LEQ, on 01565 652652 or the college on 01925 494494 for more details.

● **Whitehaven ARC** runs **RAE** and **Morse** courses at its headquarters, the training ship *Bee* at the Old New Quay in Whitehaven harbour. These are held every Wednesday at 7pm. For further details contact Norman, M0CRM, on 01946 692462.

## South West

● **Neville Lovett College**, in St Anne's Grove, **Fareham**, Hants, will be running an **RAE** course starting in mid-September on Tuesday evenings 7-9pm. Further details may be obtained from Maureen Matthews at the college, on 01329 823471 or from the tutor Rod, G0ERS, on 023 9245 3342.

● **University of Plymouth ARS** is currently holding an **RAE** course on Thursdays in Room 312, Smeaton Building, Glanville Street, Plymouth. For more details contact Bob, G7NHB, on 01752 343177.

This concludes the list of RAE, NRAE and Morse courses (started last month) of which we have been notified. If you know of a course that has not been mentioned, please ask the course organiser to get in touch with the *RadCom* editorial office ASAP!

# A Compact, Modern HF Linear

***Final part, by Bruce Edwards, G3WCE****

HAVING PREVIOUSLY discussed the design criteria and the construction of the chassis/case, we move on finally to component placement and the process of commissioning.

## PHYSICAL LAYOUT

THE PLACEMENT of major components above the chassis is shown in **Fig 10**. All components must be firmly secured. The EHT board (PCB layout in **Fig 11** and component placement in **Fig 12**) is mounted on three 12mm threaded spacers on a platform above the mains transformer, T101. Grommets are fitted wherever wiring passes through metalwork. **Fig 13** shows below chassis. The same rules apply.

## COMMISIONING

BEFORE APPLYING power, be as sure as you can that there are no errors in the wiring, off-cuts of wire, splashes of solder, etc, above or below the chassis. The EHT doubler board can be tested by applying 6 or 12 volts AC to the input and checking that the output is approximately 15V or 30V DC, before it is installed. Initially, don't connect the 900-volt secondary of T101 to the PCB, tape the ends of the wires securely and safely. This will enable you to apply mains and check that

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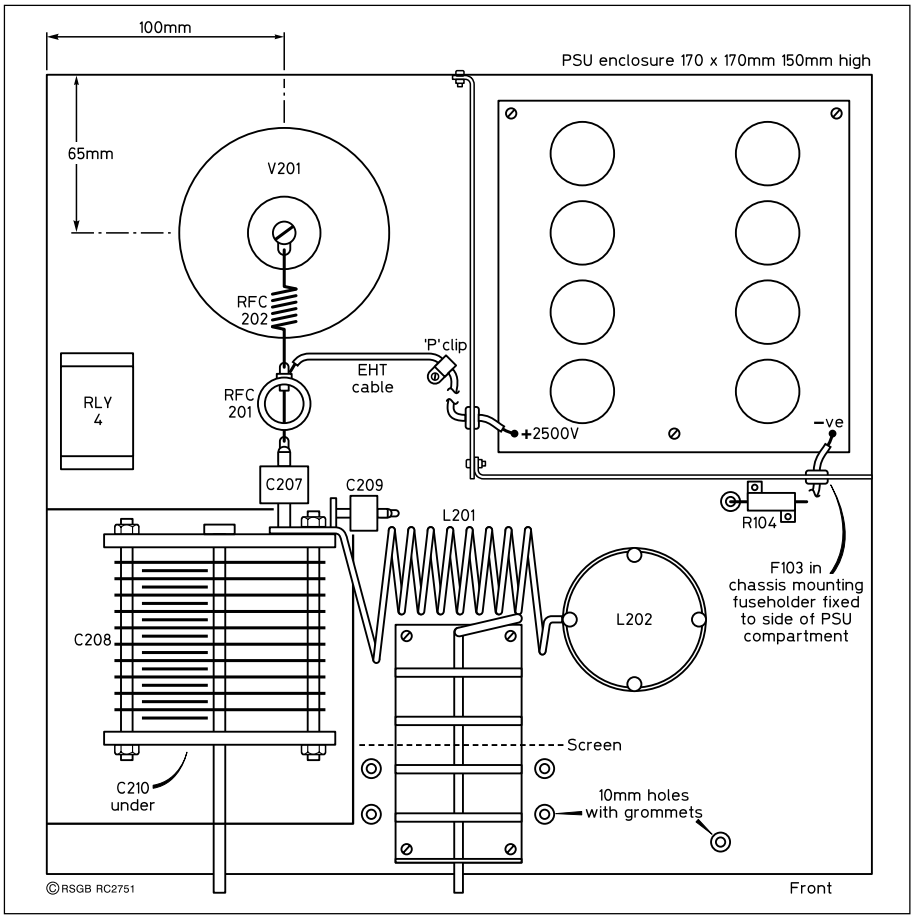



**Fig 10: Placement of major components above the chassis.**

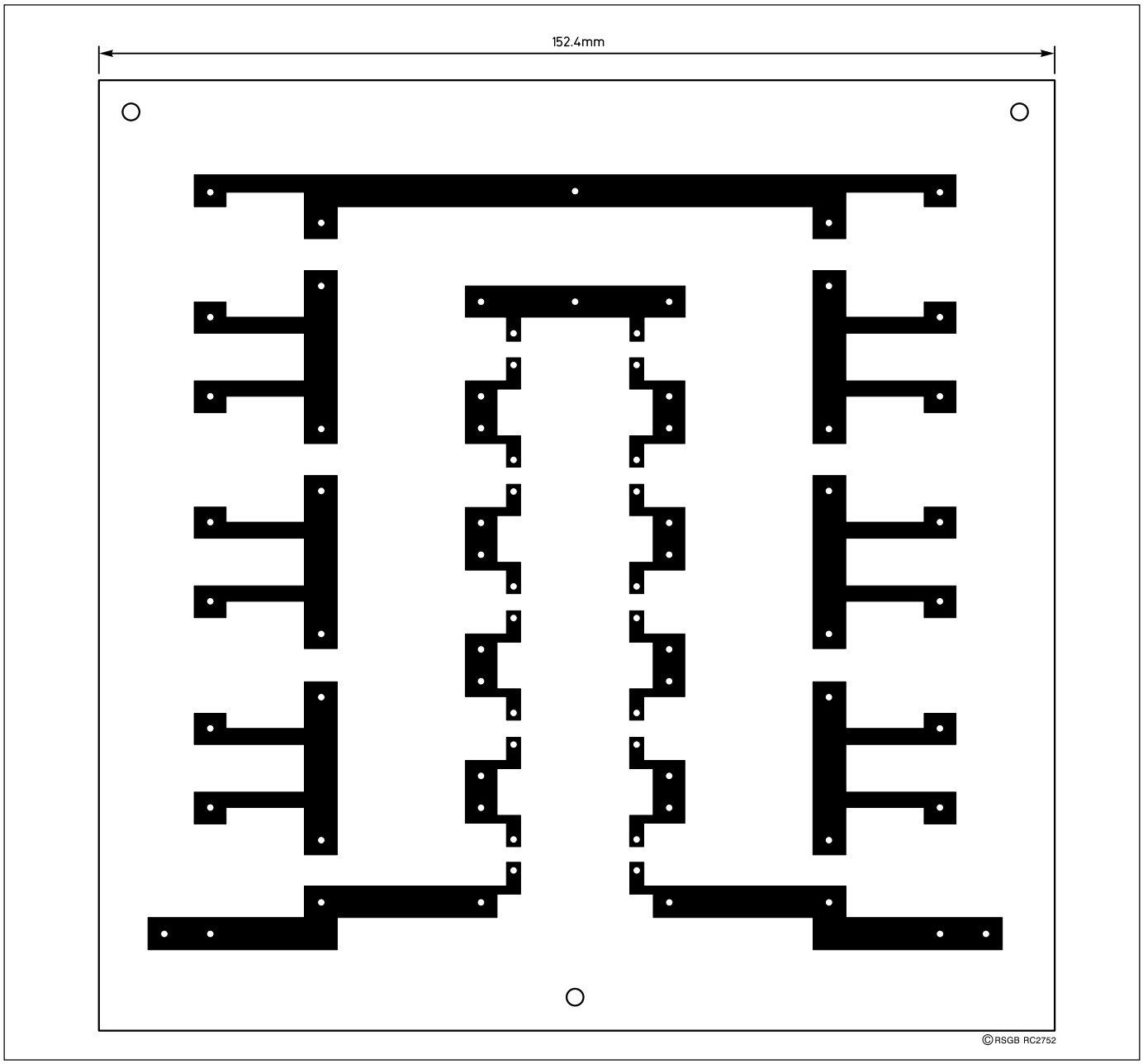



**Fig 11: Track layout of the EHT doubler board.**

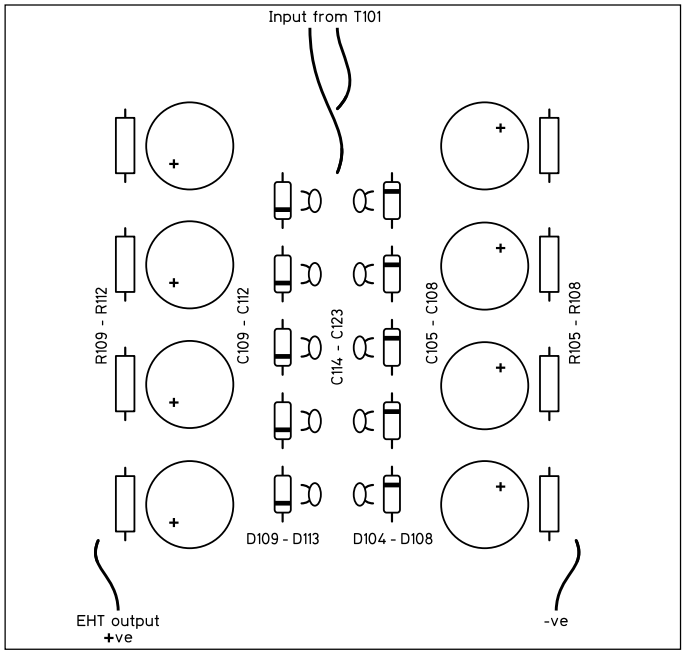



**Fig 12: Component placement on the EHT doubler board.**

everything works as it should. Do this initially without the valve in place, and check the filament voltage, which should be 5 volts or very close. Make sure the soft start is working. Check the 12-volt line, and test the transmit/receive switching.

Operational testing should be done with a suitable dummy load and in-line power meter. If the driving transceiver doesn't have SWR metering, a suitable unit must be used at the input. Work through the bands, applying enough drive to give an anode current of 200mA and adjust the tuning and loading for maximum output. Make a note of the setting of the controls, and so avoid excessive stress on the valve by pre-setting them when you return to a band.

It is necessary to adjust the input circuits for best SWR and this can be done at band centre or the particular sector that is of interest. Obviously this must be done 'live', so safety precautions must be taken. In particu-

lar, be certain that it is not possible to touch anything above chassis. Before making adjustments, tuning and loading must be correctly set. It should be possible to achieve a 1:1 match on all bands for which there is an individual network, ie all bands except 18 and 24MHz. If toroidal inductors have been used, don't aim for 1:1 yet, as these adjustments will have to be repeated later at full power. Concentrate on getting the input SWR to, say, 1.5:1 or better.

Next, the grid over-current protection has to be set. Set RV301 to maximum sensitivity, increase drive and check that the trip operates at about 100mA of grid current. If not, investigate. Disconnect R203 from the chassis and wire in a multi-range test meter, set to read 250mA FSD (in series with R203). Make sure the connections are secure, as current will rise to a high level if anything comes adrift. Connect mains, switch on, and apply increasing drive until the trip operates. Note the current at which this occurs (compare this to the reading on M2). Adjust RV301 for slightly reduced sensitivity and repeat. Carry on until trip operates at 110mA. Disconnect from the mains and reinstate R203.

Next it is necessary to check the output on all bands. Set the tuning and loading for maximum output with 200mA indicated. Now increase the drive until 400mA is indicated, and adjust for maximum output. Do this as quickly as possible, note the output shown on the power meter, then switch off the carrier and allow the valve to cool.

At 400mA anode current, DC input will be 1000 watts. The RF output should be 550 watts or more on 3.5, 7.0, 10.1 and 14MHz, around 500 watts on 1.8 and 18MHz, and a little less on 21MHz and above. Ideally, the amplifier should be operated at around 300mA anode current for maximum legal output.

Finally, check the input SWR while running full output, and make any necessary adjustments.

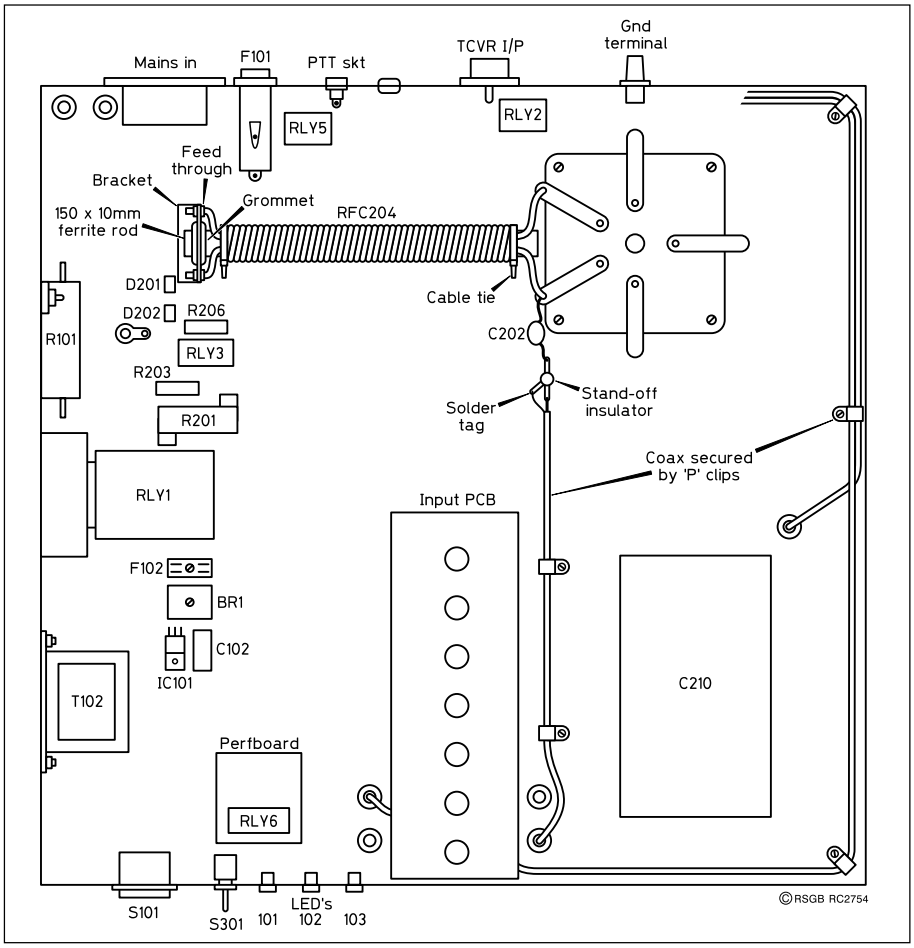



**Fig 13: Placement of major components below the chassis.**

## AND FINALLY...

OBVIOUSLY, A single valve has to work harder than a pair of valves in an amplifier such as this. However, it is highly unlikely that anyone at the receiving end will be able to tell what the configuration of your equipment is, provided the amplifier is operated properly, that is, correctly adjusted and not over driven. What the effect on valve life is cannot be predicted, but you can reduce stress by avoiding having to tune up too often. Set the amplifier up using a dummy load and make a note of the settings for each band and any favoured frequencies. Do the same for your ATU, and when you make changes to the system note any new settings. Then, whenever you go on the air, minimal (if any) tuning-up will be necessary. This, of course, is good operating practice.

In producing this amplifier I have not deliberately copied any other piece of equipment, but obviously I will have been influenced by what I have read and seen. In particular, I have found the *ARRL Handbook* a useful source of information, and recommend it to anyone who wants to go a little deeper into the theory.

## REFERENCES

[1] ARRL handbook 1999 edition (available from the RSGB One-stop Shop)
[2] High power 3-500 HF Linear Amplifier, G3HVA, *RadCom* May/June 1997. ♦

---

RadCom Helplines FOR MEMBERS

● R Scadden, G3TFM, is looking for a copy of the circuit diagram and any information on the **FM unit** that fits in the **Yaesu FT-101Z**. Also, a copy of the circuit diagram, operating instructions and information on the **Datong FL-1** frequency-agile audio filter. G3TFM, QTHR. Tel: 01458 273967.

● Douglas, G3KPO, is still searching for an ex-RAF **T1083** transmitter, for inclusion in his Wireless Museum on the Isle of Wight. G3KPO, QTHR. Tel: 01983 567665.

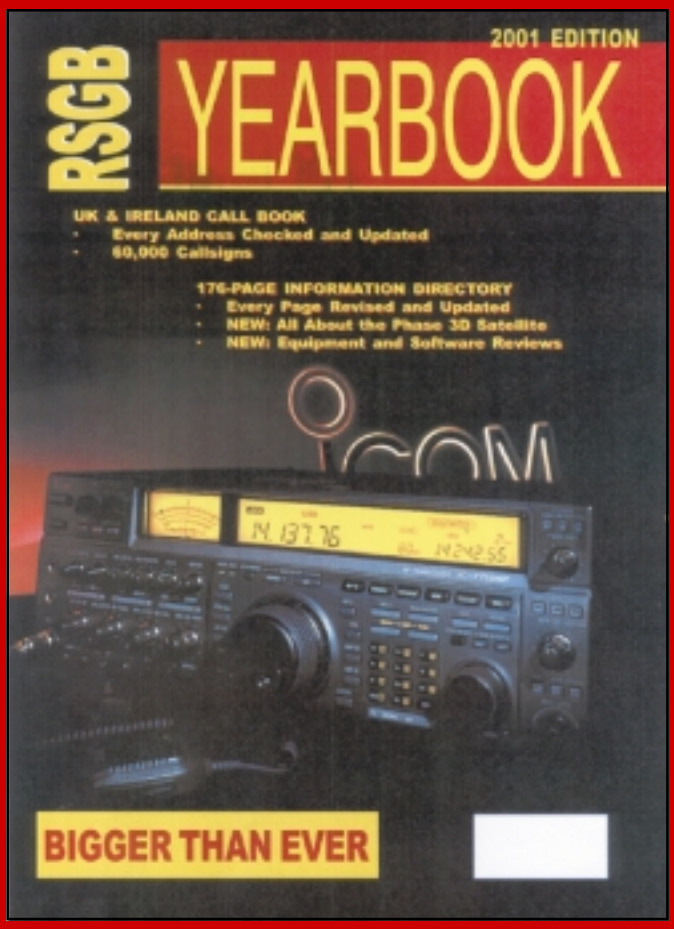
● Keith Arnold and some friends are **rebuilding Hurricane** P3179 to display condition for the Tangmere Aviation Museum, Sussex. They are in desperate need of drawings and/or photos of the radio section of the aircraft and the layout of the radio system, including **'Pipsqueak'**. Also, drawings, photos and information on the **TR9 HF set**, built June 1940. Keith Arnold, 28 Hampden Place, Tangmere, West Sussex PO20 6WD.

● H Schroeter, DK3VF, is looking for a manual or circuit diagram for the **Eddystone / Marconi Marine** receiver **EC-958/5**. H Schroeter, Moorfleeter Deich 503, 21037 Hamburg, Germany.

● Steve, G3YFG, would like to speak to anyone familiar with the **Racal MA1723** drive unit. Also, anyone who is able to provide information on obtaining **Racal spares**. G3YFG, QTHR. Tel: 01254 822222.

*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.*

# YEARBOOK 2001

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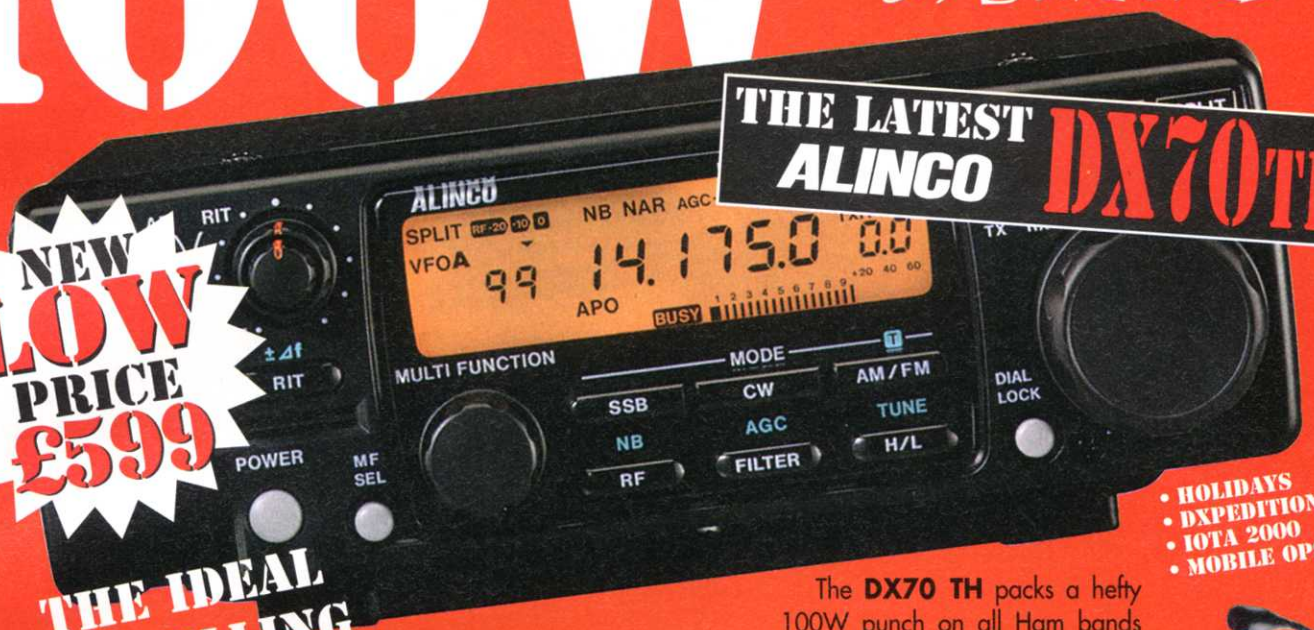


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The **DX70 TH** packs a hefty 100W punch on all Ham bands 1.8 - 50MHz. It is backed by a superb receiver with narrow filters fitted as standard. Make no mistake - this is a real DX operators transceiver ideal for use at home, in the car, or for that portable DXpedition. General coverage receive is included and wideband transmit facilities for export customers. The detachable front panel allows remote mounting and additional security.

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Add 'talk power' to your DX70TH with this matching speech compressor BASE MIC

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

The EDX-2 is supplied with 5 metres of coaxial and control cables ready wired for the Alinco DX70. The EDX-2 is also suitable for ICOM, KENWOOD and YAESU radios.

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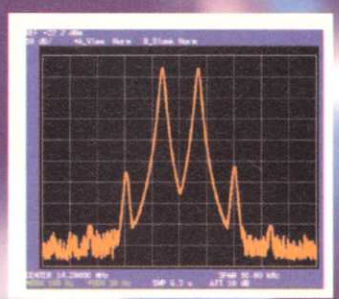

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When Yaesu engineers formulated their design strategy for the new FT-1000MP Mk V, they consulted the world's top HF operators. Improving the current FT-1000MP, regarded throughout the world as the ultimate HF transceiver, was never going to be easy. But Yaesu engineers have done just that and doubled the output power in the process!

Owners will appreciate the improvement in receiver noise floor, due in no small way to the addition of the exciting new Variable RF Front-End Filter (VRF). This has an extremely narrow bandwidth permitting easier operation alongside other transmitters; ideal for contest and Dxpedition work. And to help keep adjacent channel transmit splatter to an amazingly low level, Yaesu have uniquely provided a selectable 75 Watts class-A mode, particularly effective for driving linear amplifiers. Transmit output has been raised 3dB by up rating the output to 200 Watts using a pair of generously rated Philips BLF147 power MOSFETs. These are driven from a 30 Volt rail to improve linearity and Yaesu include with the transceiver a compact AC switch mode power supply with generous cable length for tucking away out of sight.

Receiver selectivity has received a major upgrade using Interlocked Digital Bandwidth Tracking (IDBT). This enables DSP to precisely track the selected analogue filter, dramatically sharpening the IF filter shape factor. Front panel ergonomics have also been improved including a re-designed Shuttle Jog control that incorporates fingertip access to IDBT and VRF.

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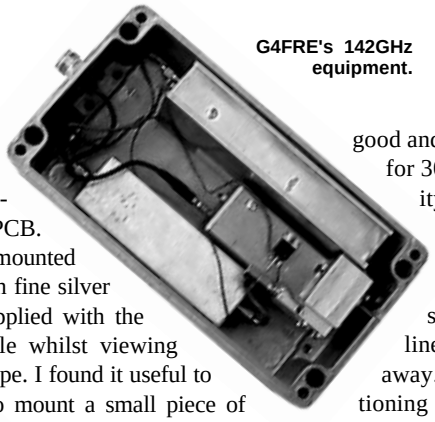
# 142GHz Expedition

*By Dave Robinson, G4FRE/WW2R **



G4FRE's 142GHz equipment.

LAST YEAR my XYL Meg, G7FRE, and I returned to the UK for Christmas, bringing along 47GHz and 76GHz transverters to try to work a UK station who had previously built transverters for these bands but had no-one to work. A QSO was had with ease across the garage on 47088MHz, but no signals were identified either way on 75976MHz, so an opportunity for a UK first was lost. After hearing that the 76GHz UK first had been completed, I turned my attention to the next band up, 142GHz.

Whilst roaming the flea market at Dayton, I happened to stumble upon a surplus Hughes 47449H-1002 G-band harmonic mixer, "condition unknown", with chipped paint for a modest price, making it worth a gamble. This would expand my spectrum analysis capabilities to cover 145GHz, so my enthusiasm to construct for the band exploded. Realising we were due to go on vacation in Crete in mid June 2000, stopping off in England on the way, I realised it would be an ideal opportunity to try for a 'first'. As insurance, I would need two transverters. The problem was I only had four weeks to build them! The good news was that on testing the mixer, it seemed to work fine, despite its tatty appearance.

## PUBLISHED DESIGNS

THE ONLY PUBLISHED equipment design available was the DB6NT one in *DUBUS*, which required drive at 11GHz then had multipliers using four FETs to generate 35GHz, which then drove the SHM diode mixer with a 144MHz IF. At Microwave Update 99 I had obtained some surplus multipliers which took an SMA input of 7dBm at 12GHz and produced +17dBm output in 36GHz in WR28 and ran off +8V. This module could be used to drive the mixer directly, saving me space and complexity, so I would only have to mill a small box to contain the mixer PCB. The incomplete drawings in DUBUS were taken and modified to accommodate the changes. As I wanted to use an unmodified IC-202 to drive the transverter, the DB6NT IF PCB could not be used, so I employed a 1.5 x 1.5 x 3.5in die-cast box with the modified circuit built dead bug style on the bottom of it, on a piece of double-sided unetched PCB. The diodes were mounted on the board with fine silver loaded epoxy, applied with the point of a needle whilst viewing under a microscope. I found it useful to practise trying to mount a small piece of wire on a scrap PCB to perfect the technique before finally trying on the diode. After mounting, the boards were baked at 150°F for 30 minutes to cure the adhesive. The photo shows the DB6NT transverter in its 8.5 x 4.5 x 3in die-cast box. The G4DDK004 is at the top, with the WDG009 multiplier at the bottom. The mixer assembly is the aluminium box centre right, sitting on top of the IF interface.

The next decision was what frequency on 142GHz? A search of my stocks of 50°C specification crystals produced a pair of 99MHz crystals, originally bought for a 24192/432MHz transverter. These could be used in the DDK004/WDG009 oscillator/multiplier that I intended to use. The DDK004 produces 2376MHz at 7dBm, which drives the retuned WDG009 multiplier to +14dBm at 11880MHz. Operating below its design frequency, the commercial multiplier produces 35640MHz at only +14dBm, but this was considered enough to drive the mixer diodes When mixed with 144MHz, an output of 142704GHz is produced. The assembly was hooked up to the analyser and after about 30 minutes of problem resolution (centred around power supplies), it produced around 20µW of RF, assuming the conversion loss quoted by Hughes for the harmonic mixer (40dB) was correct.

I was starting to run short of time and would not be able to build a second DB6NT transverter, so the possibilities of using the Hughes mixer as the second transverter was considered. The DDK004/WDG009 chain from my 76GHz transverter was recrystalled and retuned to produce +18dBm at 11879.5MHz, and fed into the mixer via an isolator for stability. Another identical 144.5MHz IF interface was built in a die-cast box, the whole unit mounted in a recycled 6 x 10 x 4in die-cast box (15 years ago it contained the G4BPO/P 23cm MHP!). The difference between the two IF frequencies was deliberately chosen to prevent the IF radios working each other.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## CONTACT!

INITIAL TESTS were done with 30dB horns, using WR7 from Eisch Electronics. The transverters were first set up at opposite ends of the garden in Texas. SSB signals were good and, after letting the LOs warm up for 30 minutes, the frequency stability was excellent. After this initial success, one of the transverters was put into beacon mode and placed on the shack window, aimed at a local line-of-sight landmark about 500m away. I then drove to the site, positioning the car for maximum signal. Good signals were finally obtained, with enough signal in hand to suggest that 1km was feasible. When I took the opportunity to swap the receive horn for my Procomm 25cm dish, signals improved by around 15dB. This is about what was expected.

On the eve of departure, the two transverters were packed in bubble wrap, along with a pair of IC-202s, a Garmin GPS unit and a box of cables, and put in the suitcase. This equipment, even without the Procomm dish, totally eliminated taking any scuba equipment to Crete! Luckily, DFW Security did not find the equipment too suspicious when they X-rayed it. Leaving Dallas in a cloudburst, which delayed departure for an hour, I was pleased to arrive in hot and sunny England. It looked ideal 142GHz weather! The lower power Hughes transverter was set up on the window ledge of G7FRE's shack, pointing down the garden to where the DB6NT transverter was set up, powered from the mobile. Signals were just as loud as over the same distance in the USA, showing the rigs had not suffered in their travels.

I then drove to a previously identified overpass on the A2, to the west of G7FRE. Talkback was maintained on 433.55MHz FM, using a pair of VX-1Rs. Signals were considerably weaker at the new G4FRE/P location and peaked-up with the horn slightly off boresight. At 1812UTC 5/2 (given) and 5/3 (received) reports were obtained. From the GPS, the distance was calculated as 1.29km (both locations were within JO01BX). There was probably enough signal in hand to extend the distance, but by this time the effects of jet lag were showing and a hasty retreat ensued. The rigs subsequently returned to the USA with me on 19 June - they still worked on arrival!

## FUTURE PLANS

SINCE MY RETURN, another oscillator/multiplier chain has been built, to replace the I stole from my 76GHz transverter. If space permits I hope to bring both 76GHz transverters to the UK for Christmas 2000. Having completed a QSO with them over tens of km in the January 2000 ARRL contest (in flat Texas), the UK possibilities are intriguing. ♦

** 2506 Sherbrooke Lane, McKinney, Texas 75070, USA*

# inpractice

by **Ian White,** G3SEK*

**http://www.ifwtech.com/g3sek E-mail: g3sek@ifwtech.com**

## COMPONENT DISTRIBUTORS

*IN THE JULY item about connectors, I didn't give the contact details for Farnell Components. The number of queries showed that it's time to run this item about distributors again!*
THE MAJOR component distributors are where you go for non-specialist components that you can't find on the surplus market. These distributors aim to stock everything you could possibly need, and in recent years most have lowered their barriers against orders from private individuals. They have come to realise that our money is just as good as money from company account holders - or actually *better* because we pay up-front instead of after 30...60...90 days! The main restriction remaining is that private orders are subject to a 'small order' charge, or a scale of charges for delivery. This is fair enough, because each order costs the firm money to process, regardless of its size. It should also encourage us to plan ahead and make one sensible-sized order per project.

There are three very large distributors in the UK, listed below in alphabetical order, and they all deal with orders from private individuals. Please note that these are their *current* terms of business, as verified at the time of writing, but delivery charges in particular seem to vary from time to time.

- Electromail, PO Box 33, Corby, Northants NN17 9EL
  Order line: 01536 204555
  Web site: http://rswww.com

  The retail arm of RS Components. Use the professional RS catalogue, CD-ROM or web site, or the Electromail CD-ROM (£3.99+VAT, post free).

  Credit/debit cards accepted. Small order charge: £4.60+VAT on orders <£30 ex VAT; £2.95+VAT on orders £30-£80 ex VAT; £1.75+VAT on orders >£80 ex VAT.

- Farnell Electronic Components, Canal Road, Leeds LS12 2TU
  Order line: 0870 1200 200
  Web site: http://www.farnell.com/uk

  Use the professional Farnell catalogue, CD-ROM or web site.

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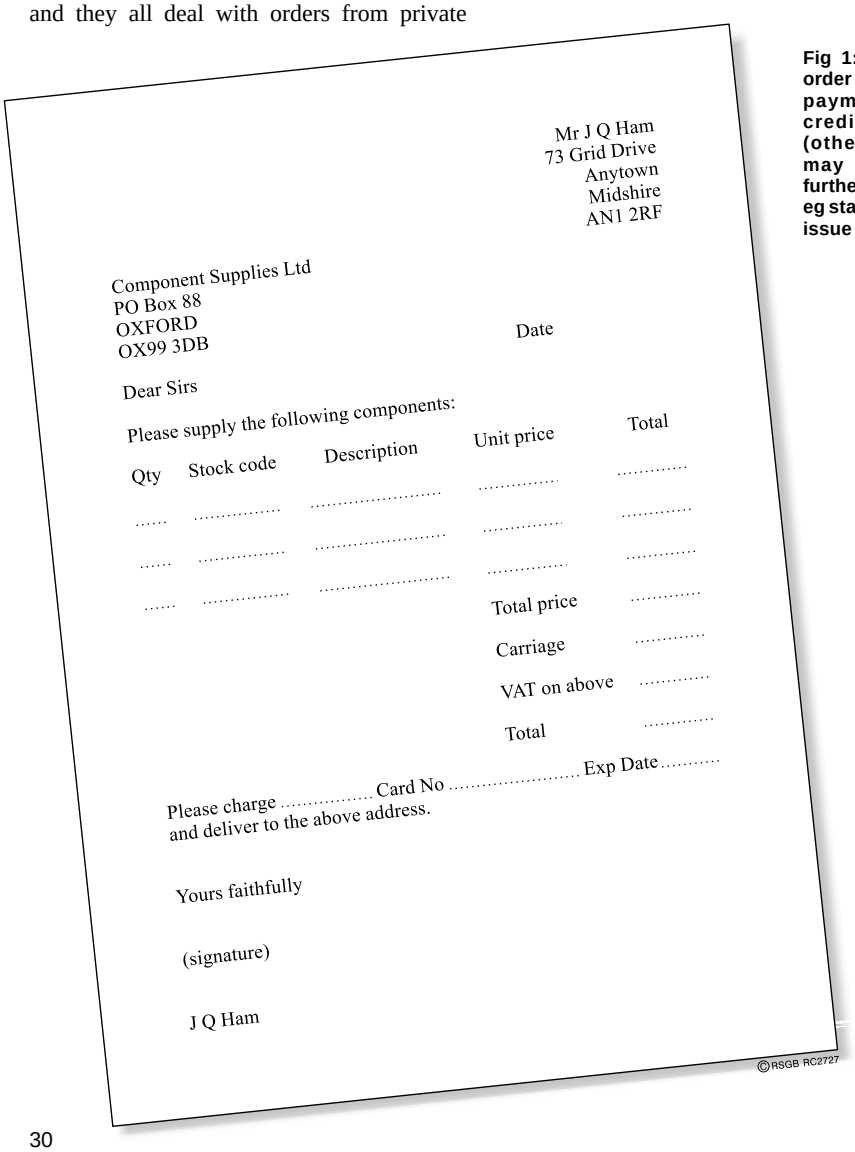
- Maplin Electronics, Freepost SMU 94, PO Box 777, Rayleigh, Essex SS6 8LU
  Order line: 01702 554000
  Web site: http://www.maplin.co.uk

  The Maplin catalogue is available in major magazine shops (£3.99) and shows VAT-inclusive prices. There is also a CD-ROM.

  Credit/debit cards accepted. Small order charge: £3.95 inc VAT on orders up to £30 inc VAT; free above £30 inc VAT.

  Maplin has many branches throughout the UK. Although none of the branches carries the full line of stock, you can order in advance for collection within a few days.



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Dear Sirs

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| ..... | ..... | ..... | ..... | ..... |
| ..... | ..... | ..... | ..... | ..... |
| ..... | ..... | ..... | ..... | ..... |

Total price .....
Carriage .....
VAT on above .....
Total .....

Please charge ..... Card No ..... Exp Date .....
and deliver to the above address.

Yours faithfully

(signature)

J Q Ham



**Fig 1: Sample order letter for payment by credit card (other cards may require further details, eg start date or issue number).**

The delivery charges quoted above are for first class post or similar, but in each case you can choose to pay more for faster delivery. As you can see, VAT makes everything more complex to calculate, and if you use the professional catalogues (other than Maplin) you will need to add VAT to all prices, including the handling charge.

Each of the Big Three distributors has its own particular strengths. With Farnell and RS/Electromail it is the vast breadth of stock, centred on electronic components, but also covering a much wider range of electronic and industrial products. Maplin are positioned more towards the consumer end of the market. Their range of electronic components is not as broad as the other two, but they do stock a wider range of consumer electronics items and related components. The same market positioning is reflected in the minimum order quantities for small, low-cost items such as resistors and capacitors: Farnell and RS/Electromail may only sell in multiples of 5, 10 or 50, where Maplin more often sell in smaller multiples or singly. However, more expensive resistors or capacitors are always sold singly.

Most of us will usually have to deal with these firms by mail order - or rather by telephone, which is by far the best way to order because you immediately find out whether each item is available. You can then decide whether to wait or to cancel those items. More than once I've discovered that essential items were not available, and decided on the spot to cancel the whole order and go to one of the other firms. You don't have any of that flexibility if you order by post. These days, telephone ordering can

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### - CATALOGUES - GET YOURS NOW!

COMPONENT catalogues are *essential* for any radio amateur. Even if you don't intend to buy anything, they keep you in touch with what's available - and best of all they are packed with technical data.

You can keep yourself up-to-date with the Maplin catalogue from magazine shops, but it isn't always easy to get catalogues from the distributors who deal mostly with commercial companies. However, you don't always need the latest catalogue. Contact someone locally who gets the catalogues and CD-ROMs at work, and make a regular arrangement for them to pass on the older copies. Club secretaries: this is something you can and should be arranging as a service for members!

actually cost less than a postage stamp if you have everything prepared in advance - which you always should. The telephone order operators are generally well-trained, efficient and helpful, and they will lead you through the process.

Pay for your order by credit or debit card. With a complex order, it's almost impossible to predict the total cost to the nearest penny; perhaps you didn't use the very latest catalogue, or some items may not be in stock, or they have been superseded during the lifetime of the current catalogue. If you pay by card, the supplier will automatically charge the correct total. The old-fashioned way, cheque with order, often results in extra paperwork to correct for an over- or underpayment. You end up paying exactly the same, but it takes you longer to get the components. Also, somebody has to pay for the extra administrative paperwork. In the short term it is the distributor, but in the longer term it could be *all of us*. If distributors find it too costly to deal with small orders, they could increase the handling charge or even close the service down. We have a responsibility to make our small orders easy to handle, and paying by card is part of this.

If there is a pre-printed order form, always use it - yes, even if you are going to order by phone. The form asks for all the information the company needs, so you can hardly go wrong if you fill it in with care. If there isn't a pre-printed form, that means you are dealing with a supplier who will treat you like a non-account commercial customer. All that means is that you should place your order in a businesslike manner. In particular, you *must* quote stock numbers and respect any minimum-order quantities specified in the catalogue. When components are supplied in multiples, read the catalogue very carefully, and don't order say five components when the stock item is a pack of five - otherwise you'll end up with 25! The type of form letter shown in **Fig 1** will generally 'do the business' for you, and is equally useful as a checklist before you pick up the phone.

You will notice that I have included these companies' web sites, but have not mentioned ordering direct from the web. Browsing those sites suggests that each of the three companies' e-commerce facilities have some way to go before they are as reliable and user-friendly as their human telephone operators. For the present, I cannot recommend ordering by web for inexperienced buyers. This situation will obviously improve, and please e-mail me with your comments and experiences as time goes on.

Finally, one of the better-kept 'trade secrets' is ['was' -*Ed*]:

- Combined Precision Components (CPC), Faraday Drive, Fulwood, Preston PR2 9PP
  Order line: 01772 654455
  Web site: http://www.cpc.co.uk

  CPC sell a wide range of largely consumer items, and their particular strength is in spares for a wide range of household electronics. They deal mostly with the trade and their catalogue is not available to private individuals, but they will accept orders from 'non account holders' if you have somehow found out what you want!

  In future you will be able to use the catalogue on the CPC web site, but this was not ready at the time of writing. Credit/debit cards accepted. Delivery charge: £3.99+VAT.

I'll give details of some other component distributors in a future column. If there are any that you'd particularly like to recommend to other *RadCom* readers, please let me know.

## CUTTING FERRITE

*HOW CAN I cut a piece of ferrite rod accurately in two? How about a ferrite toroid?*

CUTTING FERRITE can be desperately difficult, because some grades are extremely hard and brittle. A hacksaw really doesn't make much impression and by the time you've worn out several blades, you've probably tired yourself out so much that you force the ferrite the wrong way and smash it. Lacking a water-cooled diamond wheel, which would be the professional way to do it, we amateurs have to resort to glass-cutting techniques... but ferrite is not so predictable as glass.

A long rod is the easiest shape to cut. First you file a small, sharp notch at the point where you want the rod to break (**Fig 2a**). Then you grip the rod in both hands, as shown in Fig 2a, and break it outwards and away from you. The idea is to pull the ferrite apart to make it split, starting at the filed notch (which concentrates the stresses at that point). I really should advise you to wear gloves, because ferrite splinters can be very sharp indeed, but frankly gloves decrease your chances of success (the typical safety dilemma). This procedure is much more difficult if you only want to remove a short length from the ferrite rod. Try holding the part that you want to keep in the vice, with the notch level with the top of the jaws, and hold a wooden block against the unwanted end. Then push very hard on the block to break the rod (**Fig 2b**). If you can't muster enough force, you'll have to hit the block with a hammer - but this has a very high risk of smashing the ferrite, even the part that's in the vice. If you need to cut a ferrite toroid in two (for example to make a clamp-on RF current meter), you have to use the vice method, with two notches filed on the same side of the toroid but 180° apart. However, your chances of getting a clean break on both sides simultaneously are very poor. It might be worth experimenting with two vices, one fixed to the bench and the other a smaller one such as a hand-vice, but be prepared for a lot of wastage before you get a toroid broken cleanly into two.

These amateur techniques can work, but there's really no substitute for a diamond saw. Better still, find ferrite of the right size and shape in the first place... or change your design ideas to fit whatever is already available. ♦

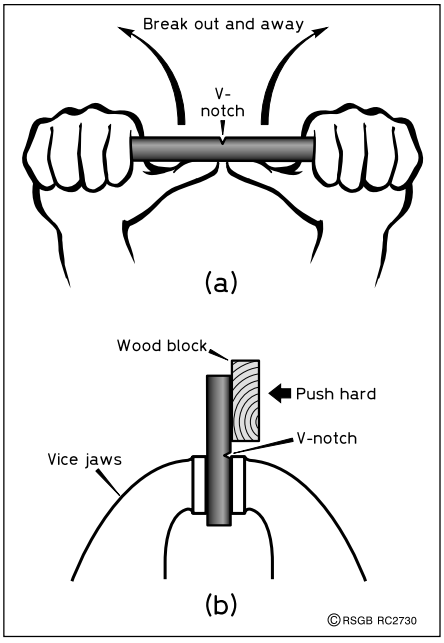


**Fig 2: How to break a ferrite rod - if you're lucky!**

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

# ESSEX AMATEUR RADIO SERVICES

4 Northern Ave, Benfleet, Essex SS7 5SN

**01268 752522**

**alan@ears97.com - http://www.ears97.com**

### ICOM

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| IC 775 DSP II | £1,499.00 |
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| IC 735 HF | £395.00 |
| IC 725+FM HF | £325.00 |
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|---|---|
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| IC 2100H 2m | £165.00 |
| IC T8E 2m + 70cm | £165.00 |
| IC 32E 2m+70cm | £200.00 |
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| FT 757GXII | £395.00 |
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|---|---|
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| FT 29OMKI 2MM | £150.00 |
| FT 69OMK2 6M/M +linear | £255.00 |
| FT 3000M 2M | £250.00 |
| FT 50R 2/70 | £150.00 |
| FT 530 2170 | £165.00 |
| VX 5 R 2/70 | £200.00 |
| VX I R 2/70 | £125.00 |
| FT 11R 2m | £90.00 |
| FT 41R 70cm | £125.00 |

### KENWOOD

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|---|---|
| TS 870S HF | £1,095.00 |
| TS 850 SAT HF | £695.00 |
| TS 570 DGE HF | £699.00 |
| TS 450 SAT HF | £595.00 |
| TS 50S HF | £400.00 |
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|---|---|
| TR 751 E 2M/M | £295.00 |
| TM 455E 70cm MIM | £395.00 |
| TM 732 2/70 | £250.00 |
| TM 701 2/70 | £175.00 |
| TH 79 E 2/70 | £175.00 |
| TH78 E | £150.00 |
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| THD 7E 21/0 | £225.00 |
| TH 42E | £90.00 |
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| TH 26E | £50.00 |

### ALINCO

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|---|---|
| DX70THHF+6M 100watts | £499.00 |
| D X70T HF + 6M | £395.00 |
| DR 605 2/70 | £195.00 |
| DJG5EY | £175.00 |
| DJ190 | £80.00 |
| DJ 480 | £80.00 |
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| DJG1 E | £65.00 |

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| AR146 | £125.00 |
| AT600 | £100.00 |
| AT400 | £90.00 |
| AT450 | £90.00 |
| AT200 | £90.00 |

### AKD

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|---|---|
| 2001 | £100.00 |

### LINERS

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|---|---|
| KW 600 single 572B 500watts | £300.00 |

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|---|---|
| AEA 300ATU | £50.00 |
| MFJ 989C 3kw | £250.00 |
| MFJ949 300+D/LOAD new | £105.00 |
| MFJ948 30OW new | £99.00 |
| Sem Transmatch atu | £50.00 |
| FC 1000AUTO/ATU NEW | £180.00 |
| TOKYO HC400L | £100.00 |
| MFJ DSP 784B | £150.00 |

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|---|---|
| SEC1223 23amp compact new | £99.00 |
| NISSEI 30 AMP MTER SETC | £99.00 |
| Manson 30 amp | £89.00 |
| YAESU FP 757 HD s/h | £100.00 |
| SMC 35AMP PSU | £100.00 |

### MICS

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|---|---|
| KENWOOD MC 60A | £65.00 |
| KENWOOD MC 85 | £85.00 |
| ICOM SM 8 | £99.00 |
| ICOM HM 70 | £30.00 |
| YAESU MD 100 | £100.00 |

### RECEIVERS/SCANNERS

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|---|---|
| ICOM 7100 25/2Ghz | £595.00 |
| ICOM 72E ac new + FM | £400.00 |
| ICOM 71 E HF /2Ghz | £295.00 |
| ICOM 7000 25/2Ghz + remote | £495.00 |
| LOWE 225 | £175.00 |
| NRD535 | £550.00 |

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|---|---|
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| DIAMOND X30 2/70 | £45.00 |
| DIAMOND X-200 2/7O | £60.00 |
| COMET CFX 514Triplexer | £54.00 |
| COMET CF 706 Triplexer | £44.00 |
| VARGARDA 3ele6m | £65.00 |
| YAESU SWR YS 60 1.8-60mhz | £65.00 |
| DIAMOND SWR SX400140-525mhz | £ 65.00 |
| DIWA 630 SWR 140-460 mhz | £65.00 |
| MFJ 815B SWR 1.8-60mhz | £50.00 |
| WELTZ SP400 SWR 140-500mhz | £60.00 |

### ACCESSORIES

| | |
|---|---|
| KPC 3 version 8.3 plus | £125.00 |
| YAESU FEX-6m-736 module | £200.00 |
| YAESU FEX-2m-767 module | £100.00 |
| YAESU FTS 8 ctoss ft736 ft767 | £50.00 |
| YAESU FTS 22 | £59.00 |
| YAESU FTS 27 | £38.00 |
| YAESU NC-42 F/C 530 | £65.00 |
| INRAD 714 455 Khz 1.8 SSB filter | £105.00 |
| KENWOOD OW YG-455-C-1 | £125.00 |
| KENWOOD CW YG-455-CN-1 | £150.00 |
| KENWOOD CW YK-88CN-1 | £60.00 |
| KENWOOD CW YK-88C-1 | £60.00 |
| KENWOOD SSBYK-88S-1 | £60.00 |
| KENWOOD SSBYK-88SN | £60.00 |
| KENWOOD AM YK-88 A | £60.00 |
| KENWOOD VS-2 | £45.00 |
| KENWOOD VC-20 | £100.00 |
| ICOM CW FL 32 A | £50.00 |
| ICOM CW FLIOO | £65.00 |
| ICOM SSB FL223 | £50.00 |
| ICOM AM FL-33 | £40.00 |
| ICOM FM-AM-UI-7 | £40.00 |
| ICOM UT-86 | £32.00 |
| ICOM OPC-589 | £15.00 |
| ICOM OPC-581 | £29.00 |
| ICOM MB-62 | £10.00 |
| ICOM MB-63 | £6.00 |

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# Newcomers' News

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

AS THE AUTUMN approaches, thoughts turn to long dark nights, construction projects, and a new batch of students for the NRAE and RAE classes. Mike Coombs, G3VTO, and I will be trying to build on the success of last year's courses here in Bath, when we bettered the national average pass rates in both exams. Let me know how your classes are going and if you have any tips for others just starting out in the hobby.

## YOUNGSTERS LEAD THE WAY

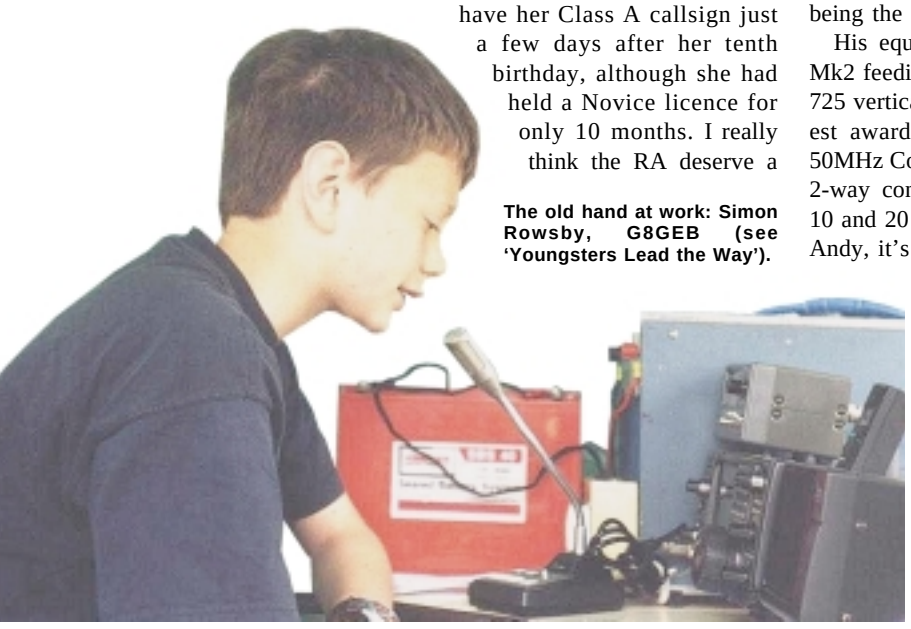
HOT ON THE HEELS of young Layla, 2E1FPM, two young members of the Bromsgove club, Simon Rowsby and Jody Preece, both passed the May RAE at just 13 years of age. Simon had held a Novice licence for over a year and a half, so he was eligible for a full class B licence straight away, but Jody thought she would have to wait for her 14th birthday before she could pick up her callsign.

The club chairman John, G4OAZ, and Jody's father Mick, M0BQF, wrote to Karen Scott at the Radiocommunications Agency about Jody's situation. Five days later Jody received a letter from the RA, saying that she had been issued with the callsign that she had asked for - M1JOD. Jody is joining the club's Morse course from this week so, hopefully, she will get her M0 callsign before too long! Meanwhile, Simon is applying for his father's old class B callsign, G8GEB, as Tony is now G4CQS.

One of the successful students at the Mid-Glamorgan Amateur Radio Group, Christopher Young, was still only 11 years of age when he sat the RAE, and he is set to become the club's youngest full A-class amateur licence holder. Again, the RA had to be approached before Chris could be considered to hold a full licence, because of his age, and because he has not held a Novice licence for a full year, although he has clocked-up quite an extensive list of countries and some exotic DX on 6 metres.

These are more good examples of the human side of the RA. They were kind enough to allow Jenny, M0BSQ, another Bromsgrove youngster, to have her Class A callsign just a few days after her tenth birthday, although she had held a Novice licence for only 10 months. I really think the RA deserve a huge round of applause. I spoke with some of their staff at the Longleat Rally, and their determination to encourage young blood into the hobby is clear for all to see. Well done all!

**Bill Harvey, G0GWW, operating GB2LSS (see 'Success at School').**



**The old hand at work: Simon Rowsby, G8GEB (see 'Youngsters Lead the Way').**

## NOVICE AWARD

RSGB VHF/UHF Awards Manager Tony, G6TTL, wrote to let me know that Andy Cooper, 2E1BRT, from Stamford Bridge has successfully claimed a certificate and stickers for 25 and 50 squares confirmed on the 50MHz band (see the August *RadCom*, p10). Andy's achievement shows that you can compete on an even playing field with just 2.5watts, sporadic-E being the great leveller!

His equipment is an FT-690 Mk2 feeding 2.5 watts to a CX-725 vertical. As well as this latest award, Andy also holds a 50MHz Countries Certificate for 2-way contacts confirmed with 10 and 20 countries. Well done, Andy, it's great to see someone else enjoying the 'magic' band.

## SUCCESS AT SCHOOL

IN November 1994 Esde Tyler, G0AEC, gave her first mention of Sue Curliss and her efforts to bring amateur radio to the attention of primary school children. Esde reported on Sue's progress a number of times with special event stations being run with the co-operation of local amateurs.

I can now bring the story a little more up to date, because Sue now has her own callsign, 2E1EXC, and is working hard to promote the hobby at the Lakeside School in Welwyn Garden City where she now works. The children at the school have some severe learning difficulties, but that did not stop them enjoying a day on the air with the special callsign, GB2LSS. Bill Harvey, G0GWW, the school caretaker, helped run the station and used his radio skills to help bring WWII communications to life for the senior history students.

Not content with the 2E1 callsign, Sue took part in the RSGB Morse Campaign at Headquarters in May, along with friends Bob Allan, G6EBJ, and his wife Maria, 2E1EXC. Unfortunately, Sue and Maria didn't manage to pass the test, but Bob got through and should be working the DX on HF by now. ♦

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

**Spread The Word!**

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

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

Down To Earth

# An Introduction to Bipolar Transistors

By Ian Poole, G3YWX *

TRANSISTOR technology is now part of our everyday lives. Its development has resulted in many changes to the world. Everything from portable radios, through to cellular phones and computers has come about as a result of the first development of the transistor.

## BASICS

BEFORE LOOKING into the way in which the transistor itself works, it is worth spending a little time to recap what a semiconductor is and how a P-N junction works, because these are fundamental to the operation of the transistor.

All materials can be classed according to the way they conduct electricity. Basically they either conduct electricity or they don't. Those that do are called conductors, and those that don't are called insulators.

Transistors are based around semiconductors and, as the name suggests, these materials do not fall into either category. Pure silicon is a good insulator, but when an impurity is placed into the crystal lattice its properties change dramatically. To see why, it is necessary to look at the lattice shown in **Fig 1**. Silicon is shown and it can be seen that the atom consists of three rings or orbits containing electrons, each of which has a negative charge. The nucleus consists of protons (that have a positive charge) and neutrons (that are neutral and have no charge). Each ring has a fixed number of electrons. The first has two, the second eight and the outer one has four. When in a lattice, the outer electrons are shared with adjacent atoms and when this happens there are no free electrons, making silicon a good insulator.

If an impurity is introduced that has five electrons in the outer ring, it will share its electrons with the adjacent silicon atoms, but as there is one extra electron, one is free to move in the structure. A semiconductor like this is known as N-type. Similarly, if an impurity with three electrons in the outer shell is introduced, there will be an electron short. This is known as a 'hole'. Essentially it is a position into which an electron can go. Semiconductor material with a predominance of holes is known as P-type. The introduction of carefully-controlled amounts of materials used as the impurities is known as 'doping'.

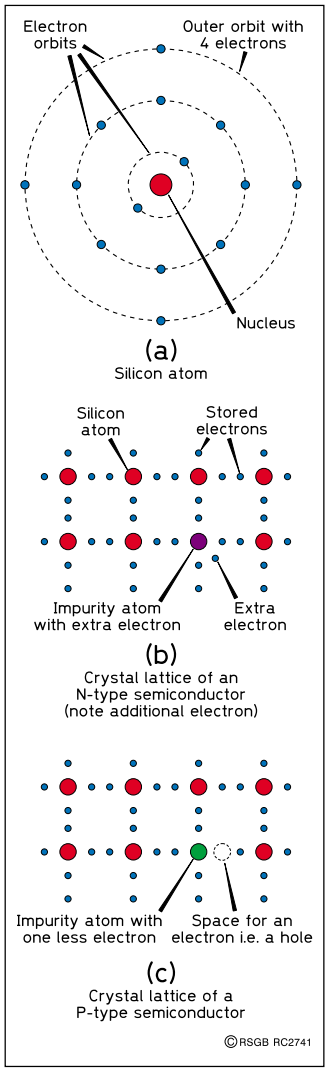



**Fig 1: Crystal lattices for N and P type semiconductors.**

The movement of holes or electrons in a particular direction will constitute a current. As such, both holes and electrons are called 'charge carriers'. As a hole is the absence of an electron it means that holes and electrons move in the opposite sense, to give rise to a current in a particular direction.

## SEMICONDUCTOR DIODE

A SEMICONDUCTOR diode (see **Fig 2**) is made by having an piece of P-type material adjoining a piece of N-type material. This means that both ends have different characteristics - one has a surfeit of electrons whilst the other has too few (ie a surfeit of holes).

In the region where the two pieces of dissimilar semiconductor join, the electrons fill the holes and there are no free holes or electrons. Accordingly this region is known as the depletion region, and under these conditions no current can flow. This region is typically only a few thousandths of a millimetre thick.

If a voltage is applied across the device such that the P-type area becomes positive and the N-type area becomes negative it is found that electrons will be forced into the depletion region, because like charges repel and unlike ones attract. Similarly, the holes will be forced away from the positive potential on the P-type area and towards the negatively charged N-type area. As a result, the depletion region narrows and holes and electrons will cross it, combining together when they reach each other.

Even though holes and electrons are moving in opposite directions they carry opposite charges, and as a result they represent a current flowing in the same direction.

If a voltage is applied in the opposite direction, the holes and electrons will be attracted away from depletion region, making the region wider. Accordingly, no current flows.

## BASIC TRANSISTOR

THE TRANSISTOR IS a three terminal device and consists of three distinct layers. It may either be a P-N-P device or an N-P-N device. In

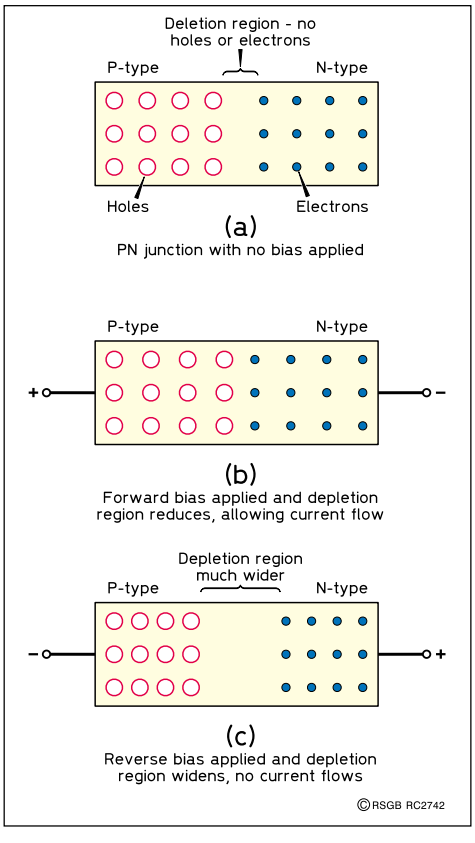



**Fig 2: A semiconductor diode.**

* 5 Meadway, Staines, Middlesex TW18 2PW.

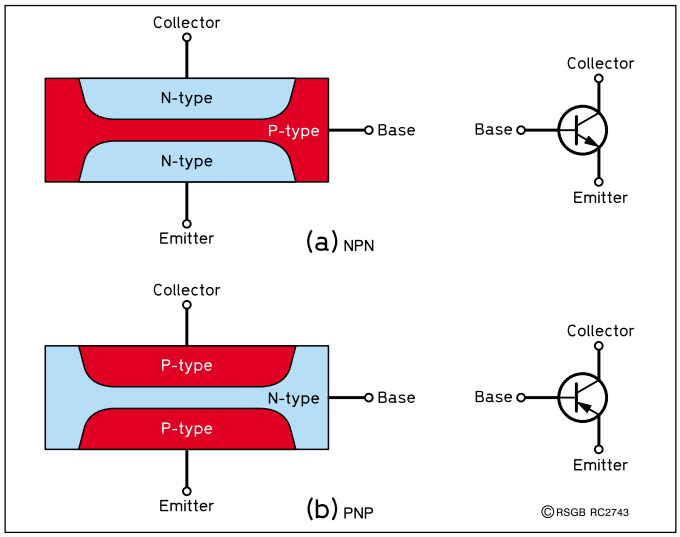



**Fig 3: Transistor symbols and diagrammatic structure.**

each case one layer is sandwiched between two others of a different type, as **Fig 3** shows.

The centre region is called the 'base' and gains its name from the fact that in the very earliest transistors it formed the base for the whole structure. The other two connections are called the 'emitter' and 'collector'. These names result from the way in which they either emit or collect the charge carriers. It is essential that the base region is very thin if the device is to be able to operate. In today's transistors, the base may typically be only about 1µm across.

## OPERATION

A TRANSISTOR can be considered as two P-N junctions placed back to back. The base-emitter junction is forward biased and the base-collector junction is reverse biased. It is found that when a current is made to flow in the base-emitter junction, a larger current flows in the collector circuit - even though the base-collector junction is reverse biased.

For clarity, the example of an NPN transistor is taken. The same reasoning can be used for a PNP device, except that holes are the majority carriers instead of electrons.

When current flows through the base-emitter junction, electrons leave the emitter and flow into the base. However, the doping in this region is kept low and there are comparatively few holes available for recombination. As a result, most of the electrons are able to flow right through the base region and on into the collector, attracted by the positive potential.

Only a small proportion of the electrons from the emitter combine with holes in the base region, giving rise to a current in the base-emitter circuit. This means that the collector current is much higher. The ratio between the collector current and the base current is given the Greek symbol β. For most small signal transistors this may be in the region 50 to 500. This means that the collector current is typically between 50 and 500 times that flowing in the base. For a high power transistor the value of β is somewhat less, 20 being fairly typical.

## BASIC CIRCUITS

A BASIC TRANSISTOR circuit is shown in **Fig 4**. It is called a 'common-emitter' circuit, because the emitter is common to both input and output. When the battery is connected to the input via the series resistor, a current flows in the base. The series resistor is required to limit the current from the battery if the potentiometer reaches the top end of its travel. When current flows in the base circuit, it causes current to flow in the collector circuit. This will be β times that in the base circuit.

It can be seen that if the voltage at the input increases, this causes the current in the base to increase. Accordingly, the current in the collector circuit increases. Using Ohms Law, it can be seen that the voltage across the collector resistor $R_l$ will increase, and hence the voltage at the collector will fall. In other words, a rise in voltage at the input results in a fall in voltage at the output. If a sine wave is placed at the input of a transistor amplifier, the waveform seen at the output will be inverted with respect to the input.

Fig 4 is only to demonstrate how the circuit operates - a more usual circuit is shown in **Fig 5**. The capacitors at the input and output are used to couple the alternating signal at the input and output. The resistors $R_1$ and $R_2$ are used to set the base-emitter junction at a voltage at which it is conducting current, ie it is biased 'on'. In this way the transistor will be held in its linear operating region and any signal at the input will appear faithfully amplified at the output.

$R_l$ is the collector resistor and is required so that the output voltage can be developed across it. The emitter resistor $R_e$ is required to ensure that the DC operating conditions of the circuit are maintained. Often a bypass capacitor is placed across this, to improve the gain of the circuit for AC signals.

The common-emitter circuit is the most widely used, providing both voltage and current gain. In other words, the voltage swing at the output is greater than that at the input, and the current that can be drawn is also greater.

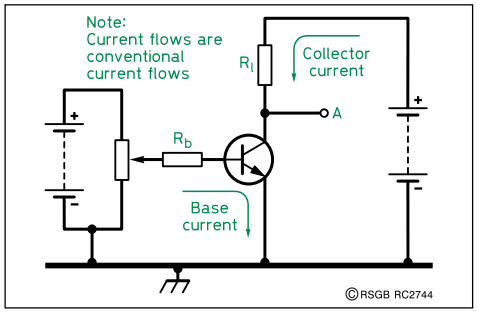



**Fig 4: A basic common-emitter transistor circuit.**

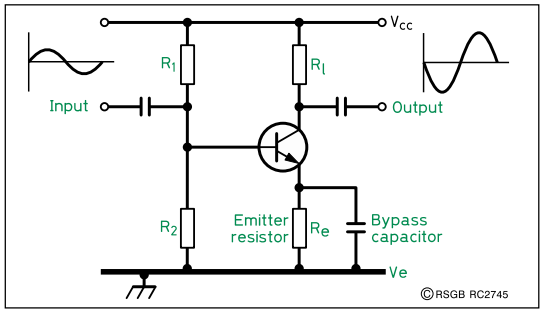



**Fig 5: A practical common-emitter circuit.**

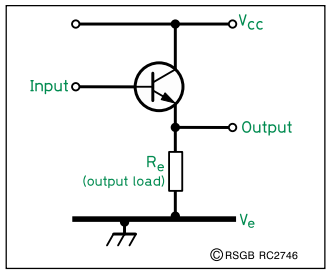



**Fig 6: A common-collector (emitter follower) circuit.**

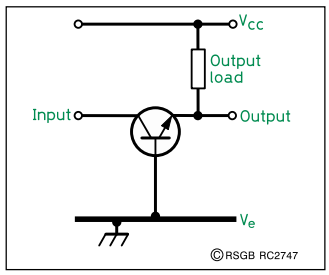



**Fig 7: A common-base circuit.**

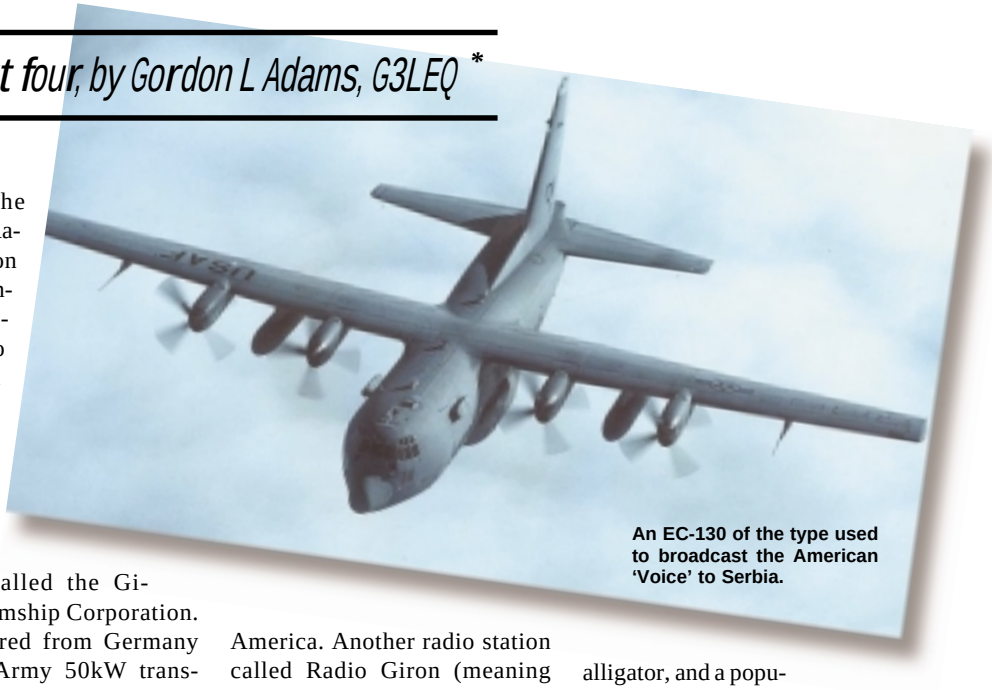
## COMMON COLLECTOR & COMMON BASE

ALTHOUGH THE common-emitter circuit is the most frequently used, there are two others. Of these the common-collector circuit shown in **Fig 6** is found more often. It also goes under the name of 'emitter follower', because the emitter voltage follows the base voltage and the output is in phase with the input. It has a voltage gain of one, but a high current gain. This means that it is ideal to act as a buffer, because it requires comparatively little current to drive it. In turn this means that it has a high input impedance, so will not 'load' the previous circuit to any degree. It can be used in many applications, one being be as a buffer for a Variable Frequency Oscillator.

The third configuration, shown in **Fig 7**, is the common-base. This is the least used, although it does find applications in some instances. It has a very low input impedance and a high output impedance, offers a high voltage gain, but a current gain of slightly less than one. It is sometimes used where the transistor has to operate close to its cut-off frequency or to give some impedance matching. One example of this is where a 50Ω input is required. ♦

# The Voices

## Part four, by Gordon L Adams, G3LEQ *




An EC-130 of the type used to broadcast the American 'Voice' to Serbia.

IN THE FIRST three parts of my feature on 'The Voices', I concentrated on European broadcasting activities. It is now time to take a look at what has been going on in Uncle Sam's back yard.

### WHO FLUNG GUANO?

THE END OF the 1950s was to see a different kind of Cold War and an epidemic of new 'Voices' breaking out in the USA's sphere of influence – namely in the Caribbean and Central America.

Cuba had been ruled until 1959 by a 'traditional' dictator named Fulgencio Batista. However, as a result of serious political unrest, he resigned on 31 December 1958 and fled to the Dominican Republic. A radical ex-student, with a gift for oratory, named Fidel Castro headed up a movement with a clandestine radio station named Radio Rebelde. The station used the callsign 7RR and was linked in a complex series of relays with various other stations – both clandestine and commercial – across Cuba.

On 1 January 1959 he spoke to the Cuban people over Radio Rebelde. He then set up a government and on 17 May seized land and property from both Cuban and American business interests. As a result, the most intense government-sponsored covert broadcasting activity ever experienced in the Americas broke out.

In 1960 the CIA set up Radio Swan on the tiny twin-island archipelago called Swan Island. This was operated clandestinely under a cover company called the Gibraltar Steamship Corporation. They acquired from Germany an ex-US Army 50kW transmitter for the new station. The island was almost uninhabited and consisted largely of sea bird excrement, known as guano. Nevertheless, the ownership of the island, and the dung, was hotly disputed by Honduras.

The CIA also funded an invasion force of Cuban exiles, who attempted a landing on Cuba on 17 April 1961, backed by a psychological broadcasting campaign. However, the landing was a fiasco, and the hoped-for public uprising did not materialise. The foiled operation became known as the 'Bay of Pigs' disaster. Radio Swan continued to broadcast throughout the 1960s, but changed its name to Radio Americas, with new CIA cover owners – the Vanguard Service Corporation. Its campaign of sedition and inducement to sabotage of the Cuban economy was further backed-up by less virulent propaganda from the Voice of America. Another radio station called Radio Giron (meaning 'Bay of Pigs') operated from Miami. Swan Island was not handed back to Honduras by the CIA until 1971.


Courtesy of Ulis Fleming, a QSL card from La Voz del Cid.

### UNCLE CAIMAN

IN FACT numerous clandestine broadcasting stations made their appearance around the Caribbean over the next three decades. During the early 1980s a mysterious station calling itself *La Voz del CID* appeared on the short waves. Initially the Federal Communications Commission made an announcement that it had tracked the station down to a ranch at Miramar in Florida, where two Heathkit transmitters running 490 Watts were said to be installed However, during the war that followed in Nicaragua, it became clear that *La Voz del CID* was being funded partly by the CIA. Later during the 1990s it has been purchasing air time on the legitimate station WRMI, which is also Florida based.

Another CIA funded station with the name *Radio Caiman* appeared on 9960kHz during 1985. It started its transmissions with a Nat King Cole song titled 'Ojos Negros'. Ironically, the word 'caiman' in Spanish means alligator, and a popular anti-American song in the 1960s, called 'Tio Caiman', suggested that Uncle Sam was the alligator! It is hard to understand how the CIA could support a send-up of this kind. The plug was finally pulled the on the alligator's funding in 1994.

### OSWALD RETURNS

IN OCTOBER 1962 the USSR attempted to arm Cuba with nuclear missiles, but backed down at the last minute under threat from US President Kennedy. A year later, on 22 November 1963, President John F Kennedy was assassinated. Lee Harvey Oswald was charged with his murder. It emerged that Oswald had been involved in the pro-Castro 'Fair Play for Cuba Committee'.

In Cuba, Fidel Castro proved to be impregnable. He even threatened to swamp American medium wave broadcasters in the 'Deep South' states using a 500kW transmitter. Some 25 years later the radio war between the USA and Cuba was still raging. On 20 May 1985 the Americans set up Radio Marti – named after a Cuban patriot and liberator called Jose Marti, and

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

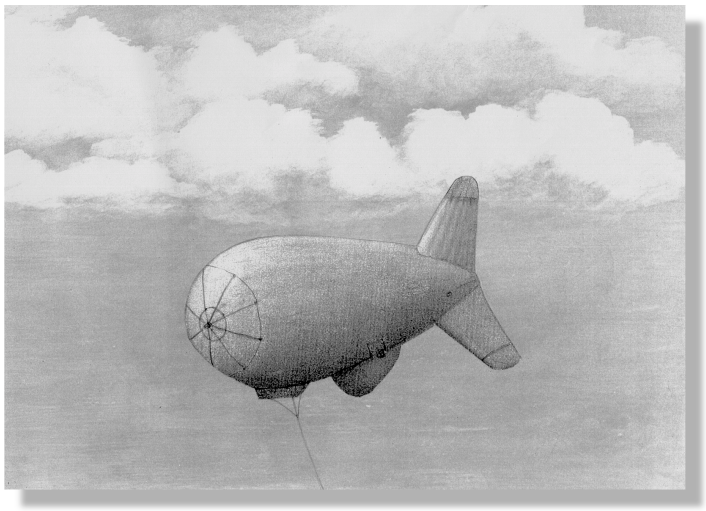
who is probably now turning in his grave. A medium wave transmitter was installed at Marathon Key, Florida. Initially, the studios were in Washington, but they were moved to Miami in August 1998. By 1999 the station had a staff of 110 and an annual budget of £7.8-million. The 50kW transmitter operates on 1180kHz 24-hours per day, and is backed up by a second unit of similar power. It shares the frequency with four Cuban transmitters, one of which varies its frequency in order to create a jamming heterodyne note of around 1kHz. Despite an ITU Region 2 agreement to limit medium wave broadcasting stations to a maximum of 50kW, both sides have accused the other of upping their power levels.

## HUBBLE BUBBLE TROUBLE

RADIO MARTI is also delivered to Cuba using short wave transmitters based in Greenville, North Carolina, and Delano, California. These use a combination of 250kW and 500kW senders (see **Table 2**). The Cubans jam every frequency carrying Radio Marti using the F1A FSK 'bubbling' technique previously described. The jamming equipment was originally supplied to them by the Russians, though the Chinese are now believed to be helping out. The Castro government also provides relay facilities for Chinese broadcasts to the Americas. In spite of the jamming campaign, Radio Marti is reported to be the most popular radio station in Cuba.

| | |
|---|---|
| 5980kHz (D) | 11660kHz (G) |
| 6030kHz (D & G) | 11815kHz (D) |
| 7365kHz (G) | 11930kHz (G) |
| 7405kHz (G & D) | 13630kHz (G) |
| 9565kHz (G) | 13820kHz (D) |
| 9805kHz (G & D) | 15330kHz (D) |
| 9825kHz (G) | 21500kHz (D) |
| D = Delano, California | |
| G = Greenville, North Carolina | |

**Table 2: Radio Marti HF frequencies. Listen on the lower frequencies when the UK and USA are in darkness, and on the 11815kHz outlet and above during UK daylight hours. Full details at http://www.ibb.gov/marti/frec.html Use the HF Propagation Predictions published each month in *RadCom* to determine the most likely frequencies for reception in the UK.**



**Fat Albert, the broadcasting blimp, tethered 10,000ft above Cudjoe Key, Florida. Image courtesy of the Cuban Air Force.**

## NO SEE TV

PERHAPS THE MOST unusual weapon in the battle of the Voices so far is TV Marti, which put out its first broadcast on 27 March 1990. Initially it was broadcasting for four-and-a-half hours nightly on the American VHF channel A-13 (vision 211.25MHz, sound 215.75MHz). The Cubans installed a number of low power jamming transmitters to wipe out the TV Marti signals. They also fitted out several Russian built Mi-17 helicopters with similar jamming equipment.

During the first seven years of its operation, it has been estimated that TV Marti cost the American government some £6.2-million per annum. To make matters worse, the Cubans were calling it 'No See TV', because they were unable to view it due to jamming. The Americans tried to counter these measures by putting out TV Marti between 08.30 and 11.00 hours local time, when Cuban television was not on the air. This was to little avail, and it is obviously easier to jam short-range VHF TV signals than HF radio signals arriving via the ionosphere.

## FAT ALBERT GOES BLIMP

LATE IN 1997, the Americans reacted by announcing that they would shortly put out the TV Marti signals from a remote-controlled blimp (balloon), to be tethered at 10,000ft above Cudjoe Key off the South coast of Florida. In December 1997 the Cuban weekly publication *Trabajadores* said that "Cuban scientists and technicians have conceived and put into practice a system to block any television signal that violates national sovereignty". Whilst a speaker in the Cuban National Assembly, named Ricardo Alarcon, commented "It wouldn't be the first time a balloon deflated".

A requirement for a tethered Aerostat (Balloon) Radar System was defined by the US Customs Service in 1984, to assist in countering illegal drug trafficking. A number of aerostats were built by ILC Dover and equipped with TCOM low altitude surveillance systems and Westinghouse TPS-63 radars. More than eight sites were set up, and at Cudjoe Key two blimps were established. The US Air Force looks after them, and for security and safety reasons, the air space around them is restricted to a radius of more than two miles and an altitude of 15,000ft.

In 1998 the two aerostats were installed at Cudjoe Key, complete with a TV transmitter, radar and customs communication systems. They normally take to the air in turn, with one on the ground for maintenance - and as a back-up. The one in the air is tethered at 10,000ft, has a payload weight of some 3,500 pounds, is more than 175ft long and is made of Tedlar fabric containing Helium gas. The on-board fuel tank carries some 100 gallons, which is consumed by the blimp's power generators at the rate of one gallon-per-hour. Nick-named 'Fat Albert', after the American 1970s TV show 'Fat Albert and the Cosby Kids', each blimp can therefore operate for four days in the air. The radar detection range is 200 miles, whilst the distance from Cudjoe Key to the Cuban coast is only 115 miles, so TV Marti is now somewhat stronger in downtown Havana! All this rather puts amateur radio kite borne aerials into the shade.

## COMMANDO SOLO

LISTENERS TO the RSGB's GB2RS News service in April 1999 may recall an unusual news item concerning airborne American 'Voices' involved in the Serbian conflict. It was reported that two 'Commando Solo' type EC-130 American turboprop aircraft of the 193rd Special Operations Wing had left the USA to broadcast over Serbia during the crisis there.

The EC-130 is a specially modified version of the Cargo TC-130 (RAF Hercules) aircraft. Indeed, the US Marine Corps have a version equipped with solid fuel rockets (also called 'Fat Albert'), which they demonstrate at air shows. The two EC-130s sent to Serbia were equipped to broadcast on Medium Wave, Short Wave and VHF radio, as well as to transmit TV signals. They were broadcasting from a height of 20,000ft to Serbia and Kosovo on 1003kHz and 87.9MHz. The choice of frequencies was designed to slot the MF outlet between programmes from Belgrade on 999kHz and 1008kHz, whilst the VHF output was within 200kHz of a station in Novi Sad. The American 'Voice' certainly had taken to the air! ♦

*In the next part of* The Voices, *Gordon Adams will look at a variety of British broadcasting operations, both at home and overseas.*

# eurotek

edited and translated by **Erwin David,** G4LQI*

*An easily built **reflection coefficient bridge** [1] can be made to work beyond **500MHz** by the use of SMD resistors. **Hans Nussbaum, DJ1UGA**, showed the bridge he built and the results he obtained in QSP (Austria) 5/00.*

DESCRIBED HERE is a simplified Wheatstone RF bridge, the three ports being RF source, impedance under test, and RF out (see **Fig 1**). As the source and impedance-under-test ports are single ended, the third port would have to be balanced. To permit the use of a single-ended output indicator, eg an oscilloscope or RF millivoltmeter, a balun is built-in.

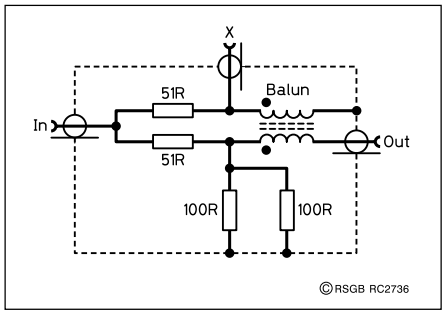
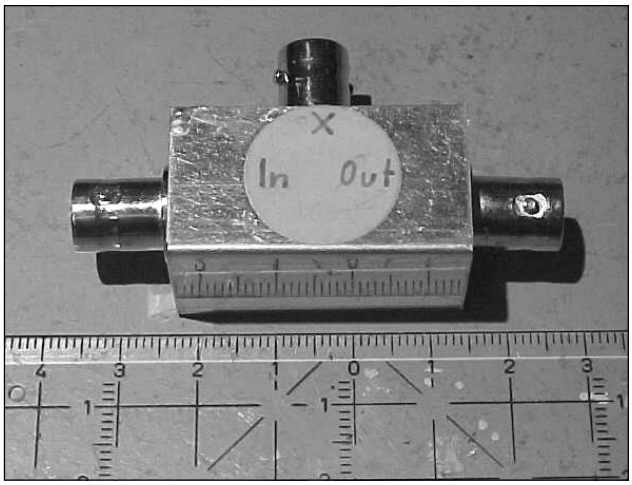
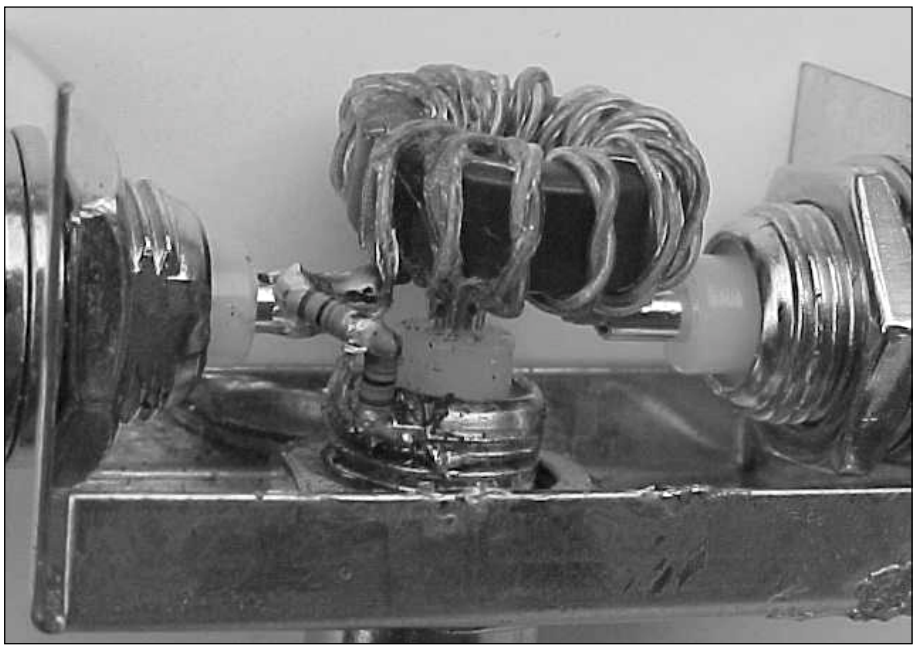



**Fig 1: Diagram of the bridge.**




**The bridge in its tinplate box.**



**Detail of the bridge construction.**

The accuracy of the bridge depends on the precision of the 50Ω reference resistor, the match between the two 51Ω bridge resistors, the balun, and the construction (parasitic capacities and inductances). The reflection coefficient [1] varies with frequency from an excellent 40dB up to 100MHz, 35dB at 145MHz and down to a still-useful 20dB at 500MHz. The basic attenuation is 12dB, which is the result of power sharing between the resistors.

## CONSTRUCTION

THE BRIDGE is contained in a tinplate box measuring 37x20x20mm, with BNC sockets for all three ports. The bridge resistors are a pair of matched 51Ω cylindrical SMDs [2] and the reference resistor consists of a pair of 100Ω flat SMD units in parallel (see the photos left and below).

A 1:1 current balun is used. The core and the number of turns determine its behaviour at low frequencies, as well as the mild resonances at high frequencies. With the Amidon FT50-43 core [3] and 12 bifilar turns of twisted 0.25mm enamelled wire, the bridge error was better than -35dB from 100kHz to 150MHz.

## CALIBRATION

TO ASSESS THE basic precision of the bridge, the output of an HF signal generator is applied to the bridge input port and an RF millivoltmeter or 'scope to its output port. Note the output amplitude, then connect a non-reactive 50Ω resistor [4] to the X-socket. The bridge should now be balanced and the output reduced to a very low value. The ratio **R** of the output readings with and without the termination is a measure for the quality of the bridge at the signal generator frequency. This quality is usually expressed in decibels: dB=20logR. By varying the signal generator frequency, the performance of the bridge vs frequency can be assessed (within the ranges of the signal generator and the 'scope or millivoltmeter, that is).

If the signal generator has a well-calibrated output attenuator, it may be used; the ratio of the inputs required to produce the same output with and without termination also represents R. In this case, the station receiver can be used as a same-output indicator, by setting the signal generator output to produce S-meter readings of, say, S9, with and without termination.

A sweep generator and a spectrum analyzer with storage normalizer, **Fig 2,** were used to plot performance over the whole range 0-1GHz. In the photo right the upper trace is the unterminated bridge output vs frequency, the lower trace its output with 50Ω termination**.** The vertical distance between the two traces represents the quality of the bridge: >40dB in the HF range, dropping to a still useful 20dB at 500MHz and not much less up to 1GHz.

## APPLICATIONS

THE BRIDGE IS used to investigate the relationship between the impedance of an antenna or receiver antenna input and its nominal value, 50Ω. The performance of wide-band RF transformers such as baluns can also be evaluated. A bridge of this type is included in commercial antenna analyzers, along with a signal source and an output indicator such as a moving-coil meter or LCD display. By

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

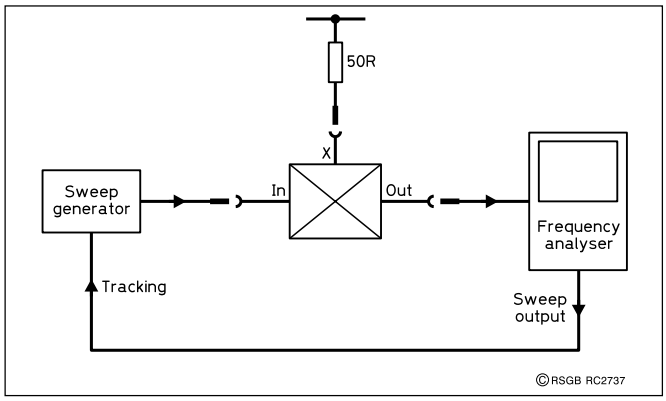
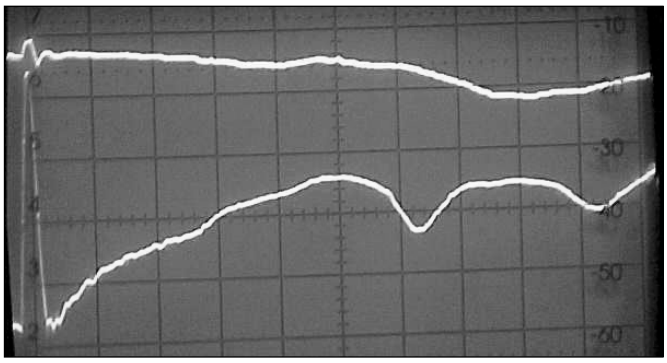



**Fig 2: Circuit to plot bridge error against frequency.**



**Bridge output without (upper trace) and with 50Ω termination (lower trace). Vertical: 10dB/division. Horizontal: 100MHz/division.**

contrast, the components for this bridge cost less than £10.

The reflection coefficient vs frequency looking into the feeder of a dual-band HF antenna is displayed in the photo below right. The near-perfect minimum on the left is at 3.5MHz. The right-hand minimum, at 7MHz, is not quite so good. To avoid false readings due to strong radio stations being picked up by the antenna under test, the input to the bridge should be at least 10mW.

For measurements beyond the bandwidth of the 'scope, the bridge output can be rectified in the circuit of **Fig 3** and the DC applied to the 'scope. This was done to measure the 'rubber duck' seen in the photo bottom left, which showed a perfect match at 145MHz.

In the photo bottom right, the receiver input match of an IC-232 is plotted. The trace shows a good match between 130 and 160MHz. The sharp null on the right is from an external marker at 180MHz.

## NOTES

[1] The reflection coefficient, ρ (rho), is a measure for the matching error between the impedance of a load, eg an antenna as seen through its feeder, and a standard resistor within the bridge, here 50Ω; ρ (always between 0 and 1) is directly related to VSWR, (between 1 and ∞) by the formula: VSWR=(1+|ρ|)/(1-|ρ|). See *The Radio Communication Handbook*, 7th ed. p.14.8 (RSGB)

[2] Two 100Ω flat SMDs in parallel may be used instead of each 51Ω resistor. A pack of 25 is sold by Maplin at £0.49. These are only 5% accurate, but they can be measured and selected at DC.

[3] Mainline Electronics, Leicester.

[4] eg two 100Ω flat SMDs in parallel on a BNC plug. ♦

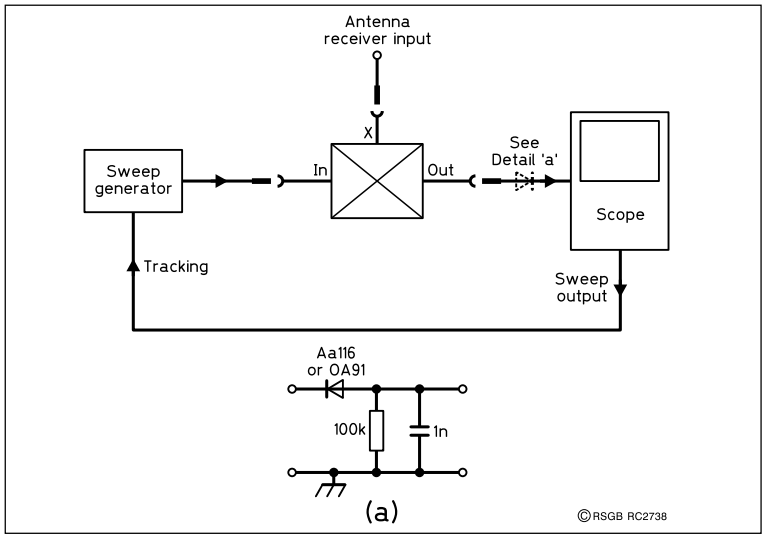
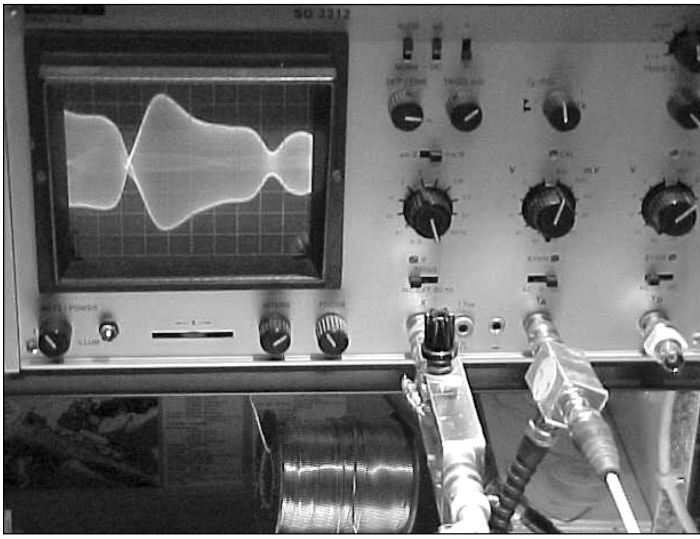
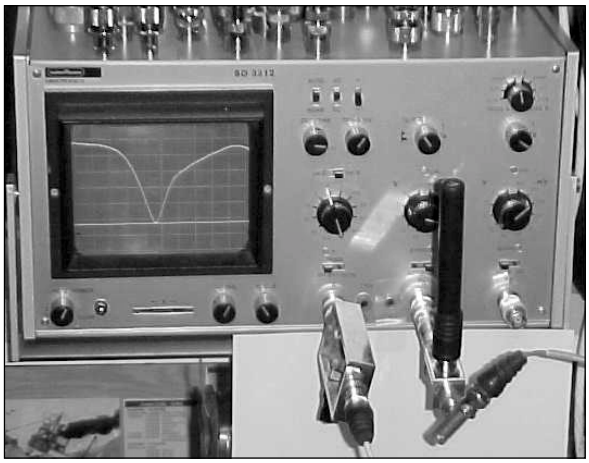


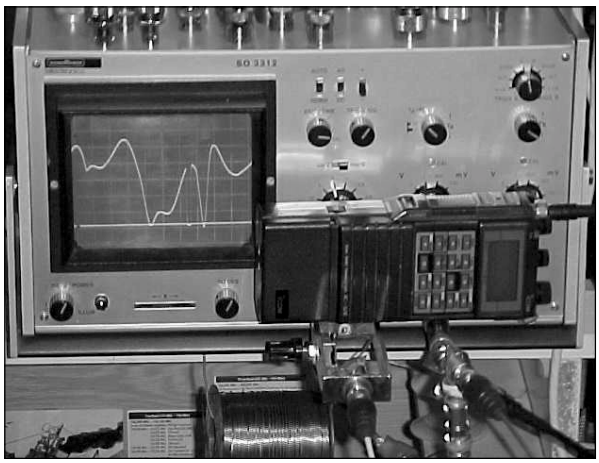

**Fig 3: The RF bridge output can be displayed directly, as in the photo right, or through a rectifier for tests beyond the 'scope's bandwidth, as in the photos below.**



**The plot of an HF antenna, showing an excellent match at 3.5MHz and a good match at 7MHz.**



**The plot of a 'rubber duck', perfectly matched at 145MHz.**



**The receiver input match of an Icom IC-232, good from 130 to 160MHz.**

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# product news

## 28MHz MULTIMODE

MARTIN LYNCH & SONS advise us that with the lifting of the ban on importing single-band 28MHz equipment into the UK, they now have available the new **Albrecht AE485S**. This is a 10m multimode covering 28-29.7MHz, with an power output of 25 watts on FM and SSB, and 10 watts on AM.

This 12-volt transceiver features a programmable repeater shift, 100, 10 and 1kHz tuning steps, a clarifier, scanning functions, and 1750Hz toneburst.

The introductory price is £179.95.

**Martin Lynch & Sons, 140-142 Northfield Avenue, Ealing, London W13 9SB. Tel: 020 8566 1120. Web site: www.hamradio.co.uk**


## QUICKIES

● At the Leicester Show, the **QRP Component Company** tells us it will be offering "all that is best in Kits, Keys and QRP", plus the full range of AKD products, which includes receivers, transceivers, filters and the new active aerial.

● Quartz crystal manufacturers **Quartslab** are now offering customers the facility of paying by credit card.

● **Waters & Stanton PLC** advises us that the low-cost Watson WMM-1 modem has now been replaced by the WMM-3, which offers additional facilities but costs the same (£69).

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**Haydon Communication, Unit 1, Thurrock Commercial Park, Perfleet Industrial Estate, London Road, Nr Aveley, Essex RM15 4YD. Tel: 01708 862524.**

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

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Many Thanks
JW Smith M1JWS

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# Tornado!

***an exclusive report for* RadCom *by David Evans, VE6DXX / G3OUF, at the tornado scene***

**Green Acres camp site, Pine Lake, Alberta, Canada. 7pm, 14 July 2000.**

THE SCENE: a beautiful camp site on the side of a hill gently sloping down towards a lovely lake, tall shady trees and the inevitableexcitement at the start of a relaxing weekend. The sky was overcast, and Environment Canada had issued a tornado warning for the area at 6.15pm.

At around 7pm, the 250-metre wide tornado smashed into the camp site head on; caravans and motor-homes were flipped over, and tall trees crashed to the ground. People were screaming as everything around them was tossed by the winds, estimated at 300km/h, with reports of hailstones several inches across. Caravans were ripped apart and debris landed everywhere. For between five and 10 minutes the tornado smashed through the camp site as it continued east for another 7km before dissipating.

Although the Province of Alberta in Western Canada is the 'tornado capital' of Canada, such events are considered rare compared with many of the USA States. The last major tornado in Alberta (Reported in *RadCom* at the time) was in July 1987.

## INTO ACTION

INITIAL CALLS OUT of Pine Lake were to the Royal Canadian Mounted Police (RCMP), who alerted Alberta Search and Rescue, ambulance services and the Canadian Red Cross.

Since several members of the Search and Rescue team were licensed radio amateurs, they used the local Red Deer 2m repeater (VE6QE) to alert the amateur community as they sped towards the lake. (It is interesting to note that, of the first eight members of the Red Cross Emergency Services team to arrive on site, five were licensed radio amateurs.)


**The area of the tornado disaster, north of Calgary.**

## FIRST ON THE SCENE

WHEN VE6ZZM ARRIVED at Pine Lake, he immediately set up a cross-band (2m/70cm) repeater, linked to the VE6QE 2m repeater. This enabled wide-area radio coverage into Pine Lake, to amateurs using hand-held equipment in a valley location difficult to cover by fixed professional radio networks.

The amateurs on site helped to organise the registration and enquiry services, alerting the Royal Canadian Mounted Police of traffic causing problems to the flow of ambulances into and out of the site, directing searches for debris, and communicating between the Red Cross and other agencies. Radio amateurs were the first on the tornado site with eight power generators and lights, which were used to continue searching the site until some diesel powered generators with large halogen lights arrived. Agencies on the site were working well, but there needed to be more coordination; amateurs helped provide such communication between the Red Cross and other agencies.

Those who had seen the damage caused by the tornado were amazed that there had been so few fatalities. Of the 1100 people originally on the site, 11 had lost their lives and some 150 required hospital treatment.

## A BUSY WEEK

AFTER SEVEN DAYS, the radio amateur team stood down. Working primarily with the Canadian Red Cross, they had provided communication to:

- help traffic control and ambulance coordination;
- provide communication between the Red Cross and other agencies;
- coordinate food, water and essential supplies;
- man the inner check point to the site;
- put relatives and friends in touch;
- co-ordinate teams searching the local area for debris.

Once again, radio amateurs had used their skills with mobile and portable radios and repeaters, to provide an invaluable communications service, for which all those involved are to be congratulated. ♦

David, VE6DXX, visited Pine Lake, meeting many of the officers and radio amateurs on site. He took many pictures, and wishes to thank the Central Alberta Radio League for supplying additional photographs.

**The author surveying the remains of the Pine Lake camp site.**

**Utter devastation: yet ony 11 people were killed.**

# Hand Portables for VHF and UHF


***Reviewed by Peter Hart, G3SJX****

THE UBIQUITOUS hand portable, or 'Handie' as it has become affectionately known, has advanced considerably over the last few years. No longer is it a basic radio with limited performance, the latest portables are multiband high performance radios packed with features with a generous power output and small enough to fit in any pocket. This review takes a look at four of the more innovative portables available today in the UK from the principal market leaders, the Yaesu VX-5R, Icom IC-T81E, Kenwood TH-D7E and Alinco DJ-V5E.

## GENERAL FEATURES

GONE ARE THE days when the hand portable was just a single band device. All four of the radios in this review cover 2m and 70cm, the Yaesu VX-5R also covers 6m and the Icom IC-T81E covers 6m and 23cm as well, four bands in total. All are provided with a single 'rubber duck' style antenna, 6 to 8 inches in length, which provides the necessary multiband coverage. Even the IC-T81E manages to cover all bands from 6m to 23cm with the antenna just 6 inches long. The VX-5R antenna has an extra screw-in top loading section for 6m to improve efficiency and increases the length to 9 inches. All the antennas attach via a screw-in SMA connector, so external antennas can also be used.

The Yaesu, Icom and Alinco radios also include a wide range general coverage receiver, although the performance is not guaranteed (or indeed performs to the same high standard as on the amateur bands). This is standard on the Yaesu, but optionally selectable on the Icom and Alinco and was enabled on the review radios. The Yaesu covers 0.5-16MHz, 48-729MHz and 800-999MHz in 11 bands, although the UHF TV band was not available on the review radio. The Alinco covers 76-1000MHz in 6 bands and the Icom 50-230, 300-1000 and 1240-1300MHz in 8 bands. In all cases AM mode is selected automatically on the appropriate bands - VHF aircraft and on HF/MF, and wideband FM on the radio and TV broadcast frequencies. Although the Kenwood does not have a general coverage receiver, its features lie in other areas (the USA version however does cover the aircraft AM band).

Although all the radios will deliver 5-6W output power from an external 13.5V supply, only the Yaesu, and to a lesser extent the Kenwood, will deliver anything approaching this level using the supplied battery packs. See the measurements table for details. The Yaesu battery is physically the smallest but remarkably the highest capacity, a 7.2V 1100mAH Lithium Ion battery pack. The Alinco and Kenwood are both supplied with 6V NiCd batteries and the Icom with a 4.8V Ni-MH battery pack, all with 700mAH capacity. Higher voltage battery packs are also available for these three radios. All the radios are supplied with wall chargers, but only the Yaesu indicates when charging is in progress and when the batteries are fully charged.

Tuning and memory selection in all cases is via the clickstep rotary control, direct keypad entry of frequency or via the multifunction rocker joystick fitted to the Icom and Kenwood radios. The rocker switches save space, are easy to use and reduce the number of functions which the keypad keys have to handle. All the radios provide a selection of tuning step sizes from 5 to 100kHz, set independently per band, with 1MHz steps for larger frequency excursions, and a wide range of repeater shifts with factory defaults set to the usual European spacings, again set separately for the different bands. The Yaesu implements automatic shift selection when operating in designated repeater sub-bands on both 2m and 70cm, the Kenwood provides this function on 2m only, and with the Icom this is only available on the USA model. I find this a very useful facility when moving frequently between simplex and repeater modes. A single touch button for reverse checking of the repeater input channel is provided on all radios.

An extensive number of memories are included on all models, and these may be tagged with 6- or 8-character text labels. In all cases the memories store duplex frequencies, split settings, CTCSS tone data, step sizes etc, and the

### KEY FEATURES COMPARED

| | Alinco DJ-V5E | Icom IC-T81E | Kenwood TH-D7E | Yaesu VX-5R |
|---|---|---|---|---|
| Amateur bands covered | 2,70 | 6,2,70,23 | 2,70 | 6,2,70 |
| Broadcast FM | yes | yes | no | yes |
| Aircraft band AM | yes | yes | no | yes |
| RX extended coverage MHz | 76-1000 | 50-1000 | no | 0.5-16, 48-999 |
| Twin receivers | no | no | yes | no |
| Crossband full duplex | no | no | yes | no |
| Receive Modes | FM, WFM, AM | FM, WFM, AM | FM | FM, WFM, AM |
| TX power settings | 3 | 2 | 3 | 4 |
| Wide/narrow deviation | no | 2m | 2m | 6,2,70 |
| AIP | no | no | yes | no |
| No of memories | 200 | 124 | 200 | 220 |
| Call/home channels | 2 | 4 | no | 11 |
| Band scan | yes | yes | yes | yes |
| Memory scan | yes | yes | yes | yes |
| Programmed scan ranges | 5 | 10 | 10 | 10 |
| Priority watch | yes | no | no | yes |
| 1750Hz toneburst | yes | yes | yes | yes |
| CTCSS encode | yes | yes | yes | yes |
| CTCSS decode | yes | yes | yes | yes |
| Tone squelch | yes | yes | yes | yes |
| Pocket beep/tone alert/bell | no | yes | yes | yes |
| CTCSS tone scan | no | yes | yes | yes |
| DTMF dialler | yes | yes | yes | yes |
| Selective call/DSQ/DCS | yes | no | no | yes |
| Automatic repeater shift | no | no | 2m only | yes |
| Alphanumeric memory tag | 6 char | 6 char | 8 char | 8 char |
| Channel/spectrum scope | no | no | no | yes |
| TX time-out timer | no | no | no | 1-10 mins |
| Battery saving modes | RX | RX | RX | TX+RX |
| Automatic power off | 0.5-1.5 hour | 0.3-1 hours | 0.5/1 hours | 0.5-8 hours |
| Size (w x h x d) mm | 58x97x40 | 58x106x29 | 54x120x36 | 58x88x27 |
| Weight | 335g | 300g | 340g | 255g |
| List price | £289 | £419 | £319 | £359 |

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

## KENWOOD TH-D7E

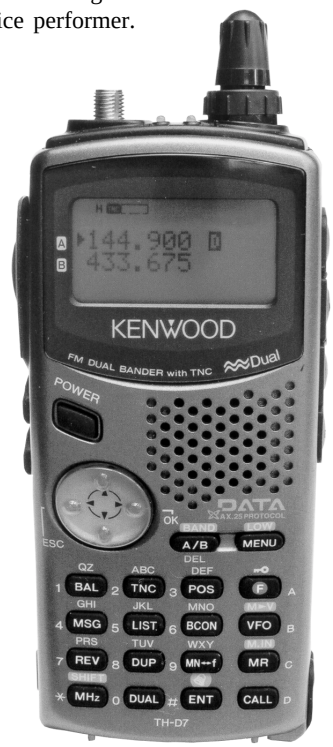
THE KENWOOD TH-D7E is really a completely different radio from the other three in this review. It uses two separate receiver paths, allowing simultaneous reception on 2m and 70cm or two separate frequencies on 2m. It also allows crossband full duplex operation.

The most innovative features with the Kenwood stem from the inclusion of a packet TNC within the radio, requiring just a simple connection to the serial port of a PC. Both 1200 and 9600 baud packet is supported and a reasonable command set are provided with the built-in TNC, including most of the commonly used commands. I checked it out using Winpack and UI-View on my PC and it performed without problems. The most recent version, the Mk 2, now also supports the TNC in KISS mode.

Associated with the TNC are a number of interesting features. Software is included to allow the radio to monitor DX packet cluster nodes without being connected and to display the last DX 'spot' but hold in memory the most recent ten spots for easy scrolling. As the works QTH is only a couple of miles from a Cluster node, I found that with the Kenwood on my desk I could observe all the DX which I was missing whilst at work - very demoralising! With the dual receiver and duplex capability, it is possible to make QSOs on one band whilst simultaneously monitoring for DX spots on the other.

Another feature supported by the Kenwood is APRS (Automatic Packet/Position Reporting System). This packet messaging system embeds location data on the transmission, for display on a map. A socket on the side of the radio allows a GPS receiver to be connected and location data automatically transferred. As if this wasn't enough, the TH-D7E will also transmit SSTV (slow-scan television) in conjunction with the Kenwood VC-H1 SSTV unit. Callsigns and messages may be superimposed on the display.

The Kenwood also includes a rocker switch, but without the straight push. It is much more positive in its response than the Icom. It in effect duplicates the function of the click-step rotary control for a variety of functions. The controls have a very positive feel and the radio is easy to use once the initial learning phase has been mastered. The receive audio is of good quality and delivers a fair volume without distortion. Similarly, the transmit audio is also good and well rounded. Overall, a nice performer.




usual memory to VFO transfer facilities. All models except the Kenwood provide a single quick access home channel per band, but only the Yaesu allows the memory structure to be split into groups.

Comprehensive scanning is a feature of all the radios. Scanning across bands, limited band segments or memories, together with a selection of scan resume options and the ability to skip memory locations in the scan, are provided in all cases. Priority watch checking of a selected channel every 4-5 seconds is provided with the Alinco and Yaesu.

All of these radios are well equipped with tone access facilities. The usual 1750Hz toneburst is included. All provide a CTCSS tone encoder and a tone decoder for repeater access, also allowing tone squelch or paging links to be set up. All except the Alinco implement tone scan, which enables the CTCSS tone being transmitted by a repeater or any other station to be identified. All except the Alinco also provide an alarm feature, whereby an incoming signal with the correct CTCSS code can sound an alarm. This is variously called pocket beep, tone alert or bell operation. The Yaesu also includes their DCS digital coded squelch system.

A DTMF tone generator is provided in all models, with the capability to store and transmit several 16-digit telephone numbers. Although primarily of interest for Autopatch repeater connection to the telephone network in the USA and Canada, the Alinco also includes a DTMF decoder for digital squelch operation (DSQ). With DSQ a 3-digit code is transmitted by DTMF tones which opens the receiver squelch only when the receive code matches that of the transmitted signal.

A number of features have been included to help conserve battery power. Display and key illumination is only activated for a brief period, several low transmit power levels are selectable, and automatic power off is provided on all

### 145MHz MEASUREMENTS

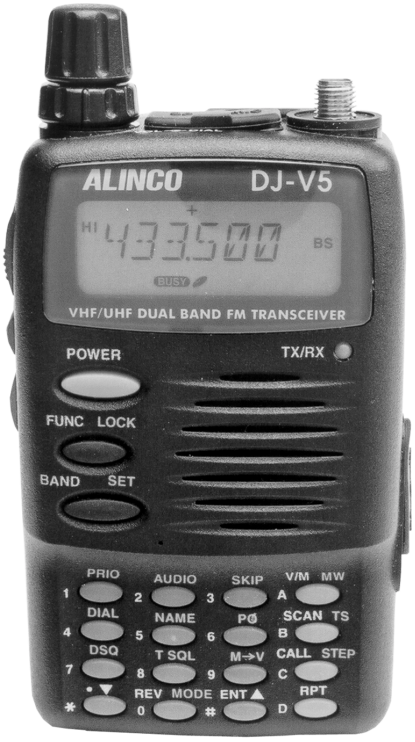
| | Alinco DJ-V5E | Icom IC-T81E | Kenwood TH-D7E | Yaesu VX-5R |
|---|---|---|---|---|
| Sensitivity 12dB SINAD, 3kHz pk dev | 0.45µV | 0.14µV | 0.25µV | 0.14µV |
| Squelch operating range | 0.11-0.22µV | 0.13-0.5µV | 0.1-0.5µV | 0.08-0.32µV |
| Smeter sensitivity | | | | |
| min scale | 0.16µV | 0µV | 0.22µV | 0.32µV |
| mid scale | 0.56µV | 0.56µV | 0.56µV | 1.3µV |
| max scale | 1.1µV | 1.3µV | 1.1µV | 7µV |
| IF rejection | 87dB | 120dB | 94dB | 82dB |
| 1st Image rejection | 89dB | 101dB | 95dB | 53dB |
| 2nd Image rejection | 84dB | 76dB | not measured | 67dB |
| Adjacent channel rejection | | | | |
| 25kHz with 3kHz dev. | 56dB | 57dB | 63dB | 72dB |
| 12.5kHz with 1.5kHz dev. | 23dB | 37dB | 33dB | 52dB |
| Intermodulation rejection | 41dB | 57dB | 55dB | 59dB |
| Blocking at 100kHz offset | 67dB | 70dB | 75dB | 80dB |
| Maximum audio before clipping (8ohm) | 0.2W | 0.08W | 0.2W | 0.5W |
| TX Power output | | | | |
| High | 1.4W | 1.8W | 3.4W | 4.6W |
| Low 1 | 0.07W | 0.7W | 0.6W | 2.3W |
| Low 2 | 0.01W | - | 0.05W | 0.9W |
| Low 3 | - | - | - | 0.3W |
| TX Harmonic output | | | | |
| 2nd | <-75dBc | -74dBc | -65dBc | -63dBc |
| 3rd | -60dBc | -62dBc | -60dBc | -60dBc |
| Peak voice deviation (high) | 1.8kHz | 4.5kHz | 4.0kHz | 4.3kHz |
| Peak voice deviation (low) | - | 2.2kHz | 2.0kHz | 2.2kHz |
| Toneburst deviation (high) | 1.0kHz | 3.2kHz | 3.6kHz | 4.2kHz |
| Toneburst deviation (low) | - | 1.5kHz | 1.6kHz | 2.0kHz |

All measurements were made with the radios powered from their supplied internal batteries fully charged.

## ALINCO DJ-V5E

THE ALINCO WAS the 'chunkiest' of the portables and quite straightforward to use. It had good communications quality and is capable of quite reasonable volume levels without overload. The audio tonal quality is switchable between high and low but the volume control, being concentric with the channel selector, I found difficult to adjust without also inadvertently changing channels. The squelch level is set independently for each of the six bands and there is a separate button to disable the squelch to check for weak signals. This button has two modes, disable whilst pushed or toggle on/off. A beep tone sounds when tuning across every 500kHz boundary, which I found rather annoying. Although this can be disabled, it is not possible to do so without disabling all the key confirmation beep tones.

On transmit the audio was a little muffled and rather thin, but the deviation had been set very low on the review radio. Broadcast FM, aircraft AM and general coverage VHF/UHF worked very well, undoubtedly the best of the review radios in this respect, although parts of the band between 500 and 600MHz resulted in the frequency synthesiser unlocking and a flashing display. The receive sensitivity was maintained at under 1µV to over 950MHz and reception on the aircraft band and TV sound was very good - even on the supplied antenna (which is really only intended for 2m/70cm). Although the Alinco has the poorest intermodulation and blocking performance of all the four radios, there was no noticeable breakthrough from other services when a full size colinear vertical antenna.

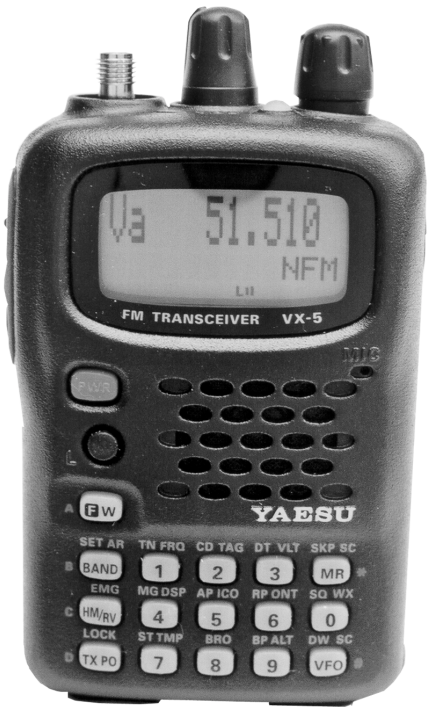



## YAESU VX-5R

THE YAESU IS the smallest and lightest of the radios, but delivers the highest transmit power. Additional features not already mentioned include a spectrum analyser (Spectra-scope) which shows channel activity five channels above and five channels below the active channel, and Smart Search which scans the band and stores busy channels into 31 special smart search memories. The display can indicate temperature and even barometric pressure and altitude (with an optional sensor fitted). It can do this even when switched off. An automatic range transponder system (ARTS) is also included, which indicates by beep tones when a similarly equipped radio is within range or not.

The Yaesu is a very nicely styled radio and the features perform well. Some of the key presses are rather obscure and awkward, and both up and down scrolling through the bands would be a definite advantage.

The Yaesu receiver audio was possibly the best quality of the four, but overloaded at relatively low volume levels. The transmit quality was good and the adjacent channel rejection excellent, even for 12.5kHz. For operation on 6m, the extended antenna was more efficient than the Icom, but the poor 47MHz IF rejection of only 17dB on this band may result in Band 1 TV breakthrough under sporadic E conditions. The general coverage performance on broadcast FM and TV sound was significantly down compared to the Alinco and for use on MW and SW broadcast frequencies an external antenna is needed. However, the radio overloads very easily on these frequencies, the best results being achieved by wrapping an end fed wire around the 'rubber duck' and adjusting the coupling. Even the cheapest MW/SW broadcast receivers perform better here.




## 435 MHz MEASUREMENTS

| | Alinco DJ-V5E | Icom IC-T81E | Kenwood TH-D7E | Yaesu VX-5R |
|---|---|---|---|---|
| Sensitivity 12dB SINAD, 3kHz pk dev | 0.35µV | 0.11µV | 0.22µV | 0.2µV |
| Squelch operating range | 0.11-0.2µV | 0.13-0.56µV | 0.16-0.8µV | 0.08-0.28µV |
| Smeter sensitivity | | | | |
| min scale | 0µV | 0µV | 0.3µV | 0.3µV |
| mid scale | 0.16µV | 0.8µV | 0.9µV | 1.4µV |
| max scale | 0.3µV | 1.8µV | 1.8µV | 8µV |
| IF rejection | >120dB | 103dB | >120dB | 81dB |
| 1st Image rejection | 57dB | 67dB | 89dB | 50dB |
| 2nd Image rejection | 86dB | 78dB | not measured | 66dB |
| Intermodulation rejection | 40dB | 57dB | 57dB | 54dB |
| Blocking at 100kHz offset | 65dB | 73dB | 74dB | 74dB |
| TX Power output | | | | |
| High | 1.2W | 1.1W | 3W | 4.3W |
| Low 1 | 0.31W | 0.5W | 0.5W | 2.5W |
| Low 2 | 0.1W | - | 0.05W | 1.0W |
| Low 3 | - | - | - | 0.3W |
| TX Harmonic output | | | | |
| 2nd | -60dBc | -70dBc | -70dBc | -67dBc |
| 3rd | -70dBc | -70dBc | -68dBc | -70dBc |
| Peak voice deviation (high) | 2kHz | 4.7kHz | 4.0kHz | 4.5kHz |
| Peak voice deviation (low) | - | - | - | 2.3kHz |
| Toneburst deviation (high) | 1.2kHz | 3.2kHz | 3.5kHz | 4.5kHz |
| Toneburst deviation (low) | - | - | - | 2.2kHz |

All measurements were made with the radios powered from their supplied internal batteries, fully charged.

radios if there has been no control activity for a defined period. The Yaesu also includes a transmission time-out timer to return the transmission to receive after a specified time. These time-out periods are all user settable. All the radios include a receive battery saver mode, whereby the receiver is cycled on and off if no signals are received or no keys are pressed. The Yaesu also includes a novel transmit battery saver mode, where the transmit power is lowered if the last received signal is strong. I am not sure what happens if two VX5-R portables are talking to each other, both with the transmit battery saver activated!

All radios except the Alinco allow the transmit deviation to be switched between wide for 25kHz channels and narrow for 12.5kHz. With the review radio the Alinco deviation was set rather narrow, even for 12.5kHz channels. In all cases the IF bandwidth was tailored for 25kHz channels, with no filter narrowing for 12.5kHz.

All four radios use a double conversion superhet architecture for the normal narrow FM mode, with a first IF between 39 and 69MHz (each radio is slightly different) and a second IF of 450 or 455kHz. The Kenwood uses different IFs for 2m and 70cm (39MHz/450kHz and 45MHz/455kHz respectively).

All the radios are very solidly constructed, with substantial diecast frames and excellent weatherproofing. Moulded rubber plugs fit into all the accessory connections when not in use and all the buttons and controls are well protected. All the radios adopt a similar philosophy - a couple of rotary controls, 16 key keypad, some additional buttons, front facing LCD, a front facing minispeaker and microphone etc. The LCD indicates frequencies and memories with status icons and a bargraph meter for signal strength and power output. With such a large number of functions and a limited number of controls, it is inevitable that access to some functions is rather complex and obscure. Particularly with the Yaesu, most of the pushbuttons are multipurpose, operating at two shifted levels with brief pushes and long pushes performing different tasks. The multifunction rocker switches used on the Kenwood and Icom can help here. I found it necessary to consult the manuals frequently. Fortunately they are all comprehensive and well written, in particular the excellent Kenwood manual which runs to over 100 pages.

## ICOM IC-T81E

UNDOUBTEDLY THE main virtue of the Icom is its coverage of four amateur bands, although during the brief period I had the radio I could not find any FM signals on 6m or 23cm. The radio is potentially fairly easy to use, but somewhat hampered by the operation of the multifunction rocker switch. This toggles up and down to increase or decrease the volume and from side to side to select between bands. A straight push selects 'set mode' and then the up/down and side-to-side operation selects and sets the various parameters of the radio. The main problem is that the straight push on the rocker is very critical and invariably also activates the up/down or sideways keys, changing volume or bands, enabling scanning and other functions which were not intended. A straight push on the rocker is also needed to activate the toneburst. The only practical way to operate through repeaters is to store the duplex frequencies in the memories and rely on CTCSS tone access. Also, I much prefer a rotary control for setting the volume, but at least the rocker speeds band selection by allowing bi-directional scrolling through the eight bands, whereas the Alinco and Yaesu only scroll in one direction.

The receiver audio was reasonable communications quality, but tended to overload and distort at medium volume levels. On transmit the audio was very punchy, but be careful not to speak too close to the microphone. The supplied antenna seemed remarkably effective when checked on 2m, considering the very wide bandwidth over which it operates, but was down significantly on VHF broadcast compared with the Alinco. The receive sensitivity was well maintained right up to 1GHz and on 23cm, but it did not appear possible to select wideband FM for UHF TV sound.


## 50 AND 1250MHz MEASUREMENTS

| | Yaesu VX-5R 50MHz | Icom IC-T81E 50MHz | Icom IC-T81E 1250MHz |
|---|---|---|---|
| Sensitivity 12dB SINAD, 3kHz pk dev | 0.16µV | 0.13µV | 0.18µV |
| Squelch operating range | 0.09-0.35µV | 0.13-1µV | 0.2-0.9µV |
| Smeter sensitivity | | | |
| min scale | 0.35µV | 0µV | 0µV |
| mid scale | 1.4µV | 1.3µV | 1.3µV |
| max scale | 8µV | 2.8µV | 2.5µV |
| IF rejection | 17dB | 58dB | 87dB |
| 1st Image rejection | >120dB | 109dB | 63dB |
| 2nd Image rejection | 66dB | 76dB | 80dB |
| Intermodulation rejection | 51dB | 61dB | not measured |
| TX Power output | | | |
| High | 5.2W | 1.2W | 0.4W |
| Low 1 | 2.6W | 0.7W | 0.08W |
| Low 2 | 1.0W | - | - |
| Low 3 | 0.3W | - | - |
| TX Harmonic output | | | |
| 2nd | -62dBc | -67dBc | not measured |
| 3rd | -53dBc | -64dBc | not measured |
| Peak voice deviation (high) | 4.0kHz | 4.5kHz | 4.7kHz |
| Peak voice deviation (low) | 2.2kHz | - | - |
| Toneburst deviation (high) | 3.9kHz | 3.2kHz | 3.2kHz |
| Toneburst deviation (low) | 1.9kHz | - | - |

All measurements were made with the radios powered from their supplied internal batteries, fully charged.

## CONCLUSIONS

OVERALL EACH OF these radios performed very well, possibly the only real shortcoming was the rocker switch on the Icom. So which is the one to buy? That depends very much on the bands and features required. The Alinco is a very good budget priced radio, covering two bands with excellent general coverage and broadcast performance, but a little light on transmit power. The Yaesu is the smallest, covers three bands, packed with features, and a high transmit power. The Icom covers 4 bands and there is no choice if you want 23cm, but for the digital enthusiast the Kenwood is in a class of its own.

The features table gives the current list price, but discounts are available from many dealers.

## ACKNOWLEDGEMENTS

I would like to thank Icom, Kenwood and Yaesu for the loan of their radios and Nevada Communications for the loan of the Alinco. ♦

# The Leicester Show Guide

*Venue:* International Exhibition Centre, Castle Donington, Leicestershire

*Date:* Friday 22 & Saturday 23 September

*Time:* 9.30am - 5.30pm each day

- Purpose-built exhibition hall
- Easy access for disabled
- Virtually unlimited free parking, adjacent to the exhibition hall
- Morse tests on demand
- Talk-in station (on 145.550MHz and 433.550MHz)
- Flea Market and Bring and Buy
- Free camping and caravanning adjacent to the exhibition hall
- Disabled parking adjacent to the main building
- Demonstration HF station
- Raffles
- Meeting room
- Licensed bar and Catering
- Easy access from M1 J23a - less than 5 minutes
- Easy access from East Midlands Airport (bus service from Loughborough railway station to East Midlands Airport, shuttle from East Midlands Airport to exhibition)
- Concessionary prices on other attractions at Donington Park (Motor Racing Museum, British Super Bikes Championship)

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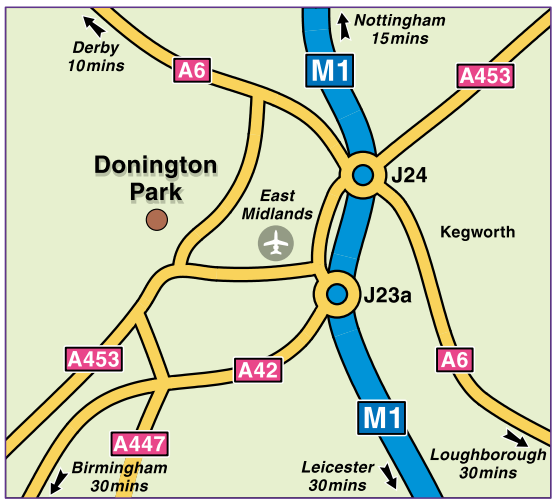
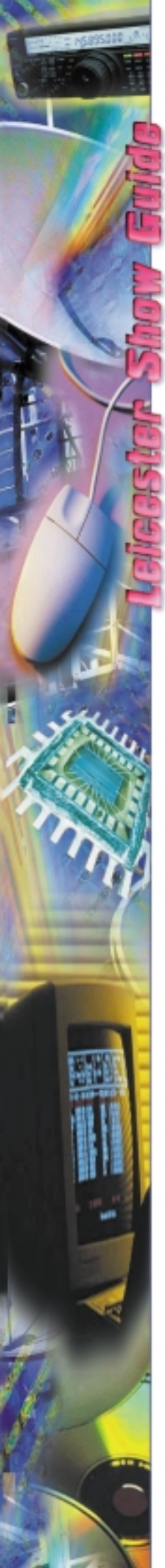
|---|---|
| **1-DAY TICKET** | |
| ADULT | £3 |
| OAP/U16s | £2.50 |
| U14 | FREE (if accompanied by an adult) |
| **2-DAY TICKET** | |
| ADULT | £5 |
| OAP/U16s | £4 |
| **GROUP TICKET** | |
| 1-DAY | £2 |
| 2-DAY | £3.50 |
| (Payable in advance. Minimum 12 persons) | |

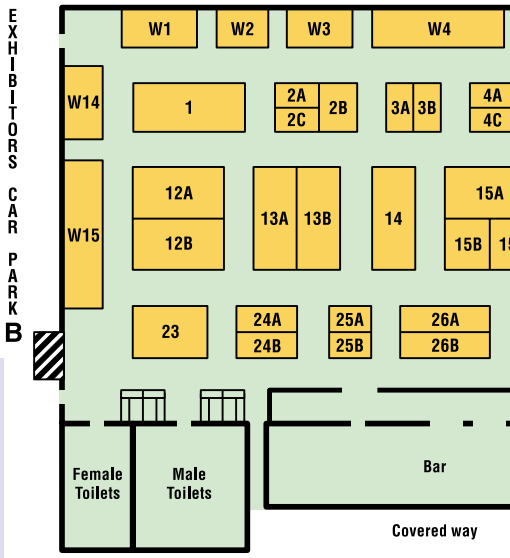

RC1966

*For further details contact:*
Geoff Dover, G4AFJ.
Tel: 01455 823344.




# Welcome to the Leicester Amateur Radio Show at the International Exhibition Centre, Castle Donington

## Floor




## Lectures & Seminars

### Friday 22 September

**11.30-12.30** **Dxing on Medium Waves**, by the Medium Wave Circle.

Find out how to go about one of the most challenging aspects of SWLing.

**14.00-15.00** **PMR Conversions**, by Chris Lorek, G4HCL.

Chris is well known as the author of numerous PMR conversion features, as well as the *PMR Conversion Handbook*. Come and hear him talk in person about this very practical aspect of amateur radio.

**15.15-16.15** **A Radical Approach to Amateur Radio Licensing**, by RSGB President, Don Beattie, G3OZF and General Manager, Peter Kirby, G0TWW.

The RSGB has presented some radical proposals on amateur licensing to the Radiocommunications Agency, based on the consultations with members and discussions within Council earlier this year. Come and hear how the face of amateur radio will change in the 21st Century, to encompass all aspects of radio communication.

### Saturday 23 September

**11.30-12.30** **Repeaters and Internet Forum**, hosted by members of RSGB Repeater Management Committee and the Data Communications Committee.

Your chance to hear about the latest developments concerning the linking of repeaters and the Internet. Put your views and help to evaluate the experiments that have been carried out and will be carried out in the future.

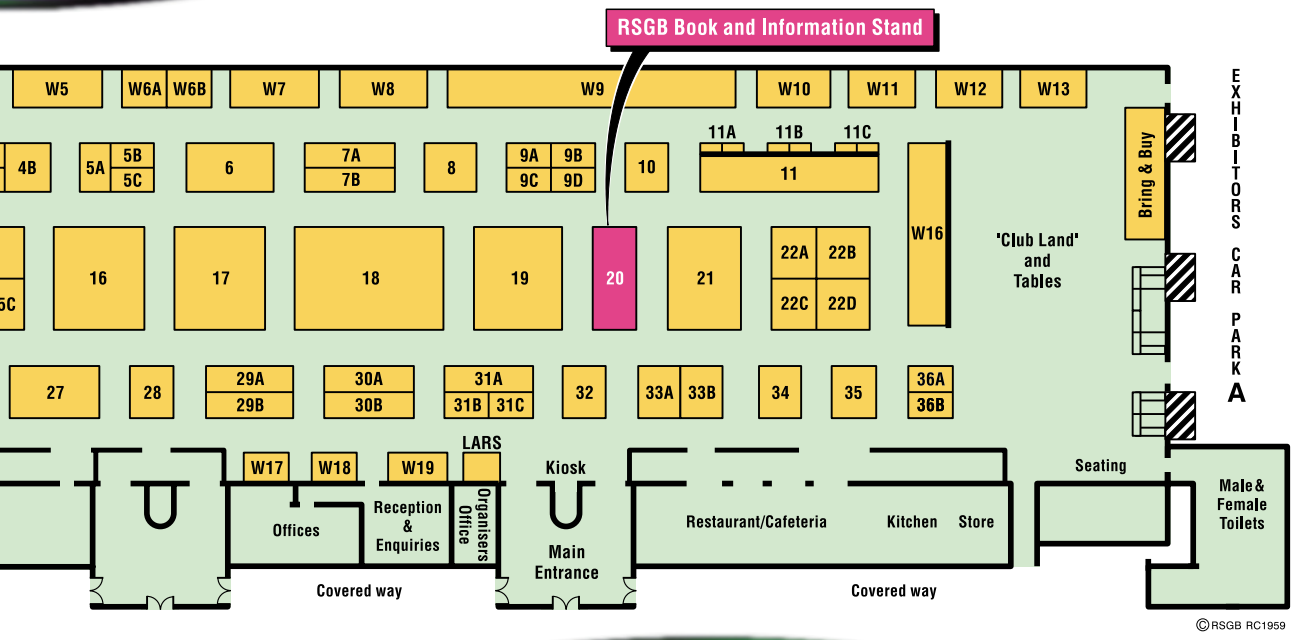
**14.00-15.00** **The Internet and Amateur Radio: Where are we now?** By Jeremy Boot, G4NJH, of *Radio Today*; and Adrian Robinson G7WFM, first in the UK with the Internet Gateway.

We hope to put things into context and look to the future of this exciting new venture. Licence permitting, a practical demonstration should also be possible.

**15.15-16.15** **High Speed Packet Links**, by Jason Flynn, G7OCD, TCP/IP Co-ordinator of the RSGB Data Communications Committee.

(Some talks were provisional at the time of going to press)

# Plan




# Exhibitors

## Main Hall

| Company | Stand |
|---|---|
| Alsco trading | 10a |
| AOR (UK) Ltd | 5c |
| Barenco | 29a |
| Bring & Buy | W20 |
| CHP | W22 |
| Computer Junk Shop | 33 |
| Dial Electronics | 27b |
| Essex Amateur Radio | W1 |
| Festival Computing | 28 |
| H Morgan Smith | 2a |
| Harwood Trading | W2 |
| Haydon Communicattions | W4 |
| Icom UK LTD | 19 |
| InkTec Midlands | 10b |
| IT Creations | 15a |
| J&M Computers | 26a |
| JAB Electronic Components | 23 |
| KM Publications | 2c |
| Kenwood Electronics UK Ltd | 17 |
| LMW Electronics | W18 |
| Lake Electronics | W6a |
| Linear Amp UK | W23 |
| Lowe Electronics | W16 |
| Maplin | 1a |
| Microgenesis | 30b |
| Microware | 4c |
| Mikay Distributors | W15 |
| Moonraker (UK) | W24 |
| Nevada Communications | 11 |
| Nomis | 27a |
| No Nuts | 5a |
| PW Publishing Ltd | W5 |
| Poole Logic | W17 |
| QRP Component Company | 31b |
| R & D Instrumet | W21 |
| RSGB | 20 |
| Radiocommunications Agency | 27a |
| Radioworld | W14 |
| Remote Imaging Group | 9c |
| Rich Electronics | 35 |
| Ronal Computers Ltd | 30a |
| Sandpiper Comms. | 14 |
| SGS Electronics | 31a |
| Strikalite | W11 |
| Strumech Versa Tower | 12a |
| T & M Milman | W6b |
| Talkabout Antenna Co | 11a/t |
| The Phone Shop | 1c |
| Timestep Electronics | W19 |
| TLX Electronics | 24a |
| UBM (London) | 32 |
| Waters & Stanton | W9 |
| Westlake Electronics | 7b |
| Yaesu UK Ltd | 18 |

## Clubs and Societies

4 Metre News
AMSAT UK
BARTG
British Railways Amateur Radio
Danpack
Derby & District ARS
G-QRP Club
International Listeners Association
Leicester Raynet
Leicestershire Repeater Group
Malvern Hills Repeater Group
March & District Radio & Amateur Society
Maxpack
Medium Wave Circle
RAFARS
RAIBC
RAOTA
Raynet Supplies
RNARS
Royal Signals Radio Society
South Yorkshire Repeater Group
United Kingdom Radio Society
Worked All Britain

## Flea Market

Computer Junk Shop - George Couzens
Northampton Communications
K Mannering
A Howard
R J Holderness
Trevor Nichols
Camlitek

(Many other flea market exhibitors book on the day)

# Accommodation

*There are numerous local hotels, guest houses and farmhouses offering accommodation in the Donington area. For details, visit the LARS web site at www.lars.org.uk*

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# technical topics

by **Pat Hawker**, G3VA*

## SLOW-TUNING FAST STABILISER

CHAS FLETCHER, G3DXZ, continues the Huff & Puff frequency stabiliser discussion and comes up with a further useful version of the 'fast' stabiliser described by G7IXH in the June 2000 'TT' (p57).

He writes: "It seems this stabiliser discussion just won't go away. G7IXH's 'fast' circuit galvanised me back into action again, largely because I could not really understand how it worked, but also because his original circuit appeared in 'TT' in the same issue of *RadCom* (December 1997) as my full-length article on my 'stay-put' design. The 'TT' item seemed so complicated that I paid it little attention. However, this latest incarnation in the June 'TT' was so neat that I had to investigate.

"I confirmed that, as G7IXH contends, this type of circuit will hold a ropey 30MHz oscillator on frequency. I have to confess that after several hours of experimental work, during which I successfully managed to refine his design parameters, I still find its exact operation, despite his hypothesis, something of a mystery. Nevertheless I believe this type of digital circuit offers the simplest solution to VFO stabilisation, provided one pays attention to one or two critical points.

"If full advantage is taken of the 'fast' attribute of this type of phase comparator, it can result in a VFO which refuses to change frequency! If you try to change the frequency slowly, the drift control proves to be stronger than the tuning action. So, in order to produce a VFO that will tune smoothly with 10Hz lockup points, it has to be slowed down, partly negating the 'fast' attribute of the comparator. I feel that a shift register with lots of stages is unnecessary.

"When testing the circuit, I had some difficulty finding an HCF4517 shift register. As a result, I tried to establish whether any specific number of shift stages has real advantage. I found that the actual number of shift stages did not appear critical. I tried from two to 32 and found that the action became rough when the number of shift stages fell below four. My conclusion is that an eight-bit shift register, such as the HC164 (more commonly available) works as well as the HCF4517 for a *tunable* VFO.

"I suggest the following guidelines for varicap and integrator values: the varicap's pulling range, as before, should be 2 to 3kHz. Most surprisingly, the integrator time constant should be 400 seconds. This may seem extremely long, but it is necessary if smooth operation is to be achieved. It also guarantees a very low level of frequency modulation on the carrier, which can become a problem with shorter time constants.

"To test this all-digital stabiliser against my charge pump integrator design, I built a 5MHz model using the same HC4060 oscillator/counter and VFO as in my original circuit ('TT', December 1997). My conclusion is that it is just as good in performance and is simpler to test and build as it uses only HC logic plus a single passive integrator. The revised circuit is shown in **Fig 1**. My congratulations to Peter, G7IXH, on his 'fast' approach - Bravo!

"Finally, I also tried including a pair of integrator capacitors connected in series between Vcc and ground, with the object of fixing the start-up voltage at half Vcc. I saw this idea in 'TT'. This idea certainly works in respect of start-up, but I am a little worried about the supply rail noise being introduced into the varicap voltage. However, while using a good regulated and decoupled supply in my test rig, no problems were encountered.

"I am sure this is not the end of this topic, but am convinced that for simple rigs it makes the DDS VFO solution look extravagant. The stabiliser could all be contained on a neat PCB. Perhaps someone might like to work one up."

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

## TOWARDS THE ALL-DIGITAL HF RECEIVER

FOR MORE THAN a decade the Holy Grail for professional receiver designers has been to develop a high-performance, general-purpose HF communications receiver in which the incoming signals would be converted into digital form directly at the antenna input, and thereafter processed entirely in digital form throughout the receiver. The all-digital receiver can, with existing technology, now be implemented for some specialised applications, but - to the best of my knowledge - still remains, despite much effort, an objective rather than fulfilment.

Why the effort? What more is wanted that cannot be found in the best current hybrid analogue/digital receivers? Why did Dr Ulrich Rohde, DJ2LR/HB9AWE, urge us all ('TT', June 2000, pp55-56) to do as much as possible in DSP, even at today's prices and clock rates? There is perhaps a warning note to be sounded in that it seldom pays to be a pioneer – at least before the market is ready and waiting. One could point to the still sad saga of Digital Audio Broadcasting, on which last year the BBC spent some £10-million in broadcasting to a virtually non-existent audience. I have yet to see a reasonably priced DAB receiver in a local store. The problem in this case is not the technology, but the price. I still receive optimistic press releases from those concerned with DAB, but nothing so far that leads me to withdraw the comment made some two years ago that DAB is seen by some critics as standing for 'Dead And Buried'.

The case *for* the digital HF communications receiver (where technology is still a limitation) was put some years ago in an article by Cliff Noonan of STC Radio & Microwave (*Communications International*, May 1991, pp37-46). More recently, the potential advantages of digital technology

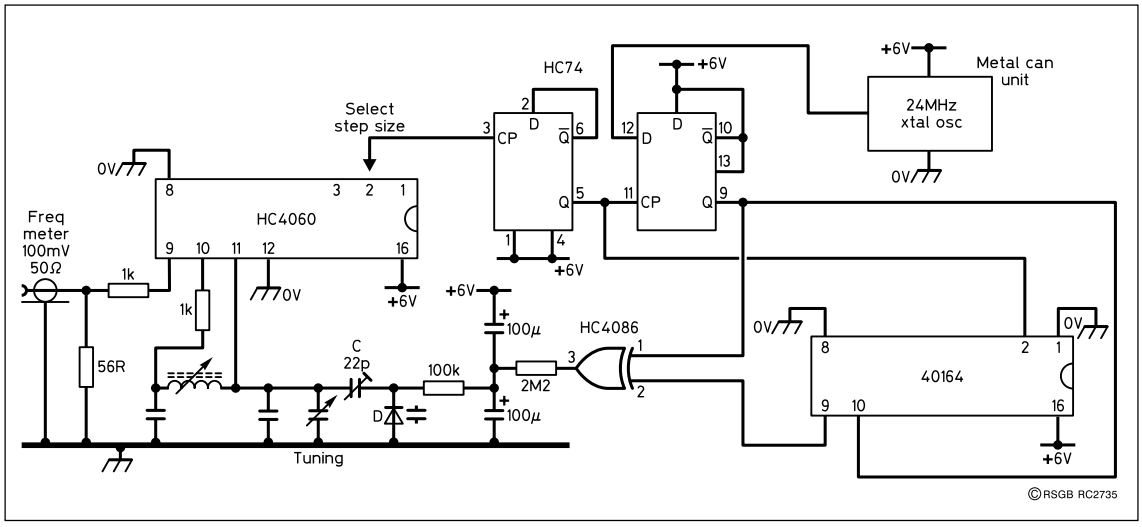


**Fig 1: G3DXZ's revised 'stay-put' fast frequency stabiliser, with acknowledgement to the late PA0KSB and G7IXH. L is tuned as described in G3DXZ's full-length article in *RadCom* December 1997. All ICs are well decoupled at supply pins. Regulated +6V supply at 50mA. The spare 4086 gates make good drivers for a high level mixer such as a diode ring. Set C for 2-3kHz varicap pull. D is a BB405B varicap.**

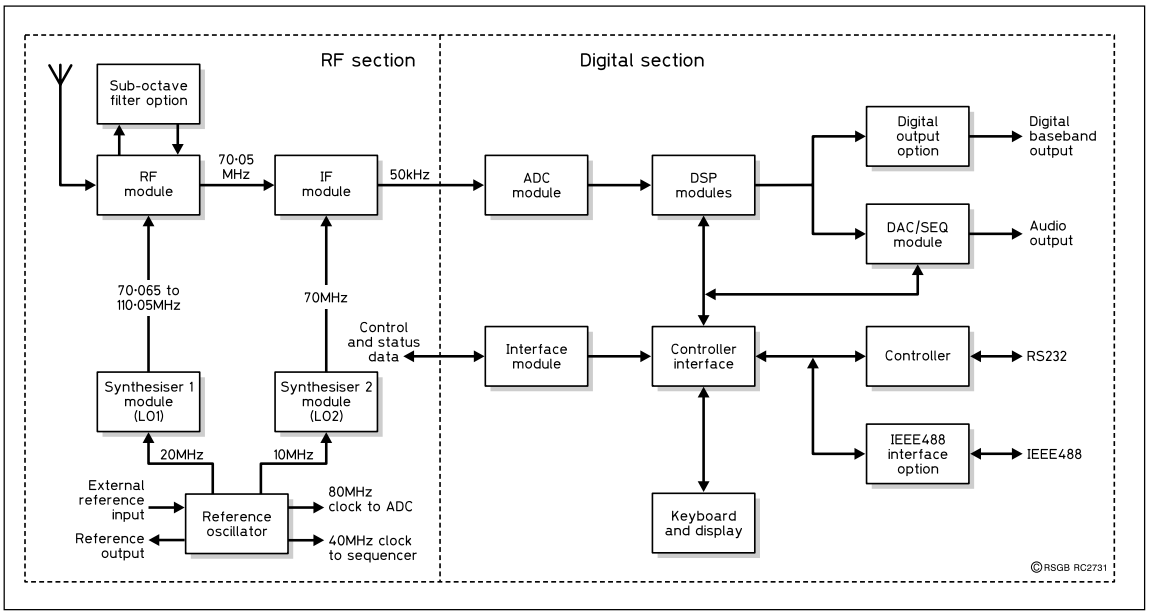


**Fig 2: Simplified block diagram of the 1991 STR8212 communications receiver that never went into quantity production. It covered 150kHz to 40MHz (15kHz optional), tunable in 1Hz steps. Reciprocal mixing: Any single unwanted signal of 96dBµV and removed 20kHz from tuned frequency will produce a noise response of less than 1µV EMF in a 3kHz bandwidth. Front-end protection: withstands 50V EMF continuous signal at input. Image and IF rejection: greater than 90dB. Input attenuators allow up to 40dB attenuation in 5dB steps under operator control. High signal levels indicated on front panel LCD.**

were underlined in 'An (Almost) All-digital HF Communications Receiver', by Peter T Anderson (*RF Design*, May 1999, pp56, 58, 60, 62, 64).

Cliff Noonan pointed out: "Production of a high-class analogue radio receiver is expensive and requires a high engineering input. Analogue components such as local oscillators, mixers, amplifiers and filters tend to be performing close to their limits, and careful alignment and rigorous testing is required. Signal reproduction is difficult to achieve, especially if any kind of matching between receivers or receiver channels is required. A digital receiver could be much easier to manufacture and leave the way open to VLSI implementation of receiver functions. This would fit well with modern trends in electronics manufacture and would lead to further significant cost reduction."

He also suggested that repair and maintenance by modular replacement without requiring re-alignment of the equipment is much easier in a largely digital product. Performance benefits should eventually be achievable, once the incoming signal is handled directly in the digital domain. Noonan wrote: "The selectivity of a receiver in an increasingly crowded radio spectrum is obviously a key performance parameter. This is defined as its ability to reject not only adjacent channel interference, but also reciprocal mixing products, close-in transmitter noise, intermodulation products, crossmodulation, IF and image breakthrough. Selectivity and ability to reject interference is largely determined by the RF and IF filter performance. Construction of sharp-sided filters with the desired characteristics in the analogue domain is extremely difficult. The digital filter has much better selectivity and is much easier to manufacture. It can also be made to be as narrow as is required without the prolonged 'ringing' effect which bedevils analogue filters with narrow bandwidths… Digital demodulation is relatively simple and can be more accurate than analogue demodulation."

Yet, the 1991 article carries an editorial comment: "Though the techniques are well understood, practical work towards a true digital receiver has been disappointing. However, new techniques have made possible the manufacture of digital receivers with better performance than the best analogue radio receivers."

In effect, the *Communications International* article was basically a marketing exercise to introduce to prospective customers the STR8200-series of HF and VHF communications receivers developed by STC Radio & Microwave Division. It was claimed that the STR8212 HF model was already in production. A VHF model was planned for production late 1991. However, it appears that only a very limited number, probably fewer than ten, of the pre-production HF models were actually assembled before the whole operation was cancelled by the take-over of STC by Nortel and the subsequent withdrawal of the new owners from the HF radio market. The primary objective of the STR8200-series appears to have been the Ministry of Defence 'Bowman' project which is still, almost ten years later, the subject of delays, and has come under fire from the politicians etc.

However, at least one of the pre-production HF models survives and has been brought into operational shape by an experienced amateur. He confirms that, despite some shortcomings of synthesiser phase noise etc, the performance of this largely digital triple-conversion receiver, with digitising at 50kHz, (**Fig 2**) is outstanding in a number of respects. He gives a simple but striking example: A local station, 600ft away from his dipole antenna, puts 1V across 50Ω and the signal floods the shack. This extremely strong signal flattens his FT-102 transceiver that has a 100dB dynamic range, although it is not internally screened to the extent of the STR8212. On the STR8212 he can copy a 10µV signal only 15-20kHz away from the local station, despite the residual synthesiser noise from the local's rig which is still receivable 600ft away. Yet the 8212 has *no* front-end signal-frequency selectivity (optional sub-octave filters were to be offered) and the input filters are broadband (40MHz). The claimed dynamic range is 125-130dB and this seems to be fully met in practice.

As noted by Dr Rohde in the June 'TT', the AGC with digital receivers is not yet perfect. The 1991 STR8212's AGC is prone to transition distortion on SSB, when moving from 'off' to 'on' at between 1µV to 5µV, particularly in the slow AGC mode.

What is the special feature that enabled Cliff Noonan to claim that this design represented a breakthrough in digital receivers? He wrote: "A new class of ADC [analogue to digital converter] is now available which is much more linear than existing types. This is the oversampling or bitstream ADC, originally developed for high-quality digital audio recording. STC Technology Ltd has developed, based on these principles, an ADC which is specifically designed for use in digital radio. The ADC has been produced as a two-chip set in VLSI technology as part of the UK MoD VHPIC Application Demonstrator programme [VHPIC = very high performance integrated circuit].

"The VHPIC ADC consists of a one-bit converter clocked at rates around 100MHz. This is called a pulse density modulator; since the density of the bitstream at the output of the device is proportional to the input signal amplitude. The converter is followed by a second VLSI chip containing filters that decimate the sampling rate and increase the word length. This chip also

digitally down-converts the signal to baseband (zero IF) and outputs in-phase and quadrature data at a sampling rate appropriate to the application.

"The VHPIC ADC has a performance equivalent to a 20-bit digitisation, giving a signal-to-noise ratio of about 100dB in a 12.5kHz bandwidth. The really important improvement in performance is that the device is much more linear than existing ADCs, so that the intermodulation products are about 100dB below peak. Equally important, as the level of interfering signals is reduced, the intermodulation products also reduce and quickly disappear below the noise when the interference is reduced to about 6dB below clip. The noise floor is at -100dB, measured in a 12kHz bandwidth, and the worst-case third order intermodulation product is -103dB."

I have no knowledge whether this application-specific chip-set ever went into production or whether a similar approach to developing a highly linear ADC has been adopted by other firms, including those involved with the Bowman project. But, clearly, these specialised chips overcame at least some of the problems that have dogged the 'fully-digital' and the 'almost-all' digital receivers. The STR8212 may not have been the 'ultimate' design in a number of ways, but it certainly seems to have represented a major advance in the digital field.

Peter T Anderson, a professional engineer with Visualization Technology and, as the author of several articles in *QEX*, presumably also a radio amateur, notes in 'An (Almost) All-digital HF Communications Receiver' how, over the past few years, monolithic analogue-to-digital converters (ADCs) and digital downconverters (DDCs) have appeared on the market. These devices permit the construction of inexpensive HF receivers using a signal path that is almost entirely digital. **Fig 3** shows the block diagram of a basic digital receiver for aural reception of SSB or CW in which only the first low-gain, broadband preamplifier and final audio output stages work in the analogue mode.

Dr Anderson discusses in detail the performance that can be expected of such a design using current devices and compares this with the *QST* (April 1996, pp68-73) review performance data of the Yaesu FT-1000MP receiver. The digital receiver uses a 12-bit ADC and a DDC both operating at 50 MSPS (megasamples per second). This sample rate limits the frequency coverage to below 22MHz. **Table 1** compares the FT-1000MP receiver versus ADC performance of the digital receiver at 14MHz with 500Hz bandwidth. It can be seen that the digital receiver data, although respectable, fall significantly below the performance of the receiver section of the high-grade FT-1000MP amateur transceiver. It needs to be stressed that the almost-all digital receiver performs ADC at up to 22MHz, compared with the STR8012 that digitises at 50kHz.

| Receiver Type | Minimum Discernible Signal (MDS) | Blocking Dynamic Range (BDR) | Intermod Dynamic Range (IMDDR) |
|---|---|---|---|
| Analogue* | -126dBm | 142dB | 97dB |
| ADC | -113dBm | 111dB | 80dB |

*Pre-amplifier turned off.

**Table 1: Analogue receiver (FT-1000MP) versus ADC performance at 14MHz (500Hz bandwidth).**

The dynamic range of an all-digital receiver is still limited primarily by the ADC linearity and noise level. Dr Anderson stresses that "Once excellent ADCs, with dynamic ranges as good as or better than those of analogue receivers are available, the DDC performance will have to be improved. The dynamic range must be improved, and the real-mode audio passband must be made shiftable for receiving various signals." He adds: "Because this digital receiver is intended primarily for aural reception, the subjective response of listeners is significant. Overall, the subjective performance is excellent. Receiver noise levels are below the noise level coming from the antenna. The audio exhibits negligible distortion. The SSB passband, though audibly narrow, is clearly intelligible for both male and female voices. The filter edges are sharp, with no hint of ringing, giving clear response to the on-off keying of CW signals."

He concludes: "Digital HF receivers are now capable of excellent operation at low cost if the signal environment does not exceed the limited dynamic range and frequency range of the digital receiver. Expected improvements in ADCs and DDCs will soon permit the construction of digital HF receivers with better performance than that obtained in analogue receivers."

It sometimes seems that at present we are passing through one of those transitional stages where the new (digital) cannot quite equal the old (analogue), although eventually it is almost bound not only to equal but to surpass the old. Much the same occurred in the 1960s, when solid-state began to replace the thermionic valve, but for some years led to a reduction rather than an enhancement of performance in a number of respects. The new is not always vastly superior to the old - at least until it has fully matured.

It was interesting to see the detailed review by John Wilson, G3PCY, of the 60-year old AR88D ('In My Experience', *Short Wave Magazine*, July 2000, pp16-18, 22) in which he provides performance measurements made in accordance with current practice of this back-breaking, hernia-inducing, but still lovable, heavyweight, monster-receiver, designed by RCA in 1941 to meet a British Inter-Services specification. Third-order intercept point based on a noise floor of -130dB is put at a fairly modest -20dBm and 73dB dynamic range. On the other hand, G3PCY gives second-order measurements at 6.5/7MHz as showing a dynamic range of 106dB and a second order intercept point of +83dBm. This is superior to most of the recent professional models that he has reviewed in this excellent series of articles. The excellent oscillator purity also results in reciprocal mixing measurements that put to shame many modern transceivers. A receiver with a beautifully quiet background noise!

Having quite recently used my own old AR88D on the amateur bands, I agree with his comment that the single-crystal filter does not provide the sharp shape-factor edges that we have become used to with more modern bandpass-crystal/mechanical/DSP filtering. On my model it is difficult to reduce the audio-image to the extent where one could claim true CW single-sideband reception. I cannot be sure whether or not this may be due to reduction of the crystal *Q* with age, since the alignment seems reasonable. One misses a front-panel phasing control (a control probably unknown to all those who have never used a vintage classic receiver!).

G3CPY concludes: "Owning a good sixty-year-old AR88D is rather like owning a good ten-year-old Bentley car. Just sitting in front of that spacious control panel, basking in the gentle warmth from the innards and

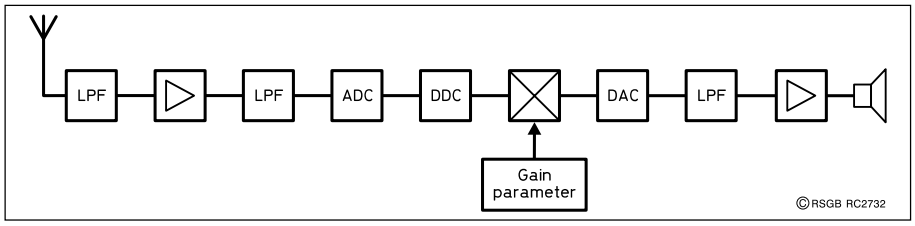


**Fig 3: Block diagram of an (almost) all-digital HF communications receiver, intended for aural reception.**
**LPF = Low pass filter. ADC = Analogue-to-digital converter.**
**DDC = Digital down converter. DAC = Digital-to-analogue converter.**

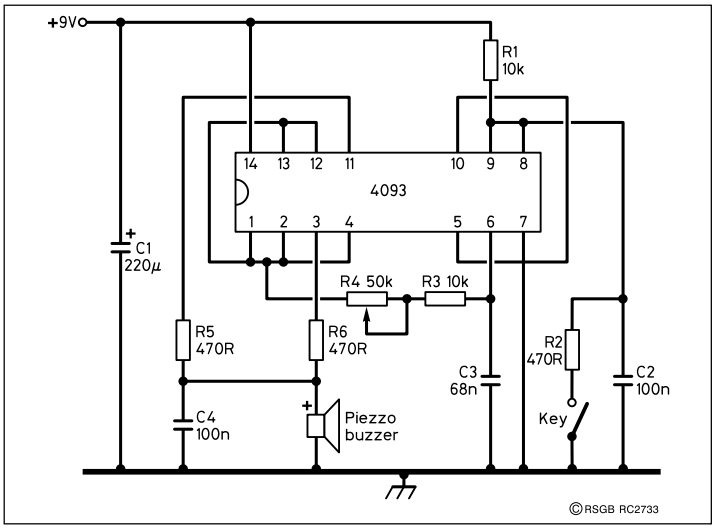


**Fig 4: Simple Morse-practice generator described in *Funk Amateur.***

rolling your fingers around the silky smooth tuning control, the desk lit only by the yellow glow from the back-lit windows, and bathed in the mellow audio from a good loudspeaker, can be a truly sybaritic experience. No radio listening enthusiast should go to that great radio receiver in the sky without being able to say 'I remember owning an AR88'. It really is that good." To which, for general MF/HF listening, I can add only "Hear, hear!"

## BITS & PIECES

A SIMPLE MORSE-practice generator is shown in *Funk Amateur*, July 2000, p746. This design (**Fig 4**) requires a minimum of components, yet gives an output tone variable by means of R4 from about 450Hz to 3kHz. It is based on the 4093 CMOS device and can be used with a 9V battery supply. A simple shaping circuit is incorporated to improve the keying characteristics.

A CONVERTER permitting reception of LF signals on an HF receiver is described by Ian Butterworth, G4BZO (*Sprat*, Nr 103, Summer 2000, pp16-18). He uses an 18MHz crystal (low-cost CPU) with an NE602 frequency converter to provide a tunable IF of about 18.050 to 18.200MHz: **Fig 5**. While a high-frequency crystal is used to reduce image etc, an alternative crystal (eg 14.0MHz) could be used if the receiver does not cover 18MHz but tunes 14MHz. Signals from about 50kHz or lower to 200kHz can be received, although the practical frequency range of the converter will be governed by the tunable range of the ingenious loop antenna. This comprises 3 metres of computer ribbon cable with 14 conductors - 12 used to form the pick-up loop and 2 to couple to the NE602. The two ends of the cable are joined to form a loop with no twists. The ends of the cable are offset by one turn to form the loop, ie the far end of conductor 1 is joined to the near end of conductor 2 and so on to form a 12 turn loop.

The loop is tuned with a polyvaricon-type variable capacitor, as found in transistor radios. The two sections are connected in parallel, providing a maximum of about 500pF. Further fixed capacitors are introduced by toggle switches, to extend the frequency range of the loop downwards. With a 0-500pF variable, switch 1 should add in parallel a further 500pF capacitor; switch 2, 1000pF; and switch 3, 2000pF. With the various possible switch positions this can provide a capacitor range variable in 500pF steps from a few pF to 3500pF, tuning the loop from roughly 200kHz to about 50kHz. The crystal oscillator can be checked by ascertaining whether the BBC Radio 4 Droitwich 198kHz transmitter can be received with near minimum tuning capacitance.

GODFREY MANNING, G4GLM, is a strong advocate of "socially-appropriate engineering" and believes that amateurs should encourage the targeting of resources at the most needy groups. He is concerned that at present amateur resources are disproportionately concentrated on such projects as amateur satellites used by only a small proportion of amateurs, although he accepts that such space experiments are real achievements of which those involved can be justly proud. But he feels that such projects as the development of pedal generators for use in African villages (described by John Longhurst, G3VLH, 'TT', April 2000, p64) is illustrative of the way that relatively small sums, compared with space satellites, can benefit far more people. He concludes: "unless technological developments serve the community, they are clever but useless".

LATEST SHOT IN the drawn-out investigations into the possible biological effects of low-intensity microwave radiation appears in 'Non-thermal heat-shock response to microwaves' by a team at the Schools of Biological Sciences and Electrical and Electronic Engineering at the University of Nottingham (*Nature*, May 25, 2000, pp417-418). This is introduced as follows: "Exposure limits set for microwave radiation assume that any biological effects result from tissue heating. Non-thermal effects have been reported but remain controversial. We show here that prolonged exposure to low-intensity microwave fields can induce heat-shock responses in the soil nematode [earth worm] *Caenorhabditis elegans.* The effect appears to be non-thermal, suggesting that current exposure limits set for microwave equipment may need to be reconsidered."

In effect, earth worms were exposed overnight to continuous-wave microwave radiation at 750MHz and 0.5W in a transverse electromagnetic (TEM) cell. Heat-induced reporter expression showed a disparity of 3°C between exposed and control [fully shielded] induction profiles. It is claimed that a thermal explanation for this disparity would require that the exposed worms become 3°C warmer than controls - or more even if only a minority of worms/tissues were affected: "We reject this thermal explanation on several grounds, not least the diffusion of heat over 18 hours. . . We suggest instead that the induction of heat-shock proteins could involve non-thermal mechanisms. These could include microwave disruption of the weak bonds that maintain the active folded forms of proteins; enhanced production of reactive oxygen species; or interference with cell-signalling pathways. . . Because of the universality of the heat-shock response, a similar non-thermal induction might also occur in human tissues exposed to microwaves, a possibility that needs investigation." ♦

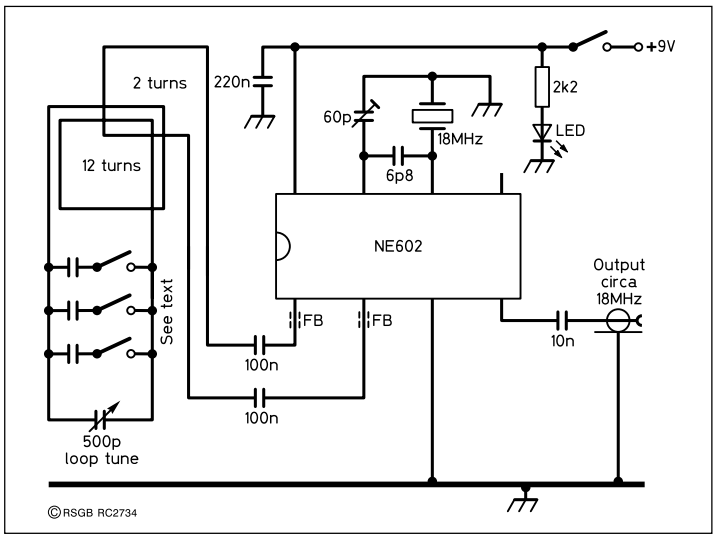


**Fig 5: G4BZO's LF converter and loop antenna formed from 3m of 14-conductor computer ribbon cable, as described in *Sprat.***

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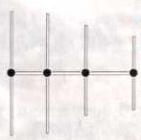

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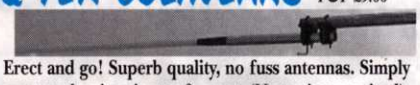

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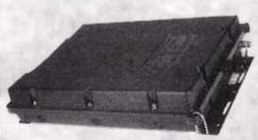

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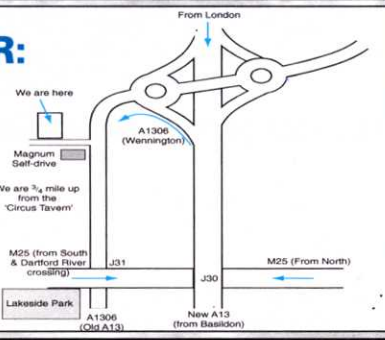


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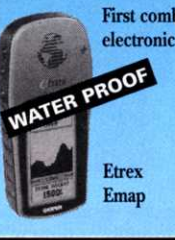


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***Warning:*** *Members are advised to ensure that the equipment they intend to purchase is not subject to a current hire purchase agreement. The 'purchase' of goods legally owned by a finance company could result in the 'purchaser' losing both the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

## FOR SALE

**ALTRON** SM-30WM tilt-over mast with HF rotator. AE pole. 5-ele 6m beam. 10-ele 2m beam, £80 the lot. Also 100W 6m linear amplifier by Microwave Modules, £40. 01707 267445 (Hatfield). E-mail: george@hatfield11.fsnet.co.uk

**BUNGALOW** large 3-4 bed, Lincolnshire, double garage, conservatory, 3-ele beam on 35ft mast with planning plus A5 vertical on roof, good garden, £179,500. G2BNI. 01400 282107 (Long Bennington). E-mail: douglas@drage32.freeserve.co.uk

**COLLINS** R-390 rcvr. Washed, revalved, realigned, refurbished front. Comtek 4-square switching unit. Four 36ft/44ft verticals. Butternut HF-4B minibeam, unused. Palomar rcvr noise bridge. B&W hi-power ATU. Daiwa hi-power ATU. Mans for all items, everything must go, offers invited. 0118 969 3284 (Reading). E-mail: 101764.2735@compuserve.com

**ICOM** IC-746 with all filters leads and software for computer to work the Icom 746. Ill health forces sale, vgc, boxed, £750 for quick sale. 0114 245 4579 (Sheffield). E-mail: dave@g7wgx.freeserve.co.uk

**SILENT** key equipment sale. Kenwood TS-950SDX HF tcvr with 3 CW filters, Kenwood SM-230 station monitor, Kenwood SP-950 speakers, c/w mans and original packaging, exc cond, £2100 ono. Also Farnell 830/10 stabilised power supply and IC-3100 rcvr with man. 0113 258 5044 (Leeds).

**TWO** metre VHF linear amp, the 'Explorer' made by Heatherlite (now Linear Amp UK), 10W input, 350W PEP output using 4CX250B valve. Perfect cond, orig box, man, £150. Buyer collects or carriage at cost. George, M5ACN. Not QTHR. 01707 657494 (Herts).

**YAESU** FT-847, as new, boxed, hardly used, £900. PK-232MBX, boxed, as new, £60. Motorola MC-2100 70cm English Dutch channels, £70. 01502 732108 (Lowestoft).

**45ft** telescopic Versatower tilt-over, with ground post, £200 ono. Already dismantled, buyer collects. G4ANP, QTHR. 01302 811280 (Doncaster). E-mail: mvys03487@cableinet.co.uk

**ALL** Kenwood, TS-750D boxed with man, as new cond, with fist and desk mic, £600 ovno. Low pass filter, £15. G5RV + G2DYM ant switch, £30. Multyterm TNC with software, all mode, £75. Kent electronic keyer, £30. Vibroplex key (as new), £150. All are subject to very close offers. Ken, M1DDA, QTHR. 01438 233365 (Stevenage).

**COLLECTORS** items: Marconi sig gen circa 1940, type TF144G, weighs 40kg, £30. HRO rcvr type MX, £35. Buyer collects. G8ZEI. 01246 413741 (Dronfield).

**CUSHCRAFT** R-6000 20-6m vertical, no radials, good cond, 18 months old, £150. G3PJK, QTHR. 0161 654 6160 (Manchester).

**DRAKE** L-4B linear, PSU, 2 x 3-500, h/book, vgc, £600. Clark SQT9M/HP mast, retracted 1.96m, h/book, original guys, stakes, spare seals, £160. 01823 680778 (Hemyock, Devon). E-mail: g3wni@bigfoot.com

**DRAKE** R-8E inc UHF, L/S, service man. Lowe HF-150 with PSU. Yaesu FT-102 tcvr. Linstead S7 power supply, 2 x 25V outputs. MFJ-948, 300W ATU. ERA Microreader. Revco RS-2000 AM-FM auto scanner. Sensible offers. 01392 861033 (Silverton).

**DRESSLER** 200S 1kW 2m linear + spare valve, £425. Yaesu 2100Z HF linear, £350. Kenwood TS-711E 2m multimode base station, 2-25W, £350. Kenwood TS-440SAT HF tcvr, £425. Icom 3200E 2m/70cm mobile, £100. Tokyo HL45U 430MHz linear, 45W, £55. All items boxed. 01527 545800 (Redditch).

**DUAL** trace oscilloscope, Philip Harris model 3304, 25MHz bandwidth 1mV-20V vertical, cond as new, only 1 year old. Perfect working order, with leads and full manufacturers man. Calibrated, real bargain at £250, cost over £400. 01372 375573 (Leatherhead). E-mail: tottenz@altavista.com

**EDDYSTONE** 2.5in coil formers with bases. Filters: Heathkit 3395/2.1kHz 5E1 QC1246 5.2MHz/2.05. Valves: PL509 (18), PL4D-21, many more. Mans: original HRO, AR88D, Heathkit IM25, SM-220, Uniden 2030, Polyskop 2, Advance D1 & E sig gens, circuits for FT-200, TR-2200, KW-2000A, Yaesu MD-1C8, boxed, new. 01332 735896 (Derby).

**EMIGRATING!** All must go! Icom IC-751A HF multimode. IC-2KL/IC-2KLPS HF linear. IC-275H 2m multimode. IC-475H 70cm multimode. IC-2400D 2m/70cm FM mobile. Rcvrs: Eddystone 830, 940, 1830. Racal 1217. Racal multimode manpack 1-30MHz. Racal HF AMU + controller. Bird power analyser + test kit. Nye Viking 3kW RF monitor. Spares: Vacuum variables, preselectors, etc. First sensible offer secures in each case. Michael. Not QTHR. 07968 267510 (Newcastle-Upon-Tyne). E-mail: lima.mike@virgin.net

**FOR** sale: ERA Mk2 Microreader with operating instructions, £30. Doug. 01935 862919 (Yeovil).

**FT-1000MP** AC, MD-100 mic, man, box, packing. Icom 746, FL-223 filter, man, box, packing. Icom 251E 10W all-mode, SM-8 mic, man, box, packing. FT-902, ATU 500W, man, box, packing. The lot, £3,050 ono, buyer pays carriage. 01670 545261 (Blyth). E-mail: ken@g0twv.freeserve.co.uk

**FT-747GX** HF tcvr with FM and CW filters, gwo, with h/books, £285. Microset 100W 2m linear, 100W o/p, gwo, £99. 01444 239371 (Burgess Hill).

**FT-840**, immac, £400. MFJ-949E, £90. 200W dummy load, £35. 1kW LPF, £40. Wide variable 300pF, £15. All ono. 024 7650 4982 (Coventry).

**FT-980** for spares or repairs, £75. FT-107R, £50. FTV-901R, £50. Modules for FTV-107R and FTV-901R, £10 each. 2m 4m 6m 70cm modules available. Prefer buyer collects. All mans available. M0AMF, QTHR. 01527 544642 (Redditch).

**GALVANISED** telescopic tilt-over 60ft mast, c/w Daiwa rotator DR-7500A X control, dismantle/collect, £400 or reasonable offers accepted. 01942 817287 (Westhoughton).

**GEM** quad, unused, £250. HF9V vertical, one year old, £150. Karl, 01296 435815 eves (Aylesbury).

**HARMSWORTH'S** Encyclopaedia set, £50. Sinclair Micromatic, original box, instructions, £40. Bush DAC90A, cream Bakelite, mint, £90. 01634 253056 (Medway). E-mail: gw.hoo@pgen.net

**HRO**, 9 coils, £110. Eddystone 659 marine rcvr with round spkr, £125. Eddystone EC-10, £40. 1155 WW2 rcvr, £80. IC-2E with batt pwr supply fixed, £20. Oscar Block 200 SWR/pwr meter, £15. Standard 2m 2W, £20. Small linear, 2m 10-20W, £15. 4 old Morse keys. 4 old galvanometers. Various old batt radios. 01732 863177 (Edenbridge).

**HRO-M** rcvr with all coils, believed to be of 1936/7 vintage. Good external and internal cond, gwo with original man. Needs PSU – HT 240VDC, LT 6.3VAC. Can be seen operating by appointment. Prefer buyer collects, delivery by courier at cost. Due to vintage and pristine cond, best offer secures. P Beaumont, G7VAK, not QTHR. 020 7594 7560 (London). E-mail: p.beaumont@ic.ac.uk

**ICOM** IC-251E 144MHz multimode, £225. Icom IC-207H dualband mobile, £195. 6m 4CX250B amplifier, no PSU, £50. B40 rcvr, gwo, £50. Pye A-200 amplifiers, 2m/4m/6m, £35 each. 1999 Worldwide Callbook CD, £7. 430MHz 21-ele Yagi, £35. Mobile, 07968 085670 or 01777 248080 (Retford). E-mail: g0oil@arrl.net

**ICOM** IC-R70 rcvr, perfect cond, original box, man, £250. Hoka Code 3 with latest software, £175. Kenwood TV-502 2m transverter, service man, leads, £80. KW Atlanta tcvr, restored, with man, Shure 201 mic, rcvr needs realigning, £80. MFJ-490 memory keyer, brand new, £60. G4JBH. 01288 331113 (Bude). E-mail: g4jbh@compuserve.com

**JRC** NRD-535 rcvr, matching spkr unit, in original cartons, mint cond, £575. Will deliver 50 miles Sheffield. 0114 258 5937 (Sheffield).

**KENWOOD** TS-940SAT, £700. SM-220 + Panadaptor, £150. FT-767GX, auto ATU, CW filters, £350. Cushcraft R-6000 vertical, brand new, £165. BNOS amp 433/3/50W, £90. SG-230 Smartuner, £195. 2-70-6m colinear, £35. DRAE 24A PSU, £65. 45ft vertical marine, £95. Alinco 30/144 amp, £20. FTV-107, £35. Ten-Tec Scout 555, no modules, offers. PK-232MBX multimode, £100. ERA Microreader MkII, £65. Mostly original packaging and exc cond. Exchange for IC-706, FT-100, TS-50, laptop, HF amp. 01953 884305 or 07970 214039 (Norfolk).



**KENWOOD** SM-220 station monitor, fitted with BS-8 pan display, boxed, h/book, full service man, nice cond, £195. AEA PK-900 dual TNC with Pakratt for Windows software. H/book and original packing. In daily use on Pactor, £150. Collins 180S-1 ATU, round emblem, £220. Ten-Tec 1320 QRP tcvr (see review, *RadCom*, Aug 2000), built by professional engineer, as new cond, 3-4W CW, 20m, £85. 6DQ5 valves, boxed, £5 each. G3GGK, QTHR. 01954 210374 (Cambs).

**KENWOOD** TS-820, good cond, starter radio, inc MC-50 desk mic. Bargain at £180 ono. Collect please. Rich, G4ZDG. 024 7660 2835 after 5pm (Coventry).

**KENWOOD** TS-940S, both CW filters, used as second rig, exc order, £599. Force 12 10/12m 7-ele Yagi, 2 years old, £120. 01751 476380 (Pickering). E-mail:g4obk@talk21.com

**LABGEAR** LG-300 150W CW/AM transmitter with companion power unit and modulator, original cond and w/o. Sensible offers invited. 01353 740434 (Cambs).

**MFJ-1786** super Hi-Q loop antenna. Covers 10MHz-30MHz. Genuine reason for sale. Ring for further details after 6pm. 0115 847 0061 (Nottingham). E-mail: kev@longleyk.freeserve.co.uk

**MFJ-1792** 40/80m antenna, brand new, good DX antenna, cost £120 new. All still boxed, man, good reason for sale. 01744 602424 (St Helens).

**NINO** 200 PPC. PSU, software, case, data lead, £100. DX-394 SW rcvr, £75. Standard AX-400E h/h scanner, case, £125. All A1 or as-new, boxed, mans and ono. John, G3XLL, eves and weekends. 01379 652043 (Diss). E-mail: jlockwood@ic24.net

**PAKRATT** model PK-232MBX universal data controller, inc Pactor/Gateway, man and leads, complete, little used, good cond, £100 ono. 01924 361357 (Wakefield). E-mail: fred@g4ros.ezesurf.co.uk

**PK-232MBX**, latest firmware, leads, man, £140. Storno 5114S, modified 2m packet, 20W, works well, £35. Psion series 3, PSU, s/w, Psilink, mans, etc, £60. All three (complete packet station), £200. John, G3ZTU, QTHR. 01403 822513 (Horsham). E-mail: g3ztu@fsmail.net

**POWER** units all 230VAC input, 220V HT 150mA, 6.4V 4A, metered. 2 @ £7 each. 300-400V. 4V 7A, 5V and 6V @ 3A, 5Z4G rectifier, £10. 50V heavy duty, 2 @ £8 each. Rack mounting 220V HT @ 600mA, 6.5V 17A, £6. STC stabilised HT 200V, 6.3V LT, £6. Small PSU, 20VDC 1A, £4. GEC DT-204 24V 1A, 12V 500mA, ±4.5V 250mA, ±6V, 2 @ £8 each. Sig gen 05-5.2MHz, 5-valve, wooden case + PSU, £10. Heathkit Cotswold speaker cabinets, 2 @ £10 each. Tony, G3KAG, QTHR. 01335 324393 (Ashbourne).

***QST*** magazines, Jan 1949 to Apr 1963 (14 years). Also Apr 1977 to Mar 1982 (5 years), Oct 1961 and May 1979 missing. 1914 to 1948 are bound. Also 34 copies *Smithsonian* magazine, 1987-90. Sale due to silent key. Offers? G3CTP. 01293 882560 (Crawley).

**RACAL** RA-17 HF rcvr, 0.5 - 30MHz, £120 ono. G3YFE, QTHR. 01980 624725 eves or 0385 360303 anytime (Amesbury).

**SILENT** key sale – the late G6BTO. Many important items for clearance. Please send SAE for list and other details to David Allen, Plaw Hatch Corner, Sharpthorne, E Grinstead RH19 4JL.

**SILENT** key sale, late GM0TWK. Icom IC-728 HF tcvr, £500. Sony ICF-2001D rcvr and mains pack, £169. Yaesu FT-790RII tcvr and FL-7025 linear amp, £225. MFJ-989C Versatuner-V antenna tuner, £250. Yaesu FT-23R 2m FM tcvr, hand speaker mic and car adapter, £120. Kenwood TH-42E 70cm FM tcvr, hand speaker and mic, £100. 01667 462513 (Ardersier).

**TIGERTRONICS** Baypac model BP-2 packet modem, £30 ono. 01963 370506 (Templecombe). E-mail: gary@g0enw.freeserve.co.uk

**TRIO** TS-830S HF SSB tcvr, bands covered - 160, 80, 40, 30, 20, 17, 15, 12, 10, modes SSB/CW, 220 watts O/P CW/F, full instruction man/schematics/diags, boxed, immaculate, £375. 01737 373373 after 6pm (Surrey).

**TWO** Racal rcvrs. RA17, RA17L, vgc, with h/books, £150 each. Wanted: power supply for 216 rcvr. 01244 815681 (Deeside, Clwyd).

**YAESU** FL-2100Z linear, re-advertised due to time wasters. Very clean, gwo with man, £350 ono. 01992 632434 (Waltham Cross)

**YAESU** FT-290 Mk1, £150. Yaesu FT-770 70cm 25W mobile FM tcvr, £120. Microwave Modules 70cm linear amplifier, 10/50W, £80. BNOS 6m linear amp, 10/50W, £80. All vgc, boxed, h/books with rigs. Jaybeam 10/15/20m trapped dipole TB-1, £80. Original owner of all the above. 0118 926 5616 (Reading). E-mail: terry@mtrwfd.demon.co.uk

**YAESU** FT-690 MkII plus clip-on 10W linear, boxed, mic, antenna, man, £240. Steve, G4TRA, QTHR. 01453 842723 (Wotton-Under-Edge). E-mail: steve_redway_traction@compuserve.com

**YAESU** FT-726R; 2m, 6m, and 70cm, satellite, CW filter. Microwave Modules 70cm 100W linear, £500 ono for both, will split. Brian. 0151 606 9613 (Upton). E-mail: g0vax@qsl.net

**YAESU** FT-901, £200 ono. Yaesu FT-290, £125 ono. Revex W-570 1.6 1300, £85. 2m 25W linear, £45. RX2, weather decoder + Quad ant, £85. 2m Tonna, £25. 2 x 6m ants, £55. 23cm Tonna, £25. 01473 425798 (Ipswich).

**YAESU** FT-901D all-mode HF tcvr, good cond, £230. Sommerkamp FT-480R all-mode 2m rig, gwo, £130. 01579 344935 (Liskeard). E-mail: ralph85@btinternet.com

**YAESU** FT-920AF, exc cond, with box, man, etc, £750. 01929 405531 (Wool). E-mail: eric_g0cgl@lineone.net

**YAESU** FT-980 HF tcvr, all-band all-mode, gen-cov rcvr, all filters, mic, mans, boxes, exc cond, £525 inc carrier delivery, GW4RLP, QTHR. 01286 675264 (Caernarfon).

**Crystal** sets and early valve radios wanted. All old equipment, valves, etc is of interest. Jim, G4ERU, QTHR. 01202 510400 (Bournemouth).

# WANTED

**HALLICRAFTERS** S27 S-meter and logging scale or a complete rcvr, faulty or working, must be complete. Peter. 0161 743 9544 or 0161 876 4153 (Swinton). E-mail: peter.nilan@btinternet.com

**23cm** tcvr, mobile or h/held wanted for 9K6 packet. Kelvin, G7NHL. 01298 77103 (Buxton). E-mail: kelvin@kayhem.fsnet.co.uk

**ANTENNA** wanted: Rotatable dipole HF 20m, 15m, 10m or mini beam. Frank, G3ZAZ, QTHR. 01772 865196 (Preston).

**DISABLED** enthusiast of 'Real Radio' offers good home to unwanted QSL cards, log books, etc. Also seeks pre-1950 *QST*s. State your price. Mike. 8 Windsor Road, Rexdon, Southwold, Suffolk, IP18 6QX.

**G3TDZ** rvcr conv boards, SL6440 (2), MCL496 (5), mic for TR-9000. Shimizu S5105S. 01332 735896 (Derby).

**KENWOOD** TS-870S sought at fair, realistic price. Cash waiting. John, G0CHQ. 020 8561 3837 (Hayes). E-mail: john@pepps.co.uk

**KW-600** would some kind person let me have a copy of the manual for this linear? Bert, G3FVO. 01908 501845 (Milton Keynes).

**MARCONI** TF-888 sig gen, AM 80kHz to 80MHz, battery/mains, complete but need not work. Tom, G0PSU. 01234 266656 (Bedford).

**MODEL** 226 crystal calibrator for Ten-Tec Century 22 tcvr. G3VCL. 02380 465793 (Southampton). E-mail: bacla3@excite.com

**OLDER** type wartime radio wanted, price about £20, all bands HF by pensioner. Must be local and delivered. 13 Sumner Ave, Bolton, BL2 5RF.

**PAPER** chart recorder, 1-3 channels. G2LV. 20 Tower Park, South Molton, Devon EX36 4EP.



**PYE** Westminster, boot mount version, must be up and running for 2m, should be reasonably priced, collection possible. 01495 750813 (Pontypool).

**SELECTOR** unit RF 25W (SURF), part of Clansman VRC-321 military vehicle. HF radio, 1.5 – 30MHz. Also Collins 75A4 rcvr. 01743 884858 (Shrewsbury).

**SPEAKER** mic for IC-2E (IC-HM9) and Kenwood VC-20 VHF converter for the R5000 rcvr. Bob, G0IIP, QTHR. Mobile 0973 548138. E-mail: g0iip@compuserve.com

**TELESCOPIC** trailer-mounted tower, minimum 60ft. Also, large HF beam. G3ZVW, QTHR. Tel: 020 8882 5125. E-mail: g3zvw@techie.com

**WANTED** meter for Racal model RA17 rcvr. Doug, G0HUD, QTHR. 01922 627084 (Walsall).

**WORKSHOP** man for Yaesu FT-225RD or photocopy. All expenses covered plus. Geoff, G4DED, QTHR. 07931 528269 (Banbury).

**YAESU** PA-10A mobile DC power adapter. G0WEN. 01920 462241 (Ware). E-mail: keith@beaconroad.freeserve.co.uk

# Club NEWS

**ABERDEEN ARS**

8, Talk by MM0CJQ; 15, High Power v Low Power; 29, Night on-the-air. Robert, 01224 896142.

**APPLEDORE & DARC**

18, Talk 'Phase 3D', by Dennis, G0FCL. Brian Jewell, 01237 473251.

**AYLESBURY VALE RS**

13, The club call, G4VRS, will be on the air for the 144MHz Cumulative Contest. NB this is the second Wednesday! Roger, G3MEH, 01442 826651.

**BANGOR & DARS**

16, AGM. Mike, GI4XSF, 028 4277 2383.

**BARRY ARS**

5, Night on-the-air & Morse practice; 12, Talk 'GB4GT - Grand Turk Project', by Glyn, GW0ANA; 19, Night on-the-air; 26, Talk 'GM4BVJ/P IOTA Contest DXpedition to Orkney Islands, EU009', by Rich, GW4BVJ. Rich, GW4BVJ, 01656 658830.

**BLACKMORE VALE RS**

5, Morse practice & on-the-air night; 12, Talk 'Tales of a QE2 Radio Operator', by G3YPQ; 19, Morse Practice & on-the-air night; 23/24, Stourhead visit by G1NWT; 26, Morse practice & shack night. Tony, G0GFL, 01258 860741.

**BRACKNELL ARC**

13, Talk by Rob Mannion, Editor of *Practical Wireless*. Baugh @compuserve.com

**BRAINTREE & DARS**

4, DF hunting, by G4KQE; 18, Junk Sale. Keith, M0CLO, 01376 347736.

**BROMSGROVE ARS**

12, Talk 'AROS'; 26, Night on-the-air & Technical Topics. Barry, G0TPG, 01527 542266.

**CAMBRIDGE & DARC**

9, 81st Birthday Celebratory Dinner, at the Arundel House Hotel, Cambridge. Bob, G0GVZ, 01223 413401.

**CHELMSFORD ARS**

5, Table-top Sale. Charles, G0GJS, 01245 256654.

**CHELTENHAM ARA**

1, Old and new equipment evening at the Prestbury Library, The Burgage, Prestbury, Cheltenham. John, G4PDQ, 01242 242336.

**CHESHAM & DARS**

13, Night on-the-air; 20, Car Boot planning; 27, Night on-the-air. Phil, G8BLB, 01494 784811.

**CHESHUNT & DARC**

6, Members' Forum; 20, On-the-air evening. David, M1DGS, 01920 463746.

**CHESTER & DRS**

5, Further talk by Gordon Adams, G3LEQ; 19, Talk on 'Satellite TV', by Paul Holland, G3TZO. Bob, G4CMI, 01244 378699.

**CHICHESTER & DARC**

5, Talk 'Digital Systems', by Graham, G0WSD. Graham, G0WSD, 01243 788292.

**CORNISH RAC**

7, Talk 'Water Telemetrics', by Peter. Robin, G0MYR, 01209 820118.

**COVENTRY ARS**

1, Night on-the-air, Novice class, CW practice; 8, Surplus Equipment Sale; 15, Outdoor event - details TBA; 22, Night on-the-air, Novice class, CW practice; 29, Indoor DF hunt. F A Noakes, G2FTK.

**CRAY VALLEY RS**

7, M2000A - International communications - John, G3WGV; 21, Taking the RSGB into the new Millennium - Don, G3OZF (RSGB President). Bob, BRS32525, 020 8265 7735 after 8pm & weekends.

**CROWBOROUGH & DARS**

27, Talk 'Backpacking', by Jeff, G1JDM. Margaret, G6UIF, 01892 663666.

**CRYSTAL PALACE & DRC**

6, Transverter project, construction class, computing and Internet; 16, Four mini talks by Brian Cannon, G8DIU. Bob, G3OOU, 01737 552170.

**DENBY DALE (PIE HALL) ARS**

3, Special Event Station in the Pie Field, Denby Dale; 20, Talk 'Low Frequency Development', by John Hey, G3TDZ. Tony, G4LLZ, 01484 318750.

**DORKING & DISTRICT RS**

26, Talk 'Future of International Broadcasting', by Graham Mytton, formerly of BBC World Service. John, G3AEZ, 01306 631236.

**DOVER RC**

13, Slide show by Jim, M1BKI; 27, Talk 'Watches', by Chris, 2E1HWT. Jim, M1BKI (Chairman).

**ECHELFORD ARS**

2/3, RSGB/Region 1 HF SSB Field Day. Robin, G3TDR, 01784 456513.

**EDGWARE & DARS**

14, Talk 'Control Systems', by Ian, G4IUZ; 28, Autumn 'Bring and Show' evening. David, G5HY, 01923 655284.

**FARNBOROUGH & DARS**

13, Talk 'Propagation', by Bob, G4HZU; 27, Talk 'Dayton 2000', by Drons, G3NVM. Norman, G0VYR, 01483 835320.

**FELIXSTOWE & DARS**

11, Novice RAE; 12, RAE course commences (provisional); 18, Amtor/Pactor and other strange modes - Suffolk Data Group Roadshow. Paul, G4YQC, 01394 273507.

**GLOUCESTER AR & ES**

4, AGM; 9, Walking DF hunt followed by cream tea; 11, Phantom DF hunt; 18, 5WPM Morse; 25, Night on-the-air. Tony, 01452 618930, OH.

**GOOLE RES**

1, Fund-raising night at the Barnes Wallis Inn; 8, Junk Sale at the Courtyard Centre, Goole; 22, Fund-raising night at the Barnes Wallis Inn; 29, G3NVE DX Trophy presentation at the Barnes Wallis Inn. Richard, G0GLZ, 07867 862169.

**GREAT YARMOUTH RC**

8, Operating, Field Day debrief; 22, Pat Gowen on satellites. Tony, G3NHU, 01493 721173.

**GRIMSBY ARS**

7, HF Night on-the-air; 21, RSGB Video. Brian, G4DXB.

**GUILDFORD & DRS**

8, Bring & Show evening; 22, Old Timers' Reunion. Tim, G7JYQ, 020 8399 5125.

**HALIFAX & DARS**

19, AGM followed by a discussion. Ray, G0PMU, 01274 600297.

**HAMBLETON ARS**

6, Night on-the-air; 20, Talk. John, G0VXH, 01845 537547.

**HEREFORD ARS**

1, SSB Field Day Preparation. Tim, G0JWJ, 01432 279435.

**HODDESDON RC**

9, Hoddesdon Carnival; 12, RSGB President Don Beattie, G3OZF; 26, CW and Open Forum evening. Don, G3JNJ, 020 8292 3678.

**HORNSEA ARS**

6, Foxhunt; 13, APRS, with G4EJP; 20, Interclub quiz; 27, Foxhunt. John, G0TPS, 01964 562258.

**HORSHAM ARC**

7, Quiz against Crawley ARC. David, G4JHI, 01403 750228.

**HULL & DARS**

8, Teaching the RAE, G0TPS; 22, Quiz. Jonathon, G7DBL, 01482 493425 or 07867 880402.

**ITCHEN VALLEY ARC**

2/3, HF Field Day - Petlake Farm, Bartley; 8, Don Beattie, RSGB President; 22, Computer Upgrading, with Mark, G1TOT. Pete, M0CFQ, 023 8034 5052.

**KEIGHLEY ARS**

7, On-the-air night; 21, Talk by Ian Dewhurst, MBE; 28, Club auction night (used equipment sale). Ian, M1BGY, 01274 723951.

**KIDDERMINSTER & DARS**

5, AGM. Geoff, G0RJP, 01299 888826.

**LEICESTER RS**

4, Night on-the-air; 18, Junk Sale; 25, Lecture by Adam, G0ORY on 'Amateur Television'. A T Wann, G0TNI, 0116 263 0947.

**LEISTON ARC**

5, Talk 'Hubble - an eye on the Universe', by Paul, G4YQC; 20, Quiz competition against the Ipswich Radio Club. John, G0FSP.

**LIVERPOOL & DARS**

5, GB0CIC planning; 12, On-the-air night. Ian, G4WWX, 0151 722 1178.

**LOUGHBOROUGH & DARC**

5, On-the-air evening - try 2m DX; 12, Tips on using test equipment, with Brian, G8BUB, & Co; 19, Talk 'Evolution of the Camera', by Alan, G7HZZ & Co; 26, Talk 'RSGB - Past, Present & Future', by Geoff Dover, G4AFJ. Chris, G1ETZ, 01509 504319.

**LOUGHTON & EPPING FOREST ARS**

8, Visit to Kelvedon Hatch secret nuclear bunker; 22, Visit by North London RLO. Marc, G0TOC, 07803 023501.

**MAIDSTONE YMCA ARS**

1, Open evening; 8, RAE licensing conditions; 15, Lecture; 22, RAE operating procedures; 29, RAE course. John, G0RHO, 01622 832259.

**MAXPAK**

4, WinPack update. Make sure you are up-to-date, by Joe, G4VYA and G0CNG. Ron, G6LRD, 01922 684496.

**MID CHESHIRE ARS**

6, VHF on-the-air night; 13, Antenna quiz night, by David, G4XUV; 20, AGM. Mike, G6GAK, 01606 784795.

**MID-WARWICKSHIRE ARS**

12, Talk 'The History of Eddystone', by Norman, G8CXL; 26, Morse evening - club members. Bernard, M1AUK, 01926 420913.

**MORECAMBE BAY ARS**

12, Surplus Equipment Sale; 26, Reverend George Dobbs, G3RJV, on QRP. Brian, G0RDH, 01524 424522.

**NEWBURY & DARS**

27, 'APRS', by Neil Savon, G0SVN. Mark, M0CUK, 01635 36444.

**OXFORD & DARS**

28, Talk by the Radiocommunications Agency. Dave, G3BLS, 01865 247311.

**QRZ AR GROUP OF SUSSEX**

8, Junk Sale. Stuart, M0CHW, 01435 863020.

**RADIO SOCIETY OF HARROW**

1, Transmitting evening from Harrow Weald Common - come along and help with a practice field day; 24 & 27, GB2DHH on the air for National Plastic Modellers' Rally at the Mosquito Aircraft Museum, London Colney. Jim Ballard, G0AOT, 01895 476933 or 020 7278 6421.

**SALOP ARS**

21, Quiz with Newtown Club at home; 28, Calibration Night. Fred, G3NSY, 01743 790457.

**SHEFFORD & DARS**

7&9, Welcome back. Special Events Shuttleworth & Millennium Green; 14, Video Night; 16/17, Shuttleworth Steam Rally, GB0BSR; 21, Rig alignment & 12.5kHz trimming. Bring in that old transceiver; 28, Mobile DF hunt. 8.00 - start at the clubhouse. Mike, G8BEG, 01462 816738.

**SOUTH BRISTOL ARC**

3, Bristol Radio & Computer Rally 2000. Brunel Centre, Temple Meads Station, Bristol; 6, 10-metre Challenge – most BS postcodes; 13, Packet radio demonstration, G6TGZ; 20, Annual Club Foxhunt, with Fred, G7LPP; 27, On-the-air night. Muriel, G4YZR, 01275 834282.

**SOUTH NOTTS ARC**

6, Post-SSB Field Day clearup; 13, Open Forum - members only; 20, Talk 'Bletchley Park and Code Breaking', by Henry Balen, G4MHB; 27, On-the-air HF & VHF. 01509 672846.

**STEVENAGE & DARS**

5, Welcome Back evening. Peter, 2E1CRK, 01462 637404.

**SURREY RADIO CONTACT CLUB**

4, Short talks. Berni, G8TB, 020 8660 7515.

**SWANSEA ARS**

23, Coach trip to Leicester Show at Castle Donington. R Williams, GW4HSH, 01792 404422.

**TELFORD & DARS**

6, On-the-air night; 13, Barbecue; 20, Talk 'The Story of Television', by Tony, M0AMP; 27, Using the right component, a committee presentation. Mike, G3JKX, 01952 299677.

**THORNTON CLEVELEYS ARS**

4, Auction of Silent Key equipment; 11, Construction competition; 18, On-the-air night; 25, Talk 'Computer Programs for Amateur Radio', by Charles, G4FWM. Jack, G4BFH, jack@duddington.fsnet.co.uk

**TROWBRIDGE & DARC**

6, Talk 'Look Out Digital TV's About', by Dr Hedley, G0SOF; 20, 'Bring and Show' - a RIG night. Ian, G0GRI, 01225 864698 evenings & weekends.

**VERULAM ARC**

25, Talk 'The de Havilland Mosquito', by Walter Craine, G3PMF. Walter, G3PMF, 01923 262180.

**WAKEFIELD & DARS**

5, On-the-air night; 12, Talk 'The Ultimate Receiver'; 19, Club Equipment Showcase (demo); 26, On-the-air night. John, G7JTH, 01924 251822.

**WATERSIDE (NEW FOREST) ARS**

5, Colin Thomas - International Amateur Radio Union; 19, 1st practical construction evening. Tony, G0LKG, 023 8084 1794 evenings & weekends.

**WELWYN HATFIELD ARC**

18, Pictures from space, by Byron, 2E1GCC. Dean, 07968 119975.

**WEST SOMERSET ARC**

5, Surplus Equipment Sale. Alan, M0AOJ, 01643 707207.

**WESTON-SUPER-MARE RS**

4, Talk 'Codes and Code-Breaking', by Peter Kilpin; 18, Workshop. Doug, G0WMW, 01934 629160.

**WIDNES & RUNCORN ARC**

6, Update and Cookies evening. Martin, G4LUQ, 01928 714843.

**WORTHING & DARC**

2, Video evening; 6, The Internet - what to do with it; 13, Discussion evening; 27, Construction contest, Roy, G4GPX, 01903 753893.

**YEOVIL ARC**

7, 'Operational Evaluation', with G3KSK; 14, Talk TBA, G3SWH; 21, Simple transmitter, G3MYM; 28, On-the-air evening. George, G3ICO, 01935 425669.

## SILENT KEYS

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

| | | |
|---|---|---|
| 2E0AAL | Mr M Bullock | 19/06/00 |
| G0EYV | Mr L Smith | 13/06/00 |
| G0GIZ | Mr R A Smith | 02/02/00 |
| G0VDW | Mrs K E Barber | 14/07/00 |
| G0WBK | Mr J Pascoe | 07/06/00 |
| G2BCB | Mr EAL Barrall | 16/07/00 |
| G2CR | Dr S A O'Hagan | 21/06/00 |
| G3BCM | Mr D Deacon | /07/00 |
| G3LWY | Mrs F Woolley BEM | 08/06/00 |
| G3NEU | Mr T L Painter | 05/07/00 |
| G4BNV | Mr A Le Good | 30/06/00 |
| G4CEW | Mr JWA Crooks | |
| G4IJH | Mr F P Stevens | 11/06/00 |
| G4ILV | Mr D Burge | 29/06/00 |
| G4WUN | Mr K Boot | |
| G6FNA | Mr B W Lambert | /06/00 |
| G6GMX | Mr P E Mack | 18/05/00 |
| G6JTJ | Mr JDH McWilliam | 24/06/00 |
| G7HYO | Mr J G Brennan | |
| G8DIN | Mr D S Cooke | 12/06/00 |
| G8KWW | Mr G W Kennion | 29/06/00 |
| G8TWC | Mr H L Mather | 27/05/00 |
| GM3AWF | Mr D F Craig | 21/06/00 |
| GW2FRB | Mr E Naish | 20/06/00 |
| RS26565 | Mr H R Hodges | /05/00 |
| RS36584 | Mr J F Coles | 23/06/00 |

## Rallies & Events

This is a list of all rallies, hamfests, exhibitions and conventions notified to HQ (as at press date). Items are given in detail for the next three months inclusive and in brief thereafter. Please send detailed information, including contact callsign andtelephone numbers direct to HQ and marked 'Rally News – DIARY'.

**2/3 SEPTEMBER 2000**

**DENBY DALE (PIE HALL) ARS Pie Day –** Dry Hill Farm, Dry Hill Lane, off the A635. Pie Day is 2 September, adults £5.95, under 16s £4 including portion of pie. Concert & Family Day is 3 September, adults £10, under 16s £4.

**3 SEPTEMBER 2000**

**ANDOVER RAC Radio & Computer Boot Sale** – Middle Wallop airfield, on the A343 between Andover and Salisbury. Entrance near to the Museum of Army Flying. OT 10am, 50p, TI on S22. Jack, G0UJW, 01264 391383.

**SOUTH BRISTOL ARC Computer & Radio Rally** – Brunel Centre, Temple Meads Station, Bristol. OT 10.15am/10.30am, £1.50 (accompanied under-12s free), B&B, C. Muriel, 01275 834282.

**9 SEPTEMBER 2000**

**BALLYMENA ARC Annual Rally** – Cullybackey High School. OT 12 noon, TI on S22. Jeff, GI4HCN, 028 2565 9769.

**10 SEPTEMBER 2000**

**LINCOLN SWC Hamfest** – Lincolnshire Showground, on A15, 5 miles north of Lincoln. OT 10.30am, £2 (under-14 free), CP, TI on 2m, CS by arrangement, C, TS, B&B, FM, MT (two photos needed). John, G8VGF, 01522 525760.

**TELFORD RADIO Rally** – RAF Museum, Cosford. OT 10am, DF, TS, RSGB, B&B, FM, SIG, MT (two photos needed), FAM, TI on S22. Bob, M5BWQ, 01952 770922 or www.telford-rally.co.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.

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*.**

**VINTAGE Technology 2000** – Blackpool. Brian 01253 508232.

**16/17 SEPTEMBER 2000**

**TRANSMISSION 2000** – National fund-raising event organised by the British Wireless for the Blind Fund. Get sponsorship for every contact you make and help to provide specially-adapted audio equipment free for life to UK-registered blind people who are lonely and in need. There are prizes for the most contacts. See July *RadCom* p76, telephone 01634 832501 or e-mail Pat@blind.org.uk

**17 SEPTEMBER 2000**

**ELECTRO-JUMBLE 2000** – South Yorkshire Aircraft Museum, Home Farm, Firbeck, Worksop, Notts. OT 8.30am, £1, children, OAP free. B&B, CP free, CBS. All types of equipment up to the 1960s. Mike, 0143 363 1296 or 0125 334 7176.

**22/23 SEPTEMBER 2000**

**LEICESTER Amateur Radio Show** – Donington International Centre, Castle Donington, Leics. Geoff, 01455 823344, fax 01455 828273, or e-mail g4afj@argonet.co.uk

**1 OCTOBER 2000**

**BELGIUM AMATEUR RADIO & COMPUTER Rally** – Hall 'la Louvière Expo', la Louvière, access direct from motorway, 50km south of Brussels. OT 9am, TI on repeaters 145.600 and 430.325MHz, TS, FM. Michel, ON7FI, 0032 64 849 596.

**GREAT LUMLEY AR & ES Rally** – Great Lumley Community Centre, Front Street, Great Lumley, Chester-le-Street. OT 10.30am/11am, £1 (accompanied under-14s free), TI, CP free, C, B&B, JS. 0191 3842803 or 020 8937 2772.

**8 OCTOBER 2000**

**NORTH WAKEFIELD RC 17th Radio Rally** – TS, SIG, B&B,C, MT (two photos needed). http://www.nwrc.mcmail.com or 01924 824451.

**PORTLAND ARC and PORTLAND ISLAND COMPUTER CLUB Rally** – Royal Manor School, Weston, Portland, Dorset. OT 10am, £1 (accompanied children free), TS, C, TI on S22. Kerry, G1WIK, 01305 788591 or e-mail parc@the-morris-family.freeserve.co.uk

**13 -15 OCTOBER 2000**

**RSGB International HF and IOTA Convention** - Old Windsor, Berkshire. RSGB, 01707 659015.

**15 OCTOBER 2000**

**BLACKWOOD & DARS Radio, Computer & Electronics Rally** – Newport Centre, Newport, 1 mile from jn 25A M4. OT 10.30am/11am, B&B, TI, CP, TS, SIG, LB, C, DF. Stuart, 01495 243824 or 07970 777756, fax 01495 240260 or e-mail fireham@aol.com

**HORNSEA ARC Radio and Computer Rally** – Floral Hall, Hornsea. OT 10.30/11.00am, TS, RSARS, RAFARS, RSGB books, B&B, C, LB. Duncan, G3TLI, 01964 532588.

**29 OCTOBER 2000**

**GALASHIELS & DARS Annual Radio and Computer Rally** – The Volunteer Hall, St John's Street, Galashiels. TS, B&B, C. Jim, 01896 850245 or e-mail jimk@gm7lun.freeserve.co.uk

**4/5 NOVEMBER 2000**

**NORTH WALES RRC Rally 2000** – North Wales Conference Centre, Llandudno Promenade. OT 10am, £2 under-14s free, C, LB, DF, TI on S22. Muriel Mee, GW7NFY, 01745 591704 or Ted, GW0DSJ, 01745 336939. Club web page www.nwrrcw.org.uk

**5 NOVEMBER 2000**

**NORTH DEVON RADIO Rally** – Holsworthy Memorial Hall. OT 10am. B&B etc. G8XMI, QTHR, 01409 241202.

**12 NOVEMBER 2000**

**GREAT NORTHERN HAMFEST** – Metrodome Leisure Complex, Queen's Road, Barnsley, S Yorkshire. OT 10am. Ernie, G4LUE, 01226 716339 or 07787 546515 or ernest.bailey1@virgin.net

**MIDLAND ARS 12th Radio & Computer Rally** – Stockland Green Leisure Centre, Slade Road, Erdington, Birmingham. OT 10am, CP, SIG, TS. Peter, 0121 443 1189.

**19 NOVEMBER 2000**

**WEST MANCHESTER RC Red Rose Rally** – Horwich Leisure Centre, Horwich, Bolton, off jn 6 M61. OT 10.30am/11am, £1.50 (£1 OAP), C, B&B. Don, G3BSA, 01942 871620, or don@g3bsa.freeserve.co.uk

**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 Saturday! OT 10.15/10.30am, £1, C. John, G7OAI, 01706 376204 (eves).

**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. 01923 893929.

**26 NOVEMBER 2000**

**BISHOP AUCKLAND RAC Rally** – Spennymoor Leisure Centre. OT 10.30am/11am, £1, (accompanied under-14s free), TI on S22, CP, B&B, C, LB, MT (two photos needed). Mark, G0GFG, 01388 745353 or Brian, G7OCK, 01388 762678.

**21 JANUARY 2001**

**OLDHAM ARC Rally** – Geoff, 01706 846143.

**28 JANUARY 2001**

**LANCASTRIAN Rally** - G0GVA, 01772 621954.

**4 FEBRUARY 2001**

**HARWELL ARS Rally** – Ann, 01235 816379

**SOUTH ESSEX ARS 16th Mobile Rally** – Brian, G7IIO, 01268 756331 or briang7iio@yahoo.com

**11 FEBRUARY 2001**

**CAMBRIDGE & DARC Radio Rally & Car Boot Sale** – New venue. G0GKP, 01954 200072.

**18 MARCH 2001**

**NORBRECK Amateur Radio, Electronics & Computing Exhibition** – Peter, G6CGF, 0151 630 5790.

**21/22 APRIL 2001**

**LONDON Amateur Radio & Computer Show** – New venue. 01923 893929.

**7 MAY 2001**

**DARTMOOR RC Rally** – Ron, G7LLG, 01822 852586.

**13 MAY 2001**

**THREE COUNTIES RADIO AND COMPUTER Rally** – John, 01527 545823.

**20 MAY 2001**

**DRAYTON MANOR Radio & Computer Rally** - Peter, G6DRN, 0121 443 1189 (eve).

**8 JULY 2001**

**SUSSEX Amateur Radio & Computer Fair** – Ron, G8VEH, 01903 763978 or 01273 417756 office hours.

## CONGRATULATIONS

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

*50 years*

| | |
|---|---|
| G3DNH | Mr J A Spicer |
| G3KPU | Mr E Prince |
| GM3DDL | Mr J Jackson |

*60 years*

| | |
|---|---|
| G3DVV | Mr J O Brown |

## 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.

**1 Sep** GB200HP: Humber Pilots. Kingston Upon Hull, E. Yorks. TLH27 (G0VVP)

**2 Sep** GB2DDP: Denby Dale Pie. Denby Dale, W. Yorks. H27P (G4LLZ)
GB2GLM: Great Lumley Millennium. Co Durham. TLHV27 (M0BPM)

**3 Sep** GB2ATC: Air Training Corps. Washington, Tyne & Wear. LH2 (G0VRT)
GB4CM: Coldharbour Mill. Cullompton, Devon. H2 (G4XXD)
GB4MCP: Maltby Community Picnic. Maltby, Rotherham. LHV2 (G0DXB)

**5 Sep** GB2MIL: Millennium. Pembroke. TLHV27 (MW0CHI)

**8 Sep** GB2BSG: Biggleswade Scout Group. Cambs. LH2 (G0GKP)
GB4JLC: John Lowther Centre. Glendon, Northants. LH (G4MRA)
GB60BOB: Battle of Britain. South Carlton, Lincolnshire. LHV27P (G0DAM)

**9 Sep** GB2SEC: St. Elizabeth's Church. Eastbourne, E.Sussex. L2 (G4YJW)
GB2SMG: Shefford Millennium Green. Shefford, Beds. TLH27P (G4LOO)
GB2WMF: Winscombe Michaelmas Fair. Winscombe, N. Somerset. LH2 (G3YOL)

**10 Sep** GB0RID: Wartime Call sign. Great Yeldham, Essex. L (G3MMA)
GB2CCC: Christ Church Cathedral. Oxford. LH27 (G3NGX)
GB2VF: Victorian Fayre. Old Harlow, Essex. LH2 (G4YBN)
GB4TRG: Telford Rally Group. Shifnal, Shropshire. 27 (M0BAV)

**16 Sep** GB0BSR: Bedfordshire Steam Rally. Bedfordshire. TLHV27P (M0AZZ)
GB0CSR: Cardiff Sponsored Radio. Cardiff. TL27 (MW0CCK)
GB0ROC: Royal Observer Corps. Lincoln. TLH27 (M0CES)
GB2HEN: Henham Steam Rally. Suffolk. TLH2 (G3IWC)
GB2NAM: North East Air Museum. Sunderland, Tyne & Wear. LH27P (G0GFG)
GB5WB: Wireless for the Blind. Wychenford, Nr Worc. LH2 (M0BPT)
GB60MAN: Manston. Ramsgate, Kent. (G0CTQ)

**18 Sep** GB8UKC: University of Kent Canterbury. Canterbury, Kent. 27 (M1ECA)

**20 Sep** GB60BOB: Battle of Britain. Donington Park, Derbyshire. LHV27P (G0DAM)

**21 Sep** GB0NDC: Newhall Day Centre. Newhall, Derbyshire. LH (G0KUN)

**22 Sep** GB4JLC: John Lowther Centre. Kettering, Northants. LH (G4MRA)

**24 Sep** GB5MC: Morse Campaign. Cambridge. L (G3PJT)

**30 Sep** GB0SM: St. Mary's. Isles of Scilly. TLHV (G0PSE)
GB4GDS: Guide Dogs. Larkhall, Lanarkshire. LH2 (GM4DAE)

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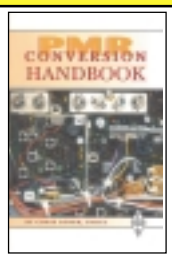


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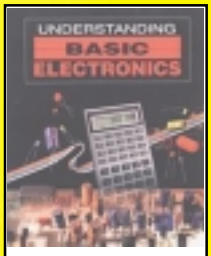


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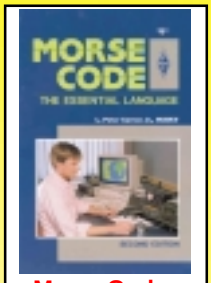


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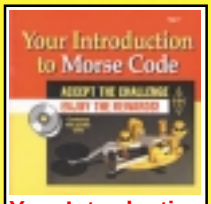


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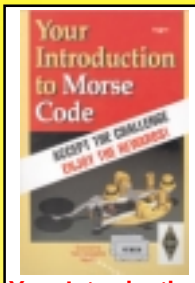


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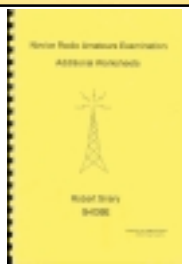

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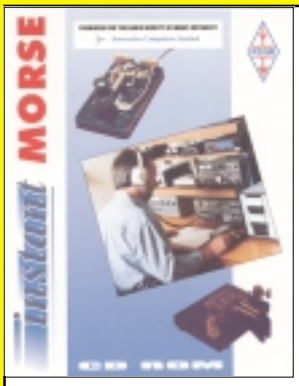


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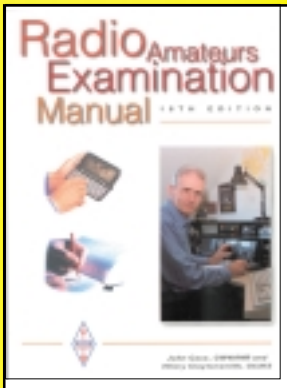


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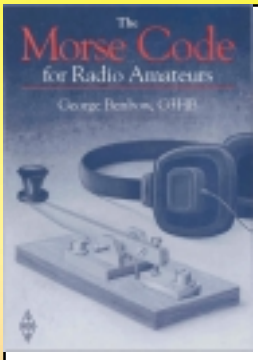


## The Morse Code for Radio Amateurs

This book originally written by Margaret Mills, G3ACC, has been expanded by George Benbow, G3HB, and includes good advice on learning and reading the Morse code. Those preparing for either the UK Novice Amateur Morse Test (5WPM) or the Amateur Morse Test (12WPM) will find this book invaluable.

184 x 244mm 28 - pages

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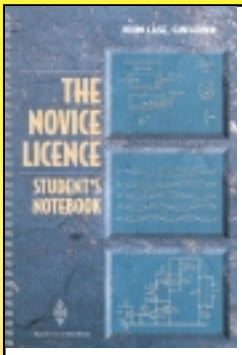


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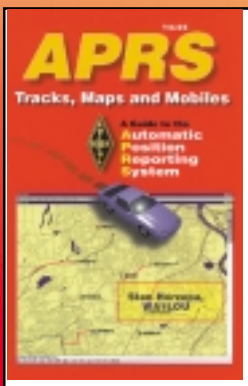


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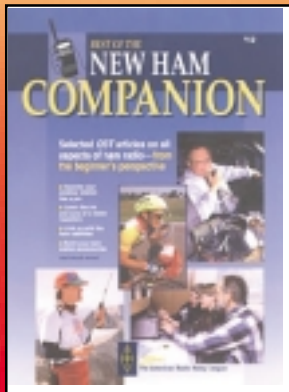


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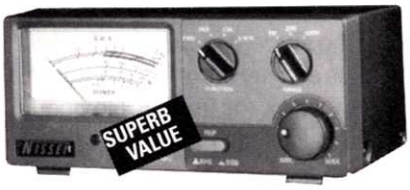


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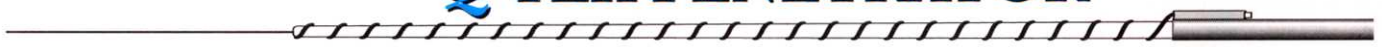

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# CONTEST

**TIM KIRBY, G4VXE**
*11a Vansittart Road, Windsor SL4 5BZ*
*E-mail: tim@ukgateway.net*

I WAS DELIGHTED to hear from Ross Wilkinson, G0WJR, about the Severnside TV Group's entry into an International TV contest. ATV contesting is not something that I had really thought about, but the effort involved in putting on a top class station, as in any field of contesting, is significant. On 432MHz, for example, G7ATV/P can run 400W into 4x21-element yagis, at 1296MHz about 70W into 4x48-element loop yagis, together with good systems on 13cm and 3cm.

Of course, compared with regular phone or CW contesting, the distances covered are somewhat reduced, but you have to bear in mind how much signal you need for a good picture! I was impressed with the best DX on 3cm being 65km, whereas the best distance on 432MHz was only 111km!

ATV contesting appears to rely on some very dedicated individuals who appear to make a fairly major effort to contact a comparatively small number of stations. When you put that amount of effort in, though, the rewards are great. Thanks to Ross for the information, and I hope we shall be able to include more on the subject of ATV contests in the future.

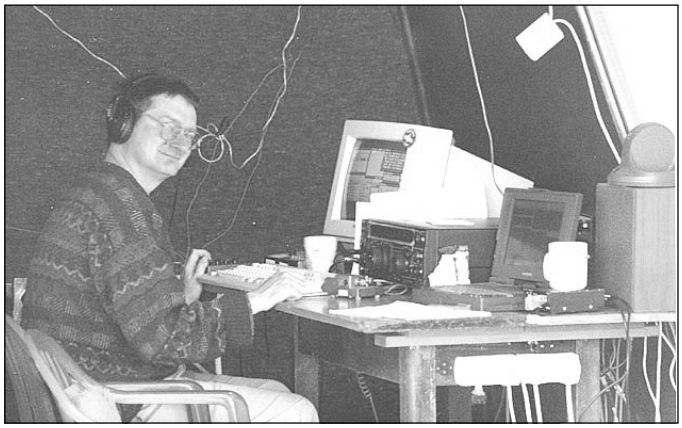
## WORLD RADIO TEAM CHAMPIONSHIP

IT'S QUITE UNUSUAL, in the amateur radio contesting world, to be able to write about the results of a contest less than a week after the contest has taken place! The World Radio Team Championship was held in Bled, Slovenia in July. Winners once again, retaining their world title crown were K1TO and N5TJ who made a tremendous score. As well as excelling in the on-air event, they made an absolutely devastating entry in the pileup tape competition, scoring a maximum 100 possible points. Team UK - Roger, G3SXW, and Dave, G4BUO, finished a very creditable 24th out of 53 teams – although those people who looked closely at the results will have noticed that they made the second highest number of CW QSOs in the competition!

By all accounts a good time was had by all, and we look forward to seeing a more detailed article about the competition in due course [next month! - *Ed*]. Incidentally, if you were active during the WRTC event and worked more than 160 band/QSOs with the special S5 stations, you may qualify for a special T-shirt. Have a look at the WRTC 2000 website at http://wrtc2000.bit.si for more information.

## THE POSTBAG

PETRA, G4KGC, WROTE with an interesting observation, having had some difficulty finding the rules for VHF NFD. She had very reasonably started off at the RSGB website, (http://www.rsgb.rog.uk). Unfortunately, this was not successful because all the VHF, and indeed HF rules and results are held on websites which are entirely separate to the main RSGB site. Of course, without special configuration of the search engine on the RSGB site, a search for contest rules will yield nothing. This is indeed unfortunate, and perhaps something that will need addressing. In the meantime, remember to look at the RSGB VHFCC and HFCC sites for these details. If you need a paper copy of the rules, remember that your October *RadCom* will contain a full listing of RSGB contests and their rules. You'll also notice that the Contest Calendar in *RadCom* now includes the URLs of the two sites where RSGB Contest rules can be found.



**Do not disturb: your columnist, G4VXE, operating G3GRS/P in CW NFD 2000.**

Quite a lot of correspondence, too, about the issue of QSLing in contests. Pleasingly, from my point of view, a good number of people felt it was very wasteful to QSL each and every contact in a contest. Eddi, DK3UZ, said though, that if he was casually tuning around in a contest then the only reason he might call someone is to get a QSL! So if he has to wait for his card to get to the station and then be returned, then the time is doubled. As usual, there is no magic solution. The key, as I said before, is to make sure that everyone who wants confirmation can get it in as efficient a method as possible.

Richard, G4ERP from the Cheltenham group felt that there was less activity on VHF Field Day this year, something which seemed to be the case to me as well. Richard says: "Where were all the Gs? I really think the new rules are to blame. All bands were well down on last year. I can't remember the last time we worked so few in a 2m contest. Maybe 1978 or thereabouts? 70 and 23cm were really hard going. I assume 6m got the attention. Please can we have the old rules back? There really aren't enough stations about to dilute them by adding another band. This, plus the reduction in power to 100W, seems to have taken its toll." What do other people think? The VHF Contests Committee is to be commended for experimenting with the rules to find a formula to keep things interesting. I know that they will appreciate feedback, either positive or negative. You can e-mail the VHFCC chairman at vhfcc.chairman@rsgb.org.uk – oh, and remember to keep it constructive!

## 432MHz Affiliated Societies Contest, 2000

THERE WERE similar numbers of entrants compared with the 1999 event. Although it was generally agreed that conditions were slightly above average, many entrants reported limited

## CONTEST CALENDAR

### HF Contests

| Date | Time | Mode | Contest |
|---|---|---|---|
| *2-3 Sept* | *0000-2359* | *SSB* | *All Asia SSB* |
| 2-3 Sept | 1300-1300 | SSB | RSGB SSB Field Day |
| 5 Sept | 1900-2030 | CW | RSGB Slow Speed Cumulative #2 |
| *9/10 Sept* | *0000-2359* | *SSB* | *WAE DX SSB* |
| 13 Sept | 1900-2030 | CW | RSGB Slow Speed Cumulative #3 |
| *16/17 Sept* | *1200-1200* | *CW* | *Scandinavian Activity Contest CW* |
| 21 Sept | 1900-2030 | CW | RSGB Slow Speed Cumulative #4 |
| *23/24 Sept* | *0000-2359* | *RTTY* | *CQ WW DX RTTY* |
| *23/24 Sept* | *1200-1200* | *SSB* | *Scandinavian Activity Contest SSB* |
| 29 Sept | 1900-2030 | CW | RSGB Slow Speed Cumulative #5 |

### VHF Contests

| Date | Time | Mode | Contest |
|---|---|---|---|
| 2-3 Sept | 1400-1400 | SSB/CW | RSGB 144MHz Trophy |
| 3 Sept | 1100-1500 | SSB/CW | RSGB 144MHz Backpackers #5 |
| 10 Sept | 1800-2200 | SSB/CW | RSGB 1.3/2.3 GHz |
| 10 Sept | 0900-2100 | All | RSGB 24/47GHz |
| 13 Sept | 1900-2130 | SSB/CW | RSGB 144MHz Cumulative #3 |
| 17 Sept | 0900-2100 | All | RSGB 10GHz Cumulative #5 |
| 24 Sept | 0900-1300 | SSB/CW | RSGB 70MHz #2 |
| 28 Sept | 1900-2130 | SSB/CW | RSGB 144MHz Cumulative #4 |

**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**

**Neat and tidy: G4ERP/P during VHF NFD 2000, with Ian, G4PDS, operating on 144MHz.**

activity north of the Midlands. Notably, apart from four contacts logged with GD4IOM, GI6ATZ, MM1ATY (IO85) and MM1CXE (IO86), no other stations were recorded in IO74, 75, 76, 84, 85, 86, 93, 94, 95 and only four stations were worked in IO83. There is an opportunity for affiliated societies in Zone A to enter next year's contest, get some certificates for the club, and increase activity from the North. The same applies to Zones E, F and G.

G0VFW reported that he had to go out and check that he still had an antenna when he did not hear any stations for 45 minutes. Despite this apparent gloom, there was some very good DX about, such as the best DX of G8OHM at 710km, and 11 entrants logged stations at a distance of 400km plus, with another eight making contacts at 300km plus.

First place in the Single Operator section was fought out between two amateurs who have previously been chairman of the RSGB VHF contest committee, namely John Quarmby, G3XDY, and Bryn Llewellyn, G4DEZ. John had a magnificent winning margin, scoring more than twice the number of points of his rival. John's entry was also the Martlesham Radio Society winning AFS entry.

**432MHz Affiliated Societies, 2000**

**Single Operator Fixed Station Section**

| Pos | Callsign | Zone | Points | QSO | Locator | Ant | Pwr | Best DX | km |
|---|---|---|---|---|---|---|---|---|---|
| 1 * | G3XDY | C | 19924 | 89 | 02OB | 28el | 250 | DG8UAW | 615 |
| 2 * | G4DEZ | C | 9245 | 56 | 01IN | 2x21 | 400 | DL8OBU | 639 |
| 3 | G3MEH | D | 9241 | 66 | 91QS | 4x21 | 160 | DF0WD | 624 |
| 4 | G0GCI | C | 8577 | 50 | 01ED | 2x21 | 100 | DL8OBU | 673 |
| 5 * | PE1EWR | | 7838 | 32 | 11SL | 2x21el | 13 | GW8ASA/P | 484 |
| 6 * | G4APJ | A | 4651 | 21 | 83UP | 19el | 25 | G4CQR/P | 366 |
| 7 | G8DKK | C | 4519 | 40 | 91VX | 21el | 80 | DC9KU | 458 |
| 8 | G0ODQ | D | 4273 | 41 | 91NQ | 21el | 90 | PA0WWM | 370 |
| 9 | G6FQZ | D | 4185 | 41 | 91JR | 21el | 100 | PE1EWR | 329 |
| 10 | G3YSX | C | 3418 | 45 | 91WF | 21el | 100 | G4APJ | 306 |
| 11 | G7ULL | C | 3152 | 47 | 01AK | 16el | 50 | DK5WO | 416 |
| 12 | M1ECY | C | 2926 | 36 | 91VV | 18el | 50 | DC9KU | 456 |
| 13 | G0VFW | D | 2841 | 38 | 91RR | 21el | 35 | PE1EWR | 284 |
| 14 | G8JXV | C | 2688 | 40 | 91WE | 48el | 120 | G4APJ | 310 |
| 15 | G4GFI | C | 2652 | 35 | 91VH | 19el | 30 | ON4PSP | 362 |
| 16 * | 2E1GUA | C | 1820 | 26 | 01FS | 21el | 10 | GW8ASA/P | 271 |
| 17 | G4ETG | B | 1791 | 24 | 92UC | 13el | 35 | G8OHM | 184 |
| 18 | G1OGY | C | 1736 | 21 | 01GR | 21el | 75 | G4APJ | 289 |
| 19 | G7PLL | C | 1330 | 19 | 01IW | 19el | 50 | G8OHM | 189 |
| 20 | G3FIJ | C | 1270 | 16 | 01KV | 21el | 10 | GW8ASA/P | 301 |
| 21 | G6GSF | C | 900 | 16 | 91XC | 11el | 25 | G8OHM | 195 |
| 22 | M1DDA | C | 868 | 19 | 91VV | 19el | 50 | GW8ASA/P | 227 |
| 23 | G3PIA | D | 737 | 10 | 91IN | 21el | 25 | GW8ASA/P | 149 |
| 24 | G7MHK | C | 731 | 20 | 01JP | 3x5/8 | 50 | G3OLX | 79 |
| 25 | G0EYO | B | 403 | 13 | 92BJ | | | G4CQR | 235 |
| 26 | G0TIB | B | 397 | 11 | 82XJ | 23el | 40 | G0ODQ | 112 |
| 27 | M0COP | B | 351 | 8 | 92BK | 17el | 10 | G3MEH | 113 |
| 28 | G7LTH | B | 346 | 9 | 82XJ | 23el | 40 | G0ODQ | 112 |

**Single Operator Other Section**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1 * | G4CQR/P | - | 15400 | 76 | 00CR | 30el | 120 | DL0BU | 699 |
| 2 * | M1CRO/P | - | 7641 | 49 | 01IT | 21el | 50 | DF0WD | 532 |
| 3 | G0WJR/P | - | 1815 | 10 | 83RO | 10el | 10 | G3XDY | 305 |

**Multi Operator Fixed Station Section**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1 * | G8OHM | B | 13789 | 73 | 02AJ | 4x19 | 400 | DF2VJ | 710 |
| 2 * | G1WAC | B | 3499 | 30 | 92BJ | 21el | 70 | F4AOA | 405 |

* Certificate winner

**Affiliated Societies Section**

| Pos | AFS | Zone | Team | | | | | | Total |
|---|---|---|---|---|---|---|---|---|---|
| 1 * | Martlesham RS | C | G3XDY | 19924 | | | | | 19924 |
| 2 * | Chesham DARS | D | G3MEH | 9241 | G0ODQ | 4273 | G0VFW | 2841 | 16355 |
| 3 * | South Birmingham RS | B | G8OHM | 13789 | G0TIB | 397 | G7LTH | 346 | 14532 |
| 4 | Stevenage DARS 'A' | C | G8DKK | 4519 | M1ECY | 2926 | G4ETG | 1791 | 9236 |
| 5 | West Kent ARS | C | G0GCI | 8577 | | | | | 8577 |
| 6 | Reigate ATS | C | G3YSX | 3418 | G8JXV | 2688 | G6GSF | 900 | 7006 |
| 7 | Colchester RA 'A' | C | 2E1GUA | 1820 | G1OGY | 1736 | G7PLL | 1330 | 4886 |
| 8 | Wythall RC | B | G1WAC | 3499 | G0EYO | 403 | M0COP | 351 | 4253 |
| 9 | Clifton ARS | C | G7ULL | 3152 | | | | | 3152 |
| 10 | Colchester RA 'B' | C | G3FIJ | 1270 | G7MHK | 731 | | | 2001 |
| 11 | Stevenage DARS 'B' | C | M1DDA | 868 | | | | | 868 |
| 12 | Harwell ARS | D | G3PIA | 737 | | | | | 737 |

* certificate winner

The South Birmingham Radio Society station, G8OHM, repeated last year's win in the Multi-Operator section. Together with the rest of their team, they took third place in the Affiliated Societies Contest behind runner up, the Chesham and District ARS team of Roger Piper, G3MEH, John Hall, G0ODQ, and T Thirwell, G0VFW. Ken Punshon, G4APJ, reported that domestic QRM took out the middle of the session, but it still did not prevent him winning the certificate as leading station operating using 25 watts or less to a single antenna. Congratulations to all certificate winners who include 2E1GUA, leading Novice, and PE1EWR, leading overseas station.

***Ian Cornes, G4OUT***

## First 1.8MHz CW Contest, 2000

REGRETFULLY, there were fewer entrants generally for the first of this year's two RSGB Top Band contests, although most of the very familiar, and regular, UK and overseas operators sent in reports. The general standard of operating and reporting was excellent and, in this particular event, no penalty errors whatsoever were detected.

Congratulations to the UK's winner for the second year, Chris Burbanks, G3SJJ, who also wins the Somerset Trophy. Second place goes to Terry Robinson, G3WUX, and third place to John Walker, G0JQN.

The Overseas winners were: First place - Virgis Matuzevicius, LY3BS, of Panevezys, Lithuania; second place - Vaclav Jilek, OK1DCS, of Kremze, Czech Republic; third place - Bertin Butz, DK0IW, of Penzberg, Germany. Our congratulations and thanks to all overseas winners and entrants.

Let's hope that radio conditions will allow the maximum general participation for the 2nd RSGB Top Band Contest, in December this year.

***Derek Stanners, G3HEJ***

[We'd like to take this opportunity to wish Derek, G3HEJ, a speedy recovery from some health problems he has had recently, and to thank him for his dedication to the task in getting these results out whilst he was feeling under the weather. Thanks, Derek! ***G4VXE***]

**1st 1.8MHz, 2000**

**UK Section**

| Pos | Callsign | Pts |
|---|---|---|
| 1 * † | G3SJJ | 943 |
| 2 * | G3WUX | 789 |
| 3 * | G0JQN | 675 |
| 4 | G3VYI | 661 |
| 5 | G4TSH | 640 |
| 6 | G6RC | 639 |
| 7 | G3HZL | 620 |
| 8 | G4CZB | 619 |
| 9 | G4OGB | 608 |
| 10 | G3THE | 591 |
| 11 | G3SXW | 580 |
| 12 | G2HLU | 557 |
| 13 | G3YAJ | 552 |
| 14 | G3IZD | 540 |
| 15 | GM3AFF | 494 |
| 16 | G3ZGC | 460 |
| 17 | G3KLH | 426 |
| 17 | GW3NJW | 426 |
| 19 | G3AWR | 402 |
| 20 | GØVQR | 389 |
| 21 | G3GMS | 346 |
| 22 | G3GMM | 323 |
| 23 | G0IGP | 273 |
| 24 | GM3UM | 272 |
| 25 | GW0KZW | 205 |
| 26 | G0MTN | 191 |
| 27 | G0MRH | 164 |
| 27 | G3LIK | 164 |

**Overseas Section**

| | | |
|---|---|---|
| 1 * | LY3BS | 354 |
| 2 * | OK1DCS | 281 |
| 3 * | DK0IW | 276 |
| 4 | LY2OU | 220 |
| 5 | OK1FCJ | 215 |
| 6 | RW4PL | 210 |
| 7 | HA7PL | 205 |
| 8 | DL4JYT | 199 |
| 9 | UU4JMG | 194 |
| 10 | DJ3XK | 161 |
| 11 | DL4KUG | 150 |
| 12 | SP3VT | 134 |
| 13 | OM3CDN | 96 |
| 14 | YL2NK | 70 |
| 15 | LZ3AB | 24 |
| 15 | RA9CTK | 24 |
| 15 | UA1ANA | 24 |

† Somerset Trophy winner
* Certificate winner

## HF Championship, 1999

ALL OF THE CALLSIGNS appear in at least two of the appropriate contests, in accordance with the HF Championship rules, and are believed to be the callsigns of individual operators.

***Bob Razey, G0ADH***

## HF Championship, 1999

| Pos | Callsign | 2nd 1.8 | 21/28 SSB | 21/28 CW | IOTA | Com-wlth | RoPo-Co 2 | RoPo-Co 1 | Cumu-lative | 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 | G4OGB | 608 | | | 153 | 771 | 891 | 766 | 1502 | | 581 | 5272 |
| 5 | G3VYI | 695 | | 148 | | 936 | 834 | 790 | 507 | 567 | 669 | 5146 |
| 6 | G3GLL | | | | | 1696 | 805 | 852 | 1690 | 0 | | 5043 |
| 7 | G4RCG | 724 | | | | | 865 | 794 | 1970 | 531 | | 4884 |
| 8 | G4IIY | 513 | | 550 | | 1530 | | 727 | 1442 | | | 4762 |
| 9 | GW3NJW | 438 | | 475 | 65 | 1086 | | 802 | 1244 | 134 | 465 | 4709 |
| 10 | G4BUO | | | | 497 | 3000 | 586 | 600 | | | | 4683 |
| 11 | G3HZL | 440 | | | 6 | 607 | 913 | 552 | 1330 | | 609 | 4457 |
| 12 | G0JQN | 613 | | | 101 | | 965 | 741 | 1372 | | 644 | 4436 |
| 13 | G3HLU | 560 | | 119 | 39 | 1392 | 787 | 779 | | 156 | 517 | 4249 |
| 14 | G3LIK | 311 | | 212 | | 1301 | | 771 | 1228 | | 193 | 4016 |
| 15 | G3IZD | 421 | | | | | 403 | 744 | 1498 | | 586 | 3652 |
| 16 | G3TBK | | | 1481 | | 2122 | | | | | | 3603 |
| 17 | G3LHJ | | | 553 | 188 | 1295 | 810 | 744 | | | | 3590 |
| 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 | GW3SB | | | | | 697 | 650 | 598 | 1020 | | | 2965 |
| 24 | G0IGP | | | 50 | 26 | 363 | 713 | 533 | 1057 | | 213 | 2955 |
| 25 | G4CXT | 668 | | | | | | | 1495 | 253 | 520 | 2936 |
| 26 | G3PJT | | | | 262 | 2653 | | | | | | 2915 |
| 27 | G3SJJ | 904 | | | | | | | 1972 | | | 2876 |
| 28 | G3ZGC | 449 | | | | 520 | | | 1393 | | 463 | 2825 |
| 29 | G4CZB | 600 | 31 | 170 | | 1408 | | | | | 562 | 2771 |
| 30 | G3GMM | 340 | | 63 | 10 | 467 | 594 | 451 | 799 | | | 2724 |
| 31 | G0VQR | 392 | | 25 | | 117 | 718 | | 812 | | 529 | 2593 |
| 32 | G2QT | | 94 | 890 | | 1599 | | | | | | 2583 |
| 33 | G3JSR | | | | | | 718 | 610 | 1179 | | | 2507 |
| 34 | G0ADH | | | | | | | 677 | 1261 | 140 | 427 | 2505 |
| 35 | G4EBK | 500 | | | | 292 | | 654 | 590 | | 465 | 2501 |
| 36 | G3LZQ | | | | | 917 | | | 1576 | | | 2493 |
| 37 | G3VJP | | | | | | | | 1518 | 324 | 598 | 2440 |
| 38 | G3GMS | 341 | | 39 | 59 | 539 | | | 947 | | 380 | 2305 |
| 39 | G3GC | | | | | 820 | 698 | 681 | | | | 2199 |
| 40 | G3YEC | 535 | | | | | | | 1076 | | 551 | 2162 |
| 41 | G0VFV | 443 | | | | | 474 | | 834 | | 381 | 2132 |
| 42 | GW3WWN | | | 168 | | 304 | 879 | 775 | | | | 2126 |
| 43 | G3HEJ | | | | | 525 | 896 | 698 | | | | 2119 |
| 44 | G3TJE | | | | 77 | 670 | | 744 | 597 | | | 2088 |
| 45 | GM3CFS | 610 | | 182 | 134 | 1008 | | | | 142 | | 2076 |
| 46 | G3KNU | | | | | | | | | | | |
| 47 | GW3KDB | | | | | | | | | | | |
| 48 | M0AJT | 429 | | | | | | | | | | |
| 49 | G0MTN | | | | | | | | | | | |
| 50 | G3UFY | 365 | | | | | | | | | | |
| 51 | G5MY | | | | | | | | | | | |
| 52 | G3KLH | | | | | | | | | | | |
| 53 | G3VQO | 170 | | | | | | | | | | |
| 54 | G4XPE | | | | | | | | | | | |
| 55 | G3YAJ | | | | | | | | | | | |
| 56 | G4EDG | | | | | | | | | | | |
| 57 | G3AWR | | | | | | | | | | | |
| 58 | GM4SID | | | | | | | | | | | |
| 59 | G4PTE | | | | | | | | | | | |
| 60 | G3ZDD | | | | | | | | | | | |
| 61 | G3JJZ | | | | | | | | | | | |
| 62 | G4BLI | | | | | | | | | | | |
| 63 | G3JKY | | | | | | | | | | | |
| 64 | G4TSH | | | | | | | | | | | |
| 65 | GM3UM | | | | | | | | | | | |
| 66 | G3ZRJ | | | | | | | | | | | |
| 67 | G3WUX | | | | | | | | | | | |
| 68 | G3KKQ | | | | | | | | | | | |
| 69 | G4AMT | | | | | | | | | | | |
| 70 | G4KTI | | | | | | | | | | | |
| 71 | G3TXF | | | | | | | | | | | |
| 72 | G3MA | | | | | | | | | | | |
| 73 | G3HKO | | | | | | | | | | | |
| 74 | GW0KZW | | | | | | | | | | | |
| 75 | G0LII | | | | | | | | | | | |
| 76 | G0DHZ | | | | | | | | | | | |
| 77 | G4OOS | | | | | | | | | | | |
| 78 | GW4BLE | | | | | | | | | | | |
| 79 | G3THE | | | | | | | | | | | |
| 80 | G3MPB | | | | | | | | | | | |
| 81 | G3CWI | | | | | | | | | | | |
| 82 | G3BPM | | | | | | | | | | | |
| 83 | G6QQ | | | | | | | | | | | |
| 84 | G0TSM | | | | | | | | | | | |
| 85 | G4ZYF | | | | | | | | | | | |
| 86 | G0DEZ | | | | | | | | | | | |
| 87 | G4DDL | | | | | | | | | | | |
| 88 | MM0BQI | | | | | | | | | | | |
| 89 | M0BAO | | | | | | | | | | | |

| Pos | Callsign | 2nd 1.8 | 21/28 SSB | 21/28 CW | IOTA | Com-wlth | RoPo-Co 2 | RoPo-Co 1 | Cumu-lative | 7MHz DX | 1st 1.8 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 46 | G3KNU | | | | | | | | 1490 | | 572 | 2062 |
| 47 | GW3KDB | | | | 108 | | | | 1948 | | | 2056 |
| 48 | M0AJT | 429 | | | | 856 | | | 728 | | | 2013 |
| 49 | G0MTN | | | 126 | | | 881 | | 850 | | 132 | 1989 |
| 50 | G3UFY | 365 | | 972 | | 217 | | | | 193 | 198 | 1945 |
| 51 | G5MY | | | | 50 | 826 | 567 | 431 | | | | 1874 |
| 52 | G3KLH | | | | | | | | 1141 | | 722 | 1863 |
| 53 | G3VQO | 170 | | | 11 | 510 | 568 | 577 | | | | 1836 |
| 54 | G4XPE | | 3 | 9 | 4 | | 758 | 654 | 353 | | | 1781 |
| 55 | G3YAJ | | | | | | | | 1306 | | 464 | 1770 |
| 56 | G4EDG | | | | | | 844 | 905 | | | | 1749 |
| 57 | G3AWR | 349 | | | | | | | 987 | | 393 | 1729 |
| 58 | GM4SID | 561 | | 210 | 201 | | | 739 | | | | 1711 |
| 59 | G4PTE | | | | | | 603 | 395 | 682 | | | 1680 |
| 60 | G3ZDD | 344 | | | | 625 | | | 373 | | 322 | 1664 |
| 61 | G3JJZ | | | | | | 896 | 735 | | | | 1631 |
| 62 | G4BLI | | | | | | 603 | 748 | 254 | | | 1605 |
| 63 | G3JKY | | | | | 952 | | 591 | | | | 1543 |
| 64 | G4TSH | 559 | | | | 971 | | | | | | 1530 |
| 65 | GM3UM | | | | | | | 360 | 804 | | 354 | 1518 |
| 66 | G3ZRJ | | | | | | 874 | 631 | | | | 1505 |
| 67 | G3WUX | | | | | | | 806 | | | 660 | 1466 |
| 68 | G3KKQ | 572 | | | 22 | | 810 | | | | | 1404 |
| 69 | G4AMT | | | | | 920 | | | | 482 | | 1402 |
| 70 | G4KTI | | | | | | 403 | 470 | 518 | | | 1391 |
| 71 | G3TXF | | | | 145 | | | 739 | | | 492 | 1376 |
| 72 | G3MA | | | | | | 722 | 602 | | | | 1324 |
| 73 | G3HKO | | | | | 586 | 718 | | | | | 1304 |
| 74 | GW0KZW | | | | | | 486 | | 801 | | | 1287 |
| 75 | G0LII | 604 | | | | | | | | 529 | | 1133 |
| 76 | G0DHZ | | | | | | 586 | 533 | | | | 1119 |
| 77 | G4OOS | | | | | | 568 | 533 | | | | 1101 |
| 78 | GW4BLE | | 1046 | | 18 | | | | | | | 1064 |
| 79 | G3THE | 531 | | | | | | | | | 441 | 972 |
| 80 | G3MPB | | | 73 | | 877 | | | | | | 950 |
| 81 | G3CWI | | | 626 | | | | | | 267 | | 893 |
| 82 | G3BPM | | | | | 615 | | | | 134 | | 749 |
| 83 | G6QQ | | 4 | 62 | 15 | 628 | | | | | | 709 |
| 84 | G0TSM | | 409 | 188 | | | | | | | | 597 |
| 85 | G4ZYF | | | | | 233 | | | 267 | | | 500 |
| 86 | G0DEZ | | | | 140 | | | | | 214 | | 354 |
| 87 | G4DDL | | 68 | 74 | | | | | | | | 142 |
| 88 | MM0BQI | | 100 | 10 | | | | | | | | 110 |
| 89 | M0BAO | | 47 | | 20 | | | | | | | 67 |




SEE OUR NEW
BUSINESS CARD SECTION
ON PAGE 72

# HF

**DON FIELD, G3XTT**
*105 Shiplake Bottom, Peppard Common, Henley on Thames, RG9 5HJ.*
*e-mail: hf.radcom@rsgb.org.uk*

NO DOUBT IT will also be reported elsewhere, but HF DXers will be sorry to hear of the death of Louis Varney, G5RV, best known for his invention of the ubiquitous G5RV multiband antenna. Louis remained active on HF until very recently, not only from the UK but also as CX5RV from Uruguay where he spent much of his time.

## DX NEWS

KEN, G3OCA, AND Les, G4CWD, will be active (HF bands, WARC included, mainly SSB with some CW) as TR0A/P from Mandji Island in the Ogooue-Maritime Province IOTA group (IOTA-new) between 22-26 September.

Riccardo, IK0YUJ, will be active as IA5/IK0YUJ from Giglio Island (EU-028, IIA GR-002) between 3-13 September. He will operate mainly on CW (6-40m) with some PSK and SSB. QSL via IK0YUJ.

Bob Henderson, G3ZEM, will mount a CW operation from Tristan da Cunha as ZD9ZM during September. Tristan is listed 29th in the *DX Magazine* 1999 'most-wanted' list. Bob and his XYL Karen will fly to Capetown at the end of August, where they will join the Antarctic survey vessel *SA Agulhas* for their onward journey to Tristan da Cunha. The *SA Agulhas* is scheduled to sail on 31 August, arriving at Tristan on 4 September. Operation is intended over a 20-day period with departure for Capetown scheduled for 25 September. During their stay on Tristan, Bob and Karen will be guests of Andy and Lorraine Repetto (ZD9BV and ZD9CO), who between them have kindly provided every assistance in the planning of this trip. The operation will be all bands 160-10m. Yagis will be used on all bands 20-10m, with verticals on the lower bands. Bob may try some RTTY operation. The trip is not a 100% DXpedition, though high levels of activity are promised. QSL to K4CIA. Bureau cards can be requested by e-mail to k4cia@mindspring.com There is a web site with further information at www.dxtechnology.com/zd9zm

**All smiles: Roger, G3SXW, and Nigel, G3TXF, operating earlier this year from the Wallis and Futuna Islands.**

Ken, AD6KA, was due to arrive on Madagascar in late August, and to be there for a month. At the time of writing he had not been assigned a callsign, but he expects to be active on 10, 15 and 20m SSB with some PSK31, CW and RTTY. A TS-940 will be his primary rig, but a TS-430 will also go on the trip. For an amplifier he'll use an AL80A, and a Cushcraft R-7000 vertical as his antenna. If space is available he'll put up some antennas for the low bands. Most of the operation will take place from Antananarivo, the capital, but he hopes to go to Nosy Be Island (AF-057). A web site has been created and can be found at www.qsl.net/ad6ka

The French Clipperton DX Club will operate from Bhutan around 1-15 September. The team members include Alain, F6ANA; Denise (YL), F6HWU; Alain, F5LMJ; Vincent, F5MBO/G0LMX; and Gerard, F2VX. They will be active on CW and SSB. They will use the A52A antennas and coax that were left set up on the Pinewood Hotel roof, and will bring along a TS-50, IC-706, and FT-757, but no amplifiers. The callsign is as yet unknown. QSL via F8RZ.

Ross, 4W6UN, has invited a DXer (not identified so far) to operate from his station in September for a couple of weeks.

DK1BT and DJ7AA will be in Panama at the QTH of Gunter, HP1XVH, during September, primarily to operate the CQ WW RTTY Contest (23/24 September). However, they also hope to do some low band (80 and 160m) operation.

The International Amateur Radio Union Region III conference will be held in Darwin, Australia, between 28 August and 1 September. A special event station, AX8IARU will operate, all bands and modes, from the conference venue, with a special QSL card being available. Also from Australia, the special call AX2GAMES will be used between 1 September and 1 November, in conjunction with the Sydney Olympics.

Dan, VK8AN; Len, VK8DK; Wally, VK6YS; and Terry, VK8TM, will be active from a couple of new IOTA locations in early September. They plan to operate (callsign TBA) from Browse Island (OC-new) in the Western Australia Outliers from 1-5 September, signing VK6BM, and then from Cassini Island in the Bonaparte Archipelago (Western Australia State North Coast Centre group), (OC-new) from 7-11 September, signing VK6CJ. QSL via VK4AAR.

Seiji, JH6RTO (also M0RAA and AH0R), will be in Bermuda from 21-26 September and hopes to sign M0RAA/VP9. QSL via JH6VLF.

A group of Spanish operators will be in El Salvador in mid September to install a communications network. The group will be active as HU4U from 17-25 September on all bands, CW, SSB and RTTY. Operators include EA1QF, EB1ADG, EA3CUU, EA4BT, EA5RM, EA5XX and EA8NN. QSL via EA4URE.

Finally, a note that this year's Clipperton DX Convention will be held on 30 September and 1 October in Andorra. If you are a French speaker, this event is always great fun, with pleasant company.

## LOGGING PROGRAM FOR DXPEDITIONS

SDX V9.62 IS a comprehensive logger intended for the majority of DXpedition and special event operations, with a typical capacity of at least 10,000 QSOs. It supports SSB and CW operation on all 9 HF bands and offers real-time prefix checking, dupe checking and beam headings. SDX is freeware and unrestricted, and may be downloaded from http://www.ei5di.com/sd/sdx.zip (192kB). For further information you can contact Paul, EI5DI, at paul@ei5di.com


**An idyllic setting: the antenna used by Roger and NIgel on the Wallis and Futuna Islands.**

## AWARDS

THE OK DXC Awards Programme consists of a series of awards, all available for contacts made since 1 January 1993. Awards are based on working QTH locator squares, a concept which will be especially familiar to anyone who has come to HF from the VHF bands. The 6x6 Award is for 36 contacts, with 6 locator fields (eg JN, KN, PM) in each of the six major continents (EU, AS, AF, NA, SA, OC). The 100 DX WWL Award is for 100 contacts with 100 fields anywhere in the world. The WWL Squares Award is for 500 contacts with different squares (eg JN89, KN54, PM34), with a minimum of 150 in EU, 100 in AS, 50 in AF, 150 in NA, and 50 in SA and OC. There are also awards for 6 and 2m and for satellite. In each case, send a GCR (certified) list to the Award Manager, Radek Zouhar, OK2ON, Malenovice 808, 763 02 ZLÍN, Czech Republic with the fee (per award) of $10 or 8 IRCs. The application must ordered alphabetically by locator square, with the usual log information. Maritime and aeronautical contacts do not count. Contacts can be made on any of the nine HF bands and any mode. SWL awards are available, with the same conditions.

### QTH Corner

| | |
|---|---|
| BI4L | BY4RSA, PO Box 538, Nanjing, China. |
| EM500E | Nick I Golub, UR4EN, PO Box 48, Ordzhonikidze, 53300, Ukraine. |
| JA4PXE/JA6 | Joe S Kuwahara, 1-74 Midorimachi Tokuyama C, Japan 7450075. |
| JI3DST | Takeshi Funaki, 2-18-26 Hannan-cho Abeno-ku, Osaka-City Osaka 545-0021, Japan. |
| JH6VLF | M Matsuyama, Hiregasaki 1330-303, Nagareyama-city 270-0161, Japan. |
| K4CIA | William G McDowell, 13208 Norwood Road, Raleigh, NC 27614-9134, USA. |
| OH6RX | Jussi Sampola, Tolby Angsvaeg 238, Tolby, Finland 65460. |
| PA3GIO | Bert vd Berg, Parklaan 38, NL-3931 KK Woudenberg, The Netherlands. |
| PA5ET | Rob Snieder, Van Leeuwenstraat 137, 2273 VS, Voorburg, The Netherlands. |
| RW3AH | PO Box-899, Moscow 127018, Russia. |
| ST0P | Jeff Hambleton, 1 Psaron, Chloraka 8220, Paphos, Cyprus. |
| TR0A/P | Ken Frankcom, G3OCA, 1 Chesterton Road, Spondon, Derby DE21 7EN. |
| TX8JNN | Akira Iizuka, JA1EOD, PO Box 8, Okegawa, Saitama 363-8691 Japan. |
| VK4AAR | Alan Roocroft, PO Box 421, Gatton 4343, Australia. |
| VK9WI | PJ Garden, VK4APG, 58 Minerva Court, Eatons Hill, Brisbane, Australia. |
| 4W6SP | Tomislav Dugec, 9A2AA, PO Box 255, 21000 Split, Croatia. |
| 5I3A, 5I3B | A47RS, PO Box 981, Muscat 113, Sultanate of Oman. |
| 7P8AA | Fritz Bergner, DL7VRO, Sterndamm 199, D-12487 Berlin, Germany. |

## CONTEST RESULTS

IN THE UBA Spring Contest 2000, G4OGB was third in the Foreign Stations CW category, with 2208 points. In the Foreign Stations SSB category, G0AOZ was first with 2898, G0VQR second with 2208, and G3VAO fourth with 990 points. In the LZ DX Contest 1999, G4OGB was 16th (51,401 points), G3UFY 31st (32,913) and G3RSD 51st (10,833) in the Single-Operator, multi-band category. G0VQT was 15th (220 points) in the 21MHz Single-Band category. In the 1999 Marconi Memorial Contest HF, G4OGB

# HFF-LayerPropagationPredictionsforSeptember2000

| | 3.5MHz | 7.0MHz | 10.1MHz | 14.0MHz | 18.1MHz | 21.0MHz | 24.9MHz |
|---|---|---|---|---|---|---|---|
| Time | 000001111122 | 000001111122 | 000001111122 | 000001111122 | 000001111122 | 000001111122 | 000001111122 |
| (UTC) | 024680246802 | 024680246802 | 024680246802 | 024680246802 | 024680246802 | 024680246802 | 024680246802 |
| *** Europe | | | | | | | |
| Moscow | 7643.....446 | 99972..13889 | 999855564899 | 9..988787999 | ..198888999. | ....999999.1 | .....9999... |
| *** Asia | | | | | | | |
| Yakutsk | ..........  | .........244 | 444311..1554 | 6..42..24556 | ....333....1 | .....4...... | ...1........ |
| Tokyo | ..........  | .........11 | 1.....1.23. | 1.11....2354 | ....111..1.. | ....11...... | .....1..... |
| Singapore | ..........  | ..........  | .........1..2 | 2.....1.223 | 1....1.1122. | .....1.132.1 | ...1..1233.. |
| Hyderabad | ..........  | 41.......144 | 6.....1344 | 5.1....12565 | ...411.3455. | ...5112445.. | ...1444554.. |
| Tel Aviv | 351.....454 | 8871.....678 | 8786211.3788 | 7..755556777 | ...76666777. | ....766677.. | 1.........1 |
| *** Oceania | | | | | | | |
| Perth | ..........  | ..........  | 1.........  | 2.........134 | 1.......33.. | ....11222..1 | ....1.342... |
| Sydney | ..........  | ..........  | .....11.  | .........24. | .....1344. | ...1..13.1.. | ....2133.... |
| Wellington | ..........  | ..........  | ..........  | ..1..1..45.. | ....544567.. | ....5556.6.. | .....6...... |
| Honolulu | ..........  | ..........  | ..11.....  | 1..21....1.. | ....32..211. | .....21.322. | ..........  |
| W. Samoa | ..........  | ..........  | ....1.....  | .1..2.11.... | 1...43333311 | 1...4434.4.1 | ......44...1 |
| *** Africa | | | | | | | |
| Mauritius | ..........  | 32.......113 | 33.....1..3 | 34.....1.114 | 4..11...3334 | ...33212444. | .....323441. |
| Johannesburg | ..........  | 221......112 | 3241.....  | 3.4......443 | ...3.11.2444 | ...31331244. | .....334.445 |
| Ibadan | 122.....21 | 655.....465 | 6654.....666 | 667632.1.666 | 57.765445687 | ...766566877 | ....7666777. |
| Nairobi | ..........  | 441.....244 | 5641.....5 | 555.1....665 | 5..533344665 | ...54444466. | ....444..6.1 |
| Canary Isles | 6551.....55 | 888731..1388 | 888854556888 | 999978868899 | 99.988889889 | .....9899899 | .....999999. |
| *** S. America | | | | | | | |
| Buenos Aires | ..........  | 232.......1 | 4443.......4 | 444411..134 | ...43.1..144 | .....1111244 | .....323334. |
| Rio de Janeiro | ..........  | 4441.....14 | 5554.....45 | 655521....55 | 6..541122456 | 6.1..3344456 | .....4444561 |
| Lima | ..........  | 2321.....  | 3433.....2 | 44.41.....13 | 4...3.....24 | ....3.11113. | ......22233. |
| Caracas | 1.........  | 55531.....4 | 6665.1....5 | 66664.1.1326 | .1...4334556 | ...1.444556. | ......55566. |
| *** N. America | | | | | | | |
| Guatemala | ..........  | 34421.....  | 455521.....  | 4566411..134 | .1..5.22344. | 1.....34455. | .....45551 |
| New Orleans | ..........  | 44421.....  | 455521.....  | 55..4...1344 | ...1..334455 | .....44445. | .....4.4.1 |
| Washington | 222.....  | 5564.....1 | 65564....1.6 | 66775.133665 | 6.....4456.6 | .....45677. | .....6677. |
| Quebec | 1111.....  | 6565.....35 | 66664..13415 | 66...2124666 | .....445666 | .....55666. | .....5..1. |
| Anchorage | ..........  | .23111..1111 | 5443.....134 | 4...3..2344 | .........41. | ..1.....  | ....111...1. |
| Vancouver | ..1.....  | 13211.....  | 3433...1..14 | 3.....1233 | ...1....332. | .....1.3.. | .....1... |
| San Francisco | ..........  | 11311.....  | .3341.1.... | 43..3.1..233 | 4.....1244. | .....344. | .....33.. |

Key: Each number in the table represents an 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 July 2000 issued by the Sunspot Data Centre, Brussels, was 169.1. The maximum daily sunspot number was 246 on 19 July and the minimum was 93 on 31 July. The predicted smoothed sunspot numbers for September, October and November are respectively: (SIDC classical method – Waldmeier's standard) 115, 112, 110 (combined method) 122, 124, 126.

## WARC BANDS TABLE 2000

| Call | 10MHz | 18MHz | 24MHz | Total |
|---|---|---|---|---|
| G0NXX | 133 | 140 | 139 | 412 |
| G3SXW | 138 | 151 | 122 | 411 |
| G4UCJ | 80 | 96 | 78 | 254 |
| G4KHM | 77 | 92 | 27 | 196 |
| G4AFI | 28 | 69 | 80 | 177 |
| G3ING | 41 | 57 | 45 | 143 |
| GM4OBK | 24 | 31 | 32 | 87 |
| G0VLC | 24 | 37 | 21 | 82 |
| GW0VSW | 21 | 20 | 40 | 81 |
| G3WP | 26 | 23 | 24 | 73 |
| M0CAL | 0 | 23 | 33 | 56 |
| MM0BQI | 18 | 17 | 19 | 54 |
| G0TSM | 15 | 13 | 25 | 53 |
| 2U0ARE | 51 | 0 | 0 | 51 |
| G4OBK | 13 | 22 | 13 | 48 |
| G4YWY/M | 0 | 19 | 29 | 48 |
| GM3IBU | 0 | 0 | 43 | 43 |
| G4ERP/M | 0 | 40 | 0 | 40 |
| M0CNP | 3 | 21 | 11 | 35 |
| G4FVK | 1 | 12 | 19 | 32 |
| M5AFA | 0 | 7 | 11 | 18 |

## 28MHz COUNTRIES TABLE 2000

| Call | CW | SSB | Mixed | |
|---|---|---|---|---|
| M0BZQ | 28 | 230 | 242 | |
| G4DUW | 169 | 210 | 232 | |
| G0VHI | 0 | 205 | 205 | |
| M0BIB | 10 | 185 | 195 | |
| G0TSM | 52 | 130 | 154 | |
| G0NXX | 151 | 0 | 151 | |
| G0CAS | 1 | 149 | 150 | |
| M0CTQ | 0 | 149 | 149 | |
| G3SXW | 145 | 0 | 145 | |
| MM5AJN | 0 | 139 | 139 | |
| G4MUW | | 134 | 134 | |
| G3MDH | 0 | 128 | 128 | |
| G4UCJ | 114 | 0 | 114 | |
| G4IDL | 100 | 0 | 100 | |
| GM4CHX | 0 | 93 | 93 | |
| G0CGV | 78 | 31 | 87 | |
| GI4XSF | | | 80 | |
| M0CAL | 0 | 78 | 78 | |
| MM0BQI | | | 50 | |
| G4OBK | 44 | 3 | 47 | |
| G3WP | 43 | 0 | 43 | |
| M0CNP | 0 | 43 | 43 | |
| GU0SUP | | | 42 | † |
| G4YWY/M | | | 41 | |
| M0ASJ | | | 41 | |
| G0KDS/M | 0 | 40 | 40 | |
| G3ING | | | 37 | |
| GM0FNE | | | 36 | † |
| G4FVK | | | 34 | |
| GW0VSW | 27 | 11 | 33 | |
| G0URR | | | 31 | † |
| GM4OBK | 25 | 0 | 25 | |
| G0NCS | | | 21 | ‡ |
| M5AFA | | | 17 | |

† RTTY
‡ PSK

## 9-BAND TABLES No 35

### Mixed Mode

| Call | 1.8 | 3.5 | 7 | 10 | 14 | 18 | 21 | 24 | 28 | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|
| G3KMA | 245 | 294 | 325 | 306 | 331 | 321 | 331 | 303 | 323 | 2779 |
| G4BWP | 233 | 301 | 330 | 310 | 333 | 325 | 332 | 299 | 315 | 2778 |
| G3XTT | 227 | 272 | 314 | 273 | 332 | 301 | 326 | 282 | 300 | 2627 |
| G3GIQ | 143 | 243 | 302 | 256 | 333 | 312 | 330 | 281 | 320 | 2520 |
| GW3JXN | 171 | 240 | 283 | 259 | 321 | 300 | 301 | 267 | 275 | 2417 |
| G4OBK | 140 | 197 | 257 | 248 | 319 | 281 | 295 | 267 | 272 | 2276 |
| G3TXF | 126 | 224 | 282 | 250 | 322 | 261 | 316 | 228 | 289 | 2298 |
| G3TBK | 116 | 230 | 265 | 231 | 320 | 272 | 303 | 245 | 268 | 2250 |
| G3YVH | 123 | 144 | 243 | 266 | 310 | 295 | 284 | 251 | 250 | 2166 |
| G3WGV | 106 | 183 | 250 | 267 | 295 | 272 | 283 | 249 | 254 | 2159 |
| GM3PPE | 148 | 210 | 246 | 260 | 302 | 243 | 267 | 214 | 224 | 2114 |
| G3LAS | 80 | 171 | 191 | 191 | 285 | 265 | 285 | 256 | 260 | 1984 |
| G3IGW | 128 | 197 | 311 | 233 | 282 | 238 | 243 | 110 | 220 | 1962 |
| G3NOF | 5 | 125 | 131 | 0 | 329 | 288 | 329 | 257 | 303 | 1767 |
| G5LP | 63 | 215 | 277 | 187 | 304 | 101 | 268 | 30 | 219 | 1664 |
| G3VKW | 43 | 148 | 192 | 77 | 314 | 150 | 305 | 140 | 287 | 1656 |
| G4XRX | 3 | 65 | 166 | 141 | 288 | 221 | 291 | 184 | 242 | 1601 |
| G0JHC | 1 | 29 | 145 | 157 | 168 | 253 | 263 | 251 | 287 | 1554 |
| G4NXG/M | 24 | 56 | 130 | 0 | 284 | 176 | 266 | 163 | 239 | 1338 |
| G4UCJ | 29 | 76 | 175 | 128 | 217 | 162 | 189 | 150 | 172 | 1298 |
| M0AWX | 43 | 109 | 109 | 0 | 238 | 154 | 200 | 148 | 157 | 1158 |
| GM4OBK | 39 | 95 | 130 | 63 | 160 | 105 | 149 | 101 | 178 | 1020 |
| G4FVK | 40 | 75 | 101 | 54 | 179 | 99 | 174 | 61 | 154 | 937 |
| G0LRX | 1 | 84 | 122 | 0 | 224 | 31 | 242 | 14 | 210 | 928 |
| GW0VSW | 28 | 35 | 87 | 111 | 153 | 115 | 113 | 77 | 72 | 791 |
| MM0BQI | 39 | 52 | 90 | 39 | 124 | 60 | 112 | 45 | 101 | 662 |
| **AVERAGE** | **90** | **157** | **210** | **166** | **272** | **215** | **261** | **187** | **238** | **1796** |

### CW only

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| G3KMA | 239 | 273 | 319 | 306 | 329 | 313 | 329 | 288 | 311 | 2707 |
| G3XTT | 217 | 241 | 300 | 273 | 300 | 274 | 296 | 245 | 269 | 2415 |
| G4BWP | 202 | 209 | 272 | 309 | 260 | 282 | 245 | 252 | 198 | 2229 |
| GW3JXN | 168 | 204 | 265 | 259 | 291 | 284 | 278 | 236 | 244 | 2229 |
| G3TXF | 126 | 215 | 280 | 250 | 316 | 259 | 307 | 227 | 274 | 2254 |
| G0NXX | 163 | 218 | 260 | 270 | 279 | 270 | 254 | 222 | 244 | 2180 |
| G3WGV | 106 | 183 | 250 | 267 | 295 | 272 | 283 | 247 | 253 | 2156 |
| G3YVH | 122 | 141 | 239 | 266 | 298 | 278 | 264 | 228 | 237 | 2073 |
| G4OBK | 127 | 169 | 242 | 248 | 278 | 263 | 255 | 244 | 238 | 2064 |
| G3SXW | 91 | 192 | 241 | 227 | 310 | 235 | 289 | 204 | 256 | 2045 |
| G3NOH | 48 | 124 | 204 | 253 | 299 | 280 | 281 | 239 | 246 | 1974 |
| G5LP | 63 | 209 | 276 | 187 | 287 | 100 | 256 | 29 | 201 | 1608 |
| G3LAS | 78 | 75 | 157 | 191 | 215 | 201 | 227 | 203 | 203 | 1550 |
| G3VKW | 35 | 73 | 131 | 77 | 194 | 108 | 187 | 96 | 148 | 1049 |
| GM4OBK | 31 | 77 | 113 | 63 | 130 | 88 | 128 | 86 | 125 | 841 |
| GW0VSW | 28 | 30 | 79 | 111 | 125 | 109 | 96 | 71 | 63 | 712 |
| **AVERAGE** | **115** | **165** | **227** | **222** | **263** | **226** | **248** | **195** | **219** | **1880** |

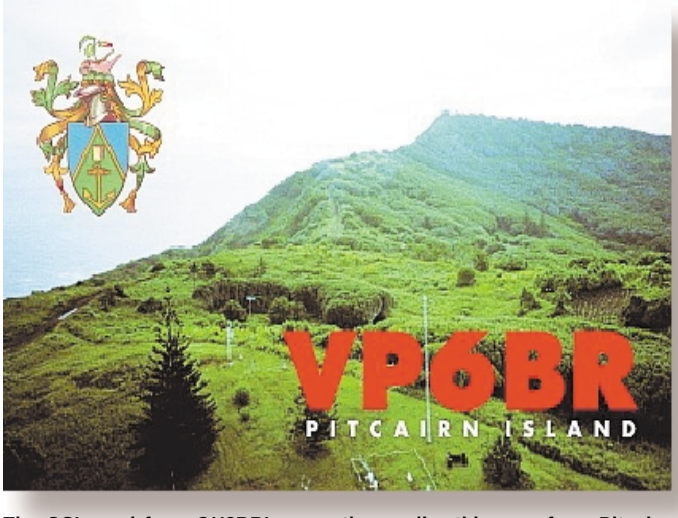
was 7th (25,543 points), GM3CFS 18th (10,586), G0MTN 53rd (1739) and G0VQR 57th (1342) in the Single-Operator class. All were in the 100-watt sub-class. In the October 1999 ON Contest, G0MRH was 1st (1170 points) and G4OGB 2nd (819) in the Foreign Stations, SSB Category. G4OGB was 2nd (1728 points) and G0MRH 3rd (1710) in the Foreign Stations CW category. In the Autumn 1999 EU Sprint Contest, G4BUO was 5th (164 points), G4OGB 31st (104), G0MTN 35th (90) and GW3NJW 41st (63). In the Worked All Germany Contest, G0LII was the leading UK entrant with 118,728 points, followed by G4OGB (58,110), G5MY (26,796), G3RSD (23,652), G3UFY (18,288) and G0WHO (11,628). Congratulations to all the foregoing, and my thanks to Les, G4OGB, for passing on many of those results.

## TABLES

SEVERAL OF THE table entrants wonder what has happened to 10m conditions compared with the same period during past cycles, and it is indeed true that propagation seems to be well below what we might expect. Let's hope we see some improvement as the autumn approaches.

Duncan Gerrie, MM5AJN, writes that in the first two months since he received his MM5 call he worked 39 of the 40 CQ zones, with most of his activity on 10m where he already has 139 countries (all this has been on SSB). Duncan comments that he has received nothing but courtesy and enthusiasm about his MM5 call from other hams. Duncan is already on the DXpedition trail too, having joined Ian, GM0TGE, to activate Raasay Island near Skye on 26/27 May.

The nine-band table makes its appearance again this month. For those who may be confused, this is an all-time table, rather than in-year, but for current DXCC countries only. The idea of excluding deleted countries is that new licensees have no chance to work them, but you have at least some hope of working your way through the current list. The table appears four times a year and is compiled by Henry Lewis, G3GIQ, to whom your scores should be sent. There is no entry level as such, though a score approaching 1000 is not unreasonable as a starting point, as it is relatively easy to achieve such a score, even at the 100 watt level, in a 12-month period. Deadlines for the tables are 8 January, April, July and October,respectively. Henry is in the *RSGB Yearbook*, or he can be e-mailed at HenryLewis@compuserve.com

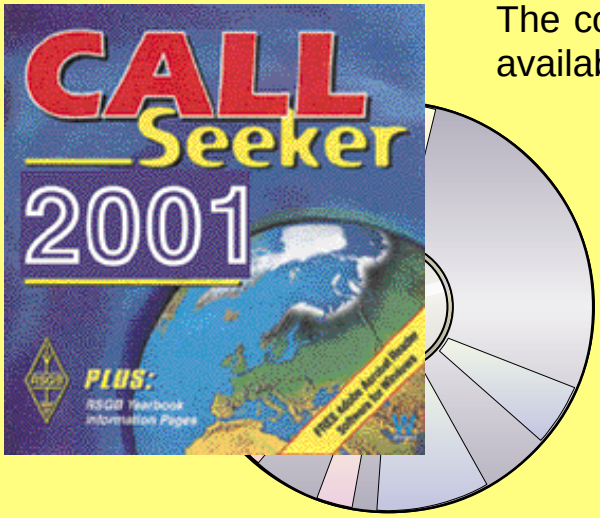



**The QSL card from OH2BR's operation earlier this year from Pitcairn**

## THANKS

MY THANKS TO all who have provided information. Special thanks go to the authors of the following for information extracted: *OPDX Bulletin* (KB8NW), *The Daily DX* (W3UR) and *425 DX News* (I1JQJ). Please send items for the **November** issue by **16 September.** ♦

# CALLSEEKER 2001

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# VHF/UHF

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

**ANNUAL VHF/UHF TABLE - JAN TO DEC 2000**

| Callsign | 50MHz Dist | 50MHz Ctr | 70MHz Dist | 70MHz Ctr | 144MHz Dist | 144MHz Ctr | 430MHz Dist | 430MHz Ctr | 1.3GHz Dist | 1.3GHz Ctr | Total Points |
|---|---|---|---|---|---|---|---|---|---|---|---|
| G4DEZ | 62 | 62 | 18 | 3 | 42 | 10 | 27 | 6 | 17 | 7 | 256 |
| G3FIJ | 36 | 34 | 22 | 3 | 56 | 10 | 30 | 6 | 5 | 2 | 204 |
| G4APJ | 26 | 29 | - | - | 82 | 10 | 44 | 5 | - | - | 196 |
| G7NBE | 23 | 21 | 14 | 2 | 44 | 7 | 1 | 1 | - | - | 113 |
| G1UGH | 3 | 18 | - | - | 26 | 9 | 4 | 4 | - | - | 64 |
| M0CNP | - | - | - | - | 3 | 3 | 2 | 1 | - | - | 9 |

The District Codes are the 124 listed on page 83 in the 2000 *RSGB Yearbook*. Up to six different GI stations and up to three different GM stations in each Scottish district may be counted. Countries are the current DXCC ones plus IT9. The deadline for the next issue is 14 September.

WELL, IT'S ALL been happening again – trans-Atlantic openings on 50MHz, more Sporadic-E propagation on 144MHz than we've had in many recent summers, another excellent aurora and some intriguing ionoscatter and Field-Aligned Irregularity (FAI) propagation. All times are UTC. An asterisk (*) denotes a CW contact. QTHR signifies that the operator's address is in the current *RSGB Yearbook* and (IP), (NG), etc after a callsign denotes the postal area and (IO91) etc is the Maidenhead grid.

## REPEATER NEWS

THE JULY ISSUE of *Lens*, the newsletter of the Leicestershire Repeater group, mentions that GB3CF on 145.600MHz (RV48) is on again (QRV) after servicing and conversion to the 12.5kHz channel spacing specification. Contact Geoff Dover, G4AFJ, (QTHR) for membership details of the LRG. His e-mail address is g4afj@argonet.co.uk

The Kent Repeater Group's June *Newsletter* includes status reports on its two VHF and five UHF repeaters. It seems that GB3CK, the licence for which lapsed in June 1999, will have to be re-licensed and this could take a year. GB3KS was removed from its old site on 17 April, so is non-operational (QRT). Contact John Wellard, G6ZAA (QTHR), for membership details. His e-mail address is krg@zetnet.co.uk

Terry Bickell, G0UIO, has done a superb job in editing issue number 40 of the Cambridgeshire Repeater Group's *Newsletter*. It comprises 36 A5 pages, and includes a list of the group's repeaters, a membership list, a report on the Millennium Rally held on 16 April, well illustrated with photographs, and a technical report section. 16 pages are devoted to a simple beginner's receiver and transmitter, again well illustrated with diagrams and photographs. For membership information contact Roger Carder, G7SRK (QTHR), whose e-mail address is rcarder@virgin.net

## PUBLICATIONS

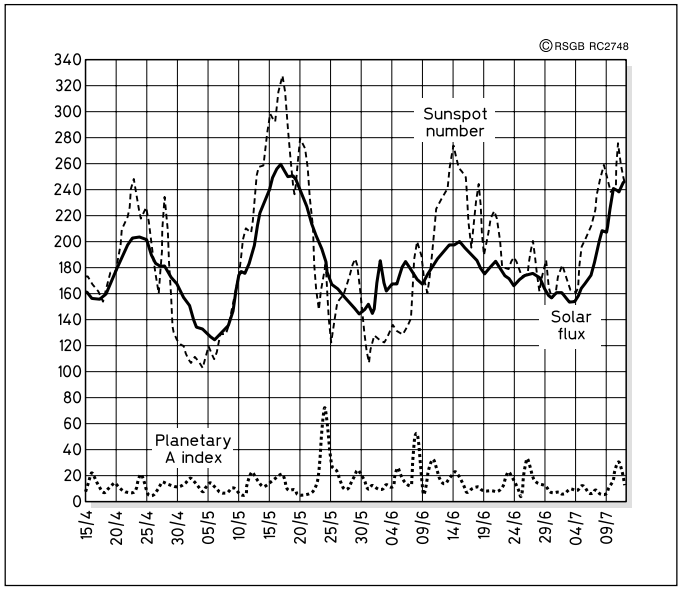
THE SUMMER edition of *VHF Communications* starts with a 23-page article by Jochen Jirmann, DB1NV, describing a vectoral aerial impedance meter. Harald Fleckner, DC8UG, investigates low noise preamplifiers constructed on Teflon and epoxy base material. Wolfgang Schneider, DJ8ES, describes a logarithmic amplifier that works up to 500MHz with a 90dB dynamic range, using the Analog Devices AD8307. For details of this excellent quarterly publication contact its editor Andy Barter, G8ATD, at KM Publications, 63 Ringwood Road, Luton LU2 7BG. There is a website - see the panel.

Issue 2/2000 of the quarterly *DUBUS* magazine starts with a 14-page article describing the Mark 2 version of Michael Kuhne's, DB6NT, 23cm transverter. Werner Rahe, DC8NR, has the second part of his 'Combiners, Couplers and Hybrids' treatise. There are the usual sections on 6m, EME news, tropo, Es, auroras and meteor scatter (MS). The UK agent for *DUBUS* is Roger Blackwell, G4PMK (QTHR), whose e-mail address is dubus@marsport.demon.co.uk and there is a website - see the panel.

## PROPAGATION

IN THE MAY issue of *The Six and Ten Report*, joint editor Dr Steve Reed, G0AEV, remarks that the month provided the best 6m propagation for UK operators this cycle. This is clearly illustrated by numerous tables. There are reports on Es, auroral, tropo and MS propagation, and a table showing the predicted smoothed sunspot numbers for the peak of Cycle 23.

There is a commentary on the American SEC and Brussels SIDC SSNs which, at present, are going in opposite directions. There are the regular tables of daily solar and geomagnetic data and K indices, and 6m activity reports from around the world.




**Graphs showing the variations in solar behaviour between 15 April and 12 July 2000. Source - NASA.**

The *Report* is an activity of the RSGB's Propagation Studies Committee (PSC), which has its own website - see the panel - and is edited by G0AEV, and Prof Martin Harrison, G3USF. Subscription inquiries should be addressed to Steve (QTHR) whose e-mail address is g0aev@explore.force9.co.uk

The June issue of *SunMag* begins with an article claiming to settle the 50-year-old controversy about the source of auroras. Using data from NASA and Japanese spacecraft, scientists with the International Solar-Terrestrial Physics (ISTP) programme now conclude that the process relies on 'reconnection', a union of solar and Earthly magnetic fields that lets the solar wind punch through sections of Earth's magnetic shell. The Japanese Geotail spacecraft has led scientists to conclude that the reconnection area is 140,000 to 150,000km downwind of Earth.

Another article describes how scientists have created a model that reliably predicts how long it takes electrified gas clouds from solar coronal mass ejections to reach Earth. These CMEs have velocities ranging anything from 20 to 2,000km/s. The table of daily solar data shows far less variation in the 2.8GHz solar flux in May than in April. It varied from 148 to 202 units. *SunMag* is compiled and distributed by Neil Clarke, G0CAS (QTHR), and his e-mail address is neil@g0cas.demon.co.uk

## MOONBOUNCE

ROY REED, G3ZIG (JO02), has been busy (QRL) in the garden - same here OM - so SM0FSS is his only new initial on 2m. Roy came 13th out of 99 entries on the band in the 1999 ARRL EME contest. In this year's European EME event he was 10th out of 40 entries on 2m. He had no luck with the recent Greenland station OX2K, as their echoes were very weak with him.

I checked on the ARRL website on 23 July, but the dates for this year's EME contest weekends were still not available. The suggested sked weekend is 23/24 September, when London latitude stations will have a total of 31.5 hours of Moon time. The declination varies from +21.30° to +17.04°, and the 144/432MHz sky

## AURORAL ACTIVITY

THOSE WHO SUBSCRIBE to the NASA Space Weather website - see the panel - will have received e-mails on 13, 14 and 15 July concerning geomagnetic storms that culminated in the superb aurora on 15 July. On the morning of 14th an X5/3B solar flare, one of the most powerful of the current cycle, triggered a proton storm in the vicinity of Earth.

Just after the eruption, coronagraphs on board the SOHO spacecraft recorded a full halo CME heading Earthwards at over 1,300km/s. By 1900 on the 15th an extreme geomagnetic storm was underway with the Ap index at severe storm level of 152 units. Radiowise, auroral QSOs were already in progress and *RadCom* editor Steve White, G3ZVW (NL), completed SSB QSOs on 2m with eight stations in DL, OZ and PA in just 15 minutes from 1704.

G4RGK operated on 70cm and from 2242 completed with DK8VS (JN39), 9A2SB (JN95) at 1,571km and OE3JPC (JN87). Dave was running his EME station, a K2RIW PA and 8x27-element 'BV' Yagis at 70° azimuth and 15° elevation. Propagation was only possible for about 20 minutes and there was a visual aurora overhead at the time. Mat Adlard, G7FBD (BS), rates the event on 2m better than the April one, and he worked some DLs. Due to the full Moon he couldn't see a visual event in Bristol.

John Maclean, MM0CCC (EH), was alerted to the event by telephone from Davy Shirley, MM1ATY, at 1530 during a shopping trip. When he got home he completed two CW QSOs on 6m and two on 2m with local Brits. At 2215 he called CQ on CW on 2m and made 51 contacts with stations in DL, F, G, GI, GM, HB9, OK, ON and OZ until close down at 0200.

GW7SMV notes two phases, the first 1658-1826 in which Jamie worked nine stations in DL, G, GW and PA. The second phase, 2210-2328 brought another 31 local continentals. Optimum azimuth was 60°. But there are reports that much more distant easterly and southerly DX was worked on 2m from the UK. Maybe some further reports next month?

temperature range is 318/23K to 200/15K. The Sun offset at Saturday midnight is -51° and the signal degradation, relative to perigee, varies from 0dB to -0.11dB.

The seventh Italian EME Contest is scheduled for this same weekend and is for all bands from 50MHz up. The rules for this ARI event were published in *DUBUS* issue 2/2000.

## SPORADIC-E

2000 IS PROVING to be a good year for Es propagation on 2m. Starting at the end of June, Alec Trusler, G0FIG (BN), worked into 9H and IT9 around 1900 and Paulo Gomes, CT1FOH (IN50), made 46 QSOs with many DLs, plus stations in HA, HB9, I7, OE5, OM and S5 on the 24th. On the 27th, Charles Coughlan, EI5FK (IO51), had a path to EA1, 2, 4, 5 and 7, but did not mention the time, and on the 30th between 1121-1140, he worked I1 and I0.

Coming to July, G0FIG made three QSOs with LZs in KN13, 22 and 32 from 1639 on the 1st. Next day brought two sessions, much to the delight of VHF NFD contestants. The first started around 1120 and YOs in KN05, 06, 16, 17, 24, 27, 32, 34-36 and 45 were worked by several contributors including Dave Dibley, G4RGK (SL), who also had ER6A/P (KN47) pinning his S-meter at S9+20dB for 15 minutes. Danny Higgins, G3XVR (GU), worked him at S9+40dB.

Other notable stations worked by several Gs were HA8MV/P (KN06), OM0R (KN08), OM3KDX/P (KN19), OM3KWZ/P (JN89), OM3RRC/P (KN09), UR5YM (KN28) and UT5OH (KN27). The second session began around 1436 when G0FIG contacted Italians in JM68, JN70, 71 and 90. Paul Bradbeer, G7GUC (LN), lists I8s in JN70 and JM88. Jamie Ashford, GW7SMV (NP), contacted five Is in JN71, 81 and 90, plus T91ASU (JN94). This event faded out around 1614.

The band opened up again to the Balkans at 1500 on the 10th. G0FIG completed with eight stations in HA and YO, ending at 1535 with UY5M (KN28). Grids worked were JN98, KN06-08 and 27. In a short opening at 1718, Alec caught a couple of YOs in KN34. In another brief opening from 1200 on the 11th, GW7SMV worked three Is in JN70 and 81. A later session from 1715 brought some choice DX for John Regnault, G4SWX (IP) - LY2BIL (KO24), UA1WCF and UA1XP (KO55), LY2IC and LY2SA (KO14), EW6FS (KO35), EW6GB (KO45), RA3LW (KO54) and RA3PG* (KO84).

As expected in the June/July period, 6m Es propagation is almost a daily occurrence, and is very similar to what we call short skip on 10m. In just a few hours of operation at G3FPK (CR), running 100W to the Cushcraft R8 vertical antenna, 24 grids have been worked in EH, EH6, ES, I, OK, SM, SP, YL, YO, S5 and 9A.

Once again GW7SMV worked some mouth-watering Es in the 24 June to 17 July period. Pick of the June bunch were 5B4FL (KM64), SV1DKR (KM17), SV9CVY (KM25), PA3HEN/MM (IN41), CU2FH* (HM77), SV8/DL3GN/P (KM09), UR7TO (KN39), TA1AZ (KN40), UU2JJ (KN75), 4Z4TL, 4Z4UR and 4X/OE1GZA (KM72) and JY9NX* (KM71). His July successes include ER6A/P, TA3BD (KM38), ZA/N7BHC (JN91), 3A2MW (JN53), UX2KA and UT/DL2SDQ (KO30), UR5WN (KO50), SV2CXW (KN10), 3A/OH2BC*, CN8YR*, EH9IB, CQ9S (IM20), 3A/OH9MM, SV3/DK7ZB* (KM06), SV8AQY (KM08), YM0KA (KM39), 5B3AGC* (KM64), 3Z0BLY (JO94) which was a museum ship, and 1A0KM. That lot brought Jamie to just one country short of his DXCC on the band.

Thanks also to Tim Boon, M0AFC/P, Steve Bunting M0BPQ, Terry Chaplin, G1UGH, Graham Badger, G3OHX, Dave Robinson, G4FRE, Paul Thompson, GM6MEN, Ted Collins, G4UPS, Mike Johnson, GU6AJE, Al Harvey, GU7DHI, Mike Kerry, GW1SXT and David Whitaker, BRS25429, for their input to the foregoing.

**USEFUL WORLDWIDE WEB SITES**

| | |
|---|---|
| VHF Communications | www.vhfcomm.co.uk |
| DUBUS | www.dubus.org |
| RSGB PSC | www.keele.ac.uk/depts/por/psc.htm |
| NASA Space Weather | www.spaceweather.com |
| GI0OTC home pages | www.gi0otc.fsnet.co.uk/home.htm |
| DXrobot | www.gooddx.net |

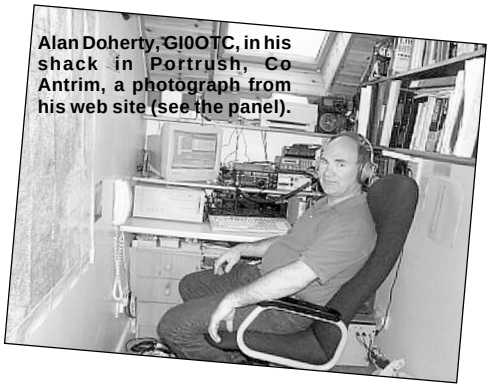
## 50MHz TRANS-ATLANTIC

ON 21 JUNE GW7SMV worked WP4G (FK68) at 2012. Next evening Jamie contacted VO1JN (GN37) and NG4C (FN16) from 2236. At 1130 on the 23rd he worked NJ2F (EL96) while G4UPS worked W4OV* and W4RCC* (EL96) between 1143 and fade-out at 1205.

9 July saw a big opening to North America, and between 2048 and 2158 GW7SMV contacted K1SIX and WA1T (FN43), N4MM (FM09), N4UFP (EM94), K1NU, NM1W, W1JR and K1SG (FN42), WV2V (FN21), NT1N and K2WE (FN31), W1TDS (FN32), KB2WAL (FM29), W2YR (FN20), VE1YX (FN74) and K1TOL* (FN44). Most came back to his CQ calls.

There was another two-hour opening from 1959 next evening in which Jamie worked VE2PIJ (FN35), VE3SXE and VE3KKL (FN25), K1MUC and W1JR (FN42), W3EP and W1QK (FN31), VE9AA (FN65), WB4WXE (EM74), K3KYR (FN24), W1COT (FN31), AF1T (FN43). W2ZKE, K3AX and N2LT (FN20), WA1ECF (FN41), N1NBD (FN32), K3CWH and W3CNP (FN10), K3MKZ (FN21) and VO1TJM (GN08). Again most answered his CQ calls on 50.205MHz and he says these were the best openings yet since being licensed.

Dave Whitaker switched on at



Alan Doherty, GI0OTC, in his shack in Portrush, Co Antrim, a photograph from his web site (see the panel).

2015 and heard 19 stations in 13 grids until he retired at 2240. He reports that G0RUX (SD) worked 126 different North Americans in 48 grids between 1956 and 0106, ODX being K0RAX (EN43) at 6,219km. G4CBW (SD) made 104 QSOs in 46 grids, his ODX being W7XU (EN13) and W5OZI and AA5XE (EM00). Ken Punshon, G4APJ (BL), copied VE1YX, VE3RM and K1SG, but his 15W was insufficient to make any QSOs.

Emil Pocock, W3EP, reports the opening on the 10th to have been the best to Europe in a long while. Running 500W to two 6-ele Yagis he made 81 QSOs into DL, EI, F, G, GW, OK, OM, ON, PA and SP in 30 grids, mostly on CW, between 1940 and 2157. Emil writes the 'World Above 50MHz' column for *QST* and would appreciate reports from this side of the Atlantic. His e-mail address is w3ep@arrl.org

## IONOSPHERIC SCATTER

STATIONS RUNNING high ERP with large antenna arrays have been enjoying the best ionoscatter propagation for years. One enthusiast is G4SWX and on 3 July, John found conditions on 2m excellent and at 0925 he completed with SM5BSZ (JO89). Signals were fluttery, but improved with 10° of elevation. The next QSO was with OH5LK (KP30), and at 1045 RW1AW (KP50EB) was his best-ever ionoscatter DX at 1,991km. He then completed with SM2CKR (KP03), SM5FRH (JO89), OH1ZAA (KP01) and SM3AKW (JP92). All QSOs were on random CW.

There was an FAI event from 1810 on 10 July, with characteristic-sounding signals at an azimuth of 85° and 9A1CAL* (JN86) was worked on this heading, his QTE being 345°, T9 tone, but fluttery. At 1926 he contacted S51ZO* (JN86) at RST559 both ways, but at 1940 the event finished.

On the evening of 13th, the MUF over JO44/54 reached 120MHz and at 2020 9A1CAL was worked, this time on SSB. Several other Gs, PAs and ONs worked him. The strange thing about these events was the T9 signals and extreme flutter, as previous experiences of FAI mode were all of auroral-sounding signals.

The 15th was exceptional, with scatter-mode propagation all day. Much of the time there was a 20kHz wide buzz of CW around 144.300MHz - much to the annoyance of some QRP contesters - and John made 19 contacts into OH, 9A, S5 and ten different SMs, peak conditions being at 1800.

## MISCELLANY

DESPITE RUMOURS to the contrary, the recent 6m operation from Monaco *was* legal, as confirmed by Claude Passet, the General Secretary of the Association de Radioamateurs de Monaco. The activity closed on 10 July. Chris Gare, G3WOS, advises that the Brazilian Society LABRE/SP now supports the UKSMG's Operating Code of Practice.

Alan Doherty, GI0OTC, invites us to look at his updated web pages - see the panel. Allard Munters, PE1NWL, advises of a DXrobot web site that gives aurora and Es warnings - see the panel. Colin Smith, GM0CLN, mentions operation from the Summer Isles in the 1-3 September period. A group will be on Tanera Mor (IO78HA/EU-092 IOTA) on 50.200, 70.190 and 144.385MHz, using the call sign GB4XS. For further information contact mm0bqi@compuserve.com by e-mail. The mobile telephone number *to be used only during the trip* is 07946 283449.

## DEADLINES

THE NOVEMBER deadline is **14 September** and for December it's **12 October**. These are early dates, you'll note. My telephone answering and fax machine is on 020 8763 9457 and my CompuServe ID is g3fpk. ♦

# GH Engineering

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| M57716 | 430-450MHz | 17W | £42 |
| M57745 | 430-450MHz | 33W | £76 *** |
| M67728 | 430-450MHz | 60W | £97 *** |
| M67715 | 1240-1300MHz | 1.2W | £42 |
| M57762 | 1240-1300MHz | 18W | £50 |

Items marked *** are obsolete, and only available while stocks last.

**Mitsubishi GaAsFETs**

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All other Mitsubishi PA modules and GaAsFETs are available to order.

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| SRA-1H | £26.00 | MAR-3 | Equivalent to MSA-0385/0385 | £2.50 |
| TUF-1H | £14.00 | MAR-4 | Equivalent to MSA-0485/0486 | £2.50 |
| ERA-1 | £3.50 | MAR-6 | Equivalent to MSA-0685/0686 | £2.50 |
| ERA-4 | £5.50 | MAR-8 | Equivalent to MSA-0885/0886 | £2.80 |
| ERA-5 | £5.80 | MAV11 | | £3.50 |

**Miscellaneous**

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| 20W 50ohm PCB mounted terminations DC-2.5GHz | £12.00 |
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| BFQ34 replacement for the obsolete BLV91 | £10.50 |

Various N-type and SMA connectors available for semi-rigid cable.

**1.3GHz Linear Power Amplifier Kits**

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| PA1.3G-2 10mW i/p 1.2W o/p | uses M67715 | mini-kit | £62 |
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Mini-kits include PCB mounted components, un-drilled heatsink and PCB.
Heatsinks can be supplied pre-drilled and tapped if required.

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| Racal 9913 200MHz Frequency Counter | £35 |
| Bird 43 power meter N-type connectors | £80 |
| Bird 43 elements - various | £30 |
| Dymar 2041 Power meter 0.01 - 100W | £50 |
| Hewlett Packard 1600A Logic State Analyser | POA |

Note that Test Equipment has an extra carriage charge - please ask for details

All component prices include VAT. P&P free for orders over £10, otherwise add £1.50

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| UNISSUED (BOXED) MICROPHONES No.16 FOR W/S No.18 COMPLETE WITH THE 4 PIN PLUG 2 UNITS FOR | £18 |
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| CAX160 | Remote battery adapter | £1.99 | CLC510 | Soft pouch | £3.99 | CAW150 | 12v power cable | £1.99 |
| CLC171 | Soft case CNB171 | £3.99 | CLC511 | Hard protective case | £1.99 | CBT151 | AA battery case | £4.99 |
| CLC172 | Soft case CNB172/173 | £3.00 | **C156:** | | | **Misc. accessories:** | | |
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| CBT175 | AA battery case | £4.99 | CWC110 | Trickle charger 230v | £11.95 | CAW591 | Extension cable C5900 | £4.99 |
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| CNB173 | Ni-Cad battery 2.8W | £14.00 | CLC155 | Soft case CNB156/156 | £3.00 | CTN5600 | CTCSS unit for C5608 | £3.50 |
| CAX160 | Remote battery adapter | £1.99 | CLC156 | Soft case CBT156 | £3.00 | CMU160 | Memory unit | £1.99 |
| CLC561 | Soft case | £1.99 | CLC157 | Soft case CBT157/158 | £3.00 | CSK15 | Extention speaker | £1.99 |
| CLC562 | Hard protective case | £1.99 | CLC158 | Hard protective case | £1.99 | CNB163 | Ni-Cad battery pack | £11.00 |
| **C508:** | | | CTN115 | CTCSS decoder | £7.99 | CTN160 | CTCSS encoder/decoder | £3.99 |
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# LF

**DAVE PICK, G3YXM**
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SOME PEOPLE seem to have got the idea that LF operation is all high-tech digital modes driven by computers. Let me assure you that CW is the way to start and the equipment can be as low-tech as a couple of 807s and a CR100.

LF operators are definitely experimenters and home-brewers, but only a minority have computer modes as their primary interest. Don't be put off if you haven't got a computer, wind some big coils, get out the key and come and join us.

Starting to listen on amateur LF could be as easy as re-tuning your receiver and putting a millihenry or two in series with the aerial. However, although most modern amateur transceivers will receive the 136kHz band, some are, to put it politely, 'a little deaf'. The little pre-amp and filter shown in **Fig 1** will help a great deal. It has about 10dB gain with a sharp band-pass characteristic. The Toko coils can be obtained from BEC (01753 549502).

## REAL VLF

A GROUP OF German amateurs has decided to see what it can do on VLF. DK8KW, DF6NM and DJ2LF have obtained permits to operate between 8.9 and 9.0kHz with a transmitter power of 20W. Geri, DK8KW, is busy winding a loading coil. It will take him a little while, as he needs half a henry! Other amateurs in Sweden, Belgium and the UK are hoping to join them soon. Now there's a real challenge - CQ DX VLF anyone? Seriously though, no-one expects to get long-distance reports with this sort of frequency and power, 10km would be a great achievement.

A simple way of looking for signals at these frequencies is to filter the aerial and feed it into a PC sound card (oops, I mentioned computers again!). A program such as *Spectrogram* will then display your chosen part of the spectrum up to 22kHz.

## MORE VLF

ON 2 JULY, the historic VLF station at Grimeton in Sweden celebrated its 75th anniversary with an on-air event. VLF enthusiasts the world over waited at the due time, but the original Alexanderson alternator needed some persuading before it could be run properly. SAQ eventually came on the air on 17.2kHz with a beautiful signal around midday. See the *RadCom* exclusive news story on page 12. I was intrigued to know how they could key the 600A aerial current from the 200kW alternator so rapidly. 30WPM was no problem. Evidently a magnetic amplifier (saturable reactor) is used as a high-speed switch in the antenna feed.

## TRANS-PACIFIC TESTS

SEVERAL ZL and VK LF stations took part in a trans-Pacific test during the weekend of 16/17 June. They transmitted in their LF band (165-190kHz), while some Americans listened in Hawaii and on the west coast of the USA. No signals were detected, but then it is a very long path. ZL to Hawaii is about twice as far as G to VO1, which we will be trying to achieve this winter.

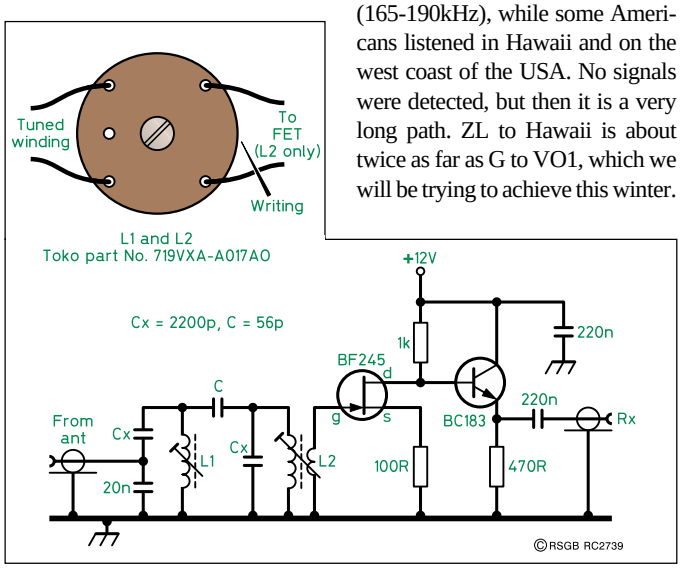


**Fig 1: A simple LF preamplifier**

## STATESIDE LF SYMPOSIUM

AMRAD, THE US experimenters' group, held a technical symposium on 17 June to mark their 25th anniversary. Many of the talks were devoted to LF issues. A presentation 'How Low is LF' by Frank Gentges, K0BRA, covered LF antennas and the modelling of electrostatic and magnetostatic fields. André Kesteloot, N4ICK, presented 'Radio Amateurs on Long Wave', covering LF antenna theory and antenna tuning equipment for LF stations. Richard O'Neill described his work on creating high-Q air-cored coils. A LF panel discussion covered possible equipment and methods to address the challenge of trans-Atlantic amateur LF communication.

## MEANWHILE, IN CANADA

AT PRESENT, two stations are operational on the 136kHz band in Canada. Larry, VA3LK, in Westport, Ontario has been running a beacon on 137.710kHz for some time now. This has been heard widely around Canada and the Northern USA. Larry uses about 60W of RF into 340ft of wire supported by a 240ft tower. He is working on more powerful transmitters in preparation for the trans-Atlantic tests this winter.

The other is Mitch, VE3OT, in London, Ontario who is also improving his system. At present he has about 150W of RF into an aerial similar to the sort of thing most of us use. Mitch doesn't have the luxury of any nearby 'lowfers' to give him reports on his progress. They have made the first Canadian LF QSO, a distance of 430km. Is Europe next? It is hoped that more VEs will join them soon. ♦


**The QSL card sent out to those who worked the 40m station SA6Q. It shows the alternator and the six 127m towers which support the VLF antenna.**

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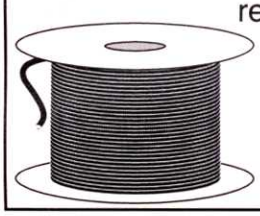

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| ALINCO | DJ-10X SCANNER (BOXED) | £210.00 |
| ALINCO | DJ-G5 EY DUAL BAND HANDY | £199.00 |
| ALINCO | DR-150 2M/FM/ 50w MOBILE | £200.00 |
| ALINCO | DR-590 DUAL BAND MOBILE | £175.00 |
| ALINCO | DR-599 DUAL BAND MOBILE | £245.00 |
| ALINCO | DX-70T 100W MOBILE / HF | £475.00 |
| ALINCO | EDX 1 TUNER MOBILE / HF | £100.00 |
| ALPHA | 87A FULLY AUTOMATIC AMP | £3,750.00 |
| AMERITRON | QSK-5 2.5kw QSK SWITCH | £199.00 |
| AOR | AR-1500 HANDY RECEIVER INC SSB | £99.00 |
| AOR | AR-3000A RECEIVER | £495.00 |
| AOR | AR-3000A+ | £595.00 |
| AOR | AR-5000 RECEIVER | £1,199.00 |
| AOR | AR-7030 REMOTE CONTROL RECEIVER | £595.00 |
| AOR | AR-8000 HANDY RECIEVER | £199.00 |
| AOR | AR-8200 MK1 HANDY RECEIVER | £280.00 |
| DRAKE | R8E RECEIVER INC CONVERTER | £595.00 |
| ICOM | IC-207 DUAL BAND MOBILE | £275.00 |
| ICOM | IC-2800 DUAL BAND COLOUR SCREEN | £285.00 |
| ICOM | IC-290D 25W MULTI MODE MINT! | £275.00 |
| ICOM | IC-4KL AMP 1K. SOLID STATE | £1,999.00 |
| ICOM | IC-725 HF MOBILE 100w | £400.00 |
| ICOM | IC-728 HF MOBILE 100w | £425.00 |
| ICOM | IC-730 HF MOBILE 100w | £250.00 |
| ICOM | IC-735 HF 100W | £450.00 |
| ICOM | IC-745 HF BASE inc FM 100w | £425.00 |
| ICOM | IC-746 HF/50/2M 100w | £999.00 |
| ICOM | IC-751 BASE HF CLASSIC! | £425.00 |
| ICOM | IC-756 HF/6M BASE TRANSCEIVER | £1,050.00 |
| ICOM | IC-765 HF BASE 100w | £950.00 |
| ICOM | IC-775DSP 200w HF BASE TRANSCEIVER | £1,799.00 |
| ICOM | IC-821 H 2/70/ BASE TRANSCEIVER | £750.00 |
| ICOM | IC-W31E DUAL BAND HANDY | £175.00 |
| ICOM | PS-15 POWER SUPPLY | £100.00 |
| ICOM | PS-55 PSU 20 amp | £120.00 |
| ICOM | R10 HANDY SCANNER | £199.00 |
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| KENWOOD | TM-751E 2M 25W MULTI MODE | £325.00 |
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| KENWOOD | TS-50S MOBILE TRANSCEIVER 100W | £499.00 |
| KENWOOD | TS530SP HF 'CLASSIC' MAINS | £250.00 |
| KENWOOD | TS-570DG 3 MONTHS OLD! | £700.00 |
| KENWOOD | TS-711E 2m MULTI MODE TRANSCEIVER | £375.00 |
| KENWOOD | TS-811E 70cm MULTI MODE TRANSCEIVER | £400.00 |
| KENWOOD | TS-830S HG ' CLASSIC' MAINS | £325.00 |
| KENWOOD | TS-850 SAT 100w HF BASE TRANSCEIVER | £850.00 |
| KENWOOD | TS-870 DSP HF/BASE TRANSCEIVER | £1,099.00 |
| KENWOOD | TS-940 SAT BUILT IN TUNER | £799.00 |
| KENWOOD | TS-950 SD DIGITAL 150W TRANSCEIVER | £1,395.00 |
| LINEAR AMP | EXPLORER AMP | £999.00 |
| REALISTIC | DX-394 HF RECEIVER (BOXED) | £99.00 |
| UNIDEN | BEARCAT 860XLT SCANNER BASE | £99.00 |
| YAESU | FC-20 Automatic ATU | £170.00 |
| YAESU | FC-757 ATU Automatic Antenna Tuner | £175.00 |
| YAESU | FC-902 500w Antenna Tuner | £135.00 |
| YAESU | FL-2100Z AMP | £499.00 |
| YAESU | FRG-100 | £295.00 |
| YAESU | FRG-9600 RECEIVER | £199.00 |
| YAESU | FT-0NE BASE HF / AC MAINS TRANS | £450.00 |
| YAESU | FT-1000MP AC LATEST SERIAL No. ! | £1,495.00 |
| YAESU | FT-101ZD HF TRANSCEIVER | £275.00 |
| YAESU | FT-101ZD MK111 FM HF TRANSCEIVER | £325.00 |
| YAESU | FT-102 BASE TRANSCEIVER 150w | £350.00 |
| YAESU | FT-3000M 70w 2m MOBILE TRANS | £225.00 |
| YAESU | FT-5100 DUAL BAND MOBILE TRANS 50w | £200.00 |
| YAESU | FT-5200 DUAL BAND MOBILE TRANS 50w | £220.00 |
| YAESU | FT-650 AC 26-50MHz 100w Base (VERY RARE) | £595.00 |
| YAESU | FT-726R 2/70/6M TRANSCEIVER | £599.00 |
| YAESU | FT-736R 2/70 cm BASE AC | £695.00 |
| YAESU | FT-767GX 2/70/6M HF inc ATU | £799.00 |
| YAESU | FT-7B HF MOBILE TRANSCEIVER MINT! | £225.00 |
| YAESU | FT-840 HF MOBILE-BASE TRANSCEIVER | £450.00 |
| YAESU | FT-847 HF/6M/2M/70cm/4m | £999.00 |
| YAESU | FT-8500 DUAL BAND MOBILE TRANS 50w | £295.00 |
| YAESU | FT-920 HF 50 MHz BASE TRANSCEIVER | £925.00 |
| YAESU | FT-990 AC HF BASE TRANSCEIVER | £800.00 |
| YAESU | SP-102 Ext Speaker inc filters | £45.00 |
| YAESU | VX-500 HANDY SCANNER | £195.00 |

# QRP

**REV GEORGE DOBBS, G3RJV**
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*E-mail: g3rjv@gqrp.com*

FOR THE LAST several years, the giant Dayton Hamvention in Ohio has attracted QRP operators to a special event. Called 'Four Days in May' (FDIM), the event is organised by the QRP Amateur Radio Club International. It begins with a full day of QRP seminars on the Thursday, followed by QRP events each evening of the Friday to Sunday Hamvention. One of the evening events is a QRP Home Construction competition with several classes, which always draws an attractive array of equipment, often inspired by imaginative classes of entry.

One of the interesting classes of entry for FDIM 2000 was the idea of Wayne Burdick, N6KR, the designer of the popular Elecraft K2 QRP transceiver. Named the 'One Volt Challenge', it was to design a transceiver of any kind that will function satisfactorily with a power supply in the range of 1.0 to 1.6 volts.

## SUCCESS AT DAYTON

I ANNOUNCED THE One Volt Challenge in the G QRP Club Journal *Sprat* and offered to take any suitable transceivers to Dayton and submit them for the competition.

I received two entries from members of the G QRP Club.

**G3RJV with the prize-winning G4DFV 'Hamoeba'.**

One was a direct-conversion transceiver for 40 metres called the 'Hamoeba', designed and built by Duncan Walters, G4DFV. The other was a TRF transceiver for 80 metres, designed and built by Chas Fletcher, G3DXZ. Both submitted full documentation and working prototypes, which I took to Dayton.

Wayne Burdick and Jim Kortge, K8IQY, a frequent winner in FDIM construction competitions, judged the One Volt Challenge. The competition standard was high, but the UK entries swept the board. The G4DFV 'Hamoeba' won the first prize and the G3DXZ TRF transceiver took the second prize. I was pleased to carry their prizes back to the UK. Well done to both of them.

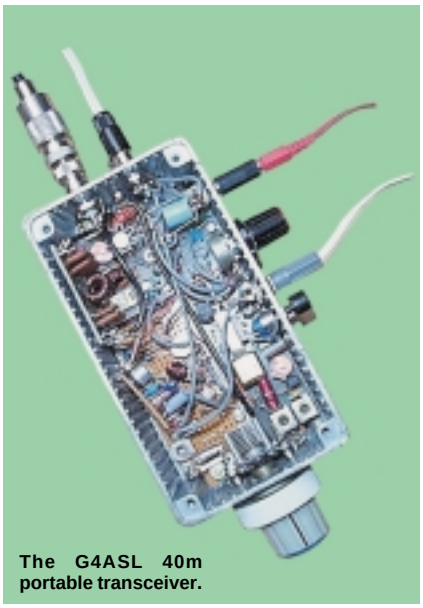
## OK8SL PORTABLE IN PRAGUE

QRP OPERATION has been popular in the Czech Republic for many years. The OK QRP Club is well-established, producing an excellent small magazine *OK QRP INFO* which has described many innovative QRP designs. I had the pleasure of spending several days in Prague with Petr Doudera, OK1CZ, the founder of the OK QRP Club. I was therefore pleased to hear about how easy it is for UK radio amateurs to operate in the Czech Republic.

Steve Ayling, G4ASL, now living in Poland and operating as SO5ASL, also holds OK8SL and was recently active in Prague using his home-built 40-metre portable transceiver. He says; "Obtaining the licence from the Czech Telecommunications Office was straightforward. I was able to choose my callsign during a personal visit, be on the air an hour later, and the printed licence followed in the post in seven days. The cost is 100 CZK, about £1.75. Of course operating with a CEPT licence is possible for up to three months, but my stay was longer."

The G4ASL 40-metre portable transceiver gives an RF output of about 1.5 watts and was used with a quarter-wave end-fed antenna loaded against a counterpoise. The transceiver is an interesting example of what can be done on the HF bands with a conventional, but well-designed home-made rig. Steve says: "Firstly I must point out that the rig is not state of the art by any means, neither now nor when I put it together in the early-to-mid-1980s. It could be described as a quite basic and straightforward design even for those days. It is a 40-metre, VFO-controlled, CW-only direct-conversion transceiver. It was intended for 'pedestrian portable' field use and hence the design was required to be small, light and require the minimum of power, including only essential functions.

**Steve Ayling, G4ASL, operating as OK8SL.**



**The G4ASL 40m portable transceiver.**

"The concept itself and the feeling of the fun that could be experienced from this kind of rig and 'go-anywhere' operating came from reading about the W7ZOI Ultra-Portable transceiver in *Solid State Design for the Radio Amateur* (1977), although the design I came up with bears no similarity."

The transmitter has a Colpitts VFO with separate buffered stages for the transmitter and receive mixer, followed by a class-A buffer and driver stages to a class-C power amplifier. All stages are tuned and link-coupled, and the output is via a symmetrical π-section low-pass filter.

The receiver input is through a 2-pole Butterworth bandpass filter to a common-gate FET RF amplifier and thence to a diode-ring type passive mixer. The resultant audio signal is coupled via a tuned audio transformer (resonated at about 800Hz) to a class-A audio pre-amplifier. It then passes through a two-stage active bandpass filter of 400Hz bandwidth and 800Hz centre frequency to the final TBA820M audio amplifier.

The original transceiver was housed in a diecast box only 8x15x5cm, but it has recently been rebuilt in a larger case with the addition of a power MOSFET final amplifier, raising the RF output to 4.5 watts. Steve hopes to be active with the improved transceiver from Prague and perhaps from Turkey and Malta during the course of this year. ♦

# SWL

**BOB TREACHER, BRS32525**
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*E-Mail: brs32525@compuserve.com*

DERRICK BROOKES has now received his RS number. It is RS182160. He was particularly keen to know if the Internet held a 'worldwide callsign directory'.

Derrick also sent an article about an Edwardian crystal receiver that was unearthed by a Midlands antique dealer almost 90 years after its maker had a historic brush with the law. A Worcestershire machine turner and clock repairer was listening in on the set's earphone on the morning of Monday 15 April 1912 when he tuned in to the CQD/SOS Morse distress signals coming from the sinking Titanic some 3,000 miles away across the Atlantic. Believing he ought to do something, the listener hurried to a local police station but he was not well received. It seems that the radio remains the only surviving receiver documented as having heard distress calls from the Titanic. It is now in private hands but was on show earlier this year at the NEC in Birmingham, alongside WWII spy radio transmitters and receivers and a Horophone time-signal receiver. This was at the National Vintage Communications Fair [see March 2000 *RadCom*, p9 – *Ed*]

## SWL QSLing

IT IS A FEW MONTHS since I tackled this subject, but following a few hours replying to SWL cards sent to M2000A, the time is clearly right to repeat a few 'rules'. At the time of compiling this column, I have replied to over 200 SWL cards for M2000A and I have to say that the standard of reporting left much to be desired – especially from British SWLs sending direct cards. The best SWL reports were from our French colleagues and it was surprising that 99% of bureau requests were fine.

The worst SWL report gave these details – "Sat Jan 2000; 7.05 approx; in QSO with 'various'"! I am sure that many stations receiving such a report would simply file it under 'WPB'.

Here are some of the things you *should* do when sending SWL reports –


**A room with a view: the QSL card of US SWL Bob Combs in New Mexico.**

Just include your QSL card, SAE and return postage – many amateurs are not interested in long letters or brochures.

Include the callsign of at least one station being worked by the station you're sending your card to – but, giving only one station 'being worked' lessens your chance of getting a card if you didn't copy the callsign properly.

Get the callsign of the station right - M2000A was not M200A.

Make sure your report is accurate – correct time, correct frequency, correct callsign of station being worked. *Do not* forget to include *any* of these.

Include an SAE or adequate return postage. Including $1 or an IRC is better than a return stamp, as postage rates have a habit of being increased. If there is no return postage, your card will be returned via the bureau, and it is not good enough just enclosing a blank envelope – write your address on it.

Make sure you put an Air Mail sticker (they're free from any Post Office) on any return envelope to anywhere outside the British Isles, including Eire.

Make sure the QSL card you order has the six main components needed for an acceptable SWL card – date (eg 5 Jan 00), time (UTC), frequency (eg 14.260kHz), station(s) being worked, mode, honest RS(T) report.

ILA members should ensure that their RS88763 QSL cards include their personalised number. M2000A received five reports from RS88763, but they were all from different SWLs. The DX4WIN software used by M2000A can cope with a longish SWL number, but your personalised number needs to be in a prominent place on the card - something like "73s from Bill 1062" is not good enough. I suggest your card should show your SWL callsign as "RS88763/1062".

I hope there are enough tips here to enable better quality SWL reports to be sent. Follow these 'rules' and watch your QSL returns rise! Finally, I have an M2000A QSL card for British SWL '26SV35' - if you read this, kindly send me a 26p stamp and I will reply to your direct report as I doubt that the Society bureau would know how to forward the card to you if I sent it via the bureau. ♦


**Stanislaw, SP9-1227, who has been an SWL since 1960. He has 810 awards and, as a result, has the SWL-CHC-800 Top Honours Award.**

# IOTA

**ROGER BALISTER, G3KMA**
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A REALLY overwhelming response greeted the announcement of 58 new IOTA groups in *IOTA Directory 2000*. A record 23 new groups saw activity in the weeks immediately following publication (see side panel) and, as this column goes to press, the tempo shows no sign of letting up.

Pride of place goes to Jose, CT1EEB, and Julio, CT1ZW, who joined Terceira resident Lionel, CU3EJ, at midnight GMT on 19 June (Start Date) to put brand new Azores Central group EU-175 on the air. Five minutes earlier, reference numbers had been flashed up on the IOTA Manager's website for eight new groups with resident amateurs. Within hours, stations from several of these were heard working massive pileups. Understandably, most of the groups newly-activated to date have been in Europe, augmented in part by five Black Sea groups.

Friday, 7 July 2000 was a Red Letter Day. Within the space of a few hours, stations from four new IOTA groups came on the air from four continents, an all-time record for any single day: KL7/W6IXP on Stuart Island, Alaska (NA-214/Pr); EM5UIA on Poludenyy Island, Ukraine (EU-182/Pr); 4W6GH/P on Atauro Island, East Timor (OC-232/Pr) and DS0DX/4 on Wi Island, Korea (AS-148/Pr). All four new numbers were given in just over 10 hours. A fifth continent - the 5I3A team on Yambe Island, Tanzania, whose AF-087/Pr had been issued just a few days earlier - was to be heard sharing in the pileup fun. Such is the truly international appeal of IOTA.

## IOTA 2000 ACTIVITY PROGRAMME

INTEREST REMAINS at a high level. Neville, G3NUG, reminds us that in September and October there are numerous counters for premium points. Look for island groups in the US, the Caribbean and South America.

The new *IOTA Directory 2000* shows an additional 58 groups. Many of these have been split from previously-activated groups. From the viewpoint of the IOTA 2000 Activity Programme, it is possible that the same island group could be claimed under both its old and new number. In order to avoid any confusion, the IOTA 2000 Activity Programme will be based on the 1998/99 and previous IOTA Directories. The only new IOTAs that will be added into the IOTA 2000 Programme will be those that arise when a previously unactivated group shown in the 1998/99 and previous IOTA Directories is activated. We will attempt to maintain a cross-reference between the new IOTA groups and the old ones on the CDXC web pages - www.cdxc.org.uk


**Stand manners - l to r: Jim, JA9IFF; Taizo, JA3AER (GW0RTA) and Takeshi, JI3DST, on the IOTA stand at the Kansai Ham Fair in June.**

## CONVERSION SHEETS

TO CLARIFY the previous point as far as it affects the HQ database scores of IOTA participants - all existing credits will be checked for correct reference number assignment in accordance with *Directory 2000* listings. If an island has been transferred from one group to another, existing credits will follow and applicants will need to find a replacement card for the original group to retain credit. The Committee did consider the alternative of not transferring old credits, but rejected it as contrary to established policy and, specifically, on 'fairness' grounds, since it opened up the possibility of the same card counting for more than one group for existing applicants, but not for future applicants.

The record conversion exercise has started. Current IOTA members with a score credited on the HQ database are asked to complete a Conversion Sheet to facilitate the moving of credits to the correct group. Conversion Sheets are available for downloading from either of the two websites (the IOTA Manager at www.eo19.dial.pipex.com/index.shtml or the IOTA HQ site at www.rsgbiota.org Hard copies are available from Lynnette Ranger, the IOTA Coordinator at RSGB HQ. The Committee encourages conversion action to be taken as soon as possible, since this opens the way for applicants to claim credit for the new groups (marked on the list alongside with an asterisk). ♦

*RSGB IOTA Programme, PO Box 9, Potters Bar, Herts EN6 3RH.*

## NEW REFERENCES

| | | |
|---|---|---|
| AF-085 | ZS | Western Cape Province North West group |
| AF-086 | *D4 | Windward Islands |
| AF-087/Pr | 5H | Tanga Region group |
| AS-145 | HS | Malay Peninsula South East group |
| AS-146 | BY4 | Shandong Province North East group |
| AS-147 | *JA8 | Hokkaido's Coastal Islands |
| AS-148/Pr | *HL4 | Cholla-bukto Province group |
| EU-170 | *9A | Dalmatia North group |
| EU-171 | *OZ | Jylland North group |
| EU-172 | *OZ | Jylland East and Fyn group |
| EU-173 | *OH1 | Lansi-suomi (Pori) Province group |
| EU-174 | *SV | Makedonia/Thraki Region group |
| EU-175 | *CU3-7 | Central group |
| EU-176 | *SM3 | Gavleborg County group |
| EU-177 | *SM5 | Sodermanland/Ostergotland County group |
| EU-178/Pr | *ES0,8 | Parnumaa County/ Saaremaa County South group |
| EU-179 | *UR | Mykolayivs'ka/Khersons'ka Obl: Black Sea Coast group |
| EU-180 | *UR | Respublika Krym: Black Sea Coast group |
| EU-181 | *LZ | Bulgaria group |
| EU-182 | *UR | Odes'ka Obl: Black Sea Coast group |
| EU-183 | *YO | Romania group |
| EU-184/Pr | *OH8 | Oulu Province group |
| NA-213 | *W4 | Alabama State group |
| NA-214/Pr | *KL | Nome County South group |
| NA-215/Pr | *KL | Northwest Arctic County group |
| OC-232/Pr | *4W | East Timor's Coastal Islands |
| SA-087 | LU | Santa Cruz Province North group |

Pr = provisional  * see text

# WWW

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FROM TIME TO time, a web site is found that is simply a cut above the rest, and the Heavens Above site [1] certainly fits in this category. Recommended by Joe Glover, G3FIC, who found it via a mainstream computer magazine, Heavens Above is an English language site maintained by Chris Peat, the original site having been created by the German Space Operations Centre. Its primary function is to predict the positions of earth-orbiting satellites, with the unique feature of the ability to create predictions based on any position on the planet.

The home page leads you through the position-selection process, using either latitude and longitude coordinates or by selecting a location from a database of over two million towns and villages world-wide. When the position has been selected, the main menu page based on that location is presented, so this is the page to bookmark. From then on all tables, listings and graphics will be based on the registered location, with all time information being 'local time', including allowances for summer/winter variations.

The main emphasis of the information available is for visible events; predicting when *Mir* and a variety of other satellites and large items of 'space junk' will be visible to the naked eye. Of particular interest to the amateur radio enthusiast is a 24-hour prediction page for all known amateur satellites. A popular feature of the site is the 'Iridium Flare' predictions, which were a new concept to me but sound fascinating; a full explanation of the phenomenon being available on the FAQ page. The uncertain future of the Iridium satellites may result in these predictions becoming obsolete in the future, so I recommend taking a look at this feature before it's gone forever.

For those with an interest in general astronomy, planetarium type functions can be used to generate star maps giving constellation and planetary position details, including a whole-sky map that can be printed for reference and later use. When I first visited this site it was in the middle of a period of bad weather, with clear skies frustratingly being a distant prospect, but I shall certainly be visiting Heavens Above on a regular basis and doing some 'satellite spotting' when visibility finally improves.

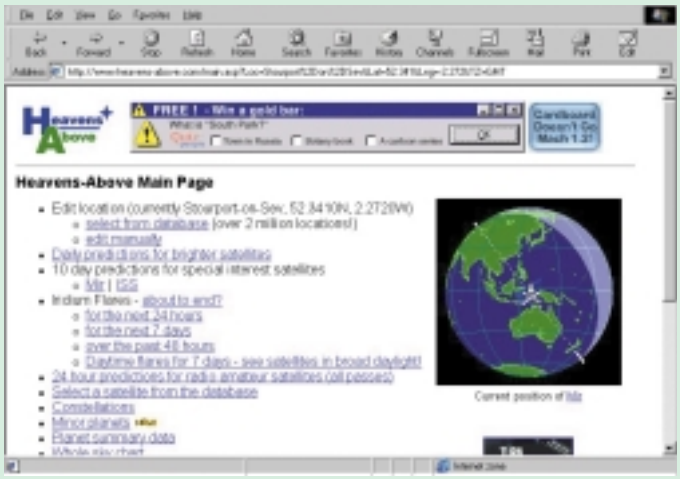
## HOMEBREW FOR ALL

I HAVE ALWAYS had the greatest admiration for amateur radio enthusiasts who display great skill in the homebrew aspect of the hobby, especially those who not only build, but also design their own equipment. This appreciation is multiplied when someone has taken the time to create a web site, to pass on the fruits of their labours to others. One such homebrewer is Eamon Skelton, EI9GQ, [2] whose unassuming web site contains a wealth of circuit ideas and projects.

For an introduction to circuit fundamentals, Eamon presents a number of building-block circuits for both transmitters and receivers. These include circuits for oscillators, amplifiers and mixers, often exploring alternative methods of achieving the same end product, for example comparing bipolar transistors and FETs when used in similar configurations. To complement these basic circuits, Eamon describes a selection of complete projects, ranging from a simple TRF receiver to a multi-band HF transceiver.

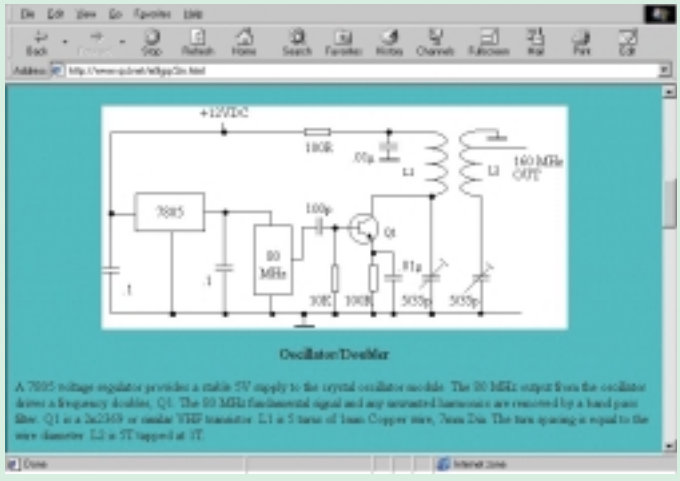
All the projects have been built previously by Eamon, and are presented using very clear circuit and block diagrams, plus photographs of the finished articles. Easy-to-follow explanatory texts accompany each diagram, though Eamon concentrates on the functions of the circuits rather than attempting to provide a step-by-step constructional guide. This approach encourages experimentation, especially as Eamon provides enough information with most of the circuits to enable them to be adapted for alternative frequencies and uses.

With additional designs for an ATU, power supplies, an iambic keyer and a J-pole antenna, to name but a few, this site gives enough information for the construction of a complete homebrew station. The construction pages are complemented by a very selective collection of links to the web sites of other homebrewers, plus good sources of semiconductor data and pictures of home-built equipment. Overall, this is a very focused web site that is an essential port of call for anyone starting-out in home construction.




**Keep an eye on the sky with Heavens Above.**

**REFERENCES**
**[1] http://www.heavens-above.com (Heavens Above)**
**[2] http://www.qsl.net/ei9gq (EI9GQ homebrew site)**
**[3] http://www.btinternet.com/~g4fgq.regp (G4FGQ software archive)**



**Circuit ideas from EI9GQ.**

## MODELLING SOFTWARE

ANOTHER AMATEUR radio operator who is 'putting something back' into the hobby is Reg Edwards, G4FGQ, whose software page [3] is a repository for a variety of mathematical modelling programs. The majority of the programs relate to antenna or feedline mathematics, allowing numerous parameters to be adjusted and the performance of the subject calculated.

Reg's software has been written to run under DOS on a PC, so the performance level of hardware required is not particularly demanding, however each of the programs demonstrates perfectly the task that a computer is best at; pure number crunching. All the programs may be freely downloaded and used, and it's well worth visiting the site on a regular basis to see what new goodies Reg has added to the archive. ♦

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# SPACE

**DENNIS KITCHEN, G0FCL**
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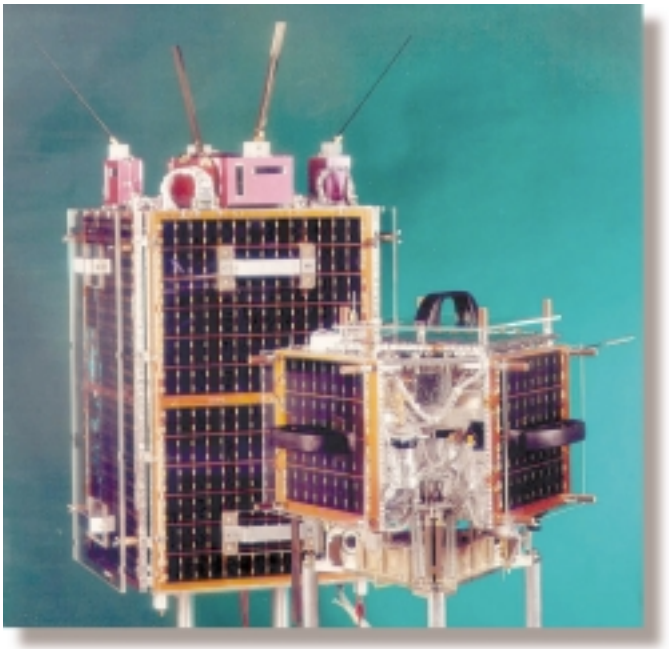
*E-mail: space.radcom@rsgb.org.uk*

***Zvezda*, the third module of the International Space Station.**

SEVERAL notable events have occurred recently. The bad news is the death of Werner Haas, DJ5KQ, Vice President of AMSAT-DL and one of the leading architects of the Phase III satellite programme notably, of course, Phase IIID. It is a measure of his dedication that, already ill, he made the trip to Orlando to perform the last acceptance tests on the satellite. Unfortunately he didn't live to see the satellite launched, but it is fitting that Werner made the first contact through Phase IIID (in March 1997 at the AMSAT Integration Lab) with Peter Gülzow, DB2OS.

The other bad news is that the already-delayed launch of Phase IIID looks like being delayed still further. Arianespace has released a press statement announcing the launch postponement of Flight 130. It is not known how the delay may affect the upcoming launch of Phase IIID. AMSAT-DL is exploring the delay on behalf of the Phase IIID team.

There has been better launch news however. The next ISS module was successfully despatched on 12 July 2000 at 0456 from the Baikonur Cosmodrome in Kazakhstan. This is the third module, called *Zvezda* ('star' in Russian), of the International Space Station (ISS). With this service module successfully docked, there will be a sufficient number of ISS modules to allow a full-time crew to move in, planned for November 2000. The module is of great interest to the amateur radio community, because it is the unit where most of the amateur radio equipment will be located, although it is likely that initial operation will be mainly on 2m. The Russian engineers really did a great job in planning for antennas on ISS. The service module *Zvezda* has four multi-purpose antenna ports installed. Each one of these empty antenna ports can be used simultaneously for commercial and amateur radio. The simultaneous working is achieved by multiplexing the signals, which allows 2-3 different signals to share a single antenna port. The *Zvezda* service module antenna port number 1, for example, will have three antennas multiplexed into one cable, supporting the amateur frequencies 144 to 146MHz, 435 to 438MHz and a wide-band L/S antenna for 1.2 to 2.5 GHz. AMSAT Italy designed the ISS triband antenna for port 1. The antennas will be installed after docking, during a space walk scheduled for the summer of 2001.



**Tsinghua-1 and SNAP-1 at the Guildford assembly facility, shortly before their launch.**

**(Photo: SSTL)**

## SNAP & TSINGHUA

ANOTHER successful launch also took place at Baikonur. Surrey Satellite Technology Limited (SSTL) recently announced the successful launch of two new satellites, Tsinghua-1 and SNAP-1, by a Russian COSMOS rocket. The Tsinghua-1 microsatellite, a collaborative project with Tsinghua University in Beijing, China, was designed and built by a joint Tsinghua/SSTL team at Surrey Space Centre, in Guildford, UK.

Tsinghua-1 carries multi-spectral Earth imaging cameras as well as experimental communications payloads, including digital store-and-forward, a digital signal processing (DSP) experiment, a GPS space receiver and a new 3-axis microsatellite attitude control experiment. SNAP-1, (Surrey Nanosatellite Application Platform), the UK's first nanosatellite, was designed and built by SSTL as a research project for evaluating the use of commercial microminiature technologies for highly advanced, yet tiny, satellites. Surrey calls SNAP-1 'a highly integrated and sophisticated spacecraft'. It weighs just 6.5kg and carries GPS navigation, camera technology, onboard computing, and propulsion and attitude control technologies. SSTL reports that both missions are experimental and, using an inter-satellite link, it is planned that the SNAP-1 and Tsinghua-1 spacecraft will attempt to rendezvous in orbit and demonstrate (for the first time) formation flying of nanosatellites and microsatellites. Both satellites are in a 650km sun-synchronous orbit.

## SPACE SYMPOSIUM

THE 18th AMSAT-NA Annual Meeting and Space Symposium will be held on 27-29 October 2000 (Friday to Sunday) at the Holiday Inn West, Portland, Maine. This event will be well worth visiting. The organisers are currently asking for papers on topics covering the diverse aspects of the amateur radio satellite disciplines. If authors do not wish to present a paper, but have a topic of interest, they are asked to submit the topic and perhaps arrangements can be made for presentation and publication in the Proceedings document. ♦

### Phase IIID Modes

In anticipation of a successful injection into orbit, here is some information on the Phase IIID operation. The transponders are arranged in a matrix and can be cross-linked. Hence the uplink on 21MHz and downlink on 145MHz would become mode 'TV'. (ie quite logical). A while ago it was decided to use a two-letter designator instead of the old single-letter transponder mode designators on Phase IIID, simply because there are so many different combinations of receiver and transmitter possible. The first letter stands for the uplink, the second letter for the downlink.

These letter assignments are consistent with the usual microwave band designations, where 'K' for example means 18 to 26.5GHz. Unfortunately, the HF bands do not have such fancy letters, so Matjaz Vidmar, S53MV, was allowed to decide (since he built the 21 and 24MHz receivers for Phase IIID). He commented that the Russian satellites used 'T' for their 21MHz transponder and suggested doing the same. There was no letter for the 24MHz receiver however, so the letter 'H' was picked for this band.

| Ltr | Freq | Remarks |
|---|---|---|
| T | 21MHz | Uplink only |
| H | 24MHz | Uplink only |
| V | 145MHz | Uplink and Downlink |
| U | 435MHz | Uplink and Downlink |
| L | 1.2GHz | 2 Uplinks only L1, L2 |
| S | 2.4GHz | 2 Uplinks and 2 Downlinks S1, S2 |
| C | 5.6GHz | Uplink only |
| X | 10GHz | Downlink only |
| K | 24GHz | Downlink only |

# µWAVE

**SIMON LEWIS, GM4PLM**

*Creoch Farm, Ochiltree, Ayrshire KA18 2QH.*
*E-mail: uwave.radcom@rsgb.org.uk*

Microwaves have always been at the forefront of amateur experimentation and this still continues today. Somewhat surprising some would say? But, given that modern microwaves still represent the 'new' ground, with new semiconductors being released weekly and that commercial users regard our 'interesting' propagation modes as 'anomalous', it really is the cutting edge of radio and one in which anyone of us can play a role, if we desire.

This is entirely true with the article on p29 of this month's *RadCom* by Dave Robinson, G4FRE, and his 145GHz exploits (yes it does exist, honest!). If you read this I am sure you will agree that Dave should be congratulated on his groundbreaking work at such amazing frequencies.

There is another important aspect of Dave's work. He has taken time and effort to exploit an amateur microwave allocation. When was the last time you became active on a new microwave band? Activity levels are safe on 3cm, with a wide range of fixed and portable stations active, but what about other allocations? 23cm is seeing a slow but gradual increase in activity, mainly due to the release of new kits by the likes of G3WDG and DB6NT, but the other bands are still slow. There is no real excuse! Kits are available for 2.3 - 5.7GHz from a number of sources, and you don't need masses of power. I think it was my microwave mentor, Mark Hughes, GM4ISM, who once said to me that it didn't matter what he had in the way of equipment for each band, as long as he could radiate 'some' signal, he would work something, and he does! So even a QRP station on a new band is better than not using the band at all. There is plenty of scope for activity below 10GHz so come on - get building!

## MICROWAVE ROUND TABLES

FOR THOSE OF you who have never visited a Round Table, a word of advice. You don't know what you have been missing! Round Tables are specialised meetings for microwavers. They usually include a variety of talks, test equipment for helping align that latest masterpiece, sometimes a small Bring and Buy or surplus sale and much more. Their biggest asset is the ability to meet others with the same interest in radio as yourself, and all in one small spot. Go along, you won't be disappointed. The next two Round Tables have just been announced: Adastral Park - Sunday 12 November - although primarily a Sunday event, a Saturday night get-together is also planned. Details have not yet been finalised. The event is being run by John, G3XDY, and Sam, G4DDK, (both QTHR). The programme is still flexible, but I am promised that there will be some extra special events throughout the weekend, so keep your eye on this column (and Sam's, G4DDK, website) for further details.

The second event is being kindly hosted by the Government Communications Headquarters at Cheltenham, Gloucester on Sunday 3 September. The event will commence at 1000, ending at 1600. Access to the event is *strictly* by ticket in advance, due to the nature of the location. All the normal Round Table events will be on the go, including a Bring and Buy. Tea, coffee and biscuits will be available free during the day and, if enough people attend, the staff canteen will be opened for lunches. For further information please send an SASE to N Negus, T13H1, 4/0404, GCHQ, Fiddlers Green Lane, Cheltenam, Glos GL52 5AJ. Please include your name, address, postcode, callsign, telephone number, nationality and date of birth, and an indication of whether you would like to use the restaurant facilities for lunch (cost approximately £5).

## IONICA MICROWAVE UNITS

PETER, G3PHO, IS searching for information or circuit diagrams for the Ionica domestic telephone units installed widely across the country until Ionica folded. The item of interest here is the small hexagonal-shaped antenna unit that mounts externally to the building. This houses an RF unit containing a data transceiver. Of particular interest in my unit is the small PA board which looks to be approximately 1 watt. It is sweated onto the main board and would require some surgery to extract it. Has anyone else come up with information or conversion details? Peter states he has seen lots of them on houses in Sheffield and he is tempted to ask the owners if they would part with them for a small fee. Peter is QTHR or can be e-mailed at g3pho@geocities.com Alternatively, e-mail me and I will include the details for all in this column.

## MICROWAVE UPDATE 2000

THE MOUNT Airy VHF Radio Club, affectionately known as the 'Pack Rats', will be hosting the world's most prestigious microwave event, *Microwave Update 2000*, from 28-30 September. This event is held in different locations each year, and this year it is the turn of the Pack Rats in Philadelphia, Pennsylvania. A special addition this year is the annual 'Hamarama' on 1 October, so it looks like a packed four days of fun! The programme over the three days of the microwave event is fairly packed, and will include a tour of local microwave surplus emporia, a full conference programme and plenty of socialising with other microwavers. This is truly a global event with microwavers from across the globe including a large UK contingent. You can obtain further information from John, KB3XG (johnkb3xg@aol.com).

## QTH MOVE AND REQUEST

CAN ALL READERS please note that my QTH move is complete and all correspondence should be sent to me at the new address. My new telephone numbers are 01290 700008/700006. My e-mail addresses remain the same: gm4plm@emn.org.uk or uwave.radcom@rsgb.org.uk

Finally, I have not received one single item for inclusion from you! That either means that (a) you are so happy that you do not feel any need to send input, or (b) you are so bored that you have all gone to sleep! Either way, I would appreciate some input from you all. ♦

**Call of the wild: Paul, G6UAJ/P, out on 10GHz.**

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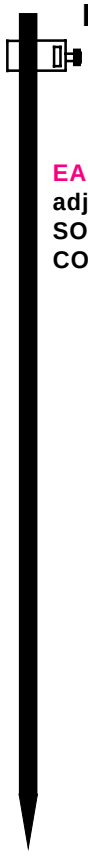

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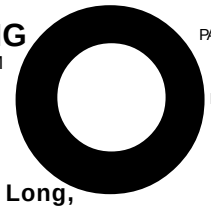

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# the last Word

## Politics, Politics

I fully concur with the letter by I J Osbourne, G4LKZ, printed in 'The Last Word', headed 'Unwelcome Politics' (*RadCom*, July 2000). Our licence conditions deem that we do not discuss politics over the air, so why introduce it into our magazine? We all know that 'Town Twinning' was the thin end of the wedge, which is pushing us toward a Federal Europe, so club twinning should be forbidden as it is too controversial and would smell of Brussels domination.

***Ron Tucker, G3KTC***

G4LKZ displays a touching naivete about amateur radio and politics. Without politics the IARU would find agreement between its diverse membership difficult and relations with the intensely political ITU all but impossible. But then I suppose one should not mention the latter body, funded as it is by another supra-national body with its own 'political' flag, namely the United Nations.

***Keith Mendum, G8RPA***

## The Late G5RV

It was with much sadness and regret that I read of the passing of G5RV, probably the UK's most famous radio amateur.

Although I never had the pleasure of meeting the man himself, it is blatantly obvious that his reputation as a selfless campaigner for the amateur radio cause went before him and anyone who had an ounce of radio in their blood can only have the utmost respect for him. His G5RV aerial was the first antenna I ever installed as a short wave listener some 18 years ago and I still have one to this day, a trend which I'm sure lots of amateurs have followed. His technical knowledge, both in his professional and amateur radio life was - and probably still is - unrivalled.

Amateur radio has obviously lost a great ambassador. It is this reason that inspired me to write to you, not only to pay my respects but also to suggest that the passing of such a talent cannot and should not go unrecognised by the amateur radio community. His name and call sign should be remembered in some way, either by an award or some form of memorial.

Just my opinion of course, but I would be interested to hear the views of others on this subject.

***Brian Pickup, M1BTP***

## Radio, but Not as We Know It

The feature on pages 38 - 39 of July's *RadCom* on software-defined radios (described in the GB2RS news as possibly heralding "a new era of amateur experimentation and could represent the final merger of radio communications and computers") was, in my humble opinion, the most important statement about radio we have seen. Let us be clear what this type of radio offers: no RF/IF/AF stages; which means an end to RF/IF/AF design, technology, skill, experience and anything else 'radio'. Where then does this leave amateur radio?

First, let us consider where and why radio started. It was driven by our need to communicate. Amateur radio led the way. Up to about 15 years ago, having an amateur station at home or in the car gave the Ham something special; the ability to speak to someone at a distance. That special place has now gone forever. Almost everyone has a telephone, a mobile phone, the Internet, even a walkie-talkie - and they can easily, dependably and inexpensively communicate. An example: "What's the point of Morse, Dad?", my son and his friends ask. I explain patiently about bandwidth and noise, to which they nod and then explain that if I lose the contact I can always e-mail, SMS or phone him on GSM to help re-connect!

I have watched with interest the various schemes introduced to encourage new blood into the hobby. Given the importance of the above feature, I am now convinced that we have got it very wrong. We should not be looking for new ways of attracting people into the hobby: rather we should be changing the hobby to fit the new environment in which it operates. Like it or not, the days of the soldering iron and Morse code are as good as gone. I strongly suggest that we focus our efforts from defensiveness and trying to sell old-fashioned, out-dated baggage to a new generation, and move toward merging with the very area that threatens our demise!

Make amateur radio an essential part of the modern computing hobby!

***Steve Vaughan, G4WXC***

## Cover Lines

Congrats on the new front cover of *RadCom*! It is great: colourful and modern. I think it will appeal to the younger generation as well, and that is a good thing.

***Dick Rollema, PA0SE***

Sorry, but I don't like the new *RadCom* nearly as much as the old one.

***Keith Powell, G4JVX***

I am delighted to congratulate you on the new cover style and banner. It is lively and modern, but avoids being tacky or childish. Well done.

***J A Butt, G8VXH***

## A Super Magazine

I have just read the editorial in the latest edition of *RadCom* which arrived yesterday.

I was a little perturbed to read that there are plans afoot to alter the content of *RadCom*. For what it is worth, I am very happy with the current balance. There is just the right mix of news, technical articles, specialist columns and band/contest reports. Unless the intention is to increase the number of pages, I would suggest it should be left well alone.

I am involved in other pursuits whose magazines are predominantly reports of meetings - and they make very dull reading unless you happened to have participated.

*RadCom* is a super magazine in its current format. It works well.

***Richard Marshall, G4ERP***

[The editorial comment in question refers to the styling and layout of *RadCom*, not the content, but all things must evolve if they are to survive and flourish –*Ed*]

## Against The Odds

I would just like to take this opportunity to say a few words of well-deserved praise to all the crew at Martin Lynch & Sons, after I took my 5WPM Morse test there on Saturday 29 July

The build-up to the occasion was extremely tense for me as I am just recovering from a badly broken foot and, as such, my mobility has been severely impaired. Coupled with this is the fact that I should have taken the test years ago when I had less to do, was more at ease and was considerably braver than I am now.

After telephoning the store all my worries were put at ease, as the shop has full access for wheelchairs and is open plan (as it is, I am now walking with the aid of crutches). Having found the shop from the tube station (excellend directions given) I was greeted with a smile, a cup of coffee and a much-needed chair. Whilst I sat with the other anxious candidates, Martin and his staff were very reassuring and helpful. The occasion soon started to become quite enjoyable! On arrival, the examiners were just as friendly. Although I had an attack of the shakes, with their help I soon completed the test.

If all Morse tests are conducted this way I would strongly recommend anyone to participate, as the sense of cameradery in such a nervous situation is something to be experienced. My only regret is that I was not brave enough to go for the 12WPM test, but maybe next time.

***Ryan Pike, G7JLF (M5???)***

## Chirps Project

I am very impressed by 'Chirps: A New Way to Study HF Propagation' (*RadCom*, July and August 2000). It shows again what an original, gifted and versatile wizard Peter Martinez is! He already gave us AMTOR and PSK31, and now this marvellous new tool. I discussed it with *Electron* (NL) Editor Gerrit-Jan Huijsman, PA0GJH, and he heartily agreed it would be an excellent idea to translate the article for publication. I will take care of the translation myself.

***Dick Rollema, PA0SE***

[Though not formally required between IARU member societies Dick went on to ask, on behalf of the *Electron* editorial committee, for permission to translate and publish the feature in the VERON magazine. Naturally he got it. –Ed]

Thank you for the 'Chirps' project in *RadCom*. I think it was one of radio's great detective stories; the equal of Geoff Perry's location of Russian rocket launch sites using an ex-WD CR100 and a group of sixth-form students at Kettering Grammar School.

Peter Martinez deserves an award for this work and all other services to radio. From hearing a chirp by accident and asking himself what it was, a great investigation took place that has changed propagation work forever. Give the man an OBE, MBE, etc!

***Albert Heyes, G3ZHE***

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**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.

**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

**ICOM 740** HF Transceiver with manual, Tokyo coupler £260. D/Beam scope £25. Absorption power meter £25. 01708 342176 (Romford).

**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

**PROGRAMMED PROMS AND EPROMS FOR PMR EQUIPMENT,** Details, S.A.E.: Atlanta Communications (RC), PO Box 5, Chatteris, Cambridgeshire PE16 6JT

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**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

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**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

**YAESU FT102** with ATU 102, SP102 Dummy load, spare valves, mic., manual £500 ono. G3FM 01803 292128

## MISCELLANEOUS

**CALL IN ON THE 'GOOD NEWS' CHRISTIAN NETS!** Every Sunday at 8am and 2pm around 7047kHz and 144.205MHz on 3747kHz 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.

**VIDEO TAPE CONVERSIONS** to and from all modes NTSC : SECAM: PALN : PALM Digital processing. Fast and economic service. Also 'cine' conversions. Phone G4WMP 01932 846139

**WIRELESS SET FAULTY?** I am able to repair any old Valve Radio, Valve Hi Fi, Guitar amp (valve type) Crystal set, Communication receiver, etc. Enquiries R.B. Kerr, GM4FDT, Tel: 01349 852332

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# CLASSIFIED Cont'd

**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).

**FRIEDENFELS IN BAVARIA,** Locator JN 69 AV, is a wonderful resort to spend your holiday, in the apartment house of
"ARNO" DL 6 SX.

For further details print-out from www.schmahl.de or write to: Arno Schmahl, DL6SX D-95688 Friedenfels or fax to: 0049 9683454.

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Email: aris@stuartalexander.co.uk

## WANTED

**CUSHCRAFT R7000** Vertical antenna system. G3SMK Tel: 01564 703423 evenings.

**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

# www.rsgb.org/shop

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# Advertisement Index



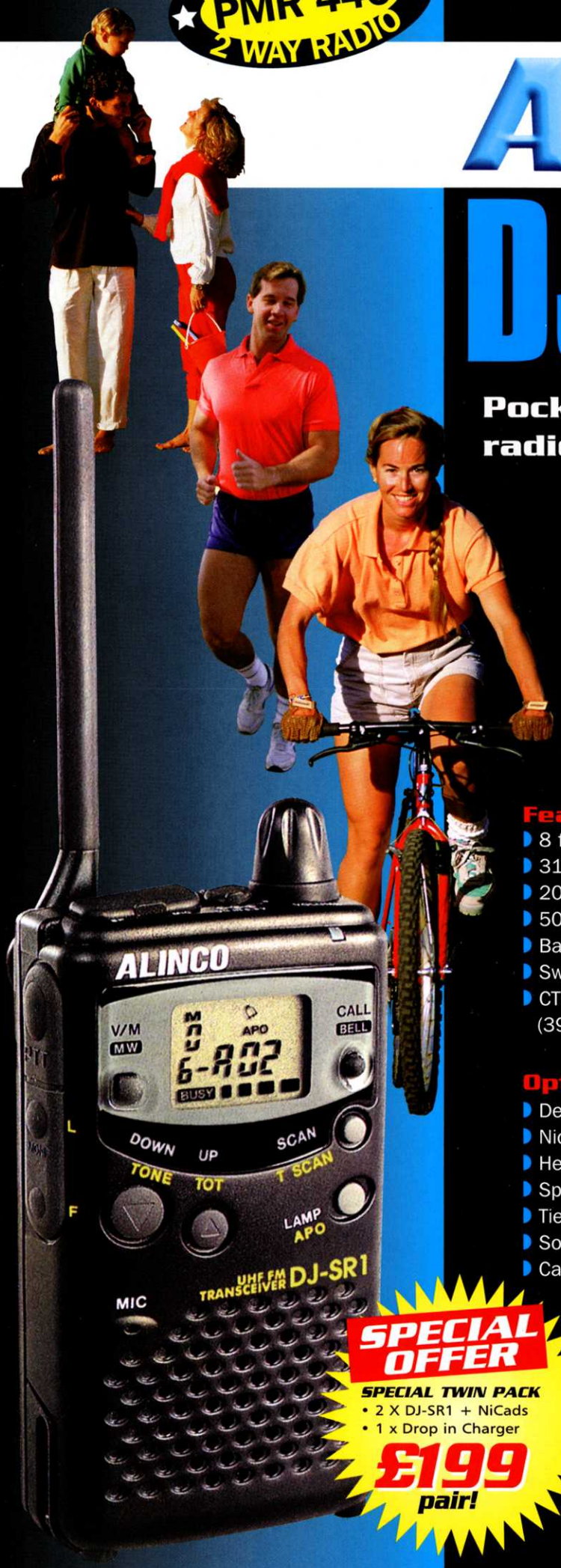
## Next Advertisement Copy Date:

**Display advertisement copy date for October 2000 is 1 September**

LICENCE FREE
PMR 446
2 WAY RADIO

# ALINCO
# DJ-SR1

## Pocket sized lightweight radio - packed with features




### Ideal for

- Business • Personal • Leisure
- No call charges - no Licence fee
- Japanese high quality construction and design gives maximum possible range with outstanding audio clarity.

*The new Alinco DJ-SR1 is the perfect radio for a wide variety of applications giving clear communications up to 2 miles range (depending on terrain).*

### Features

- 8 frequencies
- 312 channel modes
- 20 memory channels
- 500mW output power
- Battery level indicator
- Switchable hi-low power
- CTCSS on/off (39 tones per frequency)
- Channel monitor
- Private call channel
- Time out timer
- Bell function
- Memory scan
- Channel scan
- Power save mode
- Weight 190g
- Channel finder feature

Rec Retail
**£89.95**

### Optional extras

- Desk charger • £29.95
- Nicad batteries • 12.95
- Headset with VOX • £39.95
- Speaker mic • £24.95
- Tie-pin mic • £45.95
- Soft case • £14.95
- Car DC lead • £27.95

**SPECIAL OFFER**

***SPECIAL TWIN PACK***

- 2 X DJ-SR1 + NiCads
- 1 x Drop in Charger

**£199 pair!**

Alinco products are distributed in the UK by:

**NEVADA**

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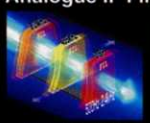
website: www.nevada.co.uk
e-mail: info@nevada.co.uk

# "Brick-Wall" Selectivity

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.

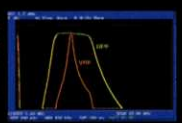

IDBT: A Breakthrough in Selectivity!


10-pole Collins® Mechanical SSB Filter

## 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.


VRF Features Large, High-Q Coils and High-Quality Relays


VRF Typical Bandpass Response (3.5 MHz)

## III. 200 Watts of Transmitter Power Output

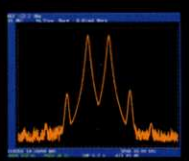
Utilising two Philips® BLF 147 Power MOSFETs in a 30 V push-pull configuration the MARK-V's Transmitter generates up to 200 Watts of the cleanest RF Power output available thanks to the conservative design of the PA Section.


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!

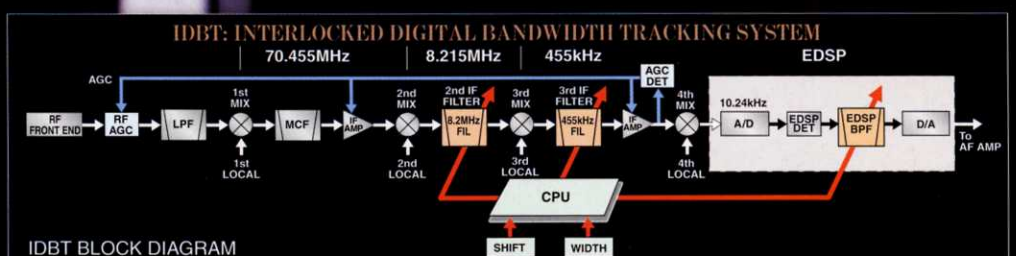

Access VRF and IDBT Features via Shuttle Jog Dial


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 BLOCK DIAGRAM

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