Tune up your antenna - without keying the transmitter

RadCom

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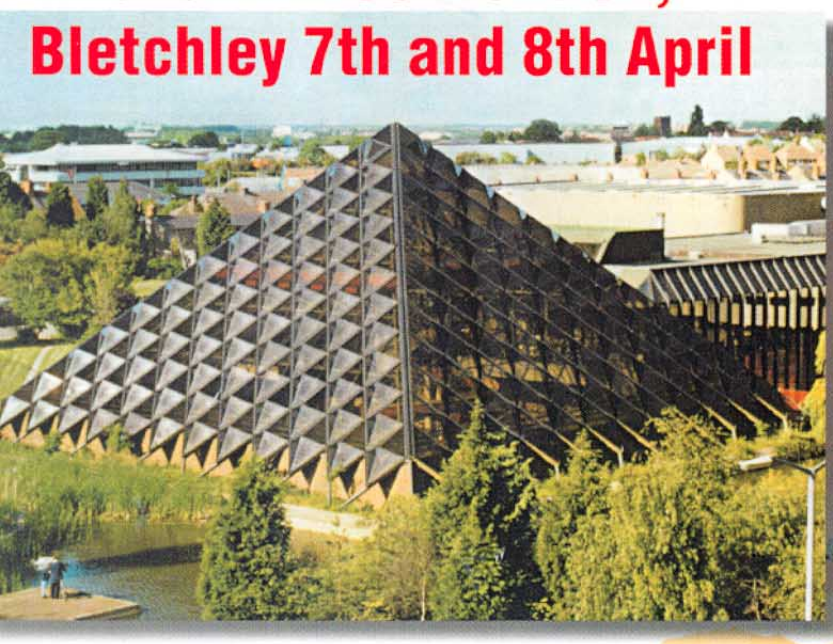
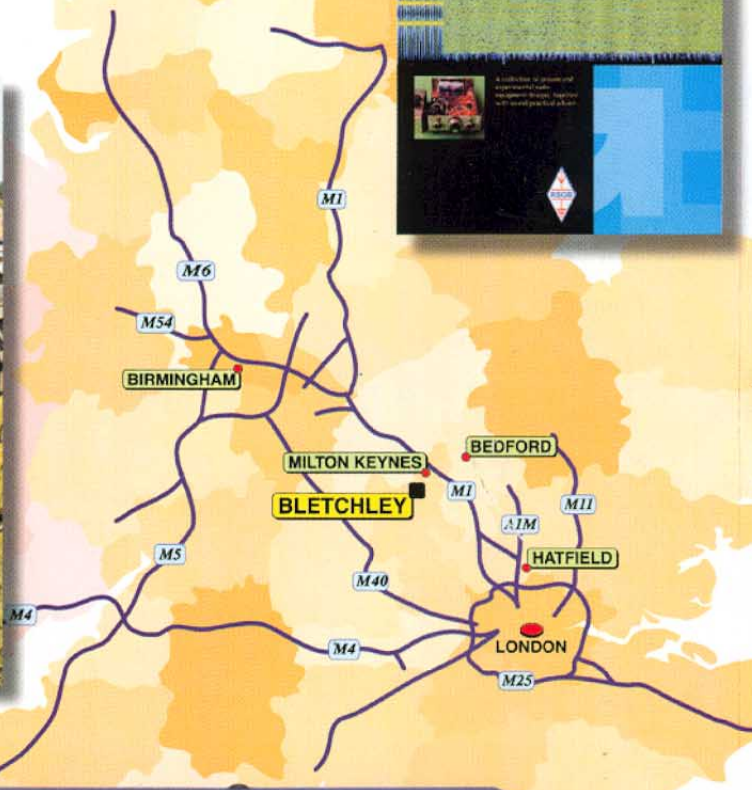
0401

£3.95 Vol 77 No 4 ♦ April 2001 The Radio Society of Great Britain Members' Magazine

This Month's Special Offer See Page 9

Don't miss the RSGB Spring Show and VHF Convention, Bletchley 7th and 8th April





Peter Hart reviews the TS-2000 13-Bander

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YAESU
Choice of the World's top DX'ers

ANY BAND, ANY MODE, ANYWHERE

FT-817

£ PHONE

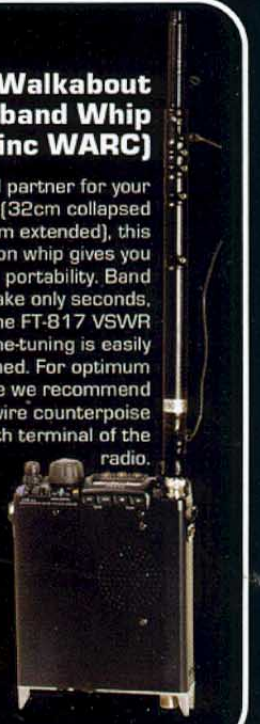
You're Never Alone with an FT-817!

The FT-817 operates on ham bands from 1.8 to 440MHz, SSB, FM, CW and AM. Use rear mounted SO-239 socket for base operation, or switch through BNC top socket for portable work (6m, 2m and 70cm whip supplied). There's bags of features with a comprehensive programmable menu. You can select the internal electronic keyer, check your VSWR, add a narrow CW filter and even change the colour of the display. But that's not all. There are over fifty other programmable features! This really is the radio you can take anywhere. It's as much at home in your shack as it is in your hand baggage. And with AA cells available almost anywhere in the world, you will never be short of power. Download leaflet from our web site at wsplc.com.

FREE MATCHING FNB-72 NICAD PACK & NC-72C CHARGER

ATX Walkabout Multi-band Whip 80m – 6m (inc WARC)

The ideal partner for your FT-817, (32cm collapsed and 1.65cm extended), this ten-section whip gives you true portability. Band changes take only seconds, and with the FT-817 VSWR meter, fine-tuning is easily accomplished. For optimum performance we recommend adding a wire counterpoise to the earth terminal of the radio.



Waters & Stanton PLC Open Day 13th May!

YAESU FT-1000MP Mk-V 200W HF All Mode Transceiver

£2899
Plus £7.50 Carr.

The New Industry Standard ..... Would a Serious DXer accept anything else ?

In choosing the FT-1000MP Mk V, you will be proud to own a rig with an impressive specification, reputation and lineage. Its outstanding performance and attention to detail, makes this the premier HF transciever for the 21st Century. This radio is a class leader.

19.4% APR: Deposit £299 and 36 months at £90.27.

YAESU FT-1000MP AC
160 - 10m All Mode

SAVE

£1799
Plus £7.50 Carr.

19.4% APR Available

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

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

19.4% APR: Deposit £199 and 36 months at £57.77.

ICOM IC-746
160m - 2m All-mode

£1395
Plus £7.50 Carr.

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

19.4% APR: Deposit £145 and 36 months at £45.13.

ICOM IC-756PRO 1.8 - 52MHz 100W

£1895
Plus £7.50 Carr.

Free desk/mic

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.

19.4% APR: Deposit £229 and 36 months at £71.13.

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.

19.4% APR: Deposit £129 and 36 months at £35.02.

YAESU FT-847
160m - 70cm All Mode

SAVE

£1199
Plus £7.50 Carr.

SCOOP!

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

19.4% APR: Deposit £129 and 36 months at £38.63.

KENWOOD TS-570DG
160 - 10m All Mode

£849
Plus £7.50 Carr.

19.4% APR Available

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

19.4% APR: Deposit £89 and 36 months at £27.43.

ONLY TWO PLACES TO GO FOR THESE FINE RADIO'S

YAESU

FT-817

WATERS & STANTON @ LOWE

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BLETCHLEY PARK SHOW 7TH AND 8TH APRIL
ALEXANDRA PALACE SHOW 21ST AND 22ND APRIL

ICOM

IC-706IIG 160 - 70cm All Mode

£1099 Plus £7.50 Carr.

SCOOP!

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

19.4% APR: Deposit £129 and 36 months at £35.02.

TS-2000 Multi Band/Mode Transceiver

WEB SITE!

Kenwood promise a top performance 160m - 23cms transceiver. Full details are in our latest catalogue and web site.

£1695 Plus £6.00 Carr.

KENWOOD

TM-D700E 2m / 70cm Data Mobile

£449 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!

WMM-3 Data Modes

£69.95 Plus £6.00 Carr.

If you want to receive data, then connect the audio output of your receiver to the WMM-3 and the output of the modem to your PC serial socket. A CD-ROM is provided with lots of software, this will get you started.

£269 Plus £6.00 Carr.

YAESU

VX-5R

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

YAESU

FT-50R

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

£169 Plus £6.00 Carr.

IC-910 VHF/UHF Transceiver - Coming Soon

£1299 Plus £7.50 Carr.

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

Optional 23cms + £400

YAESU

FT-11R 2-Metre Handheld

SCOOP!

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

£119 Plus £6.00 Carr.

ICOM

IC-2800H In Full Colour!

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

£419 Plus £7.50 Carr.

Includes FREE Remote head cable.

KENWOOD

TH-D7E

£259 Plus £6.00 Carr.

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

YAESU

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

SAVE £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.

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

FT-2600 VHF FM Mobile Transceiver

* 134 - 174MHz Rx * 144 - 148MHz Tx
* 60W Power output, 4 power levels 60/25/10/5W
* Channel steps 5/10/12.5/15/20/25/50kHz
* CTCSS/DCS tone
* Built-in CTCSS/DCS encode/decode
* 175 memories with 8 character alpha numeric display
* Direct keypad frequency entry via optional MH36B6J DTMF mic
* Smart Search™ automatic memory loading
* Tx Time-out timer (TOT)
* Automatic Power off battery saver (APO)
* Automatic repeater shift (ARS)
* Supply 13.8V DC, 10A (60W) Tx, 400mA Rx (squelched)
* Size 160 x 40 x 160mm * Weight 1.3kg

The FT-2600M is one of the toughest mobile VHF transceivers from Yaesu. Built to Mil-Spec, it provides 60W of power along with a "bullet-proof" receiver front end. Designe with packet in mind, has a dual 1200/9600bps port with microphone muting. The FT-2600M has and narrow Tx deviation and 12.5/25kHz spacing. Interactive Menu system allows you to "set and forget" many operating configurations. Options: ADMS-2E Windows PC program software, MH-36B6J direct access microphone.

£139 Plus £7.50 Carr.

ICOM

IC-207H

£279 Plus £7.50 Carr.

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

KENWOOD

TM-G707E

£289 Plus £7.50 Carr.

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

YAESU

FT-8100R

£36 Plus £7.50 Ca

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

KENWOOD

TM-V7E

£359 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

Order Details on inside Front Cover

ALL THESE ITEMS IN STOCK AT OUR MATLOCK SHOP AS WELL !!

CARRIAGE CHARGES
A= £2 C= £7.50
B= £6 D= 8.50

WATERS & STANTON

MasterCard

MORSE TUITION & TESTS

Waters & Stanton are now holding Morse classes at their Hockley premises every Saturday morning at 11am.

Sessions are expected to last between 30 minutes to an hour. All equipment will be provided.

Morse tests will be available on the first Saturday of every month at noon.

There is no charge for attending the Morse instruction sessions but anybody wishing to attend will need to book in advance.

For more information or to book a session or test please contact Mark Francis.

MFJ-269 Analyser

160m - 70cm On-site Antenna Analyser.

£299.95 Plus £6.00 Carr.

MFJ-259B 1.8 - 170MHz £229.95

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

KH-WS1

"World Space digital receiver"

KH-ANT external antenna kit in stock £49.95

£99.95 Plus £6.00 Carr.

This radio has its own mini satellite dish and receives digital WorldSpace broadcast signals via the AfriStar satellite. As well as all the normal VHF FM programmes, you can switch to satellite broadcast signals from CNN, BBC, Bloomberg (multi language), World Radio networks 1 & 2, and lots more. High quality mono via the internal speaker and stereo via the headphone socket. Runs from AC, 4 x D cells (not supplied), or external 6V.

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

Heil Audio

Appointed by Heil as UK Distributor

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

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

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.

Carolina Windoms

CW-80 Special

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

£89.95 Plus £7.50 Carr.

Other Models (all with low angle radiator stub)

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

Plus £7.50 Carr.

SGC-230 Smart Tuner

£359.95 Plus £7.50 Carr.

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

Microset Amplifiers

All FM/SSB with GaAsFET preamps and RF switched. 13.8V DC powered.

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

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

Speaker Mics.

Including Yaesu and Icom 4-way jack.

QS-112-Y Yaesu £16.95
QS-112-K Kenwood £16.95
QS-112-Y4 4-way £16.95
Phone if in doubt about suitable model.

£16.95 Plus £2.00 Carr.

Hands-Free Mobile Mics.

£42.95 Plus £2.20 Carr.

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

The Toughest Japanese Rotators

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

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

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

MC-2 Lower mast clamps £49.95 B

80-40-20m Mini Dipole

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

Power Supplies

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

£99.95 Plus £5.00 Carr.

Back In Stock

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

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

LINEAR AMP UK Amplifiers

British made Amplifiers with a Pedigree

Full Range Stocked

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

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 B
W-5A	5 Amp fixed supply	£29.95 B
W-10AM	10 Amp variable supply	£59.95 C
W-25AM	25 Amp variable supply	£89.95 C
W-30AM	30 Amp variable supply	£119.95 C

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.

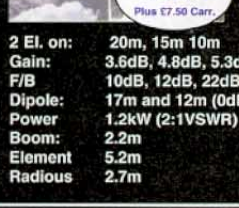
NEW W-40SM 40 Amp Switch Mode

£149.95 Plus £6.00 Carr.

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

Cushcraft Ham Radio Antennas

MA5B Mini-Beam



£299 Plus £7.50 Carr.

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

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

Phone for catalogue.

ML&S + YAESU
- A WINNING TEAM!

NEW YAESU FT-817

RRP £799
ZERO DEPOSIT!
36 * £29.69

- HF/6/2/70
- Transportable - Batteries
- 5W
- Wide Band RX
- All mode

offered with nicads, charger, antenna & microphone

YAESU FT-100

RRP £1299
ML&S £849
ZERO DEPOSIT!
36 * £31.55

- HF/6/2/70
- Mobile – 13.8V
- 100W HF/6 50/40 2/70
- All mode
- Remote Head

• WE PAY your deposit,
• FREE Yaesu Handie
• AND ONLY £19.65 P/WEEK!

NEW FT-1000MP MkV

RRP £2899
WE PAY YOUR £100 DEPOSIT!
48 * £85.17
with 2 year warranty

- HF
- Base - 234V
- 200W
- All mode
- DSP

FREE FT-50R Twin Band Handie *(RRP £269)*

FREE FT-50R OR MONEY BACK!

FT-1000MP/AC

RRP £2595
ML&S £1799
ZERO DEPOSIT!
48 * £54.74

Don't want the **FT-50R** *(RRP £269)*? Then have **£100 CREDIT** against any Yaesu accessory!

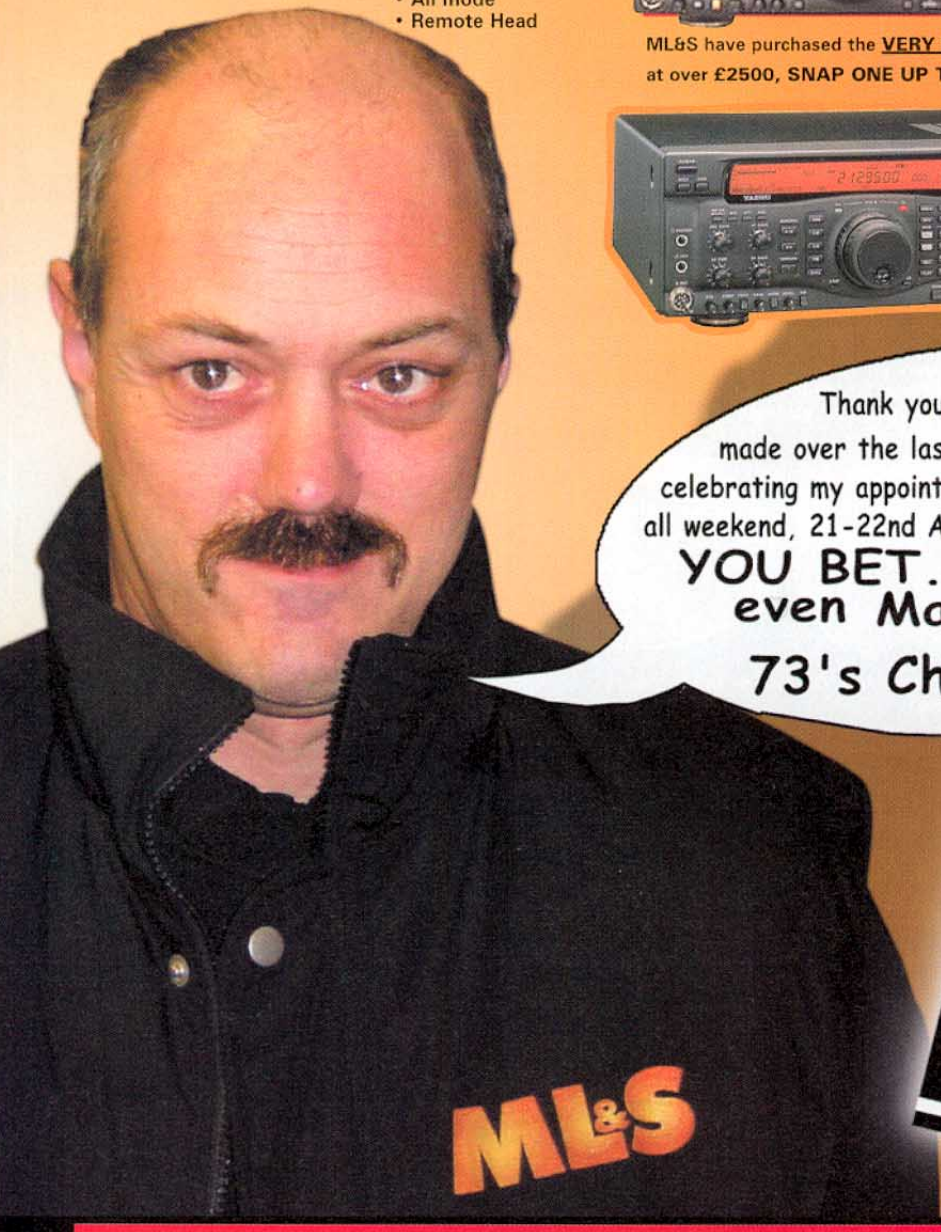
FREE FT-50R Twin Band Handie *(RRP £269)*

ML&S have purchased the **VERY LAST** of this famous benchmark transceiver. Retailing at over **£2500, SNAP ONE UP TODAY** at only **£1799** with a FREE FT-50R

YAESU FT-920AF

RRP £1499
ML&S £1099
ZERO DEPOSIT!
36 * £40.84

- HF/6m
- Base – 13.8V
- 100W
- All mode
- DSP



Thank you to all my customers & friends made over the last 10 YEARS working for ML&S. I will be celebrating my appointment as SALES DIRECTOR in the showroom all weekend, 21-22nd April. **Directors Cut?** YOU BET. Prices that will make even Martin's eyes water!

73's Chris Taylor GOWTZ

ML&S

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Front Cover:

The RSGB's Spring Show and VHF Convention takes place at Bletchley Leisure Centre on 7 / 8 April - be there! (See page 25.) Plus Peter Hart reviews the new Kenwood TS-2000 HF - UHF transceiver - see page 43.

RadCom
Radio Communication

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

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

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This Month - RSGB Spring Show & VHF Convention, Bletchley. See pages 25 - 27.

April 2001

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JOIN THE REGIONAL TEAM

DO YOU HAVE time on your hands, are you passionate about the future of amateur radio, do you support the work of the Society, are you fit, active and full of enthusiasm? Do you like a challenge? If you think you fit the bill, the Society currently has a number of volunteer vacancies within the new Regional representation structure.

There are currently two vacancies for Regional Managers: in the **North Wales Region** and the **East and East Anglia Region**.

There are vacancies for Deputy Regional Managers in the following regions:

Scotland West and the Islands Region
North Wales Region
South Wales Region
London and Central Region
South and South East Region
South West and Channel Islands Region
East and East Anglia Region

If you are interested in joining the new Regional Teams, in the first instance please telephone, e-mail or write to the Society General Manager Peter Kirby, G0TWW, at RSGB HQ.

QSL BUREAU NEWS

THREE NEW RSGB QSL Bureau Sub-Managers have been appointed. They are Mr E Murphy, G0VVT, who takes over as Sub-Manager for the G6AAA to ZZZ series of callsigns; Mr A Nowell, RS94177, who takes over the G1 and the M1AAA to AZZ series of calls; and Graham Ridgeway, G8UYD, 37 Highfield Gardens, Blackburn BB2 3SN, tel: 01254 52281, who takes over as sub-manager for the GB NAA - GB ZZZ series of callsigns.

G7NCR, G0OPC and G0PPR have recently given up as QSL Bureau sub-managers. Our thanks to them all for their service in the past.

AMATEUR RADIO DEVELOPMENT COMMITTEE

RICHARD HORTON, G3XWH, the Society's Director of Amateur Radio Development, is currently looking for volunteers to join the new Amateur Radio Development Committee. If you are interested in the future of amateur radio and would like to be considered for a position on the committee please e-mail Richard on g3xwh@rsgb.org.uk or write to Richard Horton, G3XWH, c/o Radio Society of Great Britain, Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JE. Please mark the envelope 'Amateur Radio Development Committee'.

FRIEDRICHSHAFEN COMPETITION

CHRIS McCARTHY, G3XVL, of Ipswich is the lucky winner of a free trip to Friedrichshafen worth £349. Chris was the winner of the competition held in the December 2000 / January 2001 issues of *RadCom*. He travels to Friedrichshafen in southern Germany on 25 June and will attend HamRadio 2001, Europe's largest amateur radio exhibition. The competition was held in conjunction with the South Yorkshire Repeater Group, which is organising a coach trip to the Friedrichshafen exhibition. Further details about the coach trip may be obtained from Ernie Bailey, G4LUE, tel: 01226 716339 or 0778 7546515.

INTERNET VOICE LINKING - NEW CHANNELS

THE RSGB IS pleased to announce that agreement has been reached with the Radiocommunications Agency for the availability of additional channels within the 70cm band where simplex Internet voice links may be licensed, and for the first time, some frequencies within the 2m band for this purpose. The list of available frequencies is now: 145.2625, 145.2875, 431.0750, 431.1250, 431.1500, 434.4750, 434.5000 and 434.5250MHz.

A new, streamlined application process has also been agreed, with a simple one-page application form. Please visit the 'Internet Linking' section of the RSGB Datacomms Committee web site at www.dcc.rsgb.org for full details of the process and to download the application form. It is expected that facilities will be available to make applications for these NoVs 'online' in the near future.

HELLO . . . GOODBYE

Two new faces have recently joined the RSGB HQ staff. They are Helen Fee (left), who works as a junior administrator in the General Manager's Department, and Suzanne Taylor (centre), who has joined the sales team in Commercial Department. In mid-March we said goodbye to Lynn Wortley (right), who had been working as a temp on the switchboard and as receptionist since the beginning of the year.

CALL FOR HF PAPERS

PAPERS ARE INVITED for the RSGB International HF and IOTA Convention to be held at the Beaumont Conference Centre, Old Windsor, Berkshire over the weekend of 12 - 14 October. Do you have particular knowledge of HF-orientated subjects, especially new technological developments with practical demonstrations, and would you like to be considered as a speaker or for a poster presentation? If so, please submit a brief abstract on the subject matter to the Chairman of the HF Convention sub-committee. Abstracts should be sent to: HF.ConventionChairman@rsgb.org.uk or by post to RSGB HQ. For the purpose of HFC2001, both the LF and 50MHz bands are considered to be included within the HF spectrum.

FOOT AND MOUTH DISEASE RESTRICTS AMATEURS OUTDOORS

WHILST THE Foot and Mouth Disease Declaratory (Controlled Area) Order 2001 is in force, the Radio Society of Great Britain advises all UK radio amateurs to avoid any activity that will bring them into contact with farm land or animals susceptible to FMD, such as pigs, cattle, sheep and goats. This will in the main apply to portable contest operation, rallies, ARDF events and maintenance visits to remote repeater, beacon and packet sites. It may, however, affect other types of amateur radio operation.

Further information on the restrictions is available from the Ministry of Agriculture, Fisheries and Food web site at www.maff.gov.uk/animalh/diseases/fmd/

In the light of current foot and mouth disease restrictions, the RSGB VHF Contest Committee has announced that the Portable sections of all its contests are suspended forthwith. This temporary rule will remain in force until the outbreak has been controlled. Because of this there was no portable section in the RSGB 144 / 432MHz All-Mode Contest held on 3 / 4 March. The Committee hopes that all entrants will understand the need to support the farming community during this difficult time. Any queries should be directed to VHF Contest Committee on tel: 0870 740 7909, or by e-mail to: vhfcc.chairman@rsgb.org.uk

SPECIAL OFFER OF THE MONTH

THE SPECIAL OFFER this month, for members only, is the *RSGB Technical Compendium*. For the calendar month of April *only*, this book (reviewed on page 38 of the February *RadCom*) is available for just £13.49 instead of the standard price of £17.99 (normal member's price £15.29). Just phone 0870 904 7373 or order on the web at www.rsgb.org/shop during the month of April to take advantage of this superb offer.

MORSE CAMPAIGNS IN HERTS, N IRELAND

THERE ARE STILL a few places available at the 'Morse Campaign' to be held at RSGB Headquarters in **Potters Bar** over the weekend of **31 March / 1 April**. The idea of the weekend is to provide sufficient intensive practice for those who already know the Morse code characters and prosigns to be able to pass the RSGB 5WPM Morse test. Anyone wishing to attend should contact Fiorina Sinapi at RSGB Headquarters on tel: 0870 904 7373 as soon as possible. You can also book on-line from the RSGB's web site at www.rsgb.org

It is also planned to hold the first Morse Campaign in **Northern Ireland** over the weekend of **30 June / 1 July**. Further details will be announced later.

AROS NEWS

THE AMATEUR RADIO Observation Service (AROS) Coordinator wishes to point out that AROS not only beats licensees with a big stick [see 'RSGB Matters', January 2001 - *Ed*], but also tries to foster better operating habits on our bands. Not wishing to point fingers, there are plenty of examples of poor operating to be heard on some nets, during contests and among DX chasers in pile-ups. There are also first class examples to be found. Perhaps if we all gave a thought for the listener who may be the licensed operator of the future our hobby would be all the better for it! Is it too much to ask the seasoned operators to help to set good examples for the less-experienced operators? It's like driving - bad habits are picked up so easily! Please send any comments to AROS Coordinator, PO Box 113, Potters Bar, Herts EN6 3ZY or e-mail: aros@rsgb.org.uk

RSGB MORSE TEST SERVICE 15TH ANNIVERSARY

The certificate that was available during last year's Morse Test Service anniversary weekend.

THE RSGB's Morse Test Service celebrates its 15th anniversary over the weekend of 12 / 13 May 2001. As in previous years, County Morse test teams will be on the air (on CW of course!) using GB0 callsigns, mainly on 80 and 40 metres. A certificate will be made available at a cost of £2.50 for anyone contacting at least 10 of the 27 or more stations active. Further details next month.

RAYNET AND THE GENERIC RAYNET & RSGB TRADE MARKS

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

Members of the RSGB may use the marks on their personal correspondence and QSL cards without reference to the Society. [Images may be found at www.rsgb.org/membersonly].

The Society will give sympathetic consideration to applications to use the mark from groups and organisations not affiliated to the Society and in such cases requests should be addressed to the Company Secretary at the Society's registered office (see page 8).

COUNCIL ON THE MARCH IN APRIL

RSGB GENERAL MANAGER Peter Kirby, G0TWW, will be giving a presentation on the work of the RSGB at the Kidderminster & DARS on **3 April**. For further details contact Tony Saunders, G1OZB, on tel: 01299 400172.

RadCom NEWS

National Museums Weekend 2001

HARRY Bloomfield, M1BYT, wishes to announce, and invite radio amateurs to take part in, a 'National Museums Weekend 2001'. The date for the event is the weekend of 2 / 3 June. Participating groups are encouraged to identify an appropriate link between radio and the theme of the museum. Considerable progress has already been made with the organisation of the event, but more groups and museums are invited to join in. Please contact Harry for more information on tel: 0113 2866 897 or by e-mail at harry_m1byt@ntlworld.com. More details of the event can be found at: www.qsl.net/m1byt/

UK Comoros DXpedition Sets Numerous Records

THE FIVE STAR DXers Association D68C DXpedition to the Comoros - located between Mozambique and Madagascar off the east coast of Africa - closed down on 28 February, after three weeks of continuous operation. A total of 168,731 QSOs were made with 45,315 individual amateurs, including 13,689 QSOs with 3452 UK stations. 229,772 individual pages were accessed on the group's web site (www.dxbands.com/comoros) during the course of the operation. The total number of contacts exceeds that made by any other single DXpedition by over 75% and the group also set many new band and mode records.

One of the objectives of the operation was to encourage those amateurs who might not normally chase a DX station to have a go and to give D68C a call. The figures really seem to demonstrate that the group made many contacts with operators who never thought that they would do any DXing!

Phil Whitchurch, G3SWH (QTHR), is handling the QSLing chore. If you QSL direct, please enclose at least an SASE. QSLs via the RSGB bureau system are also accepted. However, please be patient - with over 168,000 QSOs it will take a long time to reply to all the cards received. Short wave listeners should send their QSLs via Bob Treacher, BRS32525.

A full report on the D68C DXpedition will be published in *RadCom* shortly.

ML&S FT-817 Challenge

MARTIN LYNCH & SONS are offering two 'FT-817 Challenge' trophies for UK amateurs who have bought a Yaesu FT-817 from any UK Yaesu dealer. The ML&S FT-817 HF Trophy will be awarded to the person who has the most confirmed countries using an FT-817 by 15 October. The ML&S FT-817 VHF / UHF Trophy will be awarded to the person who has the most confirmed WAB squares using an FT-817 by 15 October. Contacts may be made using any mode, but they must be simplex and the FT-817 must not be used in conjunction with an amplifier. For full rules please contact ML&S on tel: 0208 566 1120.

The trophies will be presented at the ML&S annual Open Weekend on 24 / 25 November 2001.

VHF / UHF Award News

FEBRUARY BEGAN with a multi-part claim from Andy Kissack, GD0TEP (IM), which saw him successfully gain updates at 375, 400, 425 and 450 squares on 50MHz. He also successfully claimed stickers for 90, 100 and 110 countries(two-way). Andy certainly took full advantage of the good propagation periods on 6m during 2000 with many of his cards originating in countries from both north and south America. Amongst other choice cards were ones from Ascension Island, St Helena and other African countries.

This was closely followed by a successful claim from Heath Rees, GW3HWR (SA), for 50 squares and also 20 countries (two-way). Heath comments, as do many claimants, on the difficulty of working UK counties even from a relatively low activity square - IO71. Are we becoming entrenched in DX and local nets, and ignoring inter-UK activity?

The month also saw a claim from David Whitaker, BRS25429 (YO), one of a very select number of SWL award holders. David gained a certificate and sticker at the 400 square level - just reward for many years of patient listening and logging.

Lee Humphrey, G6BFP (HP), updates his Squares award to 50 squares. From Northern Ireland Ray Blythe, MI5AFJ (BT), sent a successful first-time claim for 10 countries (2-way).

Turning from 50MHz to Microwaves where your Award Manager Tony Jarvis, G6TTL (PE), has now gained a sticker for 15 squares on 23cm. Congratulations to all recipients.

Summary of Award Recipients for February:

50MHz: 50 Squares: GW3HWR, G6BFP

325s: BRS25429. 375s: GD0TEP, BRS25429. 400s: GD0TEP, BRS25429. 425s: GD0TEP. 450s: GD0TEP.

10 Countries (2-way): MI5AFJ. 20c: GW3HWR

90c (2-way): GD0TEP. 100c (2-way): GD0TEP. 110c (2-way): GD0TEP.

1296MHz: 15 Squares: G6TTL.

More on RSGB VHF / UHF awards can be found at: www.rsgb.org/awards

World Amateur Radio Day

WORLD AMATEUR Radio Day (WARD) takes place on 18 April. The IARU Administrative Council has announced the theme for WARD 2001 as 'Providing Disaster Communications: Amateur Radio in the 21st Century'. Over the years, the Amateur Service has provided emergency and relief communications after numerous disasters, both natural and man-made, most recently in the aftermath of the devastating earthquake in the Indian state of Gujarat. However, in order to fulfil this need in the future, it is essential that there be a continuing flow of newcomers into amateur radio to ensure that qualified people are there, trained and fitted out with the right resources. For more on this subject please see our web page at www.rsgb.org/ward2001

RAEN's Membership Drive

THE RADIO Amateurs' Emergency Network is carrying out a membership drive and is offering a free trial membership package. An application form for trial membership can be obtained by sending an SASE to: 'Join Us', The Radio Amateurs' Emergency Network, Hunters Moon, Station Road, Newton-le-Willows, Bedale DL8 1SX. The RAEN says it hopes that many amateurs will take advantage of this opportunity to find out what it offers its members, and how they can provide support and assistance to the Community during training exercises as well as during emergencies and disasters.

Yeovil QRP Convention

A REMINDER that the 17th Yeovil QRP Convention takes place at Digby Hall, Sherborne, Dorset, on 22 April. The event is not a rally (although there are component and kit stands), but a forum to expound the science and technology of long distance, low-power amateur radio communication, particularly in the field of home-made equipment. The event features lectures, a construction challenge, technical question and answer session and RSGB Morse code tests on demand. For further details contact D Bowden, M1WOB, tel: 01935 414 452.

AMSAT's Call for Papers

THE 16th AMSAT-UK Colloquium will be held at the University of Surrey, in Guildford over the weekend of 27 - 29 July. Potential speakers are invited to submit papers about amateur radio space and associated activities, and AMSAT-UK is also interested in any suggestions for Colloquium programme topics. Offers of papers should be submitted as soon as possible; the final date for *full* documents to be received is 15 June 2001.

An added Colloquium attraction this year will be 'Show and Tell' presentations. In these, the presenter will be given 10 minutes to describe a useful project they are involved in. Additionally, AMSAT-UK will be offering sessions specifically for amateur radio satellite beginners. Colloquium submissions should be sent to Richard Limebear, G3RWL (QTHR).

M5QSL

THE CALLSIGN M5QSL was issued to Dom Campanario of Stoke-on-Trent on 20 December 2000, having been specially requested by him. The call was later cancelled by the RA, who say that it was issued in error. Mr Campanario wishes it to be made known that he was acting in good faith and that he was not 'pirating' this callsign.

Former PM John Major Honours Young Radio Amateur

Annick Morris, 2E0ICK, Receives Top Children's Award

ANNICK MORRIS, 2E0ICK, has been presented with the Child of Achievement award, for her success in passing the NRAE and, more recently, the 12WPM Morse code test. Annick, who has been blind since birth, was nominated for the prestigious award by one of her teachers at Deanery High School in Wigan, Lancs.

Annick travelled down to the Hilton Hotel in London on 11 February to receive the award from former Prime Minister John Major. Also present were several celebrities, including TV presenters Bob Holness and Gaby Roslin and the Falklands war hero Simon Weston.

Annick was formerly licensed as 2E1HOW and recently upgraded to the Novice A licence class, although she has also taken the callsign of her late grandfather, 2E1HDE. Now 14 years old, Annick is, without doubt, one of the busiest and most enthusiastic amateurs in the north-west, with a wide circle of radio friends of all ages. She has been teaching Morse code over the air, and is now using a paddle and keyer. She will soon have her own HF antenna and will be active on the Novice allocations below 30MHz.

Annick receiving her award from John Major at the London Hilton hotel.

Oldest Morse Candidate?

IS REX BOOTH the oldest amateur to take and pass the Morse code test? A mechanical engineer, he came into amateur radio well after retirement, taking the Novice RAE course run by the Burnham Beeches Radio Club and becoming 2E1DHT at the age of 87. After passing the Full RAE he took out the callsign G7VKM, and now, at the grand old age of 94, Rex passed his 5WPM Morse code test to gain his Full Class A/B licence.

Stolen Rig

STOLEN FROM the shack of R Ainsworth, G4UPU, in Worsley, Manchester: a Kenwood TH-205E 2m FM handheld, S/N 8022503. Any information please report to PC 2043 at Little Hulton police, tel: 0161 872 5050.

Dr Ron Harkness, OBE, GM3THI / 8P9AO, secretary of the Perth ARG, recently visited the Ayr ARG to display his 150-page collection of amateur radio on stamps. The front cover of the September 1995 *RadCom* forms the first page of Ron's exhibit. Left to right: Ron; Marcus Bowman, GM4LVW; Mike Dalrymple, GM4SUC; and Ayr ARG president Denis Nutt, GM3YDN.

First G to GW Two-Way Laser QSO

THREE AMATEURS TEAMED UP to make the first laser QSOs between England and Wales on 11 March. Steve Rawlings, GW4ALG; Paul Nicholls, G0ONA; and David Bowman, G0MRF, used modulated laser pointers at the heart of two CW transceivers operating at 670nm.

On a day frustrated by heavy rain and access to suitable sites being prevented by Foot and Mouth restrictions, the first QSO was made between GW0ONA/P and G0MRF/P across the River Wye over the modest distance of 100m. Having made one QSO, the group moved on to the River Severn where the path length was a more challenging 5.1km. After 20 minutes, and despite 'QRM' from a full moon and lights on the Severn bridge, a two-way QSO was completed between GW0MRF/P, who received a 589 report, and G0ONA/P who was 569 on the Welsh side of the border.

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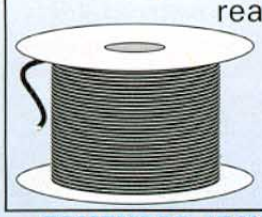

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ALINCO	DR-590 DUAL BAND MOBILE	£175.00
ALINCO	DR-605 DUAL BAND MOBILE TRANSCEIVER	£230.00
ALINCO	DX-70T 100W MOBILE/ HF	£399.00
ALINCO	DX-70TH TRANSCEIVER	£475.00
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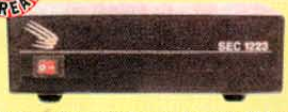

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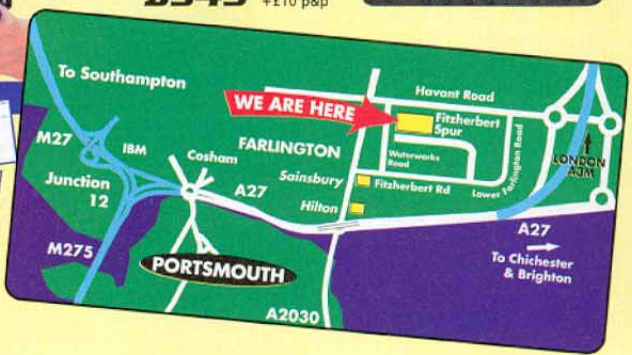

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Antenna Tuning by Stealth

How to match your HF antenna system to your transceiver without switching on the transmitter!

by Kelvin Barnsdale, ZL3KB *

IMAGINE the scenario: you change from the 20m band to 80m looking for DX. On 3660kHz you hear ZS3DXC just finishing a QSO! What do you have to do? (Please do not say you tune up on his frequency!) Store the frequency, tune away and find a clear frequency, select a transmission mode that will give some RF, turn the power down, adjust the antenna tuning unit (ATU), change the mode back, recall the frequency. By this time, he has probably gone away. Never mind, he would not have heard you anyway because you forgot to turn the power back up!

Quiet as a mouse: the prototype form of the tuning indicator.

Now try this scenario – you hear the ZS3DXC station, turn on your Silent Tuning Indicator, adjust the ATU using the receiver (on his frequency, with no transmission from you), turn the indicator off and call him. You have tuned your ATU with no transmission at all!

At the heart of this clever unit is the noise bridge [1], about which a few words need to be said.

THE NOISE BRIDGE

TO UNDERSTAND how the noise bridge functions, we need to refresh our memories about bridges and noise.

THE BASIC BRIDGE CIRCUIT

The Noise Bridge is like the Wheatstone Bridge shown in **Fig 1**, but fed from an AC source. In the left arms of the bridge, two resistors, RA and RB, are shown; they have equal values. In the opposite arms of the bridge are impedances Z and X. X is an unknown impedance, and Z is variable. A meter (or generalised detector) is connected across the centre points of the arms.

For the meter to read zero (a condition in which we say the bridge is 'balanced'), the voltages on its two leads must be the same. Because RA and RB are equal, the bridge can be balanced only if Z = X. Therefore, if we know the particular value of the variable impedance Z, that value must be equal to the 'unknown' value, X. In simple bridges, all the components are resistors, enabling unknown resistance values to be measured.

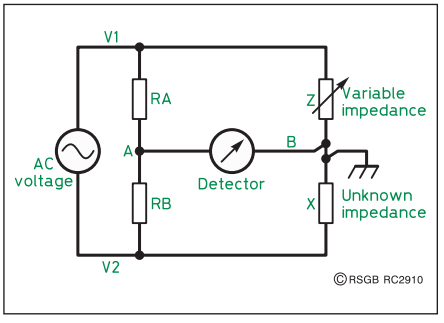

Fig 1: A basic bridge circuit, where resistors RA and RB are 'balanced' against Z and X.

In more general terms, if the known component is an impedance made up of a combination of resistance and capacitance, the bridge can measure complex impedances made up of capacitance or inductance.

WHY NOISE?

If the unknown impedance is not a pure resistance, ie it possesses reactance as well as resistance, the bridge balance will depend on the frequency of the voltage source, which could be a signal generator, for example. We are aiming to use a radio receiver as our detector (to replace the meter in Fig 1), so our signal generator would have to cover all the amateur bands on which we want to work. The device is getting more complex by the minute *unless* we can generate all these frequencies at the same time! Fortunately, we can, by using a source of near-white noise. With the receiver as your detector, you can measure resistances or impedances by adjusting the bridge for minimum (ideally zero) received noise.

PRINCIPLES

THE SILENT TUNING Indicator consists of a 50Ω fixed impedance noise bridge that is permanently connected in the antenna line, ready to be switched in at any time. For convenience, it uses the Galbraith Noise Bridge PCB [2], with a 50Ω resistor in place of the variable resistor. This ensures that, at

* *kb.ew@xtra.co.nz*

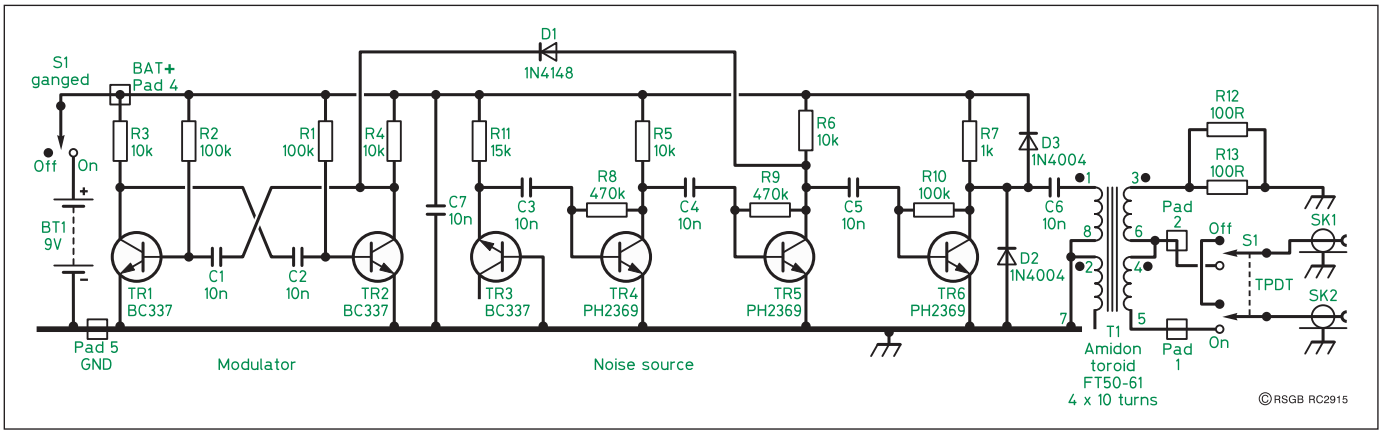

Fig 2: The complete circuit of the Silent Tuning Indicator

balance, the bridge is measuring a 50Ω impedance.

The noise bridge operates like this. When switched into circuit, the antenna and ATU are connected to one side of the bridge, and the accurate 50Ω resistor is internally connected to the other side. In the middle of the bridge is your receiver, acting as a detector. When the ATU is not tuned, the bridge is unbalanced and the receiver hears lots of noise from the noise bridge. Once the ATU is adjusted correctly, it presents 50Ω as the 'unknown' impedance, the bridge is balanced and the noise heard in the receiver drops to a minimum or zero. The transmitter is never activated for this operation!

THE COMPLETE CIRCUIT

THERE ARE three main constituents of the Noise Bridge circuit - the noise generator, the modulator, and the balun.

THE NOISE GENERATOR

This is shown in **Fig 2**. A diode is often used as a noise source, but in this design, the reverse-biased base-emitter junction of a transistor, TR3, is used. This generates a low-noise signal which is, in turn, amplified by TR4, TR5 and TR6. Because the noise source is rich in low-frequency components, the higher frequencies are (to an extent) recovered by over-driving the later stages.

THE MODULATOR

The design also incorporates a modulator, which consists of a two-transistor audio oscillator comprising TR1 and TR2, and a diode switch to modulate the signal on the collector of TR5.

Why modulate the noise? When measuring the impedance of large antennas, the noise generated in the noise bridge has to compete with the noise coming from the antenna, and sometimes the latter is overwhelming. This design modulates the bridge-generated noise, and gives the ability to discern which is bridge noise, to be tuned to a minimum, and which is antenna noise. This also gives the bridge a second use, as a modulated wide band signal generator for fault finding on receivers! This section of the bridge, namely TR1,TR2, R1, R2, R3, R4, C1, C2 and D1, can be omitted if no modulation is required.

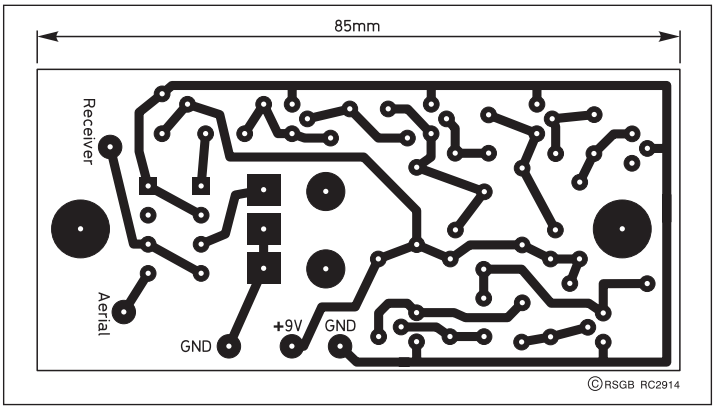

Fig 3: The PCB design, shown actual size *from the track side*. See the text for an explanation of the two circular pads in the centre.

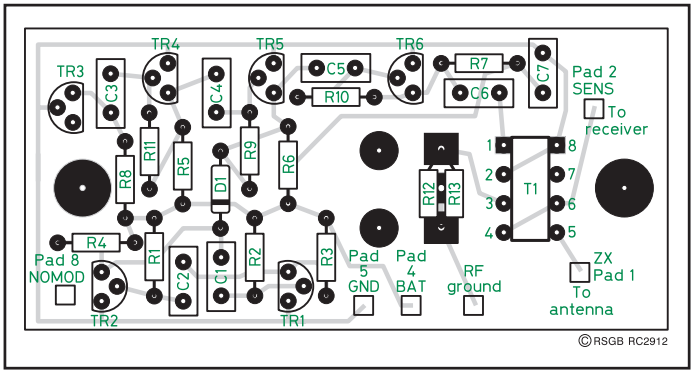

Fig 4: The component layout on the PCB.

COMPONENTS

THE DESIGN has concentrated on using parts readily available or rattling around in the trusty old junk box.

TRANSISTORS

Transistors TR4, TR5 and TR6 can be those listed or any high-speed switching transistor having good gain at VHF. TR1, TR2 and TR3 are ordinary audio types

TRANSFORMER BALUN

The balanced AC drive to the circuit is provided by the incorporation of a balun, the toroidal transformer, T1, to the right on Fig 2. The voltage divider RA and RB shown in Fig 1 is replaced by the centre-tapped secondary of T1, the receiver being connected from the centre to ground. The accurate 50Ω resistor, made up of two non-inductive resistors, R12 and R13, is connected between the opposite end of the same winding and ground.

Thorough tests were carried out to determine the best type of ferrite to use. The type finally selected provided a good noise level up to 145MHz.

CONSTRUCTION

SOME GENERAL information on the construction of the prototype is now given.

THE BOX

I built the unit into a 64 x115mm diecast box (including battery) with the antenna switch and power switch combined into a 3-pole double throw toggle switch mounted close to the antenna BNC connectors, as can be seen in the photograph. Note that the RF connectors are close to the switch to pre-

COMPONENTS LIST

Resistors, all 0.25W, unless stated otherwise

R1, 2, 10	100kΩ
R3 - 6	10kΩ
R7	1kΩ
R8, 9	470kΩ
R11	15kΩ
R12,13	100Ω, non-inductive

Capacitors

C1 - 6	10nF ceramic
C7	10nF ceramic

Semiconductors

D1	1N4148
D2	1N4004
D3	1N4004

(D2 & D3 mounted under PCB)

TR1 - 3	BC337 or any audio npn type
TR4 - 6	PH2369 or 2N2222A etc

Other items

T1	Ferrite toroid Amidon FT50-61 with 0.3mm enamelled copper wire (see text)
S1	3-pole 2-way rotary switch
BT1	9V battery & connector clip

BNC/SO239 sockets as required

The Noise Bridge PCB is available from: Branch 05 Projects group, PO Box 1733, Christchurch, New Zealand. Email: kb.ew@xtra.co.nz

serve the high-frequency performance. Another construction idea would be to build the unit inside the ATU. Wherever it goes, it takes the place of a SWR bridge, and it is a lot cheaper.

The ferrite balun is rather deceiving – it looks harder to make than it really is and, if 0.3mm wire is used, it is not fiddly.

THE PCB

The Noise Bridge PCB layout is shown in **Fig 3** and **Fig 4**, and was originally designed as a piece of test equipment with a variable balance resistor instead of our fixed value of 50Ω. This is made up of two resistors, R12 and R13, as mentioned previously.

Two 1N4004 D2 and D3 diodes are fitted around the transistor, TR6, to protect against inadvertent transmitter power destroying the circuit. These are fitted under the PCB directly onto the tracks.

Eagle-eyed readers may have noticed the appearance of a resistor in the second photograph, below and slightly to the left of TR6, which is not shown in the PCB layout of Figs 3 and 4. I decided, after the project was complete, to fit a small LED to indicate the 'power on' condition. The LED can be seen in the first photograph. The mysterious resistor is simply the current-limiting resistor for the LED, and is soldered to the two empty circular pads shown in Fig 3. Mystery solved!

Printed circuit boards are available from the NZART Branch05 projects group (see the Components list). Parts can be scavenged from junk but, if bought new, the total parts cost would probably come to less than £10.

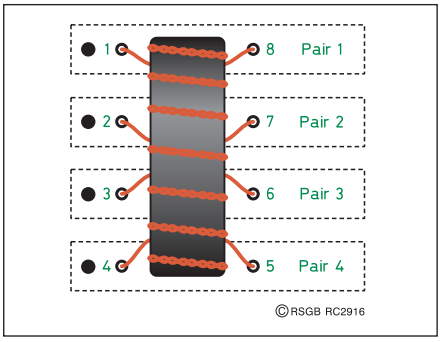

Fig 5: The connections for T1, which correspond with those shown on Fig 3. The winding on the toroid is four twisted strands of 0.3mm enamelled copper wire.

MAKING THE TRANSFORMER BALUN

The transformer T1, should really be called a balun, as it converts the unbalanced output of the noise generator to a perfectly balanced noise source across the bridge. It will be noted that this design has an unused winding between pins 2 and 7. This completely balances the capacitive coupling between primary and secondary.

A little care should be taken in winding this component.

- Twist together four 180mm strands of 0.3mm enamel copper wire. Aim to have a twist of about 40 rotations over this length.
- Wind 10 turns of the twisted bundle through the centre hole. Note: one turn is equivalent to one pass through the centre hole. Wind the turns evenly around the toroid so that the start is very close to the finish.
- Separate the ends and remove the insulating enamel. This can be done with a soldering iron on most wire types now.
- Use a buzzer or ohmmeter to identify the four pairs of windings. Arrange them as in the diagram **Fig 5**. This is the lead out pattern needed for the PCB.

I used masking tape to keep the strand ends together throughout the twisting and winding process, and a marking on the tape shows the pair orientation for placing into the PCB.

The PCB tracks connect the windings in the correct phase as long as the pair groups are maintained as in Fig 5.

PCB ASSEMBLY AND TESTING

THERE SHOULD BE no special problems with this, as long as care is taken in soldering the component leads and avoiding

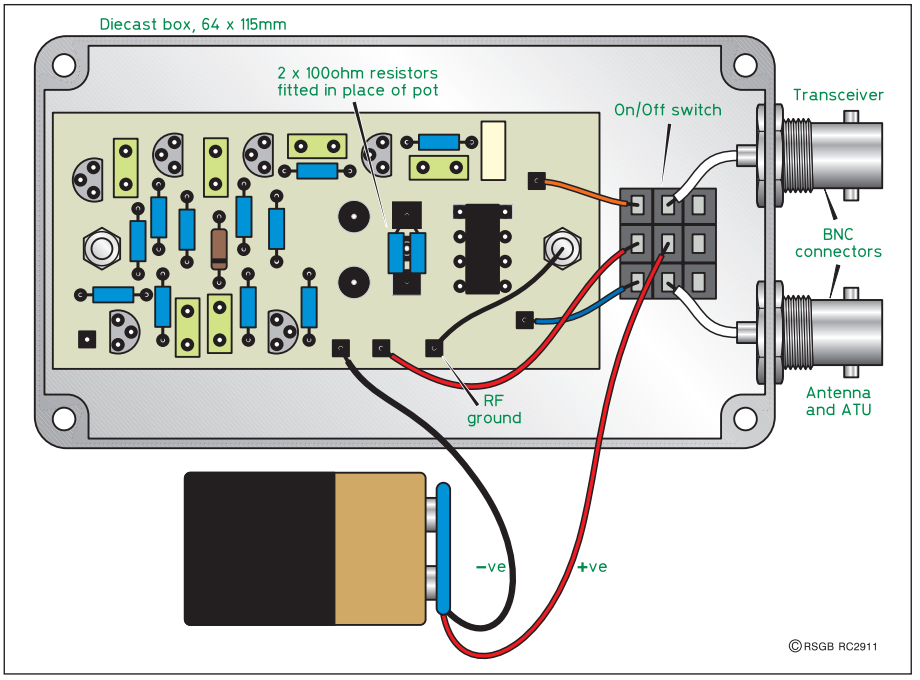

Fig 6:The mounting of the PCB inside the diecast aluminium box.

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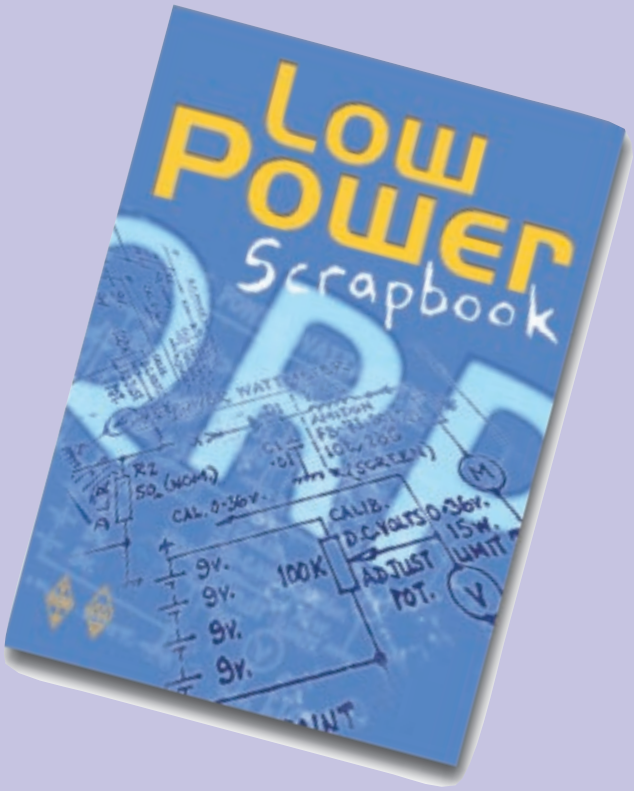

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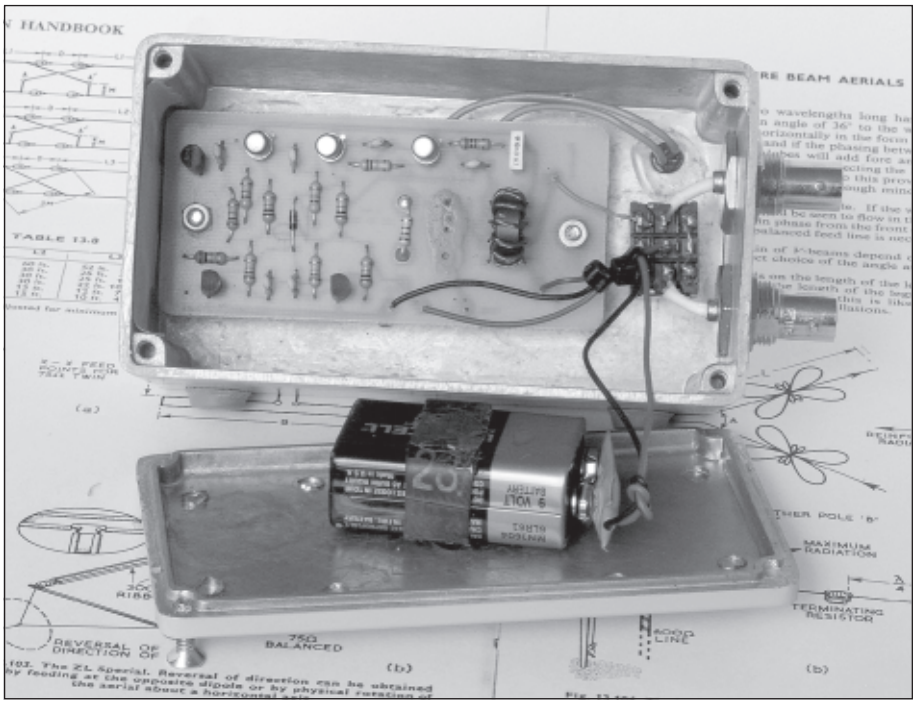

Not a complex design: the internal layout of the tuning indicator.

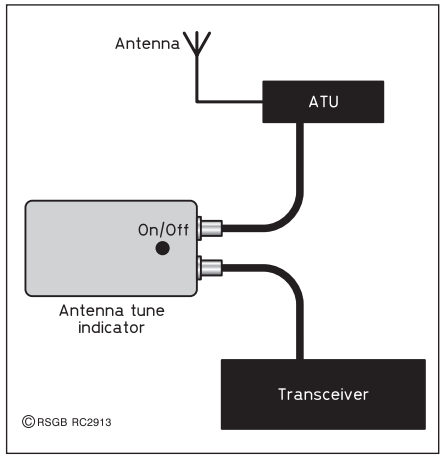

Fig 7: Connection of the Silent Tuning Indicator between transceiver and ATU.

shorting between tracks with solder 'whiskers' or 'spurs'. The track density on the PCB is fairly low, so problems of this sort should be rare.

When the components have been soldered in, hold up the board to a strong light and check for any unwanted inter-track short-circuits.

Although the circuit can be tested out of the case, it is a sufficiently robust circuit that mounting it carefully in the case together with all off-board connections is not a recipe for disaster!

Connect your receiver to SK1 and antenna to SK2. Switch on the receiver and set the frequency to your favourite segment of the 20m band, for example. With the Silent Tuning Indicator (STI) in the 'off' position, you should be able to operate as you did before.

When the STI is switched on, there should be an immediate loud hiss from the receiver loudspeaker. Now try operating the balance controls on your ATU; changes in each should change the volume of the hiss, and it should be possible to find, by using the controls sequentially, a minimum (or even a null) in the hiss signal. Your STI is working!

OPERATING

WITH THE UNIT permanently in the transmitter feeder, as shown in **Fig 7**, it can be turned on whenever the ATU needs adjustment. When turned on, the S-meter on the receiver should show a level of noise of S9 or more. Adjust the ATU controls until the noise level dips to S3 or less, although I find the match is good enough if dipped below S8. Searching for a null is much like tuning for a minimum on a standard VSWR meter. Remember to turn the STI off before transmitting, or that rare DX will definitely get away! ♦

REFERENCES

[1] 'Noise Bridge', ZL3KB, *Break-In*, NZART, September 1998

[2] The Galbraith Noise Bridge first appeared in *Break-In* in the 1980s. 'Galbraith' is a generic name given to projects originated by the author's club.

RadCom Helplines FOR MEMBERS

● John, GW3EJR, is looking for user handbooks for early computing equipment, the **Amstrad PC1512/1640**, and the **Micro PMP135 dot-matrix printer**. GW3EJR, QTHR. Tel: 01239 682 629.

● Harry, G3NGX, has recently acquired an old and non-functioning **Hallicrafters SX-28 Skyrider**. He would appreciate copies of the circuit diagram or handbook, plus information on locating reviews and modifications. He will reimburse all expenses, but would appreciate a call first. He can offer, in return, copies of the BC221 and CR100 handbooks. G3NGX, QTHR. Tel: 01491 872 919.

● Michael, MI1MTC, is looking for information on a small elegant multimeter, about 25 years old, marked **Milano ICE Italy, Supertester 680R**, 20,000 ohms per volt, with 22 sockets, scales for volts, amps, resistance, capacitance, frequency and decibels. It has a 3V internal battery, mains input, rectangular plastic case, hinged lids top and bottom, and measures 135 x 105 x 55mm. MI1MTC, QTHR. Tel: 028 6862 1436 or e-mail michael.clarke@swiftsoft.net

● John, G3GTJ, is looking for any technical information and historic data relating to **Marconi aircraft radio receiver type 118M** ref: 5821-99-970-8401. It is an HF receiver of the post-war period. All costs will be reimbursed. G3GTJ, QTHR. Tel: 01963 240 319.

● Ken, G3DJK, seeks a **listing of all XZ2 callsigns** that existed in 1947. Please contact him if you are able to assist. G3DJK, QTHR. Tel: 020 8679 2717.

● Christchurch ARS is searching for an operating/instruction/maintenance manual for a **Lafayette HA-600A HF receiver** as part of a refurbishment project. All expenses will be reimbursed. G7WSN, QTHR. Tel: 01202 484 892 (eves).

● Stephen, G0HMN, wishes to thank all those who answered his query in the 'Helplines' column, and via the amateur radio newsgroup on the Internet. He appreciates your kindness and generosity. As he says: "If you're stuck for something, ask for help. I know it works". G0HMN, QTHR.

● Don, G3WDY, would very much appreciate the loan (for photocopying) of the manual and circuit diagram for the **AVO Transistor Analyser**. Guaranteed speedy return. G3WDY, QTHR. Tel: 020 8653 4738.

● G0KYE requires the colour code for rewiring a **Yaesu FT-One** mode switch. He has the technical manual, but this does not give the colour code. Tel: 01752 705 759.

More Helplines on p40...

'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.

Antenna Testing - the VERON Way

*Translated by Erwin David, G4LQI **

THE FAR-FIELD range setup is shown in **Fig 1**. PA0FEX's battery-powered transmitter, with a horizontally-polarized yagi 1250m away across a flat meadow and aimed at the test site, provides a homogenous field at 1252 or 2350MHz, the ATV frequencies where most of the antennas are being used.

At that test site, two telescopic 8m masts, 6m apart, carry the reference antenna and the antenna under test. The latter can be turned in steps of 1° to measure beamwidth and F/B ratio; PA0RDX's home-built stepper-motor-driven rotator will handle a 2m dish.

The two antennas are connected by random lengths of Flex-2000 coax to the test bench in an adjacent caravan which houses the borrowed professional spectrum and network analysers. Power is provided by a petrol motor-generator.

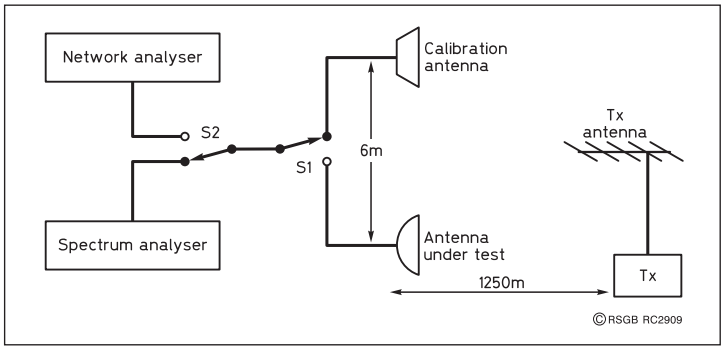

Fig 1: The antenna range instrumentation.

TWICE EACH YEAR, the Meppel chapter of VERON, the Netherlands national amateur radio society, conducts an antenna test event; in September, antennas for 145 and 435MHz are covered; in May it is 1.3 and 2.3GHz. Frits van Schubert, PA3FYS, described the antenna range techniques in Electron 9/00. *Last May, the test team of PA0JXM, PB0AOK and PA3AYQ, tested 19 23cm antennas and 28 13cm antennas.*

CALIBRATION

IDENTICAL STANDARD-gain horn antennas are mounted on the two masts and rotated for maximum signal. The difference in output between them, as read off the spectrum analyser, caused by differences in cable attenuation and environment, is noted. This will be taken into account when the antenna to be tested replaces the standard-gain horn on the test mast. S1 in Fig 1 permits quick switching back and forth between the two antennas to eliminate errors due to changes in transmitter output and propagation.

SWR measurements are performed using the network analyser. To exclude the parameters of the coax cable and switches, calibration is required for each band; this is done by replacing the antenna by a short circuit, an open circuit and a 50Ω resistor, in sequence.

MEASUREMENTS

UPON REPLACING the standard horn on the test mast with the antenna to be tested, the latter is rotated for maximum reading on the spectrum analyser. The gain then is that of the standard horn ± the previously noted difference between standard horns on the two masts. By turning the antenna 180º the F/B ratio is measured. By rotating the antenna to the left and the right of maximum until the reading is 3dB down, the width of the major lobe is determined. The difference between L and R indicates the symmetry of the pattern.

Switching from the spectrum analyser to the network analyser, the feedpoint impedance of the antenna can be studied. The SWR at 1240, 1270 and 1300MHz or 2300, 2375 and 2450MHz is recorded (but not shown in **Table 1**) and also at the frequency with the lowest SWR.

It takes an average of 15 minutes to test an antenna, and both commercial and home-made samples can be submitted. Working at 1.3GHz in the morning and at 2.3GHz in the afternoon, a total of 47 samples have been tested, but that made for too long a day! In future, only 35 antennas will be accepted. ♦

Notes:

[1] Testing of 145 and 435MHz antennas was described in *Eurotek* 9/92.

[2] 'Measuring Antenna Gain with Amateur Methods' was described by Dr Wayne Overbeck, N6NB in the ARRL *Antenna Anthology* (1978).

Owner	Type	Gain (dBda)	F/B (dB)	Beamwidth (°)	Best VSWR	at f (MHz)
23cm antennas at 1251 MHz						
PA0BOJ	11-slot omni	4.5	4.3		1.01	1282
PA0TLA	60-ele Yagi, 5m boom	18	30	4L - 7R	1.4	1290
PA3EXV	1.6m dish, LPA	19.7	29	8L - 4R	1.23	1240
PA3EXV	1.6m dish, 2-band horn	20.4	20	5L - 4R	1.6	1240
PE1KXH	Double-8, back plane	9.2	19	28L - 31R	1.12	1290
PE1RDX	2 x 36-ele Yagi	19	18	4L - 5R	1.18	1297
13cm antennas at 2352MHz						
PE1PSJ	5-slot omni	7.9			1.04	2352
PE1PUW	Yagi, 3m boom	19.4	23	7L - 6R	1.12	2435
PA3EXV	1.6m dish, LPA	22.4			1.28	2425
PA3EXV	1.6m dish, 2-band horn	27.8	28	4L - 2R	1.41	2415
PE1CMO	4 x double-quad, back plane	11.2	14	14L - 26R	1.09	2354

Table 1: Test results of some antennas performing well for their type.

* *22 Island Wall, Whitstable, Kent CT5 1EP.*
E-mail: g4lqi@rsgb.org.uk

IMPORTANT announcement

The NOT SO GOOD News

ML&S will NOT be attending the Alexander Palace Exhibition.

The VERY GOOD News

To celebrate Chris Taylor's appointment as SALES DIRECTOR at ML&S, he will be having a MONSTER SALE in the shop the same weekend!
Chris has managed to secure a large amount of USED & EX-DEMO Ham Radio Equipment for sale exclusively on our forthcoming OPEN SALE WEEKEND!

Here are JUST A FEW of the TEMPTERS on offer:

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Fully loaded **YAESU FT-1000D's**
200W HF Base

5 ONLY **£175**

YAESU FT-50
Twin Band Handie

2 ONLY **£2999**

Ex-Demo **YAESU VL-1000's**
1kW HF + 6 Amplifier

6 ONLY **£795**

Demo **KENWOOD TS-570DGE**

3 ONLY **£629**

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RSGB ISLANDS ON THE AIR CONTEST - 2001 RULES

1. GENERAL The aim of the contest is to promote contacts between stations in qualifying IOTA island groups and the rest of the world and to encourage expeditions to IOTA islands.

2. WHEN 1200UTC Saturday 28 July to 1200UTC Sunday 29 July 2001.

3. BANDS AND MODES 3.5, 7, 14, 21 and 28MHz, CW and SSB. IARU band plans should be observed, with CW contacts being made only in the recognised CW ends of the bands, ie below 40kHz up on the lower band edge. Contest-preferred segments should be observed, no operation to take place on 3560 - 3600, 3650 - 3700, 14060 - 14125 and 14300 - 14350kHz.

4. CATEGORIES

(a) Single operator, 24 hours. CW, SSB or Mixed-mode.

(b) Single operator, 12 hours. CW, SSB or Mixed-mode.

(c) Single operator assisted, 24 hours. CW, SSB or Mixed-mode.

(d) Single operator assisted, 12 hours. CW, SSB or Mixed-mode.

(e) Multi-operator, mixed mode. *Island stations only.*

Notes:

1. One transmitted signal only allowed. A maximum of two transceivers may be used. The second transceiver to be used to call other stations only if the station is a new multiplier. It must not be used to solicit other contacts, eg by calling "CQ" or "QRZ".

2. Single operator assisted categories: passive use (self-spotting not allowed) of DX spotting nets and *DX Cluster* is allowed.

3. Off periods should be a minimum of 60 minutes and should be noted on the summary sheet.

5. SECTIONS

(a) IOTA Island Permanent Station.

(b) IOTA Island DXpedition. Antennas and equipment installed specifically for the contest.

(c) IOTA Island DXpedition 100W. Antennas and equipment installed specifically for the contest.

(d) World. Any station in a location not having an IOTA reference.

(e) Short Wave Listener. See rule 10.

Note: There is *no* World multi-operator section.

6. EXCHANGE

Send RS(T) and serial number starting from 001, plus IOTA reference number if applicable. Do not use separate numbering systems for CW and SSB. Stations may be contacted on both CW and SSB on each band.

7. SCORING

(a) QSO Points - Each contact with an IOTA island counts 15 points. Other contacts count 3 points, including contacts with the entrant's own IOTA reference.

(b) Multiplier - The multiplier is the total of different IOTA references contacted on each band on CW, plus the total of different IOTA references contacted on each band on SSB.

(c) Total Score - The score is the total of QSO points on all bands added together, multiplied by the total of multipliers.

Note: Entrants are allowed to claim multiplier credit for their own island reference on the bands and modes operated.

8. LOGS

(a) Electronic entries are preferred using recognised contest software: SDI, NA, CT, TR. Two files only are required, (callsign).LOG or .ADIF and (callsign).SUM.

(b) Logs must show: Time, Callsign, RST / serial number / IOTA reference sent, RST / serial number / IOTA reference received, Multiplier claimed, QSO points.

(c) A summary indicating category and section, contacts per band / mode should be included with a declaration that the rules and licence conditions have been complied with. IOTA stations must state their island name and IOTA reference number.

(d) Single mode entrants who make contacts on the other mode should submit these separately as checklogs.

(e) Entries can be emailed to **hf.contests@rsgb.org.uk** and should be sent as a normal attachment to an e-mail.

(f) Postal entries should be addressed to: RSGB IOTA Contest, PO Box 9, Potters Bar, Herts EN6 3RH, England.

(g) The closing date is 1 September 2001.

9. PENALTIES

Points may be deducted, or entrants disqualified, for violation of the rules or the spirit of the contest. This includes refusal by IOTA island stations to make contacts with their own country when requested, use of a third party to make contacts on a list or net or not giving the IOTA reference for every contact. Duplicate contacts should be included with no points claimed.

10. SWL CONTEST

Scoring is as for the transmitting contest. Logs must be separate for each band, and show Time, Callsign of station heard, RST / serial number / IOTA reference sent, Callsign of station being worked, Multiplier claimed, QSO points.

Under 'callsign of station being worked', there must be at least two other QSOs before a callsign is repeated, or else 10 minutes must have elapsed. If both sides of a QSO can be heard, they can be logged separately for points if appropriate.

11. AWARDS

(a) Certificates will be awarded to leading stations in each category and section, and in each continent, according to number of entries.

(b) CDXC Geoff Watts Memorial Trophy to the leading IOTA Islands permanent station.

(c) IOTA Trophy presented by the IOTA Committee to the leading IOTA Island DXpedition station.

(d) Roger Balister, G3KMA, Trophy to the leading IOTA Island DXpedition 100W station.

(e) David King, G3PFS, Trophy, in memory of Geoff Watts, to the leading British entrant operating from a location in the UK in the single operator 12-hour SSB category.

(f) G3DYY Memorial Trophy to the leading British entrant operating from the UK in the single operator 24-hour CW category.

(g) W9DWQ Contest Award to the leading North American Island Expedition Station.

12. Note from the RSGB IOTA Manager:

Amateurs planning to activate an all-time new one for IOTA over the IOTA Contest weekend should, if possible, arrange to commence their operation in the preceding 24 hours to enable the new reference number to be issued before the start of the contest. Once the contest is under way, it will not be possible to issue a new number and, without this, contacts made will not count as island contacts. ♦

The station of UU7J/P on Kosa Tuzla Island (Kerch Strait, Black Sea), EU-180, in the 2000 RSGB IOTA Contest.

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7/8 April 2001
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PROGRAMME
Saturday 7 April

Lecture Theatre

12.00 - 1.00pm
'Making More Miles at VHF'
RSGB VHF Manager David Butler, G4ASR. A DX operator's audio-visual guide to propagation modes and how each is used to enable long distance contacts to be made at very high frequencies.

2.00 - 3.10pm
UK Six Metre Group:
'6m Operating and Propagation', Trev, G3ZYY, and Clive ('What's on 6?'), G4FVP. Something for everyone here as these knowledgeable band fanatics give us the low down on operating and propagation on 6.

3.15 - 4.45pm
UK Six Metre Group:
'PY5CC Operating Experiences'. Peter, PY5CC (the undisputed world no 1 6m operator with over 200 DXCC countries worked) details his operational experiences on the band.

Meeting Room

12.00 - 1.00pm
'Beginner's Guide to Microwave'
RadCom Microwave columnist Simon Lewis, GM4PLM.

2.00 - 3.00pm
'Recent Advances in Microwave Equipment and Operating'
Dr Charles Suckling, G3WDG.

3.10 - 4.00pm
'Beginner's Guide to Microwave Construction'
RadCom Microwave columnist Simon Lewis, GM4PLM.

Crow's Nest

11.00am - 12.00
'Linking Amateur Radio via The Internet' (part 1)
Adrian Robinson, G7WFM, and Jeremy Boot, G4NJH, with a demonstration / presentation / open forum on this subject.

1.30 - 3.00pm
'Linking Amateur Radio via The Internet' (part 2)
Adrian Robinson, G7WFM, and Jeremy Boot, G4NJH.

PROGRAMME
Sunday 8 April

Lecture Theatre

11.05 - 12.05pm
UK Six Metre Group AGM

12.10 - 1.20pm
'Making More Miles at VHF'
RSGB VHF Manager David Butler, G4ASR. A DX operator's audio-visual guide to propagation modes and how each is used to enable long distance contacts to be made at very high frequencies.

2.00 - 3.10pm
UK Six Metre Group:
'6m Operating and Propagation', Trev, G3ZYY, and Clive ('What's on 6?'), G4FVP. Something for everyone here as these knowledgeable band fanatics give us the low down on operating and propagation on 6.

3.15 - 4.45pm
UK Six Metre Group:
OX2K - the team that really put Greenland on the map in 2000.

Meeting Room

1.00 - 2.00pm
Award Ceremonies.

2.00 - 4.00pm
VHF Open Forum.
Come and have your say about the state of VHF amateur radio today

Crow's Nest

12.00 - 1.00pm
'Beginner's Guide to Microwaves'
RadCom Microwave columnist Simon Lewis, GM4PLM.

2.00 - 3.00pm
'Beginner's Guide to Microwave Construction'
RadCom Microwave columnist Simon Lewis, GM4PLM.

Sunday only
Guided Tours of Bletchley Park

Bletchley Park will be open from 11.00am to 5.00pm on **Sunday 8 April** at a **specially reduced** admission of £3.50 per head (normal price £5.00). No concessions. Tickets are available *exclusively* at the RSGB Show. The Cryptology Trail and grounds will be open and guided tours will be available. The Crypto Café will be open for hot and cold drinks, snacks etc. (Please note that Bletchley Park Mansion will not be open on 8 April).

£3.50 Special Price

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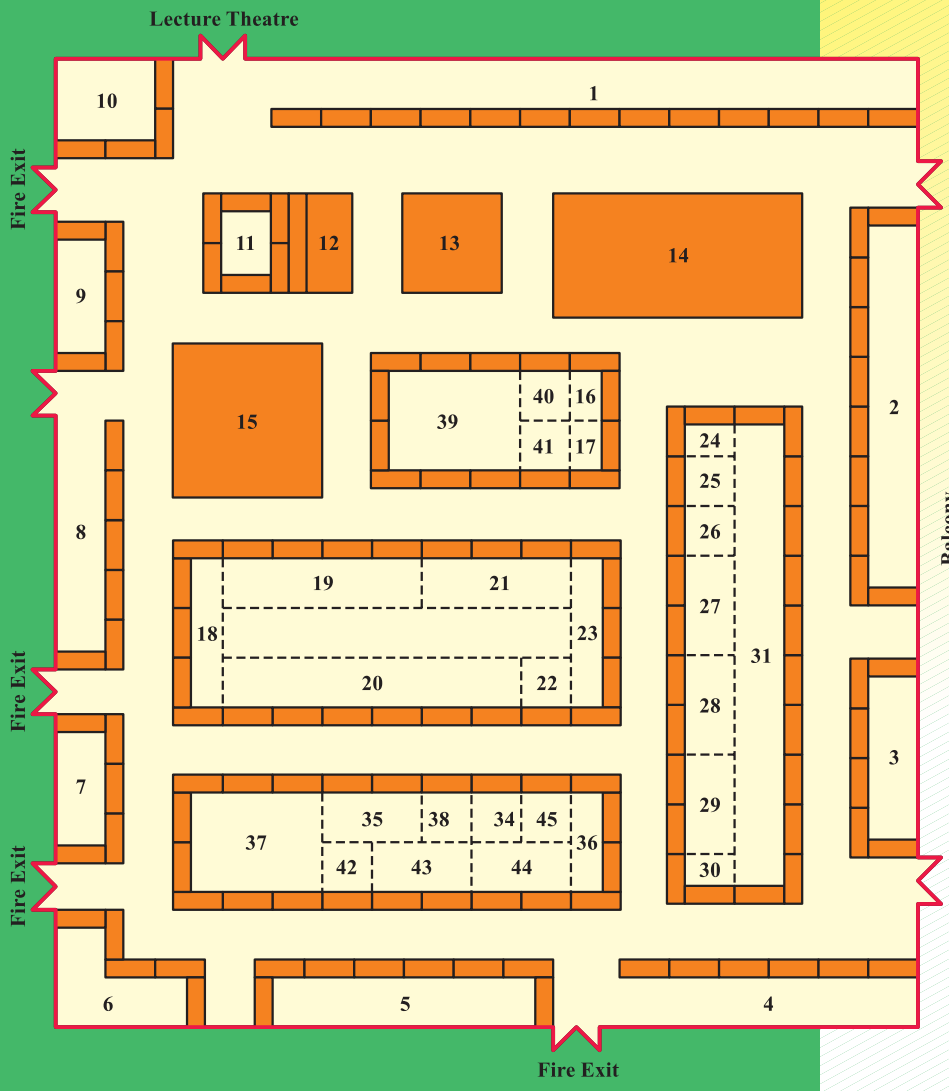

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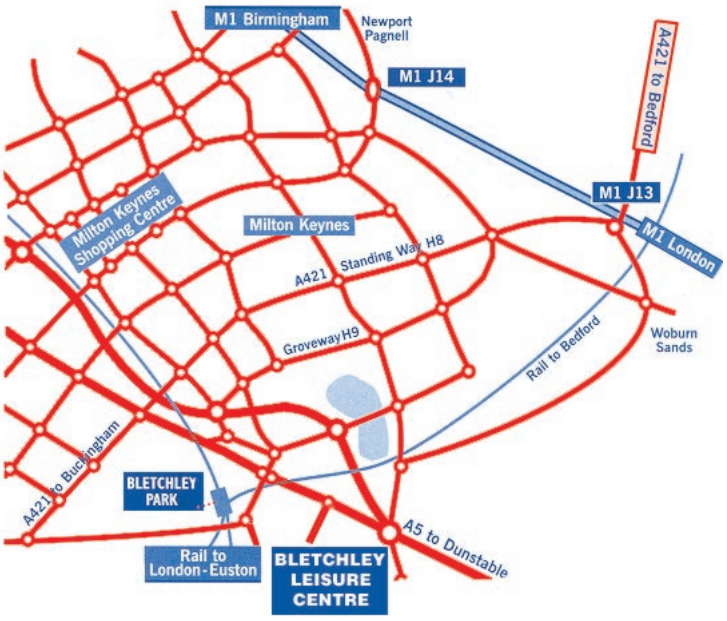

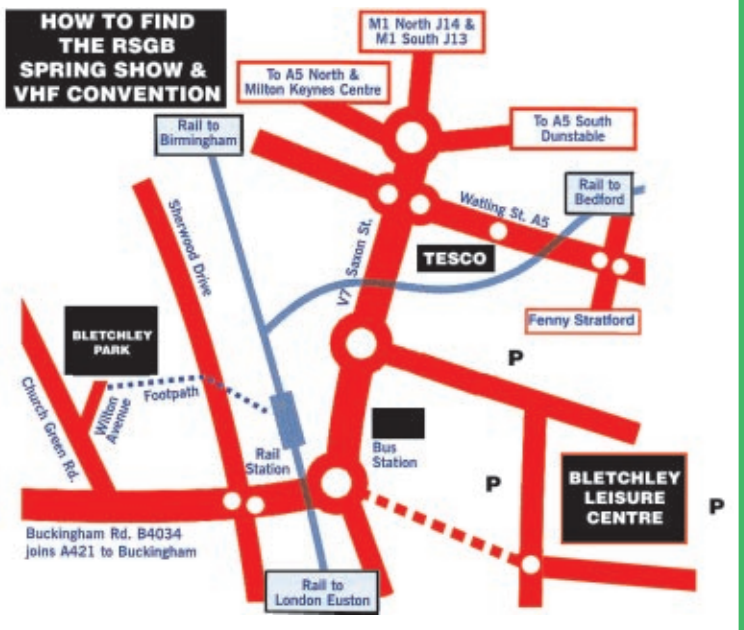

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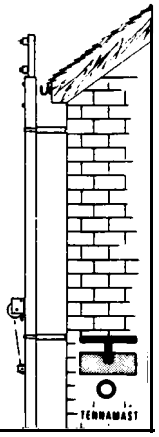

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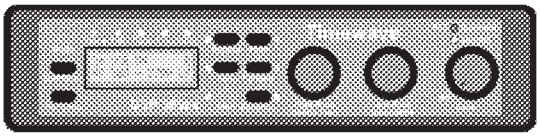
product news

ACOM LINEAR AMPLIFIERS

AS A RESULT of the review of **Acom amplifiers** in the March *RadCom*, Vine Antennas has received a number of queries about the sourcing of components from Eastern Europe. Vine asks us to point out that the valves are from the Svetlana factory in St Petersburg, and that the tank circuit components are made in the Acom factory. Nearly all other components are sourced from Western sources in the usual way. In addition, Vine wishes us to advise readers that the somewhat noisy vacuum relay in the Acom 2000A has now been mounted in a rubber bush - just like the Acom 1000. The Acom 2000A reviewed pre-dated this modification and the vacuum relay in current production examples is very quiet in operation.

Vine Antenna Products, The Vine, Llandrinio, Powys SY22 6SH; tel: 01691 831111; fax: 01691 831386; e-mail: vine@csma-netlink.co.uk; web site: www.vinecom.co.uk

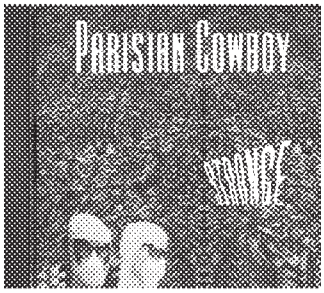
LATEST TIMEWAVE DSP UNIT



THE NEW **TIMEWAVE DSP599ZX Version 5** advanced **DSP unit** is now available from Nevada. The upgraded model now boasts an improved noise reduction algorithm, PC-radio interface and filter for PSK-31, binaural CW reception (enabling the operator to use his / her brain and both ears to separate CW signals into a 'panorama', with lower pitch signals to the left and higher pitch signals to the right); 'CW Spotlight' (highlighting a weak signal to pull it out of surrounding QRM); and even a Morse code practice oscillator. The Timewave DSP599ZX Version 5 sells for £359.95.

Nevada, Unit 1, Fitzherbert Spur, Farlington, Portsmouth PO6 1TT; tel: 023 9231 3090; fax: 023 9231 3091; e-mail: info@nevada.co.uk; web site: www.nevada.co.uk

CULT HAM BAND?



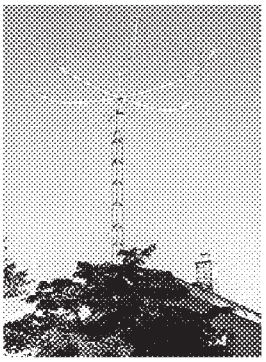
STRANGE is the name of a music CD released on the Moseley Sounds label by the group ***Parisian Cowboy***, one half of which is John, G0UYT. The style is described as 'electro rock' and includes keyboards and guitars. A couple of tracks have sampled HF SSB radio sounds mixed in. Tracks include *Tropo*, *Sporadic E's* and *Doppler Shift*. Released on 30 April, for further details call **Moseley Sounds on tel: 0121 475 6156.**

HAMCALC ON CD-ROM

HAMCALC, the suite of amateur radio and electronics calculation programs, is now available on CD-ROM which will run under Windows. It contains 211 separate programs designed to take the pain out of mathematical calculations. Hamcalc is upgraded frequently (version 50 was released on 16 February) and is available free of charge direct from the author only. Please send US$7.00 (to cover the cost of materials and airmail postage anywhere in the world) to:

George Murphy, VE3ERP, 77 McKenzie St, Orillia, ON L3V 6A6, Canada.

NEW HF BEAM ANTENNAS



VINE ANTENNA PRODUCTS has released two new ranges of products from USA. **Tennadyne** produces well-engineered **log-periodic antennas** with from 6 to 12 elements and boom lengths from 12 to 30ft. They operate on all bands 20 - 10m, including 17 and 12m, using a single feedline.

The second is the **HX-5B 'Hex-Beam'** from **Traffie Technology** (pictured right). Elements are full-size, therefore VSWR bandwidth and gain are excellent, but thanks to the design the HX-5B has only a 9.4ft turning radius.

For further details on either range of antennas, contact **Ron Stone, Vine Antenna Products, The Vine, Llandrinio, Powys SY22 6SH; tel: 01691 831111; fax: 01691 831386; e-mail: vine@csma-netlink.co.uk; web site: www.vinecom.co.uk**

JACKSON BROTHERS REBORN

MAINLINE ELECTRONICS bought **Jackson Brothers** and its entire stock in 1998. Jackson Brothers was originally founded in 1922 and was famous for decades for the manufacture of **variable capacitors** used in medium and short wave radio sets. The company now manufactures high-voltage variable capacitors and accessories and provides Europe's largest range of capacitors, drives and insulators. Jackson is addressing new technologies and market places as variable capacitors find their way into many leading-edge applications. The product range includes high voltage variable capacitors for transmitters, RF tuning capacitors and miniature trimmer capacitors. Jackson has recently introduced a range of screening enclosures for EMI and RFI noise reduction.

Mainline Electronics is a specialist broadline catalogue based electronics components distributor, serving the communications industry and the amateur radio market since 1989. For further information please contact **Anona Dakin, Mainline Group, tel: 0116 277 7648, e-mail: sales@mainlinegroup.co.uk**

CREATIVE SERVICES SOFTWARE

WATERS & STANTON has been appointed UK representative for **Creative Services Software** from the USA. There are three CDs available. ***PacTerm '98*** provides more comprehensive multimode terminal software for use with Kantronics TNCs (for use with Windows 95, 98 and Windows NT) and costs £79.95. ***Log Windows*** is primarily a logging program but also provides transceiver and rotator control. It is fully compatible with *PacTerm '98* and includes the *QSL Maker* QSL printing program, DX *PacketCluster* interface and IOTA support. It is available for £69.95. ***Digital Trio*** includes *PacTerm '98* and *Log Windows* plus *WeFax '99* and costs £129.95. For further details of these products please contact:

Waters & Stanton PLC, Spa House, 22 Main Road, Hockley, Essex SS5 4QS; tel: 01702 206835; fax: 01702 205843; e-mail: info@wsplc.demon.co.uk; web site: www.waters-and-stanton.co.uk

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.

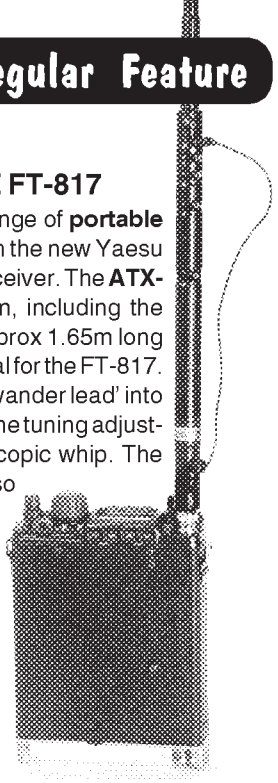
NEW ADDITION TO LINEAR AMP UK RANGE

THE **PIONEER 572H** is the latest addition to the range of UK-built amplifiers from **Linear Amp UK**. It covers all the HF bands from 10 to 160 metres and uses four vertically-mounted 572B valves. The Pioneer 572H weighs 25kg and costs £1295.

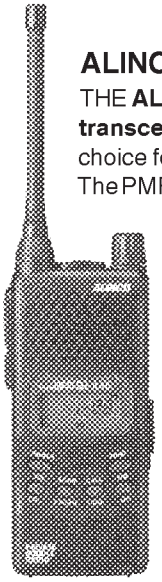
Linear Amp UK, Field Head, Leconfield Road, Leconfield, Beverley, E Yorks HU17 7LU; tel / fax: 01964 550921; e-mail: sales@linamp.co.uk; web site: http://www.linamp.co.uk

PORTABLE ANTENNAS FOR THE FT-817

WATERS & STANTON has introduced a range of **portable HF antennas**, primarily designed for use with the new Yaesu FT-817 or any other low power portable transceiver. The **ATX-Walkabout** covers all bands from 80 to 6m, including the WARC bands. When fully telescoped it is approx 1.65m long and fitted with a BNC connector, making it ideal for the FT-817. Band changing is achieved by plugging the 'wander lead' into the appropriate socket on the base coil, and fine tuning adjustments are made using the 10-section telescopic whip. The whip unscrews from the base matching coil, so that packed down the antenna measures only 32cm. **AT Single Banders**, of similar dimensions to the ATX-Walkabout, are also available for any band between 80m and 6m.



Waters & Stanton PLC, Spa House, 22 Main Road, Hockley, Essex SS5 4QS; tel: 01702 206835; fax: 01702 205843; e-mail: info@wsplc.demon.co.uk; web site: www.waters-and-stanton.co.uk



ALINCO PMR-446 RADIOS

THE **ALINCO DJ-446** heavy-duty handheld is a **PMR-446 transceiver** packed with features that make it the ideal choice for business, professional and reliable leisure use. The PMR-446 service (on 446MHz) requires no licence and can be used by anyone without any formalities. The DJ-446 is factory programmed with all eight PMR-446 channels. Each channel has 39 CTCSS tones giving an effective 312 usable channel modes. The radio features 30 memory channels, a battery level indicator, auto power off and power save modes, switchable high / low power, memory and channel scan modes, and it comes complete with a 700mAH, 9.6V thin NiMH battery.

Nevada, Unit 1, Fitzherbert Spur, Farlington, Portsmouth PO6 1TT; tel: 023 9231 3090; fax: 023 9231 3091; e-mail: info@nevada.co.uk; web site: www.nevada.co.uk

DSP FILTER-ANALYSER AND DECODER SOFTWARE

RADIOCOM 5.0 RX is a new product released by **Bonito** of Germany. It decodes digital and analog signals from the radio, also improving the sound quality using DSP technology. The signal goes directly to your computer via its soundcard for processing. You can also control the radio from the COM port without any extra hardware. The received signals are filtered and sent to the computer loudspeakers. Minimum requirements are a Intel Pentium / Celeron 200MHz or better, ColorGraphic min 16-bit colours, screen resolution 1024 x 768, 16-bit bi-directional Soundcard with Line In, Win 95, 98, NT 4.0 SP/3. RadioCom 5.0 is delivered with: Filter-Analyser, Time Spectroscopes, Dual Scope, Audio-Recorder, RTTY, CW, FAX, SSTV, PSK (PSK31, Q- and B-PSK), Synop-Decoder, 3D Scanner and Sattracking. You have all you need in one program! The price is 219 Euros (£139). For further details contact **Dennis Walter, at Bonito, Gerichtsweg 3, D-29320 Hermannsburg, Germany; tel: +49 5052 6052; fax: +49 5052 3477; web site: www.bonito.net**

FERRITE CORES

ALWAYS HANDY TO have in the shack, two new **ferrite core clamps** specifically designed for filtering RF currents on the outer sheath of coaxial cable are now available from **Waters & Stanton PLC**. The cores are available for RG-213 and RG-58 cables and are effective over the range 1 - 300MHz. They are equivalent to six ferrite beads in series, but with a higher impedance.

Waters & Stanton PLC, Spa House, 22 Main Road, Hockley, Essex SS5 4QS; tel: 01702 206835; fax: 01702 205843; e-mail: info@wsplc.demon.co.uk; web site: www.waters-and-stanton.co.uk

GRUNDIG 'SATTELIT 800 EU MILLENIUM' RECEIVER

NEVADA IS THE exclusive UK distributor of the new **Grundig 'Sattelit 800 EU Millenium' receiver** and is marketing the radio both direct and through its existing dealer network. The radio looks like a large table-top portable, but it is a true communications receiver, covering 100 - 30,000kHz for broadcasts and shortwave (AM, LSB and USB), 87 - 108MHz for FM broadcasts and 118 - 137MHz for AM airband. The receiver features AM synchronous detection to improve the purity of shortwave AM reception, helping to clarify fading signals and reduce interference from adjacent frequencies. There are three built-in IF filter bandwidths of 6.0, 4.0 and 2.3kHz. The Grundig Satellit 800 measures 20.5W x 9H x 8Din and weighs 14.5lb. It can be powered from 240V mains, using the supplied wall adapter, or from internal batteries. The Grundig Satellit 800 provides the ultimate in features, performance, convenience and legendary Grundig audio quality from its built-in 4in dynamic speaker. The sound quality can be adjusted with bass and treble controls. The RRP is £599.

Nevada, Unit 1, Fitzherbert Spur, Farlington, Portsmouth PO6 1TT; tel: 023 9231 3090; fax: 023 9231 3091; e-mail: info@nevada.co.uk; web site: www.nevada.co.uk

Newcomers' News

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

NO APRIL FOOL spoofs in this column, just lots of input from readers. So without further ado let's see what news there is.

JOTA 2000 REPORT

JAMBOREE ON THE AIR (JOTA) is an annual event when Scouts from all over the world enjoy the delights of amateur radio. Co-operation between scout groups and radio amateurs means that the youngsters can pass greetings messages to other groups and other radio amateurs in the UK and many other countries.

The Radio Scouting Group produces a fine newsletter with topics of interest for those involved with scouting and amateur radio, and the latest edition carries an excellent report on JOTA 2000, the 43rd Jamboree. There were some 96 UK stations active, many with special event callsigns, manned by 380 radio amateurs, and visited by 3500 scouts and guides. Who says the hobby is in decline?

The *Radio Scouting* newsletter also includes details of Thinking Day On The Air, (the Guides' equivalent of JOTA), the Aldershot and District Scouts, and the Radio Scouting Seminar in Rome. Subscriptions to the newsletter cost just £5 from Geoff Dellbridge, G0PMF, 19 Cleeve Close, Astley Cross, Stourport-on-Severn DY13 0NY. Suitable input for the newsletter should be send to the same address.

A NEW FOUNDATION?

I WAS ONE of the many who could not attend the Radiocommunications Agency's amateur radio forum in Edinburgh last December, but I was very pleased to receive a written record of the meeting from the RA.

The main topics for discussion seem to have been the proposed new 'Foundation' licence and the opening-up of the high frequency (HF) bands to current class B licence holders. It is clear that the HF issue is unlikely to be resolved until after the next World Amateur Radio Conference in 2003, but the introduction of the new class of licence seems to be much closer.

The new examination might follow some 8-10 hours of tuition from registered Novice instructors and would be administered by local radio clubs. Holders of the new licence would be limited to using commercial equipment on the very high frequency (VHF) bands. There was some hint at the meeting that 'approved' kit building may be permitted.

I would encourage all newcomers to the hobby to read the full Minutes which are available from the RA web site, **www.radio.gov.uk** or hard copies can be obtained from Radiocommunications Agency, Wyndham House, 189 Marsh Wall, London E14 9SX.

EXAM RESULTS

THE EXAMINERS' REPORTS for both the Radio Amateurs' Exam (RAE) and the Novice RAE (NRAE) held in December have been published. These reports are most informative for those preparing for the next round of exams as they give some clues about the sort of questions that might crop up and the areas where candidates have struggled to find the correct answers.

In this RAE the biggest pitfalls seem to have been in the questions on electro-magnetic compatibility (EMC). This is a big part of the exam with 14 questions.

171 candidates sat the RAE, of whom 117 (68.4%) were successful. Well done to those who passed and good luck with the re-sit to those who dipped. Whatever you do, do not give up! You will have another chance in May.

The pass rate in the NRAE was a little better than average with 91 of the 105 candidates (86.7%) receiving their pass slips. Well done all! The next exam is in June and our best wishes go out to all those about to take the plunge.

Most questions were answered well, but over half the candidates failed to recognise the need for a band-pass filter to reduce unwanted emissions above and below the wanted frequency. In their defence, I do not believe that band-pass filters feature in the NRAE syllabus - a bit sneaky, that one!

More worrying is that a fifth of the candidates did not know the colour of the neutral wire in a mains plug. The examiners keep including questions about mains wiring and candidates keep getting them wrong. William Aitken, MM0CNV, wrote to say that you can now buy mains plugs with colour coded pins to serve as a permanent reminder of the correct wiring positions. Thanks for that William.

Past reports for both RAE and NRAE can be obtained from **www.kippax.demon.co.uk/c-and-g/** or by sending a SASE to RSGB Headquarters and a note stating which report(s) your would like.

RAE PRACTICE

MURRAY WARD, G3KZB, has for some time provided free RAE practice questions through the Internet and on floppy disc. Murray has recently updated his software adding new questions and changing existing questions to reflect current licence conditions.

The program can be downloaded from the internet via **http://freespace.virgin.net/murray.g3kzb** or, for those without such technology, Murray is willing to send a copy on floppy disc. His address is correct in the current *RSGB Yearbook* or he can be contacted on 01483 417 597.

QSL? AND QSLL?

ANOTHER READER who gained his callsign almost 50 years after becoming interested in the hobby is Brian Davies, 2E0BGD. Brian showed me an old receiving logbook where he had written 'Property of G3BGD (one day!)'. Well he didn't manage the G3 prefix but he did manage to get his initials as his callsign, albeit after a lengthy wait.

Brian mainly operates using Morse code, but he has been puzzled by stations returning with 'QSLL'. All radio students will know that 'QSL?' means 'Are you receiving me?' and that a return of 'QSL' means 'I am receiving you', but does anyone know what the extra L signifies? I have asked around my local contacts and have been unable to help. ♦

Hey - this is *good*! Tom Fellows, one of the Scouts at GB2COS during JOTA under the guidance of G7BQY (see' JOTA 2000 Report').
Photo: Peter Taylor, Chester District Scouts

* *5 Sydenham Buildings, Bath, BA2 3BS*

Down To Earth

A Simple Morse Key

by Dick Biddulph, MOCGN *

THIS MORSE KEY was designed as an exercise *before* I had passed the Morse test in early 1999. It may not be original, but it works well *and* was tried out by that well-known Morse enthusiast, Pat Hawker, G3VA, who liked it enough to ask if he could keep it! Unfortunately, I had by then passed the Morse test, and gave it to my tutor as a 'thank-you' present.

This article is in two parts, firstly, the design of the key is described and secondly, some words of wisdom are offered regarding the working, handling and shaping of acrylic plastic.

THE DESIGN

THE THOUGHTS behind the design were to make it lightweight and quiet in operation. The lightweight part was the operating arm, made so as to reduce operator fatigue.

It was made, as was most of the rest, from ¼-inch thick Perspex™ sheet which had been 'liberated' on its way to the skip at my old place of work! It was dark green (although any or no colour would do). Note: none of the dimensions is critical except that the distance between the operating knob and the pivot should be twice that between the back stop and the pivot, as illustrated in **Fig 1**. Obviously, the final dimensions must be self consistent, ie if you make the operating arm long, the base must also be long. A previous model was made from aluminium alloy, but this needed harder work (and more machinery!) to make it.

The arm was made from two strips 1in wide and 7in long, glued together (see the advice given under 'Working Acrylic Plastics'). The base comprised three pieces about 6in by 4in with sections 5in by 3in, cut out of two of them and glued to form a flat base with a hollow for the contacts and the ballast. The arm was fitted into a yoke, the gap of which must be about 0.1in wider than the arm to accommodate a washer on each side.

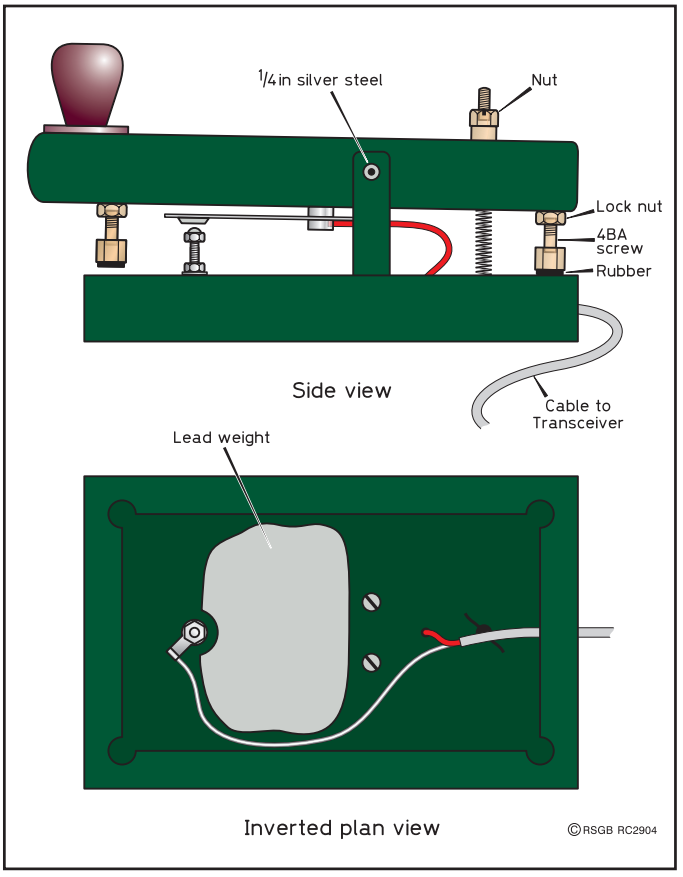


Fig 1: Side and inverted plan views of the Simple Morse Key.

... it was tried out by that well-known Morse enthusiast, Pat Hawker, G3VA, who liked it enough to ask if he could keep it!

The return spring was partly hidden in the arm, as Fig 1 illustrates. The knob was specially turned, but can be made of anything suitable. The movement of the arm was restricted by screws tipped with thin rubber or cork for quiet operation. Finally, the fixed contact was made on the top of a screw and the moving contact on a spring made from a hacksaw blade. The actual contacts were made from 'D'-section sterling silver; alternatively you could use contacts from a redundant relay. The ballast was a lump of lead cast to shape in a simple mould made from fireclay, although wood would do for a 'one-off'.

Take great care if melting lead. Don't use an ordinary tin can but a one-piece tin such as is used for canned tuna. The lead is held in place by wood screws through the acrylic top.

WORKING ACRYLIC PLASTICS

THE BASIC RULE is to keep the cutting area cool, ie work slowly or flood with coolant. Water plus a few drops of washing up liquid per pint is the simplest coolant, but to use it with an electric jig-saw is dodgy. If you try to speed things up without cooling, the acrylic melts and jams the saw blade!

For intricate shapes, a fretsaw is useful and demands little effort because the kerf (the amount removed in cutting) is very small.

Cleaning up cut edges is best done with 'wet and dry' abrasive paper on a flat surface (for flat pieces), with the water coolant mentioned above. Start with 80 grit for a rough finish and go on to 400 grit to get a really smooth finish. If you want to polish, use a cloth and Brasso™, resting the work on the same flat surface.

Gluing acrylic needs a suitable cement; I used Tensol™ which was, like the sheet, liberated on its way to the skip. Super Glue works well with *clean* acrylic (I have

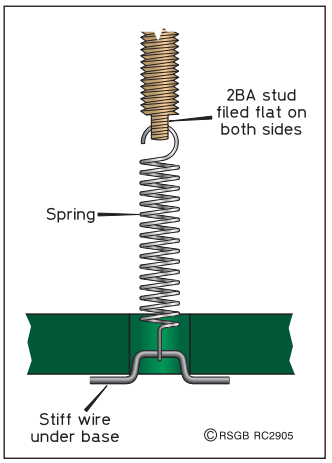


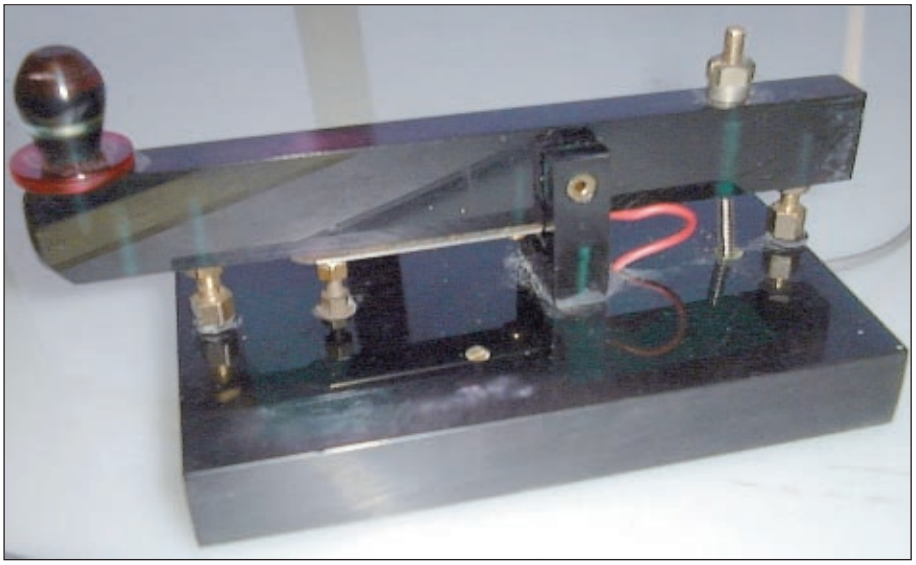
Fig 2: The mounting of the return spring and its adjustment.

* 59 Ditton Road, Surbiton KT6 6RF

tested Loctite Super Atak®, but heed the usual precautions!).

WHERE TO GET MATERIALS

SOME model shops stock acrylic, but usually only in water-white transparent form. Firms who make industrial models have plenty of off-cuts and may be prepared to sell some. They may also be prepared to part with a small quantity of cement. Yellow pages and Thomson Local directories list them.



The final product, assembled and ready for use.

- Contacts (as mentioned previously) - I used 'D'-section sterling silver about 1/8in wide and 1/4in long. You may be able to get this from a jeweller or jeweller's supply company. Alternatively, you can use a relay contact, preferably a heavy-current one for ease of handling. The contact on the spring was in line with the arm and the fixed contact was at right angles to it.
- Soldering the hacksaw blade spring demands that it should be very clean and bright *and* that you use an acid flux, such as Baker's Fluid, to tin it. It should then be well washed before soldering on the contact using normal resin-cored solder.
- The contact spring was spaced from the operating arm by a thick washer or three standard washers.
- The 'quieteners' were discs of inner tube, but slivers of cork would do.
- During assembly, lubricate the pivot shaft with light oil or preferably with Molyslip.

TOOLS

THE MINIMUM TOOLS necessary are: hacksaw and/or fretsaw; vice; drill and bits, (preferably a pillar drill or a pillar stand for an electric drill); taps for threads used; G-clamps to hold work while glue sets; wet & dry abrasive sheets (80 and 400 grit); a flat surface (plate glass or Contiboard®).

AFTERTHOUGHT

IF I WERE to repeat the project, I would make the gap adjustment more user-friendly. If you need to change the gap, the current design requires reaching for a spanner! ♦

ICOM IC-756 PRO

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also availiable at Waters & Stanton @ Lowe

Great news. Waters & Stanton have brought the price down by a massive £500 on this high performance transceiver. Brimming with features and already earning itself an enviable reputation with HF DXers, the IC-756 now offers unbeatable value at our new low price. The lovely 5-inch TFT colour display forms the central control panel, providing large clear digital readout. Switch on the real-time spectrum scope to check for band activity or home into a narrow 25kHz and check other stations' signal properties. You can even change the colour and font properties to suit your preferences. Comprehensive metering offers analogue and digital readouts, and for the contest operator, there's both voice and CW recorders included as standard, the latter capable of displaying its contents on the control screen. And when it comes to selectivity, you have no worries about buying extra filters. The IC-756 PRO's amazing digital IF filter offers 51 pass bands down to 50Hz, more than adequate for whatever mode you operate. SSB operators will love the adjustable microphone equaliser with 121 combinations, and when noise becomes a problem, Icom's advanced 32-bit DSP will come to your aid, offering unrivalled signal recovery properties. There are many more features contained in the 8-page colour brochure, free on request. But the inescapable fact is, there has never been a better time to buy.

WATERS & STANTON PLC. Spa House. 22 Main Rd. Hockley. Essex SS5 4QS

Tel:01702 206835 Fax: 01702 205843 E-mail: sales@wsplc.com Web: wsplc.com Freephone Order Line: 08000 73 73 88

Also at Chesterfield Rd. Matlock. Derbyshire Tel: 01629 582380

The Voices

Part Ten, by Gordon L Adams, G3LEQ *

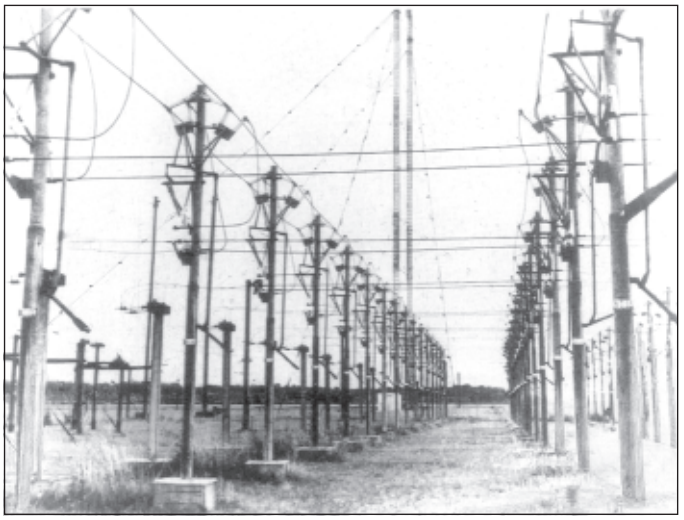
LAST JULY in Part Two of 'The Voices' I explained how Radio Free Europe and Radio Liberty came to be equipped. I also gave details of their various transmitting sites in Europe. However, both of these stations warrant further consideration, because they were active throughout the Cold War years (1948 - 89). Furthermore, they represent the most sustained anti-communist broadcasting activity carried out by the West. RFE began transmitting from Lampertheim in Germany on 4 July 1950, whilst RL radiated its first programmes on 1 March 1953; but how did all this US-sponsored effort come about?

SPECIAL PROCEDURES GROUP

IN JULY 1947 a man named Frank Wisner accepted an appointment, with the US Central Intelligence Agency, as the Deputy Assistant Secretary of State. His responsibilities were for those countries deemed to be 'occupied' by communist regimes. He had, during WWII, been employed by the Office of Strategic Services (OSS) as Chief of the South-East Europe section – which included intelligence responsibility for the Balkan states. He then spent a couple of years, after the war was over, working in a New York law office on corporate legal matters.

By the end of 1947, the CIA had assumed responsibility for covert psychological operations against any organisations or activities that were considered to be a threat to the national interests of the United States and the 'Free World'. In February 1948, the democratic government of Czechoslovakia was ousted by communists, and there was thought to be a risk of the same thing happening in Italy. Frank Wisner therefore set up a Special Procedures Group (SPG), within the CIA, with the objective of fighting the spread of communism by non-military means. Indeed, the SPG's initial foray was to be involvement in the Italian election campaign. They were lavishly funded by the CIA, and were thus able to make under-

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

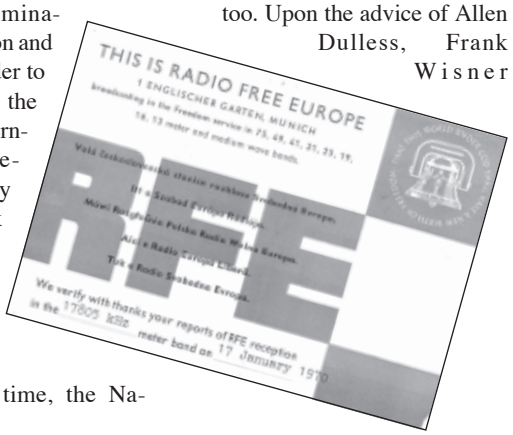


Transmission lines and antenna masts at the Radio Free Europe transmitter site at Holzkirchen, near Munich.

cover grants to the Italian Christian Democratic Party. This resulted in a defeat for the communists.

The SPG then focused its attention on creating a printing plant and also acquiring a 7.5kW broadcasting transmitter (see Part Two of 'The Voices'). They also manufactured vast quantities of 'freedom' balloons. These were to be the initial weapons used to deliver propaganda to the so-called Eastern bloc countries of Europe. It is perhaps of interest to note that it was the Roman Catholic Church, in the Middle Ages, that first employed the Latin words *propaganda fides* in connection with propagation of their religious faith. The dictionary definition of the word gives its modern meaning as "the organised dissemination of information and allegations in order to assist or damage the cause of a government or movement". I am fairly certain that Frank Wisner would have accepted that as his mission statement!

At the same time, the National Security Council sponsored a range of covert operations, which were to be directed against the USSR. This was carried out via a cover organisation, which was to become the Office of Policy Co-ordination (OPC). In 1951 Allen Welsh Dulles, a Princeton graduate, who had been the intelligence station chief in Switzerland for the OSS during the war, was appointed Deputy Director of the CIA. Two years later he became its Director. This was about the same time that his brother John Foster Dulles was made the US Secretary of State under the new President Dwight D Eisenhower. John Dulles had been a senior partner in the New York law firm of Sullivan & Cromwell, where his younger brother Allen had practised law too. Upon the advice of Allen Dulless, Frank Wisner was also made Director of the OPC. The idea was to construct a civilian organisation that would harness the talents of émigrés from the Eastern bloc, and use them to communicate back to their fellow nationals on the eastern side of the Iron Curtain.



EUROPE NUMBER TWO?

THE FREE EUROPE committee had originally envisaged broadcasting to the Eastern bloc countries of Europe by renting air time on the medium-wave outlets of Radio Luxembourg and Radio Monte Carlo, plus the high-power long-wave station Europe Number One in the Saarland. However, the owners of the stations were not enthusiastic, as they were geared to maximising profit through on-the-air advertising. As a result, RFE initially resorted to delivering its message from the American zone of Germany via short wave. I described RFE's progress, from start-up with the 7.5kW 'Barbara' transmitter in Lampertheim, to the 250kW multiple senders in Portugal and Southern Spain, in the July 2000 edition of *RadCom*.

The attitude of the European commercial operators focused the RFE team's attention, especially upon how they were to gain an audience behind the Iron Curtain. In West Berlin, the US government was already operating the radio station called Radio in the American Sector (RIAS). This station broadcast a comprehensive schedule of news, current affairs, comedy, drama and music for all tastes. It even had its own orchestra. The RIAS programmes were also widely listened to in Eastern Germany (GDR). It was clear that Radio Free Europe would have to do likewise if it was to secure worthwhile audiences in the communist countries of Eastern Europe. It would require a complete broadcasting infrastructure involving studios, programme makers, microphones, high power transmitters, transmission lines and directional antenna systems. Psychological warfare was going to have to be waged by stealth!

Down To Earth

LONDON EYE

EARLIER THIS YEAR a Georgian agent named Nodrog Smadaski was spotted by MI5, waiting to take a 'flight' on the recently re-opened London Eye. It has now emerged that numerous agents based in the UK make use of this facility in order to send data burst signals (see Parts 8 and 9 of 'The Voices') to various foreign embassies across London. Apparently, from the top of the Eye they can send their microwave signals a substantial distance, and thus have no need to endanger themselves by being spotted in the vicinity of their 'home' embassy. An associate of his, Georgi Brownkov of the Bulgar Georgenu Smirchki Rechepodobny (the BGSR is the Georgian equivalent of the KGB) has also been spotted lurking near the Brookmans Park radio station to the north of London. Next time you visit the London Eye, watch out for characters wearing raincoats with upturned collars (see photograph in Part 9 last month). If they are also wearing 'shades' on a dull day, they are more than likely up to no good; and if wearing a hearing aid as well – they could be receiving instructions from their controller!

The Millennium Wheel, also known as the . . .?

Whilst these people have no known connection with RFE / RL, I have received queries from readers about the one-time pad coding system, which I have mentioned in this series. Take a close look at **Table 4**. It is an alphabet matrix, which must be used as part of the one-time coding process. Now examine *The Secret Hope* cartoon and find the hidden nine coded letters. Write them in order under the key words suggested by the picture of the giant wheel, leaving no spaces between the words. Then decode by taking the first letter of the key word(s), say "L" in the top line of the alphabet matrix, and run your finger down the column below until you find the first letter of the coded message. In this example it is "M", and read off from the first, or left hand vertical column of the matrix which gives you "A". Continue the process for the remaining eight letters. You have received an important message relating to the secret Brookmans Park project.

+	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A
B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B
C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C
D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D
E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E
F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F
G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G
H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H
I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I
J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J
K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K
L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L
M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M
N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N
O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V
W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W
X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X
Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y
Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z

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Table 4:The alphabet matrix, used as part of the one-time coding process.

If you have followed the decoding process successfully, you should now be able to reverse the process and encode THE VOICES – which is where you first read about this. This time use as your key word the name of the most prolific writer in *RadCom* over the years (clue: total of nine letters). However, do not forget that all trained agents have to make one deliberate error in their message, in order to show that they have not come under control of the enemy. Spot the erroneous letter in the first message that you have decoded, and insert an error letter in the same place in your own coded message. Remember that you must REVERSE the process for encoding, so "P" and "T" would give you "J" on the matrix.

If you are still confident that you have arrived at an appropriate coded nine letter sequence, post it to 'The Voices' Competition, RSGB HQ, Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JE, along with a tie breaker stating which part of 'The Voices', so far, you have enjoyed the most and why. The closing date for entries is Monday 30 April 2001, and the winner will be announced in the June *RadCom*. The decision will be made solely by Gordon Adams and editor Steve Telenius-Lowe, and no correspondence will be entered into. The winner will receive a book token, worth more than a few roubles, with which their chosen prize can be obtained from the BGSR HQ book department. Perhaps the recently published book *The Big Breach* by Richard Tomlinson (ex-MI6) would be an appropriate choice. HQ-based agents of the BGSR are excluded naturally, as they are indoctrinated already.

Next month in 'The Voices', Gordon Adams will continue with the story of Radio Free Europe and Radio Liberty. ♦

***The Secret Hope*, a cartoon by E H Shepard published by *Punch* in 1941.**

Internet Linking via the GB3US Repeater

by Dr Tony Whitaker, G3RKL* - repeater keeper, GB3US

COMPUTERS and the Internet are increasingly becoming parts of everyday life, and our hobby of amateur radio is no exception. One of the many aspects of the Internet is its ability to support voice communication from the computer, either PC-to-phone (ie to the telephone network) or PC-to-PC. The latter offers the intriguing possibility of interfacing a radio to a computer, so enabling it to be operated through the Internet. Towards the end of 1999, the Radiocommunications Agency (RA) announced that some limited experiments would be allowed on Internet linking and, by March 2000, Bert, G4NJI, and Ian, G3ZHI, were issued with Notices of Variation (NoVs) to act as 'Internet gateways' to the 70cm repeater, GB3US, on RB0, located at Sheffield University.

(1) www.qsl.net/g3zhi
(2) www.g7wfm.co.uk
(3) www.radio.gov.uk/document/misc/amradio/internet.htm
(4) www.rsgb.org/extra/intlinks.htm
(5) www.irlp.net

IMPLEMENTATION

THE CONCEPT of a gateway is quite simple. The link radio works on the required frequency, in this case RB0, transmitting on 434.600MHz, receiving on 433.000MHz, with the receiver's audio going to the input of the computer sound card, and the sound card audio output going to radio's microphone input via a VOX unit, which keys the transmitter.

The computer, which is connected to the Internet, runs VocalTec's *Iphone* PC-to-PC software and, by entering the 'ham radio' chat room, anyone else within that room can connect either to Bert or to Ian, and hence can be relayed over GB3US. In effect, the Internet gateway is acting as a very long voice-controlled speaker-microphone lead to the gateway keeper's radio. The connecting station could also be a gateway, either to a simplex frequency (431.075MHz is used in UK) or to a repeater, anywhere in the world, so allowing radio-to-radio rather than PC-to-radio contact.

It should be noted that there is no direct connection between the repeater and the computer, the gateway being just another signal on the input. However, to avoid lengthy changeover times, especially when the other end of the link is another gateway, the repeater re-access sequence must be short. Fortunately, the simplified sequence of a single 'pip' followed by transmitter carrier drop after one second (although the re-access period itself remains at 10 seconds), implemented on GB3US several years ago, proved perfectly adequate and did not have to be changed. On the other hand, the continuous tone-coded squelch system (CTCSS) makes operation of the gateway much easier, so this was added a few weeks after the experiment started.

FURTHER INFORMATION

- Ian, G3ZHI, has a wealth of information on his website (1), as well as his own conference room.
- Adrian, G7WFM, also has a very comprehensive site (2), featuring several conference rooms and his own wide-spaced (7.6MHz split) 70cm Internet repeater.
- VocalTec has now withdrawn from sale its *Iphone* software, although it is continuing to support its operation for those who have already purchased the software. However, it is still possible to obtain it - see G3ZHI's web site.
- Anyone wishing to provide a gateway to a repeater needs the permission of the repeater keeper *and* an NoV from the Radiocommunications Agency. The original requirements can be found on the RA's website (3) and on the RSGB's website (4), although it would probably be worthwhile to write to the RSGB for the latest information or e-mail them at: AR.Dept@rsgb.org.uk
- The Internet radio linking project (IRLP) is another Internet linking system devised by VE7LTD (5).
- The GB3US usage information, shown on the following page, was recorded on an old (and I mean old) Amstrad PC1512DD, running at 8MHz (no, I haven't missed out a couple of zeroes), with 512K of memory (yes, K not M) and two 360K, 5.25in floppy drives (no hard disc), coupled to a Pye PF1 PocketPhone receiver via the serial port COM1. So, if any repeater group feels it would like to press into service that old, unwanted, 8086/286/386/486 PC gathering dust in the cupboard, my *Monitor* programmes (written in QuickBASIC 4) can be found in the free software download section of the RSGB Members-Only web site.

OPERATION

MOST OF THE EARLY operation could be considered as being in the basic mode, with a single station connecting to the gateway directly through the computer. Audio quality varied from superb to terrible, the main problems being incorrect audio levels and packet loss over the Internet connection, resulting at times in 'stuttered' speech.

As more experience was gained, these problems diminished and more multi-gateway contacts occurred. These took place when Bert and Ian were *both* acting as gateways *at the same time* so, for example, WB7EYS in Seattle connected to Bert, could be talking to mobiles in Sydney through the VK2RTS Blue Mountain repeater, which was connected to Ian.

A further development involved connections to conference rooms, where several stations can be active at the same time. In these circumstances, it can become a little hectic, with the repeater output sounding more like a mini-20-metre pileup under good propagation conditions!

The locals have participated with enthusiasm on the whole, especially during the morning 'cornflake net', and there has been a noticeable increase in overall activity. **Fig 1** shows a typical 24-hour period of operation on GB3US for Thursday, 2 November 2000. The 5-minute beacon callsigns are clearly visible (including the extended IDs every four), as are the long periods of contacts. **Fig 2** shows the day's usage on an hourly basis, the background 'on' time being accounted for by the beacon callsigns. **Fig 3** shows the daily usage from the beginning of the year 2000 to mid-November, and it is very obvious how activity has both increased and been maintained

** University of Sheffield, Department of Electronic and Electrical Engineering, Mappin Street, Sheffield S1 3JD.*
E-mail: a.whitaker@sheffield.ac.uk

SCREEN DUMPS USING DOS *MONITOR* SOFTWARE (see 'Further Information')

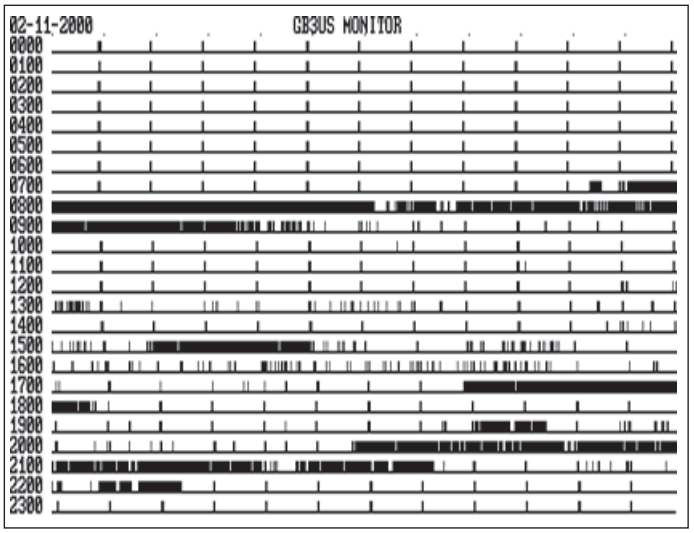

Fig 1: GB3US usage - day chart for Thursday, 2 November 2000.

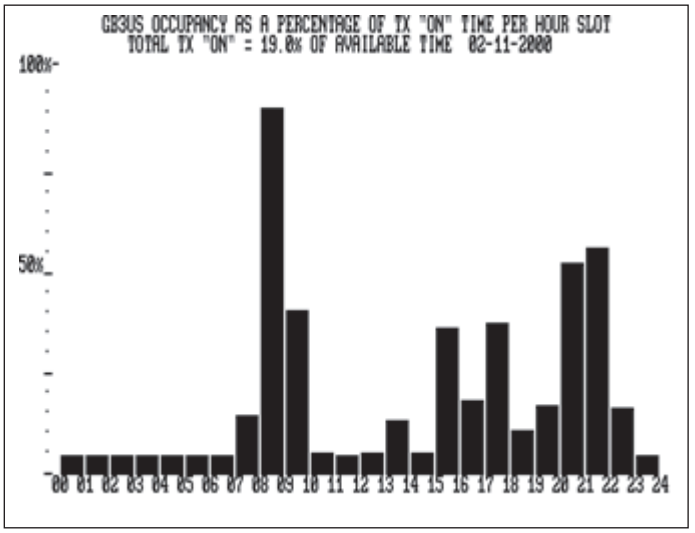

Fig 2: GB3US - hourly usage chart for Thursday 2 November 2000.

since the gateway experiment began in March. Another interesting feature is the seven-day periodicity (most visible in September), which is due to higher use during weekdays than at weekends.

CONCLUSION

ALTHOUGH IT IS still early days, the experiment has shown that operation through the Internet is perfectly feasible. Contrary to some minor opinions that have been voiced, it should be viewed as an *addition* to the amateur's arsenal, *not* a replacement; it is similar, in a way, to the fact that repeaters themselves are additions. As the Internet expands and (hopefully!) connection quality and linking software improve, it should be easier to develop a much larger and more sophisticated network. So, if you haven't already had the experience, why not try out the gateway on your local repeater, or, if it hasn't one and you have the equipment and inclination, why not obtain an NoV and put one on yourself? ♦

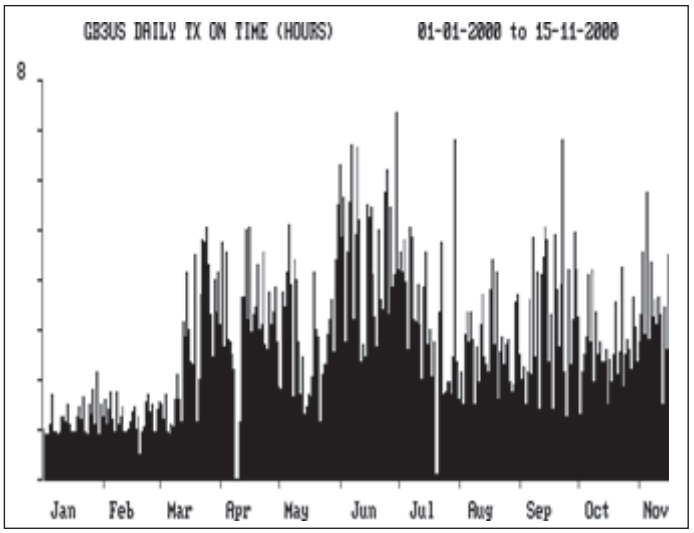

Fig 3: GB3US daily usage chart for 1 January until 15 November 2000.

● Eddie, G0ECW, wishes to borrow or photocopy a service manual or service data for an **Icom IC-725** transceiver. G0ECW, QTHR. Tel: 01273 300 772 or e-mail eddie@zamboodle.demon.co.uk

● William, GM3JDX, would like any information (particularly the circuit diagram) relating to the **Mighty Mouse Receiver**, which he thinks was in *Radio Communication* pre-1970. GM3JDX, QTHR. Tel: 0131 445 2426.

● Keith, M1ADQ, is searching for an owner's manual and schematic diagram for the **Yaesu FT-107M**, and will meet all expenses including postage. M1ADQ, QTHR. Tel: 01332 733 810.

● Dave, G4SQA, is looking for information on the **Marconi CR150/6** on behalf of Tyrone, 9Y4TD. G4SQA, QTHR. Tel: 01733 810 156.

● Mike, G3XEF, is searching for a circuit diagram and specification for the model **OS25 oscilloscope** made by **Advance Electronics** Ltd of Hainault, Essex. All expenses will be met. G3XEF, QTHR. Tel: 01952 606 373 or e-mail: mfle@mail.com

● Gian, I7SWX/F5VGU, is looking for the circuit diagram and service manual for the **Racal-Dana 9918 Frequency Counter** (up to 570MHz). He will refund any expenses or will return a second photocopy of the manual. Giancarlo Moda, Residence le Panoramic, 35 Avenue Vincent Scotto, 83700 St Raphael, France. E-mail: gmoda@schange.com

● Bill, GW0SGG, requires a Digital Unit (X54-1670-00) for his **Trio TS-930S**. GW0SGG, QTHR. Tel: 01792 549 241 or e-mail gw0sgg@gw0sgg.freeserve.co.uk

● Vic, G3REN, is attempting to set up a **KW600** linear amplifier (which has no documentation) to operate with his Trio TS-930, for which he has the manuals. He needs to know the linear's switching voltages, and if it is necessary to extend the ALC to the amplifier. Is there a means of controlling the power from the DIN socket on the rear panel? Vic needs a manual or abbreviated instructions on how to get the linear on the air. He will acknowledge all replies and return original documents. G3REN, QTHR. E-mail: vic.webb@cwcom.net

● G3ESB requests assistance in locating an operating handbook or other information relating to the **Trio CS1022 oscilloscope**. All costs defrayed. Tel: 01332 735 896.

'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.

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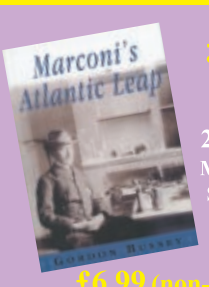

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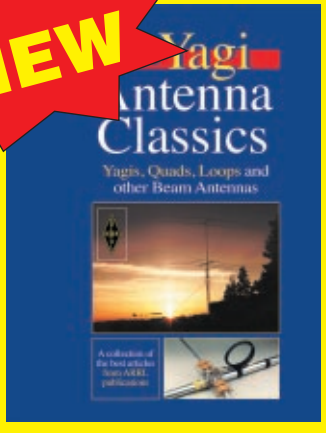

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Martin - My TS2000 arrived safely, a.m. today Tuesday 27th. THANKS.

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73s Peter Lennard

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Kenwood TS-2000

HF, VHF and UHF Transceiver

*Reviewed by Peter Hart, G3SJX**

IT IS four years since Kenwood last released a new HF transceiver model on to the amateur market and now the recent launch of the TS-2000 multimode HF / VHF / UHF radio has attracted much interest. Covering all 13 bands from 160m - 23cm (the latter band as an optional extra) it adopts the same extensive IF and AF DSP functions first seen in the TS-870 model. It also provides full satellite capability and *DX Cluster* monitoring as well as a host of other goodies, so that this single radio can satisfy virtually all amateur radio communication requirements. The radio is available in two versions, either as a conventional standalone unit (TS-2000) or as a black box minus the control panel (TS-B2000) for use with a personal computer or a remote mobile controller. Functionally, these two versions are identical.

PRINCIPAL FEATURES

THE TS-2000 is 12V operated with a peak current drain of around 21A. It is a middle-sized radio measuring 281 x 107 x 371mm and weighs about 7.6kg. The TS-B2000 remote control version is a little less deep as the front panel is a blank cover but the main body of both units is identical. USB, LSB, CW, FSK, AM and FM modes are selectable with normal or reverse sideband on CW and FSK. Wide or narrow bandwidth FM and AM is selectable, and on FM the deviation is also switched corresponding to 25kHz or 12.5kHz channel requirements.

The main receiver tunes continuously from 30kHz to 60MHz with the transmitter enabled only within the exact amateur band allocations. There are different model variants for Europe and the Americas. On 2m, 70cm, and 23cm where fitted, both receiver and transmitter cover just the amateur bands (the receive coverage can be expanded by a dealer modification). A second receiver (sub receiver) is provided covering 2m and 70cm on AM and FM modes only and operates simultaneously with the main radio operating on any band or mode, even on transmit providing that the transmit band is not the same as the sub receiver band. Up / Down keys step between bands, returning a single set of last used frequency and mode per band. It is possible to set break points to switch the mode automatically according to frequency, for example the CW and SSB sectors of each band.

The 45mm diameter tuning knob tunes in 10Hz steps at 10kHz per revolution on SSB, CW and FSK with 100Hz steps on FM and AM. A 1Hz step is also selectable for fine tuning.

A click-step rotary provides rapid navigation around the bands in a variety of user-settable step sizes, eg 12.5kHz steps for FM, 5 or 9kHz for broadcast AM, and 5kHz on SSB / CW. 1MHz steps are selected at the push of a button to move rapidly around the general coverage frequencies. The usual twin VFOs are included which are needed for split frequency operation with a button to check and set the transmit frequency. Both frequencies are displayed in split mode. The frequency may be entered directly from a numeric keypad, and RIT or clarifier operating on transmit and / or receive covers offsets to ±20kHz.

There are 300 memories provided for storing receive and transmit frequencies, modes and tone data. The memories may be tagged with a seven-character label with a very comprehensive character set and may be allocated to one of 10 group numbers. The memory bank can then be selectively searched by one or more group numbers. 10 of the memory channels are allocated to scan ranges or restricted VFO tuning limits. A quick memory feature allows up to 10 frequencies to be quickly stored and recalled by a simple key press, on the basis of last-in, first-out. The memory management and transfer facilities are very comprehensive but quite complex requiring eight pages of the manual to describe in full.

Various scan modes and selectable scan parameters are provided for VFO scanning, memory scanning, memory group scanning etc. One call channel for rapid access may be set for each band group HF, 6m, 2m, 70cm and 23cm and these can be included within the scan. A novel visual scan mode displays the scan results as a bargraph display of signal strength against frequency or channel. A switchable preamplifier and input attenuator for weak / strong signal situations is provided with of course different preamplifiers and attenuators for the different frequency ranges. The CW pitch is adjustable over the range 400 - 1000Hz to suit personal preferences and an IF noise blanker (non DSP) for pulse interference is also fitted. Receiver functions associated with DSP are described later in this review.

The transmit power is fully settable from 5W up to 100W on all bands from 160m to 2m with 50W on 70cm and 10W on 23cm. On SSB audio response tailoring is provided with VOX, speech processing and trans-

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

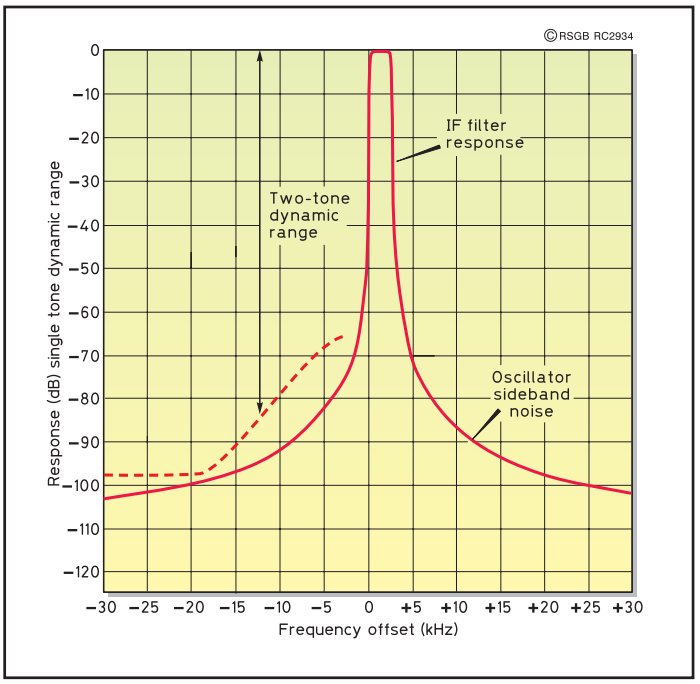

Fig 1: Effective selectivity curve on USB.

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

mission monitoring, and on CW a full memory keyer with separate key jack is included, and full or semi break-in with adjustable rise and fall time shaping. The keyer accommodates various weighting and keying paddle arrangements, and three 50-character stores. The messages can auto-repeat and also be interrupted for insertion of data such as contest serial numbers. Other features include a TCXO with 0.5ppm accuracy fitted as standard for accurate frequency control, metering of the usual parameters, a transmission timeout timer and auto-power off.

On HF and 6m, a front panel pushbutton selects between two antenna sockets, the setting being stored with the band stores. Also on these bands a separate receive antenna may be used such as a loop or a Beverage although switching is via the user menu set-up. An auto ATU is built-in matching up to 3:1 VSWR and covers all bands including 6m. A 'T' network is used with relays switching capacitor and inductor values in binary sequence to implement a compact and fast tuning ATU. 22 preset tuning settings are stored giving one to three settings per band. Separate antenna sockets are provided for 2m, 70cm and 23cm (when fitted). Separate linear switching and control is provided for HF, 6m, 2m, 70cm and 23cm with selectable delays to accommodate fast or slow switching amplifiers.

DSP FUNCTIONS

THE TS-2000 is one of a select group of radios which uses DSP for IF as well as AF based functions. This enables great flexibility to be achieved with the channel filtering without the need for expensive crystal filters. The main receiver is a quadruple superhet with a first IF of 69 or 76MHz on HF / 6m, 42MHz on 2m / 70cm and 135MHz on 23cm, and following IFs of 10.7MHz, 455kHz and 12.0kHz. The sub receiver is double conversion with 58MHz and 455 kHz IFs. IF DSP is implemented at the 12.0kHz IF and provides all channel filtering functions, modulation, demodulation, 20 selectable AGC time constants and IF auto-tuning notch. The default bandwidth on SSB is 300 to 2600Hz but the low frequency cut-off is selectable from 0 to 1000Hz (12 steps) and high frequency cut-off from 1.4kHz to 5kHz (12 steps). Four low and four high frequency cut-offs are available on AM. There are 11 bandwidth selections on CW (50Hz to 2000Hz) and four on FSK (250Hz to 1500Hz) and passband shift is implemented on these modes but not linked to CW pitch. All bandwidth settings are shown graphically on the front panel display.

Audio functions use a separate DSP, although of the same type, and provide an audio notch filter (both auto and manual adjustable), two noise reduction modes (Line Enhancement for SSB and SPAC for CW) and FM receive bandwidth tailoring. On transmit six different audio bandwidth settings are selectable and six profiles to accommodate different microphone characteristics. Speech processing is available on all voice modes and is also handled via the DSP function.

DATA MODES

THE TS-2000 has a number of features for supporting digital modes. For FSK RTTY, the shift, polarity and tone frequency are settable, and AFSK using voice modes is accommodated with suitable interfacing. A packet TNC for 1200 or 9600 baud is built-in which uses a reduced command set (39 commands) not supporting digipeating or some of the enhanced commands. The radio also accommodates interfacing to external TNCs and provides a number of adjustable parameters for TNC set-up. The internal TNC may be used with either the main or sub receiver and interfaces to a PC via the RS-232 COM port on the rear panel. This same interface also provides full remote control of the radio and data transfer to a second radio used for instance to pass data from a spotting radio to the running radio in a contest situation.

The built-in packet TNC is used in conjunction with the sub-receiver to provide *DX Packet Cluster* monitoring. Connecting to a node is not supported but by monitoring cluster channels, incoming 'spots' are displayed on the front-panel LCD one at a time, with the most recent 10 being stored in quick memory format for easy recovery. A single button press will set the main receiver to the spotted frequency and this can even be done automatically. Incoming spots can be announced in Morse code or in voice with the voice synthesiser option fitted.

VHF / UHF AND SATELLITE

FM REPEATER operation is fully supported with toneburst, CTCSS tone access and automatic offset selection according to the standard band plan (2m only). Automatic simplex check (ASC) periodically monitors the repeater input and flags when direct contact is possible. For general FM use, full CTCSS operation is provided with tone frequency ident, DCS (digital coded squelch) with code ident and DTMF tones can be stored and sent. Different tones and codes can be assigned to the main and sub receivers.

The audio output from the main and sub receivers can be processed in a number ways. Apart from outputting through the internal 7.5cm speaker, the audio signals can be fed separately to twin external speaker sockets or left and right headphone outputs, or mixed in equal or weighted proportions with internal speaker muted or not. The radio also supports transverter operation where the transverted frequency can be directly displayed up to 19.999GHz. Hence direct frequency readout can even be obtained on the 13, 9, 6 and 3cm bands, making this radio a true 'DC to light' controller!

In satellite mode the radio operates in full duplex within band groups HF + 6m, 2m, 70cm and 23cm where the uplink and downlink frequencies lie in different band groups. Any mode can be used and the uplink and downlink frequencies tracked in a forward or reverse direction, fine tuned to allow for Doppler shift and swapped to allow for uplink checking. The various settings can be stored in satellite memory which can be tagged with an eight-character name. Up to 10 satellite settings can be stored. Note that satellite mode could also be used for terrestrial full duplex, a function which can also be achieved on FM using the sub receiver and main transmitter.

OTHER SPECIAL FEATURES

A VAST AMOUNT of customisation is provided both through the extensive menu set-up and on individual controls. The entire radio can be remotely controlled from a PC and Kenwood provide a Windows driven software package as an option on CD-ROM for this purpose (ARCP-2000). This is the standard supplied user interface for the TS-B2000.

Two optional units were provided with the review radio, the VS-3 voice synthesiser and DRU-3A digital recording unit. These are remarkably small in size and easy to install. The voice synthesiser will read out frequencies, memory channel contents and S-meter readings. The digital recording unit functions on transmit only and is useful for repeated contest calls. One 30s and two 15s message stores are provided which can be linked and cascaded for longer messages and automatically set to repeat.

MEASUREMENTS

THE RADIO SUPPLIED was not fitted with 1.2GHz. Measurements are given in the table when powered from a 13.5V supply with additional comments as follows.

Receiver Measurements

The rejection of images and all IF frequencies was very good, in excess of 90dB and other spurii very low. The filter bandwidths in the table are a representative selection of available bandwidths. The 6:50dB shape factors are excellent but at -60dB somewhat compromised by reciprocal mixing noise and possibly other effects. The front end dynamic range was good at 20kHz offset, but degraded very significantly close-in which is a danger with back-end channel filtering. The reciprocal mixing figures were fairly poor close-in but much better / excellent further out. The combined selectivity plot is shown in **Fig 1** opposite.

Transmitter Measurements

The power output figures in the table were measured with the ATU out of circuit. The ATU introduced a fairly high loss of about 10 - 20%, lowest on 50MHz. SSB two-tone distortion levels were rather high but improved significantly at lower powers. The CW keying characteristic was excellent with low distortion and nicely shaped, particularly with 6ms rise / fall times.

ON-THE-AIR PERFORMANCE

THE INITIAL CONFRONTATION with the TS-2000 can be a bit daunting as it is packed with so many features and multifunction buttons that it takes some time with the manual to become fully acquainted with its operation. Fortunately the 143-page manual is very comprehensive, well written and extensively indexed. The radio is nicely styled and largely easy to use, although I found some of the lesser-used functions not so obvious in the short period I had the radio for review. For example memory operations, which I sometimes overwrote by pushing the wrong button, a comment I am sure I would change with greater familiarity. It is fitted with a bright, clear and easy-to-read display with an exceptionally wide viewing angle for an LCD. The tuning speeds were about right and without the need for speedup. There did seem to be a slight roughness to the synthesiser tuning at speed which disappeared on slowing the tuning rate.

The overall performance was good, the filters and notches were excellent and the narrow CW filters gave minimal ringing. The armoury of filters was particularly useful in combating difficult conditions, and at the other extreme it was a pleasure to open up the bandwidth on strong signals and enjoy the improved quality. Providing the preamplifier was not used at LF, there were no real overload problems although the radio seemed slightly noisy in crowded conditions as the close-in measurements might suggest. On transmit, CW break-in was clean and audio reports were excellent. 19 QSOs made on different band / mode combinations with the recent D68C expedition is a good testimonial for this radio. The results on the broadcast AM bands were good and the performance on VLF at 136kHz and lower down on the time and frequency standard transmissions was particularly clean.

Although I did not have a chance to make QSOs in satellite mode, it seemed effective and easy to operate. The *Packet Cluster* mode was novel but with a one-line scrolling display not so effective for serious use. Now that the *Cluster* network is internationally connected, spots arrive too rapidly on a typical weekend - particularly if there is a contest in full swing - for one spot to be fully displayed before the next arrives. Even delving into the memories to retrieve details does not help, as the memory contents are constantly changing. This is where controlling the radio from the ARCP-2000 software really scores. Incoming spots are tabulated and by scrolling down the list, pointing and clicking with the mouse to the selected spot the radio is set on channel. The auto mode setting function can really help here. Unfortunately the sender information is not displayed and the comments field is truncated after 20 characters. In other aspects the ARCP-2000 software also worked well although the VFO tuning was too slow and best handled directly by the radio. Greater advantage could have been taken of the flexibility of a PC display, for example tabulating and scrolling the memories with point and click selection.

CONCLUSIONS

THE TS-2000 IS A most interesting and effective radio, providing in one unit all the communication needs for the amateur with the widest of interests. It is the only radio on the market covering 160m to 23cm, with all modes including satellite and packet. At around £1700 with £300 extra for 23cm, it is excellent value with a high level of features and performance. When available, the 'black box' version will be a little less.

My thanks to Kenwood Electronics UK for the loan of the radio. ♦

KENWOOD TS-2000 MEASURED PERFORMANCE OVER PAGE

KENWOOD TS-2000 MEASURED PERFORMANCE

RECEIVER MEASUREMENTS

	SENSITIVITY SSB 10dBs+n:n		INPUT FOR S9	
FREQ	PREAMP IN	PREAMP OUT	PREAMP IN	PREAMP OUT
136 kHz	2.0µV (-101dBm)	4.0µV (-95dBm)	350µV	1.1mV
1.8MHz	0.20µV (-121dBm)	0.56µV (-112dBm)	45µV	180µV
3.5MHz	0.18µV (-122dBm)	0.50µV (-113dBm)	40µV	180µV
7MHz	0.16µV (-123dBm)	0.50µV (-113dBm)	35µV	160µV
10MHz	0.16µV (-123dBm)	0.50µV (-113dBm)	32µV	160µV
14MHz	0.16µV (-123dBm)	0.50µV (-113dBm)	35µV	160µV
18MHz	0.13µV (-125dBm)	0.45µV (-114dBm)	28µV	160µV
21MHz	0.14µV (-124dBm)	0.45µV (-114dBm)	28µV	160µV
24MHz	0.11µV (-126dBm)	0.40µV (-115dBm)	22µV	130µV
28MHz	0.10µV (-127dBm)	0.40µV (-115dBm)	22µV	140µV
50MHz	0.10µV (-127dBm)	0.63µV (-111dBm)	20µV	250µV
144MHz	0.10µV (-127dBm)	0.90µV (-108dBm)	7µV	130µV
432MHz	0.10µV (-127dBm)	0.56µV (-112dBm)	6.3µV	90µV

	CLOSE-IN INTERMODULATION ON 7MHz BAND			
	PREAMP IN		PREAMP OUT	
Spacing	3rd order intercept	2 tone dynamic range	3rd order intercept	2 tone dynamic range
3kHz	-35dBm	65dB	-23dBm	66dB
5kHz	-32dBm	67dB	-20dBm	68dB
7kHz	-28dBm	70dB	-15dBm	72dB
10kHz	-17dBm	77dB	-4dBm	79dB
15kHz	+2dBm	89dB	+14dBm	91dB
20kHz	+8dBm	94dB	+24dBm	98dB
30kHz	+11dBm	95dB	+24dBm	98dB
40kHz	+11dBm	95dB	+24dBm	98dB
50kHz	+11dBm	95dB	+24dBm	98dB

FILTER	IF BANDWIDTH		
	-6dB	-50dB	-60dB
SSB 2.3kHz	2370Hz	3200Hz	5390Hz*
AM 5kHz	12.1kHz	15.3kHz	16.5kHz
AM-narrow	2700Hz	3760Hz	4810Hz
FM	16.8kHz	24.2kHz	25.7kHz
FM-narrow	11.9kHz	18.3kHz	19.8kHz
CW 600Hz	645Hz	1340Hz	1660Hz
CW 400Hz	430Hz	890Hz	1340Hz
CW 200Hz	215Hz	505Hz	735Hz
CW100Hz	130Hz	310Hz*	310Hz*
CW 50Hz	65Hz	265Hz*	265Hz*

* see text

	INTERMODULATION (50kHz Tone Spacing)			
	PREAMP IN		PREAMP OUT	
Freq	3rd order intercept	2 tone dynamic range	3rd order intercept	2 tone dynamic range
136kHz	+14dBm	83dB	+15dBm	79dB
1.8MHz	+9dBm	93dB	+13dBm	90dB
3.5MHz	+9dBm	93dB	+15dBm	91dB
7MHz	+11dBm	95dB	+24dBm	98dB
14MHz	+5dBm	92dB	+19dBm	94dB
21MHz	+7dBm	94dB	+23dBm	98dB
28MHz	+1dBm	92dB	+22dBm	98dB
50MHz	-4dBm	88dB	+20dBm	94dB
144MHz	-20dBm	78dB	+6dBm	82dB
432MHz	-15dBm	81dB	+9dBm	87dB

FREQUENCY OFFSET	RECIPROCAL MIXING FOR 3dB NOISE	BLOCKING PREAMP IN	BLOCKING PREAMP OUT
3kHz	71dB	-38dBm	-22dBm
5kHz	78dB	-38dBm	-22dBm
10kHz	90dB	-35dBm	-19dBm
15kHz	96dB	-23dBm	-7dBm
20kHz	99dB	-13dBm	+3dBm
30kHz	103dB	-4dBm	>+6dBm
50kHz	108dB	-4dBm	>+6dBm
100kHz	114dB	-4dBm	>+6dBm
200kHz	120dB	-4dBm	>+6dBm

S-METER READING (7MHz)	INPUT LEVEL SSB PREAMP IN	PREAMP OUT
S1	1.4µV	6µV
S3	2.2µV	10µV
S5	4µV	18µV
S7	10µV	45µV
S9	35µV	160µV
S9+20	400µV	1.8mV
S9+40	4.5mV	20mV
S9+60	32mV	140mV

AM sensitivity (28MHz): 0.5µV for 10dBs+n:n at 30% mod depth
FM sensitivity for 12dB SINAD 3kHz pk deviation:
Main RX 144MHz: 0.16µV
Sub RX 144MHz: 0.16µV
Main RX 432MHz: 0.16µV
Sub RX 432MHz: 0.16µV
AGC threshold: 0.9µV
100dB above AGC threshold for +0.5dB audio output
AGC attack time: 2 - 4ms
AGC decay time: 0.1 - 3s (variable)
Max audio before clipping: 1.7W into 8Ω, 2W at 10% distortion
Inband intermodulation products: -30 to -45dB

FREQ	CW POWER OUTPUT	SSB(PEP) POWER OUTPUT	HARMONICS	INTERMODULATION PRODUCTS 3rd order	5th order
1.8MHz	96W	100W	-74dB	-26 (-20)dB	-36 (-30)dB
3.5MHz	100W	104W	-70dB	-30 (-24)dB	-42 (-36)dB
7MHz	101W	105W	-60dB	-31 (-25)dB	-46 (-40)dB
10MHz	101W	104W	-70dB	-28 (-22)dB	-44 (-38)dB
14MHz	101W	104W	-76dB	-27 (-21)dB	-42 (-36)dB
18MHz	101W	104W	-62dB	-28 (-22)dB	-44 (-38)dB
21MHz	101W	104W	-70dB	-28 (-22)dB	-42 (-36)dB
24MHz	101W	104W	-65dB	-26 (-20)dB	-50 (-44)dB
28MHz	101W	104W	-74dB	-28 (-22)dB	-46 (-40)dB
50MHz	101W	104W	-74dB	-21 (-15)dB	-31 (-25)dB
144MHz	104W	108W	-75dB	-24 (-18)dB	-36 (-30)dB
432MHz	51W	52W	-72dB	-22 (-16)dB	-36 (-30)dB

Two-tone transmitter intermodulation product levels are quoted with respect to PEP, figures in brackets are with respect to either tone.

TRANSMITTER MEASUREMENTS

Carrier suppression: <-60dB
Sideband suppression: <-75dB @ 1kHz
Microphone input sensitivity: 0.3mV for full output
SSB T/R switch speed: mute-TX 12ms, TX-mute 3ms, mute-RX 25ms, RX-mute 2ms

NOTE: All signal input voltages given as PD across antenna terminal. Unless stated otherwise, all measurements made on SSB with receiver preamp switched in.

WHATEVER NEXT

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THERE ARE SO many exciting developments taking place in the world of technology these days that I can envisage myself at some point in time having difficulty deciding where I should start the column. However, this month I'm lucky, as I am able to follow-on very conveniently from February's story about microwave digital broadcast radio.

DIGITAL RADIO, US-STYLE

EAGLE-EYED readers will have noticed in Fig 1 of February's 'Whatever Next', a significant gap in the coverage of 'Ameristar', the geostationary satellite that brings the WorldSpace digital radio service to the Americas. The gap in coverage is over no less than the entire United States and Canada. WorldSpace informed me that this is because there was no agreement to use that part of the spectrum on which WorldSpace broadcasts (1.5GHz) over the USA. From information subsequently received, it seems that digital radio from satellite may be heading in a different direction across North America!

In fact, the Federal Communications Commission has licensed two other organisations to broadcast coast-to-coast digital radio from satellite. Unlike WorldSpace however, each intends to concentrate on the car radio market from the outset. When you consider what a car-loving nation the Americans are, this is not entirely surprising. It should also come as no surprise to learn that the race to sign manufacturing deals with electronics companies and supply deals with car companies is also most definitely 'on'. Each of the new service providers intends to charge approximately US $10 per month subscription (unlike WorldSpace, which is currently free), for which the listener will receive up to 100 new commercial-free stations. In each case, radios will also cover the conventional Medium Wave and VHF broadcast bands, reception of the satellite service being via a cell-phone sized antenna. Much of the programming will be 'home grown' by the organisations themselves, but in certain instances well-known broadcasters (including the BBC) will be taking space.

XM

XM will use two geostationary satellites made by Boeing Satellite Systems (formerly Hughes Space & Communications Inc). Running 15kW each, 'Rock' and 'Roll' (as they have been named) are the most powerful commercial broadcast satellites ever built. The satellites will be positioned at points over the equator that are roughly in line with the west and east coast of the USA, and will broadcast identical information simultaneously. With identical footprints, the signal received on the ground will most often contain content from both satellites, the receiver taking care of sorting out the signal.

The launch of the XM satellite should be an impressive sight, because it will blast off from a floating platform that will be towed from California down to the equator [1]. The photo below shows one of the platforms, complete with rocket. At the time of writing the satellites were not yet in orbit.

1500 repeaters stations have already been created, to fill in the gaps where obstructions are expected to prevent receiving antennas from 'seeing' either satellite.

SIRIUS

Unlike XM, Sirius will not use geostationary satellites. Instead, its three satellites will form an inclined elliptical satellite 'constellation' (see **Fig 1**). These satellites were launched last year from the Baikonur facility in Kazakhstan (see photo above). Sirius says the elliptical path of its satellites will ensure that each of them will spend about 16 hours a day over the continental United States, with at least one satellite over the country at all times. Sirius completed the positioning of its satellites in November 2000. A fourth satellite will remain on the ground, ready to be launched if any of the three active satellites encounter transmission problems.

One of the Sirius satellites lifting off atop a Russian Proton rocket.

While XM will offer both car and portable radios, Sirius is concentrating solely on the car radio market. The Sirius receiver will include two parts, the antenna module and the receiver module. The antenna module will pick up signals (at

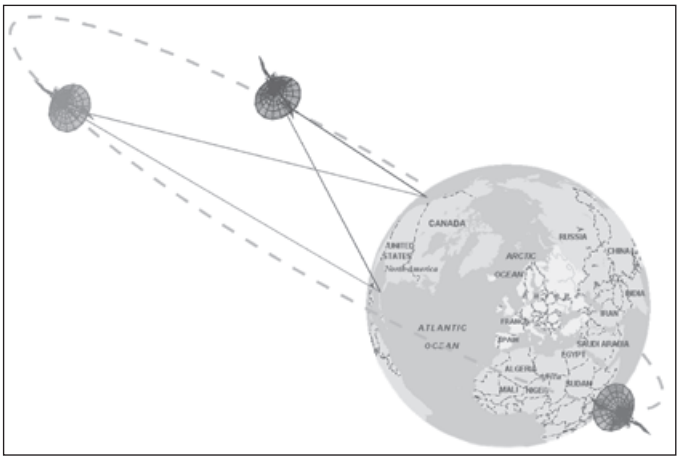
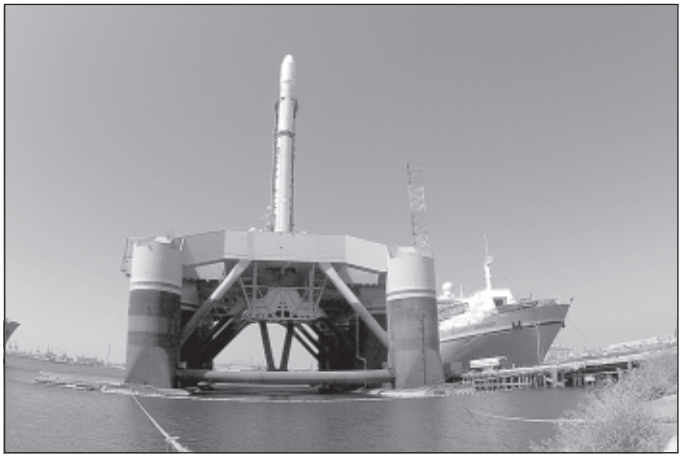


Fig 1: The highly elliptical orbit of the Sirius satellite constellation, shown here as the dashed line, means that at least one of them is always above the USA. Satellites that are not above the USA are switched into standby, so each one gets a 'rest' at some point in its highly-elliptical orbit.



The sea launch platform and rocket that will carry the XM satellites into orbit. It will be towed from California to the equator for the launch.

2.320 - 2332.5GHz), amplify them and filter out any interference. The signal will then be passed on to the receiver module, which uses a summing design to reconstitute signals that have been delayed and/or have bits missing. Sirius will also offer an adapter that will allow conventional car radios to receive the satellite broadcasts.

As with XM, in metropolitan areas, where the shadows of buildings may not allow the satellite to be seen directly, local repeaters will provide coverage.

TRANSPARENT STORAGE

IN THE WORLD of data storage we have seen great advances in the past few years. The capacity of magnetic-based hard drives has steadily increased, while the physical size has decreased. In the field of optical storage, CD (650/700 Megabytes) has been augmented by DVD (up to 17 Gigabytes), and now it looks likely that the storage capacity of the 120mm diameter disc (ie standard CD- or DVD-size) is going to take a huge leap.

The reason for this is the launch of a new system, developed by a group of Russian scientists who have emigrated to the USA. The New York-based company Constellation 3D's 'Fluorescent Multilayer Disc' (FMD) is a design that will *initially* increase the data storage capacity of a 120mm disc to 100 Gigabytes. Although the system is still under development, deals have already been signed with a leading Japanese electronics company to produce drives and a chemical company to produce the special material required for the medium, and a leading US-based semiconductor company to produce the chips.

When proposing a new format it is always important to consider compatibility with earlier standards. This is something where FMD scores highly, because one of the proposed versions of the FMD will be a hybrid drive that will also read CDs and DVDs.

As **Fig 2** shows, FMD works by focusing a beam of laser light on one of many fluorescent layers within a disc. Because the fluorescent material is transparent, the beam can pass clean through layers above it. Only on the level at which the beam is focused does fluorescence occur. The wavelength of the glowing light is different from that of the laser, so the detector is tuned to ignore the laser light and look only for the glow. This is not the case with a DVD, which is why it only supports two layers per side. As C3D chief technology officer Vladimir Schwarz put it: "DVD has only a limited multilayer recording capability and is beginning to reach its limits with about 5GB capacity on two layers. Beyond this, coherent (single beam) laser light fails to differentiate reliably between data and noise from dust and impurities. FMD reads incoherent (diffused) light using filters to identify data much more precisely. This allows many more layers, and it is much less sensitive to scratches and dirt on the medium."

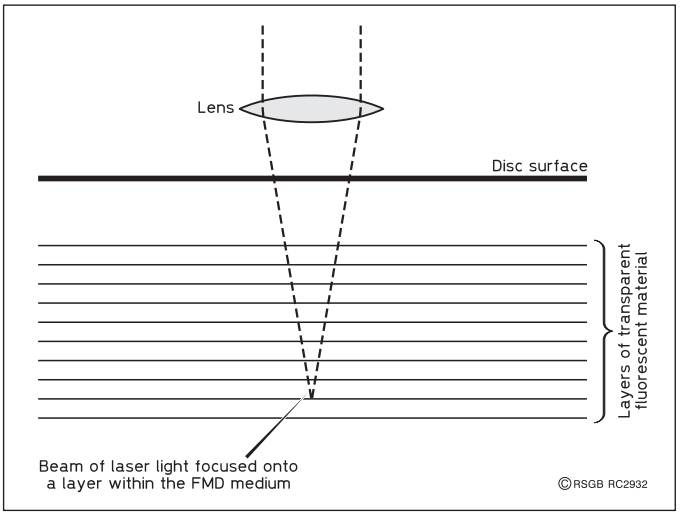


Fig 2: A beam of laser light is focused onto one of many layers in the FMD. Unlike CDs or DVDs, which contain aluminium layers to reflect light, the FMD medium is completely transparent.

Referring to the fact that doctors have long diagnosed illnesses by injecting glowing dye into a patient's bloodstream, Schwartz added "Essentially, it's a very old technology. It's just that this time the glow is used to identify digital information."

C3D has also developed a technique for transferring data to and from different layers simultaneously. This should make reading *and writing* faster with FMD compared to other optical drives, and end criticisms that writing to optical media is slow compared with standard hard drives, due to the disc surface having to change physically.

Other planned incarnations of the FMD are a mini-disc sized version, and a static-medium version that would read the information stored in a 0.5in square plastic window by a scanning laser.

All-in-all, and not withstanding other developments, FMDs could replace the preferred recording media in video recorders, camcorders, digital cameras, computers and audio recorders/players, making crash-prone magnetic storage devices *and* CD *and* DVD look like ancient relics within just a few years. The capacity of FMD is more than sufficient for a movie in high definition television (HDTV) format on a single disc, whereas DVD isn't quite enough.

Finally, the cost factor. The manufacturing cost of each disc should be about 1.7 cents per gigabyte (42.5 cents per disc) the low price of the discs being seen as vital to the system's success.

Format	Capacity
CD	700MB
DVD	17.6GB
FMD	176GB (this year)
	340GB (next year)
	1TB* (future)

* Several lifetimes' worth of information.

TELL YOUR RIG WHERE TO GO

IT WASN'T THAT LONG ago that voice recognition was the stuff of science fiction, but great advances in have taken place in the past few years. What I think we as radio amateurs could do with is some of this technology. Perhaps this could come in the form of cross-pollenation from the world of the mobile phone, where voice activation is now quite commonplace.

Just think how convenient (and safe) it would be if you could control your mobile transceiver with phrases such as "Command. Volume up," or "Command. QSY GB3 Yankee Zulu".

Mind you, according to a programme I saw on the *Discovery Wings* TV channel the other week, the military are now experimenting with thought control. Just imagine being able to eliminate interference by homing-in on it in your mind's eye and telling it to 'go away', or thinking "Let's take a look at 40 metres," at which point your transceiver duly does. Incorporating *that* kind of technology into amateur radio equipment really would be something! ♦

XM satellite radio	www.xmradio.com
Sirius satellite radio	www.siriusradio.com
Fluorescent Multilayer Disc	www.c-3d.net

REFERENCE

[1] The best place from which to launch a satellite is the equator, because the rotation of the earth is fastest there. This gives a slingshot effect to the launch… so the Russians didn't choose Baikonur (in the southerly republic of Kazakhstan) or the Americans choose Cape Canaveral (in the southern state of Florida) by accident. It wasn't chance that led the European Space Agency to pick French Guyana from which to launch their satellites, either. As the ESA site is closest to the equator, launch vehicles taking off from there require less fuel to carry their payloads into orbit.

If there is an item of new technology you would like to know more about - or one that you know about and think ought to be mentioned here - drop a line to the author, or e-mail him at the address at the start of the feature.

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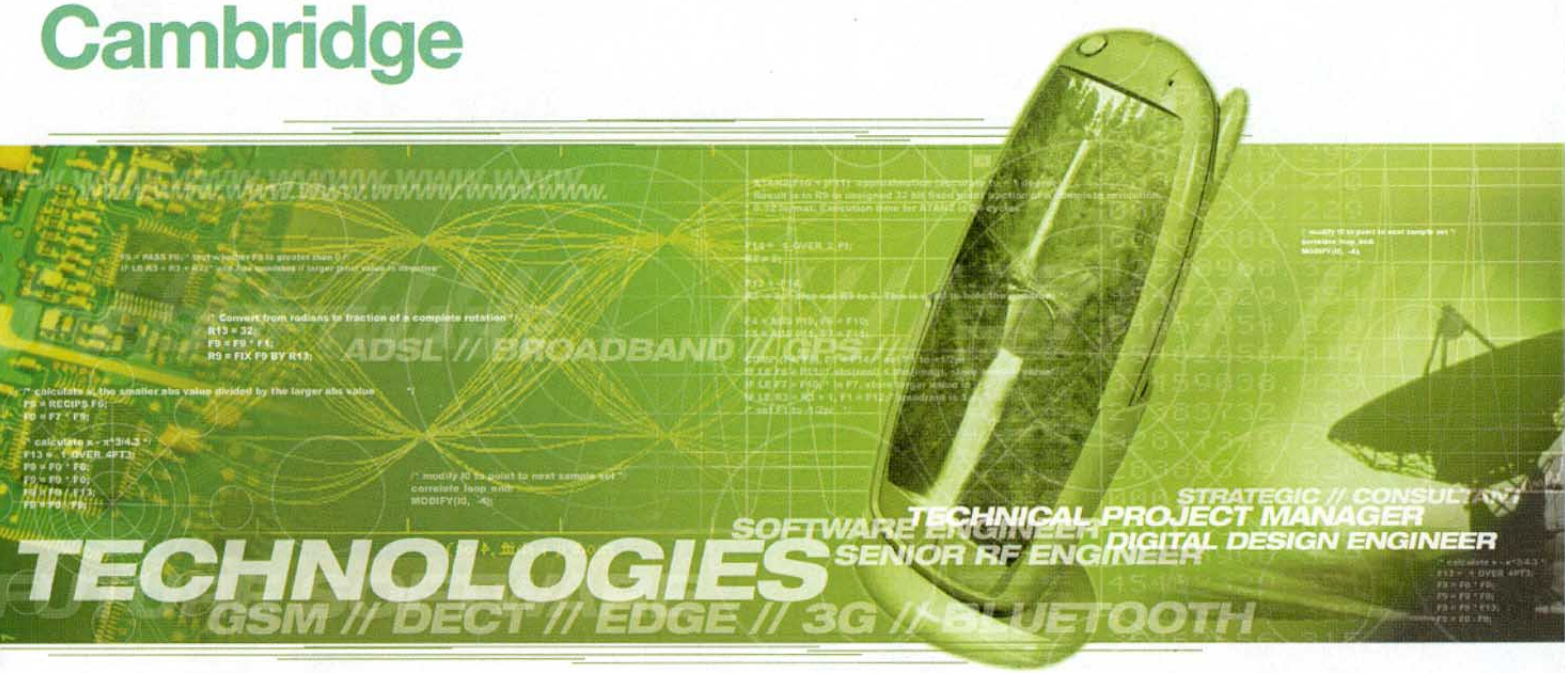

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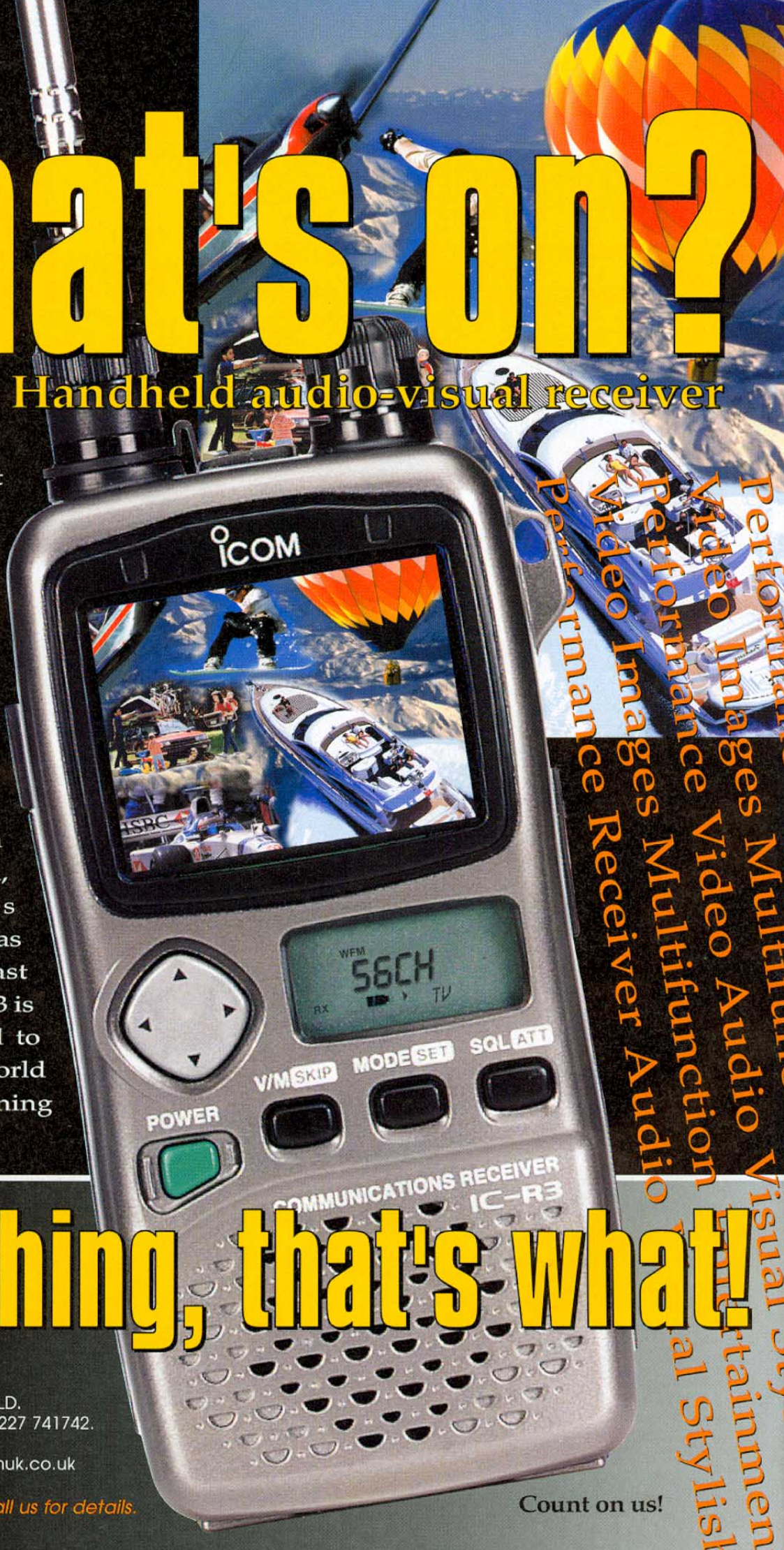

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SMITH CHARTS MADE EASY

HOW DOES A Smith chart work? What's the point of that strange shape?

A SMITH CHART is simply a map. It shows impedance, plotted as resistance and reactance, in much the same way as an ordinary map shows location, plotted as latitude and longitude. In order to show the real world on a flat map, you need to choose a map projection, but no single map projection will do everything. You need to decide which real-world features you want to show well, and which features you are prepared to distort or lose completely. So it is with impedance plotting - the Smith chart is just one of the possible map projections, chosen for its useful features.

Why do you need to be able to read this map? For the usual reason: if you want some information about RF devices or impedance matching problems, sooner or later somebody will produce a Smith chart (just like they would a road map) and say, "Here's what you need to know". In olden days, Smith charts were actually used as impedance calculators. Now we have computers for that job, so the value of the Smith chart is in *visualising and understanding* problems related to impedances and matching. Once we've understood what to do, we can turn to the computer for the numbers. If you can already handle the Universe quite comfortably in pages of mathematics, and don't need additional visual aids, then the Smith chart won't be much extra help to you. The rest of us need all the help we can get.

It's easiest to start the explanation with a simple rectangular impedance chart. We're going to plot impedances in their conventional series form, written as (R ± jX). R means resistance, of course, and for this article the j simply implies that X is a reactance. +jX means inductance, -jX means capacitance. **Fig 1** shows resistance plotted upwards and reactance sideways. Since reactance can be either positive or negative, the chart is divided into two halves by the centre-line which represents pure resistance. Resistance is almost always positive, so we start the R axis at zero (if we wanted to include negative R, we'd choose a different map projection). This linear R/X mapping has two advantages: it's simple, and it shows the phase angle of impedance correctly (Fig 1). The practical disadvantages are that you need a different chart to deal with high values and low values, and it's difficult to relate impedances to the characteristic impedance of a transmission line. The second point is important because what tends to matter is the value of impedance *relative* to the characteristic impedance of the environment we're working in - usually 50Ω in radio applications, but commonly 75Ω in TV work, and possibly 200, 300, 450 or 600Ω for parallel-wire transmission lines.

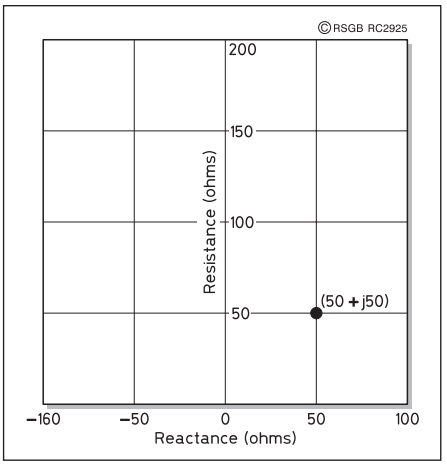

Fig 1: Simple rectangular impedance chart, plotting (50 + j50)Ω. Inductive reactance is on the right, capacitive on the left.

To solve these problems, we can make two transformations to Fig 1. To handle the characteristic impedance problem, we can divide all values by Z_0 ('zed-nought'), the characteristic impedance of the environment we're working in. For example, in a 50Ω environment we can 'normalise' a real-world impedance of say (200 + j450)Ω to (4 + j9)Ω simply by dividing each number by Z_0. This brings most practical impedances into the normalised range between about $0.1Z_0$ and $10Z_0$. To handle the high and low values, we can change R to a logarithmic scale, so that the distance from 0.1 to 1 is the same as the distance from 1 to 10. But there's a problem for X: we need to be able to plot values that may cross through zero, which is not possible on a log scale. **Fig 2** is a compromise, with normalised R and X scales, but only logarithmic R, so very high or low values of X are going to be hard to plot. Also we've lost the ability to plot phase angle accurately. *This* map projection isn't really working…

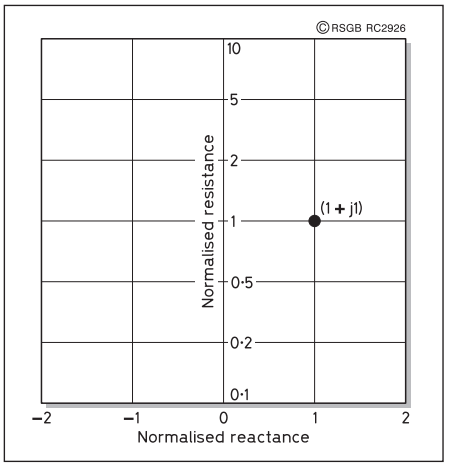

Fig 2: Normalised chart converts (50 + j50)W to (1 + j1) in a 50Ω system. A logarithmic resistance scale expands the range that can be plotted.

Enter Phillip Smith of Bell Laboratories. He took an impedance map projection something like Fig 2, kept the same normalised logarithmic R axis up the centre, and distorted the ±X fields to form a circle - **Fig 3**. Why use such a perverse projection? Because it produces some very useful features! Smith charts certainly do look weird - but probably no more weird than the first Great Circle map of the world you ever saw. The basic features are quite simple, and we'll soon see some very good practical reasons for this strange, distorted map.

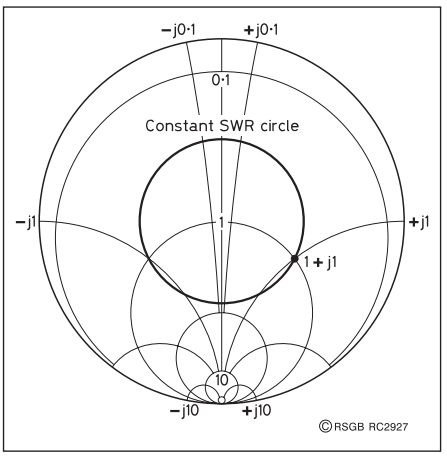

Fig 3: The Smith chart, plotting the normalised impedance (1 + j1) and also showing its SWR circle.

How do we plot impedances on this chart? Let's take R and X separately first, on some simplified charts. In **Fig 4(a)**, pure resistance is plotted up and down the centre R axis, exactly as in Fig 1. Either side of that axis, the same R values lie on circles. For clarity, Fig 4(a) shows only the circles for R = $1Z_0$, $0.1Z_0$ and $10Z_0$. If you need to plot a normalised impedance of (1 ± j-something), it will lie somewhere on the R=1 circle. The X components lie on fans of arcs, all originating at the bottom of the chart. **Fig 4(b)** shows the pairs of arcs for X = $\pm j1Z_0$, $\pm j0.1Z_0$ $\pm j10Z_0$. The inductive (+) arcs are on the right and the capacitive (–) arcs on the left. So, to plot an impedance of (50 + j50)Ω, normalised to a 50Ω system, we look for the place where the R=$1Z_0$ circle in Fig 4(a) intersects with the X = $+j1Z_0$ arc in Fig 4(b). This point is plotted as (1 + j1) on Fig 3, which also includes more circles and arcs so that any impedance can be plotted with reasonable accuracy. When we're only using the Smith Chart for visualisa-

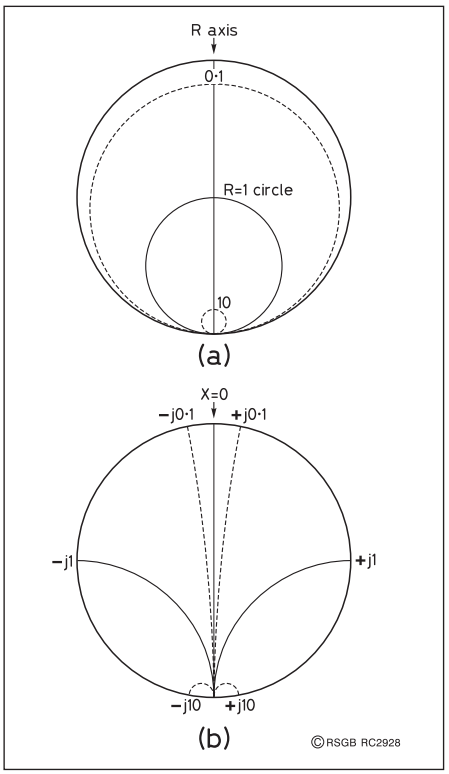

Fig 4: Elements of the Smith chart. (a) Resistance values lie on a series of circles. R=1 passes through the centre of the chart. (b) Reactance values lie on a series or fan of circular arcs. Inductive reactance is on the right, capacitive on the left.

tion, it doesn't need all the closely-spaced lines that you sometimes see [1] and this makes the whole thing much easier to grasp.

Now let's look at impedance matching. An impedance matched to Z_0 is right at the centre of the chart, at (1 ± j0). The cleverest single thing about the Smith chart is that all impedances that give the same SWR lie on a perfect circle. If you draw a circle passing through the plotted (1 + j1) point in Fig 3, you'll see that it cuts the R axis at 2.62 - which is the value of the SWR - and again at 0.382 (= 1/2.62). As well as passing through (1 + j1), the SWR circle also passes through an infinity of other combinations or R and X, including (1 - j1), all of which give the same SWR of 2.62. A larger circle means higher SWR, a smaller circle means lower SWR and better matching. The Smith chart thus gives a very clear view of impedance matching: the aim is to hit the target right in the centre.

Suppose we have a rather poorly matched antenna with a normalised impedance of (50 + j50)Ω. If we connect various lengths of 50Ω transmission line to it, what happens to the impedance that the transmitter or receiver sees at the other end? The Smith chart tells us. Normalising to Z_0 = 50Ω, the antenna impedance is our (1 + j1) point on Fig 3. When we start to extend the transmission line, the impedance at the transmitter end moves clockwise around the circle of constant SWR. It passes through the same two purely resistive points, (2.62 ± j0) and (0.382 ± j0) and comes full circle back to (1 + j1). The length of line required to come full circle is an electrical half-wavelength, after which the whole cycle repeats itself. You can measure the length of line required to move from any impedance point on the circle to any other by using the scales around the outside of the chart.

Just looking at the Smith chart shows you some fundamental facts about SWR and impedance matching. First, a measurement of SWR doesn't tell you everything. There are many different combinations of R and X (an infinite number in fact) that all share the same value of SWR . If you vary the length of the transmission line, you can visit all these points. That's why a poor SWR can make the performance of your transmitter and receiver quite dependent on the actual length of the mismatched line - because the equipment reacts to the actual impedance, not the SWR. This is particularly true of solid-state power amplifiers, and you may see very different power output into different impedances around the same SWR circle.

Fig 3 also destroys the myth that SWR problems can be 'cured' by a magic length of transmission line that will give a perfect match to Z_0 at the far end. It won't, because Z_0 is nowhere on the SWR circle - it's at the centre. You can't get there by going round and round the circle, but what you *can* do is extend the transmission line until the impedance at the other end crosses the R=1 circle, for example at (1 + j1). At that point you can add a capacitor of reactance -j1 in series to bring you back along the R=1 circle to the centre. You have cancelled the reactance and are left with a purely resistive impedance of Z_0 - in other words, you've matched the load by choosing the right combination of line length and reactance. Equally you could have extended the line to find the (1 - j1) point and added a series inductor of reactance +j1.

Notice that adding a quarter-wavelength of line takes you to exactly the opposite point on the SWR circle. High R and X values become low, or vice versa; and reactance changes sign. That's why a quarter-wave line is often described as an 'impedance inverter'. The Smith chart lets you see these things, and understand them, rather than just presenting you with numbers and equations.

Where else might you find Smith charts? One classic use is in showing how the impedance of some device varies over a range of frequencies. This is a simple plotting exercise, showing the measured impedances at a series of frequencies. These points are usually joined up with a smooth curve to help you follow the trend. The closer the curve stays to the centre of the chart, the better is the matching. **Fig 5** is an impedance curve for a typical G5RV antenna system (including feedlines) over a frequency range from 1.8MHz to 14.4MHz [2]. As with all wire antennas operated over a wide frequency range, the impedance curve goes through a series of wild loops. For the G5RV, the feed impedance in the shack stays well away from the well-matched area in the centre of the chart, except on 14MHz which is the only band for which the G5RV is truly optimised. Above 14MHz the curve departs again for the outer regions. However, it has to be said that many other HF antenna designs are far worse when used on multiple bands, which is why an ATU is generally mandatory. You could get some of this information from an SWR curve, but it wouldn't really show you how the impedance changes in cycles, or whether you're trying to match something that's inductive or capacitive.

Of course there's much, much more to the Smith chart, but I hope this has outlined the basic features and made it somewhat less mysterious. ♦

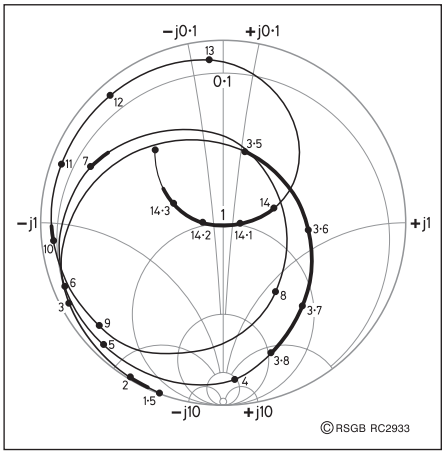

Fig 5: Smith chart plot of feed impedance for a typical G5RV antenna. Matching is good on 14MHz, but becomes progressively more difficult as the impedance curve moves away from the centre of the chart.

REFERENCES

[1] The original detailed Smith charts were produced using the *GraphPap* software mentioned in the March column. These can include as much or as little detail as you wish. Clean charts are downloadable from the 'In Practice' web pages.

[2] Calculations by G4FGQ's program VARNEY.EXE - follow the link from the 'In Practice' web pages.

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.

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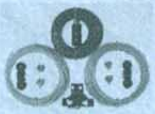

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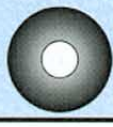

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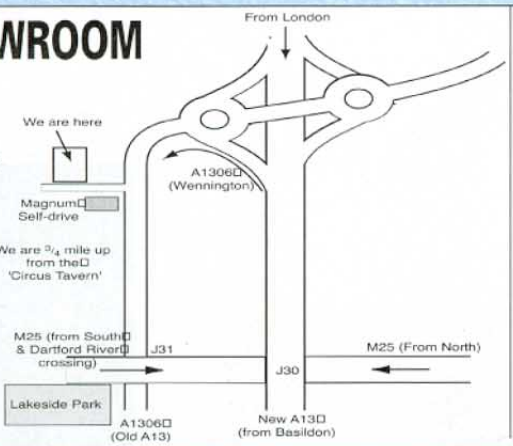

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Technical Topics

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

WIDE-SPAN TUNED-TOROID VCO

DAVID MACKENZIE, GM4HJG, recently stumbled on an Internet page that provides an interesting example of the practical value of permeability tuning - using a TO-50 toroid inductor placed in the field of an electromagnet - as described by Jack Hardcastle, G3JIR, in 'TT' December 2000, pp63/64. It appears on the Wenzel web-site (**www.wenzel.com/pdffiles/crvco.pdf**) as a reprint of one of the RF Design Awards articles as originally published in the magazine, probably in the period between about 1985-89 (I searched without success the contents pages of issues later than 1989).

The article 'Constant Reactance Voltage-Controlled Oscillator' is by Raymond T Page of the American firm of Wenzel Associates Inc. It shows how a very wide range VCO providing good frequency and amplitude stability over a tuning range of 20 to 150MHz (7.5:1 span) can be implemented without any complex band switching. These characteristics are much superior to the conventional VCO, which tends to be limited to a frequency span of not more than 3:1 with the loaded Q and resulting circuit stability degraded at the end of the frequency range. By actively holding the inductor's reactance constant in a feedback system that tracks the tuning varactor, high Q and exceptionally constant output power are maintained over the entire frequency span.

It is stressed that this form of CRVCO implementation need not be restricted to high-ratio tuning applications. Designs with smaller ratio tuning spans can benefit from its inherent stability. The key feature is the use of permeability tuning as suggested in the December 'TT' by G3JIR, with the toroid mounted between the poles of an electromagnet, in conjunction with an ingenious feedback (AGC) system. The 'saturable-core reactor' (ie tunable toroid) consists of a ferrite T-50 toroid-core inductor sited in the variable magnetic field. As the magnetic flux is increased, the 4C4 core loses permeability without significant changes in Q. A convenient electromagnet is formed from a modified Wabash reed relay (P/N: 208-31-1) with a soft iron rod replacing the reed switch and used to direct the saturating magnetic field to the toroid. The coil uses seven turns of No 30 AWG wire on a Ferroxcube core (P/N: 135TO504C4). This combination requires less than 100mA to saturate the inductor fully. With a tuning voltage of 1V to 24V, the CRVCO tunes from 20 to 150MHz with the output response a barely detectable ±0.04dBm from end to end.

Jack Hardcastle, G3JIR, comments: "The small size of the photocopied web diagram (**Fig 1**) was quite challenging [I heartily agree! – G3VA] and for a time I wondered whether the position of the 100µH inductor was correct, since it appears to be in series with the tuning inductance and the varicap which form the oscillator tuned circuit. In order to clarify this I visited the Wenzel web site and downloaded the circuit for myself. This enabled me to view an enlarged picture so I could see more clearly that my first impression was correct.

"On investigating the internal circuit of the MC1648 it became clear that the 100µH choke was a DC path for biasing the IC. The RF path from the tuning inductor is actually via the 0.1µF capacitor, the 2N2857 emitter/base circuit, the 10Ω resistor and the 0.1µF decoupling capacitor. Once I realised this, the rest of the circuit fell into place. It is a most ingenious idea and deserves to be better known. I am not sure whether the MC1648 phase-lock-loop device is still available [see caption to the diagram – G3VA] but the idea could be applied to any discrete component oscillator and I hope to try this some time in the future. GM4HJQ has certainly turned-up a most innovative application of the magnetically-tuned inductor."

It should, however, be noted that Raymond Page stressed that the exceptional performance of this CRVCO depends, not only on the tunable toroid, but also on the choice of other components. To quote: "The MC1648 is selected as the VCO because it contains an automatic gain control which precisely sets the voltages across the tank, allowing the inductor's reactance to be determined by measuring its current. This current is metered by connecting the ground end of the coil to the synthetic ground at the collector of a ground-base stage. A voltage proportional to the emitter current appears at the collector, which is amplified and detected. The low impedance collector resistor and MMIC amplifier provide very flat wideband response.

"Once detected, the inductor current results in a DC voltage which is scaled by a 50kΩ potentiometer before it is applied to the reference pin of a TL431 shunt regulator. In this unique application, the TL431 modulates the current into its cathode in an attempt to keep the reference pin at 2.5V DC.

"As an increasing voltage is applied to the

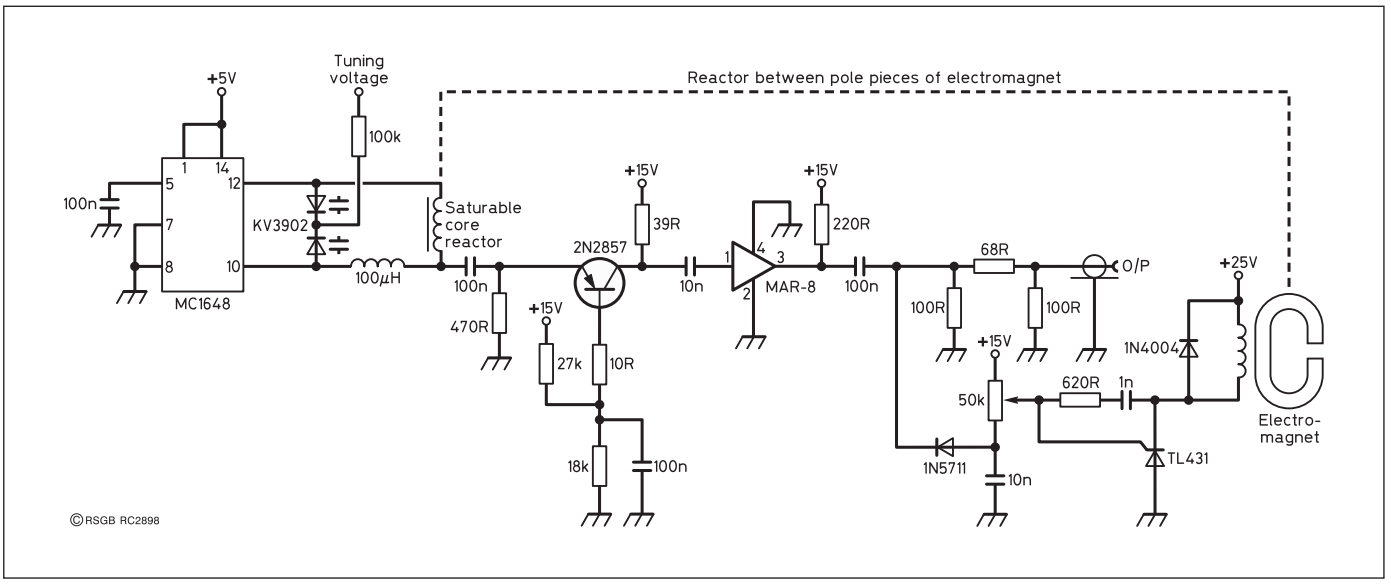

Fig 1: Circuit diagram of the wide range constant reactance voltage controlled oscillator (CRVCO) with a permeability- tuned TO-50 toroid-core inductor. Although the RF Design article was originally published some years ago, the 2000 Data Digest books show that versions of all the semiconductor devices were still in production last year. The MC1648D is an 8-pin SO device; the MC1648 L and P devices are 14-pin DIP versions.

varactors, the VCO's frequency begins to rise which makes the inductor current start to drop. Since this drop in inductor current shows up as a proportionate dip in RF voltage at the detector, the voltage at the reference pin of the TL431 will attempt to increase, causing the cathode to sink more current. This increases the saturation of the toroid and lowers its inductance, bringing the current back to its pre-set level, thereby satisfying the feedback loop. The compensation network (620Ω resistor in series with a 1nF CIF capacitor) assures that the frequency response of the TL431 is slower than the frequency response of the electromagnet for good loop stability.

"The combined performance of the grounded-base stage and MMIC stage play a crucial role in just how well the toroid's reactance can be regulated. This trans-resistance amplifier is useful to 400MHz."

G3JIR points out that the Wenzel web site also contains useful material on such items as 'Low-cost phase noise measurement' (3 pages), 'A low noise amplifier for phase noise measurements' (3 pages), 'Phase noise, harmonics and sub-harmonics' (2 pages).

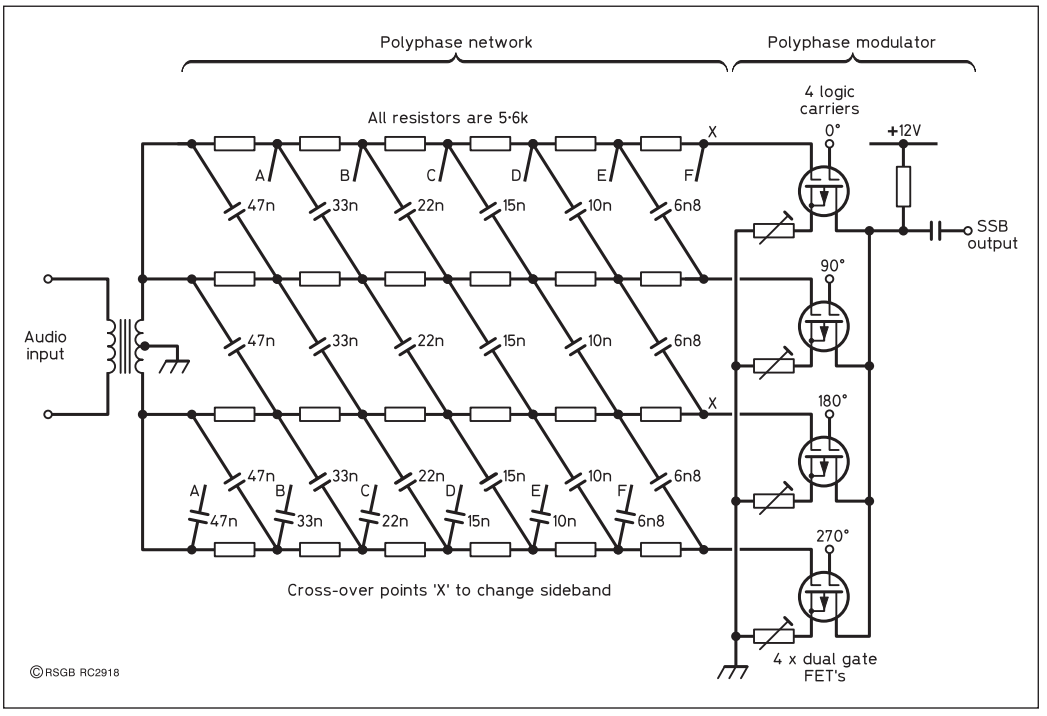

Fig 3: The first published implementation with component values of a polyphase SSB generator with a six-stage polyphase audio-shift network using preferred-value capacitors and resistors to produce four outputs with 90° phase differences as suggested by Peter Martinez, G3PLX, in 'TT' December 1973.

REGULATOR FOR LEAD-ACID BATTERY CHARGER

A BATTERY CHARGER regulator, capable of fully charging standard lead-acid batteries (15.6V maximum), sealed types (15V) and the recent Elecsol carbon-fibre battery (14.5V) or even 6V batteries, is briefly noted by Andrew Bird in the 'Circuit Ideas' feature of *Electronics World*, February 2001, p140. The adjustable voltage regulator (**Fig 2**) can be set to cut-off the charging current when the battery reaches its correct, fully-charged voltage, ensuring a 100% charge. The relay then changes over the battery, if required, to a separate trickle-charge regime at 13.7V or as appropriate.

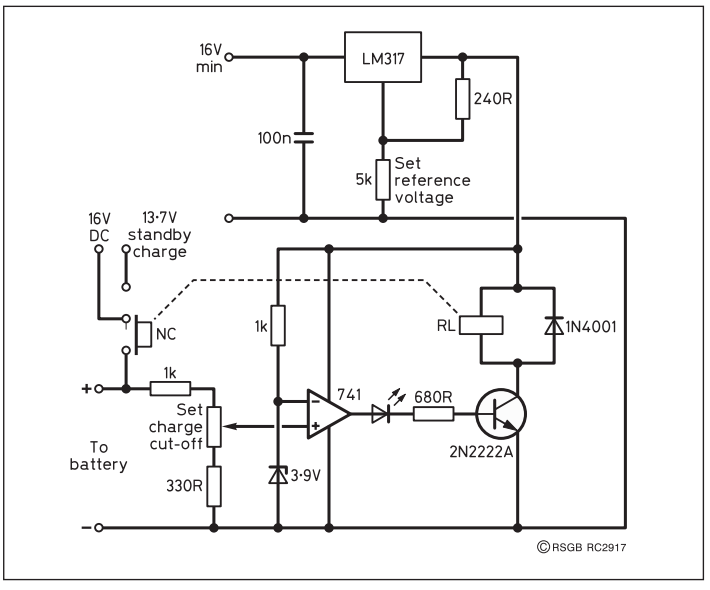

Fig 2: Circuit diagram of the adjustable regulator for a lead-acid battery charger, permitting 100% charging without over-charging and then switching to trickle charging (*Electronics World*).

POLYPHASE SSB DETECTOR FOR D-C RECEIVERS

IN SEPTEMBER 1973, 'TT' became the first column to draw attention to the possibility of using sequence asymmetric polyphase networks to generate or demodulate SSB signals in amateur radio HF transceivers. At that time, amateur SSB depended on the use of crystal filters, quadrature (two phase) networks, or the so-called 'Weaver's third method'. I had, by chance, come across an article by Michael Gingell of STL in the ITT/STC journal *Electrical Communication*, Vol 48, No 1 and 2 (combined issue), 1973, pp21-25 'Single Sideband Modulation using Sequence Asymmetric Polyphase Networks', that seemed to open a new approach to SSB although I found the mathematics etc beyond me.

I wrote: "It would be exciting to report that some entirely new method of SSB generation has been developed which combines all the virtues and none of the vices of all three systems, providing, say, 60dB of sideband suppression at low cost and without unduly critical component values. It would be even more sensational to publish a circuit diagram showing how to assemble such a system.

"I cannot do the second – but it is possible to draw attention to an article which explains the principles of a system which seems to fill most of the requirements… My difficulty is that, even after reading it through several times and phoning the author, I find it difficult to attempt to translate a pretty involved and complex paper into a form which I (and I suspect, many readers) would understand… I hope that, by drawing attention to this novel technique, I may stimulate somebody who understands or can grasp how a sequence asymmerical polyphase filter really works, and how it could be designed into an SSB generator suitable for amateurs to build. It would be possible to make a bit of communications history by doing so, since I gather that no commercial applications have yet appeared. So how about it somebody?"

I discovered later that Michael Gingell had been disappointed that his research work intended for telecommunications rather than radio applications had been rejected by STC in favour of continuing with the development

of crystal filters. Three diagrams in 'TT' reproduced from his article and a brief description gave an outline of the system.

The first to respond to the challenge was none other than Peter Martinez, G3PLX. The December 1973 'TT' included G3PLX's suggested implementation of a polyphase SSB generator including component values for the six-stage polyphase audio-shift network (**Fig 3**) using preferred-value capacitors and resistors, together with a simplified explanation of its functions. G3PLX went back to the original article, translating the mathematics into practical terms, then building several polyphase networks with results well in line with expectations, although he had not then had time to build a complete SSB transmitter with a polyphase network.

In the following years, the polyphase system attracted academic 'amateurs' in Hungary and Wales. An excellent article 'Some Reflections on the Four-Way Phasing Method', by Dr A Gschwindt, HA5WH, of Budapest Technical University, appeared in *Radio Communication*, January 1976 in which he described its use as an SSB demodulator at 450kHz, as an SSB generator at 500kHz and 3.5MHz, and also as an RF clipper.

An article 'The Phasing Method for Sideband Selection in Broadcast Receivers', by Dr R C V Macario, GW8SRW, and I D Mejallie, of the University College of Swansea, appeared in *EBU Review*, June 1980, and I seem to recall that a broadcast receiver using a polyphase network was described later by John Cronk, GW3MEO, stemming from the work at Swansea. Later work on the system was carried out by a student at Liverpool University under Dr Brian Austin, G0GSF.

The 1980 article by Dr Macario discussed both two-phase and polyphase systems. He wrote: "The polyphase network has to be driven by four quadrature mixers, but these may be implemented in exactly the same way as for the two-path method. An important difference, however, is that the unwanted sideband is now cancelled within the polyphase network and not outside it, as in the two-path method. This feature appears to have been overlooked in previous descriptions… The great merit of the polyphase method, as originally pointed out by Gingell, is the self-complementary error-cancelling mechanism within the polyphase network itself, which reduces errors by 'an order of magnitude'… Given that the introduction of SSB in some of the broadcasting bands is widely advocated, and that any such development will require the mass production of receivers fitted with SSB demodulators, there are convincing reasons why, if a phasing method is chosen, preference should be given to the four-path [polyphase] method."

Generally, the filter (lattice and ladder) approach to SSB modulators and demodulators has remained the staple diet of amateur equipment, but two-phase and third-method phasing systems continue to show up primarily in designs for home-construction. Two-phase (quadrature) SSB demodulators have found limited application in direct-conversion receivers, including the 'R2' design by Rick Campbell, KK7B (*QST*, January 1993). However, nobody seems to have tried using the polyphase four-path system as a demodulator except, as noted above, as a MF IF demodulator in a few experimental superhet designs - that is, until a recent pioneering report from Harold Wilson, G3OGW. He writes: "As a reader of 'TT' for over 40 years, I note the continued interest in relatively-simple, high-performance, direct-conversion receivers using image cancellation for single-signal reception. I constructed the Campbell R1 direct-conversion design (*QST*, August 1992) and was impressed with the results, but found the audio-image a problem for serious use. I hesitated to attempt his R2 version with quadrature demodulation, due to the difficulty of obtaining close tolerance components [and the susceptibility of a two-phase network to temperature changes etc – G3VA].

"Being aware of the phase sequence [polyphase] network and the claim for good results without the necessity for exactly matched values, I searched back to your first references in October and December, 1973. I found several references to its use as an SSB generator, but nothing relating to demodulation.

"I decided to give it a try, and constructed a front end derived from the Campbell R2 design but, in place of the emitter followers after the low-noise pre-amplifiers, inserted phase splitters, making one amplifier gain adjustable. I took the output of each phase-splitter to alternate input ports of a four-phase sixth-order network made from available 2% resistors and stock capacitors, matched where possible. The phase sequence outputs were taken in pairs to a differential/summer IC and then on to the normal audio amplifiers and filters. The block arrangement is shown in **Fig 4**.

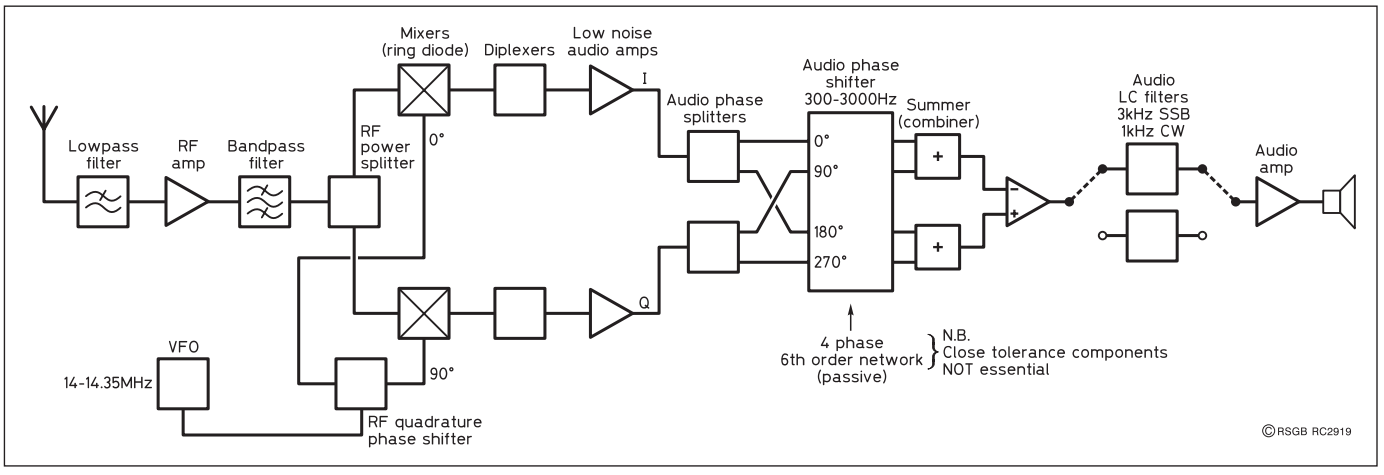

Fig 4: Block diagram of the pioneering experimental 14MHz high-performance, single-signal, direct-conversion receiver as implemented by Harold Wilson, G3OGW, to evaluate the practicability of using a polyphase sequence network in a direct-conversion receiver. Results exceeded expectations with audio-image suppression of the order of 48dB at the centre.

"The results at 14MHz exceeded my expectations, with sideband suppression at 48dB at the centre of the audio band, falling a little at the edges. Later I found Dr Gschwindt's excellent article (see above) which confirmed the use of the phase sequence network for demodulation, but to a low IF of 450kHz. I have not found any reference to its use in a D-C receiver.

"The next logical step, I feel, would be to replace the Campbell front end with the Tayloe switching quadrature demodulator as devised by Dan Tayloe, N7VE ('TT', February 1999, pp78-80, and *TTS 1995-1999*, pp258-60), and take the four outputs, via low noise amplifiers, to a phase-sequence filter

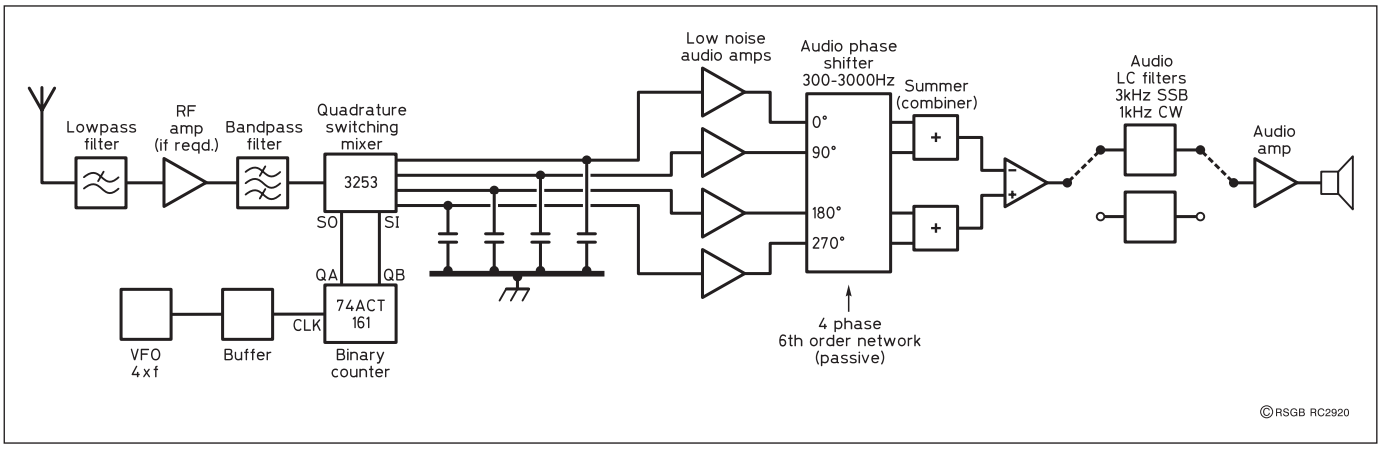

Fig 5: G3OGW's currently-planned improved polyphase direct-conversion receiver with modernised front-end using a quadrature switching mixer.

directly, as shown in **Fig 5**. Three of the amplifiers would have to be gain-adjustable, for balance. This should be the only one required as the digital RF phasing should be exact.

"Demodulation of strong AM broadcast signals should, presumably, not occur with a switching mixer. Campbell admits some disappointment with the noise figure of the ring diode mixers due to the 1/*f* effect on a D-C receiver. N7VE's reported results seem to show a great improvement in this respect. I wonder if anyone has seen any reports of this proposal, which, if it works, would seem to be an elegant solution, capable of very high performance? I have [February, 2001] the necessary ICs on order and intend to try out my ideas in practice, and will let you know the results, if any.

"I have no professional qualifications in, or connections with, electronics, having spent my life in structural/civil engineering. I am now in my eightieth year, but still a true amateur in that electronics has always been a life-long, part-time interest…"

For my part, I can add only that G3OGW's ground-breaking ideas seem an excellent approach to establishing the direct-conversion HF SSB receiver as the high-performance system originally intended by John P Costas, W2CRR, in the classic SSB issue of *Proc IRE* (December 1956) yet, at the same time, not exceeding the limits or budgets of home construction.

HERE & THERE

BY INVITATION of the Bletchley Park Trust on 30 January, some 30 of those of us who had served in the wartime Special Communications Units of MI6/SIS Section VIII at Whaddon etc (Radio Security Service (MI8c) also represented) attended a ceremony at the Park to witness the unveiling of a portrait of Brigadier Sir Richard ('Pop') Gambier-Parry (one-time 2DV), together with a similar number of guests (relatives etc). A fourth annual reunion of RSS (Box 25) voluntary interceptors (VIs) and wartime members of SCU3 & 4 together with relatives, friends, and those interested in this secret wartime organisation, will be held at the Park on Sunday, 13 May (details from Bob 'Nosmo' King, G3ASE, 7 Needingworth Road, St Ives PE27 5JN. Tel: 01480 463 129 or e-mail: g3ase@waitrose.com

AL GROSS, W8PAL, who died last December, aged 82, always claimed, with justification, that his work on the development of the American OSS Joan-Eleanor hand-held 260MHz radiophones led directly to the introduction of the original US Citizens' Band and, in turn, to the present world of cellphones and personal radio. The OSS radiophones were used in 1944-45 to enable secret agents in Germany to speak to wire recorders in British-built de Havilland 'Mosquito' aircraft. It was on March 22, 1948 that the FCC granted Al Gross the first certificate of approval for a radio transceiver to operate on 465MHz as 'the advent of a new service which will be available to individual citizens for personal use in the band 460-470MHz'. As the first CB manufacturer he soon received an order for 25,000 units from the mail-order department store Montgomery Ward. In 1998, as a Life Fellow of the IEEE, he received the Eta Kappa Nu Vladimir Karapetoff Eminent Members' Award for 'pioneering contributions to the engineering of personal wireless communication'. A history can be found on: **http://web.mit.edu/invent/www/Gross.html**

CURRENTLY UNDER development in the USA is a new electrical energy source that invites the question "Is it a fuel cell or is it a battery?" (*IEEE Spectrum*, November 2000, p32). Basically this is an electrochemical device that generates electricity by oxidising a light metal like aluminium, calcium or zinc, and that can be either refuelled or recharged. Refuelling takes the form of mechanically replacing the metal oxide with fresh metal. Recharging means replacing the energy electrically as with conventional secondary cells. The device, called the RPC (Revolutionary Power Cell) is being developed by EVonyx, a subsidiary of Reveo Inc a company set up in 1991 by Sadeg M Faris "to invent technological solutions that can benefit humanity".

The RPC, somewhat akin to the traditional zinc-air cell, is seen as particularly attractive for use in electric vehicles but, when fully developed, could find many other applications. It operates over a wide temperature range, including normal room temperature, and generates little heat. It contains no liquids, just three sheets – a layer of metal separated from an air cathode by a thin plastic electrolyte. None of its components is toxic, corrosive, or particularly flammable. With an aluminium anode, it is projected to have a specific energy of better than 5000Wh/kg and a specific power in excess of 250W/kg (although these numbers are yet to be demonstrated). It is potentially relatively inexpensive to manufacture; a dollar's worth of aluminium has the capability to power a small energy-efficient car some 30km (running cost 3 cents/km). It is suggested that the size of the cells could range from tiny units as small as a matchstick or rechargeable AAA-sized cells to large units capable of powering buildings.

It is now sometimes being seen as the future successor to the microchip. Although it is not proving easy to find a worthy successor to highly-refined microchip technologies, an article 'Nanowires begin to shine', by David J Cobden of the University of Warwick (*Nature,* 4 January 2001, pp32-33) suggests that electronic devices built from molecular-scale components are fast becoming a good bet. An initial development has been the perfection of techniques for growing nanometre-scale semiconductor wires. More recently these nanowires have been used to produce transistors and LEDs. ♦

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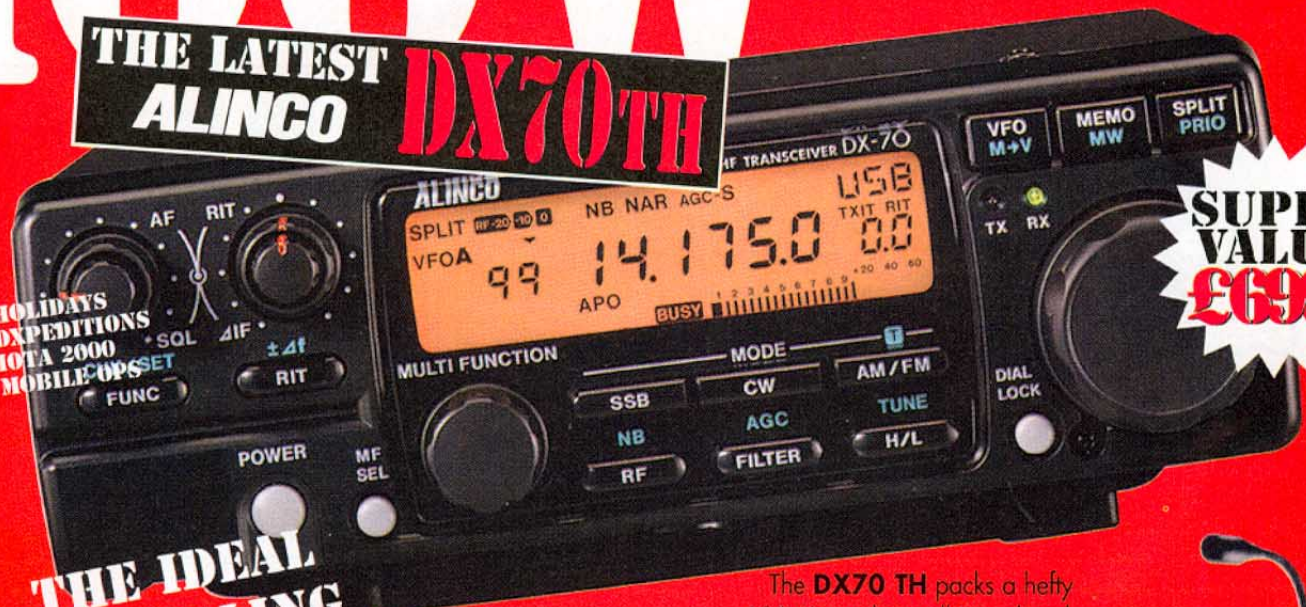

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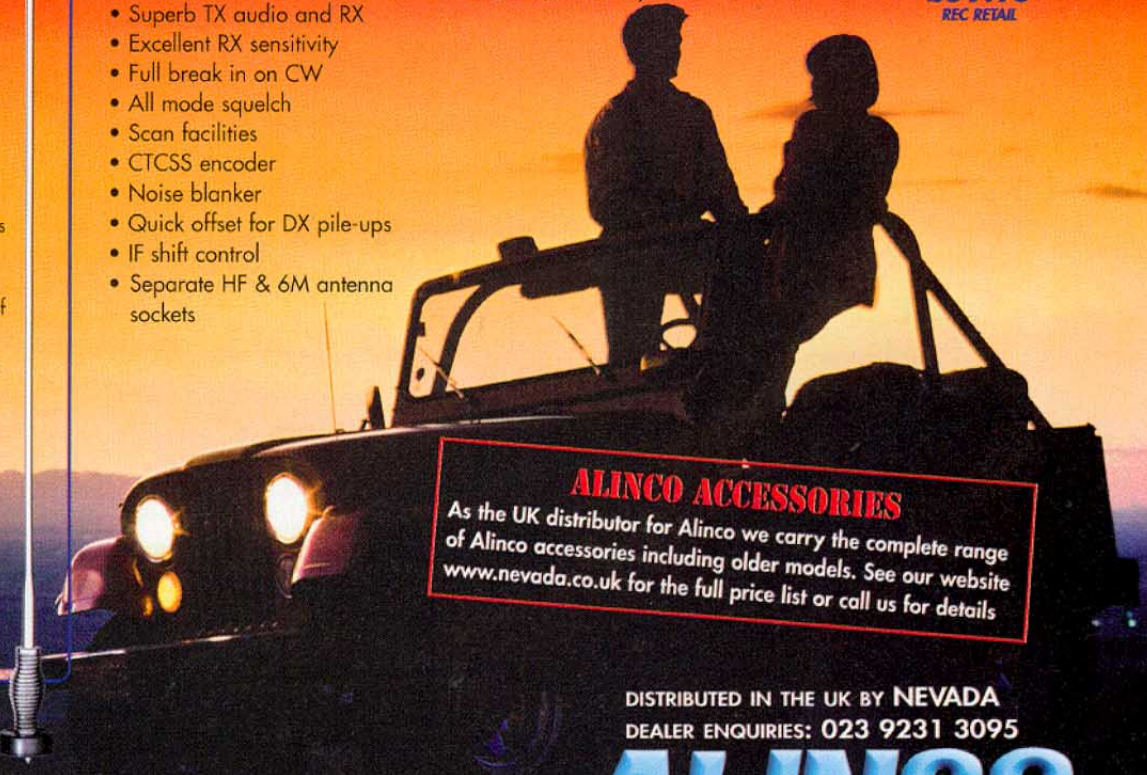

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RSGB Members wishing to place an advertisement in this section must use the official form incorporated on the label carrier of Radio Communication. This will prove membership and must be for the current month. No acknowledgment will be sent. Ads not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

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

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

EXCHANGE

HEATHKIT HW-9, gwo c/w h/book, SWR meter, ATU complete for gwo SSB/CW 5W QRP complete station equipment covering 80/40/20m bands. G4RCY, QTHR. 01934 842 797 (Shipham, Som).

SWAP Kenwood TS-430S HF tcvr 1.8 to 30MHz SSB/CW/FM mint, PWO, for Yaesu FT-650 28+50MHz tcvr, must be mint + PWO. 01329 511 718 (Fareham).

FOR SALE

ANDREW LD2-50 Heliax 50ohm 3/8in cable. Last chance to buy this superb coax at £1.35 per metre. Peter, G4GYI. 01789 763 565 (Alcester).
E-mail: ward.p@virgin.net

CHECK out my website at www.nomis.co.uk for rcvrs, tcvrs, test gear, radio books and much more. 01434 633 913 (Corbridge).
E-mail: simon@nomis.co.uk

DATONG multimode filter model FL3, £40. Pye ex-PMR tcvr converted for 2m, £50. Trio 9R59DS rcvr, £30. Heathkit valve voltmeter, offers? 01475 781 568 (Greenock).
E-mail: johnhiggins@johnhiggin.worldonline

EDDYSTONE EC958 rcvr 10kHz to 30MHz. AM/CW/SSB, gwo with homebrew plinth speaker, prefer buyer inspects, collects or RV by arrangement in table cabinet with man. Jim, M5AIP. 01708 340304 (Romford, Essex).

FREE issue *RadCom* magazines, complete years 1991, 1992, 1993, 1994 & 1995. Collect. G3BNG, QTHR. 01603 742 841 (Norwich).

FT-1000MP-AC, MD100 mic, £1250. Kenwood TH-75E dual handy, £85. SG230 Smart Tuner, £200. PK-232MBX packet + extras, £110. FT-270R mobile 2m, small, £60. Racal digital counter, £30. Icom IC-T7E dual band handy, £100. Many mobile antennas VHF/UHF free to callers. SWR bridge, 12V PSU 5A, 21in Sony TV good order, £25. All in as new cond, mans and packing. Delivery by arrangement on major items. G3XFN, QTHR. 0121 353 3364 (Sutton Coldfield).

HY-GAIN AV-620 6-band vertical, as new, £140. Datong FL1, £25. 6m converter (144MHz IF), £15. GEC UHF mobile (on 70cm), £10. Complete RTTY/AmTOR/CW set-up, CBM64, disk drive, MBA-TOR-64 cartridge, ST5C+ Toni-Tuna, immaculate, (buyer collects), £100. Revco 2m 5/8 mobile, £5. IC-202S, carry case, charger, mic, man, immaculate, £125. CMOS keyer with built-in single paddle, £5. Tim, G4ARI, QTHR. 01530 243 258 (Leicestershire).
E-mail: timothy.raven@capgemini.co.uk

ICOM 746 HF/VHF tcvr, gc, boxed with accessories, man and RS-746 remote control software, £875. Siskin multi-cat system, £15. Iomega 250MB computer zip drive, IDE internal mounting with 8 blank discs, £75. Buyer collects or pays carriage. 01986 798 524 (Woodbridge).
E-mail: steve@sboldvic.demon.co.uk

MARCONI 2960R test system, £300. Marconi 1GHz probe, £50. ITT Digiscope OX7520, £150. Ando spectrum analyser 1.5GHz, £300. Sinadder linear 5, £50. Lineman test set, £50. Seaward Pat 1000s, £100. Bird 43 with 5E element, £100. Bird 4304, £150. Bird Tenuline 20dB 25W, £40. Bird Termaline 50 ohms 25W, £40. RS RF adaptor kit, £30. 01803 290 133 (Torquay).

QTH for sale near Louth, Lincs, in JO03 square. Four bedrooms, fitted kitchen, recently redecorated throughout, oil fired central heating, double garage, brick shack out buildings, half-acre grounds, no near neighbours, no TVI good VHF/UHF DX QTH, exc views of countryside, good take off, 45ft tower ants and rotator included in sale if required, £94,500 OIRO. 01507 363 804 (Louth).
E-mail: delboybrown@btinternet.com

SHACK tidying. Transformers, chokes, computer parts, RF components. SAE to G3UFW. Pendine, Romsey Road, East Wellow, Romsey SO51 6BG. 01794 322 592 (Romsey).
E-mail: john.stevens@i12.com

VHF station QRT. Kenwood TS-570DG under warranty, mint, £750. Inrad 2.1kHz filter for 570DG, £50. Downeast Microwave tvtr for 144MHz, £90. Command Technologies Commander II amplifier, 3CX800A7 for 144MHz, £1050. Bird 43 PEP inc 2 slugs and carrycase, £300. Schurr Profi key, mint, £80. 10m Adaptamast, £200 or £350 with Yaesu G-450 rotator. MFJ-259B antenna analyser inc carrycase, £120, carriage extra. Paul. 01522 878 784 (Lincoln).
E-mail: bradbeerfamily@aol.com

YAESU 767GX Mk2 tcvr, 2m 6m 70cm, SP-767 spkr, MD-1C8 desk mic, £800. 01707 331 178 (Welwyn-Garden-City).
E-mail: cmiles1@cmiles1.screaming.net

2m rig Navico AMR1000S, £130. 2m h/held, no batteries, Kenwood Trio model TR2400, £49. ATU MFJ VersaTuner V, £150. MCL 1100 easy reader Momentum Comms, £150. Zenith trans oceanic rcvr antique, £150. Morse key, £40. Realistic rcvr 400 channel PRO 2005, £120. SWR meter 2000W, £40. Printer Citizen Swift 9. AKD WA3, £40, p&p or collect. 01179 691 025 (Bristol).

MASSIVE shack clearance. FT-902DM, £375; FTV-901R 2m 70cm 6m, £300; FTV-902 ATU, £100; SP-901, £25; FT-290R, £150; FT-790R, £200; 290/790 mobile mount, £18; FT-26 handy, £100; Realistic UHF/VHF scanner, £35; BNOS LPM144-10-180W, £200; Tono 2m MRI50W, £90; Alinco 2m 60W, £50; Tokyo 2m 35W, £35; MML 144/30LS, £45; MML 432/50, £75. PSUs 10A, £15; 3A, £5; Lambda 100A fully cased, metered, £80. Ant switches PL259, £12; 'N', £18. Rotators, Kenpro 400RC, £50; lightweight unused, £25; Microphones, Shure 444D, £30; MD1, £60. Kenwood TM-241E mobile, £175; computer Pentium 150, 15in SVGA, 2GB-h/d 32MB-RAM CD-ROM, Soundblaster, keyboard, windows 95 MS Office+, £125 bargain. Pace MMS satellite rcvr, Dolby Pro-Logic home cinema, with dish and LNB, £100. All items vgc. Ray, G6IRY. 01895 237 562 (Uxbridge).

AOR AR-8000 scanner, as new, boxed, nicads, mains charger, DC power lead, other accessories, all mans, £180 ovno. G0OED, QTHR. 01884 841 069 (Uffculme, Devon).
E-mail: andy.mardo@metron.co.uk

AR88D gc really reluctant to sell, £45. Full tech info, buyer collects from Northwood, Middlesex. G2PT. 01923 822 181 (Northwood, Middx).

ARTIFICIAL RF ground MFJ-931 as new with transit case including postage, £45. 01932 784 971 (Shepperton).
E-mail: johnreids@aol.com

CUSHCRAFT R-7000 vertical, 40-10m exc cond, little used, kept in storage, £180. Yaesu MD-100A8X desk mic, boxed as new, £70. 023 9226 5101 (Waterlooville)
E-mail: lears@tesco.net

EDDYSTONE EC10/11, £100. Kenwood TR-751E 2m boxed, £250. Yaesu FT-77 HF 100W, £200. R & D 6m 28/50, £95. FC-707 ATU, £80. Carriage extra. G3PJK, QTHR. 0161 654 6160 (Manchester).
E-mail: victormee@talk21.com

ERA Microreader Mk2 as new, with h/book, £45 plus postage. Would consider straight swap for GDO. GM3NVQ, QTHR. 01383 728 019 (Dunfermline).
E-mail: gm3nvq@hotmail.com

FRG-7700 HF rcvr exc cond, £145, collect or pay postage. FRT-7700 VHF converter, £25. RS156696. 01994 484 214 (Carmarthen).
E-mail: pelias7372@aol.com

FT-290 American spec, CTCSS encode, 12.5kHz spacing, new charger, vgc, £150. MFJ VHF 2m antenna tuner with SWR meter, £30. 01455 449 602 (Hinckley).

FT-780R 70cm multimode, £140. FT-290R 2m multimode & W2D linear, £140. KDK-201JR 2m FM synth tcvr, £50. All with mic and h/book. 01823 680 913 (Nr Taunton).
E-mail: john@g4hmg.freeserve.co.uk

FT-840 all options fitted, £400. Kenwood TS-780, £450. Baycom 4-port card, ISA interface four 1K2 modems three built, one in kit form. 9K6 modem fully assembled, £125. Alinco DR-430, £125. Alinco DM-406 20W version, £125. All equipment is in vgc, hardly used, buyers pay postage. G4OCO, QTHR. 01637 881 631 (Newquay).
E-mail: roger@g4oco.freeserve.co.uk

FT-902DM plus FC-902 in vgc, spare PA tubes, service and operating mans, delivery by arrangement, £300. IC-706Mk2 plus DSP and tune unit, never used mobile, exc cond, recently checked by Icom, £600. 01380 850 586 (Wiltshire).

G4MH mini beam 2-ele £125. ATU model VC-300 DLP, £40. PSU FP-757HP wired for Yaesu 747, £55. Buyer collects. 01723 864 716 (Scarborough).

HEATHERLITE Hunter lin amp, man, makers report, vgc, very little usage, soft-start, £450. Panasonic dot-matrix printer KX-P1124I, minimal use, man, new ribbon, vgc, perfect for packet use, £25. ATU HF 2kV tapped coil, h/book, looks good, performs well, £50, inspect collect. 01270 668 111 (Nantwich).
E-mail: derek@rooke-g0oew.freeserve.co.uk

HEWLETT Packard spectrum analyser display HP851B, £60. HP7004A3 plotter, £60. HP695A sweepgen, £80. HP431C power meter (no head), £20. HP612 1.8-4GHz sig gen, £60. Hughes TWT amplifier 20W, 1-2GHz, £70. Sanders Klystron source and PSU, 7-11GHz, £50. Elliott rotary vane attenuator 0-100dB, WG16, £30. Marconi TF-1202A thermistor power meter with X-band mount 1mW/5mW, £30. Precision VSWR slotted-line carriage, GR700, with transitions, £75. Bradley bolometer power meter VHF-26GHz coax/WG 1.5/5mW, £30. Genrad sources 350-1800 MHz, £20. Scopex 4D25 oscilloscope, £20. Airmec wave analyser, 5-200MHz, £15. TCL sig gen CW/FM 400-470MHz, £15. APT regulated PSU 200-500V 250mA, £20. Automatic AC-supply regulator 4kW (Variac), £30. G3OAD, QTHR. (Stroud)
E-mail: trev45@hotmail.com

HF G2DAF linear amplifier. 3kW antenna tuner MFJ-989C. BC221Q frequency meter, original charts. Offers? Buyer collects. G3YJJ. 023 8089 4200 (Southampton).

HILO-MAST HD 14m pneumatic, with new seals / spare pack, 12V compressor, purpose-built compact trailer with electrics, unused spare wheel / tyre, outriggers, brakes, large equipment box. Ideal contester group or club. Easy solo operation, vgc, cost £6500 first £1500 secures. 01733 205 333 (Peterborough).

IC-706 Mk2, £500 ono. IC-706 Mk1, £450 ono. Kenwood AT-50, £150 ono, boxed and mans. 07979 457 591 after 6pm (N Wales).

IC-746 with FL-100/FL52A CW filters, £850. VC-300DLP ATU, £50. 144MHz 400W solid-state linear, £150 ono. AVO Mk8 multimeter, offers? Brand new 4CX250Bs, 2 only, £20 each. SK620 4CX250B bases with PTFE chimneys, £13 each. 486DX66 PC c/w VDU etc, £40. Acrian VMIL80 VMIL150 and Philips BLF248 VHF power Mosfets, limited qty, offers? No time wasters please. 01656 660 876 (Bridgend).
E-mail: westville@btinternet.com

ICOM 735 HF tcvr, ATTU-150, PSU PS55, spkr-SP3, mics-SM8/HM12, boxed, mans, £700 ono lot. G4GJX, QTHR. 01202 572 690 (Bournemouth).
E-mail: jess@g4gjh.freeserve.co.uk

ICOM IC-725 HF all-mode compact tcvr. CW filter, mint, £200. Yaesu VX-5R triband h/held, as new, £190. Mirage B50160G 144MHz 160W linear, as new, £200. KW2000A HF tcvr, gwo, mans, £95. Microwave Modules tvtr 2m to 70cm, £80. G4JXK, QTHR. 01460 55045 (Ilminster).

ICOM IC-740 HF tcvr, all mode fitted with marker unit IC-EX241, FM unit IC-EX242, electronic keyer unit IC-EX243, filters fitted, CW narrow FL-54, SSB FL-30, plus FL53, also matching Icom IC-PS15 PSU, IC-HM7 mic, boxed, man, £475. Revex MS-1 station wave monitor scope, SSB-CW-AM (like Trio), £135. Astatic USA-made dynamic desk mic, £35. Icom IC-R7000 all mode rcvr/scanner 25MHz to 2GHz boxed, man, £395. Very very old headphones, S G Brown Ltd, original cond, type F, £25. 300 valves old & modern, 2m SWR/PWR, £20. Commercial grade 70cm antenna circulator with info, £45. Rubber ducks, dual-band, 2m scanner etc, £10 each. KW- HF three-way antenna switch £10. 70cm beams 9-ele, £15 and commercial quality 9-ele, £25. Masthead antenna switch, 12V, £12.50. 01328 710 641 (North Norfolk).

ICOM IC-970 top base tcvr, 144/430MHz, 23cm option all-mode, sat auto-tracking, fitted UXR-96 rcvr module, 50-905MHz, new, boxed, £1,200. IC-737A tcvr, new, boxed, £580. Kenwood TM-707 2/70 mobile, new, boxed, £235. Comet GP-9N 2m/70cm 8.5/11.9 dBi, unused, £55. IC-701 HF tcvr £165. 01562 747 480 (Kidderminster).

KANTRONICS KAM Plus, £100. Yaesu VX-5R with boom-mic headset, antenna adaptor, charger, £250. TS-940, SP-930, £400. Daiwa NS-660P SWR/PWR, £30 + carriage. 01935 422 973 (Yeovil).
E-mail: al@g3vlq.freeserve.co.uk

KENWOOD TR-751E 2m multimode, mint, boxed, quick release mount, mans, £225. Microwave Modules MML144/100-LS 2m 100W linear, boxed, £50 or £250 pair. Eddystone 750 HF rcvr, offers? Airmec CT542

CONGRATULATIONS

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

50 years		*60 years*	
G2HLL	Mr F H Pickard	EI4L	Mr J E Scanlon
G3FJE	Shefford & DARS	G2BPW	Mr IWK Smith
G3GMM	Mr E McFarland	G2FQR	Mr N W Austin
G3IUZ	Canon H R Davis	G4IOF	Mr M East FSVA

Our apologies to Mr F H Brindley, RS19063, who joined the Society in January 1951 and was omitted from a previous list.

AM/FM modulation meter, offers? Marconi TF-329G circuit magnification meter, offers? 01608 641 038.

KENWOOD HF linear TL-120 10W in 80W out, £85. Tokyo 6m linear HL-66V 10W in 50W out, £85. Starmaster keyer MkII, £25. MFJ-1026 noise canceller, £100. Steve, G4MPK, QTHR. 01372 812 136 (Leatherhead).
E-mail: steve@grumpy.prestel.co.uk

KENWOOD Trio TS-180S 160-10m SSB, 200W PEP, CW 160W PEP, FSK 100W DC plus man, gwo, £285. 01952 251 478 (Wellington).

KENWOOD TS-440S HF all-band tcvr with internal auto-ATU, 270Hz filter, 1.8kHz filter, matching PSU, immaculate, £430. G4JTR, QTHR. 0113 947 6873 (Reading).
E-mail: g4jtr@thersgb.net

KENWOOD TS-450S original box, leads, inspect and collect £550 ono. 01543 251 915 (Lichfield).
E-mail: s-evans13@talk21.com

KENWOOD TS-50 HF tcvr, £450. 01934 743 636 (Cheddar).
E-mail: john.lane@btinternet.com

KENWOOD TS-570D HF tcvr AATU DSP perfect, c/w man and box, £650, carriage extra. Ken, G3RDG, QTHR. 020 8455 8831 (NW London).
E-mail: kennethb@btinternet.com

KENWOOD TS-850SAT tcvr, mint cond, no mods, original packing, £700. GM4DZX. 01856 761 662 (Orkney).
E-mail: gm4dzx@qsl.net

KENWOOD TS-850SAT, CW/SSB filters fitted, SP-31 speaker, MC-80 desk mic, mint £550. TM-721E dual-band FM, MA-700 ant/diplexer, MC-55 mobile mic, exc cond, £180. TH-79E dual-band h/held, CTCSS fitted, KSC-14 desk-top charger, PB-32 extra battery, exc cond, £200. KW-200 HF/VHF meter, £60. MFJ-949C ATU, £50. KAM modem, £50. Opto 2300 freq counter, £60. Two 25A PSUs, £45 each. GM0EKY. 0141 777 8572 (Glasgow).
E-mail: brrourke@btinternet.com

KENWOOD TS-870S, £995. TH-D7E FM dual bander with TNC, £195. PacComm Tiny-2 TNC, £85. All as new, mics, leads etc. Daiwa RS-40XII power supply 40A, £100. G3RWQ, QTHR. 01905 454 303 (Worcester).

KW2000B HF tcvr, desk mic, KW11 Q-multiplier, external speaker, power supply, dummy-load ATU, gc, £250. TR-7930 2m FM tcvr, £90, Drae PSU 12A, £40. Buyer collects. Paul, G0CVO. 020 8777 8089 (eve) (West Wickham, Bromley).
E-mail: jukesp@btinternet.com

KW77, £50. CT-160, £40. BC221, £10. Racal RA17L prod det, S meter, £100. Some G2DAF rcvr xtals, £5. Unused Denco IF transformers, £10. 632 0614 (Holyake).

LINEAR amplifier Ameritron AL-811 160-10, MFJ-989C ATU, both only one year old, £550 the pair, you pay carriage. 01206 210 710 (Colchester).
E-mail: rick@g3yec.freeserve.co.uk

MARCONI 2019A synthesised signal generator 80kHz to 1040MHz, 3 LCD displays, all modulation modes, gwo, £275. John, G8BXH. 01923 234 924 (Watford, Herts).
E-mail: john@pryke.com

MARCONI power meter/dummy load, 50ohm, 10/25W, £20. Marconi VVM, £20. Microwave modules 50MHz tvtr, £80, and 144MHz tvtr, £70. AVO-8 with case vgc, £35. Datong frequency-agile filter FL1, £25. Siemens T100 teleprinter and T68 (tickertape) with tools in transit case, both vgc, offers? 40ft Versatower, needs tidying, £50. Heavier items collect only, all ono, items located near Barnsley. 028 9268 9782 (Hillsborough).

MEMORY keyer ETM9C-X3 vgc, h/book, lead, prefer buyer collect, £95. Peter, G8IKW. 0161 643 1671 or 0151 327 4280 (Willaston, Neston).
E-mail: ashtree02@cwcom.net

MOSLEY 3-ele TA-33 beam and rotator, buyer to collect, open to offers. G3IDW. 01793 822 055 after 6pm (Swindon).

NRD-515, NDH-515 spkr, workshop man, man, £650. Crystal set, no phones, £35. Global AT-2000, £35. Aerial rotator Maplins, £45. 0141 562 4571 (Glasgow).

PK-232 with h/books, £120 plus post ono. PK-232MBX, £80 plus post, but no operating man. G3AOZ, QTHR. 01394 275 820 (Felixstowe).

PROPERTY of late GM0UCB. Final clearance. Cables 2 pieces 15m+ RG213M, used but sound, £5 each. 19m RG213M new, £10. 50m UR(M)43 new on drum, £10. Bag of goodies – PL259 plugs (small cable) mostly new, phono plugs, jack plugs, connectors, fuses, nuts & bolts, £5. IC-740 tcvr with SM-5 desk mic. AR146 2m tcvr, Kenwood headphones HS 5. Reace RC-1000, FC-50. Offers to GM4EHB. Carriage at cost. 01688 302 446 (Tobermory).

PYE MX-295 converted to 2m full coverage simplex and repeater channels reverse repeat 5W or 25W output, £45 or would consider swap for an FV-101 external VFO for an FT-101 must be good cond. G0MQG, Tony. 01603 744 197 (Norwich).

RACAL RA17L, £100. Clean Yaesu FT-101E, £100. New cond Yaesu FT-757DX, £25. SX-200 scanner, £30. Offers on the above considered. 023 8086 8426 (Southampton).

RACAL equipment: RA1771 HF communications rcvr, mint, £550. RA17 rcvr with man, £175. RA905 tactical 1kW HF wide-band antenna with MA675 9m mast, as new, £500. MA1966 antenna rotator interface unit, £60. Many mans on Racal radio equipment from £25. Granger commercial HF log periodic antenna, type 2004, with self-supporting articulated tower POA. Wanted: Racal MA79 units/modules. Nigel, G0UGD. 01327 357 824 (work) or 01323 486 822 (home) (Eastbourne).

RACAL MA-152C SWR unit, £20. KR-400RC barely used, £110. TR-9000 mint, £150. Hansen HP500H up to 2kW, £40. BARTG R5 boxed, £15. Solartron variable PSU 600V/150ma, £15. Also many valves circuits & mans, transformers, aerial c/o switches. Daiwa 2W, Decca 3W, Western 4W, heavy items to be collected. 01332 735 896 (Derby).

RACAL RA17L spares, first VFO second VFO chassis, all £25 each. Spare film strips, £5 each. Panel meter, £5. Ted, G8HLJ, QTHR. 0151 632 0614 (Hoylake).

RACAL RA17W rcvr, £100. Tektronix R565, d/b CRO (dual timebase) together with faulty spare, £50. Mullard high speed valve tester, £25. Advance PPI 0-600V power supply, £25. Solartron LM1450 DVM, £10. Advance H1 AF signal generator, £15. G8KOV. 01453 546 971 (Glos).

RELUCTANT sale. Ex cond Ten-Tec Corsair Mk1 1-100W CW/SSB c/w h/books speaker/PSU, mic. Full CW filters fitted. Offer me £320 ono - small shack, need the space – boxed ready to go. Ideal for new licensee, or CW enthusiast, top band to 10m. 01732 843 497 (Maidstone).
E-mail: jack@g4emc.freeserve.co.uk

SILENT key sale, G4SEB. 45ft box tilting tower, TS-830S, FT-757GX, FT-480R, DJ-460E, TM-251E, PK-232MBX, AR-3000A, FT-290R. Phone evenings for full list. 01603 437 560 (Norwich).
E-mail: richnsal@aol.com

SILENT key sale. Henry 2006A 6m amp as new, £950. Heathkit SB220, £350. NAG144XL 2m amp, £150. Dentron ATU FRDX-400 non-working, offers, also Collins KWM2A ex cond, £500. Star Masterkey full QWERTY keyboard, £40. Maxon 70cm/m, £30. G3PPD CW501 insect filter, £25. Claude Lyons mains voltage stabiliser 240V @ 48A, £80. New boxed Eimac 3-500s, offers. FDK quartz-16 2m FM, £30. Collins 12V PSU, £50. 01362 688 430 (Norwich).
E-mail: g3zig@freenet.co.uk

SILENT key sale. SM-220, £120 + £10 p.p. Working satisfactorily BS-8, SP-930, £30. LF30A, £20. HP201 SWR, £35. G3WKF, QTHR. (St Austell).
E-mail: g3wkf@aol.com

TEN type 43 Bird Thruline meter elements £250 with free meter. 01673 842 552 (Market Rasen).
E-mail: g4uhz@aol.com

TRIBANDER and rotator in exc cond with control box and lots of coax. Help with dismantling, £250. G4XEW. 020 8958 8848 or 020 8953 5287 (Edgware, Middx).

TRIO communication rcvr and transmitter model JR-60, valve type, £60. 01254 391 472 (Accrington).
E-mail: mark.taylor@pics-sells.co.uk

TS-850SAT boxed with mic, man, CW filter, PC interface & software, vgc, £650. Alinco DR-119 50W 2m rig, with TNC cable, aerial, vgc, £120. 01908 609 284 (Milton Keynes).

VERSATOWER P60 mast. New, unused, auto brake luffing winch, electric raise lower winch and stainless steel ropes. Spare rotator head unit. New unused rotators, Bird Thruline equipment, Andrews LDF4-50 connectors and valves. Vintage test equipment. E-mail for complete list. 01254 701 151 (Blackburn).
E-mail: btom@cwcom.net

VERSATOWER W4013M20 wall-mounting non-slip luffing winch electric telescoping winch, RC-5B az-rotator KR-500 el-rotator 2m 10-ele Yagi, remote controlled Polarphaser 70cm 10-ele Yagi with Polarphaser, £50 the lot, buyer collects all or nothing. G2HCG, QTHR. 01425 617 090 (New Milton).
E-mail: bsykes@btinternet.com

VINTAGE EKCO 319 (1957) radio with tech sheets, new valves, reconditioned, £70. Audioline TEL950 telephone recorder, £30 ono. G4RCY, QTHR. 01934 842 797 (Shipham, Som).

WATSON WM-2000 desk mic, compressor, graphic equaliser, switch up to 3 rigs, Icom cable, unused, unwanted gift, £60. Albrecht AE-2015 10m FM/SSB h/held, 5W, as new, £120. MFJ-1621 portable antenna, £40. G4ILO. 01900 821 192 (Cumbria)
E-mail: g4ilo@qsl.net

WWII FL8A passive CW audio filter, select/reject, £25. AVO 8 Mk IV, £25. Geoff. 01634 253 056 (Rochester).

YAESU FT-4700RH dual band 2/70 mobile/base tcvr with boot mounting kit and 5m connecting cable, vgc, £175. Yaesu YM-38 mic, £15. Altai master rotator AR300XL, never been used, still in the box, £35. Avometer model 7 in leather case, cond unknown, £25. 01527 459 354 (Redditch).
E-mail: webheath@aol.com

YAESU FT-900C AT, Collins filters, FP-800 PSU for the FT-900C AT. Ten-Tec Pegasus 100W DSP HF computer controlled radio has all options, tuning knob and key pad, mic MC-704 new, in box, working, very good, all the rigs have the box and in a very mint cond. G0UUT. 01603 742 733 (Norfolk).
E-mail: g0uut@arrl.net

ICOM IC-746 little used, £850. Prefer buyer inspects and collects. Yupiteru MVT-7100 as new, £125. Hora C408 70cm £35. All boxed. G3MSW 01582 715549 (Herts).
E-mail: ken@g3msw.demon.co.uk

WANTED

ALL spy/clandestine radio sets from WWII and since, wanted by private collector. Accessories/incomplete units also required. Bill, G8PUJ, QTHR. 020 8508 0838 (East London).

COLLINS 51J4 or 75A4 dead or alive for rebuild. Collins or KVG CW filters wanted, also Sherwood 250Hz filters. Looking also for ITT Mackay marine valve rcvrs and current production Racal RA3790 and VHF RA3721, Siemens E311A and surf pre-selector. 01743 884 858 (Shrewsbury).

COLLINS KWS-1 transmitter with or without PSU cash or part exchange Collins equip also 200+200 dual-section variable capacitor for ATU. 01379 178 3657 (nr Diss).
E-mail: tmunro@ukonline.co.uk

DRAKE 2880 microwave down converter, input 2.5-2.686GHz with modifying kit for 13cm wanted. G4DAC. 020 8657 3081 evenings (Croydon).

FOR Ten-Tec Paragon; FM board and RS-232 port. 01202 518 776 (Cheltenham)
E-mail: graham-g4fuj@talk21.com

KENWOOD TH-41, Yaesu FT-73 any cond for spares. Also, complete or parts, TR-7500, for spares. 01332 343 640 (Derby).

MARCONI TF-21708 digital synchroniser, preferably working, but faulty item considered. Phil, G3SES. 01244 383 954 (Chester).
E-mail: philg3ses@aol.com

R1155 power supply, gwo or original RAF ground power unit, will arrange collection, reasonable price paid. Cash. 01507 480 738 (Louth).
E-mail: knowpet@btinternet.com

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

VOICE synthesizer unit IC-EX310 for Icom IC-751. Money waiting. 01226 722 545 (Barnsley).

WANTED high-power ATU for balanced line and un-balanced line, must be as new Dentron or VS1500; a Transmatch etc also wanted. 75ft to 100ft lattice-type tower, must be free standing and 2/3 piece, must be complete and as new. Cash waiting for the above. 020 8459 5392 (Willesden).

YAESU FT-101ZD, CW filters, 2 off for ERRC Radio Club and myself. R A Kerr, GM4FDT, QTHR. 01349 852 332. (Invergordon).

YAESU FT-980 for spares. Scrap or faulty cond, non-working or simply not wanted. FT-980 FT-980 please. G3NXD, QTHR. 01562 852 850 (Kidderminster).

YAESU G-5500 Azimuth/elevation rotator and/or controller, or separate elevation rotator wanted. Also Kansas city tracker PC card. 07831 337 883 (Redditch).
E-mail: bob.sayers@zetnet.co.uk

Rallies & Events

7/8 APRIL 2001

RSGB Spring Radio & Computer Show (incorporating **RSGB National VHF Convention**) - Bletchley Leisure Centre. £2.50, under-14s free. Recruitment fair, LEC, 6m Group AGM, TS, CP free, DF, LB, C. Jan, 0870 904 7377.

14 APRIL 2001

CRYSTAL PALACE & DRC Spring Sale - St John's Hall, Sylvan Road, London SE19. OT 10.30am, £1 (which includes a free drink), children free, C. Bob, G3OOU, 01737 552 170.

18 APRIL 2001

WORLD AMATEUR RADIO DAY - Theme 'Providing Disaster Communications: Amateur Radio in the 21st Century'.

21 APRIL 2001

CORNISH RAC INTERNATIONAL MARCONI DAY 2001 - Robin, 01209 820 118 or www.users.globalnet.co.uk/~straff/

21/22 APRIL 2001

LONDON Amateur Radio & Computer Show - Alexandra Palace, Wood Green, London N22. OT 10.00am, £2 (all classes) if in a group of 20 or more, otherwise adults £4, Pensioners & under-14s £3, TI, CP free, TS, B&B, MT (two photos needed), SIG, LEC, LB, C. Radiosport Ltd, 01923 893 929.

22 APRIL 2001

HARROGATE Radio, Computer & Electronics Rally – Harrogate Ladies' College. Gerald, G0UFI, 01765 640 229 or e-mail g0ufi@qsl.net

YEOVIL & DARC 17th QRP CONVENTION – Digby Hall, Sherborne, Dorset. OT 10am. TI on S22 (GB2LOW), TS, LEC, MT (two photos needed), C, DF, CP free, SIG. D Bowden, M1WOB, 01935 414 452.

29 APRIL 2001

ANDOVER RAC New Radio & Computer Boot Sale - Village Hall, Wildhern. OT 10am, £1 per visitor car. DF, C, TI on S22. Jack, G0UJW, 01264 391 383.

CAMBRIDGESHIRE RG Annual Rally - Bottisham Village College, Bottisham, access via A14 and A1303, 6 miles east of Cambridge. OT 10.30am, £1.50. TS, B&B, A, CBS, CP, C, TI on S22. Paul, G0LUC, 01462 683 574.

LOUGH ERNE ARC Rally - Killyhevlin Hotel, Dublin Road, Enniskillen, Co Fermanagh. OT 12 noon. Frank, GI3ZMX, 028 6632 9507.

MORSE ENTHUSIASTS GROUP SCOTLAND Samuel Morse Birthday Party - Bandeath Industrial Estate, Stirling (courtesy of Stirling & DARC). George, GM4HYF, 0141 634 4567.

NATIONAL VINTAGE COMMUNICATIONS FAIR - NEC Hall 11, Birmingham. OT 10.30am, £5, under-14s free. TS, historic radio exhibition. 01392 411 565 or www.angelfire.com/tx/sunpress/index.html

6 MAY 2001

BRITISH AMATEUR TELEVISION CLUB 2001 Convention & Rally - Bletchley Park Museum, Bletchley Park. OT 10am, £1, under-16s free. TS on ground floor of Mansion, C in Hut 4, CBS on the Faulkner House car park. Tours of the Cryptology Trail £1 extra. Bi-annual General Meeting of the club is at 2pm. Dave, G4NJU, QTHR, 01908 378 277.

7 MAY 2001

DARTMOOR RC Rally – Pannier Market, Tavistock, Devon. OT 10.15/10.30am. TI on S22, CP free, DF, TS, B&B, C, FAM. Ron, G7LLG, 01822 852 586.

MID-CHESHIRE ARS Rally - Civic Hall, Winsford. OT 10.30/11am. C, CP. David, G4XUV, 01606 777 87.

13 MAY 2001

MAIDSTONE YMCA ARS Mobile Rally 2001 - YMCA Sports Centre, Maidstone. 10.00/10.30am, £1.50 under 14s free, CP free, TI on 2m &

70cm, TS, DIY B&B. Colin, G0VAR, 01622 736 636.
THREE COUNTIES Radio & Computer Rally – John, 01527 545 823.

20 MAY 2001

DRAYTON MANOR Radio & Computer Rally - Drayton Manor Park, Tamworth, Staffs, on the A4091 close to jns 9 and 10, M42. OT 10am. TS, FM, B&B, SIG. Peter, G6DRN, 0121 443 1189 (eve).
MID-ULSTER ARC Rally - Silverwood Hotel, Lurgan, Co Armagh. OT 12 noon. TS, B&B, TI on S22. Jim, GI0OND, 028 3885 1179.

26 MAY 2001

HMS HOOD SINKING 60th Anniversary - GB2HA on 80m, 40m, 20m and 2m from the home of Malcolm, G0LMD, East Stratton, Winchester, 01962 774 550. HMS Hood Association web site www.hmshood.com

3 JUNE 2001

SPALDING & DARS Spalding Radio Rally - Springfields Gardens, accessible from the A16/A151 roundabout. TI on S22. OT 10am, £2. CBS, C, CS by prior arrangement.
WEST MANCHESTER RC Red Rose QRP Festival - Formby Hall, Alder Street, Atherton, Manchester. OT 11am, £1. CP, DF, C, LB, TS, SIG, RSGB, G QRP, FISTS, B&B. Les, G4HZJ, 01942 870 634.

10 JUNE 2001

NUNSFIELD HOUSE ARG Elvaston Castle National Radio Rally - Elvaston Castle Country Park, Elvaston, Derby, on the B5010 between the A6 and the A52, five miles SW of Derby. £3 per car (car park opens 9am), TS, SIG, FM, B&B, FAM, C, MT (two photos required). Les, G4CWD, 01332 559 965 or e-mail rally@g4cwd.demon.co.uk
WINDERMERE STEAMBOAT MUSEUM ARS Mobile Radio Meeting - Windermere Steamboat Centre, Rayrigg Road, Windermere. OT 10am. A new event centred on the uses of mobile radio in the Lake District. Exhibits by the Army, RAF, Police, Fire, Mountain Rescue Teams and Park Wardens on land and on the lake, all set against the attractions of the museum's exhibits of working steam launches. A great family event. Roy, g0tak@thersgb.net

17 JUNE 2001

NEWBURY & DARS 15th Annual Boot Sale - Acland Hall & Recreation Field, Cold Ash, Newbury. OT 9am, TI on S22. George, 01488 682 814 or www.nadars.org.uk

24 JUNE 2001

BANGOR & DARS Summer Radio Rally - Crawfordsburn Country Club, near Bangor, County Down. OT 12 noon, £2. TS, B&B. Club website http://welcome.to/bdars or Norman, GI3YMY, 028 9146 6557 or email normannewell@beeb.net
CITY OF BRISTOL RSGB GROUP Longleat Amateur Radio & Computer Rally - Longleat House, Warminster, Wiltshire. Ron, G4GTD, 0117 9856 253 or www.longleatrally.co.uk

29 JUNE - 1 JULY 2001

HAM RADIO 2001 EXHIBITION - Friedrichshafen, Germany. Coach trip organised by Ernie, G4LUE, 01226 716 339 or 07787 546 515,

RALLIES & EVENTS CONTINUED ON PAGE 72

GB calls

These callsigns are valid for use from the date given, but the period of operation may vary from 1 – 28 days before or after the event date. Operating details are provided in an abbreviated form as follows:
T = 160m; L = 80 or 40m; H = HF bands (30 – 10m); V = 6 and / or 4m; 2 = 2m; 7 = 70cm; S = satellite and P = packet. Please send operational details of your special event station to the *RadCom* office at least five weeks before publication.

1 Apr GB800HEL: Helston Charter 800. Helston, Cornwall. (G0RJH)
6 Apr GB0IMD: International Marconi Day. Alum Bay, Isle of Wight. TLHV2 (G0ZGN)
7 Apr GB25STD: 25th Anniversary of St.D.ARS. Brighton, East Sussex. LH2 (G3SEJ)
12 Apr GB0CCC: Camping & Caravanning Club. Glinton, Peterborough. LH (G0CWU)
GB8IRC: Internet Relay Chat. Preston, Lancs. V27P (G8XAN)
13 Apr GB0GRM: Griffithstown Railway Museum. Pontypool, Gwent. LH (GW4RIB)
16 Apr GB2KRC: Kilve Radio Communication. Kilve, Somerset. LH27S (G4JBH)
20 Apr GB2AP: Alexandra Palace. Wood Green, London. LH (G0SWY)
21 Apr GB0MD: Marconi Day. Rochester, Kent. TLH (G3UXH)
GB4JAM: Jameson Connection. Cowes, Isle of Wight. LHV2 (G4SIQ)
GB4MBP: Marconi Bass Point. The Lizard, Cornwall. LH (G3MRT)
23 Apr GB4YOU: Youlbury Scout & Guide Radio. Boars Hill, Oxford. TLH27P (G0RJX)
GB4YOU: Youlbury Scout & Guide Radio. Boars Hill, Oxford. TLH27P (G0REL)
27 Apr GB2DD: HMS Ganges. Lowestoft, Suffolk. (G3DID)
29 Apr GB4SAM: Samuel Morse. Fallin, Nr. Stirling. TLH27 (GM4HYF)
GB60ATC: Air Training Corps. Matlock, Derbyshire. TLHV27PS (G3YBO)
GB800HEL: Helston Charter 800. Helston, Cornwall. (G0RJH)

OBITUARIES

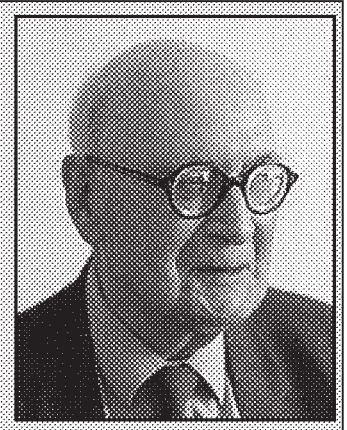
GEORGE JESSOP, G6JP

GEORGE JESSOP, G6JP, died on 11 February at the age of 93. He joined the Radio Society of Great Britain in 1929 and was first elected to the Council of the Society in 1968. He served for 17 years on the Technical and Publications Committee and was President in 1974. He became General Manager and Secretary from 1975 to 1977.

He was the author of many articles and books, notably the RSGB *VHF/UHF Manual* and the *Radio Data Reference Book*, both of which went to many editions, he also contributed to the *Radio Communication Handbook*. His latest book, written with Barry Vyse, *The Saga of Marconi Osram Valve*, has only recently been published.

His contribution to the work of the Society was incalculable, in recognition of which he was made a Vice-President in 1991. Despite poor eyesight, he served as the RSGB Historian until his death.

As a member of the British Institute of Radio Engineers (now part of the Institution of Electrical Engineers), he served on one of the British Standards Institute Technical Committees and was the United Kingdom delegate in his specialist field of valve technology. In 1934, on his own initiative he was responsible for conducting the first air-to-air VHF radio transmissions in the United Kingdom and, as a result, can truly be described as the father of airborne VHF radio communication - a facility much taken for granted by today's airline and military aircrews. These experiments received widespread national publicity at the time. He also demonstrated the practicality of using VHF radio transmitters in gliders. When these



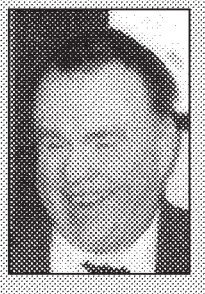
experiments were conducted, the radio systems were at the forefront of contemporary radio technology and experimentation.

His early technical education was at the Regent Street Polytechnic, after which he joined the MO Valve Company, where he remained until his retirement in 1971. During the war years he was seconded to the General Electric Company, where he was responsible for the design and production of radio transmitting valves for use by His Majesty's forces.

The Society offers its sincere condolences to his family at this sad time. The funeral took place on 16 February in Old Windsor.

ROGER JONES, G3YMK

ROGER WAS ALTOGETHER an exceptional character. He started his career in the ITA as a Junior Engineer in Training in 1970 based at the Durris transmitter site near Aberdeen. He travelled round the country as his career progressed, even returning to Durris some years later as the Chief Engineer! Indeed his frequent moves became legend, and with each move he entered the local amateur fraternity, contributed wherever he could, and made a large network of contacts as a result. Wherever he stayed he eagerly joined in with whatever amateur radio activity was going at the time, and was involved in several repeater projects around the country. Roger always entered into things with great enthusiasm; in 1981, he and G3CTI ran Morse practice classes in the public library in Biggin Hill, Kent. He was noted for his encouragement and dedication, and was never patronising when dealing with beginners. His Morse practice group soon grew into the Biggin Hill Amateur Radio Club, closely followed by the formation of a local repeater group.



Eventually, Roger's early retirement seemed to be getting into full swing. He rejoined the RSGB Repeater Management Committee as publicity officer in 1998 and became zonal manager for Zone D the following year. Despite seeming to have enough to do, he also took on the task of committee secretary. As if all this was not enough, Roger also attended rallies across the country, producing presentations and attending club meetings to give talks on repeater matters. He attended every RA / RSGB RMC liaison meeting held in the last two years. Roger contributed sections on speech repeaters and ATV in the current *RSGB Yearbook* and he had recently started a bimonthly 'Repeaters' column to add to his ATV column in *RadCom*. His work on behalf of the RSGB and the Repeater Management Committee will be missed by all.

SILENT KEYS

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

2W1FOZ	Mrs L Dimmock	07/01/01
EA7HCP	Mr C Spurrier	24/12/00
EI4FT	Mr J Bugg	15/01/01
G0ABR	Mr H Cooper-Bland	11/00
G0ASB	Mr M J Wakeford	09/10/00
G0BIY	Mr S Dolphin	05/01/01
G0GYX	Mr P W Nixon	01/00
G0THE	Mr D J Plant	29/01/01
G0UIU	Mr J H Clifton	10/01/01
G0UZR	Mr J E Dibnah	12/12/00
G1XWW	Mr F A Cole	12/00
G2AQN	Mr C Renshaw	31/05/00
G2FMU	Mr M Jackson	23/11/00
G3BOT / CT1BDK	Mr A B Reeder	23/01/01
G3CMT	Mr A H Hooke	12/00
G3CMT	Mr A H Hooke	07/12/00
G3CQO	Mr G R Burch	26/01/01
G3FTP	Mr E Davis	31/01/01
G3GHY	Mr C T Smith	14/10/00
G3GRT	Mr E Taylor	05/02/01
G3HAB	Mr D J Black	30/12/00
G3HVI	Mr S Baskeyfield	
G3ID	Mr A Tupman	11/00
G3IPO	Mr H Henshaw	20/12/00
G3JUB	Mr S Turner	30/01/01
G3KPB	Mr S Moore	09/12/00
G3LZO	Mr J Thomas	08/00
G3NSG	Mr J Tyas	07/01/01
G3OKQ	Mr JHR Russell	03/01/01
G3XWZ	Mr F J Clarke	
G3YMK	Mr R Jones	16/02/01
G4AGJ	Mr C P Price	02/01/01
G4CZT	Mr HCA Turner	
G4DOW	Mr A C Chettle	23/12/00
G4EYQ	Mr E A Coward	09/01/01
G4HXI	Mr L P Mcguire	02/12/99
G4JNV	Mr J E Watson	18/12/00
G4KBO	Mr L Bateman	09/00
G4KUN	Mr A Hussey	
G4MUB	Mr H M Joy	
G4NUM	Mr E S Wain	10/01/01
G4OAJ	Mr S M Richards	22/11/00
G4SEB	Mr RCF Beaumont	16/10/00
G4UOJ	Mr R M Williams	
G4VQU	Mr A Lynham	12/00
G5AL	Mr A B May	23/01/01
G5KS	Mr A C Bevington	15/02/01
G6BDS	Mr H H Roberts	24/11/00
G6JP	Mr G Jessop	11/02/01
G7HBC	Mr D R Waldren	04/01/01
G8DAP	Mr M Capps	28/12/00
G8KYX	Mr A G Bond	
G8TAO	Mr P Davies	12/00
G8UKB	Mr F N Northwood	06/01/01
GI3HCP	Mr D Buckley	
GI4SGP	Mr R A Mehaffey	21/12/00
GI8NBW	Mr S A Robinson	17/02/01
GM4NQT	Mr G G Miller	09/02/01
GW3JET	Mr CWC Richards	07/12/00
GW3SON	Mr L A France	17/01/01
GW4WAN	Mr E Williams	30/12/00
M1BWD	Mr B J Brain	
M1DFR	Mr O V Readman	20/01/01
RS10068	Mr P Feesey	06/11/00
RS173912	Mr W L Hampson	
RS22122	Mr W G Phillips	01/01
RS26027	Mr P J Marshall	
SU1AH	Mr A Hasan	
VE3DDR	Mr D Ratcliffe	15/02/01

Don't miss the RSGB Spring Show - Bletchley 7/8 April!

Regular Feature

Regional and Club News

SCARF - the Southern Counties Amateur Radio Forum

An idea to regenerate interest in radio clubs on a regional basis, by Brian Kendal, G3GDU

IN EARLY 1999, a group of West Sussex radio amateurs got together to discuss the fortunes of their respective clubs. It became clear that the problems were very similar: falling membership and average age of club members rising, despite initiatives such as the Novice licence. Computer games, the Internet and cellphones often prove a greater attraction than amateur radio to younger generations who see nothing magic in talking to friends over great distances.

It was agreed that, at the very least, without an interesting club programme there was little hope of retaining the interest of current members, much less attracting new ones. Contests, field days, visits and talks on radio subjects all played a part, but a common theme was the increasing difficulty of finding members to organise them. Even when an interesting talk was arranged it was all too often the case that few members turned up to hear it, disappointing a speaker who might have had to travel some considerable distance and discouraging him from doing so again. To avoid these problems needed a greater number of active members but if, as seemed likely, individual club membership was not going to rise much, if at all, the only solution was for clubs to co-operate on a larger scale than before. In this way, larger audiences would attract good speakers and better support could be given to other events. However, it was not proposed that individual clubs should lose their identity in some larger organisation. Many members had great loyalty to their local club and would not welcome this.

Following this, in July 1999 Brian Kendal, G3GDU, the originator of the initial meeting, called a more formal meeting of five local clubs (Crawley ARC, Dorking DRS, Horsham ARC, Mid Sussex ARS and Reigate ATS) which took place on 31 August 1999 at the Crawley club room. The object of this meeting was to adopt guidelines for co-operation, which became:

- The formation of an 'umbrella' organisation to be called the 'Southern Counties Amateur Radio Forum' (SCARF).
- The purposes of SCARF would be to provide for the exchange of information; the organisation of joint meetings and the encouragement of collaboration and co-operation between members.
- For a brief period (now expired) while SCARF found its feet, membership would be limited to the founder clubs, after which other clubs in the area would be welcome to join in.
- The Forum would not in any way interfere with the internal business or other arrangements of its members.

During 2000, quarterly meetings attended by two or three representatives of each club and chaired by each club in turn were held to enable SCARF to see the way forward. They were most successful; inter-club visiting has increased, the pool of speakers has been expanded and coach trips to places of interest now include members from several clubs. Newsletters and club programmes are distributed among forum members.

Now that we are more sure of our direction the limitation on membership has been lifted and we have welcomed the Kingston and Worthing clubs into the fold with three other clubs currently showing interest.

We intend to put on a major SCARF display at the Aircraft and Historic Vehicles Open Days on 23 / 24 June 2001. This will take place at Vallance Byways which is located on the Charlwood / Gatwick road near Gatwick Airport. There we will be operating HF and VHF stations demonstrating ATV, slow scan and packet.

For the future, we believe that the inter-club co-operation typified by SCARF can be a powerful tool towards revitalising amateur radio. However, we also feel that if SCARF, or any similar forum, grew too large there would be a danger of it defeating its own objectives through becoming too monolithic and losing the 'club' atmosphere. We believe similar forums might with benefit be set up in other areas.

SCARF has now been in operation since mid-1999 and all participating clubs agree that the venture has been well worthwhile. We commend the idea to others and offer our experience to those thinking of travelling the same route.

RALLIES & EVENTS CONTINUED

1 JULY 2001

YORK RADIO CLUB 11th Radio Rally - Pat, G0DRF, 01904 628 036 or pat.trask@lineone.net

5 - 8 JULY 2001

FINNISH RADIO AMATEUR LEAGUE Annual Summer Camp - http://oh8ta.oulu.fi/hietahami/en/ or e-mail hietahami@sik.oulu.fi

8 JULY 2001

SUSSEX Amateur Radio & Computer Fair - Ron, G8VEH, 01903 763 978 or 01273 417 756 (office hours).

14 JULY 2001

CORNISH RAC Radio Rally & Computer Fair - Robin, 01209 820 118.

15 JULY 2001

HULL & DARS 8th Humber Bridge Radio Rally - Phil, M1BLO, 01482 879 396 or John, M1ESA, 01482 838 560.

McMICHAEL RALLY & Car Boot Sale - Dave, G4XDU, 01628 625 720 or g4xdu@amsat.org Web site http://go.to/mcmichaelrally

27 - 29 JULY 2001

AMSAT-UK COLLOQUIUM - www.uk.amsat.org/colloquium.htm

29 JULY 2001

COLCHESTER AMATEUR RADIO SOCIETY 33rd Annual Radio Rally & Computer Fair - Richard, 01376 571 239 (evenings) or www.g3co.ccom.co.uk

RUGBY ATS Annual Rally - Peter, G0JEW, 01455 552 449 (eve) or e-mail rally@g0jew.fsnet.co.uk

5 - 10 AUGUST 2001

NORTH WALES RRC DXpedition to Bardsey Island - Edward, GW0DSJ, 01745 336 939. Web page www.nwrrcw.org.uk

10 AUGUST 2001

COCKENZIE & PORT SETON ARC 8th Annual Radio Junk Night - Bob, GM4UYZ, 01875 811 723 or GM4UYZ@GB7EDN or e-mail bob.gm4uyz@btinternet.com

12 AUGUST 2001

KING'S LYNN ARC 12th Great Eastern Radio & Computer Fair - Derk, G0MQL, 01553 841 189, e-mail Derk.Fraklin@tesco.net or Fred, G0KZI, 01760 440 570.

26 AUGUST 2001

TORBAY ARS Mobile Rally - John, G4VUD, 01626 205 514 or e-mail rally@tars.org.uk

2 SEPTEMBER 2001

TELFORD ARRG Telford Radio Rally - Bob, M0RJS, 01952 770 922 or e-mail bob@somrob.u-net.com or Don, 01743 873 815 or e-mail donfhm@ntlworld.com

9 SEPTEMBER 2001

LINCOLN SWC Hamfest - John, G8VGF, 01522 525 760 or 07968 050 318.

21/22 SEPTEMBER 2001

LEICESTER Amateur Radio Show - Geoff, G4AFJ, 01455 823 344, fax 01455 828 273 or e-mail g4afj@argonet.co.uk

12 - 14 OCTOBER 2001

RSGB International HF and IOTA Convention HFC 2001 - RSGB, 0780 904 7373.

WACRAL 2001 Conference - G4EZU, QTHR, 01474 533 686.

13 OCTOBER 2001

THE G QRP CLUB MINI-CONVENTION - George, G3RJV, g3rjv@gqrp.com

14 OCTOBER 2001

NORTH WAKEFIELD RC 18th Amateur Radio & Computer Rally - 01924 824 451 or www.nwrc.mcmail.com

21 OCTOBER 2001

BLACKWOOD & DARS Radio, Computer and Electronics Rally - Dave, GW4HBK, 01495 228 516 (eve).

28 OCTOBER 2001

GALASHIELS & DARS Annual Rally - Jim, GM7LUN, 01896 850 245 or e-mail jimk@gm7lun.freeserve.co.uk

3/4 NOVEMBER 2001

NORTH WALES RRC Rally 2001 - Muriel, GW7NFY, 01745 591 704 or www.nwrrcw.org.uk

6/7 NOVEMBER 2001

LOW POWER RADIO ASSOCIATION Radio Solutions 2001 - 01422 886 463 or www.lpra.org or e-mail info@lpra.org

18 NOVEMBER 2001

WEST MANCHESTER RC Red Rose Rally - Don, G3BSA, phone/fax 01942 871 620 or e-mail don@g3bsa.freeserve.co.uk

25 NOVEMBER 2001

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

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.

Club NEWS

Scotland West and the Islands Region

PAISLEY (YMCA) ARC
4, Home brew your own gear. 18, 'TVI, or is it EMC?'. Jim, GM3UWX, 01505 862 817.

Scotland East and the Highlands Region

ABERDEEN ARS
6, Junk sale. Robert, 01224 896 142.

COCKENZIE & PORT SETON ARC
6, Normal club night. 20, Ten Pin Bowling night. Bob, GM4UYZ, 01875 811 723.

LOTHIANS RS
11, 'Operating from Antartica', David Burke, VP8AQA. John, GM7REG.

North West Region

EAST LANCS PACKET GROUP AND NORTH WEST REPEATER GROUP
19, Surplus equipment sale. Andrew, G3INL, 01200 424482.

MID CHESHIRE ARS
4, Activity night. Niall, G0VOK, 01606 871 413.

STOCKPORT RADIO SOCIETY
11, Slide show, Gerry Jarvis, G0WGJ; 25, TBA. David, M1ANT, 0161 4567 832.

THORNTON CLEVELEYS ARS
2, Digital photography, G4BVW and G4FRK; 9, Packet update, M1ATV; 23, On air; 30, LF antennas, G3ZRZ. Jack, G4BFH, e-mail: jack@duddington.fsnet.co.uk

WARRINGTON ARC
3, Topband antennas, Jim, G3NFB; 10, Book auction; 17, Construction of the PicATUne, Bill, G0PZP and John, G0RPG; 24, Discussion evening. John, G0RPG, 01925 762722.

WIDNES & RUNCORN ARC
4, Quiz night; 18, Ten Pin Bowling at Ellesmere Port. Martin, G4LUQ, 01928 714 843 or Dave, G1PIX, 01928 591 401.

North East Region

GOOLE RES
6, Fund-raising night at the Barnes Wallis Inn; 13, Good Friday pie and pea supper at the Barnes Wallis Inn; 20, Treasure hunt; 27, Talk at the Courtyard Centre. Richard, G0GLZ, 07867 862 169.

GRIMSBY ARS
5, Construction night; 19, UHF/VHF night on the air. Brian, G4DXB.

HALIFAX & DARS
17, 'The Lowdown on Cave Radio', John Hey, G3TDZ. Ray, G0PMU, 01274 600 297.

HAMBLETON ARS
4, 18, On air. John, G0VXH, 01845 537 547.

KEIGHLEY ARS
5, On air G0KRS / G7KRC; 19, Used equipment auction; 26, Talk, demo & video by Marc, 2E1EGV (aged 12) simple kit construction. Ian, M1BGY, 01274 723951.

WAKEFIELD & DARS
3, Junk sale; 10, On air; 17, 'Commercial airline pilot's licence', Ray, G3VTD; 24, Cheese & wine evening. John, G7JTH, 01924 251 822.

Midlands Region

ALDRIDGE AND BARR BEACON ARC
29, Annual sale. Charles, G0NOL, 01922 636162.

BROMSGROVE ARS
10, Check out the DF gear. 24 DF hunt 1 (not too difficult to start with!) Angus, G8DEC, 01257 875 573.

CAMBRIDGE & DARC
6, Checking your frequency, Clive, M0CHH; 13, 'The day the world held its breath' (Apollo 13), Mike, M0BLP, and Steve, G4WSZ; 20, Project: GDO/frequency counter, Mike, M0BLP. Bob, G0GVZ, 01223 413401.

CHELTENHAM ARA
6, APRS, Graham, G4FUJ, and Dave, G4GVZ. Derek Thom, G3NKS, 01242 241099.

GLOUCESTER AR & ES
2, Construction contest; 9, Talk and demonstration: time domain reflectometry, pt 2; 16, On air: VHF /P from escarpment site; 23, On air 160 / 80m; 28, Caravan tidy-up. Tony, 01452 618 930, office hours only.

KIDDERMINSTER & DARS
3, Visit and talk by RSGB General Manager Peter Kirby, G0TWW. Tony Saunders, G1OZB, 01299 400172.

LEICESTER RS AND COMPUTER CLUB.
2, Construction Contest; 9, 16, Activities HF, VHF and Computers; 23, Quarterly progress meeting. Stan, G3HYH, 0116 2242598.

LINCOLN SHORT WAVE CLUB
4, G5FZ on air; 18, Video presentation: 'Bletchley'. John, G1TSL, 01522 793 751.

LOUGHBOROUGH & DARC
3, Computer night - radio software; 10, Back to basics: the tools of electronics; 17, First DF of the year, 2m; 24, Electricity, the other side. Chris, G1ETZ, 01509 504 319.

MAXPAK (MIDLANDS AX25 PACKET RADIO GROUP)
3, AGM. Ron, M0LRD, 01922 684 496.

MELTON MOWBRAY ARS
20, 'Addressing the subject of Aerials', John Metcalf, G4YSP. G A Griffiths, G3STG, 01664 480733.

MID-WARWICKSHIRE ARS
10, Equipment and book sale; 24, Questions and answers evening. Bernard, M1AUK, 01926 420 913.

RAF WADDINGTON ARC
5, Morse training; 12, HF wire aerials, G3VCA; 19, 26, Morse training. Bob, G3VCA/G0RAF, 01522 528708.

SALOP ARS
5, Old radios, Ben Nock, G4BXD; 19, Construction evening. Di, 01743 341 654.

SHEFFORD AND DARS
6, The spring grand junk sale; 26, 5 / 12WPM Morse Tests. Mike Carrington, G8BEG, 01438 342013.

SOUTH NORMANTON, ALFRETON & DARC
2, IOTA; 9, Fast scan TV; 16, On air; 23, DF 'foxhunt'; 30, On air at Middleton Top. Dave, M5RST.

STOURBRIDGE & DRS
9, Main meeting (note: not the third Monday). Tom Edwards, M1ESN, 01384 374 902.

STRATFORD UPON AVON & DRS
9, Visit Fire & Rescue services comms centre; 23, AGM. David, G6FEO, 07970 148 204.

TELFORD & DARS
4, On the air; 11, 'A Pacific Crossing', John Layton, G4AAL; 18, Public events/demo stations organisation; 25, Radio books / documents old and new, Allen Sundry. What have you got? Mike, G3JKX, 01952 299 677.

North Wales Region

DRAGON ARC
2, Discussion to include forthcoming special events; 16, Surplus sale. Stewart, GW0ETF, 01248 362229.

NORTH WALES RADIO RALLY CLUB
26, Quad antennas, John Parry, GW3WC. Ted, GW0DSJ, 01745 336939, or e-mail: edward@shipton.greatxscape.net

South Wales Region

BARRY ARS
3, 10, 17, On air; 24, Annual dinner, all welcome. Rich, GW4BVJ, 01656 658830.

Northern Ireland Region

BANGOR & DARS
4, Constructors' contest and talk on construction by Crawford, GI0EZD. Mike, GI4XSF, 028 4277 2383.

London and Central Region

BRACKNELL ARC
11, 136kHz from the suburban garden. Contact via e-mail: Baugh@compuserve.com

CHESHUNT & DARS
4, Junk sale; 7/8, RSGB Spring show & VHF Convention, Bletchley Leisure Centre; 18, Members' forum. John Crabbe, G3WFM, 01707 651532.

CRAY VALLEY RS
5, RF hazards, Chris, G0FDZ; 19, AGM; 28, Visit to GB2RN. Bob Treacher, BRS32525, 020 82657735 (after 8pm or weekends).

CRYSTAL PALACE & DRS
4, Testing and calibrating your GDO, construction class, computing and the Internet. Bob, G3OOU, 01737 552 170.

Don't miss the RSGB Spring Show - Bletchley 7/8 April!

DORKING & DISTRICT RS
24, Radio astronomy (TBC). John, G8SEQ, 024 76273190.
ECHELFORD ARS
12, 'The Hernia Cup', Inter-Club Quiz; 7 / 8, RSGB Spring Show & VHF Convention, Bletchley 2001; 21 / 22, London Amateur Radio & Computer Show, Alexandra Palace; 22, Yeovil QRP Convention; 26, ATV. Robin, G3TDR, 01784 456 513.
EDGWARE & DARS
12, Video evening. David, G5HY, 01923 655 284 (days), 020 8954 9180 (eves).
HODDESDON RC
10, The history of kites, Roy, G4UNL; 24, Open forum and Morse practice. Don, G3JNJ, 020 8292 3678.
MAIDENHEAD & DARC
5, Quiz vs Reading &DARC; 17, Windsor and Maidenhead emergency planning. John, G3TWG, 01628 525 275.
NEWBURY AND DARS
25, Repeaters (TBC). Mark Slade, M0CUK, 01635 36444.
RADIO SOCIETY OF HARROW
20, Special event station to mark St George's Day; 27, Club annual dinner. Jim Ballard, G0AOT, 01895 476933/020 7 2786421.
READING & DARC
12, Video on demand / concurrent, Chris Keen. Pete, G8FRC, 0118 969 5697.
SILVERTHORN RC
20, Construction contest; 28, On air. David, G0KHC, 020 8504 2831.
SURREY RCC
2, AGM. Berni, G8TB, 020 8660 7517.
VERULAM ARC
23, The work of the RA, Trevor Cullimore. Walter, G3PMF, 01923 262 180.

South & South East Region

ANDOVER RC
3, The Internet gateway, G0AMO; 17, Semiconductors pt 3, G8ALR; 29, First spring boot sale at Wildhern. Terry, M0BVO, 01980 629346 (eves).

Region	RSGB Regional Manager
Scotland West & the Islands Region	John Martindale, GM4VPA
Scotland East & the Highlands Region	Tommy Menzies, GM1GEQ
North West Region	Kath Wilson, M1CNY
North East Region	Peter R Sheppard, G4EJP
Midlands Region	John Layton, G4AAL
North Wales Region	Vacant
South Wales Region	Simon Lloyd Hughes, GW0NVN
Northern Ireland Region	Jeff Smith, MI0AEX
London & Central Region	Roger Piper, G3MEH
South & South East Region	Ivan Rosevear, G3GKC
South West & Channel Islands Region	Richard Atterbury, G4NQI
East & East Anglia Region	Vacant

RSGB Regional Managers (as of 8 March).

CROWBOROUGH & DARS
26, Surplus equipment sale. Margaret, G6UIF, 01892 663666.
FAREHAM & DARS
4, Club station on air; 11, Rebuilding & refurbishing RA17s the right way, Colin, G7MTA; 18, 25, Project building night. Steve, G7HEP, 01329 663673.
FARNBOROUGH & DARS
25, Chairman's challenge prize-giving, John G3KND. Norman, G0VYR, 01483 835320.
HASTINGS E & RC
18, First equipment auction / surplus sale of 2001. R C Gornall, G7DME, 01424 444 466.
HORNDEAN & DARC
3, Social evening; 24, UFOs, Ted Richards. Stuart, G0FYX, 023 9247 2846.
HORSHAM ARC
5, 'The Internet and what to do with it', Enrico Tedeschi. David, G4JHI, 01403 750 228.
MID SUSSEX ARS
19, Surplus equipment sale; 27, On air plus table-top sale. Sue, G6YPY, 01273 845103.
QRZ AMATEUR RADIO GROUP OF SUSSEX
6, 'Valve development: the early years, Dr Barry Vyse; 7 / 8, Eastbourne 'Mayor's Weekend' station; 18, World Amateur Radio Day special event station; 20, Club project evening. Stuart Constable, M0CHW, tel: 01435 863020.
SOLENT CLUB FOR AR & TV
3, Making a video, Mike, G8LES. at the British Legion, Park Gate, Southampton. Roy, G8CKN.
SOUTHDOWN ARS
31 Mar / 1 Apr Eastbourne Mayor's open weekend; 2, Annual surplus equipment sale. Glynn, M0CHO, 01323 765 731.
WATERSIDE (NEW FOREST) ARS
3, AGM. A Horton, G0LKG, 02380 844316.
WORTHING & DARC
4, ATV; 11, Discussion evening; 18, Aerial construction, G0ECW; 25, Discussion evening. Roy, G4GPX, 01903 753 893.

South West & Channel Islands Region

BLACKMORE VALE ARS
3, VHF on air & CW classes; 10, AGM; 17, HF on air & CW classes; 24, Shack tidy. Tony, G0GFL, 01258 860741.
CORNISH RAC
5, AGM; 9, Computer Section: Clive on Word Processors; 21, International Marconi Day. Robin, G0MYR, 01209 820118.
NORTH BRISTOL ARC
20, VHF shack evening: try out 50MHz antenna; 27, Checking generator & field day gear. John, G3IZM.
POOLE RS
6, AGM; 20, Construction; 22, Yeovil QRP Convention. Phil, G0KKL, 01202 700 903.
SOUTH BRISTOL ARC
4, Horticultural evening, Mrs Susan Grace; 11, Wine & cheese tasting evening, Muriel, G4YZR; 18, On air; 25, Shack instrument tutorial by Len, G4RZY. Len, G4RZY, 01275 834282.
SOUTH DORSET RS
3, AGM. John, M0BQO, 01305 832057.
TAUNTON & DARC
6, Station operating; 20, Skittles evening at the Catherine Wheel, Hemyock. Peter, G0EYR.
TROWBRIDGE & DARC
4, Life as a QE2 radio operator, Phil Williams, G3YPQ. Ian, G0GRI, 01225 864698.
WEST SOMERSET ARC
3, AGM & construction contest. Alan, M0AOJ, 01643 707207.
YEOVIL ARC
5, Amateur radio, setting-up and starting; 12, 55th AGM; 19, Preparing for 17th QRP Convention; 21, QRP dinner; 22, QRP Convention. Roger, M1SAN, 01963 362934.

East & East Anglia Region

BRAINTREE & DARS
2, Construction contest; 16, 6m evening. Keith, M0CLO, 01376 347736.
CHELMSFORD ARS
3, Radio and Scouting, Chris Chapman, G0IPU; Packet, Clive Ward, G1EUC. David Bradley, M0BQC, 01245 602 838.
FELIXSTOWE & DARS
2, AGM; 30, Surprise visit. Paul, G4YQC, 01394 273507.
GREAT YARMOUTH RC
27 Junk sale & operating. Tony, G3NHU, 01493 721173.
HARWICH ARIG
11, 'Public Safety Radio', Malcolm, G4CXT. Eugene, G4FTP, 01206 826 633.
IPSWICH RADIO CLUB
4, AGM; 18, Test equipment evening, G0OZS; 25, Morse practice, G4BAV. Keith, G7CIY, 01394 420226.
LEISTON ARC
3, 'The Life and times of Thomas Edison, John, G0FSP. John, G0FSP, 01728 604 621.
MAIDSTONE YMCA ARS
6, Junk sale; 13, Daytime antenna workshop; 20, RAE pre-examination night; 27, Rally organisation meeting. John, G0RHO, tel: 01622 832 259.
NORFOLK ARC
4, AGM and presentation of trophies; 11, CW practice; 18, NFD/ weekend events briefing, Steve, G7VRK; 25, CW practice; 28 / 29, Kite weekend at NFD site, Steve, G7VRK. John, G0VZD, 01953 604769.

Items for club news should be sent to the *RadCom* Office at HQ to arrive by the 26th of the month, ie approximately a month before publication (eg 26 January for the March issue). News items should be sent in writing (fax, letter or e-mail gb2rs@rsgb.org.uk) by the club secretary or the person responsible for publicity. Post cards for this purpose are available from RSGB HQ. A database of all meetings is shared between *RadCom* and GB2RS, so information only needs to be sent once.

Club News is a service for clubs and societies affiliated to the RSGB. The announcements are intended to notify non-members and potential members of your club of specific events, therefore 'informal', 'committee meeting', 'natter night' and 'ragchew evening' etc will only be included if space permits. Basic, unchanged details about RSGB-affiliated clubs are published annually in the *RSGB Yearbook*.

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3kW 1.8 - 30MHz "T" Match carr. £7.50

This standard "T" match design has a roller coaster coil for critical adjustment and a 4:1 balun to match balanced line. No matter what your antenna, this will give you a perfect match. Ideal for coax, end fed wires and open wire feeder. Features PEP or RMS power measurement (200 or 2kW max), VSWR, antenna switch, bypass, built-in dummy load (time restricted) 12v dial illumination etc. Size 270 x 375 x 115mm.

MFJ-986 ATU OUR PRICE £299.95

3kW Differential 1.8 - 30MHz carr. £7.50

This differential tuning design does away with one control, making it quick to adjust with just the roller coaster and the tune control. Rugged enough to cope with any amateur radio linear, it can be used with coax, end fed wire or balance line. You get PEP/RMS/VSWR metering, antenna switching, bypass etc. One of our most popular models, it measures 278 x 375 x 115mm.

MFJ-962D ATU OUR PRICE £239.95

1.8 - 30MHz 1.5kW "T" Match carr. £7.50

For use with medium linears. Using the famous "T" Match design, this ATU will cope with any antenna whether it be coax, end fed wire or balanced feed. You can monitor your power (average or PEP 200W or 2kW max))and VSWR. Antenna switch selector is included for two antennas. Size 270 x 375 x 115mm.

MFJ-949E ATU OUR PRICE £139.95

1.8 - 30MHz 300W "T" Match ATU carr. £6.00

Our most popular ATU because it covers all HF bands and matches anything from coax to long wire to balanced feed. Take a look at the price and then consider that it even includes a dummy load plus power and VSWR meter. Measuring 260 x 190 x 83mm, it really is great value.

MFJ-948 ATU OUR PRICE £119.95 carr. £6.00

The same as the MFJ-949 above, but without internal dummy load.

MFJ-969 ATU OUR PRICE £169.95

HF + 6m! 300W "T" Match ATU carr. £6.00

Here's the ATU for those who have an HF transceiver with 6m coverage. Now you can even use your HF antenna on 6m! This "T" Match design has a very accurate PEP meter built-in, though you'll need to install a PP3 battery to get optimum results. There's a built-in VSWR cross needle meter, dummy load and lovely roller coaster for critical adjustment. Size 268 x 242 x 95mm.

MFJ-1786 & 1788 Loops.

MFJ-1786 £349.95
MFJ-1788 £389.95
carr. £7.50

Here's the answer to those who have severe space problems. This loop antenna works as well as a full-size dipole but can be fitted in the smallest of situations. Model MFJ-1786 covers 10MHz - 30MHz and model MFJ-1788 covers 22MHz - 7.1MHz. Each one comers with remote tuning box. box. Maximum power is 100W. Loop diameter is 36 ins and can be mounted horizontal or vertical with the kit provided.

Remote tuning box.

MFJ-934 & MFJ-931 Artificial Grounds

OUR PRICE MFJ-934 £139.95
MFJ-931 £79.95 carr. £6.00

Removes RF hot spots and offers a true ground, even when operating upstairs.

If you operate upstairs or well away from an earth, you will know that trying to use an end fed long wire is a problem!

Now MFJ have solved the problem. With the MFJ-931, you just run out a random length of wire and connect it to the transceiver chassis via the MFJ-931. Then adjust as per instructions and you have guaranteed zero RF potential at the chassis and a good antenna earth. Can also be used with an external counterpoise. The MFJ-934 operates exactly the same but also includes a built-in HF ATU for wire, coax and balanced feed. Maximum power is 300W.

MFJ-941E HF 300W Budget ATU

Matches all types of antennas. OUR PRICE £89.95 carr. £6.00

At this price there is no excuse for not having an ATU and offering your transceiver a perfect match. Covering 1.8 - 30MHz, rated at 300W and having built-in VSWR and power meter. it will match wires, coax systems and balanced feed.

MFJ-418 *The easy way to learn CW*

OUR PRICE £69.95

Unlike other tutors, this one sends true text and full length QSOs, just like the real test. The massive database avoids frequent repeats too! Will also send groups and displays the text. carr. £2.00

MFJ-392 Mono Padded Communications Earphones

OUR PRICE £21.95
carr. £3.00

These are purpose designed communications padded headphones that are ideal for all the modern transceivers and receivers. Suits 3.5mm and 1/4" jacks - adaptor provided.

MFJ-616 Speech Intelligibility Enhancer

Designed to enhance the audio of your transceiver. MFJ President, Martin Jue suffers with deafness and said that this has put the enjoyment back into radio for him!

OUR PRICE £149.95
carr. £6.00

Hear Signals Better

Regular Feature

VHF/UHF

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

THE LIFT IN tropospheric propagation that was mentioned last month developed well and some good DX was worked. As this is being compiled towards the middle of February, the barometric pressure is steady at 1037mb over most of England, perhaps heralding some more good tropo?

All times are in UTC, ODX indicates best DX and QTHR signifies that the operator's address is in the current *RSGB Yearbook.* An asterisk (*) after a callsign denotes a CW contact, (EX), (GU) etc refers to the postcode area and (JN26), for example, is the Maidenhead grid reference.

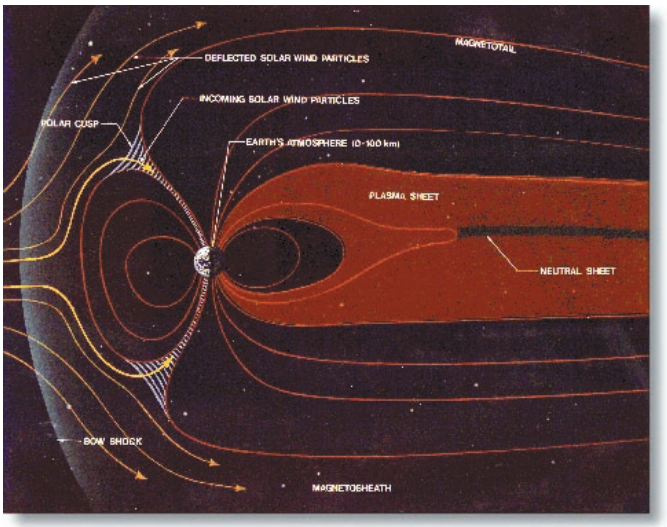
BAND PLANNING

SOME CONFUSION has arisen concerning the recommended frequencies in the VHF/UHF bands for PSK31 digital mode transmissions, due to the way these were printed in another magazine. To dispel any doubts the designated frequencies are 50.385MHz, 70.085MHz, 144.085MHz and 432.085MHz, all ±5kHz "and that's official" to quote Iain Philipps, G0RDI, Chairman of the RSGB Data Communications Committee.

RECORD KEEPING

REMI VAICIUS, LY2MW, is compiling lists of first QSOs from Lithuania on the VHF/UHF/SHF bands. He writes, "…now it is a bit difficult to find older information…" so he hopes that readers might be able to help him. To see what data he already has, look on his website - see the panel - and if you have any more input, contact him by e-mail at ly2mw@qsl.net

Ken Osborne, G4IGO (TA), has a comprehensive website - see the panel - and is searching, "…for info on firsts and history…". You can e-mail him at g4igo@freeuk.com and he is QTHR if you don't have Internet access.



A map of some of the major regions in our Earth's magnetosphere that scientists have identified. Source: NASA

NORDIC MEETING

DEREK GILBERT, G0NFA (GU), has passed on details of this year's Nordic VHF/UHF/SHF meeting in Sweden in the 8-10 June period. The venue is Gottskär on the Onsala peninsular, 35km south of Göteborg (JO67AJ). Accommodation will be in newly-built or rebuilt cabins and apartments. There are about 100 beds as well as camping possibilities with a separate installation including showers and sauna.

The programme will follow the traditional form with a welcome barbecue on the Friday evening, then lectures and demonstrations on the Saturday, followed by the 'Ham dinner'. More lectures and demos are planned for the Sunday as well as a guided tour to the Råö Space Observatory. There will be a bring-and-buy sale. The latest information can be found on the SK6YH website - see the panel.

PUBLICATION

THE FEBRUARY ISSUE of *The VHF Journal*, the monthly publication of the Rochester VHF Group in New York, includes a very interesting article on the effects, if any, of microwave radiation on the human body. Working with microwave equipment, as many radio amateurs do, this topic is of considerable interest to us. It is a verbatim reprint of an article printed in the *New York Times* for 16 January.

Reporter Gina Kolata interviewed Dr Eleanor R Adair, PhD, who has been studying the effects of microwave radiation on living creatures since 1975. Her list of published papers occupies 11 pages and she is an acknowledged expert on the subject, having served on committees setting standards for microwave exposure. Asked at the end of the interview if further research should be done into the "...dangerous effects of microwaves on cells and human tissues?" she concluded that "…billions of dollars could be much better spent on other health problems, because there is really nothing there."

Tom Richmond, VE3IEY, edits *The VHF Journal* and the group's address is PO Box 92122, Rochester, NY 14692, USA.

PROPAGATION

THE FIRST NINE pages of the December 2000 issue of the *Six and Ten Report* are devoted to 10m topics. Steve Reed, G0AEV, compiled the 6m data and he reports propagation between the UK and W/VE on 19 days in the month. There were also excellent single-hop openings to the Near East with F-layer skip distances as short as G to SV on the 19th.

The correspondingly good backscatter made it difficult to isolate Sporadic-E (Es) events. The month was rather quiet magnetically and weak auroras were noted on 7, 8, 17, 18, 22 and 23 December. Several contributors reported meteor scatter (MS) propagation, mostly in the Geminids shower.

Ted Collins, G4UPS (EX), and Arne Nilsson, SM7AED, have been conducting early morning skeds on an irregular basis for some years. The path is around 1,200km and the success rate has been quite good. Many QSOs are almost certainly achieved via MS mode but Ted also described, "…strong and constant signals that did not sound like MS…" raising the possibility of an elusive other mode.

G0AEV comments, "FAI (field aligned irregularity) is clearly a non-starter, but some form of ionospheric scatter has appeal, especially as the path currently just supports direct F-layer skip at 28MHz". He rules out tropo mode since in these tests, "…there is no apparent correlation with weather systems and certainly not the weather needed to support ducts".

6m DXers in the USA have proved that scatter is a reliable mode for weak signal DX in the summer. I would suggest that, provided that high ERPs are used, ionospheric scatter could be the

most likely mode for the G4UPS/SM7AED path.

There are the regular pages of solar and geomagnetic data and reports from 6m operators from near and far. The *Report* is an activity of the RSGB's propagation Studies Committee (PSC), 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 daily solar data for the 30-day period from 14 January reveals that the 2.8GHz radio flux was very constant. The maximum was 176 at the beginning and the minimum was 145 by 12 February, the average working out at 161.6 units, 11.5% down on that for the previous 30 days. 41 new sunspot regions were recorded but their areas were much smaller than last month's, averaging at 557 millionths of the Sun's visible disc. These data came from the NOAA's SEC website - see the panel.

METEOR SCATTER

THE LYRIDS SHOWER should peak around 1430-1600 on 22 April although it has a broad peak. The expected zenithal hourly rate (ZHR) is 15 and the radiant only drops below a mid-UK horizon for about four hours from 1430. By now I imagine all serious MS operators will be using software such as OH5IY's, so I will not bother to give best times information. There are no more reports about this year's Quadrantids shower.

MOONBOUNCE

IN THE DECEMBER 2000 'VHF/UHF' column I mentioned the experiments of SM5BSZ and others with low power EME communication using very narrow bandwidth techniques. In the February *432 and Above EME Newsletter*, edited by Allen Katz, K2UYH, he features what may be the first true DSP EME QSO completed by W7SZ and W7LHL on 9 January on 23cm.

Both stations were using software developed by W7PUA for his DSP-10 transceiver and they were frequency-locked to within 1Hz via a GPS-controlled standard. The program also corrected for Doppler effect. W7LHL was using 50W to a 10ft dish and Larry was using similar power to a 12ft dish.

They exchanged calls, grids and 'Rogers', all in text form. Larry says, "This system is currently in beta test. It shows promise for QSOs at much lower power levels than used during this test - well below the threshold of human hearing. However, both stations must use the same system."

On 5 January Peter Blair, G3LTF (IO91), completed on 70cm with EA3DXU* and DL9NDD* and next day with JH1XUJ*, JH4JLV* and UA3PTW*. Then on 23cm he worked ZS6AXT*, G3LQR, IK2MBB*, OZ6OL*, SM2CEW*, W2UHI*, G4CCH*, KA0Y* for initial #170, HB9Q*, K0YW*, K5JL* and VE6NA* (#171). 7 January on 23cm brought completions with DL6LAU, G4CCH, F5PL*, GW3XYW, SM6CKU*, F1PYR*, VE6TA*, K5JL* and K0YW*, with several others heard. On 70cm he worked G4ERG* and UT3LL*.

On 23cm on 6 January Howard Ling, G4CCH (IO93), completed with K5JL - "a nice CW practice session" - W5LUA* and W2UHI*. Six other North Americans were called with no reply (CWNR).

David Hilton-Jones, G4YTL (IO92), now runs his legal limit on 2m to four 5-wavelength DJ9BV Yagis. Back in November last year, a QSO with VP2MIS brought his 80th DXCC country on all modes, while on EME he has 237 initials in 50 countries. All but four of his 511 grids worked are confirmed.

He is running his legal limit on 70cm to six 11-wavelength DJ9BVs and is now up to 41 initials in 18 countries. He is very pleased with the IC-746 he has been using for a year on 2m as it is very easy to split the transmit and receive frequencies, essential for EME operation. When operating on 70cm he transverts from 28MHz using the IC-746.

Roy Reed, G3ZIG (JO02), has been quite active on 2m working the regulars. His three new initials are SM2EKM, DK8ZG and HA0HO bringing his total to 249. He found Faraday rotation to have been quite a problem. In a recent sked with K9TI he got nothing from him but was copied OK in the USA.

Gabriel Sampol Duran, EA6VQ, has announced a new interactive website for 2m EME enthusiasts - see the panel. It features on-line updated information on skeds and station details. He says, "The site uses standard .SKD files that will be uploaded as soon as new versions are available, which means that it will be always updated with the newest sked information, thanks to the excellent job of VE7BQH and K2LME".

The second leg of the European Worldwide EME Contest is scheduled for the 28/29 April weekend, the bands being 144MHz, 1.3GHz and 10GHz: the full rules are in *DUBUS*, issue 4/2000. The VK3UM program calculates that London latitude stations will have 31.5 hours of moon time. The declination varies from +23.19° at the start, through a maximum of +23.27° to +21.98° at the end. The sky temperature at 144MHz varies from 473K to 254K and the signal degradation ranges from -0.22dB to -0.04dB, referred to perigee.

USEFUL WORLDWIDE WEB SITES

LY firsts	http://aix.fei.lt/firstqso.html
G4IGO	www.g4igo.freeuk.com
Nordic meeting	www.sk6yh.org
Daily solar data	gopher://solar.sec.noaa.gov/00/latest/DSD
2m EME	www.datosred.com/emeskeds

BAND REPORTS

50MHz

Ron Graham, VK4BRG, reports a QSO with H44NC, whose name is Norreid. He is a missionary located at Munda on New Georgia Island, which is towards the Bougainville end of the Solomon Islands group. He was running 15W to a dipole and is looking for more contacts. Thanks to Kim, OZ5IQ, for passing along this information.

Don Gardner, KC7JDC is now active (QRV) from Malawi as 7Q7DC (KH66RK). His QSL manager is G0AIS (QTHR). Tony Selmes, A45ZN, is now back in Oman after his Christmas break, but reports poor conditions. He monitors the band constantly but had only worked VR2LC and 7J6CCU up to the beginning of February. Thanks to Ted Collins, G4UPS (EX), for these items.

John Hunter, G3IMV (MK), also reports recent band conditions as uninteresting, so chased the massive D68C DXpeditionaries on the HF bands. Hopes of working them on 6m seemed remote. He has received direct QSLs for 6m from HC8N, VP2MJJ, EY8MM, 9E1C, E30TA, T88TU, XT2OW, JW/DL3NRV, JX7DFA, UN3G, ZD8SIX, ZR1TRD and VK6DIR, but not from S92DX up to 13 February.

G4UPS's morning QSO with SM7AED* was longer than usual on 22 January when they realised there was Es propagation. Beacon SR2SIX was S7 for 20min from 0842 and later QSOs were completed with S51UF (JN76) and IW2JMC (JN45) until fade-out at 0951.

Next morning, Ted contacted SP2MKO (JO93) and SR2SIX peaked to S8. 9H1AW (JM75) was worked in the morning of the 24th. On 11 February at 1139 3C5I was heard at S4 on 50.110MHz and was heard working a G in IO80. At 1213 TR8XX* was copied at S4 in a short burst. The 3C5I keyer was copied on 50.096MHz peaking to S6 between 1230 and 1300.

Jamie Ashford, GW7SMV (NP), worked five OHs on 16 January. On the 22nd he completed QSOs with SP8BTJ, SP8DWI, SP9EYX, S51UF, HB9AID, IW1AZJ, I2YSB, IW2JMC and IZ4AIK. No F_2 DX was heard.

70MHz

G4YTL reports little activity and David's only recent addition to his grid tally was S51DI during Es last summer. He thinks it a pity that more GM, GI and EI stations don't experiment with MS on SSB mode. So how about setting up some skeds with him?

144MHz

Bill Harrison, M0BTZ (GU), has found the band rather quiet of late. On 13 January he worked ON4CGP (JO20) in what is a

81

CONTEST

TIM KIRBY, G4VXE
11a Vansittart Road,
Windsor SL4 5BZ
E-mail:tim@ukgateway.net

VERY MANY thanks to those of you who take the trouble to write with news and views. Your e-mails and letters are always appreciated.

This month, a very interesting and thoughtful e-mail arrived from Richard, G3CWI, who makes some very interesting points. Let's have Richard take up the story.

"While contests certainly have their place in our hobby, a constant complaint of the non-contesters is that there are too many of them. I'm beginning to think that they might have a point - and February's *RadCom* tends to support that. In your column, the results of 6 contests are reported. They make very revealing reading.

"The 70MHz CW contest attracted just eight entries in three separate sections. It would have been possible to have come second in two sections with just a single QSO! The report states that only 28 stations appeared in the contest logs (the highest number of QSOs was just 17). Is that really a viable contest?

Moving on to the 50MHz Backpacker, there were 13 entries in four sections. It's probably just about viable, but the number of sections surely needs an overhaul?

The 144MHz Backpacker was much better with over 30 entrants but, even here, one section attracted just four entrants.

The 70MHz Trophy looked to be in reasonable health, as did the Slow Speed CW. The 432MHz FM contest had just seven entrants - split into two sections.

"So, what is my point? There are too many poorly-supported contests. There should be a clear policy on when they are dropped. Perhaps any contest or section that gets less than 10 entrants for two years in a row should be stopped. Across the world there are many imaginative contests that get good support, FYBO and the Spartan Sprint (which is monthly) are examples. The contest committees need to be a little more adventurous in thinking of formats. Better co-operation with European societies might also help. In a couple of weeks I will be doing the 7MHz DX contest, which usually attracts the written comments "hard slog" and "in serious need of an overhaul". Do the contest committees not read the reports of their own contests? It certainly doesn't look like it. There have been some good ideas - the 144MHz Backpacker and the Restricted Sections of the 21/28 and 7MHz DX are examples. I suggest we need more *good* contests - not necessarily more contests".

In my view, Richard makes some first class points. It would be interesting to hear other reactions. It seems to me that there is considerable merit in the idea of having multiple sections in a contest, as it allows people with different types of station or times to devote to the contest, to be able to compete on something like a level playing field. This aim seems to be somewhat diluted, however, when there are very few stations in a section. How would you like to see this work? The contests committees, as always, would welcome your suggestions.

Arthur, GW4BYA, wrote and asked if it would be possible to print a calendar of all the major international HF contests in *RadCom*. I replied to him saying that I was somewhat reluctant to do this, because the information is readily available elsewhere – and because it takes a significant amount of room to include. Where is the information available? Try the WA7BNM calendar at www.hornucopia.com/contestcal/ or perhaps the SM3CER page at www.sk3bg.se/contest/ For ARRL contests, you can go to www.arrl.org/contests Details on where to find the rules for RSGB events is shown each month in the 'Contest Calendar' of *RadCom*.

23cm and 13cm Contests, September 2000

MOST ENTRANTS reported band conditions as 'average' for these contests. However, G6SPS reported that beacons on the Dutch coast were pinning the S-meter on his rig but there appeared to be very few stations active in that direction.

Congratulations to G4DEZ for winning the 23cm Single Operator Fixed Station section and to G8ZQB for winning the 13cm Single Operator Fixed Station section. G4LDR receives a 25W / Single Antenna certificate. Finally, congratulations to G6SPS/P for winning the Single Operator Others section on 23cm and 13cm.
Ian Pawson, G0FCT

1296MHz and 2320MHz Contests, 2000

23cm Single Operator Fixed

Pos	Call	Loc	QSOs	Score	Best DX	km	Pwr	Ant	Equipment
1 *	G4DEZ	JO01IN	27	4038	PA0ZM	411	110	4x55Y	IC1271E
2 *	G4BRK	IO91DP	26	3483	PA3DYS	448	40	67Y	FT290+DB6NT+TVTR +DL2AM PA
3	G3MEH	IO91QS	20	2985	PA0ZM	495	40	4x35Y	IC275+TVTR+LIN
4	M0GHZ	IO81VK	20	2742	PA0EHG	475	200	55Y	MM TVTR+2C39+2x2C39
5	G1OGY	JO01GR	22	2616	PA0ME	322	50	2x23Y	FT290R+TVTR+8533 PA
6	G8ZQB	IO92JN	19	2418	G3KTU	208	150	40Y	FT225+TVTR+2x3CX100
7	G0ODQ	IO91NQ	19	2136	PA0EHG	380	70	35Y	FT736+TLA1270-100
8 *	G4LDR	IO91EC	15	2131	PA0EHG	445	8	55Y	FT736
9	G4GFI	IO91VH	17	1703	PA0EHG	343	20	28Y	FT101+144 TVTR +MM1296+PA
10	G1EHF	IO91LH	11	978	G8EFU	155	15	23Y	TVTR+M57762 PA

23cm Single Operator Others

1 *	G6SPS/P	JO01IT	26	4114	PA0ZM	404	150	35+23Y	TS711+MM TVTR+2x2C39BA

13cm Single Operator Fixed

1 *	G8ZQB	IO92JN	6	680	G1JRU	190	25	60Y	FT480+TVTR+3CX100
2 *	M0GHZ	IO81VK	6	648	G6SPS/P	206	40	44Y	TVTR+2C39 PA
3	G4BRK	IO91DP	6	545	G6SPS/P	167	5	90cm d	FT290+DB6NT TVTR
4	G4LDR	IO91EC	5	494	G6SPS/P	180	1.5	66Y	DB6NT TVTR
5	G3MEH	IO91QS	4	380	M0GHZ	115	10	67Y	IC275+DB6NT TVTR

13cm Single Operator Others

1 *	G6SPS/P	JO01IT	7	1275	PE1PFW	276	40	25Y	FT290+SSB TVTR

432MHz Affiliated Societies Contest, 2000

Single Operator Fixed Station Section

Pos	Call	Zone	Points	QSO	Loc	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	2847	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	1758	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
27	G0TIB	B	397	11	82XJ	23el	40	G0ODQ	112
28	M0COP	B	351	8	92BK	17el	10	G3MEH	113
29	G7LTH	B	346	9	82XJ	23el	40	G0ODQ	112
30	M0BOV	C	279	9	91VI	12el	10	G8OHM/P	167

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 *	G3WHK	C	5907	63	91VH	24el	100	DF2VJ	556
3	G3OLX	C	4180	54	91VH	21el	25	G0WJR/P	300
4	G1WAC	B	3499	30	92BJ	21el	70	F4AOA	405

* certificate winners

432MHz Affiliated Societies Contest, 2000 - cont

Affiliated Societies Section

Pos	Club	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	Sutton & Cheam RS	C	G3WHK 5907	G3OLX 4092		M0BOV 279		10278
5	Stevenage DARS 'A'	C	G8DKK 4519	M1ECY 2847		G4ETG 1758		9124
6	West Kent ARS	C	G0GCI 8577					8577
7	Reigate ATS	C	G3YSX 3418	G8JXV 2688		G6GSF 900		7006
8	Colchester RA 'A'	C	2E1GUA 1820	G1OGY 1736		G7PLL 1330		4886
9	Wythall Radio Club	B	G1WAC 3499	G0EYO 403		M0COP 351		4253
10	Clifton ARS	C	G7ULL 3152					3152
11	Colchester RA 'B'	C	G3FIJ 1270	G7MHK 731				2001
12	Stevenage DARS 'B'	C	M1DDA 868					868
13	Harwell ARS	D	G3PIA 737					737

SSB Field Day 2000

MANY OF TODAY'S experienced DX chasers and contesters gained their initial knowledge taking part in a Field Day with their local radio club. The shared experiences of setting up a station, designing antenna systems suitable for the contact range required and organising and maintaining logging arrangements are all useful skills to develop to progress within the hobby. It is therefore most reassuring to see a continued increase in the number of participants in this year's SSB Field Day. Equally, it is pleasing to note a good cross-section of newly-licensed operators listed on the entry forms.

Band conditions followed much the same trend as recent years with good long distance propagation on 20m and 15m. The All-Asian contest provides some interesting DX contacts, whilst good operating skills come in handy when trying to convince non-Asian stations not taking part in Field Day that you need a contact for the multiplier. It is important to spend some time on 40m to work the G and European portables. For the Open section, a low dipole, say around 30-40ft, is useful for this, with maybe a simple quarter-wave vertical or sloper to pick up the DX multipliers. Most groups manage at least 150 contacts, though some seem to struggle, possibly due to the reduced band of just 60kHz. The only way to combat this is to get on the band at other times of the year and particularly during busy contest sessions. 80m is again useful for G and Eu portable contacts but mainly during the night.

The Leaders

Bristol Contest Group, G6YB/P**,** topped the Open section list yet again. They commented: "The excellent site take-off was our greatest asset. We are sure 20m was closed at some time for most stations, but we were able to work into North America all night. To quote one W7 "You're 10dB over S9 and we can only hear one other G who's running around S3"". In the Restricted section, Windmill Contest Group, G3GRS/P, were also winners yet again. With just 37 contacts separating the top four stations, the deciding factor became multipliers. Knowing where and when to look is the key and these guys certainly know how!

Rule Changes

From 2001, there is a minor change to the rules for the Open section, clarifying the use of a second receiver. It will now be permissible to use two radios as long as the transmitter section and any second receivers are disabled for the duration of the contest. This will increase interest, as other operators can now be involved in searching for multipliers. In reality, it just confirms what some groups have been doing already.

The Future

With this contest now maintaining a steady interest, and National Field Day, the long established CW event, showing a steady decline, maybe the time has come to consider merging the two events. There are several very positive outcomes that this could produce. Many groups look forward to participating in one of the events but find it difficult to compete in both. Coupled with this, those of us who have a long-standing commitment to NFD are convinced of the benefits of CW and this would be an ideal way to demonstrate this to newer operators. Two good examples of mixed-mode events are the RSGB IOTA contest in July and the ARRL 10m contest in December. It is certainly worth some discussion!

Chris Burbanks, G3SJJ

SSB Field Day, 2000

Open Section

Pos	Group	Call	3.5 Qs	3.5 Ms	7 Qs	7 Ms	14 Qs	14 Ms	21 Qs	21 Ms	28 Qs	28 Ms	QSOs	Points	Mults	Total	Errors	Final Score
1	Bristol CG	G6YB/P	134	18	165	36	845	73	435	68	67	38	1646	5675	233	1,322,275	107	1,297,344
2	Lichfield ARS	G3WAS/P	200	30	272	47	487	69	332	57	56	29	1347	4752	232	1,102,464	151	1,067,432
3	Port Talbot ARC	MW0AGE/P	128	13	169	27	622	55	154	43	82	35	1155	4101	173	709,473	67	697,882
4	Moray Firth ARC	GM3TKV/P	183	21	236	37	379	51	156	48	40	22	994	3795	179	679,305	158	651,023
5	East of Scotland CG	MM0BQI/P	153	17	230	34	576	54	217	44	10	7	1186	4078	156	636,168	56	627,432
6	South Notts ARC	G8DD/P	126	12	53	18	503	59	372	49	39	16	1093	3765	154	579,810	63	570,108
7	Mimram CG	M0ABC/P	161	13	185	25	408	48	117	26	66	21	937	3435	133	456,855	130	439,565
8	Ipswich RC	G4IRC/P	156	13	191	26	188	46	169	37	51	24	755	2893	146	422,378	181	395,952
9	Melton Mowbray ARS	G4FOX/P	155	17	182	23	224	36	218	37	32	15	811	2946	128	377,088	58	369,664
10	Horsham ARC	G4HRS/P	210	19	50	10	252	46	92	33	55	25	659	2587	133	344,071	35	339,416
11	North Wakefield RC	G4NOK/P	175	19	182	29	130	31	143	28	46	24	676	2611	131	342,041	12	340,469
12	Clifton ARS	G3GHN/P	149	11	49	12	283	54	150	25	89	23	720	2637	125	329,625	52	323,125
13	Hornsea ARC	G4EKT/P	201	20	171	21	149	30	99	33	29	16	649	2558	120	306,960	138	290,400
14	Banff & DARS	GM0PYC/P	110	12	138	21	227	38	101	26	43	17	619	2315	114	263,910	20	261,630
15	Edgware & DARS	G3ASR/P	184	15	163	21	181	37	46	21	23	11	597	2332	105	244,860	20	242,760
16	Surrey RCC	M0RCA/P	103	13	81	20	127	35	48	13	25	10	384	1550	91	141,050	9	140,231

Restricted Section

1	Windmill CG	G3GRS/P	177	23	183	29	138	40	115	50	43	24	656	2601	166	431,766	40	425,088
2	Stratford upon Avon	G0SOA/P	159	13	210	26	179	38	90	38	35	19	673	2733	134	366,222	72	356,532
3	Granta CG	M0CAM/P	177	18	175	27	157	42	85	32	42	18	636	2639	137	361,543	59	353,460
4	Cumbrian CC	G3IZD/P	216	19	165	22	192	39	51	27	39	20	663	2647	127	336,169	44	330,581
5	Wisbech AR & EC	M5ARC/P	191	16	195	24	114	30	166	31	35	17	701	2730	118	322,140	9	321,078
6	Stockport RS	G6UQ/P	150	13	121	24	200	39	96	35	23	11	590	2338	122	285,236	32	281,332
7	Queen Mary CG	G6QM/P	187	15	163	25	106	30	41	24	24	11	521	2147	105	225,435	67	218,400
8	Gloucester AR & ES	G4AYM/P	214	16	142	14	183	37	21	14	0	0	560	2201	81	178,281	58	173,583
9	RAFARS	G8FC/P	100	9	136	20	143	33	34	23	24	11	437	1807	96	173,472	55	168,192
10	Echelford ARS	G3UES/P	132	11	159	18	98	29	43	19	23	9	455	1875	86	161,250	39	157,896
11	Itchen Valley ARC	G0IVR/P	70	11	132	20	192	40	30	15	7	5	431	1720	91	156,520	21	154,609
12	Hereford ARS	G3YDD/P	119	14	91	19	57	23	52	25	38	19	357	1497	100	149,700	76	142,100
13	Havering & DARC	G4HRC/P	199	16	118	15	32	17	56	22	18	10	423	1714	80	137,120	33	134,480
14	South Downs	G3WQK/P	87	9	74	11	101	32	43	27	12	7	317	1309	86	112,574	22	110,682
15	Reading & DARC	M0EEE/P	122	11	124	16	74	23	7	5	14	6	341	1471	61	89,731	53	86,498
16	Stevenage & DARS	G3SAD/P	100	11	83	16	81	27	21	11	0	0	285	1274	65	82,810	12	82,030
17	Horndean & DARC	G4FBS/P	134	11	101	12	38	16	26	15	2	2	301	1325	56	74,200	28	72,632
18	West of Scotland ARS	GM4AGG/P	125	12	1	1	133	24	31	17	15	4	305	1192	58	69,136	52	66,120
19	Grimsby ARS	G3CNX/P	69	9	124	15	88	29	9	5	0	0	290	1182	58	68,556	81	63,858
20	North Norfolk ARG	G0NWT/P	26	4	94	16	78	31	38	11	4	3	240	963	65	62,595	74	57,785
21	Wigan-Douglas Valley	G3BPK/P	41	10	72	17	46	17	6	2	8	6	173	788	52	40,976	67	37,492
22	Lowestoft ARC	G3JRM/P	0	0	45	4	37	11	4	2	3	2	89	329	19	6,251	12	6,023

Ken, G3LVP, operates on 70MHz during VHF NFD 2000.

May 2000 UHF/SHF Contest Results

CONDITIONS WERE none too wonderful for the event this year, and entries were at a similar level to last year, although activity on the middle bands is definitely on the way up. There are even a few more stations getting equipped for 24GHz and even 47GHz. The general view, however, was that activity from the UK was pretty poor.

Congratulations to John Quarmby, G3XDY, who dominated all the bands which he entered, and pushed Steve Davies, G4KNZ/P, who was active on all bands to 24GHz down into second place. The Parallel Lines Contest Group once again put in a commanding performance, winning all bands to 24GHz, but congratulations to the South Birmingham Radio Society for grabbing the runner-up slot.

Andy Cook, G4PIQ

UHF/SHF, May 2000

Single Operator Overall Results

Pos	Call	Loc	432	1.3	2.3	3.4	5.7	10	24	47	Total
1 *	G3XDY	02OB	1000	1000	1000	0	0	1000	0	0	4000
2 *	G4KNZ/P	02TD	53	106	114	1000	1000	263	1000	0	3536
3	G6DER	93GN	497	308	431	551	223	41	0	0	2052
4	G4LRT	92LJ	68	82	47	505	270	89	0	0	1061
5 *	PE1EWR	11SL	248	313	251	0	0	0	0	0	812
6	G3MEH	91QS	577	0	0	0	0	0	0	0	577
7	G4AEQ	93PE	525	0	0	0	0	0	0	0	525
8	G4LDR	91EC	0	123	150	0	28	169	0	0	469
9	G3PHO/P	84KD	0	0	0	0	0	397	0	0	397
10	G1HIA	81QL	148	209	0	0	0	0	0	0	357
11	G6FQZ	91JR	274	0	0	0	0	0	0	0	274
12	GW1ATZ/P	83LC	240	0	0	0	0	0	0	0	240
13 *	2E1GUA	01FS	156	0	0	0	0	0	0	0	156
14	GM4WLL/P	85NR	154	0	0	0	0	0	0	0	154
15	G4HGI	83PL	145	0	0	0	0	0	0	0	145

Multi Operator Overall Results

Pos	Group	Loc	432	1.3	2.3	3.4	5.7	10	24	47	Total
1 *	Parallel Lines	01QD	1000	1000	1000	1000	1000	1000	1000	0	7000
2 *	S Birmingham	92GB	101	172	297	480	471	150	407	1000	3079
3	Villa	01PU	632	597	957	0	0	251	0	0	2437
4	Telford	82QL	34	135	184	122	194	255	389	0	1313
5	Martlesham	02OD	428	0	0	0	0	0	0	0	428
6	Luton	91RU	117	217	0	0	0	9	0	0	342
7	Five Bells	03CE	298	0	0	0	0	0	0	0	298
8	Northern Lights	74QD	257	0	0	0	0	0	0	0	257
9	Wythall	92BJ	47	0	0	0	0	0	0	0	47

432MHz Single Operator

Pos	Call	Score	Norm QSO	Loc	Pwr	Ant	Best DX	km
1 *	G3XDY	21983	1000 74	02OB	250	28Y	DL2LSM/P	707
2 *	G3MEH	12681	577 73	91QS	250	2x23Y	DL2DAO/P	551
3	G4AEQ	11548	525 55	93PE	200	2x19Y	DL5KCI	547
4	G6DER	10927	497 28	93GN	400	21Y	DF0CI	825
5	G6FQZ	6020	274 36	91JR	100	21Y	DL1EAP/P	513
6 *	PE1EWR	5452	248 23	11SL	13	2x21Y	GD0EMG	623
7	GW1ATZ/P	5273	240 35	83LC	50	21Y	G4LIP/P	372
8 *	2E1GUA	3440	156 25	01FS	10	21Y	GD0EMG	431
9	GM4WLL/P	3391	154 10	85NR	20	23Y	PI4GN	677
10	G7HIA	3257	148 16	81QL	30	48Y	PA6NL	468
11	G4HGI	3198	145 25	83PL	25	19Y	PA6NL	489
12	G4LRT	1484	68 10	92LJ	250	2x18Y	ON4CP	429
13	G4KNZ/P	1173	53 9	02TD	10	10Y	DH5HV	333

432MHz Multi Operator

1 *	G4LIP/P	116281	1000	294	01QD	400	8x21Y +38Y	OE5D	921
2 *	M1CRO/P	73441	632	208	01PU	400	4x21Y	DF0MTL	843
3	G0KPW	49747	428	147	02OD	400	4x31Y	DD0VF	881
4	G4SIV/P	34616	298	102	03CE	400	8x28Y +4x21Y	DL0GTH	778
5	GD0EMG	29882	257	83	74QD	400	4x20Y +4x28Y	F8KTH/P	850
6	G4LOO/P	13569	117	83	91RU	200	3x36Y	GM4LBV	553
7	G8OHM/P	11786	101	68	92GB	400	4x19Y	DL1ELY	571
8	G1WAC	5515	47	27	92BJ	75	21Y	DK0MU	632
9	G3ZME/P	4006	34	23	82QL	10	7Y	ON1ALJ	465

1296 MHz Single Operator

1 *	G3XDY	7097	1000	27	02OB	300	4x23Y	DK0FLT	689
2 *	PE1EWR	2224	313	14	11SL	10	2x25QLY	G3OHM/P	350
3	G6DER	2184	308	7	93GN	50	55Y	PI4GN	551
4	G7HIA	1483	209	7	81QL	10	2x50QLY	PA6NL	468
5	G4LDR	872	123	7	91EC	8	55Y	M1CRO/P	219
6	G4KNZ/P	755	106	8	02TD	1	15Y	G3OHM/P	209
7	G4LRT	581	82	6	92LJ	120	1.5m	G1JRU	172

1296MHz Multi Operator

1 *	G4LIP/P	34481	1000	121	01QD	400	16x23Y	OZ2LD	799
2 *	M1CRO/P	20600	597	84	01PU	150	4x23Y +35Y	DK2GR	729
3	G8ATD/P	7466	217	43	91RU	25	4x36Y	PI4GN	530
4	G3OHM/P	5933	172	35	92GB	100	8x23Y	DF0HS/P	531
5	G3ZME/P	4657	135	22	82QL	200	50QLY	PI4GN	644

2320MHz Single Operator

1 *	G3XDY	3242	1000	16.5	02OB	50	44QLY	DK2MN	416
2 *	G6DER	1398	431	4	93GN	20	1.4m	PI4GN	551
3	PE1EWR	814	251	7	11SL	7	25Y	G3XDY	173
4	G4LDR	485	150	5	91EC	8	66QLY	G4LIP/P	209
5	G4KNZ/P	369	114	5	02TD	1	QLY	PA6NL	174
6	G4LRT	153	47	2	92LJ	8	45QLY	G3ZME/P	107

2320MHz Multi Operator

1 *	G4LIP/P	6417	1000	25	01QD	90	2m	PI4GN	452
2 *	M1CRO/P	6143	957	30	01PU	40	2x25Y	PI4GN	446
3	G3OHM/P	1909	297	13	92GB	10	1.2m	ON4CP	446
4	G3ZME/P	1179	184	7	82QL	8	1.4m	PA6NL	462

3400MHz Single Operator

1 *	G4KNZ/P	303	1000	3	3	1	QLY	PA6NL	174
2 *	G6DER	167	551	1	93GN	20	1.4m	G8IFT/P	167
3	G4LRT	153	505	2	92LJ	1	1.2m	G3ZME/P	107

3400MHz Multi Operator

1 *	G4LIP/P	2015	1000	9	01QD	8	1.2m	DK2MN	422
2 *	G8IFT/P	967	480	6	92GB	15	1.2m	PA6NL	382
3	G3ZME/P	246	122	3	82QL	20	0.9m	G4LRT	107

5700MHz Single Operator

1 *	G4KNZ/P	566	1000	4	02TD	6	0.6m	G0HNW/P	263
2 *	G4LRT	153	270	2	92LJ	8	Horn	G3ZME/P	107
3	G6DER	126.5	223	2	93GN	8	1.4m	G8IFT/P	167
4	G4LDR	16	28	2	91EC	6		G1JRU	16

5700MHz Multi Operator

1 *	G4LIP/P	2356	1000	10	01QD	4	1.2m	DG1KJG	404
2 *	G8IFT/P	1109	471	8	92GB	15	1.2m	PA6NL	382
3	G3ZME/P	456	194	4	82QL	10	0.9m	G0HNW	108

10368MHz Single Operator

1 *	G3XDY	3261	1000	18	02OB	10	0.6m	F8KTH/P	441
2 *	G3PHO/P	1296	397	9	84KD	5	1.2m	G4MAP/P	258
3	G4KNZ/P	857	263	7	02TD	5	0.6m	G0HNW/P	263
4	G4LDR	550	169	11	91EC	8	0.9m	G4ALY/P	198
5	G4LRT	291	89	3	92LJ	1.2	0.4m	G1JRU	172
6	G6DER	134	41	2	93GN	0.8	0.6m	GD0EMG	218

10368MHz Multi Operator

1 *	G4LIP/P	19098	1000	62	01QD	15	1.2m	DL0GTH	662
2 *	G3ZME/P	4868	255	36	82QL	4.5	0.9m	G4LIP/P	314
3	M1CRO/P	4786	251	24	01PU	5	0.6m	DF6IY	603
4	G4MAP/P	2869	150	21	92GB	15	0.9m	PA6NL	382
5	G8FFM/P	176	9	2.5	91RU	0.2	0.4m	G4MAP/P	67

24000MHz Single Operator

1 *	G4KNZ/P	129	1000	2	02TD	0.3	0.6m	G4LIP/P	113

24000MHz Multi Operator

1 *	G4LIP/P	113	1000	1	01QD	0.05	0.8m	G4KNZ/P	113
2 *	G8IFT/P	46	407	0.5	92GB	0.25	0.3m	G3ZME/P	92
3	G3ZME/P	44	389	1	82QL	0.05	Dish	G8IFT/P	88

47000MHz Multi Operator

1 *	G8IFT/P	3	1000	1	92GB	0.0001	0.3m	G7VDE/P	3

CONTEST CALENDAR

HF Contests

Date	Time	Mode	Contest
1 April	0700-0900	CW	RSGB RoPoCo
3 April	1900-2030	CW	RSGB Slow Speed Cumulative
7/8 April	*1600-1600*	*RTTY*	*EA RTTY*
7/8 April	*1500-1500*	*CW/SSB*	*SP DX*
8 April	*0600-1000*	*SSB*	*UBA Spring*
11 April	1900-2030	CW	RSGB Slow Speed Cumulative
19 April	1900-2030	CW	RSGB Slow Speed Cumulative
21 April	*1500-1900*	*SSB*	*EU Spring Sprint*
21/22 April	*1200-1200*	*CW/SSB*	*YU DX*
28 April	*1200-1200*	*RTTY*	*SP DX RTTY*

VHF Contests

Date	Time	Mode	Contest
1 April	0900-1300	ALL	RSGB 70MHz #1
3 April	1900-2200	ALL	RSGB 144MHz UK Activity
4 April	1900-2100	ALL	RSGB 144MHz Cumulative
8 April	1700-2100	ALL	RSGB 1.3/2.3GHz
12 April	1900-2100	ALL	RSGB 144MHz Cumulative
22 April	0900-1300	ALL	RSGB 50MHz

difficult direction. Next day brought some good tropo to Scandinavia, but he only managed to work OZ5KM (JO45) for a new grid and country. He was QRV in the French contest in the morning of the 21st when activity was quite good. ODX was F5OAU/P (JN27), others worked included F1EZQ (JN27) and F4BKV (IN95).

Clive O'Hennessey, GM4VVX (IV), operated on CW in four auroras in the latter part of January. On the 21st, 1745-2110, he worked into LA, SM, G, GM and DL with JO68 the only new grid added. A weak event on the 23rd, 1915-1940, resulted in weak QSOs with PA, DL and SM stations. Next day, 1600-1845, "the usual" SM, OZ, PA, LA and OZ stations were contacted including an SSB QSO with an OZ. On the 31st, 1600-1850, more SM, LA, GM and OZ stations were worked.

He was QRV in the Activity Contest on 6 February, but only had one QSO with his next door neighbour, GM7ASN. In blizzard conditions nothing else was heard apart from a single meteor ping; even the GB3NGI beacon was inaudible. Since moving to IO78TA last August, he has found that auroras are showing the same call signs every time. He has worked G7RAU on the Isle of Wight 15 times and asks, "Where is everyone between IO90 and IO78?".

By contrast GW7SMV writes, "At last some tropo on 144MHz". On 14 January Jamie heard East Coast Gs working into OZ and SM but nothing was heard in his area till 1945. He went on to work two OZs, two PDs and nine SMs, all on SSB. New grids were SM7WNC (JO77), SK6HD (JO68) and SM7RYO (JO76). ODX was SM4VQP (JO79) at 1416km at 2315.

DEADLINES

THE JUNE DATE for your copy is **17 April** and for July it is **22 May**. My telephone answering and fax machine is on 020 8763 9457 and my CompuServe ID is g3fpk. ♦

LOCATOR SQUARES TABLE

Starting date: 1Jan1979

Callsign	50	70	144	430	1296	Total
G3IMV	659	20	616	125	53	1473
G4YTL	-	51	511	101	-	663
G0FIG	460	-	385	94	-	939
G4RGK	409	-	345	233	78	1065
G0EVT	416	14	292	77	16	815
GJ4ICD	780	1	267	121	79	1248
G0FYD	502	1	259	10	-	772
G4DEZ	488	19	258	81	67	913
G3XDY	-	33	246	170	120	569
G3FPK	30	-	246	-	-	276
G4ZHI	39	-	238	32	-	309
GW7SMV	494	-	183	-	-	677
GW6VZW	488	-	146	6	-	640
G8TOK	329	31	133	55	29	577
G6TTL	220	-	133	90	27	470
G1UGH	270	-	130	16	-	416
G4OUT	-	23	107	-	-	130
G3FIJ	236	29	105	50	23	443
EA7IT	-	-	101	-	-	101
GU7DHI	415	-	85	14	-	514
G0ISW	170	-	80	22	-	272
MM5AJN	316	-	76	32	-	424
GM4VVX	62	-	70	-	-	132
G1EFL	219	-	66	-	-	285
G0JHC	797	25	48	4	-	874
G8GNI	139	15	46	18	-	218
G4APJ	155	-	44	20	-	219
GU6AJE	311	13	32	-	-	356
M0CNP	-	1	31	12	-	44
G4FUJ	57	17	19	4	5	102
MM0BQI	44	-	18	1	-	63
GW3EJR	252	-	-	-	-	252
GM1ZVJ	235	-	-	-	-	235

No satellite, repeater or packet radio QSOs. If no updates received for a year entries will be deleted. Band of the month is 144MHz.
Next deadline is 17 April.

HF HF HF HF

DON FIELD, G3XTT
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AS I WRITE this in late February several major DXpeditions are active and going strong. 3D2CI (Conway Reef) has been enjoying propagation into the UK on 10m, as have T32RD (East Kiribati) and FO/DL1AWI (Marquesas). I trust that readers have been successful in working these, as the consensus seems to be that we have passed the peak of the sunspot cycle and propagation on the high bands will now gradually decline for the next several years. Unfortunately the CE0XT (San Felix and San Ambrosio) expedition had to be cancelled due to problems with transportation. The PW0S (St Peter and Paul Rocks) operation was reasonably successful, despite problems with equipment and the weather, while YK9A (Syria) made some 27,000 QSOs. The D68C operation, in which I played a part, has over 160,000 contacts in the log with a day or so still to go, making it, by a margin of over 60%, the biggest DXpedition of all time. The team broke many other band and mode records, and there are an astonishing 12,000 UK contacts in the log. A full write-up will appear in next month's *RadCom*.

DX NEWS

RICHARD, G3MRT, WRITES that International Marconi Day 2001 has been set for 21 April. There is a Web site at www.users.globalnet.co.uk/~straff/ with details of participating stations, etc.

German operators Frank, DL2SWW, and Ric, DL2VFR, plan to be QRV from the Åland Islands (OH0) and Öland Island (SM7) for a week each in April. First Åland Islands (EU-002) from 14 to 20 April, then Swedish Öland Island (EU-037) from 21 to 28 April. Activity is planned for 6 through 160m on CW, with some SSB and RTTY. QSL via home calls. They have a web page at http://www.iota-expedition.com

John, ZB2EO, writes that, contrary to the information I published in the January column about stations who use RW6HS as manager, John does not and has not used the services of that particular individual, but handles his own cards (see QTH Corner).

Dale, GM4ELV, writes that OZ0ITT is now active with the first-ever OZ0 prefix. Apparently he was having problems with his old call OZ1IIT, and the authorities agreed to assign him the OZ0 prefix.

F5SGI/P will be active from Yeu Island (EU-064) from 14 to 21 April, 80 - 10m, mostly CW. DL1RTW and DL7UXG will operate /P from Usedom Island (EU-129) 2 to 4 April, 40 - 15m, CW and SSB.

Rich, GW4BVJ; Doug, G0WMW; Glyn, GW0ANA, and logistics manager, Sheri, were due to sign ZD8K from Ascension in mid-March and should be ZD7K from St Helena when this appears. They will be active until around 11 April, on all bands and modes. QSL to GW0ANA. There is a Web page at www.dxpedition.co.uk

Ben, DJ8FW, will operate as CT3AS from Madeira from 2 to 16 April. He will use 10 through 40m CW, RTTY and PSK31. QSL to his home call.

Vince, G3TKN/ZL1VL, writes that he will be active as C56VL from the Gambia from 10 April for seven days, using an Icom IC-706 and 66ft Windom antenna. Main operation will be 7 and 14MHz CW, with SSB on 28MHz as conditions permit. He says that G3NKO, who has been operating as C56RF, is having a house built in Kololi, just a few hundred metres from the beach, so is likely to be a regular on the bands.

Expect Mellish Reef to be activated for a short time this month. This photo was taken during the last major Mellish Reef DXpedition, VK9MM in 1993.

Bob, G3REP, passes on news that Bob, S21YV, tries to be active each day around 0100 - 0200 and then again 1500 - 1600. He alternates between SSB on 14195 and PSK31 on 14071. Also some MFSK16 on 14080kHz.

The RAST / Thailand DX Group will operate sometime during April as E29AL from Koh Tarutao (IOTA AS-126), with the aim of making some 20,000 or more contacts. I don't have exact dates at the time of writing, so you will need to keep an ear to the bands.

The Daily DX reports there are seven newly-licensed amateur radio operators in Bhutan: A51AA (Yeshey Dorji), A51KC (Kesang Namgyel), A51PK (Parop Kinley Dorji), A51PR (Pema Rinzin), A51UD (Dorji Yeshey), A51WD (Wangpo Dorji) and A51YL (Ambika Gurung). It is certainly pleasing to see a number of the locals getting licences. A51AA has already been quite active.

F5DYD is now active as FO5RA from Tahiti and expects to be there for two years. Check 28470 from about 1630. He uses an FT-847 and two-element quad.

Dave, VE3LDT, reports that Tom, K7ZZ (currently signing V73ZZ from Kwajalein), and a few others are planning an operation (possibly as V7E) from Enewetak Atoll (OC-087), Marshall Islands, between 19 and 26 April.

Jim, KC7OKZ, plans to be in the Pacific visiting islands in the Marshalls and Micronesia. He will start by leaving in April from Hawaii. Stops include Majuro (OC-029), Jaluit (OC-028), Mili (OC-029), Kosrae (OC-059), Pohnpei (OC-010), and Chuuk (OC-011). Jim expects to be sailing in the Oceania area for about a year.

The VK9WI team that activated Willis Island in May 2000 has announced that it will be going to Mellish Reef, VK9M (above), between 21 and 24 April. This is primarily a survey trip to help facilitate the planning of a larger 'full-on' DXpedition back to Mellish Reef in either late 2001 or early 2002. The team plans to be on the reef for approximately four days only and, whilst there, will operate one HF station continuously along with one 6m station. Team members include: David, VK4ZEK; Alan, VK4BKM; Peter, VK4APG; and Harris, VK4CWT. Bill, G0VDE (BillRothwell@radioham.screaming.net), is European pilot for the expedition. There is a Web site at www.qsl.net/vk9ml QSL via VK4APG.

Two members of the Bavarian Contest Club (BCC) will be touring the Cook Islands between 20 April and 18 May. Uwe, DL9NDS, and Klaus, DL7NFK,

will be QRV from both the North and South Cooks as ZK1NDS and ZK1NFK. They will operate from Rarotonga (OC-013), Mangaja (OC-159) and Aitutaki (OC-083) in the Southern Islands and from Manihiki Atoll in the Northern group. The equipment will consist of two 400-watt amplifiers, a 1kW amplifier, LP5, V80E vertical and some wires. There will also be a lot of activity on RTTY, PSK31 and MFSK16. Up to date information and an on-line log can be found at http://www.dl9nds.de/Cook/cook.html. QSL via home calls.

DL1EMH and DL2YAK were due to sign ZK2GEO from Niue between 18 March and 8 April, 80 to 10m, all modes, QSL DL1EMH.

The Scandinavian DXpedition to Conway Reef, scheduled for this month, has been postponed due to the unavailability of two of the team members. At this time there is no information about a new date.

Jack, VK2GJH, who was active as C21JH (Nauru) in December, will be operational this month from Temotu (H40).

Joe, VE3BW, will sign V47CA from St Kitts from 9 to 24 April. Look for him mostly on CW.

Dee, W1HEO, and Paul, W5PF, will operate from Grenada from 30 March to 11 April. They expect to sign J3/homecall on 10 - 40m SSB and CW; with special attention to the WARC bands. QSL via home calls either direct or through the bureau.

A group of amateurs from the fifth call area of Colombia tentatively plan to go to Malpelo Island in April and use the call HK0TU. Jairo, HK5MQH, notes, "It is not a huge DXpedition because of our limited resources. We will operate only CW and SSB on 80 through 10m."

Scottish amateurs GM0GAV, GM4FDM, GM3YTS and GM4COX will sign VP8SDX from the Falklands between 23 April and 8 May, with particular focus on CW on the LF and WARC bands. Equipment will include a pair of TS-570D transceivers, plus linears, Titanex V80E vertical, Force 12 C3S for 10/15/20, a dual-band Yagi for 12 / 17m and ground plane for 30. They will use frequencies ending in '3', eg 3503, 10103, 21023 on CW, 3793, 14193, 21263, etc on SSB, 14083 on RTTY. Full details appear on their Web page at www.hfdx.co.uk/vp8sdx QSL via GM4FDM, direct, bureau or e-mail requests.

QTH Corner

A51AA	Yeshey Dorji, Bhutan Ham Centre, PO Box 73, Thimphu, Bhutan.
A52CO	UA9DD, P.O. Box 69, Ekaterinburg, 620073, Russia.
CT3AS	Ben Muller, DJ8FW, P.O. Box 6, D-29387 Bad Bodenteich, Germany.
FO/DL1AWI	Wolfgang Ziegler, DL1AWI, Arno-Schlothauer-Str 15, 99842 Ruhla, Germany.
JA1CKE	Yukio Hoshino, 248-1821, Tate, Hachiouji, 193-0944 Japan.
JG6BKB	Mizuho Tanaka, PO Box 7, Hayato 899-5191, Kagoshima, Japan.
OH2BN	OH2BN QSL Management, Box 73, 02380 Espoo, Finland.
PW0S	Steve Wheatley, KU9C, PO Box 5953, Parsippany, NJ 07054, USA.
VK0MM	Alan Roocroft, VK4AAR, PO Box 421, Gatton, QLD 4343, Australia (no bureau cards).
VP8SDX	Thomas G Wylie, GM4FDM, 3 Kings Crescent, Elderslie, Renfrewshire PA5 9AD, Scotland.
ZB2EO	John Bautista, 47 Valiant House, Varyl Begg Estate, Gibraltar.
3C1AG	Erik Sjolund, SM0AGD, Vestagatan 27, SE-19556 Märsta, Sweden.
3D2CI	Hrane Milosevic, YT1AD, YU-36206 Vitanovac, Yugoslavia (for CW/SSB 1.8-30 MHz) and Dragan Kosteski, Z32AU, POBox 35, 6000-Ohrid, Macedonia (for RTTY, PSK31, SSTV, FM, Satellite and VHF).
3Y0C	Mark McIntyre, WA4FFW, 2903 Maple Ave, Burlington, NC 27215, USA.

CONTESTS

THE EU/FISTS QRS Party is a new CW contest, designed to encourage newcomers to Morse, with a maximum speed of 14 words per minute. The contest runs from 0001 on 22 April until 2359 on 28 April. Certificates will be awarded to the top three scorers in each class and a certificate of merit will be awarded, to the operator receiving most votes from other competitors, for the "Most Readable Morse Heard". However, the organisers make the point that, in this event, taking part is more important than winning, providing fun for all in a non-stressful introduction to a contest-like event for beginners, and an opportunity for more experienced operators to put something back into the hobby by helping and encouraging those less experienced in CW operating. All (non-WARC) HF bands can be used and any type of key or keyer, but no keyboard sending please. Call CQ QRS / EUCW. Stations may be worked or logged once each day in each band used. Members of the various European CW clubs will send RST / QTH / Name / Club / membership number. Others send RST / QTH / Name / NM (ie non-member). There are entry classes for both members and non-members. I can provide full details if required, including a list of participating clubs, scoring and entry details, awards, etc (send an SASE, or via e-mail), or you can contact the organiser directly: FISTS/EUCW Contest Manager, Keith Farthing, M0CLO, 86, Coldnailhurst Avenue, Braintree, Essex, CM7 5PY (keithm0clo@hotmail.com)

The Low Power Spring Sprint takes place between 1400 and 2000 on Easter Monday, 16 April. CW only on all (non-WARC) bands. Categories are A (1 watt), C (5W), Q (25W), X (50W) and Y (100W), and single, two / three or all bands. Send RST, IARU locator (first four designators) and power category (eg 579 JN98 C). Reception of RST is sufficient from non-entrants. I can provide full details if required. In the 2000 contest G4GSA was 3rd in category C (one band, 14MHz), G3VIP 3rd in category C (2/3 bands, 3.5, 7, 14MHz), G4FDC 1st in category C (all band), G4OGB 1st in category X (2/3 bands, 3.5, 7, 14MHz) and G3RSD 1st in category Y (2/3 bands 3.5, 7, 14MHz). My thanks to Alex G4FDC for these details.

The Holyland DX Contest runs from 1800 on 21 April for 24 hours. Work Israeli stations on all non-WARC bands, both SSB and CW (there are single- and mixed-mode categories). Send RS(T) and serial number, receive RS(T) plus 'Area' (grid square reference plus region - eg F15TA). I can provide full details if required (SASE or e-mail).The Ontario QSO Party has moved weekends and will start at 1800 on 21 April for 24 hours. Work Ontario stations on CW and SSB, all non-WARC bands, with multipliers for Ontario counties / districts / regional municipalities. Complete information including entry forms is available at http://www.odxa.on.ca/oqphome.html

In the August 2000 EU HF Championship, CW High Power section, G0LII was 29th with 193157 points, G4BWP 34th with 165209 and G0IVZ 44th with 43508. There were 51 entrants. In the Low Power section, G3SXW was 3rd with 218964, G4EDG 11th 168760, G4OGB 38th 113844, GM3CFS 62nd 72666, G3LHJ 119th 11739, G4BUO 122nd 7416, G3VQO 131st 2940 and G0MRH 137th 1716. There were 146 entrants. In the mixed mode low power section, G0MTN was 17th with 157380 points and G6QQ 53rd 16905, from 67 entrants. In the SSB Low Power section G3VAO was 1st with 157440 points, G0EVO 75th 3920 and M0COP 91st 700. There were 101 entrants. In the 2000 Marconi contest, GM3CFS was 7th of 78 entrants. My thanks to Les, G4OGB, for forwarding these results.

Results of last year's *CQ* WPX SSB appear in the table below. I have also been asked for the results of last year's ARRL International DX Contests. Hopefully I will have space for

***CQ* WPX SSB Contest 2000**

Single-op:		
GM3BCL	A	686512
G4BUO	A	202030
G3UYF	A	6525
GM7V (op GM4YXI)	28	8305756
G0AEV	28	3597216
G4WTD	28	2298824
*M0BRK	A	1339624
*G0KRL	A	1105864
*M0CQS	A	823680
*G3VAO	A	761960
*M0AFC	A	647197
*G0NWY	A	456760
*M0BEX	A	285123
*G0VBD	A	210630
*GW3NJW	A	164920
*GW0AJI	21	194679
*M5ACC	14	1734202
*M4T (op:G0VQR)	14	119850
Assisted:		
*G0DEZ	28	11635
Multi-single:		
GX6YB		14475669
M2H		6335460
G6A		6005692
GB3RS		5699196
GX3FEC		1752324
Multi-multi:		
M5W		1128695

(*denotes low power)

these next month.

For those of you with Internet access, it might to be useful to know that calendars, rules etc. for all of the major events in 2001 can be found at the following URLs: http://home.online.no/~janalme/ (by LA9HW), http:// www.hornucopia.com/contestcal/contestcal.html (by WA7BNM), and http://www.sk3bg.se/contest/index.htm (by SM3CER).

CQ MAGAZINE AWARDS

CQ WAZ AWARD Manager Paul Blumhardt, K5RT, reminds everyone that Jim, K1MEM, who used to check cards for these awards, passed away a year ago. The official checkpoint is Paul Blumhardt, K5RT, 2805 Toler Rd, Rowlett, TX 75089, USA. However, here in the UK, applications for the WAZ and CQ DX awards may be sent to Rob, GM3YTS, or Fred, G4BWP.

300 COUNTRIES ON 160!

CONGRATULATIONS TO Jack Leahy, VE1ZZ, who worked DS4CNB on 160m recently for his 300th country on the band. Many of us would be pleased to have a 300 score on any band. It helps, of course, that Jack has a fine location on a promontory in Nova Scotia (not by accident, I suspect!), but this is still an immense achievement.

TABLES

FIRSTLY, I OWE an apology to Ed, G4RWP, whose entry for the 2000 tables had disappeared under a heap of other items in my shack. Ed's 28MHz total was 91 (CW only) and he also had 19 on 10MHz and 27 on 24MHz (again, all CW).

COUNTRIES WORKED, 2001

CALL	CW	SSB	RTTY	MIXED
M0BIB	-	-	-	184
G3IGW	107	0	0	107
GM4FAM	-	-	-	102
G4MUW	0	51	0	51
G3MDH	0	47	0	47
M0CAL	0	41	0	41
M5AEF	0	37	0	37
M0ASJ	-	-	-	21
M0CNP	0	4	0	4

Mike G3IGW, was the first to come in with a score for 2001, with 56 countries in the log by 9 January! A warm welcome to Robin, M5AEF, the first M5 to join the table. On 15m SSB, using just 1 watt, his contacts include VK, ZL, J3, IY and D6. Not bad! He hopes his efforts will encourage others to have a go. It seems that some readers missed my announcement about this year's tables, or misunderstood what I proposed. To re-iterate, I have dropped the WARC and 28MHz tables this year, as I felt a change was appropriate after several years of the same format. This year there will be one table only, with countries worked by mode, irrespective of band. Of course, the quarterly 9-band tables, compiled by G3GIQ, continue as before, and updates should go to Henry by 8 April.

THANKS

Special thanks go to the authors of the following for information extracted: *OPDX Bulletin* (KB8NW), *The 59(9)DXReport* (WB2YQH), *The Daily DX* (W3UR) and *425 DX News* (I1JQJ). Please send items for the **June** issue by **20th April.** ♦

HF F-Layer **Propagation Predictions** for **April 2001**

	7.0MHz	10.1MHz	14.0MHz	18.1MHz	21.0MHz	24.9MHz	28.0MHz
Time	000011111220	000011111220	000011111220	000011111220	000011111220	000011111220	000011111220
(UTC)	246802468020	246802468020	246802468020	246802468020	246802468020	246802468020	246802468020
*** Europe							
Moscow	999878899999	999999998999	899999999998	.999999999973	.999999993.	.899999998..	.899999996..
*** Asia							
Yakutsk	.........6..	211.....8874	688557777999	458888888776	237888876664	..578875433.	..3677643...
Tokyo	.........99..	.....69998.	.....899998.	....8989897.	...7888878..	....78.....	....
Singapore	7883	79997	599987	3899863	....1689973.	...2367883..	....36776...
Hyderabad	4788	6.....28999	84....389999	445224899987	227667899965	..6788899631	..47889984..
Tel Aviv	87.....4677	773....27878	525322468833	1..255667221	....1222431.	....11..21..	.....1.....
*** Oceania							
Wellington	.........2...	.........5...	.....235...	.....22.3...	....	....	....
Perth	.........688.	58885	177765	.....4554.2	.....233....	.....3.....	.....3.....
Sydney	.....178..	.....799..	.....168993.	.....57777..	....256654..	....2553....	.....33.....
Honolulu	....	..2.....	....	....	....	....	....
W. Samoa	....	....	....	....	....	....	....
*** Africa							
Mauritius	9.....9999	9.....89999	98....99999	98....899999	8788789999999	..888999998.	..88899998..
Johannesburg	99.....6999	99.....9999	77.....29999	..62..279997	..6544689985	..666778987.	..466788975.
Ibadan	99.....999	999.....9999	9997...89999	779999999998	5.9999999986	..999999995.	..89999998..
Nairobi	....	1.....	32.....12	54.....1234	..1....12353	..211113551.	...2223451..
Canary Isles	999.....8999	7498...59987	991997899829	999999996299	999999992999	999999999999	989999999999
*** S. America							
Buenos Aires	999.....99	9999.....999	99997....999	999998889999	999999999999	879899999999	7...9999999997
Rio de Janeiro	999.....999	999.....999	9999.....999	99999..99999	999999999999	9...99999999	....9999999.
Lima	999.....49	9998.....89	98994....199	767873..2688	4.3866446786	...65666775.	...3265676..
Caracas	884.....8	9993.....89	9999.....699	6.7997..7898	...89888899.	....898899..	.....88998..
*** N. America							
Guatemala	9998.....9	9999.....99	99999....999	9.9999999999	...999999999	.....999999.	.....99999..
New Orleans	884.....5	999.....8	857873...188	642658777886	4..3.8888873	.....688884.	.....57786..
Washington	987.....9	6992.....19	899961..1789	757789999999	535679999997	689999975	....4788987.
Quebec	897.....78	868.....589	11587446788 3	..248778884.	...36567871.	....333564..	....2.2452..
Anchorage	....	888.....7	868856779879	6.67..678987	...6...67776	.....66.	....
Vancouver	.83.....	7783.....	3353..212356	2.....46563	.....652.	.....22..	....
San Francisco	7881.....	88962.....2	6677422..246	2..3..455664	.....35664.	.....355..	.....33..

Key: Each number in the table represents the expected *circuit reliability*, eg '1' represents reliability between 1 and 19% of days, '2' between 20 and 29% of days etc. No signal is expected when a '.' is shown. **Black** is shown when the signal strength is expected to be low to very low; **blue** when it is expected to be fair and **red** when the signal is expected to be strong.

The RSGB Propagation Studies Committee provides propagation predictions on the Internet at www.g4fkh.demon.co.uk The page is updated monthly. The provisional mean sunspot number for February 2001 issued by the Sunspot Data Centre, Brussels, was 80.1. The maximum daily sunspot number was 114 on 9 February and the minimum was 48 on 24 February. The predicted smoothed sunspot numbers for April, May and June 2001 are respectively: (SIDC classical method – Waldmeier's standard) 96, 95, 93 (combined method) 124, 124, 125.

SWL

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TOO LATE for the last column was the news that Nevada had announced Comoros Trophies for the three SWLs logging D68C on the most bands/modes. The DXpedition will have finished by the time you are reading this, but you have until 31st March to send me details of your D68C loggings. Each band/mode counts one point; the three listeners claiming the most band/mode slots (which match the D68C log exactly) will win a trophy. The team had such a presence on the bands that it was not difficult to run across them while tuning the bands at any time during day or night.

To accept your entry, I need to know the usual details – Date, Time (this is important as the 'tie break' will be on the basis of the time you heard D68C on your last band), Band, Mode, Frequency, Station(s) worked. Even if you only heard them on, say, four bands, send in an entry as it will swell the entry listing and will demonstrate the SWL interest in the D68C DXpedition.

NO QSLs?

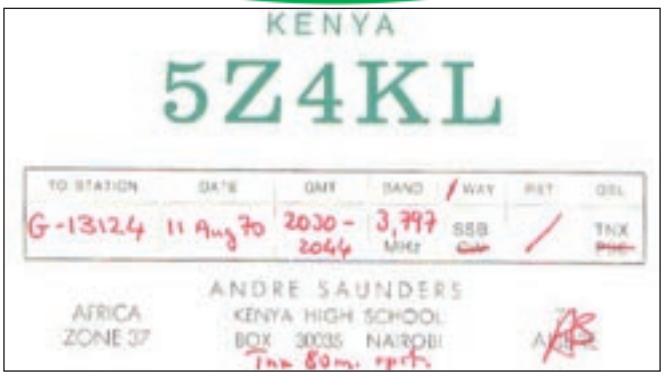
DO YOU WONDER why you never get some QSLs? One reason might be that you send your QSL via the bureau, but the station you've sent it to doesn't accept QSL Bureau cards. Here are some well known guys who only accept QSL cards direct – W3HC, W3HNK, VK9NS, ZL1AMO, AC7DX, AI6V, K2EWB, K3IPK, KE7LZ, N4FKZ, N7LVD, KC6IN, VE3DO, W6UC, WA4JTK, 5A1A, 5H3RK, VY2SS, DL7FT, FR5DX, V51AS, JA6NL, YT1AD and ZB2FK. There are probably lots more, but this list will mean that you will actually receive that 'wanted' card in reply – although it will cost you more.

WHAT'S BEEN ON?

THE ANSWER is that if you were away from the bands between mid-January and mid-February you missed quite a lot.

Robert Small, RS8841, was one of those to be busy on things other than short-wave listening during the period, so he had been unable to spend as much time at the rig as he would have liked. However, as always, Robert comes up with a mixed bag of goodies. Conditions on the high bands were getting better – until mid-February when the solar numbers were very ordinary: SFI 138, A 17, K3 was one set. Robert heard A52GJ from Bhutan, BA4DW from China and YK9A from Syria all for new countries on 3.5MHz CW. Best 21MHz DX was XQ3QBR, FY5LS, J79K, 2D2NV, BY4CJP, A52GJ, FK8HC/P and 9M2ME/P. 24MHz gave Robert ZB2/K4ZLE, HR3/K4ZLE and D68WL. 28MHz had seen 9N7RB, A22DX, D68WL, VK6BSI (OC-243) and 3C1AG.

For those with more time to monitor the bands, you might have come across the following – A22DX, D68BT, FO/DL1AWI (heard on 3.5MHz SSB at 0728 UTC), PJ5/UA1ACX, V73ZZ, YI9OM, YJ0ABS, YK9A (heard on 1.8MHz SSB at 0350 UTC), 3B9FR, 3G0Z (Juan Fernandez Island), 3Y0C (Bouvet Island), 8Q7RR, and, of course, D68C and PW0S.



5Z4KL's QSL card from 1970. He is now GM3VLBactivating Scottish islands for the IOSA awards. See 'Forthcoming Activity'.

FORTHCOMING ACTIVITY

RODGER COLLINS, G0TLC, has recently returned from a trip to Baghdad. Whilst he was there he had the privilege of operating the club station YI1BGD accompanied by his friend Diya, YI1DZ. He made over 750 QSOs and was able to activate both 18 and 24MHz for the first time. Anyone who heard Rodger operating YI1BGD can QSL to Cliff, G0MMI. Rodger and Cliff are always happy to receive cards from SWLs either direct, via the bureau or by e-mail to G0MMI@lineone.com Rodger hopes to return to Baghdad in late April with the call YI9RC, and he is hoping to receive permission to activate 50MHz.

How many SWLs remember logging 5Z4KL on 3.8 or 7MHz SSB in 1969 and 1970? André is now GM3VLB and can often be heard during the summer months activating Scottish Islands for the IOSA award. His main summer DXpedition (to include the IOTA contest) will be to the Summer Isles (EU-092). Full details can be obtained by e-mailing André at andre@gm3vlb.com He is also keen to know what SWL IOSA enthusiasts' 'top twenty' most needed islands are. André has permission for a repeat operation from CL10 Inchmarnock (possibly in April) and will concentrate on re-activating some islands many serious IOSA chasers have missed, including NH17 Treshnish (also possibly in April).

136kHz SWL

DAVID BOWMAN, G0MRF, reported that SWL Ko Versteeg, NL9222, (JO22KF) had established a new reception record for an amateur 136kHz transmission, but news is filtering through that this has now been eclipsed by the reception of a G station in Virginia (W4).

On 13 January 2001, Ko successfully received a signal from Larry Kayser, VA3LK, who was transmitting from Ottawa in Canada. The distance was 5636km. Ko used his computer sound card to look for very weak signals from Larry's LF station. This exceeded the previous record from the Czech Republic to Newfoundland.

Are there any British SWLs interested in 136kHz? If so, let me know what DX you have been hearing.

FINALE

AS SPACE HAS beaten me once again, let me thank first-time contributors Simon Wood, RS180399, and Edward Turnbull. I will refer to their news next month. ♦

CQ WORLD WIDE WPX SWL CONTEST 2001 RULES

SHORT-WAVE listeners around the world are invited to take part in the 2001 *CQ* World Wide WPX SWL Contests. The objective is to log as many stations and prefixes as possible on the 28, 21, 14, 7, 3.5 and 1.8MHz bands.

When: SSB - 0000 UTC 24 March to 2359 UTC on 25 March 2001
CW - 0000 UTC 26 May to 2359 UTC on 27 May 2001

Sections: Single- and multi-operator sections. Only 36 hours logging is permitted in the single operator section. Single-band logs can be submitted.

Scoring: (a) Stations heard from different continents to the listener are worth 3 points on 28, 21 and 14MHz, and 6 points on 7, 3.5 and 1.8MHz.
(b) Stations heard in the same continent as the listener are worth 1 point on 28, 21 and 14MHz, and 2 points on 7, 3.5 and 1.8MHz.
(c) Stations heard in the same country as the listener are permitted for multiplier credit but are worth zero (0) points.

Multiplier: A prefix is counted only once, regardless of the number of times the prefix is heard. A prefix is the letter/numeral combination that forms the first part of an amateur callsign - M6, W5, OT7, LZ5, WB8, HG19. In cases of portable operation, the portable designator becomes the prefix - KH9/W1AAA or NH9/W1AAA. KH6XXX operating from Ohio would be W8/KH6XXX. Portable designators without numbers will be assigned a zero (0) after the portable designator to form the prefix - PA/W1AAA would become PA0/W1XXX. /MM, /AM, /A and /P suffixes do not count as prefixes.

Final Score: Total points (from each band) multiplied by the number of different prefixes (prefixes are only counted once).

Penalties: Any unmarked duplicate will lose 10 times the logging value.

Awards: Certificates will be awarded to the leading stations.

Logs: Logs must show Date, Time (UTC), station heard, RS(T) report and serial number given by station heard, prefix multiplier, points. A check list of claimed prefixes *must* be provided. A cover sheet showing the points, multipliers and score claimed *must* be provided. *Entries not complying with these rules will be subject to disqualification.*

Entries: All entries must be postmarked no later than 30th April 2001 for the SSB section, and 4th June 2001 for the CW section. Please enclose two IRCs or $1 for a copy of the results. Entries should be sent to WPX SWL Contest Director, Bob Treacher BRS32525, 93 Elibank Road, Eltham, London SE9 1QJ, England.

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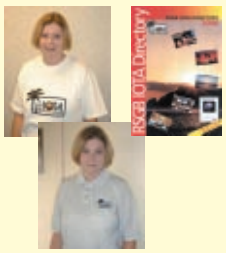

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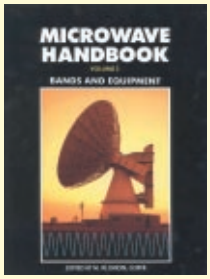

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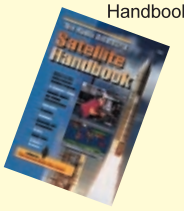

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THANKS TO everyone who has been sending in copies of EMC-related articles or adverts from newspapers or magazines. Some of these come from specialist trade publications that the EMC Committee would be unlikely to see otherwise. Even if such items appear in the national press, I would still appreciate a copy, however. The topic of particular interest at the moment is anything to do with Power Line Telecommunications (PLT).

Recently, a company that is designing an electronic product approached a member of an amateur radio club and asked him to evaluate the RF interference in the HF bands from a radio amateur's point of view. The EMC Committee advises anyone who is approached in this way to refer the matter to us.

On a general matter, it would be helpful if members could note the following points when writing or sending e-mails about EMC matters:

- Please include your address in an e-mail, whether or not your call sign is listed in the *RSGB Yearbook.*
- Please include your telephone number in any letter or e-mail.
- Please include details of the make and model number of any equipment (if known), together with bands and powers that you use if describing an immunity problem.

PLT RIDES AGAIN?

RECENTLY, THERE HAS been a resurgence of interest in HF Power Line Telecommunications (PLT), also known as Power Line Communications (PLC). In the past, any mains-borne communications system that used frequencies above 150kHz could not meet existing European EMC standards for conducted emissions (levels of RF interference injected into the mains). Now attempts are being made to introduce new EMC standards that would allow HF PLT to operate.

The standards situation is complex and the EMC Committee is involved via the British Standards Institution and the International Amateur Radio Union. The European Telecommunication Standards Institution (ETSI) PLT System Reference Document (SRD) proposes some alarming levels for PLT interference levels in the range 1.6 - 30MHz. These challenge the fundamental purpose of EMC standards, namely to protect radio services from interference from non-radio sources.

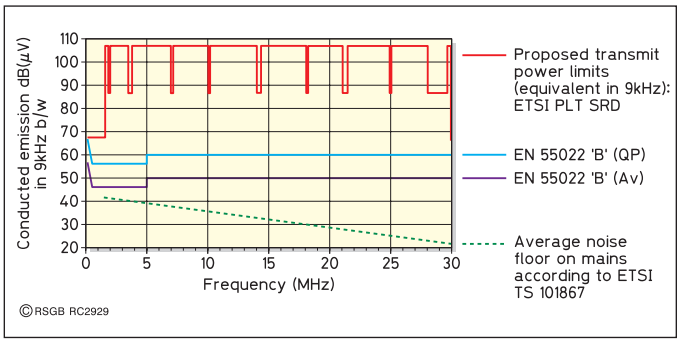


Fig 1: ETSI PLT SRD proposed conducted emission limits for PLT.

To put this in perspective, **Fig 1** shows these levels in relation to the existing EN 55022 Class 'B' conducted limits (Quasi-Peak and Average). The SRD levels are 56.5dB higher than the EN 55022 Class 'B' QP limit except in amateur bands where they are 'only' 36.5dB higher! The SRD lists the 160m amateur band as 1.81 - 1.85MHz, and not 1.81 - 2.00MHz as in the UK.

Fig 1 also shows the typical conducted 'noise floor' on the mains according to ETSI. This is interesting because it confirms what we have known for some time - that in practice, the conducted emissions from most equipment decrease with frequency so that even if they are near the limit at around 0.5 - 1MHz, they are far below the limit in the higher HF bands. Anything that comes near the EN 55022 'B' limit at around 14 - 21MHz can produce interference levels that are wholly unacceptable in the amateur bands.

Fig 2 shows the proposed ETSI PLT SRD radiated emission limits in relation to background noise levels on the HF bands. The ITU-R atmospheric noise levels are those that are not exceeded for 20% or 50% of the time. The ITU-R report PI 372-6 gives man-made noise level curves that are measured with a short vertical aerial. These appear to be near 'worst case' levels for planning transmitter coverage, rather than typical levels. In practice, G3JWI and myself have measured background noise levels below the ITU-R 'Rural' curve in suburban locations in the UK.

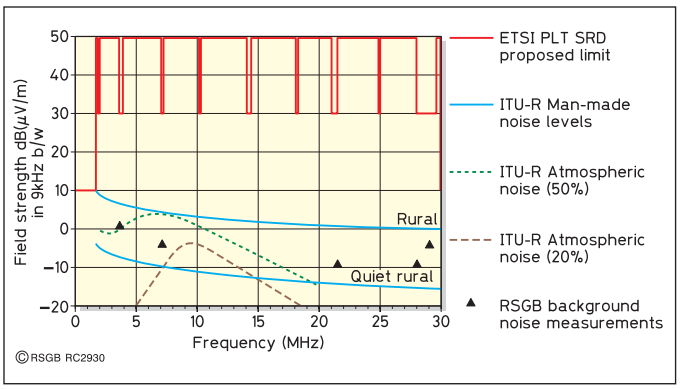


Fig 2: ETSI PLT SRD proposed radiated emission limits for PLT.

We have also seen an alternative draft proposal with slightly different levels in the 'notches' and 10dB lower levels for 'indoor devices', but these levels are still far in excess of what is acceptable in amateur bands. It must be emphasised that these are only proposals at this stage, but when they have the backing of such major companies as Siemens, they need to be taken seriously.

HF WIRELESS PHONE JACKS

THE APRIL 1999 'EMC' included an item about 'Phonex EasyJack' wireless modem jacks operating in the 80m band in the US. Wireless phone jacks are an in-house application of HF powerline telecommunications. They have now appeared in the UK, in plug-in cases with UK mains plugs. They are advertised in the Jan - Mar 2001 'Innovations' catalogue with the headline, 'Install new phone points without new cables'. Suggested applications include phone extensions for a fax machine, digital TV, Internet or online console game-playing. The way in which these devices are used is shown in **Fig 3**.

Tests by ARRL (**www.arrl.org/tis/info/rfiteljx.html**) showed that there were two types in the US, wireless phone jacks and wireless modem jacks. The modem type originally used carrier frequencies of 3.52MHz and 8.27MHz with the 3.52MHz carrier on continuously, but unmodulated and prone to drifting. When the telephone rings, the 3.52MHz carrier is modulated with an unmistakable ringing tone and the higher frequency carrier only comes on when the remote extension is actually in use. In a modified type, neither carrier is on continuously.

The EMC Committee has been unable to obtain any UK models of the 'Phonex EasyJack' for testing, so we do not know the exact frequencies

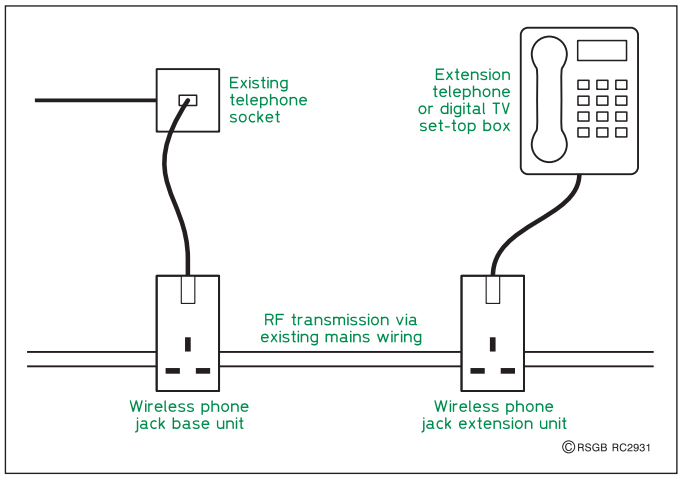


Fig 3: The use of wireless phone jacks to provide a telephone extension without additional wiring.

of operation or whether they operate within the 3.5MHz amateur band. The reason for our concern is that ARRL tests showed that such devices are susceptible to interference from HF transmitters, especially on the 3.5MHz amateur band.

If wireless phone jacks are sold in Europe, they would need to be 'CE' marked. It is difficult to see how this could be done under current EMC standards because the RF transmissions would exceed European conducted emission limits.

At the time of writing, it seems that Innovations have not had any 'Phonex EasyJacks' in stock in 2001. However, I understand that there may be other suppliers and that some wireless phone jacks may be in use with digital TV set-top boxes that need a telephone line connection, if there is no telephone extension socket within easy reach. If anyone has any further information about wireless phone jacks being installed or sold in the UK, I would be pleased to receive it.

TELEPHONE IMMUNITY

RECENTLY JOHN, GM3TCW, needed a domestic phone so he consulted the June 2000 'EMC' about RF-immune telephones. He contacted the firm Nimans of Manchester which is now called 'Tamms Direct' but still has the same phone number as published. John purchased the Siemens 'euroset' handsfree model, which was originally the 815, but is now replaced by the model 2015. The phone came with the option of returning it within 21 days for a refund if not satisfied.

John tested its immunity on 3.5MHz where most of his operation takes place, including GB2RS News reading. He uses 100W and 400W to a dipole at 50 feet, which runs above and parallel to the phone lines.

With 100W there was no breakthrough, but with 400W there was only slight breakthrough that was in no way intrusive and was not audible at the other end of the line.

John reports that he is completely satisfied with the Siemens 'euroset 2015' on 3.5MHz. He has also done a quick test on 1.8MHz. With 100W to an inverted 'L', 40ft vertical, 90 feet horizontal running above and parallel to the phone lines, there was definite breakthrough which would be intrusive but, on reducing to about 40W, there was a definite improvement and it was reasonably tolerable. John states that this was a rather hurried test on top band and suggests that a change of antenna would help. There is at least 60 feet of internal phone wiring in the house.

The point about the type of antenna is an important one, particularly on 1.8MHz where few radio amateurs have room for a half wavelength dipole and use a 'T' or inverted 'L' driven against ground. Without a very good RF earth system, which is difficult to achieve in practice, any type of aerial driven against ground can cause RF to get onto mains wiring. A possible solution is to fit a BT 'Freelance' RFI filter type LJU10/14A to the telephone. This is intended for reducing breakthrough from MW broadcast transmitters, but is also effective on the 1.8MHz amateur band and to a lesser extent on 3.5MHz.

John also reports another telephone-related RFI problem. He subscribes to cut-price phone calls from a company called 'One.Tel' (**www.onetel.co.uk**). This requires an access code to be dialled before the phone number. To save entering the code manually, 'One.Tel' provides a small unit called a 'Phone.Pal' which plugs in between the telephone and the wall socket and sends the access code automatically on calls from that particular phone. John reports that when this was fitted, as soon as the handset was lifted the RF breakthrough was very severe on 3.5MHz with 100W. When the 'Phone.Pal' unit was taken out of circuit, the breakthrough disappeared.

This illustrates an important point about tackling RF breakthrough on telephones. If there is anything else on the line that rectifies RF, then the demodulated RF will appear on the line as audio and will be heard on *any* telephone, even one with good RF immunity. When testing, it is important to unplug any other items such as a 'Phone.Pal'-type box, answering machine, modem or alarm auto-dialler. It is also possible for a corroded connection on an outdoor telephone line to rectify RF, although this is rare and would probably cause crackling.

The BT 'Freelance' LJU10/14A telephone RFI filter for frequencies up to a few Megahertz.

I would be interested to hear of any other cases involving telephone RF breakthrough that only occurs when a 'Phone.Pal' box or similar is plugged in. The situation should improve from June 2001 when telephone equipment has to be tested for RF immunity to EN 55024 with a modulated carrier.

BREAD MAKER INTERFERENCE?

IF ANYONE IS wondering whether this item is an April Fool, I can assure you that it is not.

Chris Marsden of Ludlow reports a problem with his Panasonic bread maker which has a 'CE' mark and is almost certainly affected by the BBC World Service Wooferton transmitter two miles away. Chris has had three new units and reports that they all showed the same effect, alert alarms coming on intermittently before it even starts to bake.

The power, frequency and direction of the Wooferton HF transmissions vary at different times of the day and the times when the alarms come up coincide with audible RF breakthrough on some of Chris's telephones. He also reports that the bread maker has no problem at a friend's house 20 miles away.

Panasonic Customer Support was not convinced by Chris's theory and suggested that the alarms were either caused by his mains supply or by using the wrong type of flour but definitely not by the transmitter!

Although not related to amateur radio, this case illustrates the difficulties that members of the public may face in getting a manufacturer to take a report of an RF immunity problem seriously. Another issue is that the RF immunity standard for domestic appliances is much weaker than for other types of equipment. ♦

IARU

TIM HUGHES, G3GVV
10 Farm Lane, Tonbridge TN10 3DG.

LARRY PRICE, W4RA, President of IARU, has reported on a recent meeting of the Working Group on Emergency Telecommunications (WGET), held at the United Nations' Headquarters, New York. Because its work is not widely known, it should be explained that WGET was founded by the UN Inter-Agency Standing Committee in 1994, with the mandate to "facilitate coordination of telecommunications for all partners in international humanitarian assistance".

Two items which were discussed were of particular significance to radio amateurs. The first was a presentation by Michel Milot, VY9CC, on a resolution which originated at WRC 2000, dealing primarily with international disaster relief. The second, presented by W4RA, was a report on the *Disaster Communications Handbook* being published by ITU as a result of work mostly by IARU, ARRL and volunteer editors; it was requested that, when published, ITU make the *Handbook* available both in paper copies and on CD-ROM.

Concluding his report, W4RA comments that the work of WGET is important and relevant to advancing IARU goals and garnering support amongst agencies that can provide witness to the importance of the work of the amateur services during communications emergencies. It is therefore useful that IARU be seen by these agencies as a regular partner in developing programmes to prepare for the provision of emergency communications services.

GUJARAT EARTHQUAKE

FROM ARASU Manohar, VU2UR, the Monitoring System Coordinator for IARU Region 3 (Asia and Australasia), comes an account of the disaster caused by the earthquake in north-west India. Commencing with an outline of the scene, he describes the arrival of equipment to move debris, gas cutting sets, concrete cutting saws and huge excavators. Doctors are in the area, together with orthopaedic surgeons and anaesthetists, using materials which have come from other states and countries. Indian railways have run special trains from different parts of this vast country, carrying relatives of the victims and special supplies free of cost. The Department of Telecommunications has provided free telephone calls to the victims from Gujarat.

Arasu Manohar, VU2UR, Monitoring System Coordinator of the Amateur Radio Society of India.

Sahruddin, VU2SDN, President of the Amateur Radio Society of India.

Since 27 January, amateur radio operators have put up their HF stations at Ghandinagar (at the Chief Minister's residence) and at Anjar, Bhachau, Bhuj and Ghandiham. VHF stations have been established at other locations.

Amateurs from all parts of India have been participating in providing communications, using English and Telugu languages. Offers of assistance have been received from amateurs in many countries.

EL SALVADOR EARTHQUAKE

FABIAN ZARRABE, YS1FI, reporting on the earthquake in his country, says that no amateurs have reported loss of life in their families, but material losses have been heavy. Amateurs are operating from their not-yet-completed Emergency Communications Centre. There has been considerable damage in the surrounding area, but the building has withstood the tremors well; a one-inch wide fissure crosses the building from east to west.

He concludes "The important thing is that we amateurs are operating within the framework of the Emergency Organisation and doing the best and the most possible under the circumstances. Several nets are active".

A DATE FOR YOUR DIARY

AT ITS LATEST meeting, the IARU Administrative Council selected the theme for World Amateur Radio Day, 18 April 2001, as 'Providing Disaster Communications: Amateur Radio in the 21st Century'. The choice of this theme was based on two considerations: first, to assist in dispelling the notion held by some members of the public that technological changes have bypassed and diminished the future role of the amateur service, and second to reaffirm the importance of amateur radio as a resource to help mitigate the effects of disasters by providing communications to aid humanitarian efforts. ♦

DATA DATA DATA

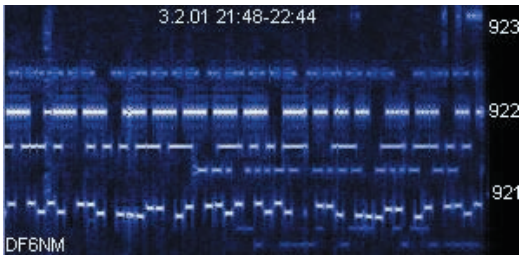
ANDY TALBOT, G4JNT
15, Noble Road, Hedge End, Southampton SO30 0PH.
E-mail: data.radcom@rsgb.org.uk

A BIT MORE from readers to report this month. The first edition of the *Wyrepak Newsletter* arrived just before writing. Wyrepak is based around the Wyre Forest and looks after the KIDDER and GB7PZT Packet nodes; they are closely allied with Fourpak, mentioned previously. The system operator is Paula, G8PZT, who has a love-hate relationship with technology and firmly believes that, for the end user, it should be as unobtrusive and simple to operate as a kitchen tap. Paula has designed and built much of the node since before 1990.

News also, from Paul, G4APL, and Bryan, G0SYR, who have been involved with packet since 1984, running 15 nodes over three sites in the Caterham area, with links running at 1200, 9600 and 19200 baud. Paul's 14-year-old daughter, 2E1PAL, is now seriously hooked on packet operating, often to be found playing network games such as Scrabble, Battleships, Connect Four etc over the radio using the TCP/IP protocol.

MICROWAVE & MOONBOUNCE DATA COMMS

PSK31 AND OTHER narrow-band data modes have proved themselves on HF for their robustness and ease of use in poor propagation conditions, easily rivalling Morse for weak signal working. Now is the time for something similar for the higher frequency and microwave bands - a data mode suitable for simple keyboard communication, with a performance to rival or better that of CW. The problem on these bands is that frequency-setting is often not very good; on 10GHz and higher, drift of several hundred hertz during a QSO is not unknown. In addition, signals are often scattered in frequency due to being reflected off rain clouds or, in the case of Moonbounce, off the fast-moving surface of the planet. Most microwave narrow-band communications, including CW, take place in a 3kHz SSB bandwidth, so the data signal should pass through a standard SSB filter. It will also have to use a standard PC plus soundcard to be a practical solution for most amateurs.



An off-air capture by DF6NM (using *Argo*) of six UK SLOW CW transmissions within a total bandwidth of 2.4Hz over a one-hour monitoring period. All were taking part in 136kHz trans-Atlantic tests. Figures on the right hand side are the audio frequencies from the receiver in Hz.
From top to bottom :
(1) G3XDV sending data too fast to resolve at this speed/ bandwidth setting
(2) M0BMU
(3) G3XTZ
(4) G3YXM
(5) G3AQC using 0.1Hz shift DFCW and showing some frequency instability
(6) G4JNT (much weaker) using DFCW 0.2Hz shift
The standard adopted for DFCW is that the high frequency corresponds to a dash, and the lower frequency to a dot. Therefore G3AQC's transmission reads '~C G3AQC G3AQ'

This would be a spread-spectrum type of modulation, at a high initial data rate, making full use of the SSB bandwidth to minimise tuning errors, then subsequently coded by repeating the data segments and interleaving the bits. This will increase reliability in noise, resulting in a much lower effective bit rate with a target around 50b/s, comparable to RTTY. The high-speed modulation could be something like Phase Shift Keying at 2400b/s or possibly FSK at 1200b/s. FSK, while not so good in noise as PSK, would probably give better immunity to tuning errors and drift, as well as being easier to design in a modem.

Is such a scheme to match the performance of CW feasible within this specification? Instinct and experience of what can be done at HF say it is. Are there any DSP Modem writers out there with an urge to try something? Microwave and EME operators are crying out for something like this!

SPECTRUM ANALYSIS SOFTWARE

SPECTRUM ANALYSIS software is rapidly gaining in popularity amongst amateur radio operators for digging signals out of noise using very narrow bandwidths. These often make use of a waterfall or spectrogram display showing frequency versus time, with amplitude of the signal illustrated by colour or brightness.

On LF, very slow CW is now routinely used with 'dot' lengths varying from three seconds per dot, to 90 seconds for the trans-Atlantic tests now underway. In all cases, such software is used to display the signals, with a callsign often building up over many tens of minutes in a bandwidth varying from 0.3Hz down to 0.01Hz. The display methods have spawned alternative modulations to exploit the technique. One, popularly called Dual-Frequency CW (DFCW), assigns separate frequencies to dot and dash, which can then be made the same length, shortening the message considerably. When displayed on a waterfall, the trace can be viewed and visualised as Morse for decoding. Suitable packages are:

- *Spectrogram* by R S Horne for resolutions down to approximately 0.3Hz
- *Argo* by I2PHD and IK2CZL specifically designed for slow CW reception
- *Spectran* by the same authors, for looking in narrow bandwidths into the millihertz region and audio processing.

All the above programs are available from one site, that of Ko Versteg, NL9222, at **http://leden.tref.nl/~nl9222tv/software.htm** The site also includes a huge selection of amateur radio software.

FUNDAMENTALS

WE WILL NOW return to modulation methods. In June, frequency-shift keying (FSK) was covered, which is the limit using non-coherent simple demodulation. We will now look at coherent schemes. 'Coherent' means that both the data clock and the RF carrier need to be regenerated in the receiver in order to recover the actual data.

The simplest such data modulation is binary phase-shift keying, BPSK, often referred to as PSK. Here, the RF carrier is reversed in phase by 180° for each '1' bit of data and by 0° for a '0' bit. This is accomplished very simply by multiplying the RF carrier by 1 or –1 (for a '0') in a balanced modulator. At the receiver there will be an ambiguity as to which phase shift is a '1' and which corresponds to a '0'. One way around this is to transmit a known patterns of '1's and '0's. If this preamble is received inverted then we know the demodulation is upside down and needs to be swapped. The other way is by differential coding. Instead of transmitting the absolute phase, a '1' is sent by changing the phase from one bit interval to the next, for a '0' the phase is not changed. Therefore a string of zeros will appear as an unchanging plain carrier, and a string of '1's as a repeated pattern of 0 - 180° phase changes.

The complexities for PSK are those of carrier and bit clock regeneration, as well as controlling the spectrum of the signal. These will be covered next time. ♦

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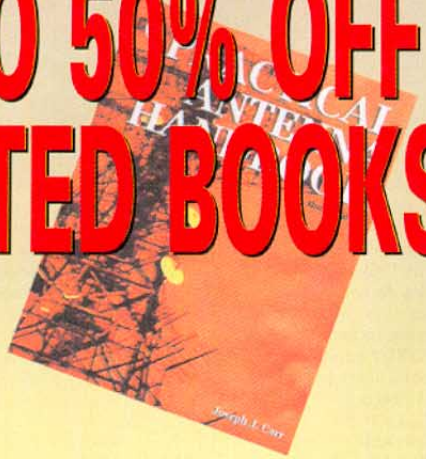

Meet the PW team: Peter - Tex - Donna

the last Word

Cold Shoulder - Teacher Responds

In reply to G3HJF's letter ('The Cold Shoulder', *The Last Word*, February 2001), much as I appreciate his good intentions in offering his services to local schools, he must understand that head teachers have a statutory duty to ensure the safety of children (and staff) in their care. As a result, legislation requires that anybody working within the school environment must have a police check. The police charge the schools a fee for this service.

Also, I suspect the offer of children visiting G3HJF's shack will have been refused on two counts:

1. Health and Safety - should a child be injured while visiting G3HJF's property the school would be liable (and individual teachers held responsible) for any accidents that occur.

2. In visiting G3HJF's home it could appear that the school has implied it is OK for children to visit G3HJF's home at any time. In the light of the recent child abuse cases no head teacher can afford to take *any* chances.

I am sorry if this has caused offence to G3HJF, but as a teacher I cannot take risks with the children in my care. Perhaps if G3HJF could get involved with a suitable local museum this could provide a platform for him to demonstrate amateur radio

Mike Davis, G0ROT

Talk to the Grandparents

Your correspondent G3HJF (*The Last Word* Feb 2001) has highlighted some of the difficulties encountered in trying to raise awareness of amateur radio amongst young persons. Clearly this is now an area which is best left to our more formal arrangements with teacher's organisations. However, I would like to suggest that we are neglecting the other end of the age spectrum.

Many people now retire at a much earlier age than hitherto and seek new activities, one of which is amateur radio. Also, when they do discover the pleasures to be gained through this, they tend to retain that interest. It would therefore be appropriate to send our publicity material to organisations such as SAGA, for inclusion in their magazines. Other outlets would be retirement counselling, occupational therapy and social worker's organisations. It would be worth stressing that this is an indoor activity which allows regular contact with a growing circle of friends, and it can be pursued from the comfort of home. It is far more than a substitute for the telephone, and a licence is easier to obtain now than at any previous time. Even attending RAE classes can be a pleasant social activity, and an opportunity to make new friends.

If individual members feel they have the necessary skills to be able to communicate their enthusiasm to others, there are plenty of church, social and cultural groups which would be only too pleased to receive a presentation and demonstration, usually before an audience of adults of rather mature years! To summarise my thoughts I think the message should be: 'enthuse the grandparents'; they are the people to pass on the message to the next generation of radio amateurs!

Jack Hardcastle, G3JIR

D68C Commended

I have just read the piece about the D68C DXpedition in *RadCom* ('Down to Earth' February 2001) and wanted to let you know how motivating it is to realise that you're talking to *me* and all the other guys who can't really compete with the DX hounds, so don't normally bother. Everything's been well explained. You have fired me up to have a real try to make a QSO.

I have just moved QTH and am not set up yet but your little dipole sketch is great. Well done, indeed. I might just mention that my rigs are all 'home brew' QRP kit - so no split operation. There's a fix for this in the latest *Sprat* that might work. If not, I'll borrow a rig, but it will still be 5W maximum.

Thanks again. We need more of this 'brotherhood of the air' stuff in the hobby.

Alan Oatey, M0AVN

[*I'm pleased to report that Alan did indeed contact D68C on 24.9MHz CW* - Ed.]

. . . I write to commend a great British success - the D68C DXpedition to the Comoro Islands. Not only was it a thrill to work this keenly-sought DXCC entity, but it was a delight to experience the professionalism and skill of the operators as they consistently worked the pile-ups. This was a fine example of amateur radio conducted with a professional approach.

Thanks for a new one on five bands using just 100 watts and a vertical!

Wesley Irwin, MM0BMA

Three Centuries Amateur!

I would like to add my name and call to the many members of the RSGB who offered hearty congratulations to Dr Sowter, G2OS, on achieving 100 years of age. It is wonderful to know that he is still active but I do not believe I have had a QSO with him as I confine my activity to CW, except in emergency!

Dr Sowter is also probably aware that he reached another milestone in his life on 1 January because, since that date, he has have lived in three centuries! He was born on 28 August 1900, some three weeks after the Queen Mother's date of birth, during the last year of the 19th Century.

I am 77 years of age and it makes an interesting comparison for me to read that Dr Sowter obtained his first amateur radio call, 2OS, in 1922 (in year number 22 of the 20th century) whereas I was born in 1923.

Richard Johnson, G2FFO

Morse Code *Not* Dead!

I am a very ordinary radio amateur, a retired engineer, running an IC-729 transceiver bought in 1992 and a wire aerial. No way can I be called an "academic, specialist researcher or the like", but during the year 2000 I did make 1071 QSOs using Morse code and so far this year I have managed 192. I wonder where this puts me in the eyes of G7PBO (*The Last Word*, February 2001)?

With the closure of shipping CW circuits, the need for radio amateurs to be proficient in the use of Morse code may no longer apply. This is a matter for governments, but to put the use of Morse in the same category as that of Latin or Ancient Greek is just not correct. Thousands of radio amateurs all over the world use Morse as a living language. Just listen on the amateur bands, you'll hear them. I doubt if the same applies to the classical languages.

With tongue in cheek, may I remind people that Morse code is a more modern mode than speech. People were talking several thousand years before Samuel Morse was born.

George Davis, G3ICO

. . . I read with interest the letter written by Mike, G7PBO. He does appear to have got into quite a state regarding Morse. I suppose I could get into the same state regarding computers, but every man to his own. I cannot agree with him, however, that Morse is dead. He should listen on the CW ends of the bands to hear the amount of activity that takes place.

It should be noted that a CW rig can be made (or bought) and communication over great distances achieved using low power and very cheaply. Many operators living in countries not so well off as our own cannot afford or 'black boxes', therefore 'home brew' CW rigs are their only means of communication, with SSB rigs out of the question to build or buy.

I get great enjoyment out of my CW contacts. I'm not the fastest operator nor the best, but I've always wanted to do it. I have met many Novices, Class B operators and CBers who want to have a go at CW and I wish them all the best of luck. After reading the letter, perhaps it would be better if Mike bought a good mobile phone and forgot the hobby!

Dennis Simms, G4FQZ

[*The above is a representative sample of the many letters received on this subject, almost all of which made the point that Morse code is definitely* not *dead. This subject is now closed - for the moment, anyway!* - Ed.]

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JOiN THE TRUNKED RADIO REVOLUTION WITH YOUR WiNRADiO RECEiVER!

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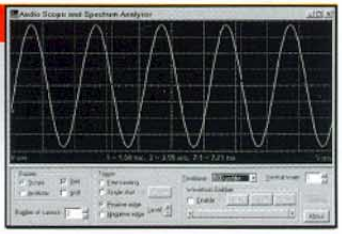
The WiNRADiO Trunking Option*
Trunking systems are used by public safety, transportation, business, law enforcement, government, military and other organisations. This software includes major trunking modes: Motorola SmartNet® and MPT1327.

ONLY £81.07 inc vat

TAKE A LOOK AT WiNRADiO's DIGITAL SUITE (AWARDED 5 STARS BY WRTH)



1. WEFAX / HF Fax
2. Packet Radio for HF and VHF
3. Aircraft Addressing and Reporting System (ACARS)
4. Audio Oscilloscope, real time Spectrum Analyzer with calibration cursors
5. Squelch-controlled AF Recorder
6. DTMF, CTSS decode and analyse

The DSP applet provided with the WR3100i spectrum monitor ISA card (£995+VAT) allows continuous control of audio bandwidth and other signal conditioning functions.

ONLY £81.07 inc vat
(requires SoundBlaster 16 compatible sound card)

WiNADiO® PC RECEIVERS

Available as either an internal ISA card that slips inside your PC, or as an external (portable) unit. WiNRADiO combines the power of your PC with the very latest in synthesised receivers.

YOU CAN USE WiNRADiO™ SCANNiNG PC COMMUNiCATION RECEiVERS FOR:
Broadcast, media monitoring, professional & amateur radio communications, scanning, spot frequency, whole spectrum monitoring, instrumentation surveillance and recording.

If you're after the ultimate receiver-in-a-PC with full DSP then smile and say, "Hello" to the new **WR3100i-DSP** with its hardware for real-time recording, signal conditioning and decoding applications. It's all you need.

NEW EXTERNAL MODELS

EXTERNAL WiNRADiO™
We are now able to offer you a complete range of stand-alone WiNRADiO comms systems:

- **WR1000e - £359** INC VAT
- **WR1550e - £429** INC VAT
- **WR3100e - £1169** INC VAT

Each stand-alone unit connects to your PC through either the basic RS232, or through an optional PCMCIA adapter (for high speed control).
The units are powered through either your existing 12v supply, or through an (optional) NiMH rechargeable 12v battery pack.

"It's software is excellent.. more versatile and less idiosyncratic than that of the Icom IC-PCR1000"
WRTH 1999 Review

"Five stars for its mechanical design"
WRTH 1999 Review

"Most Innovative Receiver"
WRTH 1998 Awards

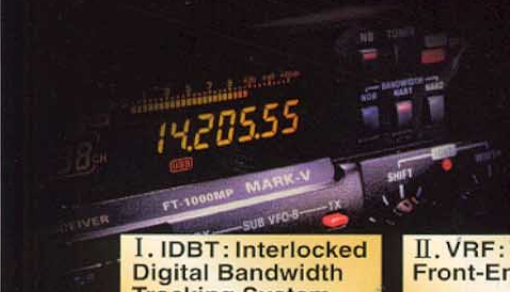
Model Name/Number	WR-1000i & WR-1000e	WR-1550i & WR-1550e	WR-3100i & WR-3100e
Construction of internals	WR-1000i/WR-1550i-3100iDSP- Internal full length ISA cards		
Construction of externals	WR-1000e/WR-1550e - 3100e - external RS232/PCMCIA (optional)		
Frequency range	0.5-1300 MHz	0.15-1500 MHz	0.15-1500 MHz
Modes	AM,SSB/CW,FM-N,FM-W	AM,LSB,USB,CW,FM-N,FM-W	AM,LSB,USB,CW,FM-N,FM-W
Tuning resolution	100 Hz (5 Hz BFO)	10 Hz (1Hz for SSB and CW)	10 Hz (1Hz for SSB and CW)
IF bandwidths	6 kHz (AM/SSB), 17 kHz (FM-N), 230 kHz (W)	2.5 kHz(SSB/CW), 6 kHz (AM) 17 kHz (FM-N), 230 kHz (W)	2.5 kHz(SSB/CW), 6 kHz (AM) 17 kHz (FM-N), 230 kHz (W)
Receiver type	PLL-based triple-conv. superhet		
Scanning speed	10 ch/sec (AM), 50 ch/sec (FM)		
Audio output on card	200mW	200mW	200mW
Max on one motherboard	8 cards	8 cards	6-8 cards (please ask)
Dynamic range	65 dB	70 dB	85dB
IF shift (passband tuning)	no	±2 kHz	±2 kHz
DSP in hardware	no - use optional DS software		YES (ISA card ONLY)
IRQ required	no	no	yes (for ISA card)
Spectrum Scope	yes	yes	yes
Visitune	yes	yes	yes
Published software API	yes	yes	yes (also DSP)
Internal ISA cards	£299 inc vat	£369 inc vat	£1169.13 inc
External units	£359 inc vat	£429 inc vat	£1169.13 inc (hardware DSP only internal)

PCMCIA Adapter (external):	£69.00 inc vat when bought with 'e' series unit (otherwise: £99 inc vat)
PPS NiMH 12v Battery Pack & Chrgr:	£99 inc vat when purchased with 'e' series unit (otherwise: £139 inc vat)
The WiNRADiO Digital Suite:	£74.99 inc vat when purchased with a WiNRADiO receiver (otherwise: £81.05 inc vat)

For your free (no obligation) info pack & WiNRADiO demo disk go to: http://www.broadercasting.com. If you don't have access to the internet then by all means feel free to phone/fax us. *Trunked radio transmissions should only be received & decoded with permission of the originator of the transmission.

Please send all your enquiries to: info@broadercasting.com or Telephone: 0800 0746 263 or +44 (0)1245 348000 - Fax: +44 (0)1245 287057
Broadercasting Communication Systems, Unit B, Chelford Court, Robjohns Road, Chelmsford, Essex, CM1 3AG, United Kingdom

"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

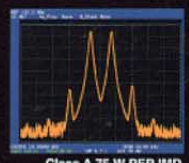
Utilising two Philips® BLF 147 Power MOSFETs in a 30 V push-pull configuration the MARK-V's Transmitter generates up to 200 Watts of the cleanest RF Power output available thanks to the conservative design of the PA Section.

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!

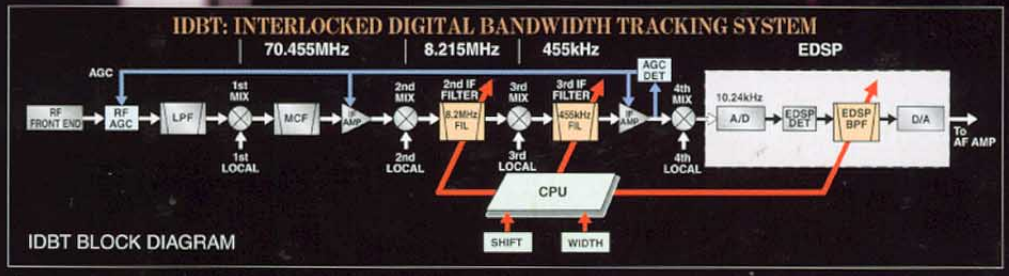
Access VRF and IDBT Features via Shuttle Jog Dial

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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