RSGB AGM in Hamilton, Scotland, 1 December

www.rsgb.org

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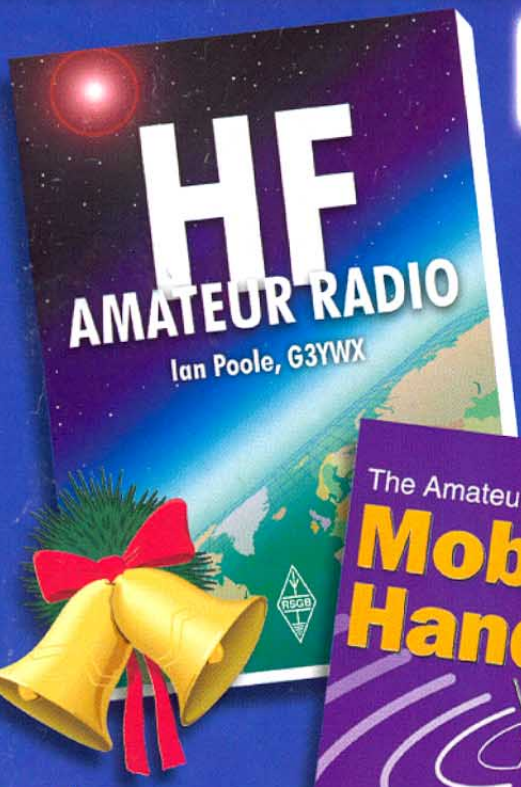
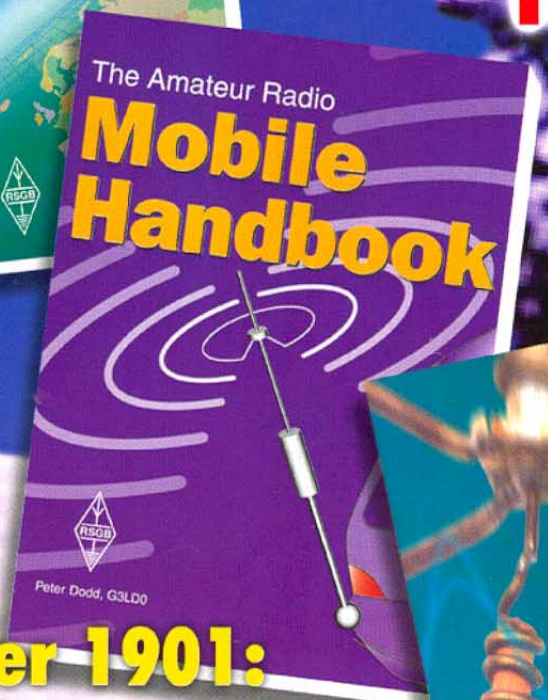
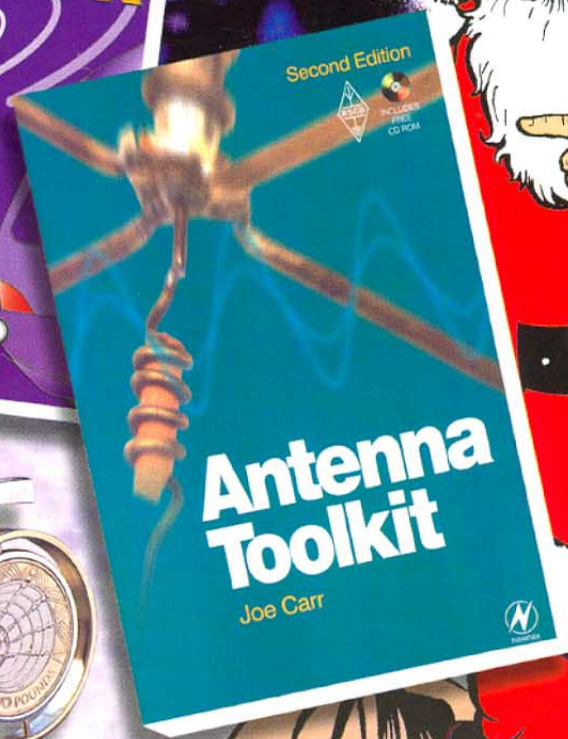
RadCom

£3.95 Vol 77 No 12 ♦ December 2001 The Radio Society of Great Britain Members' Magazine

New RSGB Books & Gifts for Christmas

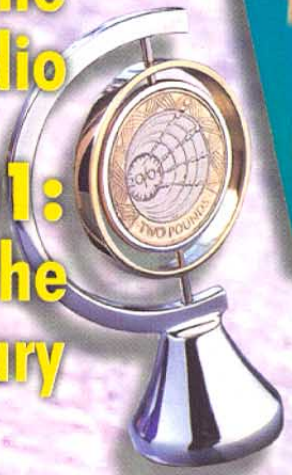






December 1901: Marconi Spans the Atlantic with Radio

December 2001: Celebrate with the Marconi Centenary Contest



WATERS & STANTON

- e-mail: sales@wsplc.com
- on-line catalogue: www.wsplc.co
- freephone orders: 08000 73 73 88

FT-817 160m - 70cms 5W Portable

£799.95 carr.£8

FT-817 is an incredible design feat by Yaesu, and world reviews agree that there has never been anything like it. It's not expensive either. So why not get out in the fresh air, or put one in the car, and put the fun back into your radio. Check out the exciting AT & ATX portable antennas elsewhere in our add.

HF Whips for FT-817

AT-80	80m telescopic	£24.95
AT-40	40m telescopic	£24.95
AT-20	20m telescopic	£19.95
AT-17	17m telescopic	£19.95
AT-15	15m telescopic	£19.95
AT-12	12m telescopic	£19.95
AT-10	10m telescopic	£19.95
ATX	WBNC	£Phone

Carriage charge £2 each

OTT-1 One Touch Tune

Plugs into rear of FT-817and gives immediate carrier for adjusting ATU or checking VSWR

£59.95 carr.£6

W-25SM 25 Amp Switch-Mode Power Supply.

Switched 230 / 115V AC input and fixed 13.8V output at 22 Amps continuous and 25 Amps peak. Over voltage and over current protected and fan cooled. Measures 180mm (W), 75mm (H) and 190mm (D) excluding terminals. Provided with detachable 13 Amp plug and cable. NEW

£69.95 carr.£6

MFJ-Micro Key MFJ-561

FT-817Micro Paddle

This tiny paddle really is a masterful idea. It's simple, yet very effective. Built from phosphorous bronze, it comes with 1m lead and 3.5mm stereo plug. NEW

£24.95 carr.£2

Z-11 Auto ATU for FT-817 160m - 10m

£199.95 carr.£6

YAESU

FT-1000MP Mk-V 200W HF All Mode £2899

3 YEARS FREE WARRANTY

Plus £8.00 Carr.

SPECIAL OFFER FROM W&S.

Your choice of one **FREE** accessory this month only.

Either:

FREE MD100ABX BASE MIC. or
FREE SP8 EXTERNAL SPEAKERS or
FREE TCXO-6 TCXO UNIT or
FREE FILTER

PHONE FOR FULL DETAILS

FT-847 160m - 70cm All Mode £1199

3 YEARS FREE WARRANTY

Plus £8.00 Carr.

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

Accessories for FT-847

FC-20 ATU	£219 B	MD-100ABX Mic	£110 B
SP-8 Speaker	£139 B	YF-115C Collins	£99 B
FVS-1A Vce synth	£38 B	YF-115S Collins	£99 B

FT-100 D 160 - 70cm All Mode £1049

SAVE

Plus £8.00 Carr.

Yaesu's latest version is now available and includes 500Hz CW filter, high stab. oscillator and CTCSS decoder.

FT- 920AF HF 160m-6m-100w £1099

Plus £8.00 Carr.

100 Watts from 1.8 to 54MHZ with dual VFO controls. Features DSP, Shuttle-jog, Internal ATU, 100 memories and built-in message keyer. Supplied with FREE FM unit.

MD-200A8X £249

SAVE

Plus £6.00 Carr.

Yaesu's Secret Weapon! NEW

The best microphone Yaesu have ever produced. Featuring Variable Side Pressure Control. You can adjust the audio response precisely to meet your personal requirements.

But there is more!

There is also provision for fitting and selecting an additional element that can be selected via the switch provided. The HEIL ceramic elements are ideal for this. Why not fit the HC-5 DX element, just £32.95 - IN STOCK

KENWOOD

TS-2000 160m - 70cms+23cms option £1695

3 YEARS FREE WARRANTY

Plus £8.00 Carr.

+FREE HEIL MIC OF YOUR CHOICE

The amazing TS-2000 offers coverage from HF to UHF. And you can go right up to 23cms with the optional module Monitor the DX cluster whilst working other DX, optimise your satellite contacts, enjoy the benefit of built-in ATU. It's all there in one very compact box. Colour brochures available on request.

TS-570DG 160 - 10m All Mode £849

3 YEARS FREE WARRANTY

Plus £8.00 Carr.

Possibly the best value in budget class HF radios. 100 Watts out on all HF bands with DSP and variable CW filtering. Lovely large dial and built-in memory keyer. We even give you a built-in ATU. Great value!

TS-570 Accessories

VS-3	Voice synth	£45 A	MC-80	Desk mic	£72 B
DRU-3A	Recording	£99 B	PS-33	Power supply	£199 C
HS-5	H'phones	£52 B	SP-23	Speaker	£68 B
MC-90	Desk mic	£187 B	CW	filters each	£61 B
			SSB	1.8kHz	£61.95B

10M OR 15M WHIPS £19.95

SUPER VALUE

Plus £2.00 Carr.

100W 10m & 15m Mobile Whips with magnetic mount +
Built-in impedance transformer

Just over 1m long, complete with magnetic base, shock spring, 5m coax cable with PL-259 and built-in impedance transformer for 1:1 VSWR. Centred on 28.5MHz or 21.250MHz, this is an absolute bargain! Get ready for the Autumn and Winter DX.

SGC SG-2020 £599

Plus £2.00 Carr.

0 - 20 Watts Output
SSB CW AM Data
RF & VOGAD Processing
Variable Selectivity (100HZ)

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

- NEW SG-2020 ADSP now available £799 carriage £8.00
- SG-237 mini auto coupler ideal for SG-2020 £369

ICOM

IC-746 160m - 2m All-mode £PHONE

3 YEARS FREE WARRANTY

Plus £8.00 Carr.

Accessories

FL-100	CW	£59 B	RS-746	Software	£44 A
FL-101	CW	£84 B	SM-8	Mic	£129 B
FL-103	SSB	£59 B	SM-20	Mic	£149 B
FL-223	SSB	£59 B	SP-21	Speaker	£74 B
			UT-102	Vce Synth	£32 B

IC-756PRO 1.8 - 52MHz 100W £1895

3 YEARS FREE WARRANTY

Plus £8.00 Carr.

IC-756PRO Accessories

CT-17	RS-232	£99 B	SP-20	Speaker	£164 B
SM-8	Base mic	£129 B	SP-21	Speaker	£74 B
SM-20	Base mic	£144 B	UT-102	Voice synth	£32 A
			PS-85	Power supply	£265 B

IC-706IIG 160m - 70cm All Mode £999

3 YEARS FREE WARRANTY

Plus £8.00 Carr.

New Heil Hands-Free Headset.

This single piece headphone with boom microphone, from Heil USA, allows true hands-free operation using VOX. Wired for IC-706 (all models) it includes PTT switch. Built-in amplifier means no more low audio from older IC-706 models! All this for just £59.95 B

IC-706IIG Accessories

AT-180	Auto ATU	£379 B	FL-223 SSB 1.8kHz	£59 B
FL-100	500Hz CW	£59 B	DC Lead (spare)	£16 A
FL-232	350Hz CW	£59 B	3.5m sep cable	£33 A
FL-103	SSB 2.8KHz	£59 B	5m sep. cable	£49 A
			Others: please phone	

IC-775 DSP 200W HF £2099

SAVE

Plus £8.00 Carr.

Your last chance to purchase this heavyweight from ICOM. It covers all HF bands and gives a robust 200-Watts output. This really is a classic DX machine that has many followers around the world.

IC-718 100W HF £549

SAVE

Plus £8.00 Carr.

If you are looking for a radio with pedigree, but without a high price tag, then this may the one for you. Covers all HF bands plus wideband receive. Plus auto notch, dual vfo, swr meter etc. Plus options including DSP & filters.

LIMITED SPECIAL OFFER!

MFJ PRODUCT CATALOGUE THOUSAND PRODUCTS FROM MFJ/ MIRAGE/ VECTRONICS/HYGAIN + AMERITRON PHONE OR SEND LARGE SAE FOR FREE COPY

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YAESU

FT-1500M 2M FM Mobile £159 Plus £8.00 Carr.

SPECIAL OFFER

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

KENWOOD

TM-D700E 2m + 70cm FM £449 Plus £8.00 Carr.

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

TM-G707E 2m + 70cm FM £289 Plus £8.00 Carr.

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

TM-V7E 2m + 70cm FM £359 Plus £8.00 Carr.

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

ICOM

IC-207H 2m + 70cm FM £279 Plus £8.00 Carr.

A great budget class radio for VHF & UHF use.

IC-2800H 2m + 70cm FM £419 Plus £8.00 Carr.

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

IC-2100H 2M FM Mobile £229 Plus £8.00 Carr.

Rugged design with switched receive filters 12.5/25kHz

IC-910 2m + 70cm All Mode £1299 Plus £8.00 Carr.

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

YAESU

FT-7100 2m/70cm Mobile £Phone Plus £8.00 Carr.

NEW

Just arrived is this new dual band radio that has extended rx. Power is 50/35W.

Features dual in-band reception and detachable display (requires YSK-7100).

FT-41R 70cm CLEARANCE PRICE £99 Plus £6.00 Carr.

LAST FEW

* 430 - 440MHz FM
* Two independent VFOs
* 151 channels or 75 Alphanumeric
* 7 channel steps
* 4 power levels
* 1.5W 4 x AA cells (FNA-14)
* 3.5W @ 9.6V DC (FNB-38)
* Alphanumeric
* DTMF
* CTCSS (optional)

KENWOOD

TH-D7E 2m + 70cm £299 Plus £8.00 Carr.

Data Communicator

One of the most successful handhelds over the past few years. It has a built-in TNC for Packet use. You can also use it for APRS operation in conjunction with an external GPS unit. Plus NMEA, 200 memos, and up to 5W output.

NEW

TH-F7E 2m + 70cm £269 Plus £8.00 Carr.

NEW

With extra wide Rx coverage

FREE BT-13

Up to 6W out with Li-ion battery and "scanner" style coverage from 100kHz to 470MHz including SSB on receive! This is a great radio to have at all times when you are on your travels.

ICOM

IC-Q7E SPECIAL OFFER £139 Plus £8.00 Carr.

The IC-Q7E Dual band transceiver with excellent wideband coverage - very popular with radio amateurs. The built-in receiver covers a wide frequency range from 30 to 1309MHz in FM, AM and FM broadcast modes. Excellent choice if you require a small dual-bander with scanner coverage.

HORA

HORA C-408 70cm £49 Plus £5.00 Carr.

HOCKLEY ONLY

230mW
CTCSS
Digital Display

Very much underrated handy. Covers the full 70cm band. Wideband receive possible. Very compact fits into top pocket. Ideal for use at rallies. Only uses 2x AA batteries (not included).

SPECIAL OFFER

ADI

ADI AT-600 2m/70cms £179 Plus £6.00 Carr.

HOCKLEY WAREHOUSE EXCLUSIVE

* Dual Band 2m/70cms
* Up to 5 Watts out
* Airband Receive
* Nicad Pack * CTCSS
* Hod Charger

You won't find better value than this. Limited stocks

ADI AT-201 £99 Plus £5.00 Carr.

* 2m Handy
* 2.5W, 5W (13.5V)
* 1750Hz & CTCSS
* Wideband receive
* Drycell case
* Batteries not included
* Full keypad

Higher power than most palm sized models. Fully (illuminated) keypad for ease of frequency entry. Channel or frequency readout.

ADI AT-147 2m 50W £199 Plus £8.00 Carr.

With Airband Receive

2m FM mobile transceiver. Three power levels 50,10,5W. Displays frequency or channel numbers, and offers Airband AM receive

YAESU VX5R BLACK OR SILVER FINISH £PHONE Plus £6.00 Carr.

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

YAESU VX1R 2m/70cm Handheld £145 Plus £6.00 Carr.

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

SECOND HAND LIST

HF Transceivers	
IC-725 x3	£399.00
IC-725	£499.00
IC-728	£495.00
IC-737	£699.00
TS-850S x2	£699.00
TS-850SAT x2	£749.00
MFJ-9020	£115.00
MX-3.5S	£149.00
SG-2020 x3	£485.00
TS-120S	£295.00
VHF/UHF Base/Mobile Transceiver	
AR-448	£199.00
2001 x2	£145.00
DR-110E	£125.00
DR-M06SX	£159.00
IC-271E	£349.00
IC-290H	£229.00
TS-811E	£495.00
MFJ-9406X	£149.00
FT-225RD	£499.00
FT-290R	£159.00
FT-290R II	£249.00
FT-690R II	£299.00
FT-712RH	£125.00
FT-5200 x2	£299.00
VHF/UHF Hand Held Transceiver	
DJ-190E	£99.00
DJ-480	£99.00
IC-M11	£199.00
IC-Q7E	£115.00
IC-T7E x2	£199.00
TH-79E	£175.00
TH-D7E	£249.00
C-108	£89.00
C-408	£89.00
TH-41E	£85.00
VX-5R x2	£199.00
Shortwave Receivers	
YB-500	£69.00
NRD-525 x2	£529.00
HF-125	£199.00
HF-225 x2	£249.00
DX-394	£99.00
R-9914	£69.00
ICF-SW77	£199.00
ICF-SW100E	£115.00
ICF-SW1000T	£299.00
ICF-SW7600D	£79.00
WA-8000	£199.00
TMR-7602	£59.00
Scanners Mobile/Base	
AR-3000	£300.00
RD-500VX	£599.00
Opto-Com	£329.00
Scanners Hand Held	
DJ-X1	£99.00
R-11 x2	£199.00
MVT-7000	£125.00
Station Accessories	
PK-232MBX	£185.00
PK-900	£299.00
ALS-600XCE	£899.00
BY-1	£59.00
LPM-144-3-100	£139.00
Explorer	£499.00
SM-5	£49.00
ICS	£50.00
FAX-1	£125.00
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KPC-3+	£109.00
EK-4	£35.00
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EP-925	£69.00
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MFJ-784B	£139.00
MFJ-1274	£100.00
MFJ-1278BX	£225.00
MFJ-1610	£4.00
PT-105A	£25.00
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MML-144-30-LS	£69.00
KX-2	£59.00
KX-3	£59.00
2600HA	£79.00
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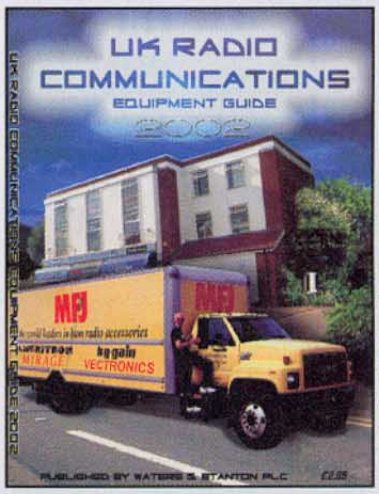
Micro-RF	£69.00
Mini-Scout	£129.00
Pico-2	£149.00
Bravo Pro	£50.00
PowerClear	£199.00
LT-23S	£499.00
Masterkey II	£49.00
DSP-59+	£149.00
WAT-2	£35.00
WM-2000	£59.00
FIF-232C x2	£49.00
FL-2025	£99.00
MD-1	£69.00
MD-100A8X	£79.00
Miscellaneous	
AE-2850	£50.00
KH-104	£60.00
GPS-II Plus	£149.00
GPS-3000	£89.00
77-095	£30.00

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

CARRIAGE CHARGE CODES:
A=£2,
B=£6,
C=8 Others: phone

NEW AND EVEN BIGGER



New 2002 Catalogue
336 pages
£2.95
carr: £1.25

The foremost guide to amateur radio products from the latest transceivers to the smallest of accessories. Full colour pages with comprehensive specifications, there is nothing else like it in the world! There is also some editorial and reviews. Three times the size of many magazines, yet it costs no more.

INCLUDES MONEY SAVING VOUCHERS

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CUSTOMER SERVICE — THE ONLY THING WE **WON'T** DISCOUNT

Get in Front with HUSTLER

5BTV

£199.95 Carr. £8.00

4BTV

£159.95 Carr. £8.00

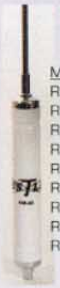
HUSTLER®

BASE STATION ANTENNAS

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

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

HUSTLER Mobile Antennas



Model	Band	Bandwidth	Price
RM-10	10m	150-250kHz	£19.95 B
RM-11	11m	150-250kHz	£19.95 B
RM-12	12m	90-120kHz	£19.95 B
RM-15	15m	100-150kHz	£19.95 B
RM-17	17m	120-150kHz	£22.95 B
RM-20	20m	80-100kHz	£22.95 B
RM-30	30m	50-60kHz	£25.95 B
RM-40	40m	40-50kHz	£25.95 B
RM-80	80m	25-30kHz	£29.95 B

Model	Band	Bandwidth	Price
RM-10-S	10m	250-400kHz	£24.95 C
RM-15-S	15m	150-200kHz	£25.95 C
RM-20-S	20m	100-150kHz	£29.95 C
RM-40-S	40m	50-80kHz	£35.95 C
RM-80-S	80m	50-60kHz	£49.95 C

Lower mast sections

MO-1	54" (FOLD @ 22")	£31.95 C
MO-2	54" (FOLD @ 27")	£31.95 C
MO-3	54" (NON FOLD)	£25.95 C
MO-4	27" (NON FOLD)	£21.95 C

WATSON

80m + 40m Monoband Verticals £69.95

Plus £8.00 Carr.

NEW

Low Cost LF Mono Band Verticals For Small Gardens

- Mono Band
- 40m or 80m
- Hustler Resonator
- Height 5m approx
- 400 Watts
- Ground mounted
- No Radials Essential
- SO-239 Feed

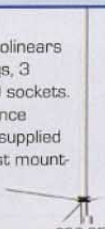
PBX-100 Portable HF £99.95

Plus £8.00 Carr.

80m - 10m 200W

The PBX 100 offers 80m - 10m operation (max 4-bands at any time) with a height of just 3.6m. Supplied with ground spike, it takes seconds to erect, yet collapses down to little more than 1m. like all ground mounted verticals, it benefits from radials, and the radial wire is provided. Use it in the garden, in the countryside or abroad. SO-239 connection.

Base VHF/UHF Verticals



2m / 70cm fibre glass colinears with stainless steel fittings, 3 short radials and SO-239 sockets. These are high performance antennas, pre-tuned and supplied with all hardware for mast mounting.

Dual Band 2m/70cms

W-30	3/6dB 1.15m long	£39.95 C
W-50	4.5/7.2dB 1.8m long	£49.95 C
W-300	6.5/9dB 3.1m long	£59.95 C

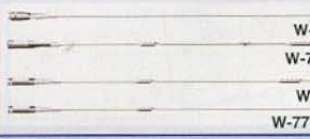
Triple band 6m/2m/70cms

W-2000	0/6/9dB 2.5m long	£69.95 C

Great Value Mobile Whips

W-285	2m 5/8th whip with PL-259 base	£14.95 B
W-7900	2m/70cm 5 & 7.5dB length 1.58m	£32.95 B
W-627	6m / 2m / 70cm 2 / 4.5 7.2dB length 1.6m	£34.95 B
W-770HB	2m/70cm whip 3dB / 5.5dB length 1.1m	£24.95 B

All with tiltover bases.



WSMA-450 2m/70cm £12.95

Plus £2.00 Carr.

Just 4.5cm Long!!

Extremely low profile SMA antenna with transmit (Tx) capability on two bands as well as useful wideband reception across the VHF and UHF spectrum. Ideal for use with covert transceivers/scanners. and for shirt pocket use.

CUSHCRAFT

COMMUNICATIONS ANTENNAS

HF Horizontal Beams + Dipoles

When you buy an HF Yagi, you want quality and realistic performance. You also want to know you can get spares. We offer a wide choice with guaranteed spares availability.

COUNT ON US!

MA5B	10-20m (5 band) 3 el 2.7m radius 1.2kW	£299.95 C
X-7	10-20m 7 el. 12.5 - 13dBi 2kW 6.09m radius	£669.95 D
X-740	40m add on kit for X-7	£269.95 C
A4-S	10-20m 4 el. 8.9dBi 2kW 5.49m radius	£529.95 D
A-744	Gives 40m or 30m operation from A-4S	£149.95 C
A3-S	10-20m 3 el. 6dBi 2kW 4.72m radius	£459.95 D
A-743	Gives 40m or 30m operation from A3-S	£149.95 C
A3-WS	12 & 17m 3 el. 8dBi 2kW 4.4m radius	£349.95 D
A-103	Gives 30m operation from A3-WS	£149.95 C
D-3	10-20m dipole element 7.86m 2kW	£219.95 C
D-3W	12, 17, 30m 17m dipole element10.37m 2kW	£219.95 C
D-4	10-40m dipole element 10.92m 2kW	£299.95 C
D-40	40m dipole element 12.88m 2kW	£259.95 C
XM-240	40m 2 el. 6dBi 7.3m radius 2kW	£699.95 C
Ten-3	10m 3 el 8dBi 3m radius 2kW	£189.95 C
ASL-2010	13.5-32MHz 8 el. log periodic6.4dBd 5.86m radius	£749.95 D

The Mini-Beam For Small Gardens

Cushcraft MA5B

The best 3 element mini beam you will ever find. 2 element gain on 10, 15 & 20m, and dipole performance on 12m and 17m. Up to 25dB F/B ratio, it accepts 1.2kW yet has a boom length of only 2.2m and element length of just 5.2m Turning radius is 2.7m. Uses a single feeder, this really works the DX. Get one up before winter!£299.95 C

Cushcraft Verticals

R8 (Illustrated), covers 8 bands from 6m - 40m, stands 8.7m high and requires no radials. You can feed it with 1.5kW and typical VSWR is around 1.2:1 £469.95 C

R8-GK Optional guy kit for R8 **£49.95 B**

R-6000 6 band 6m-20m that requires no radials and handles 1.5kW. Stands just 5.8m high and was chosen for the RSGB GB4FUN vehicle antenna. It works!! £329.95 C

NEW MA5V VERTICAL 20-10m **£229.95 C** NOW IN STOCK

WATSON

WEP-300B Earpieces £2.95

Plus £2.00 Carr.

Over-the-ear earpiece, popular for security and emergency use. Its low cost and firm mounting even in arduous conditions make this a popular item. Kenwood version fitted with 2.5mm jack plug, and the RA version with 2.5mm right-angled mono jack plug.

WSA-1 PSK-31 Adaptor £39.95

Plus £6.00 Carr.

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

YS-130 Rotator £79.95

Plus £8.00 Carr.

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

Frequency Counters

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

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

MASPRO VHF/UHF YAGIS

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

Take a look at our prices!

144-WH5	2m 5 el. 6.6dBd 0.93m	£26.95 B
144-WH8	2m 8 el. 8.8dBd 1.79m	£37.95 B
144-WH10	2m 10 el 9.7dBd 2.3m	£41.95 B
435-WH8	70cms 8 el. 8.6dBd 0.8m	£29.95 B
435-WH12	70cms 12 el. 12.8dBd 1.51m	£35.95 B
435-WH15	70cms 15 el. 14.2dBd 2.19m	£41.95 B

To compare with dBi figures, add 2.4dB

WATSON

QS-112 Speaker Mic £16.95

Plus £2.00 Carr.

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

SPM-102 Speaker Mic £9.95

Plus £2.00 Carr.

Incredible value!

Has 4-way 3.5mm plug for VX-1, VX-5, FT-50 and IQ-7E Handies

Limited stocks.

WM-308 Base Mic £59.95

Plus £6.00 Carr.

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

WCT-321 Lapel Talker £19.95

Plus £2.00 Carr.

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

Avair VSWR Power Meters

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

AV-200	1.8 - 200MHz 5/20/200/400W	£49.95 B
AV-400	140 - 525MHz 5/20/200/400W	£49.95 B
AV-600	1.8 -525MHz 5/20/200/400W	£59.95 B

All fitted with SO-239, PEP/RMS readings, 3W for FSD approx. AV-600 has dual sensors.

RSGB Matters

MARCONI CENTENARY CONTEST

THIS MONTH marks the 100th anniversary of that famous occasion when, on 12 December 1901, Marconi received the letter 'S' in Morse code transmitted by his colleagues on the other side of the Atlantic. To celebrate, the RSGB has teamed up with the Radio Amateurs of Canada (RAC) to announce the Marconi Centenary Contest, which takes place on **29 December**. Full details can be found on page 79 this month. It should be pointed out the special short contest calls (eg G1A, M2B, GM3C, MW4D etc) are *not* valid for this contest.

MARCUSE MEMORIAL

THE RSGB HAS donated £200 for the foundation of a memorial garden and plaque in memory of Gerald Marcuse, G2NM. Gerald Marcuse was a founder member of the RSGB and its President in 1929 - 1930. The rockery garden and plaque, set in a large stone, can be found in Marcuse Road, Hambledon Park, Caterham, Surrey.

FOUNDATION LICENCE PILOT SCHEME

TWELVE SITES across the UK have been selected to take part in the new Foundation Licence 'pilot scheme'. The sites are a mixture of clubs, schools, youth organisations and a number of disabled candidates. This trial is designed to test out the syllabus, tutor guide, examination software and administrative procedures before the new licence is introduced on 1 January 2002. Many more clubs and organisations have written to RSGB HQ wishing to become involved as part of the pilot scheme. Unfortunately, not all could be accommodated as the number involved in the pilot scheme was always going to be restricted and carried out in a controlled environment.

As part of the Foundation Licence training pilot scheme, the RSGB is offering week-day afternoon Morse Assessment sessions at RSGB HQ in Potters Bar. These sessions are aimed at Full and Novice / Intermediate Class B licence-holders in order to allow them to qualify for a Foundation Licence when these become available on 1 January 2002. Three two-hour sessions took place on 7 November; the next sessions will be held on **Friday 14 December**, at 12 noon to 2.00pm, 2.00pm to 4.00pm and 4.00pm to 6.00pm. Please note that because these sessions will be somewhat experimental, attendees must forgive any 'teething problems'!

Potential candidates who are interested in attending should apply for an application form via the Amateur Radio Department at RSGB HQ, tel: 0870 904 7373; e-mail: ar.dept@rsgb.org.uk or see www.rsgb.org/foundation These two sessions are limited to 40 places, which will be allocated on a first-come, first-served basis. The cost is just £5 and the RSGB will confirm your place on receipt of the form and fee. Refreshments will be available during the event.

It is hoped that before too long this service will be offered across the UK. The aim is to get as many Class B licensees who want to take the assessment through the system before Christmas so that they may go on the HF bands from 1 January.

A VERY Merry Christmas and a Happy New Year to all RSGB members from the General Manager and all Staff at RSGB HQ.

HF CONTEST RESULTS ON THE WEB

THE RSGB HF contests' results tables are now available on the members-only part of the RSGB web site at www.rsgb.org/membersonly These results, supplemented with write-ups, will still be published as normal in *RadCom* but can be uploaded to the web site as soon as the results become available.

2001 RSGB AMATEUR RADIO DINNER

FOLLOWING THE Society's AGM on **Saturday 1 December**, the RSGB will be hosting an Amateur Radio Dinner for members and non-members at the Bothwell Bridge Hotel, Hamilton, Scotland. The guest speaker will be Gaston Bertels, ON4WF, Chairman of the IARU Region 1 Eurocom Committee, who will be giving a fascinating and entertaining talk on his role in liaising with the European Commission and Parliament.

Dinner tickets £18.50. Dress: smart casual. For further details or to book please contact RSGB HQ on 0870 904 7373 or e-mail: GM.Dept@rsgb.org.uk

VHF AWARD NEWS

COLIN POTTER, G6FQZ (OX), successfully claims the first Standard Operating Award using the new postal district and country qualifications. Colin qualified for the 50MHz certificate with confirmed contacts that took place over the past decade.

Also on 50MHz, Ela Martyr, G6HKM (CM), gains a 20 country sticker whilst Robin Burrows-Ellis, M1DUD (IP), gains a 30-country sticker and with Roy White, G6XCY (CM), gain stickers at the 50 level for his squares award.

Graham Stone, 2E1STO (ST), sends successful claims for 10 and 20 countries (2-way) and for 25 squares. Graham also enclosed a claim for the Millennium 2000 Award, the first Novice to claim this award. This contact occurred on 21 June with ZC4FL at a distance in excess of 3400km. For his 6m operations Graham has used an FT-746 with 10W fed to a 5-element Moonraker Yagi. He has recently acquired an IC-746 and is looking forward to working much more with the extra power now permitted.

David Dodds, GM4WLL/P (EH), successfully claims 5 squares on 1296MHz, all contacts being made from his portable location in IO85NR. David is a relative newcomer to 23cm and describes his station as: "Still quite embryonic. It comprises a Yaesu FT-290R MkII as a tunable IF, a Down East Microwave transverter (kit-built), which produces around 2W." At the masthead are a Microwave Components Service 20W amplifier built around a Mitsubishi 'black brick' and a Down East Microwave preamp. The antenna itself is a WiMo 67-element Yagi.

Congratulations to all recipients.

Details on all VHF, UHF and Microwave Awards can be obtained on receipt of an A4 or A5 SASE from the Awards Manager, Tony Jarvis, G6TTL, Dovecote Farm, Patman's Lane, Friskney, Boston, Lincs PE22 8QJ. They are also available on Tony's site on the Internet which is linked from www.rsgb.org Queries may also be sent by e-mail to vhf.awards@rsgb.org.uk

Summary of Award Recipients for October

50MHz: 10 Countries (2-way): 2E1STO. 20c: 2E1STO, G6HKM. 30c: M1DUD.

25 Squares: 2E1STO. 50s: M1DUD, G6XCY.

Standard Operating: G6FQZ.

Microwaves: 1296MHz: 5 Squares: GM4WLL/P.

IARU Millennium 2000: 2E1STO.

EMC COMMITTEE CHAIR VACANT

A REMINDER THAT the vacancy of Chairman of the RSGB EMC Committee still exists. The closing date for applications is **23 November 2001**. The EMC Committee is concerned with Society policy and activity in the increasingly important area of electromagnetic compatibility. The Committee comprises a wide and diverse range of specialists in EMC, supported by corresponding members of the Committee and a network of EMC coordinators, under the membership services administrator. The Chairman's role requires an understanding of the underlying technical issues but, more importantly, good organisation and chairmanship skills.

The Chairman must be able to work closely with the existing Society EMC consultants, and to develop close working relationships with external bodies in the EMC field. A solid awareness of potential EMC threats and pending legislation is also needed.

Applications should be addressed to Hilary Claytonsmith, Chairman of the EMC Committee, at RSGB Headquarters, or to her at g4jks@btinternet.com Please include relevant details of your suitability for the role, referring particularly to the criteria above.

IARU REGION 1 MONITORING SYSTEM

RON RODEN, G4GKO, the co-ordinator of the IARU Region 1 Monitoring System, has been obliged to change his Internet service provider. As a result, the IARU Monitoring System Region 1 web pages can now be found at **http://myweb.tiscali.co.uk/rdnronald**

AROS TALKS AT LOCAL RADIO CLUBS

THE AROS Coordinator, Barry Scarisbrick, G4ACK, will be giving presentations on the work of the RSGB Amateur Radio Observation Service (AROS) at the **South Notts ARC** on **Wednesday 28 November** and at the **Hoddesdon ARC** in Hertfordshire on **Tuesday 4 December**.

The South Notts club has issued an invitation to *all* local amateurs to attend this meeting. Further details from Gary Bishop, G0WUG, tel: 01509 569679 (non-members of SNARC are asked to contact Gary so he knows the number likely to attend). Further details of the meeting at Hoddesdon can be obtained from Don Platt, G3JNJ, on tel: 020 8292 3678.

VIDEOLOGIC DRX-601ES COMPETITION

DON'T FORGET that you still have time to enter the RSGB VideoLogic DRX-601ES competition and win one of these great Digital Radio Tuners, as reviewed in the October *RadCom*. Full details of the competition can be found on page 45 of the November issue, and the closing date for entries is not until after the Christmas/New Year holidays, on **Wednesday 2 January 2002**. Good luck!

MEMBERS ONLY CHRISTMAS OFFERS

A series of unique historical radio kits all based on actual examples from the 1920s. Three of these are crystal sets, whose power is drawn from the radio signal itself, and one is a single valve receiver which uses everyday batteries (not supplied). Aerial and earth wires are included. No special tools or prior knowledge are needed for assembly.

"OLD TOM" CRYSTAL RADIO

This kit looks very similar to the original, but uses a glossy printed image wrapped around a plastic tube to provide the "Old Tom" look. The tuning coil is wound around the top hat. The radio is tuned by moving a metal cylinder up and down within the body.

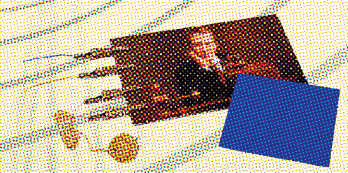
£ 21.24

MATCHBOX CRYSTAL RADIO

The original was probably the smallest commercial radio until Sinclair introduced a transistor version in the 1960s. The kit contains all the parts to build a radio in a matchbox. The components are connected together in a terminal block for which a special screwdriver is provided.

ONLY £9.34

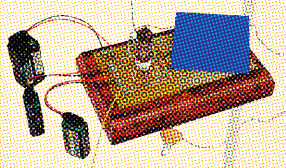
POSTCARD CRYSTAL RADIO



This kit comprises a *ready to use* 2mm thick radio board manufactured using printed circuit technology. It is tuned by moving a metal plate over its flat coil.

ONLY £14.44

ONE VALVE RADIO



The kit needs only four (AA) batteries and one or two (PP3). Although the kit uses a later valve, it is laid out and looks like one of the originals. The components, including an authentic ceramic valve base, are pre-soldered onto the main board.

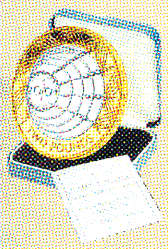
ONLY £14.44

DON'T MISS YOUR LAST CHANCE TO BUY 2001 COINS

MARCONI £2 COIN

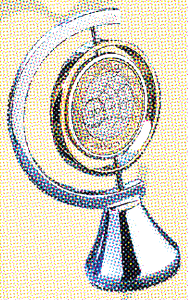
Uncirculated sterling silver with outer ring plated with 22 carat gold Limited Edition.

£26.50



Also available:
Uncirculated £2 coin
£6.95
22 carat Gold £2 coin
£285.00

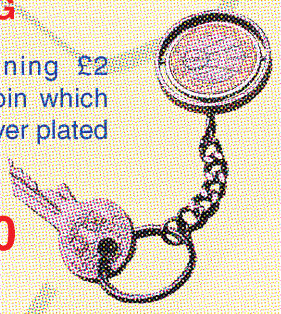
EXECUTIVE SPINNING DESK TOY



Featuring a 2001 uncirculated £2 coin commemorating the achievements of Guglielmo Marconi.

£27.85

KEYRING



With spinning £2 Marconi coin which sits in a silver plated frame.

£13.90

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Available in Jet Black Enamel for all members. Also available in the following finishes for long serving members:

5 Years+ Green
25 Years+ Red
50 Years+ Gold
10 Years+ Blue
40 Years+ White

Deluxe

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Standard

£4.00

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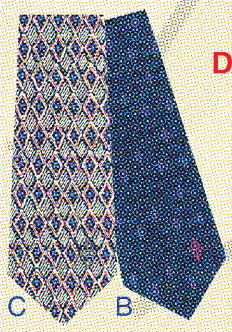

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Durable Polyester

Cream and blue design (order code: TIEC)

Dark Blue with red diamond (order code: TIEB)

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RSGB POLO SHIRTS

- Hardwearing Poly/Cotton
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RSGB BASEBALL CAP

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100% Woven silk

Burgundy, navy and gold woven pattern

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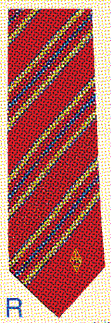

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1.8 to 23 cms all mode with built in dual speed TNC (1200/9600) and a host of features all for £1999.00, also available for £1699 without 23cms. (Requires 25 amp 13.8 volt PSU)

Kenwood TS B2000 **£1599.00**

Kenwood TH-D7E Mk2

Dual Band Hand Held with built in TNC (Ideal for APRS and DX Cluster monitoring)

£299.00

Kenwood TS-570DGE — £849.00

An Ideal first radio offering excellent features for CW operators. Also very well suited for blind operators (with optional VS3) 1.8-30MHz with built in ATU at only £849.00 (Requires 25 amp 13.8 volt PSU)

Kenwood TS-50S

The original HF mobile radio. 100W all mode - still plodding on at only -

£599.95

Kenwood TS-870S — £1399.00

The original DSP HF Radio with built in ATU
(Requires 25 amp 13.8 volt PSU)

Kenwood TH-F7E

The new TH-F7E dual band hand held transceiver with a built in multimode scanner (0.1-1300MHz) in stock at only £289.95

£289.95

NEW RADIO!

Kenwood TM-D700E — £479.00

The only Dual Band mobile with a built in TNC (Ideal for APRS and DX Cluster monitoring) Remote head is standard on this model.

All radios on this page are available on various finance packages - call for details

Kenwood VC-H1

While other manufacturers are making radios to receive pictures Kenwood bring you a unit to send and receive slow scan pictures with the ability to take low resolution colour pictures.

£299.95

EO&E

Kenwood TM-G707E — £299.95

Twin Band mobile with large Display for at a glance reading while on the move. One of the few VHF/UHF mobile radios that can have a voice module installed for blind operators. (With optional VS3)

ACCESSORY LIST

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Front Cover:

Stuck for an idea for a Christmas present? This year we have some splendid new books and gifts for Christmas. See pages 7, 28, 41, 44, 65 and 68 for some inspiration! A very merry Christmas to all readers.

Radio Communication

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(Applications should provide proof of age at last renewal date)	
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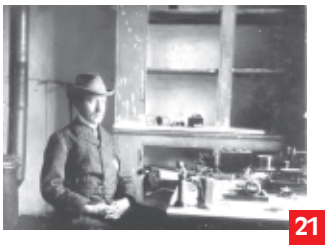
RadCom This Month

December 2001

News and Reports



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Technical Features

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Down To Earth - Amateur Radio From The Ground Up

Regulars

Birth of Radar Memorial

Rex Boys and Mrs Wilkins admiring the plaque near Weedon commemorating the 'Daventry Experiment'.

AS THE OCTOBER issue of *RadCom*, containing Brian Kendal's article 'The Birth of Radar', was arriving on members' doormats, a commemorative stone was being unveiled at the site of the 'Daventry Experiment' described by Brian in his feature. A gathering of 80 people saw Mrs Wilkins, widow of Arnold Wilkins who set up and demonstrated the Daventry Experiment, unveil the plaque dedicated to Robert Watson Watt and her late husband. Erection of the memorial stone and plaque was organised by Rex Boys, who gained the support of the local community and parish council and battled with the planning authority to get permission for the memorial.

The site is about 3 miles south of Weedon, 600 yards from the west side of the A5 along an unclassified road (formerly the B4525) leading to the village of Lithborough (NGR SP 650 557).

The RSGB is grateful to Rex Boys, Squadron Leader Mike S Dean MBE, and Donald Tomlin, RS37399, for this news story and for supplying a number of photographs of the ceremony.

Help to Central America by Amateur Radio

AMATEUR RADIO had brought Dr Andreas Goens, YS1AG (ex-G5AYU), an El Salvador plastic surgeon, into contact with Jerry, YN3YAM, in Nicaragua. Jerry is paralysed from the waist down and, in order to help him, Andreas needed to make contact with a specialist in spinal injury treatment. He contacted his friend Kerry, G0LCS, in London with the request. Kerry in turn contacted Colin, MU0FAL, whom he knew had been a former patient at Stoke Mandeville Hospital, the national spinal injuries centre, having been partially paralysed in 1981. Early in July Colin received an e-mail from Andreas, explaining what he was trying to do.

Guernsey is a long way from Stoke Mandeville, and a telephone call from there with a strange story about amateur radio, a man in El Salvador who talks to a man in Nicaragua, who would like to contact a consultant at the hospital in England was met with a little apprehension from the hospital's telephonist! A different approach was tried, with a copy of a letter from Andreas to Stoke Mandeville hospital being despatched by courier. Soon after, contact was made between the consultant in England and Andreas, who were able to discuss Jerry's medical condition and make assessments of the required treatment to make his life more comfortable. A care plan for Jerry was sent to Andreas by the consultant and Andreas has translated it to Spanish so that Jerry's family and local doctor can improve his standard of living. This is a great example of how amateur radio and computers can have a symbiotic relationship, leading to genuine help being provided for an individual.

Trans-Atlantic Radio Communication is 100 Years Old

ONE HUNDRED years ago this month, on 12 December 1901, Guglielmo Marconi received the letter 'S' sent in Morse code from across the Atlantic. It opened up the era of inter-continental radio communication which we, as radio amateurs, now take for granted. At the time, many considered it impossible, as it was thought the curvature of the earth would block reception of the signals. The story is told in full on pages 21 / 22 this month.

Several amateur radio commemorative stations will be on the air to celebrate this milestone. The Chelmsford Amateur Radio Society has been asked by Chelmsford council to provide a special event station in the town's High Street to commemorate the 100th anniversary of the first trans-Atlantic radio communication. It will take place on **8 December**, the nearest Saturday to the actual anniversary. It is hoped that Marconi's daughter, Princess Elettra, will attend the celebrations and will pass a message from Chelmsford (the birthplace of radio broadcasting) to Newfoundland, where her father received that historic signal. It is planned that the RSGB's mobile amateur radio demonstration vehicle, GB4FUN, will also be at the event.

At Poldhu in Cornwall, from where Marconi's team sent their signal 100 years ago, GB100GM will be on the air on **12 December**. The station will be transmitting from the new premises of the 'Marconi Centre' on land leased by the National Trust to the Poldhu Amateur Radio Club. GB100GM also plans to link up with VO1S in Newfoundland. For further details of the celebrations taking place at Poldhu, see page 90 of the November *RadCom*, or visit www.mullionline.com

Another location with strong connections to Marconi's work is the Isle of Wight, and the Brickfields Amateur Radio Society on the island will be using the special callsign GB100MAL ('Marconi's Atlantic Leap') on 12 December. The station will be active on 10 - 40 metres and possibly also 2 metres. All stations working GB100MAL will be sent a QSL incorporating the famous photograph of Marconi at Signal Hill after reception of the first trans-Atlantic signal (no return card is necessary). A special A4-size certificate is also available (pictured below), sent in a stiff-card envelope, for £3.00.

The Society of Newfoundland Radio Amateurs (SONRA) has been granted the use of the special callsign VO1S from **1 - 31 December**. A special QSL card has been commissioned and will be sent to all stations in the log. On 12 December VO1S will be operating from Cabot Tower, Signal Hill, St John's from 0000 to 2400UTC. All stations in the log on 12 December *only* will also be eligible for a commemorative certificate. To receive one, send an SASE large enough to accommodate a sheet 8.5 x 11in to Paul Piercey, VO1HE, 66 Rumboldt Pl, St John's, NF, A1A 5K9, Canada. In order to continue the celebration for the anniversary year, a new VO1AA QSL card is being produced for contacts made between 12 December 2001 and 12 December 2002. Further details can be found on SONRA's web page at www.sonra.ca

UK and Canadian amateurs have the opportunity to join in the celebrations by participating in the Marconi Centenary Contest - a 'one-off' special operating event to commemorate this 100th anniversary. It takes place on **29 December** and full details can be found on page 79 this month.

The Brickfields Amateur Radio Society's Marconi centenary certificate.

Epsom Radio & Electronics Fair

A MAJOR NEW amateur radio rally has been announced for next summer. It is the Epsom Radio and Electronics Fair and will take place on **16 June 2002** at Epsom Downs Racecourse Grandstand. In addition to the usual trade stands and a large bring and buy sale, it is also hoped to have international celebrities to open the event and provide entertainment during the day. Clubs wishing to exhibit at the rally may book tables at a heavily subsidised rate. Further details from Paul Berkeley, M0CJX, on m0cjx@lineone.net

World Amateur Radio Day 2002

THE IARU Administrative Council (AC) met from 6 to 8 October in Guatemala City. The theme for World Amateur Radio Day, **18 April 2002**, was selected as 'Amateur Radio: continuing innovation in communications technology'. A summary of the main business of the IARU AC meeting can be found in the 'IARU' column on page 92 this month.

● NEIL STACKHOUSE, G1ISL, has been installed as the Worshipful Master of Radio Millennium Lodge 9709. He welcomes all enquiries about membership from existing Freemasons and others interested in joining; tel: 0161 764 4479.

JOTA Jubilation as Scout Speak to ISS

Norfolk Scouts Contact Space Station

THERE WERE cheers all round the Scout hut in Cawston, Norfolk, on 20 October as the Scouts made contact with the International Space Station. The excited scouts were astounded as Scout leader Chris Rolph, G7HXW, talked to Crew Commander Frank Culbertson, KD5OPQ, on board the ISS.

The event was part of the international Jamboree On The Air, which links Scouts and Guides world-wide via amateur radio. "We were thrilled," said Chris Rolph. "We planned the JOTA event very carefully and were pleased to made contacts with Scout groups in Italy, Norway, Russia, Newfoundland and the USA across the weekend, but contacting the International Space Station was the icing on the cake." Many Jamboree stations were calling the ISS, but Cawston scouts, using the callsign GB0CAW, got through at the third attempt. The conversation was short as the space station hurtled southwards towards Europe as stations continued to call. Eleven year-old Scout Ashley Lincoln said that he was excited to hear signals from space. "I want to be an astronaut when I grow up," he said. "The ISS crew is very busy, but excited about supporting JOTA QSOs," said Will Marchant, of the Amateur Radio on the International Space Station (ARISS) programme. "Frank had packed his Scouting T-shirt and will be wearing it during the amateur radio operations." The amateur station was put together by Chris, G7HXW, his father Doug Rolph, G0UYC, and Steve Nichols, G0KYA.

Scout Leader Chris Rolph, G7HXW,and the Cawston Scouts at GB0CAW.

Masirah Veterans Assn

THE MASIRAH ISLAND Veterans Association has recently been founded and welcomes applications for membership from anyone who has lived on this Omani island in the Arabian Sea. Many RSGB members worked for the FCO or BBC at the British Eastern Relay Station on the island. Further details from the MIVA secretary, Ken Dixon, 50 Greenfield Crescent, Waterlooville, Portsmouth PO8 9EJ or by e-mail to: Masirahveteran@aol.com

CQ World Wide Logs

THE AMERICAN *CQ* magazine, organiser of the *CQ* World Wide DX contests, has announced that this year it will only be accepting logs sent by e-mail, and not posted disks or paper logs. A press release from *CQ* Communications says, "In light of recent events regarding hazardous items sent through the mail, logs received through the mail at the *CQ* offices will be held unopened until all potential health risks have been evaluated." It could not guarantee that logs submitted via the US Postal Service would be opened at all. However, Roger Western, G3SXW, of the *CQ* Contest Committee, is offering to forward all UK logs, in whatever format, to the adjudicators. The e-mail address to submit logs is ssb@cqww.com or cw@cqww.com Disks or paper logs should be sent to Roger Western, G3SXW, 7 Field Close, Chessington, Surrey KT9 2QD. He will forward by e-mail files sent to him on disk, or will even have the log typed in and then e-mailed to *CQ*. In this way, *all* UK entries will be received at CQ by e-mail. Roger asks everyone to help to reduce his work load by e-mailing if at all possible, but adds, "even more importantly please do send an entry. Enjoy the contest - the biggest event in our calendar!"

Coast Wireless Stations Certificates


After the recent Coast Wireless Station Centenary event, certificates were awarded by Dragon ARC chairman Steve Jones, GW0GEI (centre), to Geoff Spencer, GW4DRR (left), and Dan Lockyer, GW3HCL (right).

THE CENTENARY of the establishment of the first Coast Wireless Stations was celebrated on 30 June, with seven special event stations around the UK and Ireland [see *RadCom* June 2001, page 10 - *Ed*]. A total of 2052 QSOs were made, resulting in 79 requests for commemorative certificates. Martin Snow, GW3PRL, the organiser of the event, says that he is sending out the certificates as quickly as possible. The first two certificates were presented to Geoff Spencer, GW4DRR, and Dan Lockyer, GW3HCL, by Steve Jones, GW0GEI, the chairman of the Dragon ARC in Anglesey.

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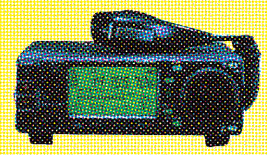

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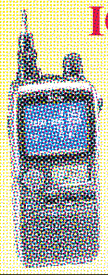

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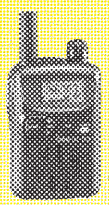

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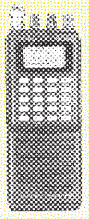

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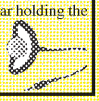

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Pic-A-Switch:
a frequency-dependent switch

*Concluding part, by Peter Rhodes, BSc, G3XJP **

IN THIS LAST episode, the code is presented for the Pic-A-Switch application. I have tried to write it such that, on a first pass, you can follow the story without reading the actual code. Then, using the flow-chart and details from last month, you should be able to follow the overall code flow - and every individual line within it.

OPTIMISING CODE

WRITING THIS CODE has been a new experience for me. With more ambitious applications, the issue and the skill is to code certain aspects for speed performance - at the same time as squeezing it all into the 1024-instruction space provided.

The Pic-A-Switch code spends most of its time waiting for relays to operate - so speed is hardly an issue. Nor are there any size constraints - except that, as a learning vehicle, it needs to be short and snappy. So this code has been optimised for 'understandability' - but without sacrificing functional performance in any way. The resultant code is quite different. So please don't write to me and say you can see faster or more efficient ways of coding it. So can I, but that was not the objective.

For the same reason, some of the code has been organised in an unconventional sequence. Normal practice is to code the detail first (eg subroutines) - then the main program body. This leads to impossible difficulties in describing it, so I have reversed normal practice here.

TYPING CODE

IF YOU TYPE the code that follows into your editor, it will perform as described. You can then edit the detail to configure the timing values, band versus output channel allocations and initialisation band.

You might ask why you can't just download this code from the RSGB web site. The answer is that the act of keying-in the code forces you to think about what you are doing and why. So no matter how indifferent your typing skills, please do not obtain secretarial assistance. There is not that much effort involved. And, for the same reason, include (or even add to) the comments, even though they make no difference to the functionality.

RULES FOR TYPING CODE

These are important:

- A 'comment' is everything after a semicolon (;) on a given line. You can type anything you like in a comment - and all the remaining rules do *not* apply to comments.
- Do not alter the cases of any characters. For the code mnemonics it doesn't actually matter but for some other aspects, it might. So the above rule is the simplest.
- Never type any 'space' with the space bar. Always use the tab key. This will keep your columns lined up.
- If a line of code starts on the left margin, type it there. If it is indented, make sure it is. The amount of indent is not important - just that there is some. You will find that the editor tries very hard to put the tabs in for you, but it does not always succeed.
- Any time you see an ambiguous character '0', then it is a 'zero' and not a capital 'o'.

Finally, if you get any of this wrong, you will find you get a list of errors at assembly time. By double-clicking on any one error, it will take you to the line of code in question.

The IT Department in the author's shack. On the desk is his LPF board connected by umbilical to the TOPIC programmer. The parallel port cable can be seen disappearing off to the PC.

PIC-A-SWITCH CODE

IRONICALLY, the first few lines of 'code' do not result in executable code. Rather, they are instructions (directives) to the assembler and are frankly a bit obtuse. Just type them at this stage and then refer to the MPLAB on-line help later.

```
   LIST          P=PIC16F84
; PIC16F84 with 4MHz xtal clock
   INCLUDE       P16F84.inc
```

The LIST line defines which PIC is the target processor. Together with the INCLUDE directive, if you want to code for a different PIC, edit these lines.

P16F84.inc hides a multitude of sins. It is a file provided by Microchip which defines some standard names for *this* PIC's internal registers - and their locations. Its 'inclusion' (as opposed to copying its content into your listing) removes the clutter of boring definitions in your code. By its nature you don't want to know or need to know; though clearly the assembler needs the absolute addresses of the PIC's internal registers.

```
   __CONFIG      b'11111111110001'
```

__CONFIG (NB *two* underscore characters) specifies a number of settings which cannot be changed dynamically at run time. Concerned mostly with hardware options, the significance of these 14 bits is detailed in the literature. Here it is used to define a crystal oscillator (as opposed to the RC option) and to enable a precautionary time delay at power on.

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

DEFINITION OF TERMS

NEXT SOME WORDS are defined which are peculiar to and meaningful in the Pic-A-Switch context. Although not technically necessary, this is standard practice to make the code easier both to read and write.

NAME YOUR SUBSTITUTES

These allow you to *define* a human-meaningful word such as LED1 as a substitute for the assembler-meaningful term PORTB,3.

```
#define    TR_relay      PORTA,1
#define    RF            PORTA,4
#define    LED1          PORTB,3
#define    LED2          PORTB,4
#define    bias          PORTB,5
#define    PTT_line      PORTB,6
#define    PTT_fitted      state,0
```

So, it would now be possible to light LED1 by the instruction 'bsf LED1' (or equally - but more obscurely - by 'bsf PORTB,3'). See also Part 2, Fig 8.

All but the last line derives from the hardware pin allocations to specific Pic-A-Switch functions. Whether a PTT line is fitted is computed later, the result being stored in bit 0 of the state byte.

Note that the 'state' byte has not even been defined yet. That comes later (in the next block, as it happens) - but the assembler cares not in the least about your definition sequence.

NAME YOUR RAM

Next, some meaningful names are defined for RAM locations using the 'equ' directive ('equates to' or 'is equivalent to' or, in the vernacular, 'same thing as'). The 16F84 has 68 RAM bytes at addresses running from 12-79 (0C-4F hex). This application uses but 9 of them - and it could be less if there were any shortage.

```
; 4 misc counters for use in time delays
delay1    equ    h'0C'    ; (first)
delay2    equ    h'0D'
delay3    equ    h'0E'
delay4    equ    h'0F'
; cache for freq count
freq      equ    h'10'
; Pic-A-Switch hardware state
state     equ    h'11'
; number of extra times freq is counted
repeat    equ    h'12'
; last channel in use
oldCh     equ    h'13'
; general purpose transient variable
temp      equ    h'4F'    ; (last)
```

Which locations are used - and their names - is a matter of personal preference. It is useful to use the *last* available location since it makes for some easy code to clear all variables to zero at the beginning of the program. Any values stored in these locations are lost after power-down.

Well, that concludes the preliminaries.

POWER-ON CODE

FROM NOW ON, executable code will result, starting at address 0 - where the PIC begins at power-on. The 'org' directive tells the assembler to load the values in successive locations starting at the address specified. The pace picks up!

```
    org     0
    clrf    PORTA          ; initialise
    clrf    PORTB          ; initialise
```

Ports A and B are cleared immediately as good precautionary practice.

OPTIONS

Next the PIC dynamic options are configured. To do this, the first instruction switches to Bank 1 - where the registers to be loaded are located.

The OPTION_REG is then loaded with the bit values needed to specify a prescaler division ratio of 256:1, to allocate the prescaler to the RA4 input (pin 3) and to define that counting occurs on a falling edge. Also, optional internal weak pull-up resistors on PORTB inputs are disabled.

```
    bsf     STATUS,RP0     ; to Bank 1
    movlw   b'10100111'
; prescale /256 to RA4, no pull-ups
    movwf   OPTION_REG
```

INPUTS OR OUTPUTS?

Each I/O port line can be defined as an input or output by setting a '1' for an **I**nput and a '0' for an **O**utput in the respective TRIS register for PORTA and PORTB.

```
    movlw   b'00010000'    ; RA4=input
    movwf   TRISA
    movlw   b'11000000'    ; RB6&7=input
    movwf   TRISB
    bcf     STATUS,RP0     ;back to Bank 0
```

That completes the configuration of the PIC for our application.

CLEAN START

The next step is to clear all RAM locations to zero to get off to a clean start. In principle, the PIC does this for you but, in practice, if you have large reservoir capacitors on the power line, the PIC may retain some values for days!

The code ritually clears all RAM (even though not all of it is used here) using a process called indirect addressing. It works by loading an address of interest into FSR whereupon the content at that address is available for reading/writing in the INDF register. In this case, the content at INDF is cleared, the FSR being then incremented to point to the next location - and this process is repeated 67 times (ie until temp=0). The function of decfsz is perfect for managing these loops.

```
;clear RAM
    movlw   d'67'          ; no of bytes to clear
    movwf   temp           ; load counter
    movlw   h'0C'          ; address of 1st byte
    movwf   FSR            ; point to 1st byte
RAMloop
    clrf    INDF           ; clear this byte
    incf    FSR            ; point to next
    decfsz  temp           ; all done?
    goto    RAMloop        ; no, so next
```

Next, get the address of the initialisation band, look up the data value in EEPROM and send it out to the appropriate channel. The exact workings of the two subroutines used below follows later. Have faith!

```
; initialise startup band
    movlw   init_band      ;load address
    call    Read_EEPROM    ; get value
    call    new_Ch         ; do it!
```

That completes the power-on sequence. Thus, all the code listed so far is executed once only.

MAIN PROGRAM LOOP

THE PROGRAM STARTS in earnest here - and comes back here - every time you go to receive.

```
initialise             ; outputs to Rx state
    bcf  bias          ; off
    bcf  LED2          ; off
    bcf  LED1          ; off
    bcf  TR_relay      ; to receive
    bsf  PTT_fitted    ; assume fitted
```

Having placed all the outputs in the receive state, the code next loops for ever, polling both the RF input and PTT lines (some 250,000 times per second) until the transmit state is detected.

```
wait_Tx
    btfss   PTT_line   ; test PTT line
    goto    Tx_On      ; if PTT line low
    btfss   RF         ; any RF?
    goto    wait_Tx    ; if no RF
    bcf     PTT_fitted ; PTT is not fitted
```

If transmit is detected as a result of RF detection, the PTT_fitted bit is cleared. The RF could never have arrived first had there been a PTT line fitted.

The process of launching the T/R relay off on its journey to transmit is started immediately. Typically, some 15ms will elapse until it actually settles down in the transmit state, so the sooner started the better.

```
Tx_On               ;transmit state detected
   bsf  TR_relay    ; to transmit
```

Meanwhile, grasp the opportunity to measure the frequency! This is otherwise just wasted waiting time.

OVERALL MEASURING SCHEME

Fig 18 shows the multiple frequency measuring scheme employed to avoid miscounts, which is coded as follows:-

```
; Measure freq. Potential errors are:-
;   Tx stops/starts while measuring
;   out of band measure
;   no count, not enough power
;   successive counts not same
   movlw   d'4'
   movwf   repeat      ; # times to repeat
   call    freqcount   ; measure once
   movwf   freq        ; and retain
   btfsc   STATUS,Z    ; test for zero
   goto    initialise  ; 0 or >10m error
   bsf     LED1        ; light LED
freq_again
   call    freqcount   ; measure again
   subwf   freq,w      ; compare
   btfss   STATUS,Z    ; same?
   goto    initialise  ; not same freq error
   decfsz  repeat      ; same, so all done?
   goto    freq_again  ; no, so loop
   movf    freq,w      ;yes, all OK, continue
```

The frequency - now in w - is used to address EEPROM, returning the channel select data byte - in w; how this is contrived is explained later. The last possible error is that the frequency is out of band, in which case 0 is returned and detected below.

```
   call    Read_EEPROM ; for Ch byte
   btfsc   STATUS,Z    ; zero?
   goto    initialise  ; yes out of
                       ; band error
```

The new channel (in w) is now compared with the previous (ie old) one. If different, the new_Ch subroutine is executed before continuing.

```
   subwf   oldCh,w     ; compare old
   btfss   STATUS,Z    ; same?
   call    new_Ch      ; it is different
   movlw   tA          ; T/R relay
                       ; address
   call    Read_EEPROM ; get value
   call    w_mS        ; and delay
                       ; for w ms
   bsf     bias        ; then turn
                       ; bias on
   bcf     LED2        ; and LED2 off
```

At this stage, the receive-to-transmit transition is complete - either with or without a channel change.

If a PTT line is fitted, the program now loops forever - until key-up.

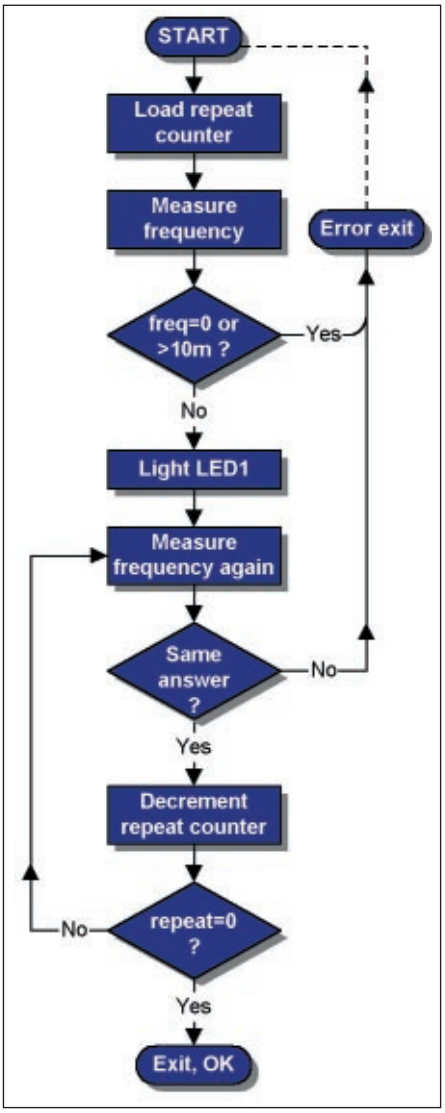


Fig 18: Flow chart of overall frequency-measuring scheme. If there are any errors, the entire process starts again (at 'initialise').

```
   btfss   PTT_fitted  ; is PTT fitted?
   goto    sethang     ; if PTT not fitted
wait_PTT_lift          ; if PTT is fitted
   btfss   PTT_line    ; test PTT line
   goto    wait_PTT_lift ; until PTT lift
   goto    initialise  ; and start again
```

Otherwise the retriggerable hang time, tD is counted down in accordance with **Fig 19**.

```
; come here only if PTT line not fitted
sethang
   movlw   tD          ; hang time
                       ; address
   call    Read_EEPROM ; get value
   movwf   delay4      ; cache it
hangloop
   call    one_ms      ; delay 1ms
   btfsc   RF          ; test for RF
   goto    sethang     ; if RF on,
                       ; retrigger
   decfsz  delay4      ; time up?
   goto    hangloop    ; no, so loop
   goto    initialise  ; yes, restart
```

That concludes the main body of the program - which now goes back round the main loop again.

SUBROUTINES

THERE NOW FOLLOW the subroutines. These are called from the main body of the code - and sometimes by other subroutines.

TIME DELAYS

The first is a double loop to produce a 1ms delay. That's how long it takes to execute with a 4MHz clock. The values loaded into delay1 and delay2 were determined by arithmetic and pre-checked off-line using the MPLAB stopwatch facility.

```
; DELAY LOOP 1 millisecond
one_ms
   movlw   d'4'
   movwf   delay1
loop1
   movlw   d'81'
   movwf   delay2
loop2
   decfsz  delay2
   goto    loop2
   decfsz  delay1
   goto    loop1
   return
```

So that gives a *fixed* delay. The next routine produces a *variable* delay, simply by loading w with the desired number of milliseconds before calling it. In turn, it merely calls the 1ms delay routine w times. Clearly, the resultant delay is therefore slightly longer than w ms, but easily near enough for our purposes:

```
; DELAY LOOP w milliseconds (roughly)
w_ms
   movwf   delay3
w_ms_loop
   call    one_ms
   decfsz  delay3
   goto    w_ms_loop
   return
```

READING DATA FROM EEPROM

This routine reads one byte from EEPROM. This requires a switch to/from Bank 1 to set the RD bit in EECON1

```
; read 1 EEPROM byte from address in w
Read_EEPROM
   movwf   EEADR       ; load address
   bsf     STATUS,RP0  ; to Bank 1
   bsf     EECON1,RD   ; specify read
   bcf     STATUS,RP0  ; back to Bank 0
   movf    EEDATA,w
   return              ; with data
                       ; result in w
```

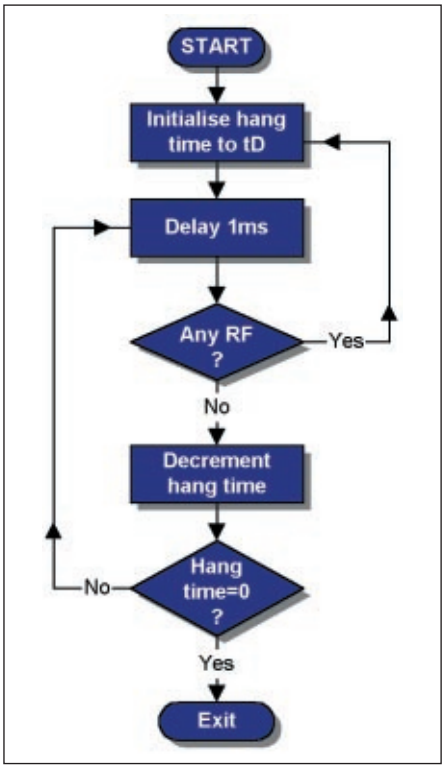


Fig 19: Flow chart showing how a hang time is implemented if a PTT line is *not* fitted. This is broadly analogous to a VOX hang time and is designed to prevent syllabic T/R relay switching. Note that this flow-chart is precisely that of a retriggerable monostable.

FREQUENCY COUNTER

A pause first for a little functional explanation. It is time also to make some decision on the width of the counting gate.

What is required is a gating time which is just long enough to discriminate between amateur bands. Any longer than that just wastes time and provides more resolution than is needed.

Table 1 shows an extract from the spreadsheet I used for some 'what-if's. The Prescale column shows the number of cycles per second on the output of the internal ÷256 prescaler.

If a counting time of 150µs is chosen, this then lets through count values between 1 and 17 (after truncation to an integer).

Note that critically, the same count value never spans more than one band - so we have the needed discrimination. Further, counts of 0, 3, 7, 9, 11, 13, 15 and >17 result from out-of-allocation operation.

Next the frequency counter code for a one-off measurement. It counts incoming RF in the counter TMR0 - during the gate time of 150µs.

At the end of the gate time, TMR0 contains the count which is latched into w (and the prescaler contains the detail - which is ignored).

```
; FREQUENCY COUNT
freqcount
    movlw  d'50'      ; for 150µs
    movwf  delay1
    clrf   TMR0       ; reset & start count
gateloop
    decfsz delay1
    goto   gateloop   ; loop for gate time
    movf   TMR0,w     ; end & latch result
```

If you ever needed convincing that software is effective, try to conceive a simpler frequency counter than that! Note that an 8-bit latch is but one line of code.

Next, two errors are trapped. Either a count of 0 - or an excess count - results in 0 being returned in w. Otherwise the latched count value is returned.

```
    movwf  temp       ; preserve w
    sublw  d'17'      ; max legal count
    btfss  STATUS,C   ; test for >max?
    clrf   temp       ; count was >max
    movf   temp,w     ; recover w
    return            ; with count in w
                      ; (0 if error)
```

CHANNEL CHANGING

The following routine is called if a new output channel is needed following a band change - and for the initialisation band required at the start of the program.

The desired behaviour is to 'make' the new channel before 'break' on the old one.

Also, the states of the LEDs and T/R relay need maintaining during switching.

The new channel value is held in EEDATA following an earlier read from EEPROM. First, the new channel value is used to overwrite the old one - for next time. Then bit 4 is tested (why bit 4 in a moment) to determine if the new channel is on PORTA or PORTB - and the code continues down one of two possible paths as a consequence.

```
new_Ch  ; NEW CHANNEL NEEDED
    bsf    LED2       ; Ch change LED
                      ; on
    movf   EEDATA,w   ; get new Ch
    movwf  oldCh      ; overwrite old
    btfsc  EEDATA,4   ; test for PORTB?
    goto   setB       ; yes, else next
                      ; below
```

If the new channel is on PORTA:

```
    iorwf  PORTA,f    ; start 'make' new
    movlw  tB         ; relay operate time
    call   Read_EEPROM
    call   w_ms       ; complete 'make'
                      ; new
; break if old channel was on PORTA
    movf   oldCh,w    ; now current Ch
    movwf  PORTA
; break if old channel was on PORTB
```

Band	Freq (MHz)	Prescale by 256 (Hz)	After gate period
160m	1.76 2.04	6,875 7,969	1 1
80m	3.43 4.08	13,398 15,938	2 2
40m	6.86 7.45	26,797 29,102	4 4
30m	9.89 10.36	38,633 40,469	5 6
20m	13.72 14.64	53,594 57,188	8 8
17m	17.70 18.54	69,141 72,422	10 10
15m	20.58 21.88	80,391 85,469	12 12
12m	24.39 25.49	95,273 99,570	14 14
10m	27.44 30.30	107,188 118,359	16 17

Table 1: Spreadsheet showing the count after prescaling and a 150µs gate time. The 'Freq' column represents the larger USA band allocations with an additional 2% measurement tolerance.

```
    movlw  b'00011000' ; maintain LEDs
    movwf  PORTB
    movlw  tC         ; relay
                      ; release time
    call   Read_EEPROM
    call   w_ms       ; complete
                      ; 'break'
    return            ; with new ch
                      ; set - and old
                      ; clear
```

A similar but alternative process is followed if the new channel is on PORTB:

```
setB                  ; new channel is on
                      ; PORTB
    iorwf  PORTB,f    ; start 'make' new
    movlw  tB         ; relay operate time
    call   Read_EEPROM
    call   w_ms       ; complete 'make'
; break if old channel was on PORTB
    movf   oldCh,w    ; now current Ch
    movwf  PORTB
; break if old channel was on PORTA
    movlw  b'00000010' ; maintain T/R
    movwf  PORTA
    movlw  tC         ; relay release time
```

```
call    Read_EEPROM
call    w_ms          ; complete 'break'
return                ; with new ch set -
                      ; and old clear
```

Note that it was easier to remove the old channel from *both* PORTA *and* PORTB than to work out which one it was actually on in the first place.

LOADING EEPROM DATA

THE FINAL TASK is to define and load data into EEPROM. There are 64 bytes available, starting at 2100 hex. Their contents are retained after power-down. Pic-A-Switch uses them: (1) to map amateur bands to *your* output channels; (2) to define *your* initialisation band; (3) to retain *your* timing values. Sensible initial default values need loading here.

EXPLANATORY INTERLUDE

How to convert that frequency count (1-17, as in Table 1) to an output channel? By using the *data* value of the count as the *address* of a byte in a 17-byte block of memory. The data stored at *that* address is then simply the value needed to send to the appropriate PORT - to activate the desired channel. Easy! And quick!

The other dimension is that because mapping of bands to output channels needs to be configurable (and retained), the memory block chosen is in EEPROM. Further, to avoid any address offset issues, it is mapped starting at the second address in EEPROM which - when truncated to one byte - is 1. So a frequency count of 1 addresses the first byte, 2 the second… and so on.

BAND-TO-CHANNEL MAPPING

Now for the syntax to get the default band-to-channel mapping data loaded.

The output channels are split between the two I/O ports, so two more substitutes are now brought on to give an easy way of distinguishing between channels destined for PORTA and PORTB.

```
#define A  b'00000010'  ; T/R relay set
#define B  b'00011000'  ; both LEDs on
```

By adding these values to the bit values to be set (the assembler performs the addition), this ensures the T/R relay and LEDs remain on during a channel change - and also allows testing of bit 4 to determine the destination of the byte.

This scheme works because PORTA,4 could never be set here (ie not an output).

```
   org  h'2101'          ; start+1
; EEPROM lookup table
; converts frequency count to o/p channel
; bits 4,3 set if PORTB, bit 2 set if PORTA
;  CHANNEL        Band(m) Count  Dest
   de B+b'00000100'  ; 160   1    RB2
   de B+b'00000010'  ; 80    2    RB1
   de 0              ;       3    error
   de B+b'00000001'  ; 40    4    RB0
   de A+b'00000100'  ; 30    5    RA2
   de A+b'00000100'  ; 30    6    RA2
   de 0              ;       7    error
   de A+b'00000100'  ; 20    8    RA2
   de 0              ;       9    error
   de A+b'00001000'  ; 17    10   RA3
   de 0              ;       11   error
   de A+b'00001000'  ; 15    12   RA3
   de 0              ;       13   error
   de A+b'00000001'  ; 12    14   RA0
   de 0              ;       15   error
   de A+b'00000001'  ; 10    16   RA0
   de A+b'00000001'  ; 10    17   RA0
```

To take an example, any frequency in the 20m band results in a count of 8 (see Table 1). The corresponding memory location returns a byte with bit 2 set and bits 3 and 4 *not* set. (Note also that, as defined, 30m produces the same result). So the result is destined for PORTA, setting RA2 (pin 1) - which is Ch 4.

The error value '0' is returned for any frequency outside the allocations.

Both 30m and 10m may result in two different count values (again, see Table 1). No problem; both counts are simply mapped to the same channel.

The 'init_band' label points to a copy of the value you want at power on.

```
init_band
   de A+b'00000001' ; 10m          RA0
```

To change it, simply edit that byte.

TIMING PARAMETERS

Now for the time values. Edit these as required. If your target application does not use these features, leave well alone - because there must be some legal values stored here even if they are not used.

```
; Editable timing, all decimal values in ms
; must be in range 1-255.
tA  de d'15'     ; TR relay op time
tB  de d'15'     ; bandsw relay op time
tC  de d'8'      ; bandsw relay rel time
tD  de d'200'    ; hang time, used if PTT line
                 ;not fitted
```

Each value is labelled, so that it can be referenced explicitly by the code.

THE END

THEN, *VERY* LAST is the directive to tell the assembler (and you!) that it's all over.

```
   END           ; whew!
```

CONFIGURING PIC-A-SWITCH

NOW FOR A COMPLETE CHANGE of subject. What follows is the configuration procedure which applies if you have purchased the software from me. And it also acts as a possible 'behaviour definition' should you wish to write your own utility.

Three aspects of Pic-A-Switch can be configured to suit your installation, namely timing, band versus output channel and initialisation band. Proceed as follows:

- Power-off and wait at least 20 seconds.
- Remove IC2 from its socket. This gives access to TP1 as well as absolutely preventing any external switching.
- Connect a jumper lead from TP1 (+5V) to pin 1 of IC2 socket. The jumper comprises a 1k resistor with a few cm lead length.
- Power-on Pic-A-Switch.

On sensing the logic '1' on pin 1, Pic-A-Switch will enter 'configure mode' and send a continuous series of dits as confirmation.

These dits and the CW messages which follow can be observed simultaneously:

- On both LEDs.
- On a small piezo sounder connected across LED2.
- On any HF receiver coupled to the RF input to Pic-A-Switch.

TIME DELAYS

Once the initial dits are established, remove the lead from pin 1, whereupon Pic-A-Switch will send **R** and enter the time editing sequence:

tA 15 (T/R relay operate time)
tB 15 (Bandswitch relay operate time)
tC 8 (Bandswitch relay release time)
tD 200 (end of transmission hang time)

Each 'line' gives the current duration in milliseconds - default value shown - and must be in the range 1 - 255ms. If you are not using the feature associated with any of these times in your installation, leave the respective default time unchanged.

For each line/time, you must connect the jumper to one of the IC2 socket pins as below. Until you do so, the line will be continuously repeated, so there is no hurry.

Pin 1 Increase time by 5ms
Pin 2 Increase time by 1ms
Pin 3 Leave unchanged - and go to next.
Pin 4 Decrease time by 1ms
Pin 5 Decrease time by 5ms

If you change the time, the line is replayed and may be further altered. Once happy,

Pic-A-Switch continues on p38 ⇨

Making Waves: Marconi Bridges the Atlantic

A century ago, Guglielmo Marconi made his giant technological leap of the Atlantic to bring 'wireless' communication to the world. Bernard Tennant traces the single-minded vision, determination and immense speed with which he did it.

GUGLIELMO Marconi's diary entry for Thursday, 12 December 1901 records simply: "Sigs at 12.30, 1.10 and 2.20". It was the only record of his giant technological leap across the Atlantic which changed the world into an electronic village. *The Times* acknowledged his achievement as "the greatest triumph of applied science" marking the arrival of the new century which would be revolutionised by his invention of 'wireless' communication.

Born in 1874 in Bologna, Italy, Marconi early developed a precocious interest in electricity: not unusual at the time, as it was a well-established college subject. Fellow countryman Alessandro Volta had invented the electric battery in 1800.

On holiday in the Italian Alps, the 20-year-old Marconi read an obituary of Heinrich Hertz describing the German physicist's work and the idea came to him that the Hertzian waves could be used for transmitting sound from one place to another. Later he was to say: "The idea obsessed me more and more, and in those mountains of Biellese I worked it out in [my] imagination. I did not attempt any experiments until we returned to the Villa Grifone in the autumn, but then two large rooms at the top of the house were set aside for me by my mother. And there I began experiments in earnest." [1]

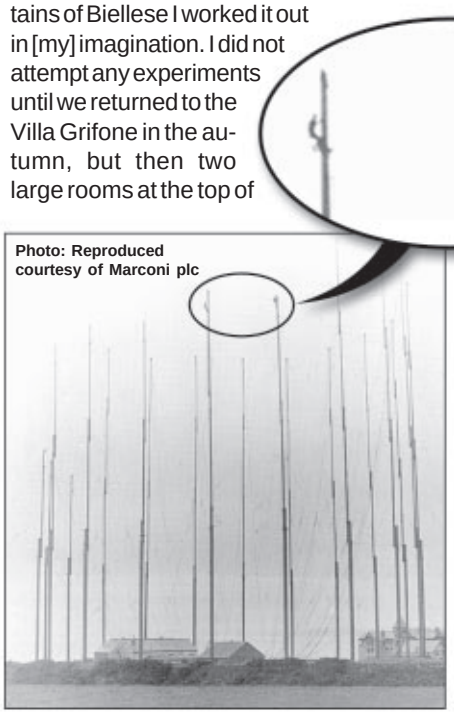


Photo: Reproduced courtesy of Marconi plc

The Poldhu aerial nearing completion in August 1901. Inset: two aerial riggers at the top of the 200ft masts.

Both Michael Faraday and James Clerk Maxwell had conceived the idea of electronic waves. Hertz had shown that they could be created and detected. Marconi now began the task of harnessing them. First he invited his own coherer - a glass tube full of metal filings to facilitate the flow of electrical impulses - a superior version of earlier models by Frenchman Edouard Branly and Britain's Oliver Lodge. His second inspiration came when, by chance, moving parts of his modified receiving apparatus about, he discovered the principle of using an aerial and an earth as a means of enhancing and strengthening signals across the sea.

Marconi had little interest in abstract science. He simply wanted to use the Hertzian waves for sending signals and messages. Marconi took up the story in a later interview: "I was sending waves through the air and getting signals at a distance of a mile, or thereabouts, when I discovered that the wave which went to my receiver through the air was affecting another receiver which I had set up on the other side of the hill. In other words, the waves were going through or over the hill." [2]

By September 1895, Marconi had a wireless telegraph system with a potentially useful range, unaffected by natural obstacles. He offered his invention to the Italian Government but the Ministry of Post and Telegraph was not interested. Arriving in London in February 1896, Marconi lost little time in making an application for a patent to protect his invention. It was granted on 2 June 1896, the first patent for wireless telegraphy issued.

The first public trial of Marconi's practical wireless system was successfully carried out from the roof of the General Post Office in St Martins-le-Grand to another Post Office building a mile away in Victoria Street, London [3]. By March 1897 Marconi was sending signals over seven kilometres across Salisbury Plain. Two months later he was signalling across the Bristol Channel, over 14km.

TRANS-ATLANTIC TESTS

CONSTRUCTING SHORE stations at strategic points, Marconi set up his own business in July 1897 and made the secret decision to go ahead immediately with trans-Atlantic tests with the aim of spanning the Atlantic Ocean with wireless.

Returning briefly to Italy in July, Marconi sent the first ship-to-shore wireless signal during experiments on board an Italian naval vessel fitted out to his specification. More importantly for all his company's future

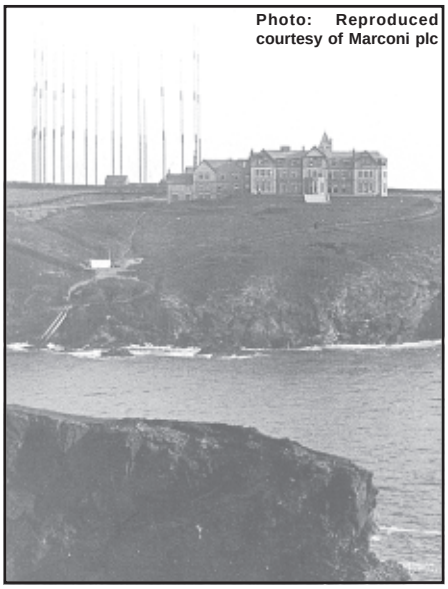


Photo: Reproduced courtesy of Marconi plc

Poldhu Hotel and the completed circular aerial system, August 1901.

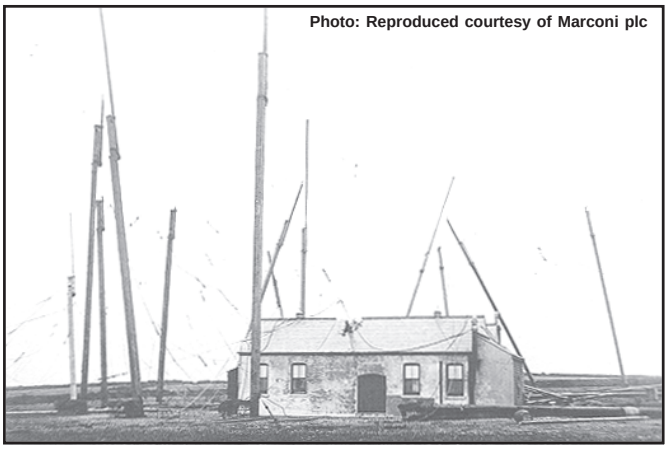


Photo: Reproduced courtesy of Marconi plc

Disaster strikes! A gale on 17 September 1901 destroys the Poldhu aerial system.


Photo: Reproduced courtesy of Marconi plc

Left to right: Kemp, Marconi and Paget at Signal Hill, Newfoundland, in December 1901. The wicker basket was used to transport the apparatus. Behind the men is one of the kits used for supporting the receiving aerial.

maritime developments, he discovered that communication remained intact, even when the vessel was below the horizon [4].

The most pressing problem to be solved before the tests began was that of tuning: getting the transmitter and receiver on the same frequency. Marconi found the answer and brought together a number of important tuning principles which he included in his famous Patent 7777 in April 1900.

Once he had his company's approval for the 'big thing', as he called it, Marconi wasted no time, but the fates seemed against him. He chose the transmitting site at Poldhu in Cornwall in July. Building began on the spectacular aerial system needed to send electrical energy to the receiving station, only to be left a tangled mess of masts and aerials in September by a fierce gale. In November, the receiving station at Cape Cod was similarly destroyed by the elements. A temporary aerial was quickly rebuilt at Poldhu, and a new site found on the other side of the Atlantic at Signal Hill in Newfoundland.

On 9 December 1901 Marconi connected the Newfoundland receiver's earth wire and ran the aerial to their 'mast', a balloon and kite atop a telegraph pole. By cable, Marconi asked Poldhu to transmit the Morse letter 'S' - dot-dot-dot - for three hours every day. On Thursday, 12 December bad weather and strong winds blew the balloon and kite away and Marconi had to rely on an untuned circuit. At 12.30pm, through the atmospherics, he and his assistant George Kemp heard the faint 'dot-dot-dot' of Poldhu's first trans-Atlantic signal, "serenely ignoring the curvature of the earth", he wrote later.

Marconi describes his supreme moment: "I knew then that all my anticipations had been justified. The electric waves sent out into space from Poldhu had traversed the Atlantic - the distance, enormous as it seemed then, of 1700 miles - unimpeded by the curvature of the earth. The result meant much more to me than the mere successful result of an experiment . . . I now felt for the first time absolutely certain that the day would come when mankind would be able to send messages without wires not only across the Atlantic but between the farthermost ends of the earth." [5]

Marconi shared the Nobel Prize for Physics with Germany's Karl Braun in 1909. Having successfully introduced long-wave radio telegraphy as a practical system of communication, during WWI Marconi began development of short-wave radio to facilitate pilots flying their aircraft 'blind'. By 1927 he had brought in a world-wide short-wave network between Britain and its Commonwealth partners. In 1932 he discovered microwave radiation which later became the basis of radar navigation.

By harnessing the forces of the ether, Guglielmo Marconi, against the most weighty scientific opinion of his day, showed that 'wireless' communications could work, could be a reliable medium, and that it could broadcast to the world. When he died in July 1937, wireless stations all over the world - including the BBC - went off the air as a mark of respect. The silence that Marconi had broken 42 years before was back - for just two minutes.

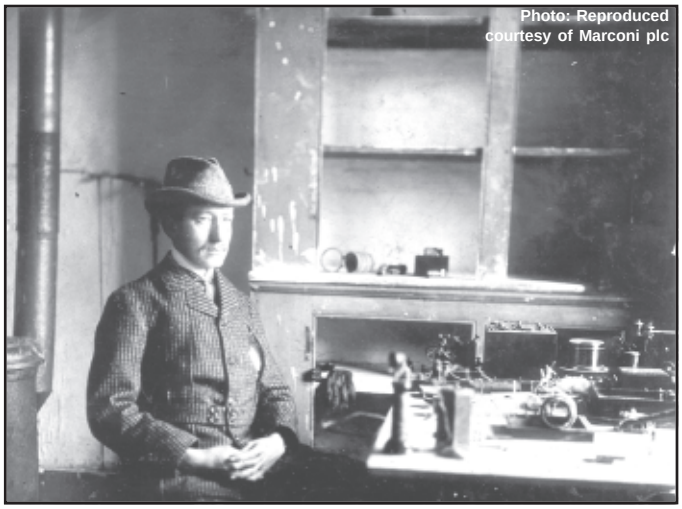


Photo: Reproduced courtesy of Marconi plc

This well-known picture of Marconi shows the great man immediately after receiving the first trans-Atlantic radio signal on 12 December 1901 at Signal Hill, Newfoundland.

REFERENCES

[1] *Marconi, Master of Science*, Jacot and Collier, Hutchinson, 1935.
[2] Interview, McClure's Magazine, March 1897.
[3] '100 years ago: Marconi's early experiments', *RadCom*, April 1995.
[4] Information received by the writer from Marconi Communications Ltd, 16 May 2001.
[5] *Scrapbook 1900 - 14*, Ed Leslie Bailey, Muller, 1957.

FURTHER READING

Marconi's Atlantic Leap, by Gordon Bussey, published by Marconi Communications, 2000. Available from RSGB Sales, price £5.95 (members). ♦

YOU'VE READ ALL about Marconi's remarkable achievement, now you can join in too! To celebrate the spanning of the Atlantic from the UK to Canada by wireless, 100 years ago this month, the RSGB has teamed up with the Radio Amateurs of Canada (RAC) to organise a special commemorative contest - the Marconi Centenary Contest. Marconi plc has kindly agreed to sponsor 102 prizes available to UK and Canadian participants. Now turn to page 79 for full details of this fun operating event.

RSGB Annual Meeting

Saturday 2 December 2000
Harrogate Ladies' College, Harrogate, North Yorkshire

THE MEETING WAS in two parts: the Annual General Meeting as required by the Companies Act, and an Extraordinary General Meeting. Following the formal meetings there was an Open Forum. Only the formal meetings are described here.

The Minutes of the 74th Annual General Meeting of the RSGB

THE PRESIDENT, Don Beattie, G3OZF [now G3BJ], introduced the rostrum party as: K Ashcroft, G3MSW, Treasurer; and P Kirby, G0TWW, General Manager and Company Secretary.

Council Members present were: G Adams, G3LEQ; R Biddulph, M0CGN; R Horton, G3XWH; T Menzies, GM1GEQ; R Page-Jones, G3JWI; P Sheppard, G4EJP; J Smith, MI0AEX.

Apologies for absence had been received from the following members: GW3KFE, G3PJT, G4BWP, GI8AYZ/MI0AYZ, G4ACK, G0NSY, GM4HYF, G4OBE, 2E1AQS, G3AAJ, GW0AJA, G3YGF, G0WMD, G0MRF, G3YMK, G3RZP and G3COJ.

The President announced that there were more than 50 members present [actual number 92] so the meeting was quorate.

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

Item 1: Minutes of the 73rd Annual General Meeting

These had been published with the December 2000 edition of *RadCom*.

The motion to confirm the Minutes was proposed by P Sheppard, G4EJP, seconded by R Horton, G3XWH, and carried.

Item 2: Accounts of the Society

To receive and consider the accounts for the year ending 30 June 2000, and reports of Council and Auditors.

The General Manager read the Auditors' Report which had been circulated to members with the November 2000 edition of *RadCom*.

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

H Bellfield, G3SBV, informed the meeting that he had submitted some written questions on the accounts to the General Manager. However, he was still concerned over the costs of *Radio Today* magazine.

In answer to Mr Bellfield's question the President gave the following reply: "Council, as many members will know, has for some time been concerned about the future of amateur radio in the UK and more generally in the Western world. As you will hear from my review of the year later this morning, numbers coming in amateur radio are now in terminal decline. It is essential, through whatever reasonable means are available, that we seek to attract new blood into our hobby, otherwise, I think we can look forward to a reduction in privileges and, indeed, in spectrum over the next years. And it was really against this background that Council took the decision to acquire and seek to develop and grow a newsstand publication, thus broadening our penetration into the amateur radio market and indeed the potential amateur radio market. So, really, against that after extensive due diligence, Council authorised the purchase of *HRT* [*Ham Radio Today*] around the end of '97/beginning of '98. The purchase price was modest, it was subject to a confidentiality agreement, which is not uncommon in cases like this and we cannot reveal the purchase price. I am prepared to say further that it was extremely modest and significantly less than other publishers had been quoted for the publication. From then we built the subscriber base significantly and we did slowly impact on the newsstand sales, although within about a year of its acquisition we did begin to experience significant difficulties in distribution. Council set a maximum monthly loss on *RT*. That figure was £2000 a month. I have to say when we acquired the magazine the initial losses were much higher. But we reduced them dramatically very quickly. Council also decided that if we could not start making inroads into that £2000 a month by the middle of 2000 we would close the publication because it was going to take too long and be too hard to get it into profit.

"The difficulties with distribution worsened in 2000 and, unless *RT* was simply to become a subscriber-only magazine - which frankly just destroyed the whole argument for having it, because we wanted to be on the newsstands - we came to the conclusion it couldn't be made viable, and even if it were subscriber-only it wasn't going to be profitable for quite a while. So it was against that background Council saw no viable alternative than to cease publication".

H Bellfield, G3SBV, thanked the President for his statement but went on to ask for the full figure that *RT* had cost the Society. The President in reply, referred Mr Bellfield to the published accounts.

Mr Simmonds asked whether the Society was aware of the distribution strategy that was allegedly enforced by W H Smith, and if so why the Society proceeded with the purchase. The President in reply stated: "The Society went ahead because we carried out 'due diligence' across a whole range of issues associated with *RT* and Council believed overall it was a commercial risk worth taking." The President further added that we had been advised by COMAG, the distributors of *RT*, on the issues associated with the distribution of a newsstand magazine and Council was satisfied that at that time, based on the best information from COMAG, it was a reasonable commercial risk.

Mr Bellfield, G3SBV, asked if the Society had received his second letter containing questions pertaining to *RT*. The General Manager acknowledged receipt of the letter and informed Mr Bellfield that a reply had recently been posted. A full reply to the letter would be forwarded after Council had had the opportunity to discuss the contents. Mr Bellfield thanked the General Manager and went on to ask if holding the AGM outside of London was more cost effective. The General Manager in response replied that Council, following a number of requests from members, had decided to hold the meeting in a different location for this year. A number of bids had been received and Harrogate was the most cost effective. The venue costs this year would be lower because the fee being charged by Harrogate Ladies' College was lower that that charged by the Institute of Chemistry.

Item 3: Election 2000

The President announced the name of the member elected to serve on the Regional Council from 1 January 2001. Due to the proposed changes to the Memorandum and Articles of Association and the new Regional Structure there was only one vacancy to the Council. This was in Zone E - Wales. There were two candidates for the position: P Allely, GW3KJW: 57 votes and S Lloyd Hughes, GW0NVN: 76 votes. S Lloyd Hughes, GW0NVN, was declared elected. [It must be noted that the election was carried out under the Society's Memorandum and Articles as at 29 November 2000. Candidates stood for Zone E - Wales. However, on taking up the position on 1 January 2001, Mr Lloyd Hughes, under the new Regional Organisation, would represent the members in Region G - South Wales.]

Item 4: Scrutineers

The President thanked the election scrutineers for their dedication and hard work. He then took the names of several members present who were prepared to volunteer as scrutineers for the 2001 election.

Item 5: Auditors

To reappoint the auditors, KPMG, and to authorise the Board to fix their remuneration. The motion was proposed by the President, seconded by D Biddulph, M0CGN, and carried on a show of hands.

That concluded the business of the AGM. The President moved to proceed with the Extraordinary General Meeting, the notice of which was published in the November 2000 edition of *RadCom*.

Minutes of the Extraordinary General Meeting of the RSGB

THE PRESIDENT informed the meeting that there were two special resolutions.

Special Resolution 1: That the Memorandum of Association of the Company be altered in the following manner:

The deletion of the existing clause (11) (C) and the insertion of a new clause (11) (C) reading: "To purchase, take on lease, or otherwise acquire, and also let lease, or dispose of any premises or other property for the purpose of the Society."

This resolution removes reference to a piece of legislation that is no longer extant.

Mr Bellfield, G3SBV, raised the question of members' access to the Society accounts. The General Manager replied that the statutory accounts were published in full in *RadCom* and that as a Public company there was a requirement to lodge the accounts at Company House, where they are open to scrutiny by our members and the general public.

The resolution was proposed by Mr Smith, MI0AEX, and seconded by Mr Johnson, G1GNS, and carried.

Special Resolution 2: That the Articles of Association of the Company be deleted in their entirety and that new Articles of Association and related By-laws, as initialled by the Chairman and attached to the notice of the meeting, be adopted in place thereof.

The resolution was proposed by Mr Sheppard, G4EJP, and seconded by D Biddulph, M0CGN, and carried.

There being no further business the President closed the meeting.

RSGB

ANNUAL GENERAL MEETING

SCOTLAND

1st DECEMBER 2001

The 75th AGM of the RSGB is being held in Scotland. There is a formal meeting of the Society followed by a complimentary lunch. In the afternoon the floor is open for a discussion on Amateur Radio.

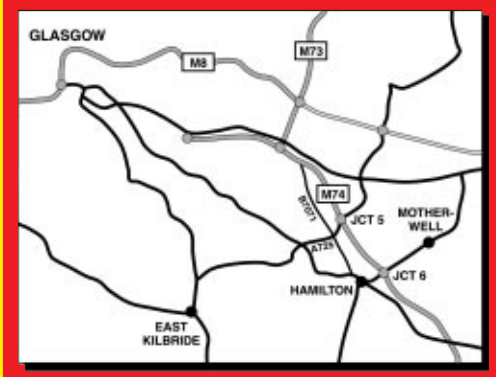
VENUE

Strathclyde Fire Brigade HQ
Bothwell Road, Hamilton, Scotland

TIMETABLE

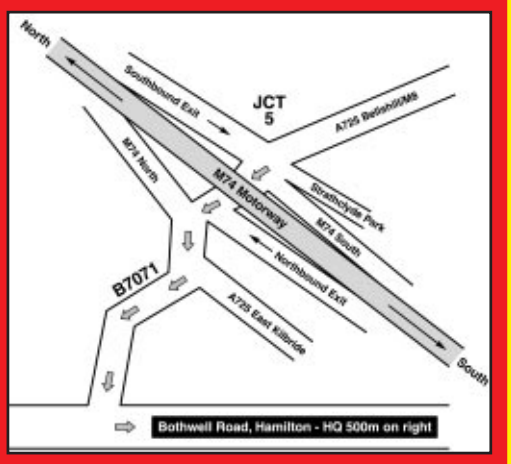
10am	Doors Open
10 - 10.45am	Registration and Coffee
11am	Annual General Meeting
12.30pm	Buffet Lunch
2 - 4pm	Open Forum
10 - 2pm	RSGB Bookstall
7.30pm	2001 Amateur Radio Dinner

HOW TO FIND THE VENUE



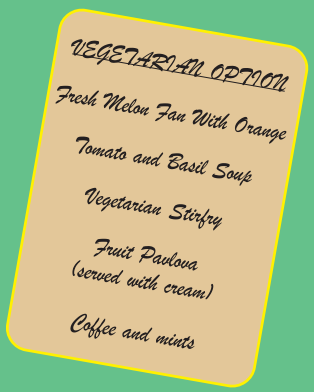
By Road

By Rail: The nearest station is Motherwell



2001 Radio Amateur Dinner

This is being held at the Bothwell Bridge Hotel, Hamilton. The dinner is open to members and non-members alike at £18.50 per head. Dress code for the dinner is jacket and tie.



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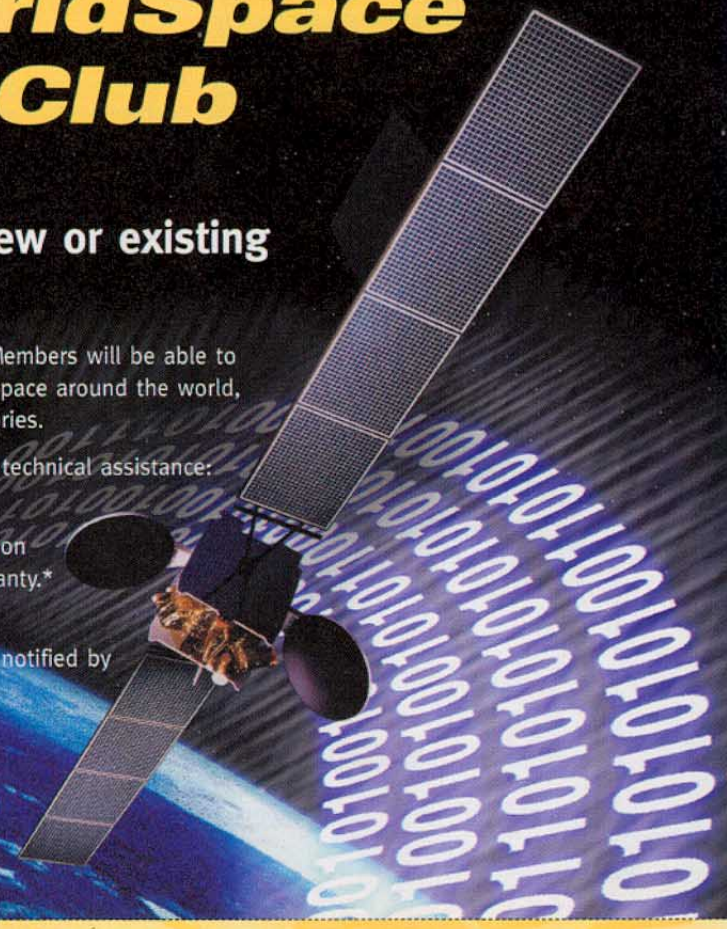
TO BOOK CALL 0870 904 7373

or book online www.rsgb.org/shop

Introducing the WorldSpace Global Club



This is an important notice for all new or existing WorldSpace listeners:

We are pleased to announce the launch of the **WorldSpace Global Club**. Members will be able to receive a regular newsletter including all the new developments in WorldSpace around the world, new stations that have joined the WorldSpace line up and many other stories.

The **WorldSpace Global Club** also offers members the following important technical assistance:

- **CONFIRM YOUR WARRANTY**
  Your prompt return of this card confirms your rights to the protection available under the terms and conditions of your WorldSpace warranty.*
- **REGISTER YOUR PURCHACE**
  Returning this card is your only way to guarantee that you will be notified by WorldSpace of any issues that arise concerning this product.
- **PROTECT YOUR PRODUCT**
  We will keep the model number and date of purchase of your WorldSpace product on file to help you refer to this information in the even of an insurance claim such as theft or loss.

** This does not affect your statutory rights.*

Receiver Serial ID Number

Date of purchase (Day, Month, Year) Place of purchase

Name:

Mailing address:

City State/Province

Zip/Potal code: Country

Phone E-mail _____

Including yourself, how many people are currently living in your household? _____ What is preferred language? _____

What is your occupation? ☐ Self Employed/Owner ☐ Professional/Technical ☐ Clerical/Service Worker ☐ Middle Management
☐ Upper Management ☐ Labourer/Tradesman ☐ Sales/Marketing ☐ Retired
☐ Student ☐ Military ☐ Homemaker ☐ Other _____

Where did you hear about *WorldSpace*? ☐ Television ☐ Radio ☐ Website ☐ Magazine ☐ Friend ☐ Expo or show ☐ Other _____

Do you have any *WorldSpace* accessories? ☐ Yagi antenna ☐ Cable extension ☐ Low noise amplifier ☐ No ☐ Other _____

Do you have a computer? ☐ Yes ☐ No Do you have an internet connection? ☐ Yes ☐ No

Do you have any *WorldSpace* Direct Media products? ☐ PC Adaptor Kit ☐ PC Card ☐ No

Thank you for filling out this questionnaire. Your answers are important to us.

Please check here ☐ if you would prefer not to learn more about *WorldSpace* or obtain new product and service updates from *WorldSpace*.

Data Protection Act: Occasionally we may make sufficient information available to other companies who have products and services which may be of interest to you. If you would prefer not to receive such offers please tick the box ☐.

A Practical Approach to Operating AO-40

Part two - the conclusion - by Howard Long, G6LVB *

Last month, G6LVB discussed the principles involved in satellite communications, and began to discuss the reception of AO-40's signals. Here, he takes up the description of the downlink antenna.

THE HELIX FEED

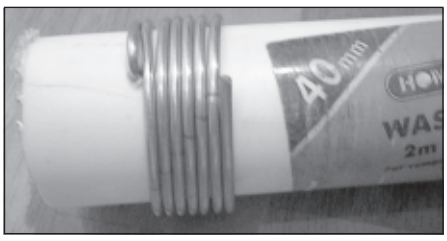
THE DOWNLINK ANTENNA uses a helix feed based on a design by James Miller, G3RUH. James's original design was for a much deeper dish and required fewer turns. For most offset-fed dishes, 5¼ turns seems about optimal.

There are two parts to the helix feed - the reflector and the helix itself.

For the helix, take 1m of Westflex W-103 (or similar solid inner core coaxial cable with 100% shield) and extract the solid 3mm diameter copper inner wire. Save the copper foil shield for later. Mark the wire every 146mm with a permanent marking pen. Wind the wire uniformly and firmly around a 40mm former, such as a 30cm length of 40mm PVC waste pipe.

Take care to wind it the opposite way to a standard screw thread. When viewing the helix from the end, the helix will turn anticlockwise as it turns away from you. This is called left-hand circular polarisation (LHCP), and will effect the mirror image right-hand circular polarisation (RHCP) when reflected in the dish.

When you release it, the wire will spring out slightly. You'll be left with about 7 to 7¼ turns of a closely-wound helix.



Winding the helix on a 40mm former.

Mark a length of dowel or smaller PVC pipe every 32mm. This is used as a template to help make the helix uniform. Place the closely wound helix over the dowel and carefully pull the helix apart so that each turn is 32mm from its adjacent turn, and that the marks made previously on the helix line up.

Stretch the helix to the correct spacing using a spacing template.

Cut off and discard the first turn, which is invariably difficult to make uniform. The first quarter-turn of the helix will be part of the matching section. A helix has a native impedance of about 140Ω, and we're trying to match to a 50Ω impedance.

To make the matching section, take a piece of the copper foil from the Westflex W-103 100% shield. Using the helix as a template, trace out both sides of the outline of the first quarter-turn on the copper foil using a permanent marker. Expand the width of the trace to 8mm with the help of a ruler and some freehand artistic licence. With a pair of sharp scissors, carefully cut out the 8mm-wide quarter-turn of copper foil.

Use the helix as a template to mark out the matching section.

The foil expands the width of the helix wire in order to act as a matching transformer, and is attached flat to the base of the helix on the reflector side (see **Fig 4**).

Using a high-power (~60W) soldering iron, carefully solder the copper foil to the first quarter-turn. I used one of the higher-power butane soldering irons for this job. The foil should start right at the helix end you have just cut. Try to allow the solder to flow down the seam between the wire and the foil to ensure that it is soldered along the entire length. Keep in mind when soldering the foil that it will need to be parallel with the reflector surface.

For the reflector, cut a square 125mm x 125mm piece of single-sided fibreglass PCB.

With a four-hole panel-mounting N-type socket, mark out and drill the holes; *only three of the four screw mounting holes are used*, as the fourth would upset the matching section. The N-type socket centre should be offset 23mm from the centre of the reflector, as shown in Fig 4(a).

Taking a 30mm x 30mm piece of the Westflex W-103 copper foil, cut a cross in the middle of it and use it to 'through-hole plate' the hole through which the N-type socket will reside. Push the foil flaps from the rear of the reflector through to the copper side. Smooth the flaps down and solder them to the copper cladding, keeping the surface as smooth as possible.

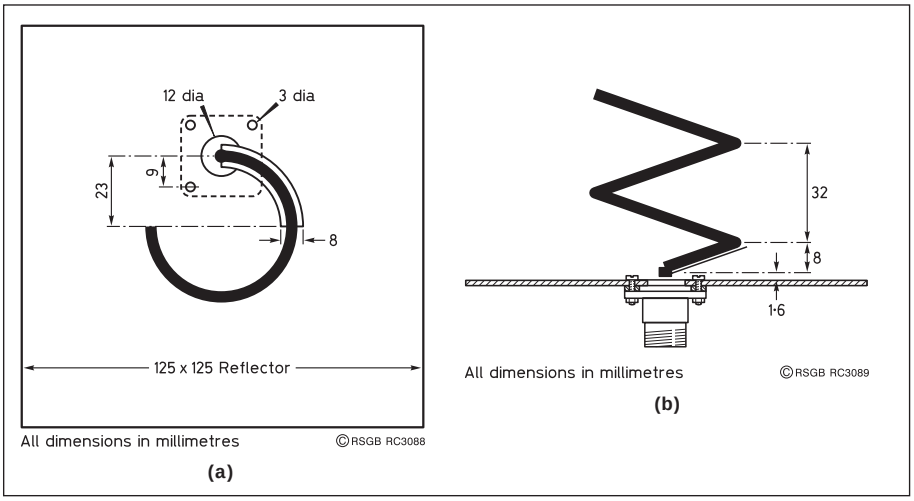


Fig 4: (a) Plan, and (b) elevation views of the helix feed.

** 72 Princes Gate, London SW7 2PA.*

To make the N-type socket's PTFE insulator at the base of the solder pot level with the copper-side surface of the reflector, a 25 x 25mm, 1.6mm-thick PCB spacer, placed between the reflector and the N-type socket, will be required (**Fig 5**). Make the holes for the N-type socket and wrap the spacer in a layer of copper foil. Push the holes through on the foil.

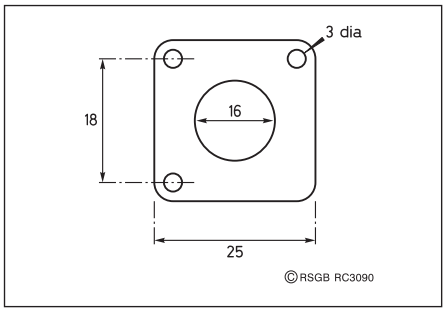


Fig 5: Dimensions of the PCB spacer.

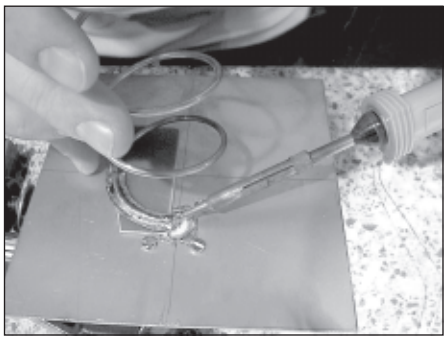
With a junior hacksaw, carefully cut the N-type solder pot so that it's short enough to allow the helix to sit in the solder pot with a 1.6mm spacing from the reflector surface. You can measure the 1.6mm exactly by using a standard piece of PCB as a gauge.

Attach the N-type socket to the spacer and reflector using three M3 12mm brass screws and nuts, with the socket on the unclad side of the PCB as shown in Fig 4(b).

Solder the helix end with the copper foil to the N-connector centre conductor, with the height at the base of the helix from the reflector 1.6mm. For a good match, the 1.6mm starting height is fairly critical. Here's an easy way to ensure that this distance is achieved - temporarily place a piece of Veroboard or single-sided 1.6mm PCB material, copper-side down, wedged between the reflector and the wire when the wire is soldered to the N-connector.

If you hold the helix while soldering it to the socket, hold it a couple of turns from the base as the copper wire conducts heat very well! Only the solder joint at the base supports the helix, so keep its fragility in mind when moving it.

Because each full turn is 32mm from the next, the quarter-turn matching section has 8mm total displacement. Thus, whilst one end of the matching section is at 1.6mm, the other end should now be about 9.6mm or so above the reflector.



Use a piece of PCB between the helix base and reflector to ensure that the initial spacing is precisely 1.6mm. Hold the helix at least two turns from the base when soldering; it gets very hot!

Snip off the last ¾ turn or so, so that there are 5¼ turns total (including the matching section).

To mount the reflector of the helix to the old LNB fixture, drill two 3mm holes through the reflector and fixture, and mount with two M3 8mm brass screws. Using the original LNB fixture will ensure that the feed has the correct angle and position in relation to the dish.

To weather-proof the copper, spray the entire helix feed with two light coats of clear spray-paint or varnish. During heavy rain, the helix may detune as excess water surrounds the matching section. To avoid this, a simple solution is to wrap the helix loosely in a heavy-duty clear plastic freezer bag with the helix end in first to protect it from direct rainfall.

LISTENING FOR AO-40

NOW YOU'RE QRV on 2.4GHz, it's time to listen. Place your dish on a camera tripod, garden chair or any other suitable mounting device, and point it in the direction of the satellite. When pointing the dish take into account that as it's offset-fed, you need to point the dish about 21° lower in elevation than predicted by your software. **Fig 6** illustrates this point. With your receiver switched on and set to receive USB, when you power-up the downconverter you should hear an immediate increase in noise.

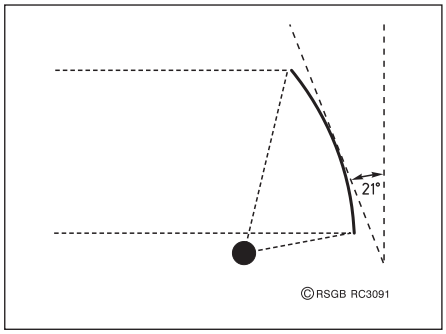


Fig 6: Analogue TV offset fed dishes generally need to be tilted down about 21° from their true elevation.

Even without the satellite above your horizon, you can still perform a sanity check by listening to the noise increase as you point the antenna to the ground, and decrease as you point it to the sky.

For most of the time AO-40 has a beacon running, normally the S2 Middle Beacon (or **MB**), nominally at 2401.323MHz. It sounds like a harsh buzzing and is unmistakable, once you've heard it.

Now comes the tricky bit. Unadjusted, the downconverter IF may well be ±40kHz off frequency. To make matters worse, due to the relative velocity of the satellite, it's very likely that the Doppler shift on the signal will be another ±30kHz too.

So there's quite a lot of tuning to do before you find the satellite's signal. To remove some of the guesswork, your prediction program may give you an idea of the frequency you should be looking for. *FODTrack*, for example, although originally designed as a hardware and software solution, will accurately estimate Doppler-corrected frequencies when using only the software component. *FODTrack* is available free from the AMSAT-NA website (see the WWW panel).

Once you've calibrated your downconverter's local oscillator so that the received signal agrees with the predicted Doppler-corrected frequency, you can predict the frequency to within a few kilohertz. The main inaccuracy will be due to the local oscillator thermal drift of the downconverter.

When you've found the MB, if you wish you can plug your receiver's audio output into your PC's soundcard and proceed to decode the beacon's telemetry using a program such as *AO40RCV* by Moe Wheatley, AE4JY. There are alternative AO-40 telemetry programs available too, and are referenced in the WWW panel.

Of course you can now also listen to some QSOs. Check that the transponder is switched on by checking the schedule on the AMSAT-DL website. If the S2 downlink is in use, most activity at the moment occurs above the MB frequency. Note that QSOs will be 10dB weaker than the MB.

TRANSMITTING THROUGH AO-40

HAVING HEARD the satellite, you're ready to consider how to conduct a QSO through it. The schedule is often on modes U/S and L/S simultaneously, so you need to be able to transmit either on 70cm (U-band) or 23cm (L-band).

Of the two, 70cm is the easier and cheaper band to consider, so what are the requirements? You need to be able to generate SSB, and for reliable contacts, even during moderately-bad squint angles, about 500W EIRP circular polarisation will suffice. A well-balanced system would need about 50W transmitter power and an antenna gain of 10dBic.

For my own configuration, I purchased a second-hand Yaesu FT-790 Mk1 for £90 and added a second-hand 50W amplifier at a cost of £78 from Ebay on the Internet.

AN UPLINK ANTENNA

ALTHOUGH ANY Yagi of 10dBi gain or more will be satisfactory, I built a crossed-Yagi antenna based on an article from Kent Britain, WA5VJB, to complete the uplink. **Table 2** gives the dimensions.

By mounting two 8-element Yagis orthogonally on the same boom and off-

setting one λ/4 (172mm) behind the other, right-hand circular polarisation (RHCP) can be achieved by feeding them via a power-splitter.

To begin with, you may wish to start with just a single linear Yagi rather than providing circular polarisation. The circular phasing adds quite a lot of complexity. The benefit of an RHCP antenna is that you will suffer less QSB on your uplink and, on average, have a 3dB better signal.

The antenna is constructed on a 1.3m, 18mm x 18mm wooden boom purchased from a DIY store. The 4mm solid aluminium elements were purchased from one of the larger warehouse-style DIY stores. The antennas and the feed method are illustrated in **Fig 7** and shown in the photograph. The dimensions of the uplink Yagi driven element are given in **Fig 8**.

I provided BNC sockets at both of the feed points. To connect the BNC sockets to the aluminium driven element, I used the metal part of a 10A terminal block to screw into the aluminium and allow adjustment, with the benefit that it's easy to solder the BNC socket to the terminal block. Consider a more robust method for a permanent installation, paying particular attention to weather protection.

If you do take the RHCP route, you should be aware of some tips whilst tuning the antenna. There is some coupling between the two antenna planes so, although you should tune each antenna individually first, both sets of elements should be in place on the boom. To make power splitters work effectively with the antennas, it's always worth making the effort to tune in each individual antenna down to a very low VSWR, say 1.2:1 or less. I found that the WA5VJB Yagis tuned in very easily to under 1.1:1 VSWR with some very minor length adjustment required on the driven element.

	Dimensions (mm)							
	Reflector	Driven Element*	D1	D2	D3	D4	D5	D6
Element Length	340	330	315	305	305	305	305	298
Spacing from Reflector	0	64	140	286	445	610	775	959

Table 2: Dimensions of the elements used for the uplink Yagi. *The driven element is folded; see Fig 8 for details

The power-splitter is constructed from two $\lambda/_4$ pieces of 75Ω RG-59 terminated in 75Ω BNC plugs and combined with a T-piece. Taking the velocity factor of the RG-59 into account, the cable lengths (including the BNC plugs and part of the T-piece) should be 115mm each. Be wary of cheap, thin Ethernet T-pieces! Many don't work at all well at 435MHz.

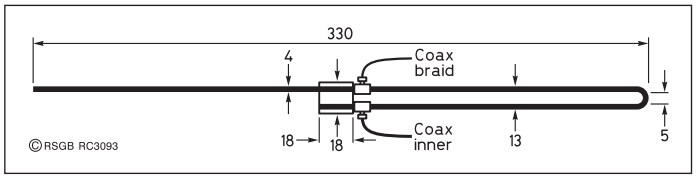


Fig 8: Detail of the uplink Yagi driven element dimensions.

SAFETY FIRST

BE AWARE of safe distances that should be adhered to when operating 50W into this antenna. To abide by the US FCC safe radiation limits at 435MHz, I calculated that, with typical heavy use, the safe distance along the main lobe of the antenna in a controlled environment should be at least 2m. Away from the main lobe, 50cm is calculated as being safe. These figures are based on sustained use over a period of time.

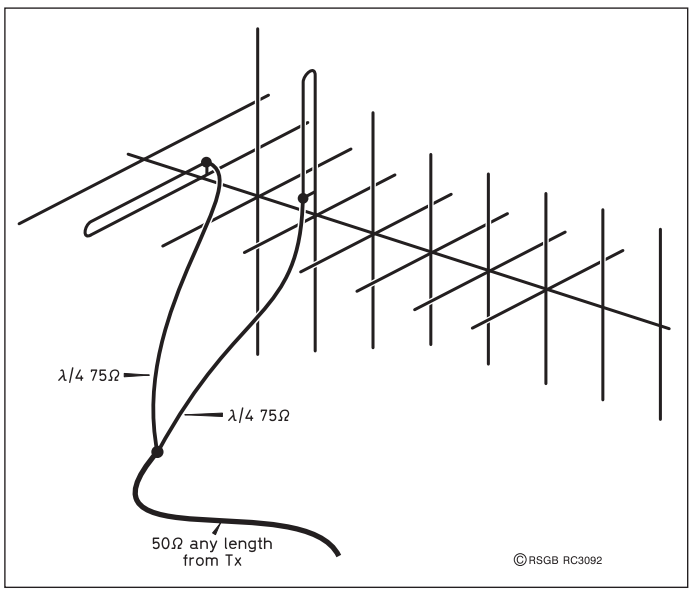


Fig 7: The uplink antenna combines two 8-element Yagis mounted orthogonally on the same boom, but physically offset by λ/4 to give RHCP.

INVERTING TRANSPONDERS

IN ORDER to support inverting transponders, today's purpose-built satellite radios can track the uplink and downlink frequencies in reverse so, as you tune the receiver *up* the passband, the transmitter automatically tunes *down*.

The FT-290 and FT-790 were never designed for this style of operation, so of course they don't directly support it. They don't even have computer interfaces.

Even so, I discovered that it is possible to modify the FT-290 and FT-790 (and possibly other rigs) to connect the tuning dial rotary shaft encoders to each other, thus supporting easy inverted-transponder passband-frequency tracking. See the WWW panel at the end of the article for details on this modification.

Frequency tracking is not essential, but it can make life a lot easier as you scan the passband.

QSO TIME

WITH BOTH an uplink and downlink in place, it's time to prepare for a QSO. Review the current operating schedule posted at AMSAT-DL's web site and, with the help of your prediction software, determine when the U/S transponder is switched on.

Point your antennas in the direction predicted, and then locate the beacon. Adjust the receive antenna for the peak signal. Change frequency to a quiet part of the passband, well away from the beacon. If your downconverter is properly calibrated, your prediction software can help you determine an accurate uplink frequency to within a couple of kilohertz.

Key up your transmitter with a CW key for a few seconds and attempt to locate your signal on the downlink. You will find that there can be quite an unnerving delay of up to nearly 0.5s, depending upon the satellite's distance from you.

If this is your first try at a satellite, you will never forget that first moment when you hear your own downlink!

When you have found your downlink, switch to USB on the downlink and LSB on the uplink and you can now conduct some voice QSOs. Use headphones when conducting voice satellite QSOs - the echo from your own downlink being retransmitted makes your signal very difficult to listen to.

CONCLUSION

FOR MANY AMATEURS, working most of the world has suddenly become viable.

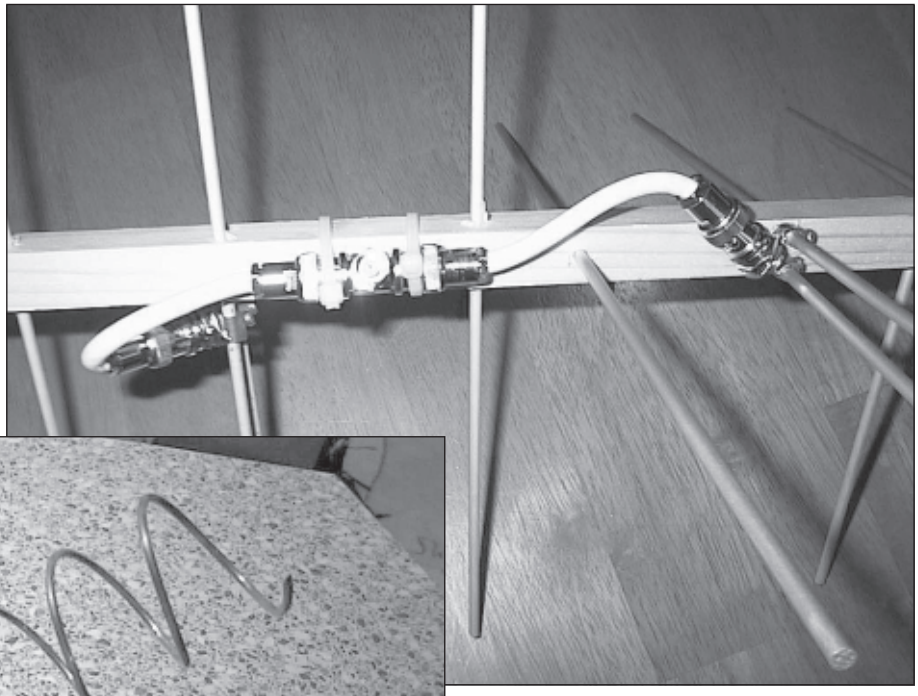
www.

K5GNA downconverter modification details	http://members.aol.com/k5gna/AIDC3733modifications.txt
Sourcing TransSystem downconverters:	www.ebay.com and search for AO-40
DIY downconverter	www.g3wdg.free-online.co.uk/modes.htm
Off-the-shelf downconverters	www.db6nt.com www.ssb.de www.parabolic.se
Satellite prediction software	www.amsat.org/amsat/ftpsoft.html www.uk.amsat.org/members/services.htm#Software
AO-40 status and schedule	www.amsat-dl.org/journal/adlj-p3d.htm
WA5VJB UHF Yagis	www.clarc.org/Articles/uhf.htm
Connecting rotary shaft encoders for uplink and downlink tracking	www.g6lvb.com/satellite_passband_frequency_tra.htm
AO-40 telemetry decoding software	www.qsl.net/ae4jy/ao40rcv.htm www.amsat-dl.org/journal/adlj-p3d.htm
2.4GHz G3RUH 60cm dish and feed	www.jrmiller.demon.co.uk/products/s_ant.html
2.4GHz 20- and 40-turn helices	www.wimo.de
2.4GHz Loop Yagis	www.downeastmicrowave.com
2.4GHz Yagis	www.f9ft.com/

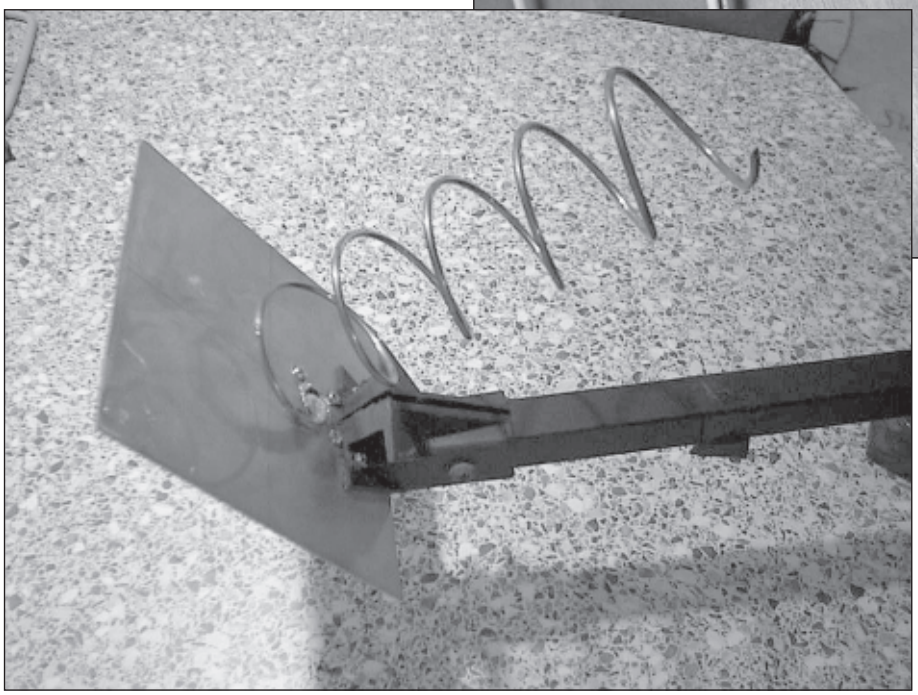
With either temporary or permanent small antennas in the garden or pointed out of windows, many stations with antenna restrictions can now look forward to reliable DX communications. The antennas are of similar sizes to those for standard broadcast TV reception, and so should blend in more easily for permanent installation.

With AO-40, both Full and Intermediate Class-B licensees can now reliably operate world-wide.

Hopefully you'll now realise that it also doesn't cost an arm and a leg to get QRV on AO-40.



Using two λ/4 75Ω sections and a T-piece, the two 50Ω antennas can be combined to present a 50Ω impedance.



The complete helix feed mounted onto the dish arm using the old LNB bracket.

While satellite communications bring new operating challenges, none of the individual concepts is particularly difficult to grasp, especially once you've had a go. However, there are a lot of new concepts to take in, so a modicum of perseverance is required. The rewards are the huge satisfaction of the achievement and a whole new aspect of the hobby to enjoy. ♦

Newcomers' News

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

HAVING JUST started this year's radio classes, I can report first hand that there is certainly a buzz about the new licence structure. However, it would appear that there is still as much interest in the Full licence as there is in the new Foundation licence and the Novice, now known as the Intermediate, licence.

FOUNDATION FEEDBACK

THE ABSENCE OF 28MHz from the draft Foundation Licence Schedule seems to have caused more debate than the creation of the licence itself. I have heard one or two screams of anguish but existing amateurs have been mostly supportive of its introduction. However, John Wheeler, G0IUE, is one of those who could not believe his eyes when he saw the proposals. As he puts it, "10 metres is crying out for more users, the Foundation licence holders can surely bridge the gap".

The reason for excluding 28MHz from the new licence, given at the Leicester Show, was that the Radiocommunications Agency (RA) were concerned about the potential use of illegal 27MHz Citizen Band (CB) radio amplifiers. John has written to the RA expressing his disappointment at the apparent lack of trust in the new licence holders. After all, many will be using transceivers capable of much more than 10 watts in any case.

I remember the furore that surrounded the introduction of the 27MHz CB licence in the early 1980s, and the subsequent ban on converted CB radios being used by licensed radio amateurs, I guess this is much the same sort of concern.

Rumour has it that the schedule will be reviewed some time after its introduction and 28MHz may be added, in the same way that the Intermediate licence holders have gained more bands and power since the Novice licence was first introduced. Let's hope the Foundation is a great success and that extra privileges follow.

Kyle McInnes under tuition (see 'Two Way Learning').

TWO WAY LEARNING

THE FINNINGLEY ARS started Novice training recently and amongst their students is young Kyle McInnes, aged 10. Kyle is learning Morse code under the tuition of George Boothroyd, G4AWT, and will be sitting the NRAE any day now. Howard Jones, G3FSO, is the Novice tutor at the club, whilst Kyle is teaching the 'older hands' a thing or two about computers. He has helped out members with PC problems and even designed the club's web site at www.geocities.com/g0ghk

Good luck with the exam Kyle, and let's hope that this will be the first stepping stone to a full amateur licence and a successful career in radio, electronics or computing.

NOVICE EXAM RESULTS

THE SEPTEMBER Novice Radio Amateurs' Exam (NRAE) report is now available from www.kippax.demon.co.uk/c-and-g/ David Pratt, G4DMP, posts the reports on the web after every exam to help future candidates, and tutors, prepare for the next one.

Those about to sit the December NRAE and / or the RAE will be relieved to know that the new licensing system will not be included in the exam. The exam papers were set well before the changes were announced!

Only 42 candidates sat the September Novice exam, which is somewhat down on previous years. Let's hope the licensing system will do something to reverse the decline.

For those who do not have access to the Internet, copies of RAE and NRAE exam reports can be obtained by sending a stamped self-addressed envelope marked with the reports required to RSGB Headquarters.

QSLL - ANOTHER VIEW

EDMUND RAMM, DK3UZ, wrote to say that in his neck of the woods the Q-code 'QSLL' is taken to mean "my QSL sure via bureau, pse ur QSL". He expresses great disappointment at stations who do not send QSL cards and observes that, in his experience 'G' (not GD, GM, GJ, GU and GW) stations are the worst culprits. Eddi sees the exchange of cards for the first contact with a station on each band as being 'the final courtesy'.

I have read some very strong exchanges of correspondence on the topic of QSL cards and have no desire to open up that particular can of worms, but I have to agree with Eddi in that large numbers of stations ask for QSL cards but never return them. Newcomers be warned, don't expect 100% returns, you will be disappointed.

I asked Eddi about newcomers in his country and he described how he came to be a radio amateur. He told me how he heard a radio amateur "by accident" on an old crystal set and tracked down one of the "mysterious" voices through the telephone directory. A visit to the shack sent Eddi home elated and fascinated. His enthusiasm was not shared by his parents, who saw electricity as far too dangerous, or his school friends, who thought he should be kicking a ball, not doing physics! Nevertheless, some 10 years later the licence was obtained and the rest, as they say, is history.

What encouraged Eddi to persevere? He says it was self-generated enthusiasm, something you cannot, and should not, force on others. I agree with the sentiment but I wonder whether the same 'spark' would have been there had that first radio ham not taken the time to introduce Eddi to the hobby? We can't force youngsters into becoming radio amateurs but if no-one shows them what radio can do, who will?

NEED HELP FOR FIRST QSO?

TERRY BARCLAY, G0TBD, says that he is only too pleased to offer help to newly-licensed amateurs who may be nervous about their first Morse code (CW) contact (QSO) on the air. He says he will gladly have a QSO at the newcomer's speed in order to introduce them to the delights of CW.

Anyone wishing to arrange a scheduled contact ('sked') with Terry can e-mail him at Stahlhamer@btinternet.com Thanks Terry. [See also 'The Last Word', *RadCom* November 2001, page 113 - *Ed.*] ♦

* *5 Sydenham Buildings, Lower Bristol Road, Bath BA2 3BS; e-mail: newcomers.radcom@rsgb.org.uk*

Down To Earth

Morse Code - the Little-Known Facts

The Second and Concluding Part, by Mike Bedford, G4AEE *

IF THE FACT that there are numerous variants of Morse Code, each tailored to a particular language, is news to you [see *RadCom* November 2001, 'Morse Code - the Little-Known Facts' part 1 - *Ed*], what might be even more of an eye-opener is that there are two variants of Morse which can be used for transmitting the English language. Or to be more accurate, *there used to be* two flavours of Morse Code.

Morse Code, as devised by Samuel Morse in 1835, is not the code we use today. First of all, the code underwent a number of modifications in the first few years before it became stable. It was adopted as a standard in 1844, but even this would be barely recognisable to today's telegraph operators. That original Morse Code, which later became known as American Morse, is shown in **Table 2**. Some of the symbols are familiar; others most definitely aren't. And it's not just that the unfamiliar symbols are a different sequence of dots and dashes from the ones we're used to.

Just take a look at the symbols for T, L and 0. T is what we'd expect but the symbols for L and 0 are also single dashes, it's just that they're different length dashes. The L dash is longer than the T dash and that for 0 is longer still. Even more odd are the symbols for C, O, R, Y and Z. These have three, two, three, four and four dots, respectively, but they differ from the symbols for S, I and H in that they have an embedded space. That space is longer than the normal space between the dots and dashes in a character but shorter than the space between letters.

A	·–	N	–·	1	·–––
B	–···	O	–––	2	··–––
C	–·–·	P	·––·	3	···–––
D	–··	Q	––·–	4	····–
E	·	R	·–·	5	·····
F	··–·	S	···	6	–····
G	––·	T	–	7	––···
H	····	U	··–	8	–––··
I	··	V	···–	9	––––·
J	·–––	W	·––	0	–––––
K	–·–	X	–··–		
L	·–··	Y	–·––		
M	––	Z	––··		

Table 2: 'American Morse', the original Morse Code.

Within a short period of time Morse Code crossed the Atlantic and, in particular, it was adopted in Germany. But those varying length dashes and intra-character spaces didn't find universal favour. Within a short period of time, multiple variants of Morse code had been developed to overcome the perceived limitations of Samuel Morse's creation. Clearly this was a recipe for mayhem but, in 1865, a standard was adopted throughout Europe. This was called Continental Code and is much the same as the code you'll find on the amateur bands today. Even so, the code wasn't totally invariant and, in 1939, some minor changes - mostly to the punctuation characters - were introduced to create a new standard code, International Morse. And what became of American Morse? You might be surprised to learn that it remained in use, mainly on the railroads, until the mid-1960s.

IT'S ALL IN THE TIMING

THE SECRET OF sending good Morse is all in the timing. Although you'll have picked it up subconsciously by ear, the process of learning to send Morse involves making dashes three times as long as dots, inter-letter spaces three times as long as inter-dot / dash spaces, and inter-word spaces seven times as long. But these various ratios haven't always been set in concrete. There was a time, for example, when the inter-word space was five unit lengths instead of its current seven. Then there's the issue of American Morse in which it appears that the various ratios were not rigorously defined. Some reports suggest that the ordinary dash was two times as long as a dot, others say it was three.

In reality, Morse himself probably just said that a dash was longer than a dot, that the dash in the L was longer still, and that the dash in the figure 0 was even longer. We can assume that the ratios of the various spacings, including that embedded space in some characters, were equally vague.

As a result of this, there was more diversity in style between

MORSE WHAT?

YOU MIGHT BE interested to know that the phrase 'Morse Code' is a misnomer and I'm not just talking about the debate over whether Morse or his business partner Alfred Vail actually devised it. Morse is not a 'code', nor, for that matter, is ASCII, despite those letters spelling out the phrase American Standard Code for Information Interchange. In a code, each symbol substitutes for a word or a concept. In the Q-code, for example, each of those three-letter combinations represents a phrase (eg QRP means "reduce power").

So if it isn't a code, what is Morse? Actually it's a cipher, this being the name of a system in which symbols represent individual letters. Normally, of course, ciphers are used for secrecy, but not in this case. To be pedantic, therefore, we should use the phrase Morse Cipher, but I really can't see it catching on.

* *4 Holme House, Oakworth, Keighley, West Yorks BD22 0QY.*

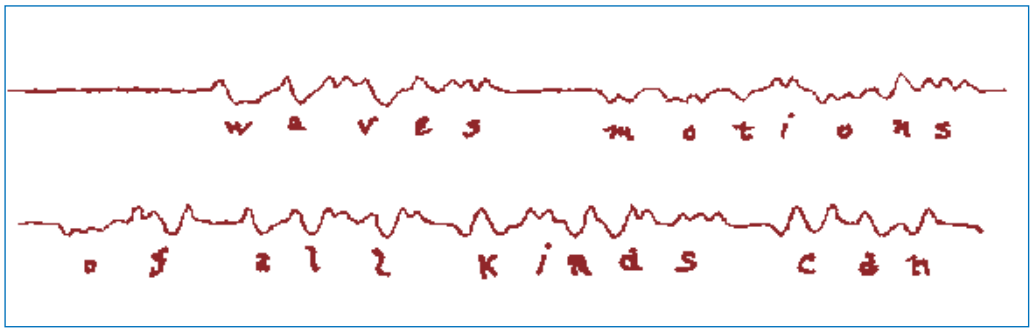


Fig 1: An actual trace of Cable Code as recorded from a trans-Atlantic cable. Dots are above the baseline, dashes are below. Although the waveforms are distorted after 3000 miles, the text can be made out, even so (from *Scientific American*, August 1922, 'Submarine Telegraph Cables With the Men Who Lay and Repair These Invisible Strands That Bind Continents Together', by Lt-Col C de F Chandler, US Army, Ret).

American Code operators than between people sending International Morse using a straight key. Operators found it particularly easy to identify operators from their characteristic timing - their 'fist'.

But there's a much more interesting - and at first sight bizarre - example, of timings which are different from those we're used to. I say bizarre because I'm talking about a system in which dots and dashes were exactly the same length. Intrigued? Let's start with a bit of background then.

TRANS-ATLANTIC COMMUNICATION

ON 28 AUGUST 1858, a message was sent via the newly completed trans-Atlantic cable which ran from Valentina in Ireland to Trinity Bay in Newfoundland. The world was amazed and 1 September was declared an official day of celebration in New York. But the electrical characteristics of a submarine cable are very different from those of the landlines which had formerly been used for sending Morse. Whereas a landline, suspended some metres above the ground on poles, has a low capacitance to ground, the same is not true of a submarine cable. Since the conductor is separated from the sea water which makes up the return path by only a few millimetres, the capacitance is significant. Any attempt to send an on-off signal along a long submarine cable would, therefore, be met with difficulty. Sending a dot or a dash would charge up the cable and this charge would then leak away over time. Dots and dashes would, therefore, tend to merge into each other unless they were sent extremely slowly. Not only this, but the fact that these cables could be, say, 3000 miles long with no in-line repeaters, meant that the current at the far end would be minuscule - certainly not enough to drive the sounders used for landline telegraphy.

CABLE CODE

THE SOLUTION TO both of these problems was found in a derivation of Morse Code called Cable Code.

Rather than differentiating dots and dashes by their duration, they were differentiated by the direction of the current. And the code was read by observing the movement of the newly-developed mirror galvanometer which deflected a beam of light in opposite directions for dots and dashes. The periodic reversal of the polarity had the effect of dissipating the charge in the cable and the use of the galvanometer allowed the minute currents to be detected.

Slightly later, a chart-recorder type device was developed to record the signal as a trace which moved either side of the centre line depending on whether a dot or a dash was being received.

Needless to say, the result was far from a square wave, as shown in **Fig 1**, but it provided reliable communication, nevertheless.

A FINAL LOOK AT EFFICIENCY

TO WIND UP the subject of submarine telegraphy, and the entire article for that matter, let's return to the comparison with ASCII that we introduced at the outset. Since the Cable Code's dash is now just one unit long, the same as the dot, it would be interesting to make that comparison again. You can see from **Fig 2** that Cable Code is about 25% shorter than International Morse Code - in fact the average character length is about seven bits – and this compares very favourably with our 6-bit variant of ASCII which has an 8-bit character length once start and stop bits are added.

We're not comparing like with like, though, since we have actually increased the capacity of the channel by using three signalling levels (ie negative, zero and positive). And if we were to do the same with ASCII, we'd actually be able to transmit 1.58 times more information in the same period of time.

That figure, of course, is $\log_2(3)$, the number of bits per unit time transmitted using three signalling levels. So perhaps, in the final analysis, Cable Code doesn't offer any code efficiency advantages over ordinary Morse. It provides a solution for communication over submarine cables which ordinary Morse doesn't, but the perceived improvement in code efficiency is illusory. In other words, it really doesn't make the most of that three-level communication channel.

But although Cable Code isn't the ultimate in code efficiency, let's not lose sight of how well standard Morse compares with ASCII.

The code was made deliberately inefficient so as to aid reception by ear and still manages to be almost as efficient as a code which was developed 125 years later - not bad going. It looks like the public perception of Morse, as an unsophisticated method of communication, best left to western movies and the history books, is well short of the mark. But then I guess you didn't need me to tell you that, did you? ♦

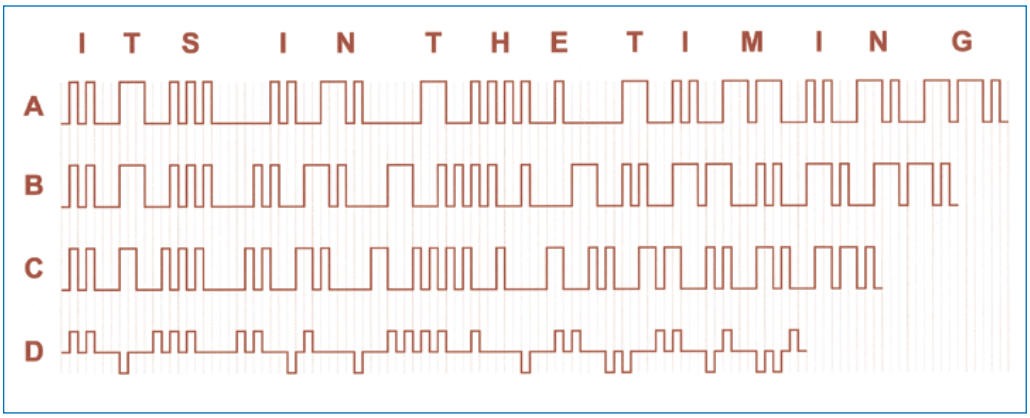


Fig 2: Although we're used to the ratios of the dot and dash lengths and the various spacings beng constant, as in (A), this hasn't always been so. Before 1949, International Morse Code had a five-unit inter-word space as shown in (B). (C) shows the American Code in which the ratios were rather vague. Some reports suggest that the ordinary dash was just twice as long as a dot. Things are further complicated by longer dashes and intra-character spaces which don't occur in the letters used here. (D) shows Cable Code and here dots and dashes are exactly the same length and are differentiated by the current polarity.

The Birth of Radar

Part Three, by Brian Kendal, G3GDU *

IN PARTS 1 and 2 of this article, I described how the team at Orford Ness and Bawdsey developed an operational radar chain from scratch in the amazingly short time of four years. However, this is really only part of the story, for after the basic principles had been laid down, both the Royal Navy and the Army experimental establishments had been fully briefed and were developing their own radar systems. But there were two other major developments which were to have a major effect during the forthcoming war, and both stemmed from the genius of Sir Henry Tizard.

Sir Henry Tizard was the chairman of the Committee for the Scientific Study of Air Defence which had been formed in January 1935. Other members included H E Wimperis, the Director of Research at the Air Ministry; A V Hill, a physiologist from Cambridge who already held a Nobel Prize; and P M S Blackett, who was Professor of Physics at Cambridge and who was to win a Nobel Prize after the war. The secretary was A P Rowe. The Committee reported to the Committee for Imperial Defence. Commonly called the Tizard Committee, the members had a major influence on scientific research.

In assessing the possible value of the radar early warning system, Tizard realised two factors. The first was that the HF radar being developed was not particularly accurate in bearing, and whilst it would be adequate during daylight for bringing an intercepting aircraft within sight of an enemy, it would not do so at night. It was therefore necessary to develop a lightweight, short-range radar which could be installed in an aircraft to facilitate interception after the ground radar had provided guidance to the vicinity of the enemy. The second factor was that RAF Fighter Command had long cherished its free-ranging spirit and would have to learn to operate from strict ground control if radar interception was to be effective. The second of these factors resulted in the 'Biggin Hill Experiment'.

12 Weald Drive, Furnace Green, Crawley, West Sussex RH10 6JU.

AIRBORNE RADAR

BY EARLY 1936, the future success of the ground radar was assured and, at Sir Henry Tizard's suggestion, work was started on equipment suitable for airborne use and, after the move to Bawdsey, Dr E G (Taffy) Bowen was allocated the task.

The problems were formidable, for the existing system used a roomful of transmitters weighing several tons and the aerials were located on high masts. The receiver was a large rack of equipment, bristling with valves, control knobs and indicators requiring the services of a highly skilled operator. Furthermore, to bring the aerials down to a size suitable for airborne use, the wavelength had to be reduced to one or two metres at a time when six metres wavelength was pushing the limits of technology. In order to achieve a minimum range of 1000 feet, the pulse length would have to be reduced to 1 microsecond. For the ground equipment, the pulse length had been reduced from the 200 microseconds used for ionospheric experiments to 20 microseconds. This had not been difficult, but to then reduce to one microsecond was taking the team into strictly unknown territory. Finally, the total electrical power available on RAF aircraft was 500 watts at 12 volts, most of which was already allocated to other services.

Gradually the design guidelines came together. The equipment should not weigh more than 200lb or occupy more than 8 cubic feet. Aerials were to be limited to a foot or so in length and the set should be suitable for operation by the pilot alone or by a radar operator.

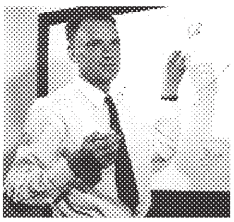
At that point, Bowen obtained an EMI 45MHz receiver chassis designed for the projected TV service. This was immeasurably more sensitive than any receiver at the time. Over the next two years, strenuous attempts were made to obtain another, but even Watson Watt failed. Looking back, it seems hard to realise that between 1936 and 1938, the airborne radar group had the use of five aircraft with transmitters and indicators for each, but the whole responsibility for reception fell on a single TV receiver chassis.

Early trials were conducted on 45MHz. A transmitter designed on the lines of those already in use was constructed for the frequency and installed on the roof of the buildings at Bawdsey. Starting with a pulse width of 4 microseconds, a power of 30kW and simple dipole aerials, ranges of 40 to 50 miles were soon achieved. It was then time to start trials with aircraft. Initially it was decided to fit a receiver in the aircraft working in conjunction with a transmitter on the ground.

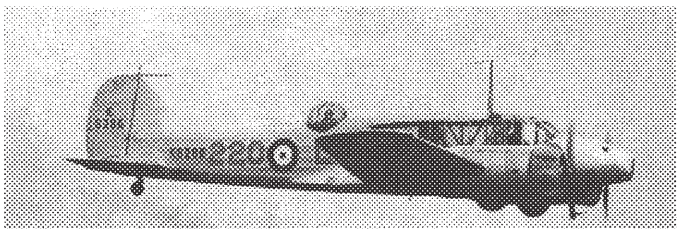
A Heyford bomber was made available for the tests. A dipole aerial was strung between the wheels of the aircraft and the power came from a collection of batteries on the floor of the aircraft. EHT for the cathode ray tube was obtained by a second-hand Ford ignition coil driven from a vibrator operating from a 12 volt battery. The results were encouraging for, flying over the Bawdsey transmitter, aircraft echoes were received up to 12 miles range. Work then began on an airborne transmitter. A transmitter was constructed using Western Electric 316A valves. These produced a few hundred watts peak power at a pulse length of 3 microseconds and a PRF of 1000Hz. When installed in the Heyford bomber, ranges of several miles were obtained on ground installations.

After these tests, two Ansons were allocated for airborne trials, based at the nearby Martlesham Heath RAF Station. Work then commenced on raising the frequency of the equipment. A new transmitter was constructed using two 316A valves in push pull and the receiver was modified by fitting a converter using acorn valves. After various tests an operational frequency of 200MHz was selected. Equipment was installed in the Ansons and echoes from ships were soon obtained at three miles.

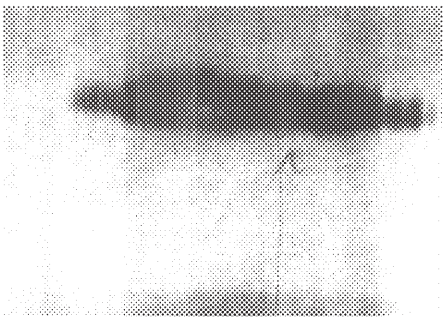
In September, a major Royal Navy exercise was planned in which a fleet would sail from the Straits of Dover to Invergordon. Coastal Command had the task of finding them. The temptation was too much and the Bawdsey contingent decided to take part. They took off early in the morning and at 8.00am a large echo was received at six miles. Clos-



Dr E G ('Taffy') Bowen, the leader of the airborne radar team.



An Avro Anson aircraft similar to that used by the airborne radar team.



The first airborne radar image shows the aircraft carrier *Courageous*. This photo was loaned to the author by Hanbury Brown, one of Bowen's airborne team, for an illustrated talk at the Royal Institute of Navigation. The same picture is included in Bowen's book *Radar Days*.

ing the range, they realised that it was the aircraft carrier *Courageous* which flew off a number of aircraft to intercept. These also appeared on the radar screen – the first time that aircraft had been detected. The weather was deteriorating and they found no other ships, so when fuel ran low, they returned to base. On landing, they were told that the exercise had been cancelled due to the inclement weather.

ASV

AT THIS POINT, airborne radar began to divide into two objectives: AI (airborne interception) and ASV (air to surface vessel). The ASV itself evolved in two directions. The first was the 'homing' mode, in which the radar was aimed in a forward direction and left-right indication given by receiving aerials mounted on either wing being aimed outwards (see **Fig 7**). The other configuration was the 'search' mode in which narrow beams were aimed sideways.

For the initial trials, however, beam aerials were fitted pointing from the port side of the Anson. The transmitting array was a six-element Yagi on the tail of the aircraft and the receiver aerial was similar, but mounted through a window amidships. Tests gave a maximum range of this combination of 20 miles on ships. A makeshift photographic recorder was assembled and on 10 May 1938 the *Courageous* was sighted and photographed. This was the first ever sideways looking radar picture.

Air interception was not ignored, using a similar system to the homing mode of the ASV. By early 1939 the air-to-air range was already two to three miles and nearing the requirement of four miles, but an elevation display was also needed for interception. This was achieved by fitting another pair of receiving aerials below the wing of the aircraft. As the upper aerials had an upwards and the lower aerials a downwards squint (Fig 7), this provided the elevation information. A simple display unit was devised for azimuth in which two vertical traces were produced on the CRT. The left-looking aerial caused outward deflection of the left hand-trace and the right-looking aerial to the right-hand trace, the deflection indicating whether the target was to the left or right. Range was indicated by the position of the echoes along the trace. A similar display was provided for elevation (see **Fig 8**). The major problem was that the maximum range was limited by ground echoes, thus at 15,000ft the maximum range was three miles, but at 10,000ft it was limited to two miles. This problem would not be overcome until the frequency was raised sufficiently for a narrow beam to be transmitted, an option which was not available until the invention of the magnetron several years later. This display system was later adopted for all metric airborne radars used by the Allied Air Forces and even, later, by the Luftwaffe.

The final problem was that the Air Ministry required that the fighter should, after a radar approach, be able to identify visually the target before opening fire. This was solved by reducing the pulse length to 0.5 microseconds, giving a minimum range of 500 feet, which fully met this requirement

The complete system was flying by May 1939 and a pre-production order for 30 sets was made with Pye for the receivers and Metro-Vickers for the transmitters. The equipment was delivered in mid-August and, after much frenzied effort, were installed in Mk2 Bristol Blenheim aircraft which were destined for 25 Squadron, then located at Northolt. Six installations were completed by the end of the month and on the first night of the war one of these aircraft was on patrol over London.

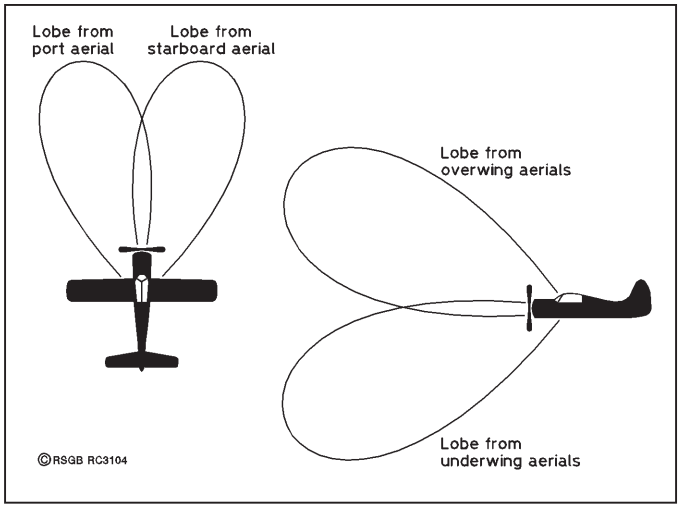


Fig 7: Polar diagrams for left and right looking, and under and over wing aerials used for metric AI. ASV equipped aircraft had only the underwing aerials but had additional sideways looking array.

As with the ground radar, the development of airborne radar was a remarkable achievement. In three short years, they had developed metric wave radar from scratch to an operational system with a staff that never exceeded 23 - which included the typist and the cleaner.

THE BIGGIN HILL EXPERIMENT

BY THE EARLY summer of 1936, the Air Ministry was convinced that an operational radar chain would soon be available and, on Tizard's suggestion, steps were taken to develop the operational procedures which would take full advantage of the system. Selected for the purpose was B Flight 32 Squadron, RAF, flying Gloster Gauntletts under the command of Sqn Ldr Arthur McDonald (later to become AVM Sir Arthur McDonald). The selection was probably because the squadron had been particularly skilful with its use of their TR9 HF transmitter receivers and was regularly achieving ranges of 40 - 50 miles compared with 5 - 10 miles of most other squadrons.

Prior to this time, the position of opposing aircraft had been plotted on a large map from sighting reports from other aircraft or ground observers. The defending fighters had been guided to their target by ground reference such as "steer towards Maidstone". However, with radar surveillance, the location of hostile aircraft could be determined even when they were high above solid cloud cover and ground reference could have no meaning. Under such circumstances, pilots had to be given compass courses to steer to intercept the intruders.

The basic principle was that all information, whether from radar, observer corps or other sightings should be plotted on the 'Filter table'. This was then forwarded to the sector operations centre and from the dispositions indicated, the fighter controller decided his response. It did not matter, therefore, where the information came from, his response was the same. In 1936, there were no operational radar stations but under this system this was of no concern, for when they came on line, they would be just another, albeit important, source of information.

For the purposes of the 1936 trials, two sources of information were used - the 'hostile' bombers reporting their position and the 'pipsqueak'. This was a clock-controlled relay which switched the aircraft equipment to transmit for a brief period at regular intervals. This signal was received by the RAF DF stations and the air-

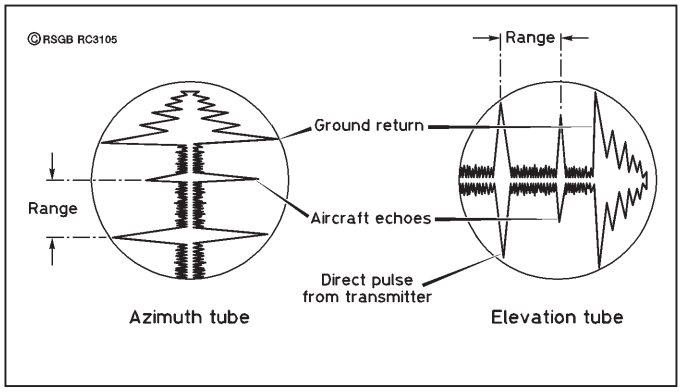
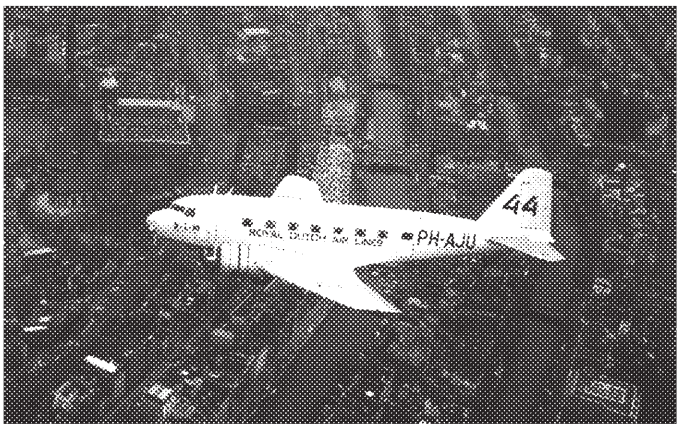


Fig 8: The range and elevation displays used for all metric airborne radars. At a later stage of the war, similar displays were used for the Luftwaffe equipment (based on drawings in Bowen's book *Radar Days*).



A KLM Royal Dutch Air Lines Douglas DC2 - the first aircraft intercepted using radar (KLM publicity photo to celebrate the DC2's 50th anniversary).

craft position determined. The basic principles of radar interception were therefore developed without the use of radar.

In early August, however, Sqn Ldr McDonald received a telephone call from the Biggin Hill filter room asking if he would like to try a "real" interception. He left his office, donned his flying kit, climbed into his Gauntlett and took off. He climbed through cloud to the east, was then given a series of course changes until he was told "your target should be just ahead". There, just ahead and a few hundred feet below to starboard was a KLM DC2 airliner *en route* from Amsterdam to Croydon. The controller had been relaying instructions received from Bawdsey and this was the first radar-controlled interception.

Tizard visited the squadron a number of times during that summer and on one occasion happened to mention that he thought it would be a good idea if the aircrew developed some kind of code or R/T procedure which could streamline communications and also, perhaps, confuse any enemy monitoring stations. Shortly afterwards, there was a short period of very bad weather when flying was impossible. In the crew room, the pilots started discussing this suggestion and within a few hours developed the well-known RAF 'jargon' made famous in the Battle of Britain: "angels" for height, "pancake" to land, "bandits" for hostile aircraft and many more.

In these short articles, I have only been able to scratch the surface of the achievements of the Bawdsey teams which, between 1935 and 1939, developed both ground and airborne radar from scratch to operational equipment.

However, to appreciate fully the magnitude of their efforts we must look to the words of Adolf Galland, the German fighter leader, who said, "The British had from the first an extraordinary advantage, never to be balanced out in the whole war: their radar and fighter control network. It was for us and for our leadership a freely expressed surprise, and at that a very bitter one, that Britain had at its disposal a closely meshed radar system, obviously carried to the highest level of current technique, which supplied the British Fighter Command with the most complete basis for direction possible. We had nothing like it." There can be no higher praise. ♦

Pic-A-Switch: continued from p20

jumper to pin 3 and Pic-A-Switch will send **R** (whereupon you remove the jumper) and it proceeds to the next line.

BAND ALLOCATIONS

Once the four times are configured, Pic-A-Switch moves on to the allocation of bands to output channels. First it sends a continuous series of dits. At this point you can power-down (see later) - but only if you don't want to alter *any* settings.

Draw up a list of your desired allocations in the sequence below. (This example shows the default settings.)

160m 1
80m 2
40m 3
30m 4
20m 4
17m 5
15m 5
12m 6
10m 6 and initialisation band

The number against each band is the desired output channel (see Part 2, Fig 8) *and is also* the IC2 socket pin you jumper to in order to specify your requirement.

When ready to continue, dab the jumper on/off pin 1. Pic-A-Switch sends the band in CW. If you want to set it as the initialisation band, first jumper to pin 8 before continuing. To allocate the band to a channel, touch the jumper on the appropriate pin as per your table. Until you do so, the band CW is sent continuously. Once the jumper is detected, Pic-A-Switch sends **R** (whereupon you remove the jumper) and it then moves on.

Once all the bands are allocated - and you must make an allocation for *every* band - Pic-A-Switch sends a continuous series of dits and the process is complete. Remove the jumper completely, power-down, wait 20 seconds, replace IC2 and power-up again - into the normal operational state.

Any changes you have made are retained in EEPROM - and thus will survive powering-down.

SOME FINAL THOUGHTS

WELL, I HOPE you enjoyed all that. It is supposed to be *fun* as well as intellectually stimulating. If you have an irrational fear of computing (as I have of spiders) then no amount of rational argument will ever convince you. But if this article has persuaded you to expand your horizons, then it will have served both you and ultimately our community well.

To demonstrate your new-found skills, I suggest your *next* project. Using the same hardware (but increase C5 to several µF), build a combined VOX unit and T/R timer/sequencer. This will have a major advantage over the conventional window comparator approach, namely that the R to T sequence and delays can be different from those on the T to R transition. At a guess, it will be about a quarter of the code used here. That's the power of software!

ACKNOWLEDGEMENTS

TO THE BETA testers: David, G4FQR, and Harry, G3NHR; to Bill, W7AAZ, and Dave, G3UEG, for ideas for the article; to Steve, G4ZBV, for the photography; and, as ever, Fran. My thanks for all your time, help and suggestions. ♦

WHATEVER NEXT

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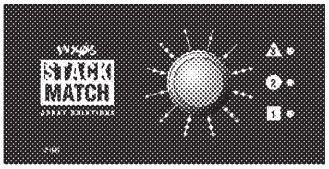
THE ANGLE AT which RF leaves an antenna can have, as we all know, a significant bearing on the performance of a station. Casual users of HF, plus those who have limited space in which to erect an antenna, generally make do with whatever radiation pattern is obtained from what it is physically or socially possible to erect. Such an antenna is almost certainly going to be a compromise and far from ideal, but lacking any alternatives and with probably nothing to compare it against, it will be something that is accepted as a fact of amateur radio life.

In the VHF part of the spectrum, operators with beams are likely to be familiar with the concept of stacking and / or baying, to tighten-up the radiation pattern, but this practice is only really common amongst DX enthusiasts and they almost invariably want RF directed close to the horizon. Satellite users will undoubtedly be familiar with the concept of elevation, as well as azimuth.

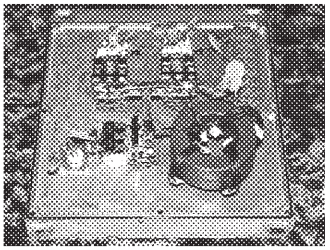
Returning to HF, the better equipped operator is likely to have a beam antenna. It is widely appreciated that, for low angle radiation and optimal DX performance, such an antenna needs to be a minimum distance (in terms of wavelengths) above ground. An example of this can be seen in **Fig 1**, which are NEC plots of a 3-element 28MHz beam at 5, 10 and 20m above ground. As Fig 1(a) shows, when the antenna is at 5m above ground, the main lobe is at about 30° - not good for long distance working, but actually quite good for medium distance working. In Fig 1(b) the antenna height has been increased to 10m above ground, and this shows the main lobe now at 15° - somewhat better for DXing. In Fig 1(c) the antenna height has been increased further, to 20m, and now the main lobe is at 8° - ideal for long distance DXing. Really enthusiastic (and wealthy) HF operators might even have beams to choose between. In this instance they are likely to be mounted at different heights above ground, to take advantage of the fact that QSO distances (and changes in propagation) result in signals that don't come in from (or want to be directed to) the same angle of elevation.

CHOOSE A TAKEOFF ANGLE

FOR SOME TIME, Array Solutions of Sunnyvale, Texas, has been marketing the StackMatch. Basically this consists of a relay bank and power splitter (see photos above), which enables the switching in and out of up to three antennas (beams or verticals). By changing the combination of antennas it is possible to select a variety of take-off angles. To maintain the correct phase, each antenna needs to be fed with an identical length of feeder, but by modifying the StackMatch it is possible to feed antennas out of phase, which will radically alter the radiation pattern of a combination of beams.



Front panel of the StackMatch control box. Turning the rotary switch selects combinations of antennas, the square representing the lowest, the circle the middle and the triangle the top one on the tower.



Inside the 20kW version of the StackMatch power splitter / relay box.

Array Solutions has now provided the US Army 3rd Special Forces Group at Fort Bragg, North Carolina, with what it describes as a radical new concept in HF communications. As you can see from the photo below, this system utilises three log periodic antennas mounted on a single large tower. What isn't clear from the photo is that they are independently rotatable, as well as being able to be switched in and out of phase. Using the Array Solutions' StackMatch, these antennas can be phased together in such a way as to 'steer' the take-off angle of the array. Multiple radios can also be simultaneously used with this system, giving the user even greater flexibility.

Array Solutions worked with the army closely to design, manufacture, and erect this system to meet their requirements of long haul, medium haul, and short haul highly reliable HF communications. The completed system also included phased long wire arrays and NVIS antenna arrays.

In a Press Release, Jay Terleski, WX0B, President of Array Solutions, commented, "This was a highly sophisticated project that we developed for the Special Forces. They understood from their use of ICEPAK and other propagation software programs that they needed to match the take-off angles required for these shots. We developed the system of phased logs to allow them to steer and match the take-off angles required with a controller system located in the communications station. The ability easily to change the take-off angles has already proved itself by increasing the reliability of their communications substantially. We also delivered a complete software simulation model of this system to investigate the possibilities of this system, as well as

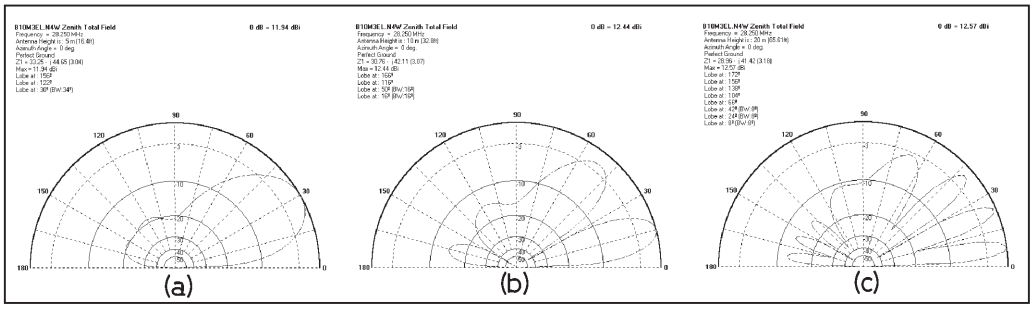
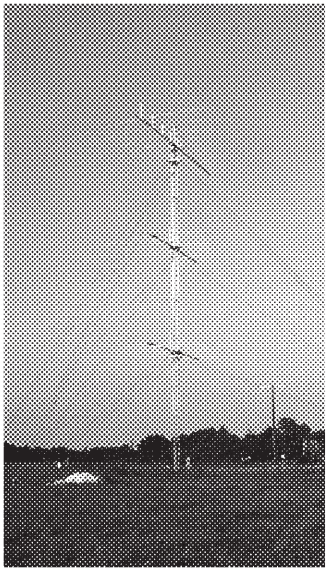
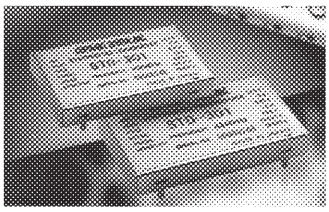


Fig 1: NEC plots of a 10m 3-element beam at (a) 5m, (b) 10m, and (c) 20m above ground. Note that the higher the antenna is mounted above ground, the lower the angle of radiation from the main lobe (although other major lobes appear as the height is increased).



The three independently-rotatable log periodic antennas of the US Army 3rd Special Forces Group.



The Circuit Design STD-301, a complete, frequency-synthesised, programmable UHF transceiver in a module.

giving them a tool to utilise in planning their communication shots."

SINGLE-MODULE TRANSCEIVER

WE ARE ALL familiar with the concept of integrating components into a chip, and many of us I would imagine are familiar with electronic modules such as RF Power Amplifier strips, but how about a module containing a *complete* radio transceiver?

The latest product from Circuit Design Inc, the STD-301 (pictured above), is just that - a completely self-contained frequency-synthesised UHF transceiver. Primarily it is intended for sending and receiving data in the part of the 70cm band that we share with Low Power licence-free devices, 433MHz. Circuit Design quote the communication range of the module as "over 500m . . . in combination with an MSK modem". In their publicity material they do not specifically state that it can be used for telephony, but I suspect very much that it can. The pin-out of the module is shown in **Fig 2** and the specification in **Table 1**. Frequency programming is via a serial interface, the Application Note showing a circuit that uses a PIC.

So far as radio amateurs are concerned the main drawback is likely to be the price. At present the cost of modules purchased in bulk is £100 each - significantly more than I have seen for a pair of commercially-made low-power 70cm transceivers. Still, as we all know, prices do change.

RADIO GAMES

SOME MONTHS AGO I learned of a new device that was becoming popular in the USA, primarily amongst kids. The Cybiko, as it is called, is a PDA-sized computer / games machine / personal organiser / scientific calculator / address book / alarm clock / phrasebook. When connected via an RS232 cable to a PC, it can also be used to send and receive e-mails. However, the real difference is that it also contains a 19.2K modem and an 870MHz radio transceiver which permits it to communicate over short distances (50 to 100m) to other Cybikos. This enables multi-user games to be played, and text messages and pictures to be exchanged.

The processor is a 32-bit Hitachi running at 11MHz and the memory is 1MB. The screen is a mono LCD with limited greyscale resolution, so it is possible to display images. This may only be a fraction of current PC specifications, but we are not comparing like for like here.

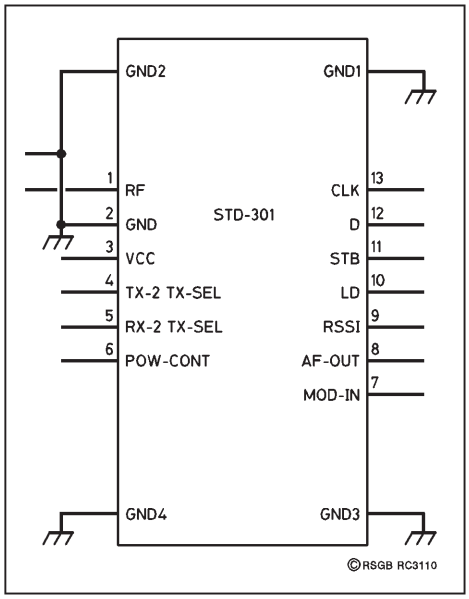


Fig 2: Circuit Design STD-301 pin-out.

Common	
Communication form	Semi duplex
Oscillation system	PLL controlled VCO
Frequency	433.050MHz to 434.775MHz
Channel step	Programmable
Frequency stability	±4ppm (-10 to +55°C)
Data rate	4800bps max (MSK)
Frequency response	600 to 2400kHz
Operating temp. range	-10 to +55°C
Supply voltage	3.0 to 5.5V
Dimensions	50 x 30 x 7 mm
Weight	19g
Transmitter	
RF output power	9.5±1.0mW (POWCONT terminal GND) 1.5 ±1.0mW (POWCONT terminal OPEN)
Modulation	FM narrow
Data input	Sub-carrier MSK
Deviation	2.4±0.2kHz (MSK-IN terminal 350 350mVrms fm=1kHz)
TX S/N	30dB (fm = 1k ON/OFF LPF = 20k)
Spurious emission	-43dBm (Deviation ATT30dB)
Adjacent channel leakage power	-40dBm (CH25k BW16k MSK PN9 2400bps)
Supply current	35mA (VCC=3V at 50ohm terminal)
Lock time	35msec (After PLL data set, +/-1kHz / charge pump+/-200uA)
Receiver	
Receiver type	Double superheterodyne PLL synthesiser
Receiver sensitivity	-118dBm (fmod= ±2.4k, fm=1k CCITT filter ON)
RX AF output	240 ±15mVrms (fm=1.2k) 220 ±15mVrms (fm=2.4k) 160 ±20mVrms (fm=4.8k)
Receiver S/N	35dB (RF level =-40dBm)
Distortion	-30dB (RF level < -30dBm) -25dB (RF level > -30dBm)
Spurious emission	-70dBm (ATT10dB)
Supply current	28mA (VCC =3V)
Spurious sensitivity	45dB (2 signal method)
Intermodulation	45dB (2 signal method)
Adjacent CH selectivity	40dB (2 signal method)
Next adjacent CH selectivity	50dB (2 signal method)
Lock time	35msec (after PLL data set, ±1kHz charge pump ±200uA)
RSSI output delay	35msec (after PLL data set)
AF output delay	35msec (after PLL set)

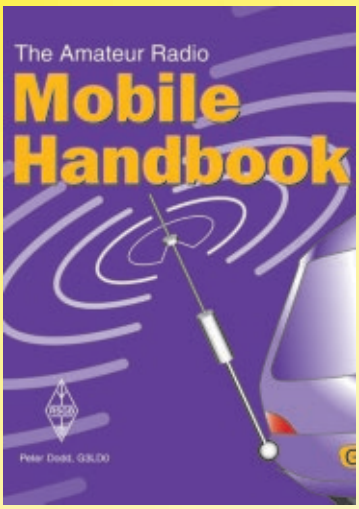
Table 1: Specification on the Circuit Design STD-301 UHF transceiver module.

It was just the other day that I saw my first Cybiko in Britain. Having convinced the owner to let me get my hands on it for a few minutes, I must say that it has its attractions. The QWERTY keyboard may be microscopic, but a stylus is included for pressing the keys. I wouldn't be at all surprised if it becomes the next 'must have' gadget for kids - it might even help to reduce the bills they run up using their mobile phones to send SMS messages to their friends! ♦

The Cybiko, a hand-held gadget that seems to do just about everything. Add-on cartridges for playing MP3s, voice recording and FM radio reception are said to be imminent.

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.

THREE GREAT NEW PUBLICATIONS FROM THE RSGB



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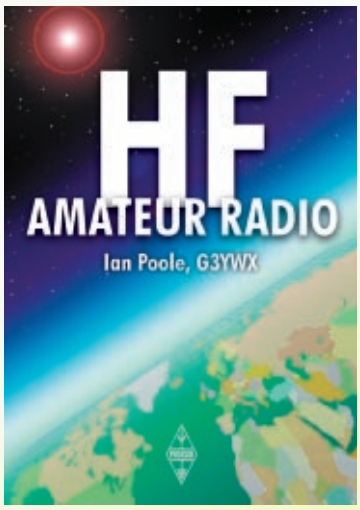

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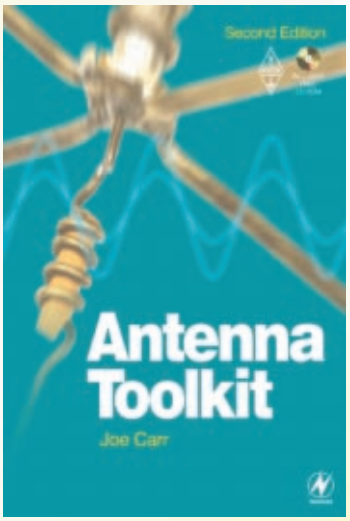

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MAYCOM AR108	HANDHELD SCANNER	49
REALISTIC PRO 2026	MOBILE SCANNING RX	125
YAESU FRG7700	HF RECEIVER	159
YAESU FRG9600	BASE SCANNER	299
YAESU VR500+CASE	HANDHELD SCANNER	159
YUPITERU MVT7000	HANDHELD SCANNER	129

ACCESSORIES

AMDAT ADC60	FREQ STANDARD CLOCK UNIT	99
DAIWA RS40X	35/40 AMP POWER SUPPLY	125
DAIWA SWR 110A	POWER METER 1.8-150MHZ	35
DRAE 12/24	24 AMP POWER SUPPLY	79
ICOM SM8	BASE MIC	89
ICOM SP21	BASE SPEAKER	49
KENWOOD IF-232C	COMPUTER INTERFACE	49
KENWOOD SO2 TCXO	UNIT FOR TS-950	65
KENWOOD VS2	VOICE BOARD	40
PALSTAR PS30M	25/30A PSU	69
TONO Q-550	TERMINAL UNIT	125
TOYO	200W DUMMY LOAD	25
WATSON W420	118-530MHZ SWR/PWR METER	49
WATSON 225 AM	25 AMP POWER SUPPLY	75
YAESU FRV-8800	VHF CONV'TER FOR FRG-8800	59
YAESU FC757AT	FT-757 AUTO ATU	179
YAESU HF-726	21-28MHZ MODULE FT-726R	99
YAESU FIF232 CVAN	COMPUTER INTERFACE (FT736R)	79

List updated **DAILY** on our website
www.nevada.co.uk

SG-230

Auto ATU
1.8 - 30MHz
200W PEP

NEVADA PRICE £359.95

THIS MONTHS Featured Products

Kenwood TH-F7E

- Dual band 144/430 TX
- 5W RF output
- Wideband (100kHz - 1300MHz) RX
- Multimode reception AM/FM/CW/SSB

IN STOCK NOW!

NEVADA PRICE £289

POWER SOLUTIONS from - MAHA energy

for use in the CAR or AROUND THE WORLD!

MH-C777 *Plus*

Universal Charger *AND* Analyser

- Charge almost any Lithium Ion, NiMH, and NiCad battery packs for your ham radios, scanners, PMR 446, cellular phones, digital cameras, camcorders.
- Analyse & condition battery packs and display capacity
- Display digital voltage, time and capacity
- Lightweight international 80-240V AC mains adaptor
- Car kit for charging from cigarette lighter
- Charge AA, AAA, C, D battery cells using optional holders. *Battery holders...£2 each*

NEVADA PRICE £89.95 £8.50 P&P

FNB-72

Yaesu FT817 - Heavy Duty Battery Pack

- Ultra high capacity 9.6V 1700 mAH
- Includes special 3 hour rapid charge cable for use with MH-C777

NEVADA PRICE £59.95 £2.50 P&P

NEVADA COMOROS TROPHY 2001

Mike Devereux G3SED *(Managing Director)* and the staff of **NEVADA**, would like to congratulate the winners of the ***NEVADA COMOROS TROPHIES*** for outstanding achievment in their contacts with the **D68C Comoros Dxpedition** earlier this year.

Our congratulations also go to the UK based ***5 star DXers Association*** for organising the D68C world record beating DXpedition.

AT THE HEART OF AMATEUR RADIO

NEVADA COMOROS TROPHY WINNERS

			SCORE
UK - High Power			
1st PLACE	John Butcher	G3LAS	23
2nd PLACE	Darren Collins	G0TSM	23
3rd PLACE	Ron Stone	GW3YDX	23
UK - Low Power			
1st PLACE	Victor Brand	G3JNB	20
2nd PLACE	Andy Morgan	M5ZAP	19
3rd PLACE	Jim Martin	MM0BQI	19
Rest of the World - High Power			
1st PLACE	Mark Demeuleneere	ON4WW	23
2nd PLACE	Vilnius Young Technicians Club	LY3MR	23
3rd PLACE	Martin Jonink	PA4WM	23
Rest of the World - Low Power			
1st PLACE	Alain Tuduri	F5LMJ	17
2nd PLACE	Jean-Louis Chabernaud	F5UJK	16
3rd PLACE	Krzysztof Hodyr	SP7ICE	16
UK Clubs			
1st PLACE	Cheltenham ARA		242
2nd PLACE	Stockport RS		170
3rd PLACE	Reading & DARC		150
SWLs			
1st PLACE	Yuri V Maslov	UA9-165-700	18
2nd PLACE	Vladimir Zaretsky	LY-R-404	17
3rd PLACE	Michael Glasemann	DE1MGL	17

ZX YAGI

LOW COST MULTIBAND VERTICALS

Two lightweight multiband verticals that really work. Each is supplied with a set of 3 wire radials. These may be laid out or bent to suit your location. Power handling approx 500W.

GP3 ..... £69.95
10/15/20M, 3.9 MTRS

GP3W £69.95
12/17/30M, 5 MTRS

DAIWA

ACCESSORIES
SWR/POWER METERS

CN801H	1.8 - 200MHZ 2KW	£109.95
CN801V	140 - 525MHZ 200W	£119.95
CN101L	1.8 - 150MHZ 1.5KW	£59.95
CN103LN	140 - 525MHZ 200W	£65.95

PLUS £6 P&P (UK MAINLAND)

DAIWA MOBILE ANTENNAS

DAX 3300	50/144/430MHz	£42.50
DAX 1500	144/430MHz (Hi Gain)	£33.95
DAX 1000	144/430MHz (Standard)	£29.95

Mini 2000

Low profile 3 band Mini Beam

NEVADA PRICE £229.95 £15 CARRIAGE

A lightweight compact beam for 20/15/10mtrs, designed for the UK Amateur with limited space. The boom is just 2mtrs long with elements of 5mtrs. A quiet receiving antenna with good side rejection and front to back performance. Some customers are using them on 6mtrs!

Gain	10m/6.1dB, 15m/4.2dB, 20m/3.5dB
F/B Ratio	From 16 to 18dB
Boom Length	2 mtrs
Element length (max)	5 mtrs
Turning Radius	2.6 mtrs
Weight	11kg
Mast Diameter	50mm
Wind Load	(144 km/h) 255 N
Power	500 Watts

MONO BAND YAGIS

MODEL	BAND	EL.	BOOM LGTH	TURNING RADIUS	GAIN DB	F/B RATIO	WEIGHT (KG)	PRICE
4m Band								
ZX4-3	70MHz	3	4.00m					£99.95
6m Band								
ZX6-2	50MHz	2	0.60m	1.53	6.2	-18	2.20	£49.95
ZX6-3	50MHz	3	1.75m	1.74	9.1	-25	3.00	£89.00
ZX6-4	50MHz	4	2.75m	2.03	11.4	-28	4.30	£99.95
ZX6-5	50MHz	5	4.35m	2.64	12.1	-28	6.50	£129.00
ZX6-6	50MHz	6	6.40m	3.53	12.5	-35	7.70	£149.95
10m Band								
ZX10-4DX	28MHz	4	5.80m	3.90	12	-26	10.80	£166.00
ZX10-4CL	28MHz	4	5.00m	3.60	11.4	-28	10.20	£149.00
ZX10-5DX	28MHz	5	8.00m	4.80	12.7	-35	13.40	£215.00
12m Band								
ZX12-3	24MHz	3	3.50m	3.30	9.1	-25	6.90	£128.00
15m Band								
ZX15-2	21MHz	2	1.30m	3.36	6.3	-18	6.60	£112.00
ZX15-3	21MHz	3	4.15m	3.98	9.1	-25	10.90	£155.00
ZX15-4	21MHz	4	6.40m	4.67	11.4	-28	15.40	£185.00
17m Band								
ZX17-2	18MHz	2	1.45m	4.26	6.3	-18	6.80	£123.95
ZX17-3	18MHz	3	4.90m	4.85	9.1	-25	11.58	£159.95
20m Band								
ZX20-2	14MHz	2	1.70m	4.57	6.3	-18	10.00	£149.95
ZX20-3	14MHz	3	6.20m	5.60	9.1	-25	13.50	£199.95
ZX20-4	14MHz	4	9.40m	6.58	11.4	-28	21.00	£259.00
30m Band								
ZX30-3	10MHz	3	8.55m	8.10	9.1	-25	27.50	£220.00

Palstar HIGH QUALITY TUNERS *from the USA*

Palstar AT1500

HIGH POWER HF ANTENNA TUNER with *CERAMIC* ROLLER INDUCTOR for HIGH RELIABILITY

CHEQUE SPREAD

- 1.5kW
- 1.8 - 30MHz
- Built in 4:1 Balun
- 6 position ant switch
- SWR/Power meter

NEVADA PRICE £369

Palstar AT300

ANTENNA TUNER

- 150W
- 1.8 - 30MHz
- 4:1 Balun

NEVADA PRICE ~~£129.95~~ £99

Palstar WM150

- 1.8 - 150MHz
- 300W/3kW
- Average or Peak power
- Cross needle meter

HF *PLUS* VHF HIGH POWER SWR/ POWER METER

NEVADA PRICE £89.95

PALSTAR ACCESSORIES

ALL PLUS £6 P&P

B4000

B4000	4kW 4:1 Balun	£79.95
B1500	1.5kW 4:1 Balun	£35.95
B1500C	1.5kW 1:1 current Balun	£35.95
R128C	2kW 28μH ceramic roller ind	£99.95
C240	240pf 4.5kV var capacitor	£49.95
C350	350pf 6.0kV var capacitor	£69.95

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NEW OPENING HOURS MON - FRI 9.30 - 5.30 CLOSED ALL DAY SATURDAY

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NEVADA OPEN DAY!

SATURDAY 8TH DECEMBER 9.30AM-4PM
Make a note in your diary now!

CRAZY DEALS on latest equipment!

LARGE DISPLAYS FROM THE LEADING MANUFACTURERS 100's of NEW & USED items

ICOM See the *NEW Icom IC-756 Pro MK11. Jon & Sam* from Icom UK will be on hand to answer questions

ALINCO Several new releases will be on show for the first time with a limited quantity of *HALF PRICE BARGAINS!*

TRIDENT ANTENNAS See this NEW RANGE of British manufactured high quality Yagis & meet the designer *John Barker*

- *Plenty of parking*
- *Free car boot sale*
- *2mtr talk in*
- *Refreshments*
- *Icom, Yaesu, Kenwood in attendance*

YAESU See the new *YAESU RANGE OF TRANSCEIVERS* with *Ailsa of Yaesu UK*

KENWOOD *David from Kenwood UK* will be giving live DEMOS of APRS and answering your questions.

REFRESHMENTS FREE TEA & COFFEE from *MICK'S CATERING* plus purchase a selection of hot food. This was very popular last year, Mick dished out over 600 free drinks !

Walk around our warehouse and pick up a BARGAIN!

Full directions & a map are available on our website www.nevada.co.uk

Don't miss THE event of the South Coast!

ALINCO

Alinco DX-70TH
- 100W HF+100W 6 mtrs
- LSB, USB, CW, AM & FM
- Wide range RX 150kHz-54MHz
- CW+SSB narrow filters fitted
- 100 memory channels

NEVADA PRICE £699

Alinco DR-135E
- 50/10/5W output
- 144-146MHz (RX 118-170MHz) Airband RX with NEW 8.33 steps
- 100 memory channels
- Built-in CTCSS sub tones

NEVADA PRICE £235.95

Alinco DR-610E
- 2m/70cms twinbander
- 50/35W VHF/UHF + mid/low power
- Built-in duplexer
- Extended RX possible (118-999 with gaps)
- AM for Airband receive

NEVADA PRICE £399.95

Alinco DR-605E
- 2m/70cms twinbander
- 50/5 Watts 2mtrs
- 100 memory channels
- 35/5 watts 70cms
- 138-173MHz RX possible
- 9600 bps I/O jack fitted

NEVADA PRICE £299.95

Alinco DJV5E
- New dual band transceiver
- 5W/1W/0.5W output
- Super wide RX (76-999MHz)
- Includes wide FM mode
- CTCSS enc/dec fitted
- 200 memory channels

NEVADA PRICE £229.95

Alinco DJ-195E
LARGE RANGE OF ACCESSORIES AVAILABLE
- 2 mtr (144-146MHz)
- Easy use, direct entry keypad
- Wide RX possible (typical 135-173MHz)
- Up to 5W output (0.8W low power)
- 40 memory ch+1 call ch

NEVADA PRICE £159.95

PALSTAR PS-50
50 Amp heavy duty supply with meters. 13.8V DC 40/50 Amp

NEVADA PRICE ~~£169~~ £149

YAESU

Yaesu FT-1500M
NEVADA SPECIAL! save £69!

50W Heavy duty 2 metre FM mobile

NEVADA PRICE ~~£229~~ £159.95

Yaesu FT-847
All mode DSP Transceiver 70cm - Top Band

NEVADA PRICE ~~£1699~~ £1199

YAESU FT-817
NEW! IN STOCK!
- HF/6/2/70 cms
- Transportable with wide RX
- Supplied c/w Nicads, Charger, antenna & mic

NEVADA PRICE £799

FT 1000MP Mk V
HF 200W All mode transceiver (Our boss's favourite rig'

NEVADA PRICE £2899

Yaesu FTV1000
NEW!
- 6 mtr Transverter for Yaesu FT1000MP Mk V
- 200W output
- RX pre-amps
- Fully interfaces with Mk V and Quadra amplifier

NEVADA PRICE £799

YAESU FT-8100
Dual band high power mobile + wideband receive

NEVADA PRICE ~~£399~~ £349

PALSTAR PS-30
- 3-15V adjustable
- 25/30A max
- Voltage + current meters
- 10mW RMS noise and ripple

NEVADA PRICE £99

ICOM

Icom IC-756 PRO
Icoms latest SUPER rig

save £496

LAST FEW AT THIS PRICE!

NEVADA PRICE ~~£2395~~ £1895

Icom IC-706 Mk IIG
- 100W HF/6 + 50W
- 2M + 20W 70cms

NEVADA PRICE ~~£1299~~ £995

Icom IC-R8500
PRICE MATCH

IN STOCK! Covering 100kHz - 2GHz & lots of features inc computer control.

NEVADA PRICE ~~£1349~~ £1249

Icom 910H
1.2GHZ & DSP OPTIONAL
- VHF/UHF All mode TX
- Suitable for DX'ing or Satellite
- 100W 2mtr/ 75W 70cm
- Full Duplex

NEVADA PRICE ~~£1399~~ £1299

Icom 718
- 100W HF Transceiver
- Built in keyer
- General coverage RX

NEVADA PRICE £699

Icom R-75
IN STOCK! READY TO SHIP!

PRICE MATCH
- 0.03 -60MHz
- Twin PBT built-in
- PC control capability
- Synchronous AM detection

NEVADA PRICE £699

TIMEWAVE DSP 599ZX V-5
NOW WITH PSK 31 INTERFACE
- Eliminate heterodynes
- Filters QRM
- Brickwall PSK31 filter
- Sound card interface
- Binaural CW
- CW spotlight
- Enhanced noise reduction

NEVADA PRICE £359.95

KENWOOD

KENWOOD TS-2000
DC to Daylight! HF to 1200MHz*

IN STOCK!

*1200MHz optional

NEVADA PRICE £1699

KENWOOD TS-570 DGE
100W HF radio with a superb DSP RX.

NEVADA PRICE ~~£999.95~~ £849

KENWOOD TM-D700E
Dual band DATA mobile radio

NEVADA PRICE £449

KENWOOD THD7E
Dual Band Handie
- Up to 6W Output
- Built in TNC!

NEVADA PRICE £299

KENWOOD TM-G707E
- Twin band mobile
- 50/35W RF output
- Large display
- CTCSS ENC/DEC
- 12009/9600 pkt

NEVADA PRICE £299

President LINCOLN
High class 21W 10mtr Multimode Transceiver
- 28 - 30MHz
- AM/FM/SSB

NEVADA PRICE ~~£225~~ £199

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LONDON SHOW
NOVEMBER 24TH - 25TH
Stand H in the RED HALL

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CHEQUE SPREAD - by three post dated cheques

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- Write your telephone number, cheque card No & expiry date on the back of each cheque.
- Post them to us, enclosing your name & address & we will (subject to status) send your goods immediately.

RadCom

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ML&S £2899
ZERO DEPOSIT!
36 * £125.86

Yaesu FT1000MP Mk5
Yaesu's Flagship radio still our number one selling radio among the discerning DXers.

ML&S £799
ZERO DEPOSIT!
36 * £34.68

FTV1000
Yaesu's new 200 Watt six metre transverter for the FT1000MP Mk5 at only £799.00

RRP £1499
ML&S £1099
ZERO DEPOSIT!
36 * £47.71

FT920AF
a top grade starter radio HF and 6 metres with internal ATU

DEPOSITS BEING TAKEN NOW

Icom IC756 Pro Mk2
YES, THE SECRET IS OUT - the *IC756 Pro* has been improved. The new model will be called the *IC756 Pro Mk2* and *IC7500* in some countries. Estimated price to be about £2495.00 offering:

- *Improved Twin Pass Band Tuning*
- *Better strong signal handling*
- *Extra display modes*
- *Digital Voice storage*

Orders are being taken for the new model with first shipments expected in November!

We have a selection of used original *IC756 Pros* being sold in anticipation of the NEW Mark 2 - FROM £1395 LAST FEW!

This radio ONLY
ML&S £999
ZERO DEPOSIT!
36* £43.37

Icom IC706 Mk2G
the original mobile multiband radio. Now the 3rd variant offering HF/6/2&70 with DSP and detachable head. Icom certainly got this radio spot on with features and performance.

ML&S £3999
ZERO DEPOSIT!
36 * £173.62

Yaesu Quadra VL1000
The ultimate add on for your station. Offering 1000 Watts of effortless RF on HF and six metres this amplifier is a delight to use.

RRP £799
ML&S £599
ZERO DEPOSIT!
36 * £26.00

Yaesu FT840 FM
an excellent basic radio offering top notch performance at a budget price.

RRP £1299
ML&S £1249
ZERO DEPOSIT!
36 * £36.54

Yaesu FT100D
following on from the FT100 the D version offers a few extras and improved HF performance.Auto repeater shift on VHF and UHF plus an easy menu system make this the most popular HF mobile radio.

RRP £339
ML&S £269
ZERO DEPOSIT!
36 * £11.67

Yaesu VX5R
Our best selling hand held ever with free SU1 and Case giving 5 Watts on 2/70 & 6metres. With built in wide band receiver (inc AM & WFM) this is a scanner and a hand held.

STANDARD UNIT
ML&S £1299
ZERO DEPOSIT!
36 * £56.39

Icom IC910H
The LATEST VHF/UHF multimode. Features include 100W on VHF, 75W on UHF and true dual receive.

OPTIONS AVAILABLE 1296MHz, DSP units, TCXO, Voice Synthesiser, TCXO, Narrow CW filters.

FREE DSP this month
ML&S £699
ZERO DEPOSIT!
36 * £30.34

Icom IC718
this is Icom's entry level HF radio. offering 100W HF CW/AM/SSB and DSP. The performance is staggering for a budget radio ! Only £699.00 with DSP

RRP £1699
ML&S £1199
ZERO DEPOSIT!
36* £52.05

Yaesu FT847
at only £1199.00 this is still the best selling multiband base radio offering HF/6/2 and 70cms plus still the only radio to offer all mode four metre operation.

FT817 PACKAGE
- Nicads
- Charger Case
- HF Walkabout
- VHF/UHF rubber helical

ML&S £850
ZERO DEPOSIT!
36 * £36.90

Yaesu FT817
this is a radio that every radio ham should own. As well as being an excellent portable radio this makes an ideal second receiver for the shack. Supplied as a package with nicads, charger, protective case VHF and HF aerials at only £850.00 you are ready to sample the delights of QRP operation.

THE VERY *BEST* RADIO EQUIPMENT *brought to you by* MARTIN LYNCH & SONS

Yaesu VX1R
still the smallest handheld around with built in scanner offering up to 1 Watt on 2 & 70 and Lithium ion battery that last for ages this is the ultimate pocket radio at only:

ML&S £159
ZERO DEPOSIT!
36 * £6.90

This radio ONLY
ML&S £1299
ZERO DEPOSIT!
36 * £56.39

IC746
This radio still ticks along as a great shack in a box giving 100 Watts HF/six and 2 metres.

Icom IC775DSP
This is the Icom Flagship and still a very popular choice with the daytime net guys. TX audio is first class and despite being a top grade radio the uncluttered controls and simple display make it a delight to own.

Where is the 785?

Have a

.....STOP PRESS...MARTIN LYNCH & SONS OPEN DAY....24TH-2

The BEST RADIO EQUIPMENT at the

The Men in Red say 'Treat yourself for Xmas - buy now, pay June - interest free!

FIRST 3 ORDERS FREE VR-120

ML&S £699
ZERO DEPOSIT!
36 * £34.34

YAESU VR-5000
the new desktop scanner from Yaesu all bands and all mode with a host of features.

If you require the B2000 or 23cms CALL FOR A PRICE PACKAGE

The Millennium Radio Station

ML&S £1699
ZERO DEPOSIT!
36 * £73.76

Kenwood TS2000
Every once in a while a new product comes along that sets a new trend and the TS2000 has certainly done that. Offering all bands 1.8 to 23cms *(23 cms optional)* Built in DX cluster monitor and auto QSY plus dual speed packet modem make this radio stand out. Add to that the excellent Kenwood build quality and reliability you have a radio that is going to be around for a long time.
Also available: 23cm version £1999

Kenwood B2000
all the features of the TS2000 but no knobs. This radio is controlled via your PC or the Head of a TMD700E *(Upgrade will be required on early versions of the TMD700E)*

ML&S £1599
ZERO DEPOSIT!
36 * £69.42

ML&S £849
ZERO DEPOSIT!
36 * £36.86

Kenwood TS570DGE
this is a first class radio that has no competition in its price bracket. Offering 100 Watts HF and built in ATU. A good choice for your first HF station but equally at home in the experienced operators shack.

ML&S £1395
ZERO DEPOSIT!
36 * £60.56

Kenwood TS870S
The original DSP radio still very popular and very reliable offering 100 Watts and built in ATU

ML&S £599
£60 DEPOSIT!
36 * £26.00

Kenwood TS50S
this is the original HF mobile radio still selling at only £599.00 - an absolute BARGAIN

Kenwood THD7E
the Packet handheld that every one wants.

ML&S £299
ZERO DEPOSIT!
36 * £12.98

IC-756pro Mk2 is expected any day!!!!!!!
IC-7400 in stock soon orders being taken !!!!!!!

The Miracle whip now in stock only 55 inches long covering 3.5-435MHz receive and transmit (10W max)

FT8100R - last few at only £299

ML&S £459
ZERO DEPOSIT!
36 * £19.92

Kenwood TMD700E
with packet cluster monitor and APRS built in this is fast becoming THE mobile radio for VHF/UHF in car operation.

ML&S £299
ZERO DEPOSIT!
36 * £12.98

Kenwood TMG707
a simple twin band VHF radio with a large display and speech option make this an ideal choice for people with Eyesight problems.

Whats new!

NEW MIRACLE ANTENNA HAS JUST ARRIVED!
This antenna has been designed with the FT-817 in mind but is a 55 inch whip with a tuning box at the base. The performance is staggering and it will work with any radio from 3.5 to 150mhz (5W max). It even works without a counter poise. Call for full details and price.

MD200A8X
The new "Old Style" microphone from Yaesu. The audio is very punchy with top class clarity. A superb match for any Yaesu Base radio.
This microphone has room for a second insert which is switchable.
At an introductory price of £249.95
delivered to your door.

NEW RADIOS
announced by Yaesu & Icom - call for details

...STOP PRESS...PRICE CONFIRMED...£2495 ICOM 756 PRO 2

Yaesu VX5R Limited edition VX-5MD

FT-897

Samlex SEC1223
Back in stock! The best selling original 23 amp switch mode power supply Only £99.95 accept no substitute!!!!!

New Icom radio!
Icom have announced the New IC7400, replacement for the IC746. Many improvements inc 32 bit DSP!
CALL FOR DETAILS

SGC Smart Tuners
we have the full range of these unique tuners in stock with an SG230 and 20 foot of wire you are ready to operate top band to ten. The SGC tuners start at £259.00 with different types to suit specific needs. Give us a call with your requirements.

Kenwood TH-F7E
The new TH-F7E dual band hand held transceiver with a built in multimode scanner (0.1-1300mhz) in stock at only £289

ML&S £289
ZERO DEPOSIT!
36 * £12.54

Diamond SX1000
1.8-1300mhz power and swr meter. 200W and dual sensor. The ideal companion for the TS2000/FT847 at only £169.95

MFJ-269
Antenna Analyser 160m-70cms Probably the best analyser MFJ have made! Every shack should have one. Only £299.95 delivered to your door.

Diamond Power Supplies
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Diamond WD330
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RF FEEDBACK

RETURNING TO THIS important point from October's column...

BOB HEIL, K9EID, is of the opinion that the audio quality of many SSB transmissions is spoilt by low levels of RF feedback [1] and he's probably right. By 'RF feedback' we mean rectification of RF in the low-level transmit audio stages. The symptoms can be very variable. In severe cases you get an ugly squawk whenever the PTT is pressed, which makes the rig unusable until you fix it. Less severe cases cause only 'roughness' on speech peaks, of which Bob Heil complains.

The RF can get into the rig many ways, and I'll deal with each of these in turn.

- The microphone lead
- Accessory connection leads
- Power leads (mains or DC)
- The antenna coax - down the outside
- Combinations of the above.

CONNECTION LEADS

One of the reasons why RF feedback is so common is that it depends very much on details of the station setup, the antennas and the power level. The transceiver manufacturers cannot design for complete immunity, but they sometimes seem unreasonably optimistic about the problems we encounter in the real world outside the factory. One particular design practice is almost *asking* for trouble from RF feedback: most of the major transceivers today do not ground their microphone cable shields where they enter the box. To avoid ground loops inside the rig, it is desirable to use a single microphone input ground on the circuit board, right at the microphone amplifier device, and this is what many designers now do. But that is the worst possible thing from the RF feedback point of view, because a cable with an ungrounded shield, snaking deep into the box, is literally *inviting* unwanted RF to come inside!

The Heil people have come up with a very simple fix that just about anyone can make to the microphone plug. You don't have to get inside the rig at all. These detailed instructions apply to the common 8-pin microphone connectors, but you can do the same for just about any other microphone connector too. Remove the two small Phillips screws on the microphone connector, and also the cable clamp they hold. Then remove the tiny Phillips screw that holds the metal sleeve. Rotate the sleeve anti-clockwise a little until it will slide back onto the mic cable, leaving the connector hanging free (**Fig 1**). Now cut about 5-7cm (2-3in) of 1mm solid tinned copper wire (about the same thickness and length as a resistor lead). Identify the 'mic ground' pin on the back of the connector, that has the shield of the mic cable soldered to it. With a small iron, carefully solder the solid wire to that pin. Holding the wire close to the main cable, slide the metal shield back over both. Re-engage the shield on the connector, and replace that tiny fixing screw. This leaves the solid wire coming out the back of the connector. Check that there are no shorts to other wires or contacts. Then replace the cable clamp, wrapping the wire around one of the screws (Fig 1) and tightening the clamp assembly firmly down onto it. You have now grounded the shield to the transceiver's chassis ground through the ring on the mic connector. Just make sure that ring is screwed down firmly whenever you insert the plug. According to Bob Heil - who sees a lot of these problems in his line of business - this simple modification has been a big help to many stations suffering from RF feedback.

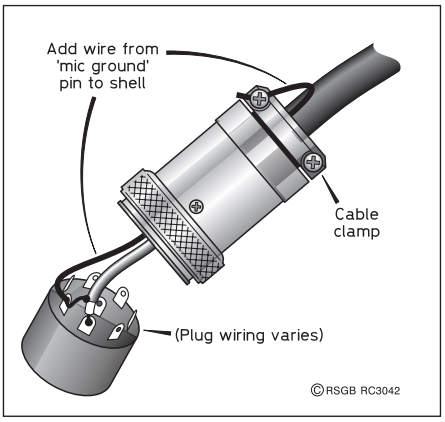

Fig 1: Suggested method for direct grounding the 'mic ground' connection at the entry to the rig, to prevent RF feedback (Heil Sound).

The same problem can apply to accessory leads. In the September 1995 column, I noted the tendency for transceiver designers also to ground the shields of rear-panel auxiliary audio ports deep inside the rig. When something like a data terminal is plugged in, this is another potential inlet for RF feedback. If there is a chassis ground connection to the shell of the plug (as in DIN sockets, for example) then try the Heil trick of grounding the shield inside the plug. With simpler connectors such as phono and jack sockets, you will have to ground the shield directly to the transceiver chassis at the back of the socket. The sockets are often fully insulated plastic mouldings, but these are often screwed to the chassis. A good way to create a ground for these is to slacken off the screws and then trap a thin wire around the fixing screw between the moulding and the chassis - **Fig 2** - or better still, a piece of copper foil or a solder tag. The screw pressure will create a reasonably good ground connection without needing to drill a new hole for a solder tag. Then solder the grounding wire to the ground point at the back of the socket or under the PC board, keeping the wire as short as possible.

These modifications will cure many cases of RF feedback, although you should be aware of potential problems such as increased pickup of noise from an internal switch-mode power supply. Since the modifications are simple, harmless and reversible, they are certainly worth trying.

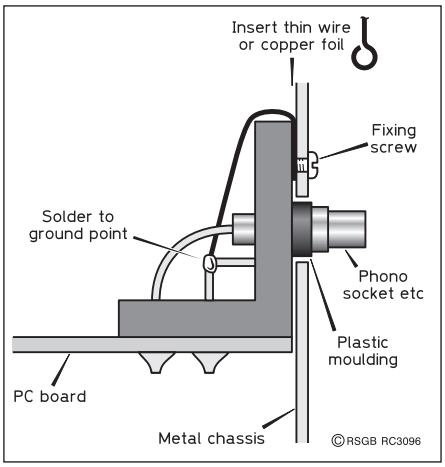

Fig 2: How to ground a plastic-mounted connector to the metal chassis. Use the shortest possible lead. Alternatively connect the ground wire to a PCB track under the board.

DOWN THE COAX

Almost invariably, the original source of the RF that gets back into your transceiver is the antenna and its feedline. It's most unusual for RF feedback to persist if you disconnect the antenna and transmit into a fully screened dummy load. (However, it may be worth making this test before you try everything else I've mentioned. If you still get RF feedback, look for a faulty ground or shield connection inside the rig itself.)

As mentioned in previous 'In Practice' columns [2], there are several possible sources of RF coming back into the shack (**Fig 3**). One is direct radiation from the antenna - which can be particularly severe if the shack is in the loft and the antenna passes close overhead - but the more common problem is RF crawling down the outside of the coax feedline or appearing as a common-mode current on parallel line. There are two sources of feedline current: 'conducted' currents which are launched on

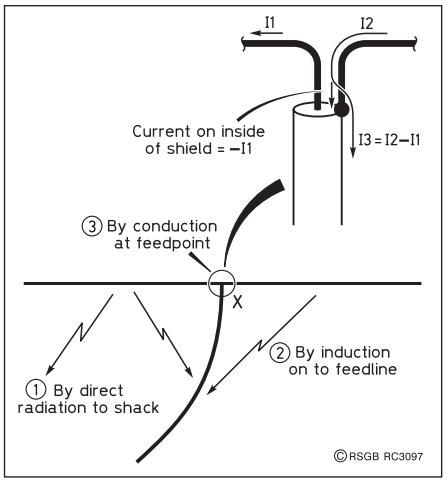

Fig 3: Sources of 'RF in the shack': direct radiation from antenna, induced currents on asymmetric feedline, and direct conduction at the feedpoint. If the antenna is unbalanced, I1 and I2 are not equal, so the difference I3 flows on to the outside of the coax - a choke balun at X will stop this.

to the line by the direct connection at the antenna; and induced currents which appear when the feedline is not at right-angles to a balanced antenna. The best precaution against conducted currents is a choke balun at the coax feedpoint, or where the parallel line of an antenna such as the G5RV makes the transition into coax. In addition, you may need to coil the coax around a ferrite ring close to the transmitter. Trying to 'get a better station ground' will almost certainly *not* work, because that's not actually the problem.

TRACING TROUBLE

These sources of RF feedback often do not appear on their own, but in complex combinations. This can make problems more difficult to trace. For example, if RF feedback only appears when you plug in an accessory such as a data terminal, you might assume the accessory is the culprit - but it may not be. If plugging in that connection has just created a ground loop between the transceiver, the accessory and various other ground connections (eg through power supplies), that loop will act as an RF pickup antenna. Once the loop exists, the RF could be getting into the transceiver from *anywhere* around the loop - not necessarily at the last connection you plugged in to create the loop.

One of the most powerful tools to sort out RF feedback problems is a clip-on RF current meter [3]. This lets you see which leads are actually carrying RF current in the shack when you transmit, and helps you to concentrate on the important ones. For instance, it immediately reveals when you create a ground loop. If you have RF feedback problems, I highly recommend that you take a break and build yourself one of these meters. Even if it takes you a week or more to get the parts and put them together, it's probably still the fastest route to get yourself back on the air with the problem solved.

SHORTENING SCREWS

I HAVE BEEN trying to find five screws of a particular type, now identified as 35mm M4. Who supplies these, please? I can find 40mm and 30mm, but not 35mm.

EVEN IF YOU'RE sure that you need 35mm - perhaps because 40mm won't fit in a blind hole, or the extra length looks unsightly - there's still no point in looking for only five of them. There are various sources of small screws on the 'Component Suppliers' part of the 'In Practice' web site, but even if they stocked an odd length like 35mm, none of them would sell you as few as five. So, you'd better to get some 40mm screws and learn how to cut them down... then you can regard them as a potential source of screws in any shorter lengths you need!

There are a few tricks about shortening screws that I've never seen passed on in print. As usual I'm trying to steer a middle course between a nasty bodge and a 'proper' engineering-workshop method that needs special tools.

1. Run two steel nuts on to the screw: two nuts, and steel - both are important.
2. Adjust the outer nut to the length you want (plus maybe a small fraction of a millimetre if it's very critical). Run the inner nut up behind it to act as a locknut. It doesn't have to be tight, but try to line up the flats of both nuts together.
3. Grip the whole assembly in a vice with fibre jaws (**Fig 4(a)**) - not the bare metal jaws which will chew into the screw head as they grip. The screw will be held quite firmly enough by its head and the two nuts.
4. With a small hacksaw, saw off the unwanted part of the screw using the face of the outer nut as a guide for the blade. Face-off the cut end of the screw with a fine file.
5. Carefully remove the outer nut. It will be quite stiff because it's re-forming the thread on the cut end - and that's why the nut needs to be steel. However, when it comes off you'll find it has raised a sharp lip on the end of the thread (**Fig 4(b)**).
6. A bodger stops at this point - and leaves a nasty hazard. Naturally, you are going to remove the lip with a fine file, and clean up the start of the thread. A knife-edged needle file is good for this.
7. Finally, try removing the inner nut. If it's at all stiff, don't remove it completely - screw it back on and clean up the end of the thread some more.

The important thing is to avoid trying to screw a nut *on* to the cut end of the thread, which can be very difficult. It's always better to re-form and check the thread by screwing a nut *off*, and the second nut gives you two chances to get it right.

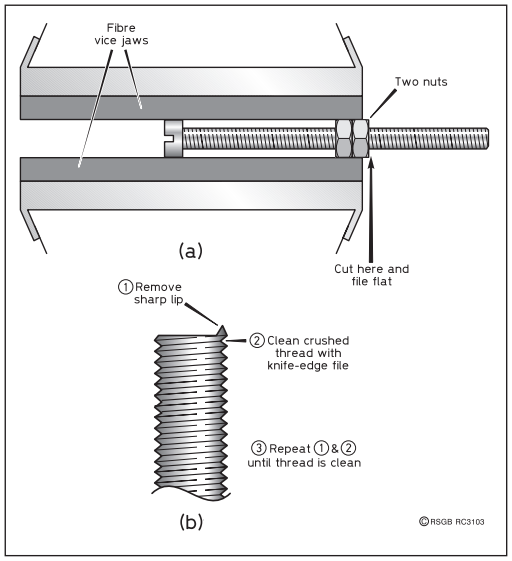

Fig 4: (a) How to grip a screw for shortening; (b) how to restore the cut thread with a knife-edge file.

NOTES AND REFERENCES

1 *Harmonics From Heil* (web newsletter, see below), December 1999.
2 'In Practice' for April 1993, July 1993, September 1994, September 1995, May 1997 and August 2000 - this is a popular topic!
3 'Clip-on RF Current Meter' by David Lauder, G0SNO, *RadCom* April 1993 - see also the 'In Practice' web site.

WWW.

Heil Sound www.heilsound.com
Clip-on RF current meter
www.ifwtech.com/g3sek/clip-on/clip-on.htm

The 'In Practice' web site [www.ifwtech.com/g3sek] contains links to all pages mentioned in this column.

THANK YOU!

THANKS TO EVERYBODY who has sent in questions, comments and ideas during the past year. Although it isn't possible to reply to everybody individually, 'In Practice' exists to pass on **your** practical experience as well as my own. Happy holidays and best wishes for 2002. ♦

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

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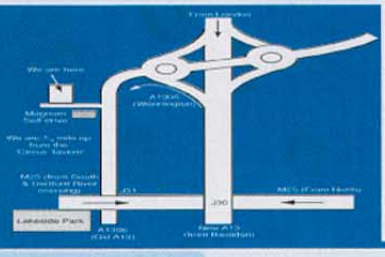

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Technical Topics

PAT HAWKER, G3VA
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12 DECEMBER 1901: DID MARCONI'S EARS DECEIVE HIM?

THE BIRTH OF long-distance radio, one hundred years ago this month, by Guglielmo Marconi - who was later to confess "You know I have always considered myself an amateur" - and his assistant George Kemp, is a matter of history. Or is it? Even today, many radio-propagation experts are convinced that whatever clicks Marconi and Kemp heard on that windy Newfoundland cliff, they could not have originated from the three dots automatically transmitted from Poldhu, 3500km distant. At both ends, the planned large antenna systems had been wrecked by gales, and the North American location changed from Cape Cod, USA to Signal Hill, Newfoundland. [A photograph of Marconi and some of his receiving equipment at Signal Hill appears on p22 - *Ed.*]

The Poldhu antenna was a hastily-salvaged makeshift; at Signal Hill, a kite-borne antenna was used when strong winds vetoed the use of balloons. The path was in daylight. The frequency of Poldhu is conjecture, but estimated to have been MF, between about 500kHz (Ratcliffe) and 850kHz (Belrose). The sensitivity of the untuned receiver (substituted for a tunable receiver affected by the plunging of the kite) is unknown, but apparently used the 'Italian-Navy' coherer ("not in fact a coherer, but an early example of a detector operating by rectifying the RF signal" – Geddes) with a single sensitive earphone. This was not regarded as particularly sensitive.

The commercial pressure on Marconi to achieve this 'success against all odds' was onerous. "Last, but not least, of the problems which beset the company in the first years of the twentieth century was the purely financial one" – W J Baker: *A History of the Marconi Company* (p90). How history repeats itself in the twenty-first century!

But Marconi and Kemp were not likely to have deliberately falsified their claims. It seems certain that they heard faint clicks - for that is all genuine Poldhu signals could have been. But can we rule out that the clicks came from static or some electrical interference generated locally? The Poldhu spark transmitter was being run at a power that ruled out any transmission of more distinctive dashes! For dots, the instantaneous radiated power may have been in the hundreds of kilowatts but, as **Fig 1** shows, reception at 3500km with a 1901 'receiver' would have been against all the odds.

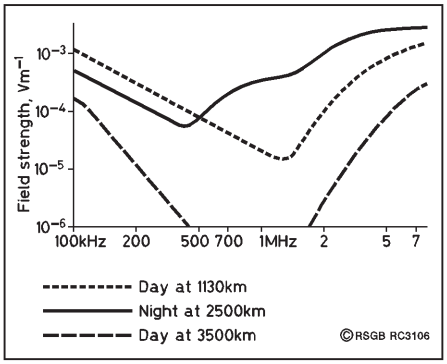
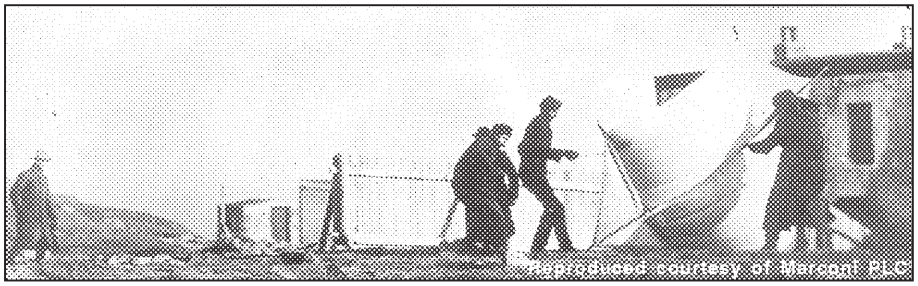


Fig 1: To reach Signal Hill, the Poldhu signals on 12 December, 1901 needed to travel 3500km and surmount an Atlantic 'ocean wall' 160km high. Against all odds success was claimed and appeared to be confirmed in February 1902 when the liner *Philadelphia* definitely received the Poldhu signals to a distance of 1120km by day and up to 2500km by night. This diagram (source J A Ratcliffe's 1974 paper) shows calculations based on modern radio propagation theory of day and night field strengths as a function of frequency, corresponding to a peak radiated power of 100kW. There seems no way in which the sensitivity of the receivers at Signal Hill could have been sufficient to detect MF signals from Poldhu during daylight. The question remains – did Marconi's ears deceive him?

Even today in the frenzy of amateur contests or in DXpedition operation, it is possible to monitor many amateurs becoming convinced they have made two-way contact, when an independent listener (or the DX station log) shows this was not the case. In the 1920s during the various trans-ocean tests, a special code group had to be successfully received and/or exchanged to confirm reception. The UK does not use the US telephone emergency number 911 because single pulses can be so easily generated accidentally.



Launching the kite-borne antenna at Signal Hill. Marconi is at the extreme left.

Several suggestions have been put forward to account for the 'impossible' success of the 1901 experiment. I recall the late Gerald Garratt, G5CS, of the Science Museum telling me of his belief that, since the Poldhu spark transmitter must have been rich in harmonics, Poldhu signals may have been received on HF. This idea was discussed in the excellent paper 'Scientists' Reactions to Marconi's Trans-Atlantic Radio Experiment', by the eminent propagation scientist J A Ratcliffe (*Proc IEE,* September 1974, pp1033-1038), and more recently in 'Fessenden and Marconi: Their Differing Technologies and Trans-Atlantic Experiments During the First Decade of This Century', by John S Belrose, VE2CV, given at the IEE International Conference on 100 Years of Radio, London, September 1995, *IEE Publication No 411*, pp32-43. Dr Belrose throws serious doubt on the HF hypothesis but it is accepted as possible in another paper given at the same IEE conference: 'Wide-band HF Signals from Poldhu?', by J C B MacKeand, WA3ZKZ, and M A Cross (pp26 - 31). They conclude: "We therefore argue that in December 1901, Marconi is likely to have received HF wideband signals, spurious components of the spark transmitter output, propagated across the Atlantic by sky waves near the maximum usable frequency". Personally, I find their argument rather less convincing than that of Dr Belrose. But who can now be sure?

In a Science Museum monograph *Guglielmo Marconi: 1874-1937* (HMSO, 1974) Keith Geddes writes of the 1901 experiment: "Public reaction was, of course, enthusiastic, but in the scientific community many considered that Marconi's ears had deceived him, though few doubted his honesty. The telegraph company operating in Newfoundland at once asserted its monopoly by threatening legal action if the tests continued, thus denying Marconi any chance of confirming the observations. Two months later, however, he rigged an outsize aerial on a west-bound trans-Atlantic liner and was able to maintain *night-time* reception of messages from Poldhu to a range of nearly 2500km, under conditions that left no room for doubt." [Italics added. It was this voyage that first revealed the difference between day and night conditions on MF – *G3VA*].

Perhaps then, we should celebrate the 100th anniversary of the birth of undisputed DX not on 12 December, but in the last week of February 2002, with full credit given to Marconi and the *Philadelphia's* operator, the redoubtable C S Franklin. Take your choice! The important point is that Marconi *did* prove that radio signals could be received far beyond the horizon, and thus opened the way to world-wide radio communication.

G3GKG'S SIMPLE DIGITAL pF METER

BRIAN HORSFALL, G3GKG, has found the arrangement shown in **Fig 2**, used with a bench frequency / period counter, provides a remarkably accurate low-value capacitance meter. He finds its particularly useful for measuring low values, although it does tend to give 'jittery' readings above a few thousand pF, unless used on an earthed metal tray or suchlike, possibly due to mains pick-up.

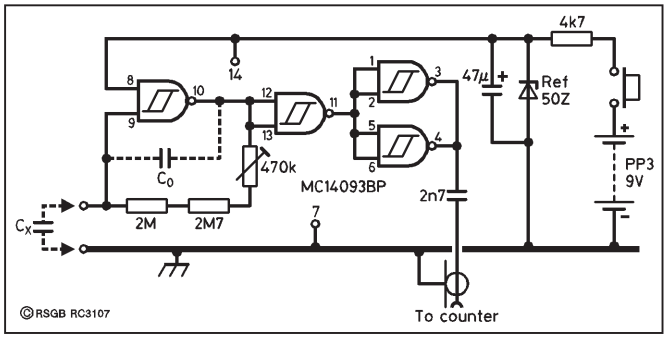


Fig 2: G3GKG's simple 'puffmeter', used in conjunction with a digital counter, can measure accurately low values of capacitance.

His unit is housed in a small ABS box, with just the push button and terminals on the outside. While the arrangement is largely self-explanatory, G3GKG provides the following notes on calibrating the device: "With the counter set to count 1µs periods (1µs ≡ 1pF), proceed as follows:

1. "With C_x a capacitor of accurately known value (at least 1000pF) connected, set the 470k pre-set resistor to give the correct reading on the counter.
2. "With C_x an accurately known value of about 10pF, adjust the 'gimmick' capacitor C_0 to give the correct reading.
3. "Repeat steps 1 and 2 until both readings are correct.

"Calibration is then complete, and the device should accurately read any value up to the limit of the counter. Note that, in construction, stray capacitance around the 'unknown' part of the circuit should be kept to a minimum. If the required C_0 becomes too high, all readings will be too low, and it may prove impossible to get very low values to read accurately".

THE CHALLENGE OF AMATEUR RADIO

IN INTRODUCING the new licence structure, *RadCom*, in October 2001, categorised amateur radio primarily as a technical "hobby", which my dictionary defines as "an activity pursued in one's spare time for pleasure or relaxation". I suppose that is a fair enough definition of what, for many, amateur radio has now become, although for my part, I prefer the definition given in the *ITU Radio Regulations. Geneva 1959*: "A service of self-training, intercommunication and technical investigations carried on by amateurs, that is, by duly authorised persons interested in radio technique solely with a personal aim and without pecuniary interest". My favourite pastime may be passively watching television but I like, possibly wrongly, to think of amateur radio as a challenging activity, requiring the exercise of personal operating skills and at least some degree of technical understanding, even when using factory-built equipment.

Yet one has to admit that the tenor of technical progress over the past 50 years or so has been largely directed at 'deskilling' the operation of the black box radio station. No longer the incorporation of several external units. No longer the need to master the technique of tuning up a pi-output circuit. No longer the trick of zero-beating the transmitter to the received frequency. No longer the quite tricky procedure of using the phasing-control of a single-crystal filter together with adjustment of the variable-frequency BFO. A diminishing few of us still use old valve equipment in which some of these half-lost arts are still required, but for many newcomers this is no longer the case. I remember the efforts that were required at Hanslope Park to persuade operators, most of whom had never previously used receivers with crystal filters, that the HRO filter could provide a tremendous aid *but only if its operation was understood, requiring the correct setting of the BFO, use of the phasing control, etc.*

That the modern easy-to-use 'black box' concept does not satisfy quite a large section of enthusiasts is shown by the continuing success of the G QRP Club and its lively journal, *SPRAT*, with more than 10,000 enthusiasts having at some time been members, and with its current membership around 3500 world-wide. But QRP operation is essentially a spin-off of the basic hobby. What we need to do is to make standard amateur radio equally interesting and challenging in a manner that will attract the young and at the same time encourage established amateurs to improve their technical and operating skills, prepare for emergency operation etc. Amateur radio *is* fun, but to attract the young we must show it is more than that. The young like a challenge, not just a pastime!

Fortunately, even the modern transceiver offers an opportunity to explore new wire antennas and ways of optimising station performance. A two-part, seven-page article 'How to Maximize Your Receiver's Effective Selectivity' by Larry Scheff, W4QEJ (*QST*, February and March 2001), is subtitled 'Are you blaming other hams for interference that could be eliminated if you *really* knew how to operate your receiver? Is band noise irritating? Effective use of your receiver's selectivity features can reduce or eliminate much of the interference and noise that's been spoiling your fun.'

W4QEJ discusses the use of *variable bandwidth tuning* (VBT), the form of VBT known as *SSB slope tuning,* and the *IF shift* control for passband tuning. But more controversially he urges amateurs: "Forget the S-meter. Your primary interest should be minimising interference."

Basically, he recommends judicious use of the receiver front-end attenuator control and the RF gain control. He provides some 10 drawings to illustrate his belief that receiver selectivity can be improved by ensuring that the signals passing through the early stage are kept low. The articles produced an impressively large response (three full pages in the August issue of *QST,* pp77-79). Most writers criticised W4QEJ's presentation on theoretical grounds, but with some agreeing that the ideas appeared to work in practice. The point appears to be that although selective filters – crystal or ceramic – are highly linear at normal signal levels, they should not be regarded as 'brick-wall' filters, and tend to pass narrower bandwidth at the nose rather than the skirt of the filter. This implies keeping the signal-to-noise ratio to a figure low enough to provide an intelligible output of the desired signal, while still providing sufficient selectivity to eliminate interference on adjacent frequencies. This approach will not work where a desired signal is only just above the noise, and much weaker than the interference. But this is less common than where the signal is reasonable, but the interference sufficient to cause annoyance. Another piece of advice given by W4QEJ is that when receiving interference on SSB it may prove beneficial (although invalidating the S-meter) to turn off the AGC. If this is not possible then use fast AGC (intended for CW).

The conclusion can be drawn from such a debate (controversy) that, even with modern receivers, it is possible to improve performance by the exercise of technical understanding of how receivers work.

RF SWITCHING DIODES – DEVICES & FAULTS

'TT' FEBRUARY 1993 and May 1995 discussed a number of the factors arising from the use of RF switching and tuning diodes, showing the effect they could have on intermodulation performance. The May item included suggestions by Dr Ulrich Rohde,

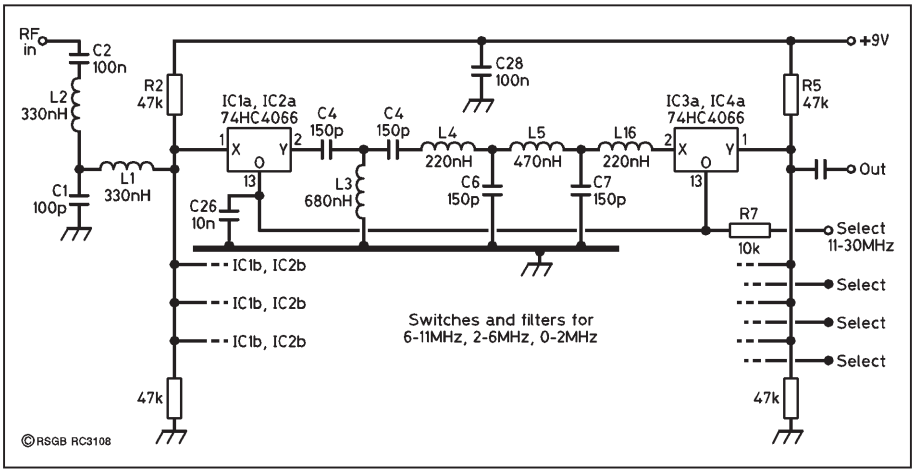


Fig 3: Use of 74HC4066 IC switches to select bandpass filters at the front-end of a receiver. In the design shown on the web there are filters covering four frequency ranges. To reduce the 'on' switch resistance, each of the two switches uses two paralleled devices, mounted piggy-back.

KA2WEU / DJ2LR, on replacing RF filter switching diodes in the front ends of typical black box transceivers, a rather formidable undertaking. He recommended the use of HP5082-3081 or the lower-cost and more readily available Motorola MPN3700 diodes.

Gian Moda, I7SWEX / F5VGU, wrote an article in ARI's *Radio Rivista* in September 2000 with the title 'Che Cosa non Funziona Nei Ricevitori Radioamatoriali Commerciali' ('What does not work in the amateur radio commercial receivers'), in which he advocated the use of G3SBI's H-mode mixer with the FST3125 in the front end, and the use of the 74HC4066 in the third conversion mixer (to 455kHz).

He also mentioned that the replacement of the original RF switching diodes, with PIN diodes, may not improve the IP3 performance to the extent one might expect, while the cost can be excessive. He believes the optimum solution is the use of miniature RF relays, though this involves two problems - the space needed and a cost even higher than for PIN diodes. He feels a cheaper solution could be the use of miniature DIP switches. He suggested in his ARI article that amateurs should investigate the use of Fast Bus Switches such as the FST3125 to select the various front-end band-pass filters and the IF crystal filters.

More recently, while roaming around various ham web sites, he discovered that one amateur has designed and built a transceiver where the front-end BPF and the IF crystal filters are switched using the 74HC4066 (**Fig 3** is a truncated version of the HF BPF switching). Gian is unable to provide the callsign of the amateur concerned as he was unable to re-trace the web site, found through multiple links. However, he was pleased that someone else had shared with him similar ideas.

To reduce the R_{on} of the HC4066 devices, two had been soldered in parallel (piggy-backed). However, Gian feels that this still results in an R_{on} of about 15Ω for a Vcc of +9V (recent production). With a filter impedance of 50Ω, this would result in an attenuation of about 2dB for each filter switch, or some 4dB total signal loss for each pair of switches per filter – not a good solution. He strongly believes that the correct device would be the FST3125 or equivalent, with its R_{on} of 5Ω presenting a total attenuation of some 1dB or less per filter.

He adds: "As the 3125 may not prove easy to purchase, it is possible to accept the HC4066 solution, but using one IC per switch with all inputs and output pins in parallel, including the control ones. This solution may require rather a lot of space, not always available when modifying commercial equipment. Since the HC4066 has its SMD version at an affordable price, this may simply modification of commercial equipment. The HC4066 is certainly a good choice for home-made equipment, where we can build filters with 200Ω impedance and then use two broadband 4:1 balun transformers to adapt the input and output impedance. The use of the HC4066 for switching crystal filters in the IF stages is certainly valid since the impedance of these components is normally between 500Ω and 2000Ω, so attenuation will be well below 1dB."

Gian feels that one should find, using these solid-state switches, a small possibility of RF rectification as is 'normal' with switching diodes, permitting a higher IP3, and a cheaper competitor to PIN diodes.

He considers that a further important aspect that should be borne in mind is to ensure that when one filter is selected none of the other filters are 'connected' in circuit through the switch input/output capacitance (much less than 1pF). This small capacitance may be sufficient to pass the 'offend-

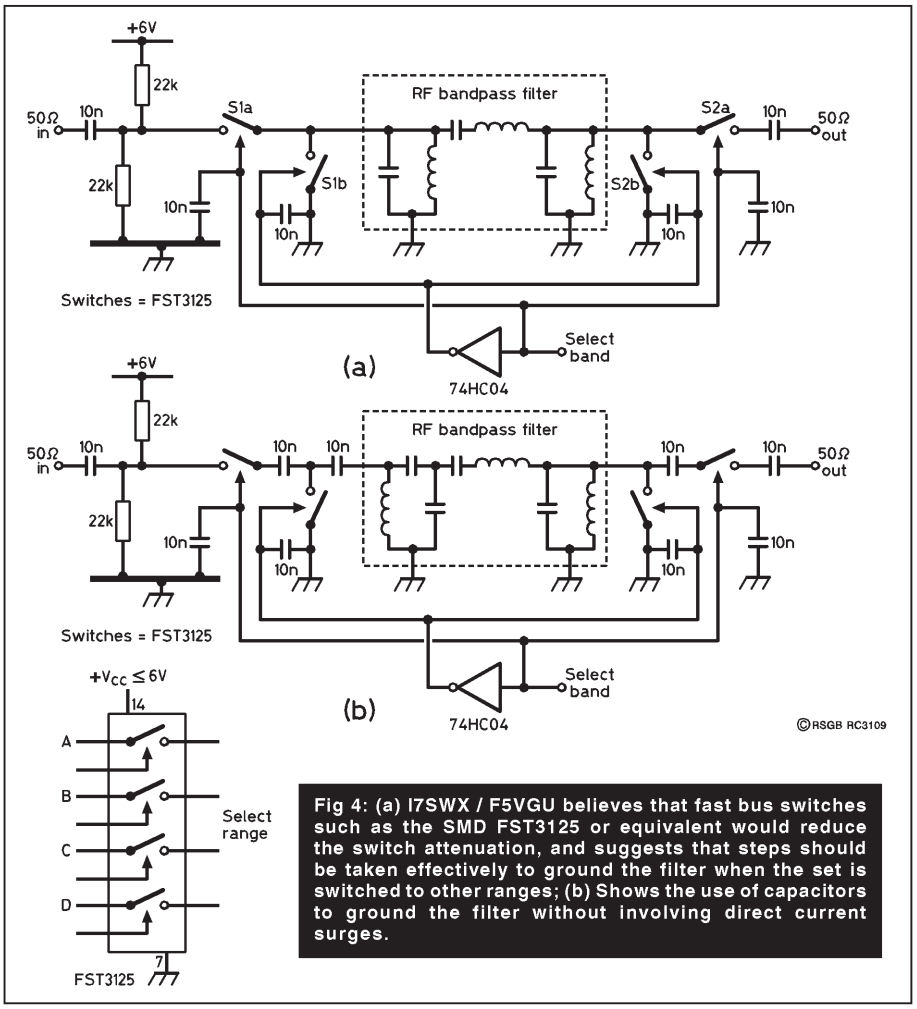


Fig 4: (a) I7SWX / F5VGU believes that fast bus switches such as the SMD FST3125 or equivalent would reduce the switch attenuation, and suggests that steps should be taken effectively to ground the filter when the set is switched to other ranges; (b) Shows the use of capacitors to ground the filter without involving direct current surges.

ing' frequencies that will intermix with the filtered signals – a problem that certainly exists when using diode switches. A possible solution would be to have one switch (3125 or HC4066) to ground the input and output of the non-selected filters: **Fig 4(a)**. This could generate a high peak current through the two switches, during the switching periods, since both will be in a conducting state. However, provided a high value bias resistor is used there should be no problem. For a 'clean' solution, Gian suggests using two capacitors, avoiding, for the purists, having the earth connection in such a way as to make a delayed switch on/off, complicating the switching circuit: **Fig 4(b)**.

It has to be admitted that relatively few readers are likely to contemplate modifying existing diode-switching in the ways advocated by professional engineers such as Ulrich Rohde or Gian Moda. But, as the following report shows, faulty RF switching diodes can prove an unexpected source of poor receiver performance.

To précis a long letter from Ray Perrin, VE3FN / VY0AAA / G4DFT: "Over the past few years, I have made a number of business trips to Iqualuit (formerly Frobisher Bay) on Baffin Island in the Canadian Arctic, each visit lasting over a week. I would take along my old Drake TR-4CW and external VFO throwing a dipole antenna out of the bedroom window. Iqualuit is way north of the tree line, but I tied the far end of the dipole to whatever I could find. I made quite a few contacts, though often suffering the auroral blackouts lasting several days.

"Last year I decided to try 50MHz in the far north. I borrowed an old Yaesu FT-620B (10W on 50MHz). I took it, with the Drake HF transceiver, on two trips, but found this a chore. I started looking for a small radio having both HF and 50MHz to take up north and eventually obtained a used Icom IC-736 which provides 100W on both HF and 50MHz with internal antenna tuner and PSU.

"Used in Ottawa, it seemed to be working well. But, after a while, I realised that the receiver was not as sensitive as it should be – especially on 50MHz. I noted another anomaly. The receive front-end band-pass filters switch at exactly 15MHz. When listening to WWV on 15MHz (AM position) I found the signal to be substantially stronger when I tuned a couple of hundred Hertz below 15MHz than when I tuned a couple of hundred Hertz above 15MHz. Something clearly was wrong!

"I called Icom Canada. Their service technician felt the problem was likely to be that some of the RF diode filter switches were blown. He said that in the IC-736 these are tiny surface-mount components. If they fail shorted (as they usually do), more than one filter is connected before the first RF stage, degrading the sensitivity.

"I sent the IC-736 to Icom Canada where it was confirmed that three blown diodes were indeed the cause of the problem. With more than one BPF in circuit I guess the amount of signal degradation depends on the band selected and the impedance presented by the undesired filters at the receive frequency. The service technician indicated that failure of these diodes is fairly common on the IC-736 and he had seen the problem also on the IC-746.

"After repair (the two antenna connectors were also replaced although I am puzzled why) the 736 worked well and was very sensitive on all bands. I took it along on a trip to the far north in July, making over 100 contacts on 50MHz and a bunch on HF as well.

"Other users of the 736 and 746 have confirmed that the failure of these switching diodes is quite common. I feel that low-signal diodes should live virtually for ever, unless subject to static or a design flaw. I recall that Peter Hart, G3SJX, has noted in some of his reviews that a short spike is emitted by some radios when they first transmit. I wonder if this spike could appear so quickly that the T/R PIN diodes fail to operate in time and the signal is applied to the receiver input – possibly taking out the switching diode? But this is conjecture.

"I am puzzled at why it was necessary to replace the two antenna connectors. The technician said they "weren't making proper contact" and wonder if this is in any way connected with the diode failures. But it does seem there must be some basic design flaw in these two transceivers to cause these repeated failures which can pass unnoticed for quite some time. Incidentally, in my 35 years as a ham, this is the first time I have had to pay someone to repair one of my radios!"

HERE & THERE

THE JUNE 2001 issue of *RF Design* includes a five-page article 'Using Polyphase Filters as Image Attenuators', by Tom Hornak, which explains that "using active polyphase filters in receivers with image-rejection mixers not only reduces component count, but also provides some unexpected benefits". The author shows how a simple active polyphase filter stage can assist in the design of low-cost gigahertz-band radio receivers used for data communications. He writes: "Low cost demands single-chip implementation with minimum off-chip components. An important goal is to replace any external IF filters with on-chip IF filters, while maintaining sufficient image rejection. One possible solution is a direct conversion approach - for example, using a zero IF. But direct conversion has many well-known drawbacks, such as DC offset, $^1/_f$ noise and local oscillator leak-through. A solution that avoids these problems uses a low-megahertz IF, where on-chip filters can be built within the high-frequency limitations of IC processes." Tom Hornak discusses in detail the use of active polyphase filters in such UHF data receivers.

MANY MODERN hearing aids use filtering tailored to fit the individual's audio loss within specific bands of frequencies. This technique seems to lie behind the MFJ-616 Speech Intelligibility Enhancer that was given an enthusiastic review by Steve Ford, WB8IMY (Managing Editor of *QST*), in his April 2001 issue. Between 100-5000Hz the unit enhances or attenuates audio signals in four frequency ranges about 300, 600, 1200 and 2400Hz. WB8IMY writes: "No I'm not deaf – at least not yet. But I have difficulty distinguishing individual voices in noisy environments - at age 46 I can't bear the thought of hearing aids. DSP filtering will eliminate the annoying carrier whistles or clean up certain types of noise, but it does nothing to restrict or enhance specific audio frequencies. Worse still, conventional DSP can often add an aliasing effect that gives speech a wispy, other-worldly sound. An audio equaliser allows you to filter the audio signal in specific frequency groups to create an output that is best suited to your listening environment. The MFJ-616 is designed in recognition of the fact that many of us need effective assistance to counterbalance our hearing disabilities whether due to ageing, illness, injury, or mistakes in our youth. The benefits of the MFJ-616 are so profound, and yet the design is so clear-cut, it almost makes you kick yourself for not thinking of it first!"

A SIMPLE GIMMICK from the 'Circuit Ideas' feature of *Electronics World* (September 2001): **Fig 5** shows a simple tester to check for open circuit bulbs on Christmas tree lights (a time-consuming problem), but which could have other more relevant uses for amateurs in detecting live mains cables. R A J Humphrey writes: "By running the probe over an insulated cable, the LED will illuminate when mains is present. If built on stripboard the gate/probe should be low capacitance to the surrounding copper. The battery can be permanently connected." ♦

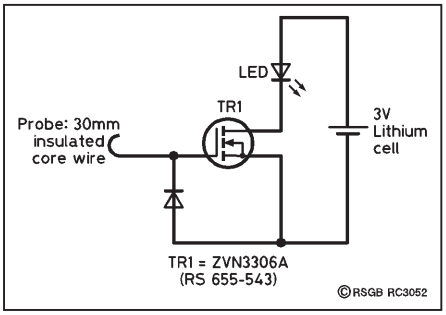


Fig 5: Simple mains voltage detector (*Electronics World*).

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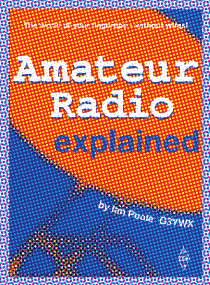

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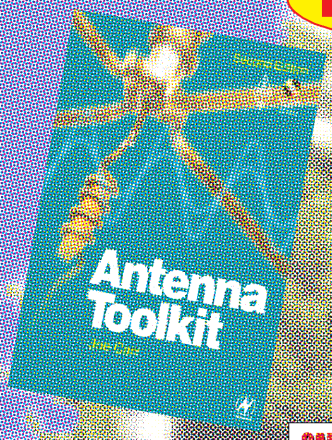

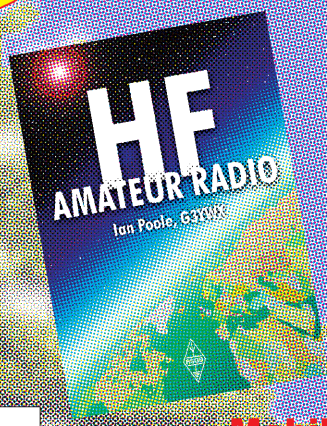

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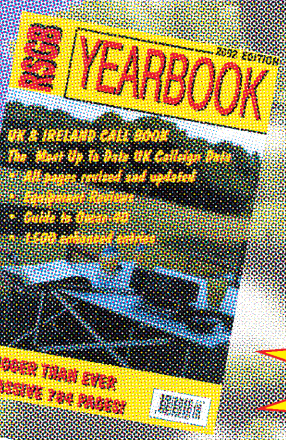

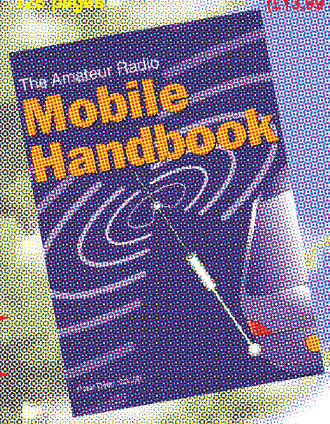

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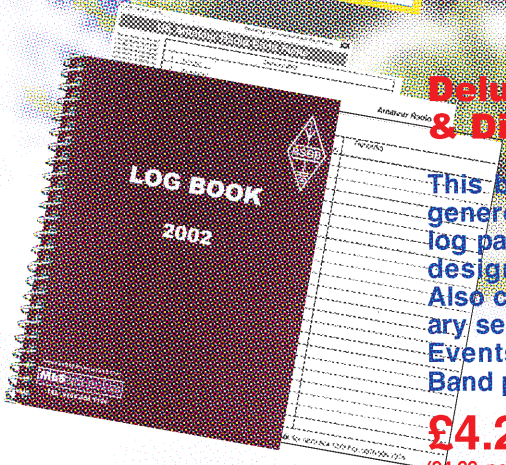

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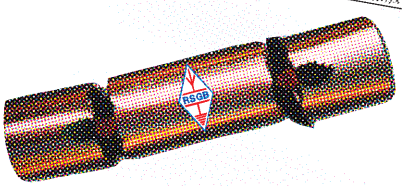

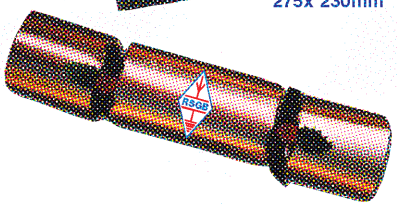

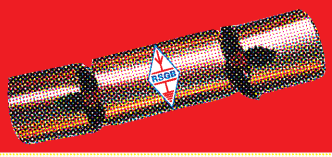

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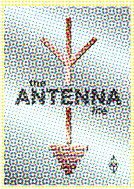

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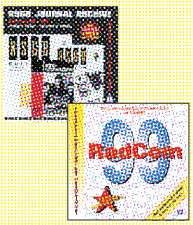

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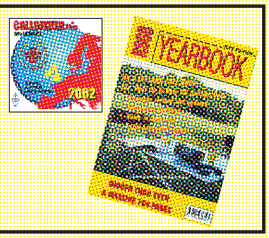

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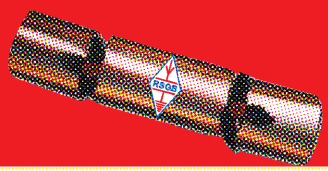

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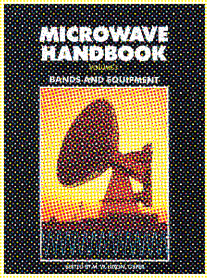

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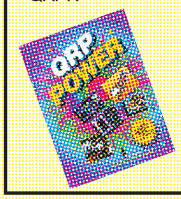

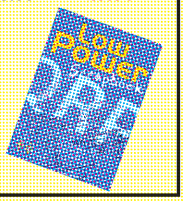

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MCRA	Morse Code for Radio Amateurs	£4.99	£4.24

ARRL

MCEL	Morse Code The Essential Language	£8.99	£7.64
MCC1	Morse Instruction Tapes 5-10 wpm (2 tapes)	£9.99	£8.49
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IMTC	Your Introduction to Morse Code (2 tapes)	£9.99	£8.49
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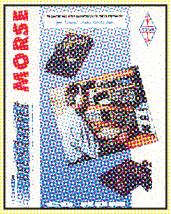


SPECIAL MODES

PRPR	Packet Radio Primer	£9.99	£8.49

OTHER PUBLISHERS

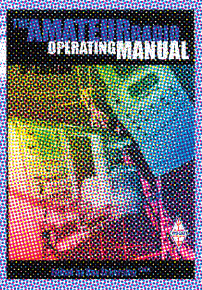
ATMM	APRS Tracks, Maps & Mobiles	£12.99	£11.04
PSMS	ARRL Packet, Speed & More Speed	£11.99	£10.19

or Tel: 0870 904 7373

Cranborne Road, Potters Bar, Herts EN6 3JE

All major credit cards accepted.

The Amateur Radio Operating Manual

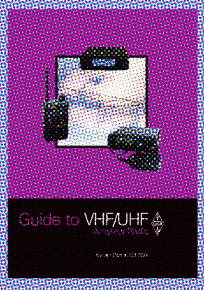


This book is essential reading for any amateur radio operator. It describes operating techniques invaluable for enjoying amateur radio to the full.

272x198mm
264 pages

£21.24
(£24.99 non-members)

Guide to VHF/UHF Amateur radio

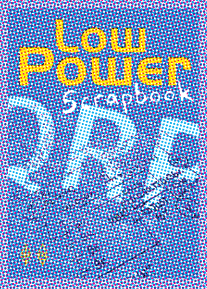


The handy new guide to operating on the bands between 30MHz and 3GHz. How to get the most from your VHF/UHF station.

£7.64
(£8.99 non-members)

210x148mm
112 pages

Low Power Scrapbook



The G-QRP Club are renowned as the leaders in Low Power and this book contains 139 of the very best projects from the Club's magazine Sprat.

£11.04
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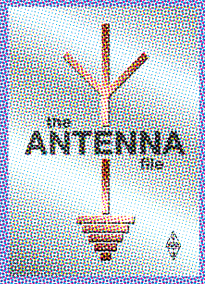
320 pages

The Antenna File



The RSGB produces some of the best works on antennas, this is a collection of that work from the last ten years. Containing articles drawn from RadCom magazine.

297x210mm
288 pages

£16.14
(£18.99 non-members)

The L F Experimenter's Handbook

This book has been written to meet the needs of amateurs and experimenters who have an interest in low power radio techniques at frequencies below 200kHz.

295x210mm
146 pages

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(£18.99 non-members)

Radio & Electronics Cookbook

A collection of the best weekend projects from the popular RSGB magazine D-I-Y RADIO. Ideal for DIY enthusiasts.

£14.44
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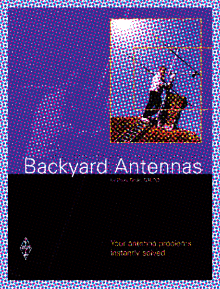
234x172mm
192 pages

Backyard Antennas



Antenna guru Peter Dodd explains how by using a variety of simple techniques, it is possible to achieve very high performance from a compact antenna.

£16.14
(£18.99 non-members)

244x193mm
208 pages

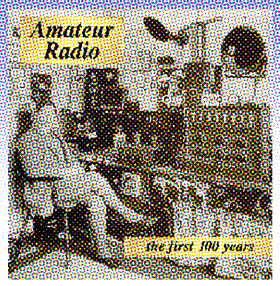
Radio Communications Handbook

This book is an invaluable reference for radio amateurs everywhere. It also provides a comprehensive guide to practical radio, from LF to the GHz bands.

272x198mm
626 pages

£22.49
(£29.95 non-members)

Amateur Radio the first 100 years



This lavishly illustrated, large format title, plots a memorable visual history of amateur radio over the last 100 years.

265x265mm
256 pages

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(£49.99 non-members)

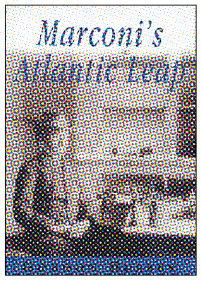
The RSGB Guide to EMC

This book from the RSGB is of immense use to anyone called upon to resolve EMC problems that occur in the real world.

£16.99
(£19.99 non-members)

244x172mm
208 pages

Marconi's Atlantic Leap



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(£6.99 non-members)

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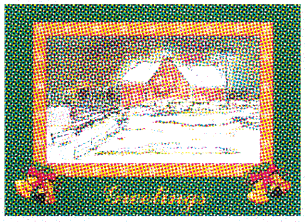

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RSGB Members wishing to place an advertisement in this section must use the official form incorporated on the label carrier of Radio Communication. This will prove membership and must be for the current month. No acknowledgment will be sent. Ads not 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 callsigns and QTHR, provided their addresses in the current edition of the RSGB Yearbook are correct. RS members will have to provide their names and addresses or telephone numbers. 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

EXCHANGE new and unused SGC-230 Smartuner for a VHF or HF marine radio and antenna. John, 01733 232 277 (Peterborough).
E-mail: john@rmccallum.com

FOR SALE

4 x 13-ele 2m Yagi array, computer-enhanced 9-ele Tonna beams, including feeder and driven elements, fair-good condition, £80. 2 x 4CX250B 2m linear, tank circuit based on Sagra, SK620 bases, good valves, built to high standard, £80. DB6NT 2m-23cm tvtr, unopened kit, purchased directly from Germany, £150. SSB Products 10m - 70cm tvtr, contest grade with SRA-1H ring mixer in rx, professionally constructed, £80. SSB Products 2m – 70cm tvtr, DKIVA design (*VHF Comms*), including matching 10W linear, professionally constructed, £90. Cushcraft 203-CD 3-ele 20m beam, 20ft boom, vgc, £90. *VHF Communications*, bound volumes, *Dubus* 1978 – 2000, ring for details. Eimac 8877, brand new, boxed, purchased from Richardsons, £380. Vargarda 13-ele 70cm beam (DL6WU), £25. David, 01778 440 079 (South Lincs).
E-mail: david@g4dhf.freeserve.co.uk

ALTRON 30 telescopic tiltover tower with rotator box plus KR400RC rotator, £150. R-7000 cushcraft vertical, boxed, £100. FL2 filter, £40. AKD HF wavemeter WA3, new, £30. MFJ-875B SWR/PWR meter, new, £40. AR8200 all-mode rcvr, nearly new, £185. Dummy load DL 600W, £15. PK-232MBX, £50. G0IYK, 01603 870 833 (Nr Norwich).

GM4YJL shack sale. TS-930S, CW filter, MC30 desk mic, £400. MFJ-948 HF ATU, £65. Dentron GLA1000 HF linear amplifier, £200. DRAE SSTV terminal, £50. Wraase SSTV/FAX/WEFAX terminal, £50. Timestep Prosat II Weathersat ISA card/software, £50. Timestep HRPT Weathersat ISA card/dongle/software, £50. Icom IC-202S SSB/CW 2m portable tcvr £100. Microwave Modules 2/70 tvtr 10W, £50. Ampere 50W 70cm linear amplifier, £50. Mutek 2m masthead preamp with sequencer, £40. Cushcraft 17B2 2m long Yagi, £100. Cushcraft 424B 70cm long Yagi, £80. Yaesu G500 elevation rotator c/w controller, £150. Yaesu G500 elevation rotator c/w controller, £150. Both controllers adapted for computer-controlled tracking. Rotorinterface II computer interface for the above rotators c/w software, £75. BSX2 packet TNC, £40. All items in first class order with documentation and mans. 01259 781 433(Dollar).
E-mail: richard.turner11@btinternet.com

JST-245 HF & 6m, £1000. TS-530, £150. Linear Alinco ELH-230, £30. FT-707, £150. IC-240, £50. EC10 Mk1, £50. FT-102, FV-102, CW filter, £350. Wanted P60 top section, interested any tower bits. Offers to Ian, G3ROO. 01304 821 588 (Dover).
E-mail: g3roo@btinternet.com

SILENT key sale. Sommerkamp FT-767 DX tcvr, FP-767 PSU/speaker and FC-707 ATU/SWR, £299. FT-290 Mk1, RN tvtr, tri-band colinear, £150. MFJ deluxe Versa Tuner II ATU, £30. 40ft lattice tower in two 20ft sections with fixed baseplate, winch and rotor cage, £100 ono. Buyer collects on all items. Can put you in touch with lorry owner for tower move. 07971 887 772 (Bristol).
E-mail: spanner@spanner-in-works.com

TELEX four-channel stereo one to one cassette speed copier, service man, large quantity of blanks professionally serviced, offered at fraction of new listed price, suit new club for Morse practice tapes etc. Buyer collects or carriage by mutual arrangement, £95. 01656 653 585 (Bridgend).

WINRADIO Spectrum monitor, model 315DE (external), cost new £1,400, accept £635, see November *RadCom* p112, would exchange for good quality base scanner. MFJ-1786 10-30MHz Super Loop Antenna, bought July this year, cost new £369, accept £275 ovno.01484 462 960 (Huddersfield).
E-mail: g0iry@onetel.net.uk

YAESU FT-817 and LDG-Z11 autotuner plus 2.5A PSU, £740. *QST* CD-ROMs 90-96, £20. M2 antennas, buyer collects: 2M9SSB, £45; pair 2M7 plus splitter and cables, £70. LDF-450 70ft plus connectors, £55. Gone QRT, all stuff must go. Paul, M0CVX, 01522 514 238 (Lincoln).
E-mail: bradbeerfamily@aol.com

YAESU FT-817 HF, VHF, UHF all mode portable tcvr as new with charger, nicads, boxed with free walkabout antenna & soft case, £650. MFJ-9406 CW/SSB 10W tcvr, £140. Weller PS-2D temp-controlled soldering iron with base, £30. Would exchange all above plus cash adjust for TS-2000 HF tcvr, post extra. Terry, G4OXD, 01462 435 248 (Hitchin).
E-mail: tm.rose@thersgb.net

YAESU FT-990 & SP-6 & DVS-2 & filters, still one of the best HF rigs, £650. Dentron MT-3000A 3kW ATU, £100. AEA PK-900 TNC, £100. AEA Morse machine, £50. All in excellent condition. 01823 442 477 (Taunton).
E-mail: eddie.hayden@clara.co.uk

ALTRON SM-30 (30ft) slimline mast, fitted to base post bolted to concrete. Should be easy to dismantle and re-erect. Also Yaesu G-600RC rotator (requires attention). 9-ele Tonna 2m beam and 3-ele 6m beam and attached UR-67 cable. Purchaser to dismantle and take away. Around £50 for the lot, but don't let that put you off! G6HTM, 01256 781 021 (Basingstoke).
E-mail: brian@hedge70.freeserve.co.uk
AMERITRON AL-800 1.2kW PEP amplifier 160-10m, 3yrs old, £850, mint condition. Karl (evenings), 01296 435 815 (Aylesbury).
E-mail: karl@heines3.netscapeonline.co.uk
AMSTRAD ALT-386 laptop. OK but battery dead, £30. Loads of PC memory, m/boards, printers etc. Please call. M0NZA, QTHR. 01580 892 637 (Staplehurst).
E-mail: robin@vesma.com
CODAR AT5 transmitter with PSU, £40. AVO-8, £10. AVO HF/VHF generator, £10. Marconi TF1100 VVM, £10. Airmec 301 VVM, £15. Telequipment S-51B scope, £18. Telequipment D-755 d/b scope, £35. STC R502/HF wavemeter £5. 30m 0.5in tx-coax, £15. 10m 0.5in tx-coax, £5. Truvox R92 7½ips r/r tape recorder, £20. Heathkit 20W spkr units, £20. Sinclair stereo 60W spares, £5. Garrard SP-25 deck, £5, and assorted wireless books, £10 lot. 01242 256 295 (Cheltenham).
COLLINS 51J general coverage rcvr, £350. Icom IC-271E 2m multimode, Mutek board fitted, Icom speaker, 25W £245. Murphy CAS-100 general coverage rcvr, 59-555, 1.47-30MHz PSU, h/book, £85. KW1000 linear amp, perfect condition, spare new Cetra 572Bs £300. Gerry, G0AQH. 01273 454 108 (Shoreham by Sea).
COMMUNICATIONS rcvr 150kHz – 30MHz Kenwood R-600, £100. Mizuho 14MHz h/held, perfect, swap for 40m or 80m model. Wanted: racal TA-944 HF linear, also Racal 12V input PSU for Syncal 30. Always interested in Racal manpacks, exchanges possible. G3GTJ, 01963 240 319 (Castle Cary).
CUSHCRAFT R7000 vertical, never used, in box, original packing, £250. Force 12 4-ele Yagi 10m, used once, cost £259. Offers? 01743 245 896 (Shrewsbury).
DATONG FL3 multi-function filter, £35, Datong RF clipper, home brew case, £25, 600MHz frequency counter mains or battery operation, with man, £35. 01673 857 420 (Wragby).
E-mail: rvcopeland@iee.org.uk
DRAKE MN-2700 matching network, only been used 100W, gwo inc man, £200+p&p or vno. 01874 623 815 (Brecon).
E-mail: pjt41@tesco.net
DX33 3-ele triband beam, c/w man, £120. 70cm contest array 4 x 21-ele Tonna, 4-way power splitter, cables, original Tonna stacking frame, £150. 70cm EME array 8 x 17-ele NBS Yagis, aluminium tubes for spacing along boom, 2 spare antennas, no splitters or cable, £120. All in excellent condition, buyer collects or pays carriage. Wanted – Drake R4C rcvr, Kenwood VOX 4. 01288 331 113.
E-mail: g4jbh@compuserve.com
EDDYSTONE EC-958 rcvr 10kHz to 30MHz, commercial grade high stability communication rcvr incl operating and service data man, £100 ono. 01666 825 780 (Malmesbury).
E-mail: g7cnp@btinternet.com
FT-100 HF to 70cm mobile, only used indoors, boxed as new, £650. FC-20 matching auto ATU as new, £145. ATAS-100 matching auto mobile antenna (never used), £165. John, G0PRF, 01484 640 064 (Huddersfield).
FT-221 with Mutek board, mic, digital readout, h/book, mains and 12V leads, £125 ono. Carriage extra. Dave, G0IXZ, 01246 824 061 (Chesterfield).
E-mail: daveg0ixz@lineone.net
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GARAGE sale weekdays 0800-1200 December, cash carry only, FT-225 RD plus linear, £300. Qty 10 Varivac capacitors 250pF 7kV. Waveguide straights, bends, oilcaps 30µF 1kV, 4µF 6kV. VHF valves, bases, meters. Vitres 200W 50Ω load. SM drives, VHF/SHF samplers, relays, mini-counter 2.8GHz, lots of bits. G3LTN, QTHR. 01295 710 623 (Banbury).
GROUND post for P40/P60, unused. Also P40. Capco SP-300 ATU, £125. FDK 2m FM, £75. Unused tower P40, all new, £600. 01708 374 043 (Romford).
E-mail: g3rcq@supanet.com
HAM-4 rotator as new, original box, man, offers? 01526 354 366 (Lincoln).
E-mail: mikep586@bigfoot.com
ICOM 271H multimode 100W output, transmits but does not receive, hence £75, 30A PSU new in box with twin meters, £50. 01179 642 867 (Bristol).
E-mail: trevor@26gatcombe.freeserve.co.uk
ICOM IC-735 tcvr boxed with man, exc cond, £350 ono. G8VG, QTHR. 01453 883 739 (Stroud).
E-mail: g8vg@supanet.com
ICOM IC-756 etc, CW filter, FL52 500 Hz and 455kHz, £45. Shure 401A mic with free Datong RF clipper wired for TS-520, £35. Argonaut QRP tcvr 505 by Ten-Tec with pre-audio SSB/CW filter. Offers? 01438 368 670 (Stevenage).
ICOM IC-756 HF + 6m with CW filter and hand mic, unmarked cond with man & box. 01924 825 443 evenings & weekends (Wakefield).
E-mail: john.hoban@btinternet.com
ICOM IC-756PRO, mint, £1199. MFJ-1782 magnetic loop, as new, £175. Other items see www.qsl.net/g4ilo, 01900 821 353 (Cockermouth).
E-mail: g4ilo@qsl.net
ICOM IC-R7000 VHF UHF rcvr, exc cond. Icom IC-R71E HF rcvr, exc cond, very nice matched line-up. Separates. Offers? M1DXN, 0161 747 8489 (Manchester).
E-mail: howard90nine@aol.com
ICOM tcvr IC-740, good condition. Not used much, £350. 01582 766 410 (Harpenden).
E-mail: daveskye@kodak.com
KENWOOD 450 & int ATU & Kenwood PSU, all filters fitted, fist mic, boxed & mans, cond mint, £500. GW0SZN, QTHR. 01495 200 240 (Blackwood).
E-mail: maxdaugi@aol.com
KENWOOD TL-922 linear, £800. Yaesu FT-890, CW filter, £500, G3BJ, 01694 781 475 (Church Stretton).
E-mail: g3ozf@btinternet.com
KENWOOD TS-140 HF tcvr 10-160m, £295. 01503 240 432 (Liskeard). g4mpq@diver34.freeserve.co.uk

SILENT KEYS

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

G0FQX	Mr L Key	06/09/01
G0VRA	Mr R A Mackay	29/07/01
G0VUG	Mr K Townsend	02/05/01
G3ARZ	Mr C L Waywell	30/06/01
G3CNW	Mr TL Fletcher	
G3OVS	Mr S A Isaac	07/09/01
G4ITS	Mr J H Brear	10/00
G4OTN	Mr M C Cook	23/09/01
G4XSW	Mr E B Ward	
G4YHY	Mr H Harper	03/06/01
G7HWS	Mr F Blades	
G7VYM	Mr R Hewison	28/07/01
G8ABI	Mr J A Hodgkins	
G8DV	Mr A P Morgan	01/10/01
G8ZMN	Mr B Carr	20/09/01
GD0BCM	Mr W G Livsey	
GM2CRV	Mr G Cardoo	04/09/01
GM3GG	Mr G Mortimer	08/09/01
GM3JDX	Mr W M Roger	10/09/01
GW0NWW	Mr M G Gibbons	
GW3EPF	Mr P J Curtis	28/09/01
M1BOS	Mr W A Thomas	05/10/01
RS17229	Mr E G Blachford	06/07/01
RS44520	Mr E Bishop	05/09/01
RS92021	Mr W Vink	25/09/01

KENWOOD TS-8305 (no VOX), £225. SP-230 spkr, £60. Various Collins and AR88 mans, Drake TR4 relay, Collins KWM 2 antenna relay, £30. KWM 2 relays £30. 01379 783 657 (Nr Diss).
KENWOOD TS-870S HF tcvr only used on receive, boxed, manuals, mint cond, £850. 01954 212 989 (Cambridge).
E-mail: dghill@tesco.net
KW-109 Supermatch, £100. Shure 444 boxed, £50. 130m stainless 5mm rope, £80. 49m stainless 8mm rope, £40. Andrews type L45W N male connector for LDF 5-50 (qty 5), £40 lot. All items unused. 01254 701 151 (Blackburn).
E-mail: btom@cwcom.net
MAST 60ft lattice. Electric raise & lower, has Chelcom quad on top with rotator. HP-1000 remote switching box. Buyer collects, no offers, £500, G0JWJ, 01432 279 435 (Hereford).
E-mail: g0jwj@btinternet.com
MFJ-949E new, £100. Rcvr FRG-7700, £150. PSU 13.8V 10A, £20. AVO-8, £25. Looptester Robin, £60. Oscillator HP-209A, £20. Scope calibrator, £75. 01684 295 189 (Tewkesbury).
E-mail: absnow@absnow.freeserve.co.uk
MOSLEY TA-33JR, £80. 01639 630 880 (Neath).
E-mail: gw3wwn@onetel.net.uk
NEW ratchet winch 1400lb, £25. Ditto 1200lb, £20. 4 new alloy poles, £25 ea. Turnbuckles guy rings, mast fittings, bag ferrite rings etc, de luxe G5RV unused, 30A PSU, £30. 01446 413 379 (Barry).
PMR Messenger modified 70MHz, man, 3 channels, £30 ono. FT-690 Mk1, Nicads charger, man, case, £160 ono. *HRT* CTCSS tone burst, £10. 6m pre amp (Spectrum Communications) £15. Low pass filter 6m, £5. Trevor. 01922 451 797 (Aldridge).
RACAL rcvrs RA-1792 exc cond, stored, £650. RA-1771 pristine, £300. Ditto RA-1771 U/S, spares or repair, £200. RA-1772, the classic, £450. One set h/books RA1771/72, £60.

Redifon R550 gen cov rx, £100. Buyer inspects and collects please. 01869 242 613 (Bicester).

ROTATOR Kenpro KR-600RC with mast clamps, controller, manual, good cond, £120 ono.01656 653 585 (Bridgend).

SELLING up, FT-757GX, PSU, ATU, accessories, £330. Kenwood TS-440S, Auto-ATU, PSU, £375. FT-290, £175. KDK-2830 2m mobile, £125. Yaesu FRG-9600 rcvr all/mode HF/VHF/UHF, £180. FT-707 tcvr, £80. Blackstar Meteor 1000 freq counter, £30. Telewave 44A throughline, £40. Swiftech M198 marine portable, £80. Navico RT-6500 marine base, £80. Daiwa CN-620A cross-needle SWR/pwr meter, £30. In-line bridge, £5. Samplex PSU 14A, £10. 1kW HF linear, all-band, £100. 01909 478 060 (Worksop).
E-mail: grahamjbarker@yahoo.com

SILENT key sale. Kenwood TS-870S, £775. Yaesu FT-726R, c/w 2m, 70cm, 6m modules, £525. Kenwood TS-140S, £295. Kenwood TS-130SE, £195. Yaesu FT-200 & spkr, £125. Pakratt 232MBX, £150. Daiwa ATU, CNW-419, £100. Other items - please telephone for details. Gordon, G3LZT, 01299 402 274 (Nr Kidderminster).

SILENT key sale. R4-vertical, £40. AKD – 7003, £70. Heathkit CR bridge, £10. Topward 1GHz counter, £50. Marconi TF-995 sig gen, £50. Cushcraft 144MHz Ringo-Ranger, £25. HB9CV 144MHz, £5, 432MHz colinear, £10, Deecom 144MHz mag-mount, £20, Ever-Ready vintage valve radio, £50. BNOS 2m 100W linear, £80. Bencher paddles, £50. PK-44 keyer, £20. PO/BBC phones, £10, Tandy DX-394, £70. Yupiteru YP-7000, £70 and assorted scanners, POA. SAE to G3OOU, QTHR, 01737 552 170 (Coulsdon).
E-mail: bccmburns@cs.com

SILENT key sale. Yaesu FT-1000 HF tcvr 200W, £1000. Yaesu FT-290R tcvr 2m, £130. Kenwood TS-440S tcvr, £400. Ten-Tec Corsair HF tcvr Mk 2, £250. Ten-Tec ATU 4229, £100. 3A PSU, £10. 40A PSU, £70. Weltz SP-15m SWR/power meter1.8 > 150MHz, £35. Micro Modules 2m linear, £35.Tono 550 data terminal, £30. Weston Penetrator 3-ele beam 10-15-20m, £60. Super Star CB, £100. 01903 234 347 (Worthing).

SINCLAIR Spectrum, keyboard ribbon, 6 packs, 6 interfaces, printer Alphacom 32, sound amp, fax board, microdrive, 5-81 papers, 6K overlays, RS 232 interface, 13 keyboards, 4 Spectrum+, Pascal Devpal, Currah M speech, TV-A stuc unit, DKtronics keyboard, VTX-5000, Alphacom 32 printer and 20 books, £60. 020 8374 9070 (London).

SPECTRUM analyser Systron Donner, model 751, 10MHz, 10GHz with man, £375. Chris, G4IOK, QTHR, 01993 704 867 (Witney).
E-mail: chris@marshall-family.fsnet.co.uk

STAINLESS steel mast, two sections 10ft long 1$^3/_4$in into 1$^1/_4$in and guy ring, £30, MFJ-949D De Luxe Versa Tuner, £75. Max, G3BSK, 0121 744 4671 (Birmingham).

SUPER bargain Kenwood TS-950 SD digital HF 150W tcvr, internal ATU etc. excellent condition, boxed, instruction book & mic, £500. Ex Army Crystal Calibrator No.10, instructions, offers? Silent key sale, non smoker, buyer collects or arranges carriage, GM4FSB, QTHR. Phone evenings 1800-2200. 01382 543 069 (Newport).

TEN-TEC Corsair, £285. Argosy 525D 250Hz and 2.4kHz filters, £195. Navico 1000S 2m FM, £95. Datong D-70 Morse tutor, £28. Lowe HF-225 rx, £110 with keypad, PSU. Advance SG-62B sig gen 1.8-220MHz all with manuals. 01656 653 342 (Bridgend).
E-mail: gw3mfy@btinternet.com

TEN-TEC Pegasus 550 computer control HF radio, 100W all mode, key pad tuning knob and mic in a mint condition box, easy to work, £500, call G0UUT, 01603 742 733 (Norwich).
E-mail: g0uut@arrl.net

TM-G707E mint condition, boxed, £200. 01329 234 958 (Fareham).
E-mail: macg0rpk@lineone.net

TRANSVERTER 10m to 6m complete kit inc instructions by circuit, few parts mounted and tested OK, good club project, £20. 01656 653 585 (Bridgend).

TRIO 711E all mode 2m base rig, mic, man, original packing. Thrice leading low power station 2m Fixed/AFS contest! £400 plus carriage. Also Palomar PK44 keyer for dual paddle key, £40. Reason for both sales - now have TS2000! 01273 844 951 (Brighton).
E-mail: lenkillip@argonet.co.uk

TRIO TR-9130 2m multimode, 25W, mic and man, mobile mount, £150. PSU 6A, £10. 2m halo and ¼ wave and coax FOC. Buyer collects. G0WQC, QTHR. 01959 522 818 (Kent).
E-mail: johnk@globalnet.co.uk

YAESU FT-101EE working order, used base station carton, man, leads, very good appearance, offers invited. 01723 362 537 (Scarborough).

CONGRATULATIONS

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

50 years		*60 years*	
G3FAU	Mr V Cundall	G2FWZ	Mr S I Biggs
G3HVX	Mr W H Wells	G2FXZ	Mr J B Hodgetts
G3KHR	Mr J W Fox		
G3MZO	Mr D Rosen		

YAESU FT-101Z HF tcvr. Boxed/mans, Daiwa DK200 keyer, Kent paddles, boxed/new, maritime fist key, ATU, GDO & SWR meter, books plus more! All in excellent condition and all for £280 ovno. 01442 397 532 (Herts).
E-mail: kevin.hoare@ntlworld.com

YAESU FT-200 with power supply, man, ext spkr mic, £75. Buyer to collect (Suffolk). M0BJR, 01728 638 639 (Nr Framlingham).

YAESU FT-530 dual-band h/held, boxed, as new, three nicads, spkr mic, £160. Alinco 70cm mobile DR-430, boxed, as new, £160 inc p&p. 01827 58004 (Tamworth).
E-mail: g1ygj@talk21.com

YAESU FT-736R 2m 6m 70cm, mint condition, £650. Linear Amp UK Discovery 2m mint condition, under 12 months old, £950. Linear Amp UK Discovery 6m mint condition, under 12 months old. Tonna 6m 5-ele beam never been used, still in box, £40. 01905 23306 (Worcester).

YAESU FT-757 GX11 HF tcvr, £280. Matching FC-757 AT auto ATU, £120. FT-840 HF tcvr, £400. All in good cond. 01580 883 300.
E-mail: jeffb@bruderhof.com

YAESU FT-757GX 100W AM/SSB/CW, general coverage rcvr, auto keyer, mic, excellent condition, boxed, man, original owner, suit foundation licensees, £200. 01684 562 552 (Malvern).
E-mail: peter.bolton3@btinternet.com

YAESU FT-840 CW/narrow filter, h/book, mic, mint, can deliver 150 miles, £395 ono. G3SQV, QTHR, 01509 814 762 (Loughborough).
E-mail: maurer34@aol.com

YAESU FT-840, fitted CW filter, man, boxed, £425. FT-290 RII, man, boxed, £225. Both in excellent condition. Ron, G0WUZ, QTHR. 01279 437 320 (Harlow).
E-mail: ronrous@lineone.net

YAESU FT-920 HF/6m tcvr, FM unit, CW filter, boxed, man, exc cond, £725, inc carriage. AEA Morsematic MM2 memory keyer, man, £45. Wanted 4m solid-state linear BNOS MM etc. 01751 476 380 (Pickering).
E-mail: phil.catterall@ntlworld.com

YAESU VX-1R h/held 2m 70cm wideband FM rcvr as new, boxed, plus accessories, £80. 01895 236 397 (Uxbridge).

YAGI 9-ele 2m antenna surplus to requirements. Would suit Novice or club station. Purchaser to collect, £10 ono. 01274 682 991 (Bradford).
E-mail: walanj@supanet.com

WANTED

EARLY crystal and one valve sets wanted, all early valve equipment is of interest inc valves, speakers, components and catalogues. Very keen for early Marconi items, still want a good Hallicrafters SX-42 or similar top-end valve comms rcvr. G4ERU, QTHR, 01202 510 400 (Bournemouth).

KENWOOD ATU AT-130, Hamm M rotator any condition. 01954 206 029 (Cambridge).
E-mail: howardjames2@ntlworld

4m module for Yaesu FTV-901R tvtr mainframe. Other 4m tvtrs with 10m or 2m IF considered. 01202 460 174 (Poole).
E-mail: g0faj@freenet.co.uk

50MHz receive converter, LF impedance bridge. G3PAI, 01394 460 298 (Woodbridge).
E-mail: word.factory@zetnet.co.uk

AEA memory keyer model MM3. Larry, G0IKE, 01494 441 037 (High Wycombe).
E-mail: larryd@dodsonl.fsnet.co.uk

ALTRON mast CM35, wall mounted with rotator, 10, 15, 20m mini beam, £350, you collect. 01702 230 133 (Southend on Sea).

ATARI ST or STE computer. I will pay for a working model. Ask for Victor. 01297 23421 (Seaton).
E-mail: victor@vmcclure.freeserve.co.uk

AVO coil winder or similar machine capable of winding small mains transformers. G3WCE, QTHR, 01692 538 794 (North Walsham).

CALLBOOKS 50s or early 60s for research project. Any early radio-related books or written items considered also.01789 296 342 (Stratford upon Avon).
E-mail: g0rep@otterburn2.freeserve.co.uk

COLLINS S-line equipment, 75S-3B/C, 312B-4, 30S1 etc. Must be clean cond. Would consider non-working units, WHY? Also AM and CW filters for Drake R4C rcvr. G3GGK, QTHR. 01954 210 374 (Cambs).
E-mail: peter@g3ggk.freeserve.co.uk

DIGITAL readout for Yaesu FT-7B also 4m linear 50-100W out. GW4IIL, QTHR, 07771 872 838 (Tregaron).

DISABLED fan of old days seeks unwanted QSLs, log books etc. Also *SWM* and *CQ* pre 1970, *QST* pre 1951, RSGB pre 1950. Mike, 8 Windsor Road, Reydon, Southwold, Suffolk, IP18 6QX

DRAKE R-4C with Sherwood filters, consider with T-4XC Collins 75S-3B with CW filter(s). Any old Collins equipment, advertising material, handbooks and memorabilia, also large VHF transmitting valves. 01362 688 430 (Norwich).
E-mail: g3zig@freenet.co.uk

EDDYSTONE 504 rx, Eddystone die-cast speakers, both sizes, angled mounting blocks. GW6AYM, QTHR. 01792 232 782 (Swansea).

EDDYSTONE rcvrs 556, 710, 850, 870, 880, 960, 730 and 720. Prefer fully working models but any condition considered. Also Eddystone accessories, speakers, panadapters, especially panadapters EP961A and EP1061. Also 1990R synchroniser. If it is Eddystone them I am interested. 01335 360 755 (Ashbourne).
E-mail: g8ebm@compuserve.com

INFORMATION wanted for Icom 707. I have man, but which country was it designed for, what year made and what model precedes IC-707? Any comments on performance. Replies QTHR, current call book or phone after 7pm. All costs reimbursed. Malcolm, G4APF, 01803 528 128 (Paignton).

MFJ ATU, must be in good condition plus instructions, all types considered. Phone Ron (pensioner), G0NXC, 0191 586 6383 (Peterlee).

MORSE keys wanted by private collector. All types of straight and bug keys, galvanometers, relays, sounders, all telegraphy-related items, also heliographs, anything considered. Gerald, 01189 834 307

PLUG-IN coils or blank coil forms for National FB7/FB-XA rcvr. I would be interested in a complete FB7/FB-XA with coils. 01786 811 237 (Stirling).

POLAPHASER and commercially-made phasing harness for 70cm and FT-747 FM board all wanted. Bill, GM0NRT. 01224 591 606 (Aberdeen).
E-mail: bill@bcardno.freeserve.co.uk

R1155 and/or T1154 would prefer in original or working order for collector, also handbooks. Contact by e-mail or phone. 01988 403 364 (Wigtown).
E-mail: weebooks@globalnet.co.uk

RACAL RA 1795 scrap or non-worker for spares. Any cond, will collect, pay cash WHY? Thanks, Jake Adamson, 01304 373 788 (Dover).

ROTATOR G-400 or KR-400, also Woden mains transformer type SRS/152/T 670-0-670V at 160mA. Only this one will do. Details to Dennis, G3UVR, 0151 342 7880.
E-mail: g3uvr@qsl.net

SANYO AC adapter VAR30B for video camera also MD-1C8 desk top mic for FT-990. Please phone evenings, thanks, Keith, 01524 781 946 (Carnforth).

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

STAMPS. If you have radio amateur or Great Britain stamps, I will buy them, G4ABT, QTHR. 0115 923 0205.
E-mail: g4abt@yahoo.com

TCS 12, coils for HRO senior, DX100. 01904 708 704 (York).

TRIO JR-310 HF rcvr, good working order c/w manual. 01224 735 321 (Aberdeen).
E-mail: allanchalmers@hotmail.com

VLF Radio Engineering, author Watt, published by Pergamon. Mr Wilson, 30 Glencoe Avenue, Ilford, Essex IG2 7AN.

WANTED Trio tx T-599, also probe for use with Marconi sig gens 2016. GM8MLH, 01838 200 304 (Dalmally).

WEFAX ICS HF to fax converter. Please contact Nigel, G4PJJ, 01452 750 128 (Gloucester).
E-mail: g4pjj@tudor-cottage.fsnet.co.uk

WESTERN PM-2000A peak reading watt meter. SG-500 smart power cube. Remote head bracket mount for SG2000. Please contact GU0HRY, QTHR, 01481 263 489 (Guernsey).

WINDING machine suitable for mains transformers. Someone must have one! Any help appreciated. G3WCE, 01692 538 794 (North Walsham).

X7 beam antenna, could dismantle and collect. Please contact Chris Quarton, G0WOT, 07790 616 783 (York).

YAESU SP-901P phone patch speaker for my 902DM station or FV-9901DM external VFO or YO-901 multiscope, must be vgc and working order, thanks, John, 01366 378 870 (Downham Market).

Rds & Events

1 DECEMBER 2001

RSGB ANNUAL GENERAL MEETING - Strathclyde Fire Brigade Headquarters, Hamilton. Starts at 11am. Refreshments and hot food available. RSGB, 0870 904 7373.

5 DECEMBER 2001

SURREY IEE MEETING - Wates House, University of Surrey. 7pm,free admission. 'The Rise and Fall of the Decca Navigator System', by Walter Blanchard, G3JKV. Stewart, G3YSX, sfbryant@iee.org

8 DECEMBER 2001

WORCESTER Radio, Electronics & Computer Rally - Perdiswell Leisure Centre, Bilford Road, Worcester. OT 10am, £2. CP free, TI on S22, TS, FM, SIG, LB, C, WIN. John, G8MGK, 01527 545 823 or 07762 203 355. [www.qsl.net/gb2tcr]

16 JANUARY 2002

SURREY IEE MEETING - Wates House, University of Surrey. 7pm, admission free. 'The Small Antenna Controversy', by Prof Mike Underhill, G3LHZ. Stewart, G3YSX, sfbryant@iee.org

20 JANUARY 2002

OLDHAM ARC Rally - Queen Elizabeth Hall, Civic Centre, West Street, Oldham. OT 10.30/11am. TS, B&B, MT (two photos required), TI on S22 via GB4ORC, C, CP free. Steve, 01706 848 092 or m5aeg@btinternet.com

23 JANUARY 2002

SURREY IEE MEETING - Theatre M, University of Surrey. 7pm, free admission. 'UK Space Electric Propulsion', by Richard Blott and Neil Wallace, DERA Farnborough. R Longman, e-mail rlongman@iee.org

27 JANUARY 2002

FENLAND RG Horncastle Amateur Radio Rally - The Old School, Cagthorpe, Horncastle, Lincs. OT 10.30am, £1. C, MT. 01526 860 320 or 07778 274 535. [www.fenlandrepeater.org.uk]

30 JANUARY 2002

SURREY IEE MEETING - Theatre M, University of Surrey. 7pm, admission free. 'Channel Tunnel Fire', by Colin Kirkland, OBE. R Longman, e-mail rlongman@iee.org

3 FEBRUARY 2002

SOUTH ESSEX ARS Rally - The

Paddocks, Long Road, Canvey Island, Essex (at the southern extremity of the A130). OT 10.30am. Radio, computer and electronics, CP free, DF, C (home-made), MT (two photos needed), but book before midday, please. Brian, G7IIO, 01268 756 331. [www.southessex.ars.btinternet.co.uk]

10 FEBRUARY 2002

CAMBRIDGE & DISTRICT ARC Annual Radio & Computer Rally - Lordsbridge Arena, Wimpole Road, Barton, near Cambridge. From M11 jn 12 (A603) follow signs. OT 10am, £2, disabled £1.50, with concessions. CBS, B&B, C, LB, CP free. John, G0GKP, 01954 200 072 or j.bonner@ntlworld.com

HARWELL ARS Radio and Computer Rally - Didcot Leisure Centre, Mereland Road, Didcot, signposted from A34. OT 10.15/10.30am, £1.50. TI on S22, CP, TS, B&B, SIG, LB, C, DF. Ann, G8NVI, 01235 816 379 or ann.stevens@btinternet.com

11th NORTHERN CROSS Radio Rally - Thornes Park Athletics Stadium, Wakefield, W Yorkshire. Just out of town on the Horbury Road. Easy access from M1 jns 39 and 40 - well signposted. OT 10.30/11am. TI on 2m and 70cm, B&B, MT (two photos required). John, G7JTH, 01924 251 822 or e-mail g7jth@wdrs.org.uk [www.wdrs.org.uk]

24 FEBRUARY 2002

SWANSEA ARS Amateur Radio & Computer Show - Swansea Leisure Centre, on the Swansea-Mumbles A4067 coast road. OT 10.30am. TS, B&B, TI on S22 via GC4CC, LB, C. Roger, GW4HSH, 01792 404 422.

6 MARCH 2002

SURREY IEE MEETING - John Stevens, e-mail jstevens@iee.org

17 MARCH 2002

BREDHURST RECEIVING & TRANSMITTING SOCIETY Rainham Radio Rally - Martin, M0AAK, 01634 365 980 or martinm0aak@yahoo.co.uk [www.the-brats.com].

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

20 MARCH 2002

SURREY IEE MEETING - Abhaya Sumanasena, e-mail abhaya@iee.org

23 / 24 MARCH 2002

LONDON COMMUNICATION & COMPUTER SHOW RadioSport 01923 893 929. [www.radiosport.co.uk]

6/7 APRIL 2002

RSGB Spring Radio & Computer Show (incorporating **RSGB National VHF Convention**) - Jan, 0870 904 7377.

7 APRIL 2002

45th NORTHERN MOBILE RADIO & COMPUTER FAIR - Gerald, G0UFI, 01765 640 695. [www.harrogaterally.co.uk]

18 APRIL 2002

WORLD AMATEUR RADIO DAY 2002 - theme 'Amateur Radio: continuing innovation in communications technology'.

21 APRIL 2002

YEOVIL & DARC 18th QRP CONVENTION – Derek, M1WOB, 01935 414 452, m1wob@tiscali.co.uk

27 APRIL 2002

CORNISH RADIO AMATEUR CLUB International Marconi Day - John, G4LJY, QTHR.

28 APRIL 2002

ALDRIDGE & BARR BEACON ARC Surplus Radio & Electrical Sale - John, G0SWZ, 01922 548 014.

6 MAY 2002

DARTMOOR RADIO CLUB Radio Rally - Ron, G7LLG, 01822 852 586.

MID-CHESHIRE ARS Rally - Civic Hall, Winsford. OT 10.30/11am. C, CP. David, G4XUV, 01606 77787.

11 MAY 2002

YORKSHIRE DX CLUSTER SUPPORT GROUP Rally - John, G3LZQ, g3lzq@john-dunnington.freeserve.co.uk

19 MAY 2002

MIDLAND ARS Drayton Manor Radio and Computer Rally - Peter, G6DRN, tel: 0121 443 1189 (evenings).

22 MAY 2002

SURREY IEE MEETING - R Longman, e-mail rlongman@iee.org

26 MAY 2002

SPALDING & DARS Annual Rally - Ray, M0CTM, 01775 711 953, or John, G4NBR, 07946 302 815. [www.sdars.org.uk]

WEST MANCHESTER RADIO CLUB 6th Red Rose QRP Festival - Les, 01942 870 634 or e-mail g4hzj@btinternet.com

5 JUNE 2002

SURREY IEE MEETING - John Stevens, e-mail jstevens@iee.org

16 JUNE 2002

EPSOM Radio & Electronics Fair - Paul, M0CJX, m0cjx@lineone.net

NEWBURY & DARS Boot Sale - Mark, M0CUK, 01635 36444. [www.nadars.org.uk]

23 JUNE 2002

MID-LANARK ARS Scottish Convention - Elvin, GM8BBA, 01698 748 616 or e-mail elvin8bba@blueyonder.co.uk

30 JUNE 2002

CITY OF BRISTOL RSGB GROUP Longleat Amateur Radio & Computer Rally - Ron, G4GTD, 0117 985 6253 or ronford@g4gtd.freeserve.co.uk [www.longleatrally.co.uk]

KEY

Rallies & Events

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

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.

3 Dec	GB4YOU: Youlbury Scout and Guide Radio. Oxford. TLH27P (G0RJX) GB4YOU: Youlbury Scout and Guide Radio. Oxford. TLH27P (G0REL)
8 Dec	GB2DX: DX. Ormskirk, Lancs. H (G4NXG) GB2RAF: Royal Air Force. Neatishead, Norfolk. LH2 (G4PSH) GB2TCR: Three Counties Rally. Worcester. 2 (G3EVT)
14 Dec	GB2HTC: Hampshire Technology Centre. Winchester, Hampshire. (G0VNI)
31 Dec	GB4YOU: Youlbury Scout and Guide Radio. Oxford. TLH27P (G0RJX) GB4YOU: Youlbury Scout and Guide Radio. Oxford. TLH27P (G0REL)

Regional and Club News

Club NEWS

Region1: Scotland West & Western Isles

PAISLEY (YMCA) ARC

12, Party night. 26, No meeting. Jim, GM3UWX, 01505 862817.

Region 2: Scotland East & the Highlands

COCKENZIE & PORT SETON ARC

7, Normal club night. Bob, GM4UYZ, 01875 811723.

LOTHIANS RS

12, PSK31, Brian Howie, GM4DIJ. Peter, 0131 446 0155.

Region 3: North West

MID-CHESHIRE ARS

5, HF on air. 12, AO-40 update, Martin, G0CZD. 19, Wine & cheese evening. 26, No meeting. Niall, G0VOK, 01606 871413.

STOCKPORT RS

4, 18, Skills meeting. 12, AGM. David, M1ANT, 0161 4567832.

THORNTON CLEVELEYS ARS

3, Software hands-on. 10, Meteorology, Mick, G4EZM. 17, Christmas party. E-mail: Jack, G4BFH, jack@jduddington.fsnet.co.uk

WARRINGTON ARC

4, Topband transceiver tune-up session, by George, G3OGQ. John, G0RPG, 01925 762722.

Region 4: North East

DENBY DALE ARS

5, Christmas party. Tony, G4LLZ, 01484 664 360.

FINNINGLEY ARS

4, Committee meeting. 13, Christmas dinner. Eric, G3KPU, 01302 840166.

GOOLE R & ES

7, Fund-raising night at *Barnes Wallis Inn*. 14, Courtyard. 21, Pub night at *Barnes Wallis Inn*. 28, GRES Christmas party. Richard, G0GLZ, 07867 862169.

GRIMSBY ARS

6, Party night. Brian, G4DXB, 01472 231383.

HALIFAX & DARS

18, Christmas buffet and quiz with guests from Keighley club. R E Nolson, G0PMU, 01274 600297.

HORNSEA ARS

5, Anniversary meal. 12, 30 years of Hornsea ARS, G3TLI. 19, How I got into amateur radio (round table). Andy, G0VRM, 07050 287279.

Region 5: Midlands

ALDRIDGE & BARR BEACON ARC

19, Christmas lunch. Charles, G0NOL, 01922 636162.

BROMSGROVE ARS

11, Final meeting of the year. Angus, G8DEC, 01257 875573.

BROMSGROVE & DARC

30 Nov, Talk by Rob Yarnold, G6DOC, of BBC Hereford & Worcester. Jon Noel, M5DRW, e-mail: M5DRW@ninja.demon.co.uk

COVENTRY ARS

7, On air, Novice class, CW practice. 14, Christmas social (venue TBA). 21, On air, Novice class, CW practice. 28, No meeting. John, G8SEQ, 024 76273190.

GLOUCESTER AR & ES

3, 'The Year in Question'. 10, On air. 17, Christmas buffet. Tony, 01452 618930.

HEREFORD ARS

21, *Station X* video part 1. Mike, G0WZY, 01981 251743.

KIDDERMINSTER & DARS

4, Christmas social evening. Tony, G1OZB, 01299 400172.

LEICESTER RS & CC

3, Activities HF, VHF and computers. 10, Quarterly progress meeting & usual activities. 17, Mince pies & sherry night. 24, 31 - closed. Stan, G3HYH, 0116 2242598.

LINCOLN SW CLUB

5, G5FZ on air. 12, Committee meeting. 15, Annual dinner. John, G1TSL, 01522 793751.

LOUGHBOROUGH & DARC

4, Working with weak signals, Art, G3KWY. 11, Corgi & EFI model

collection, Ian, G8SNF. 18, Christmas fun quiz and drink. Chris, G1ETZ, 01509 504319.

MAXPAK

3, Christmas get-together. G4GSB, tel: 01952 585447, or e-mail: milesclifford@aol.com

MID-WARWICKSHIRE ARS

11, Christmas meeting and party. Bernard, M1AUK, 01926 420913.

RAF WADDINGTON ARC

6, RAE course. 13, Christmas dinner. 20, 27, RAE course. Bob, G3VCA, 01522 528708.

RUGBY ATS

4, 11, 18 TBC + 5WPM Morse practice. Tony Humphries, G0OLS, 01455 552519, e-mail: THumph3426@aol.com

SHEFFORD & DARS

6, Inter-club quiz night. 13, Chairman's mince pie evening. Derek, G4JLP, 01462 851722.

SOUTH NOTTS ARC

5, On air HF & VHF. 12, Open forum (members only). 19, Sherry & mince pies. 21, Club Christmas dinner (venue TBA). 26, Closed. Tel: 01509 569679.

STRATFORD UPON AVON & DRS

10, Official shack opening & Building a pocket linear, Bob Whelan, G3PJT. 24, Social get-together. David, 07970 148204.

TELFORD & DARS

5, Open evening, on air, committee. 12, 10-minute topics. 19, Annual dinner (TBC). Mike, G3JKX, 01952 299677.

Region 6: North Wales

ABERYSTWYTH & DARS

12, Waunfawr Hall, talk and teacakes. John, GW6IDK, 01970 890657.

Region 7: South Wales

No club details submitted.

Region 8: Northern Ireland

No club details submitted.

Region 9: London & Thames Valley

AYLESBURY VALE RS

12, Mince pies and discussion evening. Roger, G3MEH, 01442 826651.

BRACKNELL ARC

12, Quiz night with guest club team. johnellerton@beeb.net

CHESHAM & DARS

5, General Meeting. 12, Christmas quiz: bring 10 questions with you! 19, Christmas gathering at Sue's. Terry, terence.thirlwell@eds.com

CHESHUNT & DARC

5, Marconi's first DXpedition? G3WFM. 19, Christmas get-together. John, G3WFM, 01707 651532.

COULSDON ATS

10, AGM. Steve, G7SYO, 01737 354271.

CRAY VALLEY RS

6, Chairman's Christmas feast. 22, No meeting. Bob, BRS32525, tel: 020 82657735 after 8.00pm and weekends.

CRYSTAL PALACE & DRS

5, SWR bridge project. 21, Christmas meeting. Bob, G3OOU, 01737 552170 or Victor, 020 86532946.

DORKING & DISTRICT RS

7, Annual dinner. 18, Christmas social. John, G3AEZ, 01306 631 236.

ECHELFORD ARS

13, Christmas party. Robin, G3TDR, 01784 456513.

EDGWARE & DARS

13, Junk sale. David, G5HY, 01923 655284 (days) / 020 89549180 (eve).

HORSHAM ARC

6, AGM. David, G4JHI, 01403 252221.

MAIDENHEAD & DARC

6, 'The PicATUne', Paul Berkeley, M0CJX. 18, Quiz and construction contest. John, G3TWG, 01628 525275.

RS OF HARROW

7, QSOs in foreign languages. 21, Christmas social. Jim, G0AOT, 01895 476933 / 020 7 2786421.

READING & DARC

13, AGM. Pete Milton, G8FRC, Peterw.Milton@btinternet.com

SILVERTHORN RADIO CLUB

21, Christmas party (TBA). David, G0KHC, 020 85042831.

STEVENAGE & DARS

4, 2m operating. 6, Inter-club quiz with Shefford & DARS. 11, Grand Christmas party. Peter, 2E1CRK, 01462 637404.

SURREY RADIO CONTACT CLUB

3, The M2000A Millennium station, Bob Treacher, BRS32525, & team. Ray, G4FFY, 0208 6447589.

VERULAM ARC

17, 'Bunfight'. Walter, G3PMF, 01923 262180.

WELWYN-HATFIELD ARC

3, AGM. 17, Christmas 'bunfight'. dean@g3wgc.freeserve.co.uk

Region 10: South & South East

CRAWLEY RC

7, Crawley fish and chip supper. Derek, G3GRO 01293 520 424.

FAREHAM & DARS

5, A contest-grade RTTY station, Andrew, G0AMS. 12, Display technology, John, G6BHB. 19, Mince pies & 5-minute talks. 26, No meeting. Steve, G7HEP, 01329 663673.

HARWELL ARS

11, AGM. John, G6LNU, 01235 223250.

HORNDEAN & DARC

4, Social evening. 25, No meeting. Stuart, G0FYX, 023 92472846.

ITCHEN VALLEY RC

14, Christmas social. Mike, G6AIQ, mamjh@yahoo.com

MID SUSSEX ARS

7, Christmas dinner. 14, Quiz and microwave evening. Geoff, G6MJW, 01273 845103.

OXFORD & DARS

13, Christmas social. Dave, G3BLS, 01865 247311.

SOUTHDOWN ARS

3, Christmas social, quiz night. 6, G0DOF 2m Contest and activity night. John, G3DQY, 01424 428064.

SWINDON & DARC

6, Looking at HF aerials, Bob Henly, G3IHR. Den, M0ACM, 01793 822705.

TROWBRIDGE & DARC

5, Christmas party & presentation night (visitors welcome: please contact Secretary). 19, Farewell 2001. Ian, G0GRI, 01225 864698 E / W.

WORTHING & DARC

5, Discussion evening. 12, Christmas quiz evening. 19, Christmas party & awards. Roy, G4GPX, 01903 753893.

Region 11: South West & Channel Islands

APPLEDORE & DARC

10, Club Christmas party. Brian, M0BRB, 01237 473251.

CITY OF BRISTOL RSGB GROUP

10, Grand Christmas Party at Arno's Manor Hotel, Brislington, Bristol. Details / bookings: Ron Ford, G4GTD, 0117 985 6253.

CORNISH RAC

6, Christmas party in football club. Robin, G0MYR, 01209 820118.

NORTH BRISTOL ARC

7, Committee meeting. 14, Christmas party. John, G3IZM, 01179 572176.

SOUTH BRISTOL ARC

5, Open house: 'see amateur radio', Muriel, G4YZR. 12, Christmas social, Muriel, G4YZR. 19, Greetings messages from GX4WAW. Len, G4RZY, 01275 834282.

YEOVIL ARC

6, 1920s radio stations, G3MYM. 13, The Marconi 1901 trans-Atlantic tests, G3MYM. 20, Mince pies on the air. 27, On air. Derek, M1WOB, 01935 414452.

Region 12: East & East Anglia

BRAINTREE AR & COMPUTER COMMUNICATIONS CLUB

3, Digital cameras, 17, Christmas party. Ron, G4JIE. Keith, M0CLO, 01376 347736.

BROMLEY & DARS

18, Members' short talks & mince pies. Alan, G0TLK, alangm2@clara.net

CHELMSFORD ARS

4, Kitmaster, David Mageehan, M1CZY. 8, Marconi celebrations in Chelmsford High Street. 12, Marconi 100 year anniversary special event stations, Sandford Mill and Marconi House, Chelmsford. 13, Christmas dinner at *White Horse*, Pleshey. David Bradley, M0BQC, 01245 602838.

FELIXSTOWE & DISTRICT ARS

10, Christmas video & mince pies. Paul, G4YQC, 01394 273507.

GREAT YARMOUTH RC

14, Christmas party. A D Besford, G3NHU.

HARWICH AR INTEREST GROUP

12, AGM & Christmas party. Eugene, G4FTP, 01206 826633.

IPSWICH RADIO CLUB

5, Quiz vs HARIG, quizmaster Paul, G4YQC. 19, Christmas drink & chat. Keith, G7CIY, 01394 420226.

LEISTON ARC

4, Christmas dinner. Lisa, 2E1HBF, 01728 833202.

MAIDSTONE YMCA AMATEUR RADIO SOCIETY

7, Social evening. 14, RAE receivers. 21, 28, Closed. Andy, M0CST, 01622 661035.

NORFOLK ARC

5, Morse practice and instruction. 12, Christmas dinner (bookings with John, G0VZD). 19, Morse practice and instruction. 26, No meeting. Peter, G3ASQ QTHR.

SUDBURY & DISTRICT RADIO AMATEURS

4, Quiz with mince pies and sausage rolls. Bryan, G1TWY, 01787 247893.

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*.

CLUB NEWS IN BRIEF

Tim, M0ACV, and Mike, G0NRK, operating GB2EVR from a brake guard's van on the rails at the Eden Valley Railway in Warcop, Cumbria, 30 September.

SUPPORT FOR USA

THE QRZ Amateur Radio Group of Sussex will be putting on a special event station from 1800UTC on Friday 23 November until 1800UTC on Sunday 25 November from its club rooms at Herstmonceux Science Centre. The callsign will be GB4ISE, standing for International Support Event.

The purpose of the event is to allow amateurs around the world to express their support for the work of American amateurs who helped provide emergency communications, often in harrowing situations, following the terrorist attacks of 11 September. A copy of the event log will be presented to the ARRL as a token of the club's own support. Further details can be obtained from tel: 01435 863020 or e-mail: qrz@jandc.demon.co.uk

Region	RSGB Regional Manager
1. Scotland West & Western Isles	John Martindale, GM4VPA
2. Scotland East & the Highlands	Tommy Menzies, GM1GEQ
3. North West	Kath Wilson, M1CNY
4. North East	Geoff Darby, G7GJU (temp)
5. Midlands	Vacant
6. North Wales	Liz Cabban, GW0ETU
7. South Wales	Simon Lloyd Hughes, GW0NVN
8. Northern Ireland	Jeff Smith, MI0AEX
9. London & Thames Valley	Roger Piper, G3MEH
10. South & South East	Ivan Rosevear, G3GKC
11. South West & Channel Islands	Richard Atterbury, G4NQI
12. East & East Anglia	Malcolm Salmon, G3XVV

RSGB Regional Managers in place until 31 December 2001.

LIGHTHOUSE WEEKEND

The Wisbech AREC GB0HLH station at Hunstanton light.

MEMBERS OF the Wisbech Amateur Radio and Electronics Club operated GB0HLH from Hunstanton on the north Norfolk coast during the International Lighthouse and Lightship Weekend in August. The station was located in the club's portable shack on top of the cliffs and adjacent to the cliff-top car park next to the lighthouse, ensuring a steady stream of visitors from the general public. The antenna was an inverted-V supported almost at the top of the lighthouse. A good time was had by one and all and as Pete, M0CNX, says, "Do it again? - See you next year!"

CHELMSFORD FOUNDATION COURSE

THE CHELMSFORD Amateur Radio Society will be running a course for the new **Foundation** licence in January. For further information contact the secretary, David Bradley, M0BQC, tel: 01245 602838; e-mail: DavidWBradley1@activemail.co.uk or visit the club's web site at www.g0mwt.free-online.co.uk/

STOLEN EQUIPMENT

THE NORTH WAKEFIELD Radio Club has had a Yaesu FL-2100Z linear amplifier stolen. It is security marked and has a repair using 'non-standard' components. If you are offered an FL-2100Z and are not sure about its origin, please call Ken, G3SPX, on 01924 824451. The police have been informed.

PETERLEE SHOW 2001

THE PETERLEE Radio Club puts on a special event station at Peterlee Carnival in early September every year. The council provides the radio club with a big marquee and power at a prime location near the main entrance, next to the local dignitaries' reception suite. The club operated as GB0PC for the full 36 hours of the carnival on VHF, UHF, packet and SSTV. Many members of the public visited the station in the marquee and showed an interest in what was going on.

Left to right: Barry, GW4HYZ; John, GW3LDC; Bernard, M0BFL; Roly, G3IYT; Tony G0HND; Derek, G0DRA; Phil, G0DZA, and Merv, GW3VXC: all members of a regular Thursday night 160m (1967kHz) net, who arranged to meet at the RSGB stand at the Leicester Show in September. This was the first time for some of the group to meet: faces can now be put to all the callsigns!

YEOVIL CLUB CELEBRATES MARCONI CENTENARY

YEOVIL AMATEUR Radio Club will be celebrating the 100th anniversary of Marconi's first trans-Atlantic radio reception [see pages 21 / 22 - *Ed*] on 12 December with a special event station and a display of vintage wireless equipment at the club headquarters. Several VIP guests have been invited.

VHF/UHF

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

TROPOSPHERIC conditions have been rather dismal but there was some auroral activity. There were few reports this month and the gales and rain may have affected some stations. 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, (EH), (MK) etc refers to the postcode area and (JN04), for example, is the Maidenhead grid.

PUBLICATION

THERE ARE SEVERAL very interesting articles in the autumn edition of the quarterly magazine *VHF Communications*. Henning Weddig, DK5LV, describes Motorola's Impedance Matching Program (MIMP). This is a DOS program and I downloaded it from Motorola's web site - see the list. This short, self-extracting compressed file is called MIMPZIP.EXE and when expanded will not take up much space on your hard drive. With it you can "...design matching circuits for transistor amplifiers in a very clear manner."

Richard Formato, WW1RF, contributes 'Designing Long Yagis with YGO3', which is another DOS program. To quote, "YGO3 is a *genetic algorithm* (GA), a class of software that stochastically optimises a design problem by mimicking natural selection (survival of the fittest)." This Yagi Genetic Optimiser freeware program can be downloaded in zipped form from the magazine's website - see the list.

Gunthard Kraus, DG8GB, reviews another antenna analysis program available in compressed form. PCAAD21.ZIP can be downloaded from the RFGlobalnet website - see the list - as a 161kB file which expands to 360kB. Gunthard writes that it is very user-friendly and that, "No problems have been detected while operating with Windows 95/98 and using a fast computer." It deals with everything from simple dipoles, through log-periodic antennas, arrays, horns and transmission lines. Andy Barter, G8ATD (QTHR), edits *VHF Communications* and the tel / fax number is 01582 581051.

SOLAR ACTIVITY

THERE WAS A marked increase in solar activity in the 30 days to 9 October compared with the data for the previous 30 days. The solar flux was above 200 units on 21 days, peaking at 283 on 26 September and a record for Cycle 23. The minimum value was 171 on 8 October. This averages out at 224.6 for the period, up by almost 21%. The SESC sunspot number peaked at 320 on 25 September declining to just 99 on 9 October. The average was 222.7, up over 26% on the previous value.

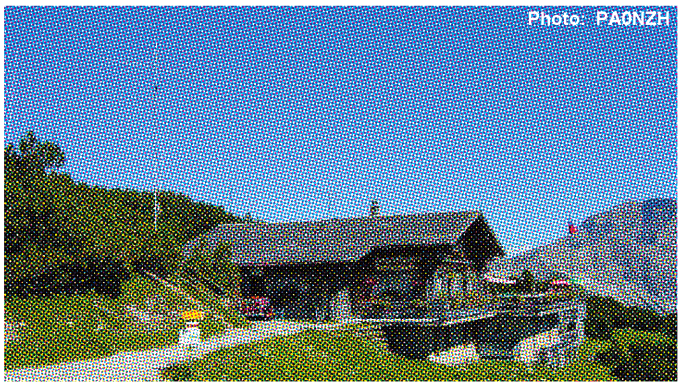
43 new sunspot regions were recorded. The maximum sunspot area in millionths of the Sun's visible disc was 3160 on 24 September, falling to only 590 at the end of the period as the active side of the Sun rotated away. The daily average was 1884. These data seem to confirm that we are enjoying a second peak in Cycle 23 activity. However, space scientists still deem the peak to have occurred in summer 2000.

The daily geomagnetic data from the Space Environment Center (SEC) shows that the middle latitude A-index at Fredericksburg was in double figures on 15 days, values peaking at 24 - 26 in the 1 - 3 October period. At College in Alaska the A-index was in the sub-storm range (21 - 50) on nine days, in the storm range (51 - 80) on two days, peaking at a major storm level of 82 on 2 October, when the K-index reached 8.

The July issue of *The Six and Ten Report* includes the regular table of solar and geomagnetic data covering such parameters as the solar flux, sunspot numbers, Kp, Ap and Aa indices, X-ray background, particle fluences, etc. Then there was a downward trend in flux and sunspot numbers in the month, since reversed.

The comprehensive reports from UK and overseas contributors are collated into tabular form so that readers can see when and to where Sporadic E (Es) and other DX-mode propagation occurred. The *Report* is an activity of the RSGB's Propagation Studies Committee (PSC), and is edited by Dr Steve Reed, G0AEV, and Prof Martin Harrison, G3USF. Subscription inquiries should be addressed to Steve (QTHR) whose e-mail address is g0aev@explore.force9.co.uk

The August edition of *SunMag*, compiled and distributed by Neil Clarke, G0CAS, starts with a two-page 'Glossary of Commonly Used Terms' as used in the weekly GB2RS news broadcasts which Neil compiles. The next three pages are devoted to 'D Region Absorption Documentation' and this will appeal especially to the mathematically minded; fascinating reading. There are the usual daily solar, geomagnetic, particle and sunspot group data and a solar flare list. Contact G0CAS (QTHR) for subscription details, tel: 01302 531925; or



The HB0/PI4TUE DXpedition location, 2000m ASL. On the left is the 2m antenna on HB9QQ's tower.

BEACON IDEAS

THE ULTIMATE DX achievement will be a trans-Atlantic QSO in the 144MHz band by terrestrial mode, ie a one-to-one QSO without any satellite, EME or Internet content. It is likely that suitable tropospheric, possibly Es assisted, conditions have existed in the past, bearing in mind that longer distances have been achieved elsewhere in the world. The main problem is to know when suitable conditions occur.

It is impractical for operators to sit for days on end listening to white noise in the hope of catching an opening. To this end Ev Tupis, W2EV, writes that, "The idea is to establish a network of home-based automated propagation monitors." He explains that such a system is already operational on 28.131MHz using PSK31 modulation and has proved that the concept works.

What happens on 10m is that a station transmits continuously in beacon mode sending the callsign, a six-character code giving the band and station information, and the grid locator. Upon reception, using software called *UI-View*, the transmission is decoded and an icon appears on a map at a location corresponding to the grid. He suggests, "It is now time to begin thinking about setting up on 2m with an eye on the Brendan Trophies."

This is an interesting idea and, for a start, we might consider using this on GB3SSS on 144.407MHz, when it finally comes on stream, which could be monitored with *UI-View* software in North America. He mentions a frequency (QRG) of 144.288MHz but that will not be acceptable in Region 1. More information can be found on the web - see the list.

send an e-mail to: neil@g0cas.demon.co.uk

MOONBOUNCE

FIRST A CORRECTION to the September column due to an ambiguity originating in the July *432 and Above EME Newsletter*. The activity attributed to Peter Blair, G3LTF, was in fact that of Simon Freeman, G3LQR (JO02): apologies to both. Peter was QRV on 70cm on 8 September when Faraday rotation was 90º and very sharp making his echoes inaudible. Around moonrise he completed with VK4AFL, UA3PTW and JA6AHB and next morning with DL9NDD. CWNR were K4EME and KU4F, with K5WXN and UT3LL heard. He then put on the 23cm feed and worked on the 9th K1RQG for initial #178, then F5HRY #179, K2UYH, G4CCH, SM2CEW and OZ6OL. K0YW, IK2MBB, WD5AGO and W7SZ were heard, but he did not mention the modes.

Roy Reed, G3ZIG (JO02), completed on 2m with C31TLT on 14 August after which he went on vacation to Ekaterinburg (UA9) to visit his mother-in-law, family and friends. He had hoped to visit RK9CC, whom he has worked many times on EME, but Stepan was away on vacation. However, he did meet the operators of the University's HF station RK9CWW. On return to Norfolk he participated in the Italian EME Contest making 56 QSOs. Sun noise made conditions difficult at times and there were high winds battering the antenna array. New initials were RA3BA/1, OH3NJC, I5YDI, 9A1CAL and YU7BCL. All those were CW contacts but when he switched on on 7 October he heard I2FAK calling CQ EME on SSB, so he called him and they exchanged RS53 reports each way.

Howard Ling, G4CCH (IO93), was QRV on 23cm in the 6/7 October sked weekend but activity was very low on the Saturday and only slightly up on the Sunday. N7AM* was initial #157. On the 6th he also completed with OZ4MM on CW and SSB and OE9XXI. At 0509 on the 7th three stations called at the same time and he completed with K5JL, DJ5MN, K9BCT, VE6TA, ZS6AXT, N7AM again and IK2MBB all on CW. On the 5th he worked GW3XYW* and OZ6OL*.

More apologies, this time to David Anderson, GM4JJJ. In the October column I wrote that G3ZIG was the only UK station listed in the results of the 144MHz section of the European EME Contest. In fact David was 7th out of 32; I really must get some new glasses! He suggests trying *MoonSked* software, which offers tracking, prediction, and scheduling. Check his web site - see the list.

The first December sked weekend is on 1 / 2 when London latitude stations will have 31.2 hours of Moon time. The declination ranges from +20.54º to +24.21º, the 144/432MHz sky temperature varies between 464/34K and 575/44K and the signal degradation, referred to perigee, ranges from -0.97dB to -0.54dB. The second is on 29/30 weekend when the respective data are 31.7 hours, +22.21º to +24.28º, 575/38K to 408/30K and -0.87dB to -0.45dB.

METEOR SCATTER

THE GEMINIDS shower should be active between the 7 and 15 December and the OH5IY software suggests the peak could be around 0400 on the 14th with a zenithal hourly rate (ZHR) of 118. For stations in mid-UK the radiant is above the horizon from 1630 through midnight to 1230. Reflections are 50% above average for about 30 hours with a steady build up to the peak but a sharp drop off afterwards.

The last shower of the year is the Ursids and the peak should be around 1230 on 22 December. The ZHR is about 10 and the radiant doesn't set. Reflections should be 50% above average for about 12 hours but note that the north / south path is rather poor for this shower.

BAND REPORTS

50MHz

The only report this time is from Ted Collins, G4UPS (EX). In September on the morning of the 2nd he worked S51UF*, S51GW* and S51AP (JN76). Other countries and districts heard were I0, I3, OK2, SM7, T9, YO7 and 9A. In a weak evening opening he contacted LA3IKA* (JO59). From 0958 next morning he worked DJ4AX (JO31) with stations in HB9, S5, SP, YU and 9A heard. On both mornings there was European in-band TV, which faded out around 1230.

Polish stations were copied in the morning of the 9th with DK2JP (JO73) and SP4NI (KO13) worked, signals fading out by 1125. OZ7DX (JO54) was contacted at 0710 on the 13th and Jogg was copied via MS the next morning. Ted was QRT from 16 to 23 September inclusive and from the 24th the only DX worked was OZ7DX again via MS and SM3BIU* at 0708 on the 28th.

Coming to October he reports that G3HBR (HP) had an opening to I and 9H at 1225 on the 2nd. At 1506 Ted heard ZS6PJS* briefly. UT3BW* was copied briefly at 0949 calling CQ. He missed the aurora the next day. At 1349 on the 6th he heard ZS6XJ working a GW station. From 1458 he heard ZS6WB, ZS6XJ and ZS6O working stations to the north of him. There was a good tropo path to OZ7DX at 0713 on the 9th and he was heard again via weak MS next morning.

144MHz

G3LTF operated portable at 1680ft ASL from JN04VB in France in the IARU contest over the 1 / 2 September weekend. Peter ran 20W to a 16-ele Yagi 5m AGL and ODX were G8P at 792km and TK5EP/P at 613km. Conditions were rather ordinary and he found it hard to raise stations in the north of France, LX and PA, as they seemed to be beaming mostly east/west. He visited Graham Daubney, F/G8MBI, and saw his monster 2m Yagi and the 4m dish he is building for 23cm operation.

Bryn Llewellyn, G4DEZ (JO03), reports very poor conditions and just, "The usual DX around 600km on a flat band with the antenna only 10 - 12ft AGL and surrounded by trees." He expects that raising it above the tree line will boost signals by 5 - 10dB. David Hilton-Jones, G4YTL (MK), reports, "An unexpected pleasure to work LY2CI/P in KO15 on CW MS on 15 September. Good reflections. Does anybody have contact details for QSL?"

Bob Harrison, G8HGN (CM), was QRV for the Activity Contest session on 2 October. Running an FT-847 and 150W PA with two 15-ele Yagis 13m AGL he completed 35 QSOs with stations in 19 grids for a claimed score of 665 points. The breakdown was 5 DLs, 17 Gs, 5 ONs, 6 PAs, an

LOCATOR SQUARES TABLE

Starting date: 1 1 1979

Callsign	50MHz	70MHz	144MHz	430MHz	1296MHz	Total
G0JHC	836	26	48	4	-	914
GJ4ICD	780	1	267	121	79	1248
G3IMV	698	20	616	125	53	1512
GW7SMV	550	-	198	-	-	748
G0FYD	538	1	276	20	-	835
G4TIF	491	28	234	112	-	865
GW6VZW	488	-	146	6	-	640
G8TOK	351	32	135	56	29	603
G1SWH	350	42	240	81	30	743
GU6AJE	338	13	32	-	-	383
G4OBK	319	-	57	-	-	376
MM5AJN	316	-	76	32	-	424
G4DEZ	305	14	40	13	7	379
G1UGH	280	-	130	17	-	427
G3FIJ	271	29	107	50	23	480
G8HGN	270	-	163	58	-	491
GW3EJR	260	-	-	-	-	260
G7CLY	244	-	248	16	-	508
G1EFL	230	-	67	2	-	299
G6TTL	220	-	133	90	27	470
G0ISW	206	-	80	22	-	308
M1DUD	190	1	30	-	-	221
GM4VVX	186	-	100	-	-	286
G0XDI	182	-	239	67	-	488
G4APJ	168	-	44	22	-	234
GM6MEN	166	-	-	-	-	166
M5PLY	120	-	-	-	-	120
M1DRK	113	-	-	-	-	113
G4FUJ	68	18	23	5	5	119
G3FPK	30	-	246	-	-	276
G4YTL	-	53	524	111	-	688
G3XDY	-	34	251	173	122	580
G4OUT	-	23	107	-	-	130
EA7IT	-	-	102	-	-	102

No satellite, repeater or packet radio QSOs. If no updates received for a year entries will be deleted. Next deadline is 4 December. Band of the month 50MHz.

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CONTEST

TIM KIRBY, G4VXE
11a Vansittart Road,
Windsor SL4 5BZ
E-mail:tim@timkirby.net

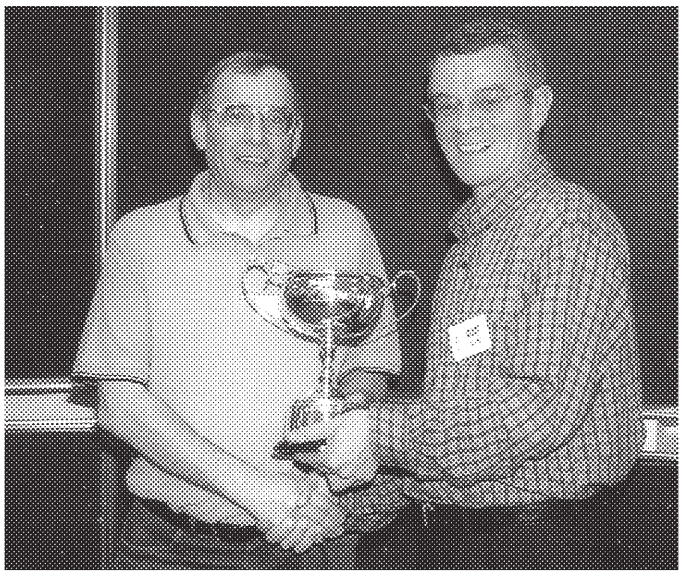
FOLLOWING A number of requests, the HF Contests Committee is now publishing results on the web. Before the results are published in *RadCom*, they will appear on the RSGB Members' Only web site at http://www.rsgb.org.uk Once the results have appeared in *RadCom*, they will appear on the main RSGB HF Contests Committee site at http://www.rsgbhfcc.org

VHF Contest Results, will continue to be available on the web at http://www.blacksheep.org/vhfcc

SEASON'S GREETINGS

THERE'S JUST room, before we move on to the contest results, to wish all readers of the column, wherever you are, compliments of the season with all good wishes for a Happy, Healthy, Prosperous and Peaceful New Year.

Tim Kirby, G4VXE



The original Marconi Trophy, awarded to the leading individual station in the RSGB AFS (Affiliated Societies) CW contest, had become broken over the years and could not be economically repaired. Marconi plc is thanked for providing this splendid new silver cup, which was awarded for the first time at the recent RSGB International HF and IOTA Convention. It was awarded to Chris Burbanks, G3SJJ, by RSGB President Don Beattie, G3BJ.

144MHz UK Cumulatives 2000

ALTHOUGH THERE wasn't much in the way of propagation enhancement, this contest attracted a healthy crop of entries once again, with a generally high standard of logs submitted. Some entrants were a little unsure of the format, and their logs were re-scored by the adjudicator. Peter, G8FBG, ran Andy, G4PIQ, very close in the single op fixed category and the A1 Contest Group won the multi op section from nearer the M4.

This format is obviously popular with contesters who don't have the geographical advantage of an east coast location, but what can be done to make the scoring system more attractive to entrants from GM and GI I wonder? Congratulations to the certificate winners and see you in the next one.

Steve Redfern, G4AEQ

144 MHz UK Cumulatives 2000

Pos	Call	Loc	Pwr	Ant	14.8.00 QSOs	14.8.00 Norm	29.8.00 QSOs	29.8.00 Norm	13.9.00 QSOs	13.9.00 Norm	28.9.00 QSOs	28.9.00 Norm	20.10.00 QSOs	20.10.00 Norm	Total Norm
Multi-Operator Open															
1	G4ZAP*	IO81SG	400	2x12Y+17Y	82	816	75	1000	0	0	64	1000	73	1000	3000
2	G1WAC*	IO92HI	400	18Y	90	1000	77	199	26	1000	31	289	0	0	2289
Single Operator Fixed															
1	G4PIQ*	IO01MU	400	4x15Y	142	1000	99	979	101	1000	80	1000	0	0	3000
2	G8FBG*	IO91SG	400	2x10Y	0	0	95	1000	89	905	69	902	64	1000	2905
3	G0HAS	IO81VH	350	2x13Y+17Y	68	482	71	693	84	896	65	838	52	693	2427
4	G8ZRE	IO83NE	80	8XY	46	315	39	294	41	333	0	0	30	352	1000
5	G0GCI	IO01ED	150	9Y	58	266	46	297	46	268	35	245	0	0	831
6	G0GJV	IO91QK	100	9Y	28	72	35	167	25	109	31	191	33	286	644
7	G8HGN	IO01FO	50	2x15Y	45	75	41	189	42	154	23	108	40	300	613
8	M0COP	IO92BK	100	8Y	40	213	0	0	31	171	24	133	21	190	574
9	G1KHX	IO81MI	50	9Y	41	173	35	174	27	124	22	122	21	145	492
10	G0PHZ	IO81RL	100	9Y	20	40	22	75	31	132	23	120	21	134	386
11	G1TWS	IO01HO	25	11Y	25	44	25	94	28	112	23	120	15	96	328
12	G4XPE	IO92GU	25	10Y	26	110	16	58	10	25	16	78	18	125	313
13	2E1GUA*	IO01ES	10	13Y	18	33	21	40	0	0	0	0	15	115	228
14	GW5NF	IO81KQ	50	9Y	0	0	25	85	29	131	0	0	0	0	216
15	MW0AXA*	IO81FM	10	9Y	10	17	18	61	21	79	19	74	13	41	214
16	PA0GHB	JO11WH	90	15Y	21	48	23	76	19	54	20	63	13	33	193
17	PE1EWR	JO11SL	80	10Y	0	0	24	76	19	52	15	60	0	0	188
18	G3YJR	IO93EJ	60	9Y	27	98	8	20	14	34	0	0	9	38	170
19	GW4HBK	IO81KP	60	9Y	18	43	18	53	12	27	14	46	15	67	166
20	G7NBE	IO92GS	40	9Y	17	34	15	51	11	28	15	59	3	5	144
21	G0NFO	IO82VI	10	5ZL	11	18	0	0	0	0	0	0	0	0	18
Single Operator Open															
1	M0AFC/P*	IO84SA	25	13Y	82	1000	79	1000	76	1000	0	0	0	0	3000
2	GW8ASA/P*	IO81FP	50	5Y	76	606	73	720	82	857	63	1000	38	1000	2857
3	GW5NF/P	IO81LS/KR	25	7ZL	0	0	0	0	0	0	52	708	99	988	1696
4	M0BAO/P	IO80LV	80	8Y	62	654	0	0	0	0	0	0	0	0	654
5	G8ZRE/P	IO01AL	25	HB9CV	0	0	0	0	0	0	30	339	0	0	339
6	MW0COP/P	IO72WU	20	5Y	0	0	7	9	0	0	0	0	0	0	9

*Certificate Winner

2nd 70MHz 2000

AGAIN, COMMENTS were mostly aimed at conditions - or rather the lack of them. QSO counts were down this time, but the number of entries remains consistent. Most entrants are looking forward to the day when more of our European friends are allowed on the band, but saying this no Slovenian stations were active this time, leaving the 'best DX' column looking a little sorry. Congratulations go to all section winners and runners up - all will receive certificates.

Martin Platt, G4XUM

2nd 70MHz 2000

Pos	Call	Score	Loc	QSO	Power	Antenna	Best DX	km
Multi-Operator								
1	GW5NF/P	4280	81KR	31	10	5	GD4GNH	287
2	G7RIH	1413	91RR	15	12	5	GD4GNH	383
Single Operator Fixed								
1	GD4GNH	12842	74QD	42	160	5	G0GCI	474
2	G4ZTR	5663	01KW	28	150	8	EI3IO	495
3	G1OGY	4680	01GR	28	50	5	GD4GNH	441
4	G0GCI	4135	01ED	24	100	4	GD4GNH	474
5	G3TCU	4128	91QE	32	150	6	GD4GNH	425
6	G3MEH	3795	91QS	33	150	6	GD4GNH	377
7	G4JJI	3320	92SD	30	60	6	GD4GNH	356
8	G3NKS	3157	81XU	24	100	6	G4CAY	312
9	G3LVP	3029	81WV	26	25	7	EI3IO	308
10	G1KHX	2898	81MI	18	90	5	GD4GNH	330
11	G1EHF	2208	91LH	17	50	4	GD4GNH	397
12	G3XPU	1880	92HM	15	50	3	GD4GNH	282
13	G4OUT	1266	92AT	9	10	3	GD4GNH	230
14	GM4DIJ	600	85IW	4	50	4	G0DPS	362
Single Operator, Other								
1	M0AFC/P	6249	84SA	31	20	5	G0GCI	373
2	G3ULU/P	5482	92XD	36	100	6	EI3IO	427
3	GW8ASA/P	4641	81FP	30	8	3	G4ZTR	306
4	G0WIR/P	3198	83RO	18	15	5	G0GCI	337
5	G4XRV/P	1990	91RU	17	10	5	GD4GNH	374

Christmas Cumulatives 2000

THE RESULTS of last year's event again demonstrate that you need to be on more than one band to win, although only Tim, M0AFC/P, went for a full four-band entry this year and indeed nobody entered a log in the 4m single operator category at all. This is a fast and furious event, and despite the cold weather several entrants braved the seasonal elements including GW6FFB/P and MW0AXF/P, who travelled to the Black Mountains, and M1EPR/P who sent in a picture of his icy operating conditions near Harlow with his entry.

There were some interesting interpretations of the rules demonstrated in some of the logs, requiring a degree of adjustment by the adjudicator. Roger, G3MEH, rounded off a successful year of fixed station contesting with a commanding win in the single operator section, and Tim, M0AFC, took the open section winner's certificate, operating with 25W on each band.

Steve Redfern, G4AEQ

Christmas Cumulatives 2000

Single Operator Fixed

			50MHz					70MHz					144MHz					432MHz					
Pos	Call	Loc	26/12 QSOs	27/12 QSOs	28/12 QSOs	29/12 QSOs	BandNorm	26/12 QSOs	27/12 QSOs	28/12 QSOs	29/12 QSOs	BandNorm	26/12 QSOs	27/12 QSOs	28/12 QSOs	29/12 QSOs	BandNorm	26/12 QSOs	27/12 QSOs	28/12 QSOs	29/12 QSOs	BandNorm	Total
1	G3MEH*	IO91QS	0	0	0	0	0	0	0	0	0	0	30	55	61	43	2964	4	13	19	11	3000	8964
2	G8ZRF*	IO83NE	7	8	6	8	3000	0	0	0	0	0	22	28	21	31	1265	0	0	0	0	0	4265
3	G7ULL	IO01AK	0	0	0	0	0	0	0	0	0	0	36	50	53	51	2993	0	0	0	0	0	2993
4	G0UJK	IO01AK	0	0	0	0	0	0	0	0	0	0	41	43	54	48	2547	0	0	0	0	0	2547
5	G4NPH	JO02BI	0	0	0	0	0	0	0	0	0	0	0	40	36	40	1887	0	0	0	0	0	1887
6	G4IVH*	IO92WN	0	0	0	0	0	0	0	0	0	0	27	26	36	32	1675	0	0	0	0	0	1675
7	2E0ATF	IO00DX	0	0	0	0	0	0	0	0	0	0	24	28	28	17	947	2	2	4	1	439	1406
8	G0RRC	JO02MB	0	0	0	0	0	0	0	0	0	0	13	26	25	22	913	2	1	3	2	459	1372
9	G3YJR	IO93FJ	0	0	0	0	0	0	0	0	0	0	9	24	20	22	946	1	4	3	3	408	1354
10	G0TIB	IO82XJ	0	0	0	0	0	0	0	0	0	0	17	19	11	12	491	4	0	0	0	776	1267
11	PE1EWR	JO11SL	0	0	1	1	97	0	0	0	0	0	12	16	16	17	301	2	2	1	3	412	1010
12	G1TWS	IO01HO	0	0	0	0	0	0	0	0	0	0	20	29	23	29	997	0	0	0	0	0	997
13	G4APJ	IO83UP	1	0	1	2	167	0	0	0	0	0	9	0	18	17	509	0	0	2	5	280	956
14	M5AJX	IO01BI	0	0	0	0	0	0	0	0	0	0	7	8	0	10	933	0	0	0	0	0	933
15	2E1GUA	IO01FS	0	0	0	0	0	0	0	0	0	0	12	10	11	0	244	3	0	1	0	575	819
16	GM4CXM	IO75TW	0	0	0	0	0	0	0	0	0	0	14	0	19	21	684	0	0	0	0	0	684
17	M0ATY	IO92PB	0	0	0	0	0	0	0	0	0	0	12	18	18	20	360	1	0	1	1	90	450
18	ON1DIC	JO21HF	0	0	0	0	0	0	0	0	0	0	7	12	12	13	295	0	0	0	0	0	295

All Others

			50MHz					70MHz					144MHz					432MHz					
Pos	Call	Loc	26/12 QSOs	27/12 QSOs	28/12 QSOs	29/12 QSOs	BandNorm	26/12 QSOs	27/12 QSOs	28/12 QSOs	29/12 QSOs	BandNorm	26/12 QSOs	27/12 QSOs	28/12 QSOs	29/12 QSOs	BandNorm	26/12 QSOs	27/12 QSOs	28/12 QSOs	29/12 QSOs	BandNorm	Total
1	M0AFC/P*	IO84SA	0	7	0	0	24	0	8	0	7	2000	47	9	0	41	2049	0	7	0	0	1000	5073
2	M1EPR/P*	JO01BS	0	0	0	0	0	0	0	0	0	0	19	32	31	29	1472	0	1	1	1	2071	3543
3	GW6FFB/P	IO81KW	0	53	30	45	3000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3000
4	MW0AXF/P	IO81KW	0	0	0	0	0	0	0	0	0	0	0	66	39	18	2256	0	0	0	0	0	2256
5	2E0ARB/P	IO91NE	0	0	0	0	0	0	0	0	0	0	0	44	25	28	1726	0	0	0	0	0	1726

*Certificate winner

RoPoCo 2 2001

THE ADJUDICATOR for this contest needs to have certain standard phrases pre-loaded into the word processor, the most important of which is, "Fraser Robertson, G4BJM, repeated his success in {insert contest and year}, to head the table once again". RoPoCo2 completed a clean sweep of winning entries and perfect logs for Fraser in 2001, and he therefore receives both the G3XTJ memorial trophy for this event, and the G5MY trophy for the highest aggregate score from both events. This makes depressing reading for other entrants, who must hope that the HFCC offers Fraser a generous severance package, in order that they have a chance to win! Don Field, G3XTT, takes second place on this occasion. Many congratulations to both Fraser and Don.

This time, several dissenting views regarding a time change were received, although most still seem to want an alternative time slot. Of course, the views of non-entrants cannot readily be ascertained, and these may be germane to the popularity of the contest. Nevertheless nearly everyone once again reported how much they enjoyed the event.

Now for the statistics! The number of perfect logs was down somewhat at four. The number of entrants remained virtually constant, as did the number of paper-based logs at seven. These seven logs were retyped for entry into the database of over 2200 lines of QSO information, used for the automatic cross checking, and compilation of errors. The mean error rate was about 5.3%, and the median approximately 4.5%, which considering the complexity of the exchange seems creditable. Some readers may recall the old chestnut from WWII. In the North African campaign, the following message was sent to base using radio telephony: "The general is going to advance, please send him reinforcements". However, on arrival it read: "The general is going to a dance, please lend him three and fourpence". Perhaps RoPoCo entrants could have used CW to better effect!

Clive Whelan, GW3NJW

CONTEST CALENDAR

HF Contests

Date	Time	Mode	Contest	Bands	Exchange
7/9 Dec	*2200-1600*	*CW*	*ARRL160m*	*1.8*	*RST*
15/16 Dec	*0000-2400*	*CW/SSB*	*ARRL10m*	*28*	*RST + Serial*
29 Dec	*0000-2359*	*CW/SSB*	*RAC Winter*	*1.8–144*	*RST + Serial*
29-30 Dec	*1500-1500*	*CW*	*Stew Perry Challenge*	*1.8*	*Grid Square*

VHF Contests

Date	Time	Mode	Contest	Bands	Exchange
2 Dec	*0500-1100*	*CW/SSB*	*Courte Duree (F)*	*144*	*RST+Serial+Locator*
2 Dec	0900-1700	ALL	RSGB 144MHz AFS	144	RST+Serial+Locator
4 Dec	*1800-2200*	*ALL*	*Nordic activity*	*144*	*RST+Serial+Locator*
4 Dec	2000-2300	ALL	RSGB 144MHz Activity	144	RST+Serial+Locator
5 Dec	2000-2230	ALL	RSGB 1.3/2.3GHz Cum.	1.3/2.3	RST+Serial+Locator
11 Dec	*1800-2200*	*ALL*	*Nordic activity*	*432*	*RST+Serial+Locator*
11/15 Dec	*2000-0200*	*CW*	*BCC Meteor Scatter*	*144*	*MSexchange*
13 Dec	2000-2230	ALL	RSGB 432MHz Cum.	432	RST+Serial+Locator
16 Dec	*0800-1100*	*ALL*	*DAVUS 144 (OZ)*	*144*	*RST+Serial+Locator*
18 Dec	*1800-2200*	*ALL*	*Nordic Activity 1.3G up*	*1.3 up*	*RST+Serial+Locator*
25 Dec	*1800-2200*	*ALL*	*Nordic Activity 50MHz*	*50*	*RST+Serial+Locator*
26 Dec	*0800-1400*	*ALL*	*DAVUS 144/432*	*144/432*	*RST+Serial+Locator*
26 Dec	1400-1600	ALL	RSGB Christmas Cum.	50/70/144/432	RST+Serial+Locator
27 Dec	1400-1600	ALL	RSGB Christmas Cum.	50/70/144/432	RST+Serial+Locator
28 Dec	1400-1600	ALL	RSGB Christmas Cum.	50/70/144/432	RST+Serial+Locator
29 Dec	1400-1600	ALL	RSGB Christmas Cum.	50/70/144/432	RST+Serial+Locator

Microwave Contests

Date	Time	Mode	Contest	Bands	Exchange
30 Dec	0900-2100	ALL	RSGB All Bands Activity	All	Non-competitive

The full rules of RSGB HF and VHF/UHF contests were published in the RSGB Contesting Guide in October 2000 *RadCom*. Brief rules for non-RSGB contests, which are listed in italics above, can often be found in the 'HF' and 'VHF/UHF' columns. The HF and VHF Contest Committees both have web sites from which comprehensive details are available. These are www.g4tsh.demon.co.uk/HFCC/index.htm and www.blacksheep.org/vhfcc

RoPoCo 2 2001

Pos	Callsign	Equipment Code	Final Score	Pos	Callsign	Equipment Code	Final Score
*1	G4BIM	4C17	700	24	G2HLU	4C12	490
2	G3XTT	4C15	670	25	GM4SID	4C13	480
3	G3WUX	4C14	630	26	G4ELZ	3C1	470
4	G3KEQ	4C1	620	27	G3VYL	4G14	460
5	G3IZD	4C13	610	28	G2AFV	4C14	450
6	G4CZB	4C13	610	*29	GU3SQX	4C13	450
7	GW3NJW	4C12	600	30	G4IEL	3C14	410
8	G4OGB	3C13	590	31	G3MA	3C1	390
9	G0CKP	3C15	590	32	G3LHI	3W1	380
*10	G4EDG	3C14	590	33	GW3SB	3W11	380
11	G0MTN	3W12	560	34	G3IXF	4C16	360
12	G4RCG	4C16	560	35	G0BIN	3W	370
13	G4IIY	3C13	560	36	G4RLS	3C12	320
14	GW3WWS		560	37	G0WBC	3C13	310
15	G4ARI	3C14	530	38	G4XPE	3C11	310
16	G3IIZ	3W1	520	39	G0RDO	3G12	300
17	G3KKP	3C11	520	40	G3RYP	3C1	280
18	G0DHZ	3C1	510	41	GM4OSS	3G12	280
19	G3LJK	3C13	510	*42	G3GMS	3G12	280
20	G3GLI	3C13	500	43	GM3UM	3W1	250
21	G3IIE	3Q13	500	44	G3ZGC	3W1	240
22	G0WHO	3C13	500	45	G3VQO	3W1	220
23	G3UIG	4C11	500	46	G3CQR	3C1	180

*indicates a perfect log Checklog: G3XNG

Marconi Centenary Contest (MCC)

TO COMMEMORATE the centenary of Marconi's reception in Newfoundland of the Poldhu transmissions on 12 December 1901, a fun contest will take place between radio amateurs in Canada and the United Kingdom. This event, the Marconi Centenary Contest (MCC), will be sponsored by Marconi plc in conjunction with the Radio Amateurs of Canada (RAC) and the Radio Society of Great Britain.

The intention is to stimulate as many VE - UK QSOs as possible between the two countries in a 24-hour period. It is hoped that special Marconi stations will also be active.

Date and Time. 29 December 2001, 0000 to 2359UTC.

Entrants. Only radio amateurs in Canada and United Kingdom will be eligible for the MCC. All entrants must enter the RAC Winter Contest 2001, observing the rules of that contest as published by RAC and reproduced here.

Contacts. A qualifying QSO will be one between a UK station and a Canadian station. Stations may be worked twice per band, once on CW, once on phone. Entrants must enter the total number of qualifying QSOs on their summary sheet, subject to a minimum of 10 QSOs.

Regions

Canada. For the MCC, Canadian entrants will be grouped into six regions:

Eastern (VO, VE1, VE9, VY2)
Quebec (VE2)
Ontario (VE3)
Central (VE4, VE5, VE6)
Western (VE7)
Northern (VE8, VY1, VY0).

UK. All of the United Kingdom will be combined into a single region for the MCC, ie G, GB, GD, GI, GJ, GM, GU, GW, their M and 2 equivalents, and any special prefixes.

Categories. The five categories of entrants will be as the RAC Winter Contest, see below. RAC suffix stations will also be eligible for prizes in the appropriate entry category.

Prizes. 102 prizes donated by Marconi plc will be available for UK and Canadian entrants.

Silver Commemorative Marconi coin sets will be awarded to the single operator stations making the most QSOs, with the UK from Canada, and with Canada from the UK. These will be presented to the winners in each country by Marconi company representatives in the UK and Canada respectively. This is irrespective of the region and category of the entrant.

Canadian Prizes: 50 Marconi Commemorative £2 coins will be awarded to the Canadian stations making the highest numbers of QSOs in each of the regions and categories.

United Kingdom prizes: 50 copies of *Marconi's Atlantic Leap* by G Bussey will be awarded to the leading UK stations. As there is only a single region for the whole of the UK, the 50 books will be distributed amongst just the Categories above.

Allocation of prizes for UK entrants. In each entry category, a number of awards will be made dependent upon the ratio of the number of entries in that category relative to the total number of UK entrants. Here is an example of one of the category combinations. If there were 10 UK entrants in SOABLP (Single Operator All Band Low Power) compared to 125 total UK entries, the number of prizes awarded among SOABLP entrants would be 10 divided by 125 times 50. Thus four of the 10 could receive one of the 50 prizes, subject to the requirement that each category with at least one valid entry will receive one of the 50 prizes. Winning entrants can receive only one prize.

Adjudication. Administration of the Marconi Centenary Contest will be the sole responsibility of the RSGB.

Logs. Logs must be sent by 31 January 2002 to the RAC HQ at 720 Belfast Road, Suite 217, Ottawa, Ontario K1G 0Z5, Canada. E-mail logs to VE7CFD@rac.ca. See details below.

Contact points

Canada: Bob Nash, VE3KZ, e-mail: rtnash@attcanada.ca
UK: Bob Whelan, G3PJT, e-mail: G3PJT@rsgb.org.uk

RAC Canada Winter Contest Rules

Contest Period: 0000UTC to 2359UTC, 29 December 2001

Bands and Modes: 160, 80, 40, 20, 15, 10, 6 and 2 metres, CW and phone (SSB, FM, AM, etc.) Suggested frequencies: CW - 25kHz up from the band edge; SSB - 1850, 3775, 7075, 7225, 14175, 21250, 28500kHz. Check for CW activity on the half-hour.

Exchange: Stations in Canada send RS(T) and province or territory. VEØs and stations outside Canada send RS(T) and a serial number.

QSOs: Contacts with stations in Canada or VEØs are worth 10 points. Contacts with stations outside Canada are worth 2 points. Contacts with RAC official stations are worth 20 points. RAC official stations are: VA2RAC, VA3RAC, VE1RAC, VE4RAC, VE5RAC, VE6RAC, VE7RAC, VE8RAC, VE9RAC, VO1RAC, VO2RAC, VY0RAC, VY1RAC and VY2RAC. You may work any station once on each of the two modes, on each of the eight contest bands. It is prohibited to make CW contacts in the conventional phone sub-bands, phone contacts in the conventional CW sub-bands, or to make or solicit contest QSOs through a repeater during the contest period.

Multipliers: Canada's 10 provinces and three territories, and may be counted once on each mode on each of the eight contest bands. The multipliers, with their postal abbreviations and prefixes are: Nova Scotia [NS] (VE1, CY9, CYØ); Quebec [QC] (VE2, VA2); Ontario [ON] (VE3, VA3); Manitoba [MB] (VE4); Saskatchewan [SK] (VE5); Alberta [AB] (VE6); British Columbia [BC] (VE7); Northwest Territories [NT] (VE8); New Brunswick [NB] (VE9); Newfoundland and Labrador [NF] (VO1, VO2); Nunavut [NU] (VY0); Yukon [YU or YT] VY1; and Prince Edward Island [PE] (VY2).

Final Score: Total your QSO points from all bands, and multiply by the total multiplier points from all bands.

Categories:

- Single Operator All Bands;
- Single Operator Low Power (max 100W output);
- Single Operator QRP (max 5W output);
- Single Operator Single Band;
- Multi-operator.

Single operators who receive assistance from a DX spotting system or *PacketCluster* network during the contest must classify themselves as Multi-ops. There are no single-mode categories. Multi-operator stations may operate on several bands simultaneously.

Awards: Plaques will be awarded to the top scoring entrants in each category. Certificates will be awarded to the top-scoring entrant in each category in each province, territory, USA call area, and DXCC country.

Results: will be published in the May issue of *The Canadian Amateur*, and will be sent to certificate winners.

Entries: Send entries **by 31 January 2002** to: Radio Amateurs of Canada, 720 Belfast Road, Suite 217, Ottawa, Ontario, Canada K1G 0Z5. E-mail entries are encouraged and should be sent to Dave Shipman, RAC Canada Winter Contest Manager, at VE7CFD@rac.ca

Entries must contain a summary sheet showing score calculation, a dupe sheet listing calls worked on each mode on each band, a multiplier checksheet and log sheets. Logs sheets must show time, band, mode, call of station worked, exchanges sent and received and points claimed for each QSO. New multipliers must be clearly marked in the log.

Logs and summary sheets submitted on floppy disk or via e-mail must be in ASCII text format. Name your files with your CALLSIGN (ie yourcall.SUM and yourcall.LOG). Cabrillo log format for electronic log submissions is also acceptable. Ensure that you completely fill out the header information in the Cabrillo file. Please do *not* send binary files produced by a contest logging program (ie yourcall.BIN, yourcall.QDF, etc). If you e-mail your log, please send the file(s) as attachments. Do not paste the log file into the text of your message. This is often impossible to extract correctly. Large files may be zipped if necessary. If you need help with preparing or e-mailing your log, please contact VE7CFD at VE7CFD@RAC.CA or by phone at 001 604-926-8170 (evenings only - PST).

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F and a GW. ODX was DJ2FH (JN49) at 624km. Three contacts were over 500km and he writes, "Surprisingly some reasonable DX around considering the weather conditions. Best grids total so far but no Scandinavians again."

Colin Smith, GM0CLN (EH), has been busy brass pounding on the band during recent auroras. On 25 September, 2142 - 2208, he worked OZ2TF (JO46), G4KWQ (IO92) and G7RAU (IO90) at a beam heading (QTE) of 60º. DK1KO, G0RUZ and GM0BQM were heard. At 1725 on the 30th he contacted G4HGI (IO83) and heard GM4VVX at the same QTE.

The Ap index was up to a storm level of 53 on 3 October and in the 1452 - 1658 period Colin made 35 QSOs with stations in 23 grids, most all at QTE 70-80º. 15 were over 1000km and ODX was DF1CF (JN57) at 1318km. Grids worked were I080, 81 and 90, JN37, 49 and 57, JO00, 10, 20-22, 30-32, 40, 42, 51, 52, 54, 60, 62, 63 and 67. His log shows 23 DLs, 3 Gs, 2 ONs, 2 PAs and one each F, GW, HB9, OK and SM. His station comprises a TR-751E, 100W amplifier and 14-ele Yagi just 8ft AGL.

430MHz AND UP

G3LTF reports a nice tropo path to the east from the Andover area on 2 August during which he worked OK2BFH at about 1478km on 70cm and 23cm. It was Peter's best ever DX on 23cm.

David Dodds, GM4WLL, was out portable again at Lauder Common (IO85NR) during the RSGB Trophy Contest on 6 October. He writes, "Activity was a little disappointing after the amazing turn-out for the last 23cm contest, but I guess Saturday afternoon / evening isn't the best time for an 8-hour contest." He was pleased to work four new stations and three new grids with only five QSOs and he was glad to hear another portable Scottish station. Activity died away altogether in the evening so he packed up while it was still daylight. The QSOs were with G3XDY (JO02 and ODX at 488km), G8VHI (IO92), G5B (JO03), G6DER (IO93) and GM4ZUK/P (IO86). David was running a DEM transverter with a masthead preamp and 18W PA to a 67-ele Yagi.

He also took a 70cm station with which he had hoped to make some 23cm skeds, but in the event, he only set up one QSO that way. Two others were set up via mobile telephone and the other two resulted from CQ calls. Next time he proposes to try a *DXCluster* connection.

ODDS AND ENDS

MARTIN PLATT, G4XUM, writes that Andy Kissack, GD0TEP, is the QSL manager for the recent EI4VWY operation. Please note that if you want a QSL direct, UK stamps on an SAE are *not* valid in the Isle of Man. He suggests, "Sufficient remuneration for direct QSLs should be provided in another way." International Reply Coupons (IRCs) would be one method.

John Peters, PE1OGF, reports that some pictures of the recent HB0/PI4TUE Dutch DXpedition to Liechtenstein can be found on a special web site - see the list. They have found a printer for their QSL cards so all QSOs will be confirmed with a full colour photo card.

DEADLINES

THAT WRAPS IT up for another month. Please note the *very* early deadline for February: **4 December**, necessitated by the Christmas / New Year shut down. For the March issue the date is **15 January** when I'll need your final Annual Table scores. My telephone answering / fax machine is on 020 8763 9457 and my CompuServe ID is g3fpk. All the best for Christmas. ♦

WWW.

MIMP	http://e-www.motorola.com/webapp/sps/library/tools_lib.jsp
VHF Comms	http://www.vhfcomm.co.uk
RFGlobalnet	http://www.rfglobalnet.com
BEACONet	http://go.to/beaconet
MoonSked	http://www.braeside.demon.co.uk/moonsked/moonsked.htm
HB0 pictures	www.hamnet.demon.nl/fotopagina/HB0_2001.html/page1.html

HF HF HF HF

DON FIELD, G3XTT
105 Shiplake Bottom, Peppard Common, Henley on Thames, RG9 5HJ.
e-mail: hf.radcom@rsgb.org.uk

MIKE, G4ADE, HAS responded to my comments in the October column regarding HF band activity. He agrees that activity is on the decline, and suggests it is at least partly because the RSGB encourages competitive activity in preference to general HF communication. Mike will not be surprised that I don't totally agree with this. It's almost inevitable that a column such as this will focus on DX activity and contesting, because day-to-day 'rag-chewing' is effectively 'business as usual', which will happen anyway (though I am always happy to hear about such activity, and to pass on any relevant news items). As I said in that October item, many of us enjoy HF because of the magic of hearing voices from across the world, arriving straight out of the ether. In many ways, it doesn't matter whether those voices are 'DX' or not. But I would, nevertheless, suggest that DX and contest activities are very closely related to the 'self-training' aspect of our hobby. To be successful in these activities requires a greater knowledge of propagation, operating technique, antenna design, etc than, for example, maintaining a regular sked with a friend in the US or Australia, or rag-chewing with whoever you come across on the bands. I must add that Mike is warm in his comments about the D68C operation, in that through the pre-publicity and the professional way in which the operation was conducted, it encouraged many such as himself to get on and 'have a go' (with successful contacts on several bands).

LOGBOOK OF THE WORLD

I HAVE (RIGHTLY!) been taken to task by several readers for not having said anything about the ARRL's plans for a 'Logbook of the World' (LOTW). There have been calls for some years now for the removal of the requirement of paper QSLs for the major awards, to be replaced by some sort of electronic system. With a perceived lack of progress by the major award sponsors, the gap has been filled by services such as the e-QSL web page (see Bob Treacher's October 2001 'SWL' column). However, the problem with these is that, though they clearly fulfil a demand, they are not 'secure' in that anyone with a PC and printer can generate a card and claim it originated from such a service.

Wayne Mills, N7NG, made a presentation at the Dayton Hamvention earlier this year about the work the ARRL has been doing. It is clear they have been far from idle, and that a lot of development work has been going on. What they want to do is develop a huge database of logs, initially from the major DXpeditions, but eventually from a wide variety of sources, including historic logs if available. These will be validated at the time they are loaded to the database, and DXCC applicants will be able to claim credit for contacts without sending QSLs (eventually it will be possible, therefore, to submit your DXCC application or update electronically, perhaps via a web page). Your application will be checked against the database and, if the data matches, the credits will be applied.

Given that this all sounds simple and sensible, some will ask why it hasn't been done before. The answer, perhaps not surprisingly, is that it isn't quite that simple at all! The big concern is to maintain the integrity of the programme, which means being able to validate the logs when they are loaded to the system, and ensuring that the data cannot be tampered with in any way (by hackers, etc). Another major problem arises about how any discrepancies will be dealt with. Let's suppose that a DXpedition log contains around 2% errors (I am basing this figure on the typical error rate of an experienced contester in one of the big contests). In a database of, say, a million QSOs (ie quite small, with big DXpeditions these days typically making well over 50,000 QSOs each), that would mean that some 20,000 records would be in error! These errors are typically in the callsign logged, though there may be instances where the DXpedition changed band or mode but didn't do so on their logging PC. These are the sort of problems a DXpedition QSL manager deals with all the time. As the QSLs come in, he will spot, for example, that there is a 20-minute period when all the incoming QSLs show a different band, and he will draw the appropriate conclusion. Or, if a callsign differs from what is in the DXpedition log, he will make a decision as to whether the station concerned should receive a QSL. Suppose I send a card, and he finds G3XM in the log, he will realise that the callsign G3XM doesn't exist but that the Morse characters are identical to G3XTT, all but for a space between the two final dashes. So he may use his discretion, assume that the DXpedition operator was tired and misread my call, and send me a card anyway. The problem with the 'Logbook of the World' concept is that the DXpedition QSL manager is no longer in the loop, and the ARRL will have to find a process (and the necessary resources) to deal with these kinds of situation.

It is hoped that 'Logbook of the

QSL from ZL/G3TXF (right) who, with G3SXW (left) operated from the Chatham Islands in September. The first QSLs were received within a week of the operators returning to the UK!

2000 ARRL 10m CONTEST RESULTS

Mode: A=Mixed; B=Phone; C=CW; D=Multi-operator
Power: A=QRP; B=Low Power; C=High Power

Call	Score	Mode	Power
G0OGN	104218	A	A
G3FNM	40180	A	A
G0WMW	178398	A	B
G3XTT	159728	A	B
G6QQ	96084	A	B
MM0BQI	64152	A	B
G4EDR	12200	A	B
M0SDX	857090	A	C
G3MXH	404064	A	C
G3TMA	393432	A	C
GM4ELV	6290	B	A
G0AEV	344960	B	B
G0KRL	194120	B	B
GI0KVQ	112480	B	B
GM0JKF	29896	B	B
GM4UYZ	17464	B	B
GM4YXI	673904	B	C
GW4BLE	352000	B	C
G4OJH	350208	B	C
G0VSN	175514	B	C
G4EDG	238336	C	A
GW3NJW	378720	C	B
G3KKP	216996	C	B
GM3CFS	214652	C	B
G4IIY	133960	C	B
G3TJE	105944	C	B
M3C	65208	C	B
G4ZME	54464	C	B
G3RSD	54036	C	B
G0MRH	13760	C	B
MU0FAL	12920	C	B
GM3POI	841208	C	C
G5G	731016	C	C
G0CKP	584716	C	C
G0ORH	373008	C	C
G4BJM	123136	C	C
G3ZRJ	80812	C	C
MM5BRI	63920	C	C
M5W	271776	D	B
M4U	142004	D	B
M5X	1886738	D	C
GB2DX	1041680	D	C

World' will come live sometime in 2002, no doubt with the inevitable teething problems. The ARRL is also working with the developers of various logging programs, to enable them to offer LOTW compatibility. I imagine other award sponsors are watching with interest, as they will no doubt want to ride on the back of the ARRL system once it is up and running. To allow this sort of wider use of the database will, of course, require even more attention to security aspects, based on public key encryption techniques, etc. So it's very much a case of 'watch this space'.

DX & IOTA NEWS

CHRISTIAN, TT8DX, WILL be in Moundou, **Chad**, until December 2002. On HF Chris is using a dipole and 1kW, mostly on SSB but with CW on request. Chris is a personal friend of the Telecommunication Minister of Chad and was active as TT8SA and TT0A in 1989 / 1992 from N'Djamena, the capital city. QSL via F5OGL. Related news is that the DXCC Desk has received, and accepted, documentation for TT8DX and TT8JE. Anyone who has previously submitted a TT8DX card and had it rejected should contact DXCC and your record will be updated without having to re-submit the card. If not, it can be sent in the next submission.

The trip to the **Austral Islands** by Jon, WB8YJF, and Leo, K8PYD, originally scheduled to take place between 24 September and 2 October, was postponed and should now take place during early December.

Take, JI3DST, will be active as JI3DST/3 from Miyako Island (**AS-079**) from 29 December to 5 January. He plans to operate on 10, 12, 15, 17 and 40m SSB. QSL direct or via the bureau.

A large group, consisting mainly of local Thai amateurs, will activate Tarutao Island (**AS-126**) as E29AL from 8 to 15 December. They will be active on all bands (except WARC) and modes (CW, SSB, RTTY, PSK31, SSTV, FM) with 100 watts. Look for them on the usual IOTA frequencies plus 14086, 21086, 28086 kHz (RTTY); 14070, 21070, 28070 kHz (PSK31); 14230, 21340, 28680 kHz (SSTV); 1834 and 3524 kHz. QSL via HS0GBI.

Adi, YC3MM, will be on Siberut Island (**OC-215**) during the third week of December. This IOTA group, the Mentawai islands, has only been activated once, as 8A5ITU in May, 1996.

The Southern Cross DX Group of Chile has announced plans for several IOTA expeditions during the next couple of months. Look for them from Hornos Island (**SA-031**), possibly sometime this month, then Lennox, Nueva and Picton Islands, all located in **SA-050**, sometime in January. In February the group plans to go to Riesco Island (**SA-NEW**). More information on their web site.

The Caio Martins Scout Group, PT2CM, plans to be active sometime this month from the Abrolhos Archipelago (**SA-019**), including an entry in the ARRL 10m Contest.

TABLES AND RELATED MATTERS

THE TABLES CONTINUE to attract new entrants, to the extent that I have been chastised for forgetting to mention some of them. My apologies! I always read the comments you send with your updates, even if I don't always mention them here. New participants in recent months include GM0VIT, M0PLY and M0AWX. This month GU0SUP returns to the fray with an RTTY entry, and G3URA also felt that, as Chairman of BARTG, he should wave the RTTY flag too. Welcome one and all. And, in response to a question from a couple of people, RTTY should be taken to include all RTTY modes (Baudot, PSK, MFSK, etc) as it gets too confusing otherwise. While not a table entrant, Dick, M0CLZ, of the Essex DX Group writes of his delight at working ZL3JT recently on 21MHz PSK, using one of the new FT-817 radios, running just 2 watts to a 5/8 vertical (a modified CB antenna). I know others would concur that PSK31 is a remarkable mode for working DX with very low power, and this is yet another example.

Once a quarter we feature the all-time table, of course, and it appears this month. As always, my thanks to Henry, G3GIQ, who has compiled this for many years. Henry writes, "There have been several requests to include 50MHz as an extra band on the currently 9-band table. I have mixed feelings about this, as the band is inactive for much of the year and much of the sunspot cycle. During inactive periods it could be said to give those with the higher scores a built-in advantage. However, I feel that there should be a democratic resolution to this. Accordingly, I will take votes from all participants and those who have participated during the last year, until 31 December, and a simple majority vote will suffice. In the case of a 'yes' vote, I would probably include 50MHz on alternate occasions." Your comments to Henry, please, by e-mail to: HenryLewis@compuserve.com or to his address in the *RSGB Yearbook*.

Chris, ZS6EZ, took up the idea of an all-time table a few years

COUNTRIES WORKED, 2001

(sorted this month by RTTY totals, where declared)

CALL	CW	SSB	RTTY	MIX
G0ARF	0	0	154	154
GU0SUP			122	122
MM0BQI	89	117	119	165
G3JFS	142	99	103	172
G4OBK	227	118	81	255
ZC4DW	148	82	80	165
GW4SKA	0	0	66	66
G3URA	0	0	53	53
ZC4BS	139	197	52	213
G3LHJ	185	72	51	196
G0TSM	201	181	48	244
GI0NQC	0	15	41	49
G4DDL	54	35	23	67
G3YVH	163	101	2	202
GM0VIT	141	134	2	196
G3XTT	161	89	2	177
G3TXF	193	1	1	193
M0CTQ	40	250	0	273
G4DUW	182	210	0	256
G0NXX	248	0	0	248
M0BZQ	38	218	0	246
G0VHI	0	240	0	240
M0AWX	0	231	0	231
G3SXW	222	0	0	222
G3IGW	210	0	0	210
M0LLW	0	181	0	181
MU0FAL	138	133	0	164
M5PLY	0	140	0	140
M0CAL	0	121	0	121
G4IRN	91	85	0	119
GM4OBK	110	10	0	116
G3WP	108	0	0	108
G4FVK	46	97	0	107
G3MDH	0	103	0	103
G4YWY/M	0	85	0	85
M5AEF/qrp	20	77	0	79
G4MUW	0	75	0	75
M0BIB				231
G0CAS				180
M0CNP				128
GM4ELV				107
GM4FAM				102
M0ASJ				55

9 BAND TABLE No 40

MIXED MODE

CALL	1.8	3.5	7	10	14	18	21	24	28	TOTAL
G3KMA	249	300	327	315	333	328	332	317	329	2830
G4BWP	241	304	332	318	333	327	332	308	320	2815
G3XTT	231	276	316	281	332	309	329	290	307	2671
G3GIQ	150	245	302	260	333	314	331	293	323	2551
GW3JXN	177	250	289	279	325	314	311	284	291	2520
G4OBK	156	214	269	269	325	297	310	285	289	2414
G3TXF	127	231	290	269	324	278	321	253	297	2390
G3SED	228	249	281	264	299	269	266	238	264	2358
G3TBK	119	231	271	238	323	284	308	263	281	2318
G3YVH	124	153	254	274	318	309	303	270	277	2282
G3LAS	95	186	232	233	306	290	305	279	280	2206
G3IFB	62	221	287	227	325	242	304	235	286	2189
GM3PPE	148	210	247	262	313	244	268	219	224	2135
G3KMQ	59	209	264	204	323	233	279	243	242	2056
G3IGW	129	198	315	236	286	246	256	120	231	2017
G4PTJ	33	163	198	132	319	241	315	213	286	1900
G5LP	67	222	281	202	309	181	276	116	239	1893
G0JHC	1	29	151	234	260	287	302	279	303	1846
G3VKW	47	158	210	94	319	181	316	182	296	1803
G3NOF	5	126	131	0	332	298	330	263	305	1790
G4XRX	7	67	168	143	292	225	296	192	255	1645
M0AWX	44	133	135	0	268	199	243	187	211	1420
G4NXG/M	24	58	137	0	287	197	274	175	246	1398
G4UCJ	33	87	178	139	221	173	198	161	186	1376
G4OWT	2	44	151	77	302	55	288	59	257	1235
GM4OBK	41	96	134	76	163	115	157	125	188	1095
G0LRX	1	92	123	0	226	44	245	37	220	988
G4FVK	40	77	102	56	182	104	184	63	162	970
M0CNP	4	61	83	6	163	60	141	23	88	629
AVERAGE	**91**	**169**	**223**	**175**	**291**	**229**	**280**	**206**	**258**	**1922**

CW ONLY

G3KMA	243	279	324	315	332	321	330	302	318	2764
G3XTT	221	245	303	281	303	284	298	263	277	2475
G4BWP	212	218	286	317	287	297	283	273	238	2411
GW3JXN	174	219	273	279	302	298	296	260	264	2365
G3TXF	127	224	288	269	319	276	315	252	283	2353
G0NXX	169	232	276	282	292	281	272	255	259	2318
G4OBK	144	193	261	269	299	283	280	269	267	2265
G3SXW	96	201	258	251	316	267	298	240	275	2202
G3YVH	123	149	250	274	309	296	287	253	257	2198
G3SED	237	232	277	264	271	237	233	196	208	2155
G3NOH	49	124	208	257	301	283	294	248	261	2025
G3LAS	93	104	204	233	260	253	268	239	240	1894
G5LP	67	217	281	202	298	181	264	116	228	1854
G4PTJ	32	95	154	132	224	204	251	193	222	1507
G3VKW	41	83	154	92	219	135	241	133	180	1278
G4OWT	0	43	116	77	221	38	222	44	188	949
GM4OBK	33	78	117	76	138	97	137	105	138	919
AVERAGE	**121**	**173**	**237**	**228**	**276**	**237**	**269**	**214**	**241**	**1996**

NEXT DEADLINE 8 January 2002
PREPARED BY G3GIQ 9 October 2001

back, and it has done a lot to encourage HF operation from South Africa. High band scores tend to be on a par with those achieved from the UK, but the low bands are a much tougher proposition from that part of the world. You can see the scores on Chris's web page. I dare say other countries have something similar. At the global level, I have mentioned the DXCC Challenge before. The latest scores appear on the ARRL's web pages. The ARRL has announced that the 30m band will be added to the DXCC programme when resources allow, probably sometime during 2002.

CONTESTS

THE MAIN EVENT this month is the ARRL 10m Contest, on **15 / 16 December**. To whet your appetite, UK scores from last year's event appear in the table. Four UK scores appear in the top ten boxes: G0OGN (8th DX, Mixed Mode QRP), G0AEV (3rd DX, Phone Low Power), GM4YXI (4th DX, Phone High Power) and G4EDG (3rd DX, CW QRP). DX means everywhere but US / Canada. Congratulations one and all.

QSL ROUTES

DAVE, G3TBK, WRITES that cards for all his past operations go to his home call. They include: J3G, J88DR, S79JDC, 8Q7TB, 7Q7TB, VP2MDC, V29TBK and J3/G3TBK.

As a result of his recent visit to Madagascar and meetings with local amateurs there, Phil Whitchurch, G3SWH, is now the QSL manager for the following stations: 5R8FL, 5R8FT, 5R8FV, 5R8GO and 5R8GZ.

Pepe, EA5KB, is the QSL manager for the following stations: 7X3WDK CE2GLR CE2LZR CE2SQE CE5CSV CM6QN CM6YD CO2AV CO2CR CO2FN CO2FU CO2GL CO2GP CO2QX CO2VQ CO3JR CO3ME CO6BR CO6FU CO6HF CO6RD CO6TH CO6TY CO6YY CO8CH CO8CY CO8EJ CO8OT CO8XI CP4AY CP4BT CP4IC CX1CCC CX2AQ CX2SA CX3UG CX3VB CX5AO CX7OV HC3AP HC5NCR HK1RRL HP1AC OA6CY TG9AAK TG9AMD TI3TLS UN3F UN7JJ XE2KB YC1DYY YC1HDF YC9NBR YF1T YV6AZC ZP3CTW ZP6GBA ZP6VLA.

QTH Corner

HS0GBI	Cherdchai Yiwlek, PO Box 1090, Kasetsart, Bangkok 10903, Thailand.
JI3DST	Takeshi Funaki, 2-18-26 Hannnan-cho, Abono-ku, Osaka-city, Osaka 545-0021, Japan.
PA3AXU	(*new*) Gerard Dijkers, NAPO 550, 3509VP Utrecht, The Netherlands.
SP9FIH	Janusz Wegrzyn, Box 480, 44-100 Gliwice, Poland.
T20T/T22T	Toshihiko Niwa, JN1HOW, 1081-8 Sakae, Kitakawabe, 349-1213 Japan.
YB5NOF	John E Daluas, P.O. Box 194/CPA, Ciputat 15401, Indonesia.
ZL8CW	(or ZM8CW) Jacky Calvo, ZL3CW, PO Box 593, Pukekohe 1800, New Zealand.

THANKS

SPECIAL THANKS GO to the authors of the following for information extracted: *OPDX Bulletin* (KB8NW), *The Daily DX* (W3UR) and *425 DX News* (I1JQJ). Please send items for the **February** issue (including table updates) by **7 December.** ♦

WWW.

DXCC Challenge: www.arrl.org/awards/dxcc/listings/challenge.html
LOTW: www.arrl.org/news/stories/2001/08/02/3/
Southern Cross DX Group: www.qsl.net/ce9c/
ZS6EZ: http://zs6ez.za.org/lists/bands/latest.htm

HF F-Layer **Propagation Predictions** for **December 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	8881..288888	2186227982 23	..1877892...	..2999994...	...999982...	...4888.....	...2886.....
*** Asia							
Yakutsk	543...166667	8457777888 77	2.1884256222	...85.....	...53.....	...2.....	.....
Tokyo	...4..14535.	...62124422.	...53.....	...52.....	...3.....	...2.....	.....
Singapore	266432	686322	....1783...	....687....	....1686....	...24773....	...2355....
Hyderabad	1.....12222	5.....166654	.....5771..	...125894...	...667982...	...89998....	...89997....
Tel Aviv	868....88888	9153..298599	5..855895.44	...77788....	...67785....	...58874....	...37662....
*** Oceania							
Wellington	...3767 84...	...699985...	...699982...	...59997....	...29984....	....888.....	....786.....
Perth	.....2223.	.....36421.	.....772...	.....5982...	.....687....	...56887....	...56785....
Sydney	.....2321..	.....37621..	....1786....	....8997....	...18995....	...68993....	...5898.....
Honolulu	.1.31..3....	.2.534262...	...1.2.23...	.....	.....	.....	.....
W. Samoa	...11.14....	...37778....	....88871...	....7875....	....5763....	....365.....	.....32.....
*** Africa							
Mauritius	3.....1212	2.....23212	.....531..	.....62...	.....15....	.....23....	.....2.....
Johannesburg	98.....4899	86.....8988	611....58866	1.24214887 22	...6557984..	...777886...	...677883...
Ibadan	667.....3556	858....17777	3.271.157722	2..988898522	...9999973..	...9999973..	...9999962..
Nairobi	33.....2211	56.....14444	6.4....46677	2.6322477622	..26556873..	...767783...	...77778....
Canary Isles	8885....8888	8837...28788	33.864468863	2..98888973.	...9899794..	...428886...	...2.8883...
*** S. America							
Buenos Aires	7769.....26	5519.....23	11.8.....1.	...83...22..	...7511232..	...353353...	....43352...
Rio de Janeiro	1217.....11	11.8.....11	...7.....	...851.2551.	...7732563..	...575465...	....74363...
Lima	11.4.....1	11.6.....	...41.....	...6541121..	...337543...	.....7763...	.....776....
Caracas	2333.....22	45.5.....33	....3....1..	....32.11...	.....4234...	.....8786...	.....8884...
*** N. America							
Guatemala	3315.....1	12.52.....1	...1.....	.....1.....	.....1.....	.....65.....	.....65.....
New Orleans	3223.....3	44.62.....22	...3.2.....	...3.57671..	.....3888...	.....896...	.....994...
Washington	7677.....77	78185....487	23.323..3721	.....75572..	.....7778...	.....3785...	.....883...
Quebec	78382....987	12.64...161.	....131151..	....288882..	.....9999...	.....7998...	.....7997...
Anchorage	77661.136545	52.3322344.1	.....5...	.....4...	.....2...	.....	.....
Vancouver	3312.....1	22.21.....1	.....21...	.....76...	.....44...	.....43...	.....2.....
San Francisco	3313.....1	11.21.....	.....	.....64...	.....62...	.....5.....	.....2.....

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 October 2001 issued by the Sunspot Data Centre, Brussels, was 125.6. The maximum daily sunspot number was 168 on 1 October and the minimum was 72 on 8 October. The predicted smoothed sunspot numbers for December, January and February are respectively: (SIDC classical method – Waldmeier's standard) 106, 104, 102 (combined method) 94, 93, 90.

SWL

BOB TREACHER, BRS32525
93 Elibank Road, Eltham, SE9 1QJ.
E-Mail: brs32525@compuserve.com

SIX SWLs attended the Society's HF and IOTA Convention in October. This is the most listeners that have attended the event. There was no dedicated SWL exhibit this year, but there was a lunch-time event at which we got together. Paul, BRS176562, and Peter, RS181414, Goodhall came for the first time and had an excellent time. Paul remarked that his son and he were made most welcome as they spoke to well-known amateurs and attended several of the lectures. Paul considered Neville's, G3NUG, D68C lecture "the icing on the cake", providing a fantastic insight into the planning and dedication that go into planning and pulling off a major DXpedition. Peter and Paul thoroughly enjoyed the day and recommend that other active HF listeners should definitely make the effort to attend the 2002 event.

Once again Mick Toms, BRS31976; Simon, RS177448; Clare, RS102891, and I attended. I have to agree with Paul's view of the D68C lecture – but then I'm biased! Another good talk was that given by Martin, G3ZAY, and Phil, G3SWH, about one-man DXpeditions. I am glad that other SWLs made the effort to attend this year, and hope that a few more listeners will make the trip next year.

SWL VOLUNTEERS

I AM PLEASED to report that two SWLs have taken on volunteer jobs within the Society. Paul Goodhall, BRS176562, has recently become the Society's Deputy Regional Manager for Oxfordshire (Region D37), while Anthony Nowell, RS94177, has become the QSL sub-manager for G1 and M1AAA - AZZ callsigns. It is pleasing to see listeners becoming more involved with Society business.

SWL CONTESTS

THE RULES OF the 28MHz SWL Contest are reproduced in full below. Please note that there is a date change - the event is now on the weekend of **15 / 16 December** and corresponds with the ARRL 28MHz DX contest. I hope that British SWLs will support the event this year.

January and February are busy months for SWL contest activity, with both the CQ 160m and Cray Valley LF contests taking place - the rules will appear next month. These 160m events are a good way of adding to your DXCC scores on that band. Good DX is likely to be scarce as it is at the bottom of a sunspot cycle that the band is at its best for DX. However, as most of Europe has an allocation on the band there ought to be 40+ countries on offer.

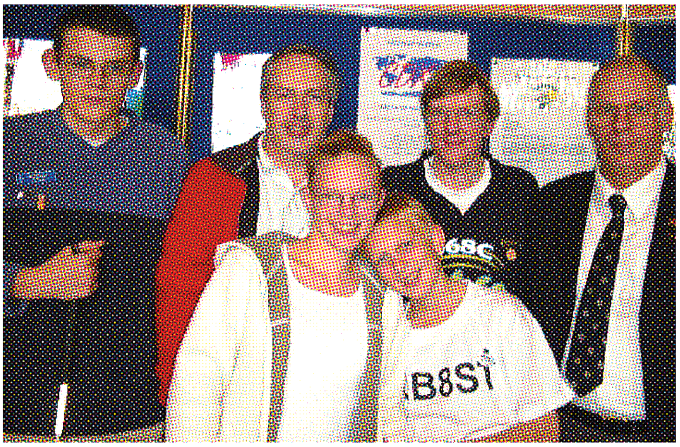
The Cray Valley event is a 40, 80 and 160m contest. Regulars will know that the White Rose ARS and SMC have been past organisers. The Cray Valley committee was pleased with the entry earlier this year but obviously hopes that even more listeners will take part in 2002.

The 'low bands' (40, 80 and 160m) are capable of providing spectacular DX at the end of December and through January as we experience greater darkness in those months. It will especially be worth spending time listening on 40 and 80m because sunrise or sunset in the UK will correspond at times during those months with sunset or sunrise on the west coast of the USA, Japan, New Zealand etc. It really will pay listeners to take a keen interest in sunrise and sunset times in these two months, as it will be possible to hear signals at these times from some real DX such as the Pacific and Far East.

As an example, take 80m at 1555UTC at the end of December / early January. Our sunset corresponds with sun*rise* on the west coast of the USA, and it will be possible to hear good signals from stations in W6/7. Conversely, at *our* sunrise, it will be possible to hear strong signals from JA (although these examples will only work if propagation is favourable!)

DX NEWS

IN VIEW OF the excellent propagation conditions we experienced in late September / early October, I am surprised there are not more reports this month. The good conditions for DX - especially on 10 and 12m - resulted in the following callsigns bagged on these bands: 3D2CY (Conway Reef), FW5ZL, ZD8BV, FR5ZU/T, VK9LO and 4W/CU3FT. 17m also seems to have produced good DX as well, with these callsigns noted: T88AY, KH0/JA5XAE, 9N7DK, 9V1YC, ZK1ETW (South Cook Is), 3DA0FR, TG/DL3GA and C98DC. ♦



Back row: Peter Goodhall, RS181414; Mick Toms, BRS31976; Bob Treacher, BRS32525; Paul Goodhall, BRS176562. Front: Clare Treacher, RS102891 and Simon Treacher, RS177448, on the CDXC stand at the RSGB International HF and IOTA Convention.

RULES FOR SWL 28MHz CONTEST 2001

THIS CONTEST IS OPEN to SWL stations all over the world. The contest takes place from **Saturday 15 December 2001 at 0000UTC to Sunday 16 December 2001 at 2400UTC**, during the ARRL contest.

The purpose off the contest is to log DXCC countries, USA States and Canadian Provinces on the 10 metre band only. SWLs can listen during the whole weekend with no time restriction.

Listeners may log only three stations from each DXCC country, US State or Canadian province. The District of Columbia (DC) counts as a state.

There are two sections: A: Single Operator SSB. B: Single Operator CW. The use of a DX- or *PacketCluster* is not allowed.

Logs must show: Date, UTC, Callsign of station heard, RS (RST for CW) at SWLs QTH, DXCC, State or Province. RS must be at least 33 (339 for CW). The callsign of the station being worked is not required.

Scoring: For the first station from each DXCC country, US State or Canadian Province you score 5 points, the second station scores 3 points and the third station 1 point. The total score will be the number of points for stations heard, multiplied by the number of States and Provinces heard, multiplied by the number of countries heard.

Example: 300 station points x 45 State / Provinces x 100 countries = 1,350,000 points.

Example Log for 28MHz contest

Date	UTC	Station	RS	Points	DXCC	State/Province
15/12	1020	JA2BK	57	5	JA	
15/12	1023	OK2FD	58	5	OK	
15/12	1026	JA6JK	56	3		
15/12	1027	PA0WPX	55	5	PA	
15/12	1029	4X1WF	59	5	4X	
15/12	1040	K2BJ/NY	59	5	W	New York
15/12	1045	K3ZO/MD	58	5		Maryland
15/12	1109	VE3GG/ON	57	5	VE	Ontario
15/12	1110	VE2SG/QUE	58	5		Quebec
16/12	0645	LU2HL	57	5	LU	
				48	7	4

Total Score: 48 points x 7 DXCC x 4 State/Prov = 1344 points.

Logs must be sent before 31 January 2002 to: Lambert Wijshake, NL-10175, Kattedoorn 6, 8265-MJ Kampen, Netherlands, or by e-mail to: nl10175@amsat.org

To receive the results of the contest sent 2 IRCs or $1 with your log.

The overall winner in every category will receive a plaque with inscription; and the country winners will receive a certficate.

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ALINCO	DJ-G5EY DUAL BAND HANDY	£199.00
ALINCO	DJ-X1 RECEIVER	£90.00
ALINCO	DJ-X10 WIDE BAND RECEIVER	£275.00
ALINCO	DR-150E 2M 50W MOBILE TRANSCEIVER	£140.00
ALINCO	DR-M06 6M FM TRANSCEIVER	£140.00
ALINCO	EDX-1 ATU	£140.00
AMERITRON	AL-1500 1.5KW AMPLIFIER	£1,499.00
AOR	AR-3030 HF / VHF RECEIVER Inc converter VHF	£450.00
AOR	AR-3030 HF RECEIVER	£399.00
AOR	AR-7030 TOP RECEIVER	£550.00
AOR	AR-7030+HF RECEIVER (With AM Filter, Optical Encoder)	£650.00
AOR	AR-8000 WIDE BAND RECEIVER	£199.00
AOR	AR-8200 mk1 WIDE BAND RECEIVER	£230.00
BEARCAT	UBC-860XLT SCANNER	£120.00
BEARCAT	UBC-9000XLT RECEIVER	£199.00
BNOS	LP-50 50MHz 50 Watt AMPLIFIER	£99.00
DAIWA	CN-1001 AUTO ANTENNA TUNER	£140.00
DAIWA	CNW-518 1KW AUTO ATU	£199.00
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DAIWA	CN-540 SWR &PWR MTR	£30.00
DAIWA	CN-630 SWR &PWR MTR	£40.00
DATONG	FL3 FILTER	£75.00
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ICOM	IC-2100H 2M MOBILE TRANSCEIVER	£150.00
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ICOM	IC-275E 25W TRANSCEIVER	£525.00
ICOM	IC-290 2m MULTIMODE TRANSCEIVER	£240.00
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YAESU	FT-736R 2m / 70cm / 6m TRANSCEIVER	£750.00
YAESU	FT-7400 70cm MOBILE TRANSCEIVER	£160.00
YAESU	FT-747GX HF TRANSCEIVER	£399.00
YAESU	FT-757MK1GX HF TRANSCEIVER	£375.00
YAESU	FT-767GX HF BASE 100watt built-in ATU	£599.00
YAESU	FT-790R 70CM MULTIMODE MOBILE TRANSCEIVER	£225.00
YAESU	FT-7B HF 50 W MOBILE TRANSCEIVER	£199.00
YAESU	FT-80C 0-30MHz COMMERCIAL TRANSCEIVER	£375.00
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REPEATERS

MARK LEWIS, GW7KDU
14 Hornbeam Close, St Mellons, Cardiff CF3 0JA. E-mail: rmc-wales@net.ntl.com

Blofeld's lair? No, the site for the HB9F repeaters.

LATEST CLEARED REPEATERS

Call	Type	Channel	Keeper
GB3MC	Site change 23cm, Blackrod, Lancs	RM0	G8NSS
GB3RD	Site change 2m Aldworth, Berks	RV54	G8DOR

Outstanding voice repeater proposals submitted for licensing are:

Call	Type	Process Stage	Proposed Keeper
GB3DV	Site change 70cm Maltby, South Yorkshire	RIS	G4LUE
GB3ES	Site change 2m Hastings, East Sussex	RA	G7LEL
GB3HE	Site change 70cm Hastings, East Sussex	RA	G7LEL
GB3HF	Site change 6m Hastings, East Sussex	RA	G7LEL
GB3HG	Site change 2m Ripon, North Yorkshire	RIS	G0RHI
GB3LD	Site change 2m Lancaster, Lancs	RA	G3VVT
GB3LF	Site change 70m Kendal, Cumbria	RA	G3VVT
GB3LR	Frequency Change Newhaven, Sussex	Primary User	G7PUV
GB3MD	Site & Freq change 70cm Mansfield, Notts	RIS	G0UYQ
GB3MX	Site Change 2m Mansfield, Notts	RIS	G0UYQ

Repeater proposal status as of 6 October 2001.

WE HAVE ALL heard repeater keepers complaining of the difficulties of accessing hilltop sites. The Bern section of the Union of Swiss Shortwave Amateurs (USKA) [1] has a number of repeaters in unique locations on top of mountains in the Swiss Alps that present their keepers with more than the average amount of difficulty of site access! The group was formed in 1972 to attempt to solve the problems presented to VHF / UHF operation in such mountainous terrain. In 1973 they established their first repeater to the east of the city of Bern. This was built from a combination of PMR, commercial amateur and homebrewed equipment.

In 1974 the group decided to embark on a more challenging project. This was to build a repeater on a mountain called the Schilthorn (locator JN36WN) at 2970m (9744ft) ASL. On top of this mountain is a restaurant called the Piz Gloria that James Bond fans will recognise as the site of Blofeld's mountain top hideout in *On Her Majesty's Secret Service*. The only reasonable way of accessing the site is by cable car. HB9F has a 2m voice repeater and a 13cm ATV repeater here. The 2m repeater currently runs 15W ERP on 145.700MHz. The transmitter and receiver is a unit from BBC (Brown Broveri) with homebrewed pre-amp, power amp and logic.

A 23cm voice repeater was built in 1993 in an even more ambitious location. This time the site chosen was the Jungfraujoch (locator JN36XN). The altitude of this site is an amazing 3581m (11,748ft). The repeater is installed in a high altitude research station. Temperatures here vary from -37 ºC to +10 ºC. The equipment for the repeater is homebrewed with a transmitted power of 20 watts ERP. The Jungfraujoch is 'next door' to the Eiger and is a spectacular location for a repeater. From the nearest town of any reasonable size it is a two-hour train journey at a cost of £67 to reach the site. The final leg of the journey involves travelling through a tunnel inside the Eiger to the highest railway station in Europe. Once at the top the air is so thin if you move around too quickly you certainly feel the effects!

The group has a web site [2] dedicated to their repeaters and there are some interesting web cams that can be accessed via it. So, the next time you hear your local repeater keeper moaning about the difficulties of accessing site, think of the amateurs who look after the repeaters of HB9F!

Careful: it's a long way down! Antenna rigging at the Jungfrau site.

INTERNET LINKING UPDATE

THE SOFTWARE THAT many have been using to access Internet linked repeaters, *I-phone*, looks as if it has come to the end of its useful life. Although the software has not been supported for new applications for some time, the Vocaltech servers had been kept running full time until recently, but now are no longer available reliably. There is an alternative called *I-link*, developed by Graeme Barnes, M0CSH, and it is specifically for amateur repeater linking. On-air users can select specific repeaters to link with, using DTMF tones. Access from the Internet is also easier, with press to talk signals from the keyboard, removing the need for VOX operation of the radio connection. The software offers many improvements over *I-Phone*. For more details and downloads visit the *I-Link* web site [3].

The Bracknell repeater, GB3BN (RB0), is one of the first to use *I-link*, from the station of Paul Westwell, G4HLF.

This is another example of amateurs developing new techniques to further and better the commercial offerings. Well done, Graeme!

LOCAL NEWS

WALES

GB3MG in Bridgend is currently off air. GB3SG (Pontypool) has returned to service.

NORTHERN ENGLAND

The keeper of GB3LD and GB3LF has applied for site changes for both repeaters.

SOUTHERN ENGLAND

Andy Barrett, G8DOR, hopes to have the re-sited GB3RD on air from its new location shortly.

GB3ES, GB3HE and GB3HF have been submitted for site change to a new location north east of Hastings.

EAST MIDLANDS

Len Baddeley, G8LXI, reports that he has had severe problems getting his newly cleared repeater, GB3FJ, on air in Spilsby, Lincolnshire. Since Len installed the equipment for the repeater the feeder has been cut three times and the power supply once. The police have been informed about these acts of vandalism but if you have any details of who is responsible I would be happy to pass this on to Len. Len is determined to get the repeater on the air despite the problems that he is suffering at the moment. On a positive note, when the repeater has been operational there have been very favourable reports received. ♦

WWW.

[1] USKA: http://www.uska.com/
[2] Bern repeaters: http://www.relais-hb9f.ch/
[3] I-Link: http://home.btclick.com/aacnet/
[4] RMC web: http://www.coldal.org.uk/rmc

Regular Feature

EMC

DAVID LAUDER, G0SNO
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THE SUBJECT of Power Line (Tele)Communications (PLT or PLC) hasn't gone away. There is still a great deal of commercial pressure to allow data communications via electrical power wiring using frequencies in the MF and HF spectrum. There is a conflict between protecting the radio spectrum and enabling 'Broad Band Britain'.

At the moment, there are EMC-conducted emission standards such as EN 55013 and EN 55022 limiting the amount of radio interference that equipment is permitted to inject into mains supply wiring between 150kHz and 30MHz. Some equipment that complies with the existing standards, such as some models of TV set, is already causing interference problems to amateur radio reception but, in order to accommodate PLT systems, a substantial relaxation in conducted emission standards would be necessary.

Some of the more extreme proposals would be the electronic equivalent of removing the need for motor vehicles to be fitted with silencers and then allowing fleets of noisy motorcycles to ride around residential streets 24 hours per day!

The RSGB EMC Committee continues to devote much time and effort to trying to protect the HF spectrum, particularly the amateur bands, from possible future interference from PLT and other systems.

PLC CONFERENCE

ON 24 SEPTEMBER, the current and former EMC Committee chairpersons, Hilary Claytonsmith, G4JKS, and Robin Page-Jones, G3JWI, gave a presentation at the Fourth International Powerline Communications World Congress in Brussels, organised by IIR Telecoms and Technology.

They were invited to attend by the Conference organisers, at no cost to the Society, but could only stay for one of the four conference days. Robin and Hilary represented the UK HF Users' Group, which Hilary chairs. As well as representing radio amateurs, this group includes representatives of NATO, BBC, Merlin Communications, the UK Home Office, the Ministry of Defence, and Civil Aviation Authority. Radio astronomy and maritime interests are also represented.

The general attitude at the conference seemed to be that everything was ready to roll, take advantage of de-regulation and make profit once the small matter of EMC standards had been cleared up. A majority of the delegates seemed to have no real understanding of the fundamental nature of the EMC problems in PLC. The presentation given by Robin and Hilary raised a few eyebrows!

It also included a summary of some interesting tests that Robin has done to relate interfering current in a cable to the field strength measured in a nearby antenna (see below).

EFFICIENT USE OF RF SPECTRUM?

ONE ARGUMENT that is sometimes heard in favour of PLT is the claim that radio frequency bandwidth could be used more efficiently if sections of the HF spectrum were allocated to PLT instead of to radio services. It is argued that this would allow many more users to use each Megahertz of bandwidth at the same time because many different cables in a given area can each carry separate signals, all using the same band of frequencies.

This is not a valid comparison, however, because the extra users would not be radio users using the RF spectrum. Instead, they would be preventing radio users from using part of the RF spectrum. Although cable communication systems can accommodate many users per unit of bandwidth in a given area by using multiple cables, wireless is by definition without wires and cable communication systems are not!

Cable communications and radio communications can co-exist provided the cables do not let significant amounts of RF signal in or out. The fact that someone wants to use unscreened power cables for an unsuitable purpose does not justify relaxing EMC standards or re-allocating frequency spectrum.

NOVEL PLT IDEA?

THANKS TO the member who pointed out the Powerline World web site (see the panel). The 'Welcome' page states: "Powerline World is a global online community facilitating the development and deployment of Powerline Communications (PLC) products and services."

The site includes a Powerline communications introductory page which is taken from a research project for a telecommunications course at the H John Heinz III School of Public Policy and Management at Carnegie Mellon University, Pittsburgh, USA. This page includes some information on the Nor.Web trials in Manchester in 1999 and other information that appears to have originated from Nor.Web, who ceased trading in 1999.

In a section on limitations of digital powerline technology, there is a reference to interference with broadcasting, amateur radio and other services. The web page states: "Nor.Web is addressing the problem by proposing to lease the frequencies involved from their owners and offering amateur radio operators a new frequency. Negotiations on this topic are currently taking place in London."

This is a novel idea but it doesn't sound very plausible. There are a few details that would need to be addressed if anyone were serious about this. Would the proposed new frequency be offered to amateur radio operators throughout the world or only in some countries? Would amateur radio operators be provided with new transmitting and receiving equipment if their existing equipment could not operate on the new frequency?

RADIATING CABLES

EMC COMMITTEE member Robin Page-Jones, G3JWI, has done some useful practical work to establish the level of interference that may be caused by a given interfering current flowing in a relatively short (4m) length of power cable or telephone cable. In principle, it is possible to calculate this from theory but, in practice, there are various factors to consider including near-field effects and ground proximity, so some actual practical measurements are very useful.

Fig 1 shows the principle of Robin's tests. An RF noise generator feeds a 4m long wire that runs 2m above ground, in the shape of a 'goal post'. The end of the wire is terminated to earth via a 150Ω load resistor. An inverted 'V' dipole cut for 7MHz is situated 10m from the radiating cable.

The noise current flowing in the cable was set to 30dB(μA) or 31.67μA when measured in 9kHz bandwidth with a CISPR 16 measuring receiver. This is intended to represent a common-mode current flowing in a length of power cable for PLT or telephone cable for VDSL, at a level permitted by existing standards.

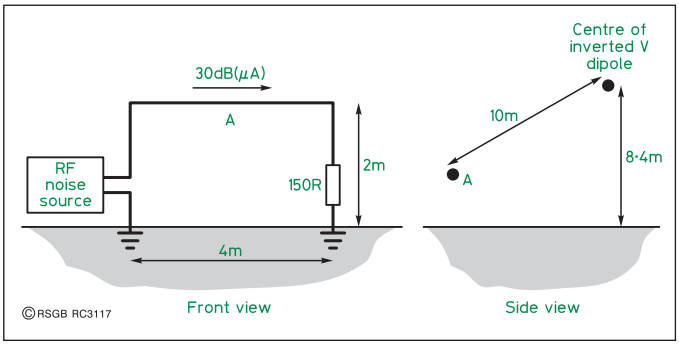

Fig 1: The G3JWI test rig for demonstrating the effect of broad-band common-mode noise current in an elevated cable.

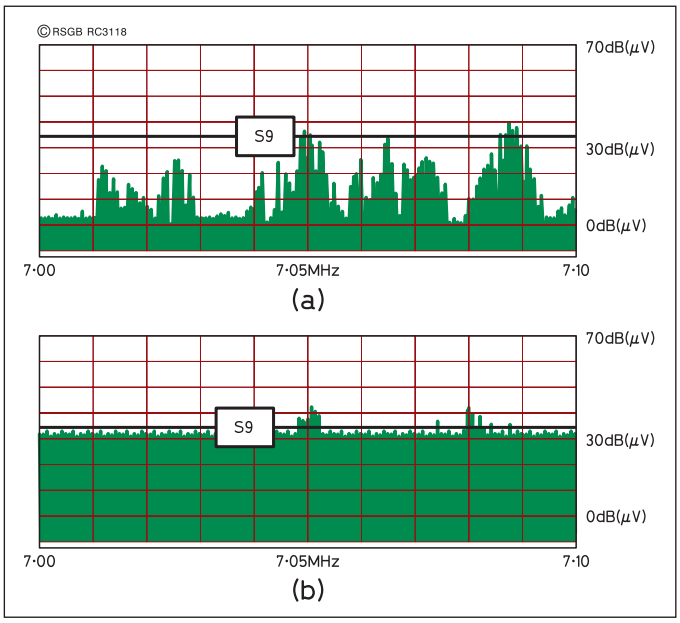

Fig 2: Spectrum analyser plots of the 7MHz band (a) with the noise source off and (b) with the noise source on.

The common-mode current arises due to imbalance between the currents in the two halves of the pair.

Fig 2 shows spectrum analyser plots of the 7.0 - 7.1MHz amateur band with the noise signal switched on and off. The apparent 'noise floor' with the noise source off is due to the spectrum analyser and is not the true background atmospheric noise level on the band. When the noise source is switched on, the strength of the noise signal from the dipole antenna is over 30dB(μV) or 31.67μV when measured in 3kHz bandwidth. Taking S9 as -73dBm or 34dB(μV), the broad-band noise is right across the band at a level of S9, which buries all but the strongest signals.

These results give an indication of the effects on one band with one particular configuration. We plan to do further tests in future with other configurations and other bands.

WATER TREATMENT PLANTS

IN THE PAST, Clive, GW4VVX, suffered with much interference to amateur reception from PCs, lawn mowers, burglar alarms, etc. In August 2000, he moved to Sutherland in the far north of Scotland, after checking the site for RF problems and became GM4VVX. With the nearest neighbour over half a mile away, there was peace on the bands at last.

Then the dreaded problem of noise on the 50MHz band appeared. It was a strong 50Hz-sound, like heavy electric motors with S9 peaks about 20kHz wide every 40kHz through the entire band. The source appeared to be the North of Scotland Water Authority water treatment plant about 300 yards away.

After phoning the customer help desk, Clive received a letter from the Senior Field Support Engineer (Plant & Systems) with a date for a home visit. Two engineers arrived from Inverness but, when Clive turned on his receiver, there was no interference. The engineers then explained that they had turned everything off in the plant and would then switch things on one at a time until the noise re-appeared.

This was done but still no interference was heard. The engineers then took a list of the frequencies that Clive had previously noted and did a scan of the plant with a scanner that they had brought. Only a small leakage was found on one of the frequencies, but instructions were given immediately to the staff on how to screen it and the problem has not recurred.

Clive notes that this sort of service for a problem to an amateur radio station is rare indeed. He thinks that credit is due to the North of Scotland Water Authority and in particular to Duncan and Duncan, the two engineers who drove 38 miles each way from Inverness.

TV AUDIENCE RESEARCH DEVICES

IN OCTOBER'S 'EMC', I reported that Paul, G7PFH, was experiencing interference on the 70cm band that appeared to come from a neighbour's new TV set or related equipment.

Paul suffered from interference at S9 + 20dB signal on the 70cm calling channel, 433.500MHz. This channel is known as U280, formerly SU20. Paul found out that the neighbours had volunteered to have a TV audience research device installed. This collects information on which channel is being watched and transmits data to a unit connected to the telephone line. The equipment was subsequently removed at the neighbour's request and Paul hasn't heard the signal since then.

Bob, G3VVT, of Kendal, Cumbria heard a similar signal and traced it to a TV audience measuring device installed by a company called Advanced Television Research. Bob contacted ATR who sent an engineer. The engineer changed the pattern of pulsing the carrier on and off but did not change the carrier frequency.

Robert, G4OBE, transmits the GB2RS News on Sunday Evenings on 433.525 MHz and has received reports of a data signal on this frequency from various parts of London.

Chris, G4BOH, the RSGB Intruder Watch Co-ordinator, has also passed several similar reports to the EMC Committee. I have also found a similar signal in my travels. It is centred near 433.525MHz and carries a wide-deviation FSK data signal with a bandwidth of about 100kHz.

I have contacted ATR and it says that the device can be programmed to operate on 433.520MHz, 434.020MHz or 434.520MHz. It has offered to stop using 433.520MHz for new installations and to change to one of the other two frequencies when revisiting existing installations. It has also offered to 'fast-track' the frequency change at locations where radio amateurs are bothered by signals on 433.520MHz.

If any members suffer from interference from these devices on 433.520MHz, please inform me of the address or at least the street where the device appears to be installed and I will pass the information on to ATR.

The band 433.050MHz to 434.790MHz is within the 430 to 440MHz amateur band, and is also used by licence-exempt short range devices (SRDs) with a maximum power of 10mW. These include vehicle radio keys and various other devices. In the UK, SRDs on this band are allowed to transmit data but not speech and are limited to a maximum duty cycle of 10%. That means that the carrier can only be on for a maximum of 10% of the time. The 10% duty cycle limit came into effect from 19 April 1999 for new designs of equipment. Existing designs of equipment with a higher duty cycle that were approved before that date can continue to be used until 31 December 2005.

Further information on SRDs is available in the RA Short Range Devices Information Sheet RA114 (see 'www.' below). ♦

WWW.

Powerline World, Powerline Communications introduction
www.ipcf.org/powerlineintro.html
Radiocommunications Agency, Short Range Devices Information Sheet
www.radio.gov.uk/publication/ra_info/ra114.htm

IARU

Left, Tom Atkins, VE3CDM, retiring President IARU Region 2, and right Ole Garpestad, LA2RR, Region 1 EC Member and President of NRRL.

TIM HUGHES, G3GVV
10 Farm Lane, Tonbridge TN10 3DG.

IARU REGION 2 includes North, Central and South America and the Caribbean Area, with 40 member societies. From 30 September until 5 October, its triennial Conference was held in Guatemala City, hosted by the Club de Radioaficionados de Guatemala, CRAG. Thirteen countries' societies were represented: USA, Guatemala, El Salvador, Mexico, Cuba, Brazil, Columbia, Panama, Canada, Honduras, Venezuela, Turks & Caicos, and Trinidad & Tobago, whilst eight societies were represented by proxies. From Regions 1 and 3, came LA2RR; and ZL2AMJ with HL1IFM. The International Secretariat members there were the President, W4RA, Vice-President, VK3ADW, and Secretary, K1ZZ; W4RI was also present.

Regional conferences consider Documents which are submitted for consideration by its member societies. These Documents consist of reports, proposals and matters of general interest and for information.

Several matters were raised which are of interest to Region 1. The Morse issue was discussed at length, and a resolution was brought forward to the Administrative Council, as reported later in this article. It was agreed that a 300kHz band was a non-negotiable requirement at 7MHz. It was further recommended that Region 2 Member Societies seek a coordinated approach to a secondary allocation at 135.7 - 137.8kHz and 160 - 190kHz.

The decrease in the number of radio amateurs is a problem affecting many societies, not only in Region 2, but also in Regions 1 and 3; it was agreed that this is so urgent that it should be pursued by individual amateurs, by their societies, and by the formation of a permanent committee to consider action which might be taken to further investigation and find possible solutions.

Harmful interference to legitimate amateur radio operations from unlicensed operators is a world-wide problem, it being particularly bad in Region 2 in the 28, 24 and 7MHz bands - an effect worse during periods of maximum sunspot activity on the higher frequency bands, but noticeable on a local basis throughout the 11-year cycle. A recommendation was made that IARU supports and encourages the use of educational material by member societies to expand all existing publicity programmes, to include a brief and simple explanation of international frequency allocations. It is relevant to mention that Region 1 has an effective and recognised Monitoring System, with G4GKO as its coordinator.

Three Papers were submitted by Region 1, dealing with Power Line Communications, by DK9HU; the Pacemaker situation in Germany, by DJ1ZB; and the PLC situation in Germany, also by DJ1ZB. A report on a Workshop on regulatory issues regarding the introduction of ultra-wide band (UWB) in Europe, by DL2CH, was noted. Societies were encouraged to provide information about PLC in their own areas, and it was hoped that interest and awareness of UWB would be increased. Appreciation was expressed for the work which DARC is doing in this area.

David Sumner K1ZZ, Secretary IARU International Secretariat.

Finally, and of major interest to radio amateurs throughout the world, the Conference supported the work of the Future of the Amateur Service Committee (FASC). It has made proposals for agenda items which appear at WRC-2003, dealing with the basic rules for the Amateur Services, formation of amateur callsigns, and consequential changes in definitions.

A new Region 2 Executive was elected, comprising President YV5BPG, Vice-President HP1DJ, Secretary W6ROD, Treasurer 9Y4NED. The Area Directors are VE6SH, W6ROD, CO2RP, TG9AGD, 9Y4NED, PT2ADM, and LU2AH.

After serving for 18 years on the IARU Region 2 Executive Committee as President, Secretary, Vice-President and Area A Director, Tom Atkins, VE3CDM (also known as G4ABN), has now retired. Many presentations were made for his long and outstanding service. Radio Amateurs of Canada (RAC) presented him with a plaque recognising these achievements.

WRC-2003 DOMINATES DISCUSSION

THE ADMINISTRATIVE Council (AC) of the IARU met from 6 to 8 October in Guatemala City following the 14th General Assembly of IARU Region 2. The principal business at this meeting was to continue preparation for WRC-2003, which has several items of importance to the amateur service on its agenda.

The status of IARU preparations for WRC-2003 were reviewed. The agenda items of concern include harmonisation of amateur and broadcasting allocations near 7MHz, adequacy of HF broadcasting allocations below 10MHz, possible revision of Article S25 of the International Radio Regulations, changes to terms and definitions in Article S1 as a result of amendments to Article S25, review of provisions concerning the formation of amateur callsigns in Article S19, additional allocations for 'Little LEO' satellites, study of a possible allocation to the earth-exploration satellite service for synthetic aperture radars (SARs) near 435MHz, and possible identification of globally harmonised frequency bands for use by agencies and organisations dealing with public protection (such as police) and disaster relief. IARU objectives with regard to these agenda items were affirmed.

The IARU Council adopted the following resolution: "Considering the approval without opposition of ITU-R Recommendation M.1544 which sets out the minimum qualifications of radio amateurs, recognising that Morse code continues to be an effective and efficient mode of communication used by many thousands of radio amateurs, but further recognising that the position of Morse as a qualifying criterion for an HF amateur radio licence is no longer relevant to the healthy future of amateur radio, resolves that (i) Member Societies are urged to seek, as an interim measure, Morse code testing speeds not exceeding five words per minute; (ii) setting aside any previous relevant decisions, IARU policy is to support the removal of Morse code testing as an ITU requirement for an amateur licence to operate on frequencies below 30MHz."

In addition, the AC made a number of decisions of a mainly administrative nature, including adopting the budget and setting dates for future meetings. ♦

DA DATA DATA TA

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15, Noble Road, Hedge End, Southampton SO30 0PH.
E-mail: data.radcom@rsgb.org.uk

IN THE LATEST edition of *VHF Communications,* an improved high-speed PSK demodulator by Matjaz Vidmar, S53MV, is described. In the past, Matjaz has published a whole range of high-speed microwave data link designs - going into the full and detailed design of the direct-conversion microwave circuitry and modems. Some of his designs were covered in an earlier 'Data' column. The superb elegance of this design is in its simplicity! A rotating phase clock signal is generated by nothing more than CMOS switches acting on the baseband I/Q signals from a microwave downconverter; clock recovery and PSK demodulation are performed in a Costas Loop. Further details from the address given below.

T7F TRANSCEIVER UPDATE

IN THE AUGUST column, I reported on the T7F data transceiver from DF2FW. Having now constructed two of these kits, both tuned up and worked flawlessly from turn-on - apart from a minor software bug in the synthesiser controller preventing operation on the 'odd numbered' 12.5kHz channels. The bug was immediately fixed by the author within a couple of days of informing him - apparently no one had reported the problem before so, presumably, no-one operates with 12.5kHz spacing on 432MHz! Now to find a good use for them.

FUNDAMENTALS - BANDWIDTH CONTROL

UP TO NOW we have covered digital signalling by direct modulation of either the amplitude, frequency or phase of a carrier without taking into account the RF bandwidth of the resultant signal. As we know, a CW signal switched on and off too abruptly leads to key clicks which can spread a long way either side of the centre. We also know that CW can be received with quite a narrow filter in the receiver, so the wide clicks represent wasted energy as well as causing interference to other users. To reduce the bandwidth, the switching waveform has to have its edges slowed down. The situation is identical for digital waveforms. A carrier modulated (by any means) with a binary waveform without shaping will have a very wide bandwidth indeed! **Fig 1** shows a random binary signal, and the resultant spectrum when this is directly applied to a PSK modulator by switching the carrier between 0° and 180° phase while keeping the amplitude constant. The resulting spectrum has a well-defined shape, decribed mathematically by the expression

$$\frac{\sin(x)}{x}, \text{ where } x = \pi F_c t,$$

and is symmetrical about the RF carrier frequency. The periodic sharp nulls occur at multiples of the clock frequency, the first at F_c, with maxima at 1.5, 2.5, 3.5 etc times the clock frequency, either side of the RF carrier. By plugging in these values of x, we can see that the amplitude of the first peak at $1.5F_c$ is at 1 / (4.7) or -13.5dB, the second peak at $2.5F_c$, -17.9dB and so on. By the time we reach 16 times the clock frequency either side of the carrier, the signal is only down to -34dB which still represents a potential for causing serious interference while contributing little to signalling efficiency

The solution is to control the transmitted bandwidth by slowing down the rise time of the data transitions, or by passing the modulated waveform through a bandpass filter. Waveform shaping before modulation and filtering after modulation actually perform similar functions although their implementations and end result can be widely different. **Fig 2** shows the same random data waveform with two different rise and fall times with resulting spectra. Now we run into the other serious problem for data communications. As soon as the modulating waveform is slowed down to reduce the bandwidth it becomes smeared out and the transitions are no longer so precisely defined. This smearing of one data symbol into the next is termed inter-symbol interference and reduces the ability to regenerate the timing at the receiving end, harming the decoding, particularly in the presence of noise. So - we have the two opposing requirements of wide bandwidth for good quality data transmission and noise performance or narrow bandwidth for spectrum congestion and interference issues. As usual, the result is a compromise, with the waveform shaping being adjusted to meet satisfactory performance targets for adjacent-channel splatter and signalling efficiency.

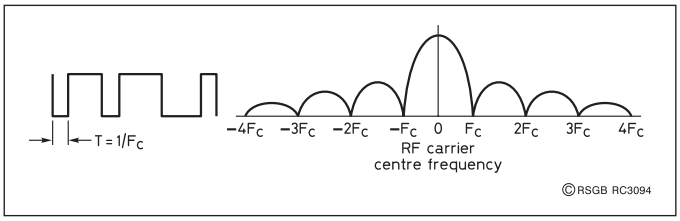

Fig 1: Unfiltered data waveform together with its spectrum when PSK-modulated on a carrier.

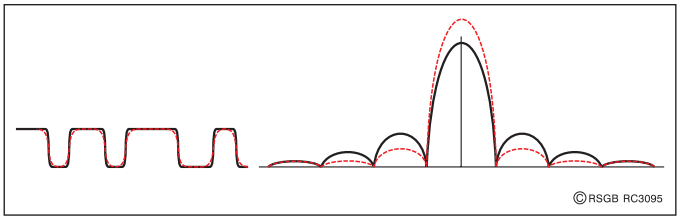

Fig 2: The same waveform with two different levels of filtering applied, and the resulting spectra.

One type of shaping often used is called the 'raised cosine' response. Here, the amplitude of the data waveform (or that of the carrier) is ramped up in the shape of a half cosine, raised above the centre axis so it goes from zero to a maximum. Raised cosine shaping allows good trade off of inter-symbol interference performance versus bandwidth and, by choosing the rate (cycle frequency) of the ramp, a suitable compromise can usually be found.

PSK31 carries this waveform shaping to the extreme, where a complete symbol (with transitions either side) consists of a single half-cycle of sinusoidal shape at the symbol rate. This gives the narrowest bandwidth possible at a little over the symbol rate of 31.25b/s, but with a definite degradation in inter-symbol interference, equivalent to approximately 1 - 2dB worse performance in noise than the theoretically ideal case. Another pulse waveform used for GSM mobile phones is the Gaussian response curve applied to the frequency spectrum of a Minimum Shift Keyed modulated waveform. The result is known as Gaussian-MSK or G-MSK. MSK is an extreme version of Frequency Shift Keying with a frequency shift equal to half the symbol rate.

For FSK signalling, it is possible to shape the frequency transition by changing slowly from one tone to the other while keeping the amplitude envelope constant. This technique does not appear to be too widely used, possibly because it is a mathematical nightmare to analyse and demodulate optimally, but simple analysis and modelling shows it could have some benefits in the long term with increasing DSP power in modems. ♦

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the last Word

Reflections on 11 September

There cannot be anyone that has not been moved by the tragic events of 11 September. Indeed, our own communications media have brought the full enormity of these cowardly terrorist acts directly into our homes.

I like many others, have shared our private thoughts with fellow amateurs in the States and with special stations like 9K2USA. The sad fact is that with over 7000 lost, the odds are such that we could be reflecting upon a number of premature Silent Keys.

I'm sure our thoughts are with all who have lost loved ones, and our admiration goes out to the emergency services and volunteers who have the task of recovering those who were lost.

Steve Smith, MIMgt, G4HJE

UTC vs GMT

In the last paragraph of 'Technical Topics' (September 2001) it is reported that Denzil Roden, G3KXF, is concerned about the growing use of UTC rather than GMT. Having recently had to learn about time distribution because of moves by some people to abolish leap seconds, I am very pleased to see this trend towards UTC.

The main reason for this is that as an international time standard GMT was abolished in 1925. It was replaced by UT which has since been refined into UT0 (Instantaneous mean time), UT1 (the same with correction for polar wander), UT2 (a better corrected version of UT1) and UTC which is within 0.9sec of UT0 but runs at atomic time (TAI) rate.

It is usually assumed that GMT is the same as UTC but without that nice feature of GMT that the date changed at mid-day, which was very handy for the astronomers who defined it. The attempt in parliament to change all references to GMT in British statute to UTC was, yes, you guessed, talked out of time!

If you don't like being precise, then I suggest you use UT. This fails to say what sort of UT you mean and gives up to 0.9s uncertainty in your time.

Oh, and why was I bothered about leap seconds? I maintain the program that tell the astronomers which way the biggest single mirror optical telescope in the UK is pointing. For this I need to know the time, and the Internet does that nicely at the moment. If leap seconds were abolished this time would drift away from UT0 (which is what I really want) by more than 0.9s (which I can just tolerate). Then the astronomers would have to know what this month's time fudge factor was, and they don't really want to know about that.

Roger Stapleton, GM0GKR
University of St Andrews, School of Physics and Astronomy

A Bright Future

At last, a sensible licensing structure that should ensure the continuance of our marvelous hobby. In my opinion it should have happened years ago. Think of all the potential operators lost during the late CB fad and the present Internet age.

With equal enthusiasm I welcome the change of status and attitude both within and towards our Society. The RSGB has proven itself capable of being the main instructional and examining body of the Amateur Radio Service; may it become so.

I am a modern professional VHF / UHF person at work and a vintage CW man at heart and home. Let us welcome the newcomers and, above all, encourage them to cherish and maintain the true spirit of amateur radio.

David Jones, G4LXH

. . . As a new MM5 licence-holder, I was delighted with the news from the RA that I am to be upgraded to join our 12WPM Morse fellows as a Class A type. Having taken some 34 years as a former Class B (GM8AVM) to actually pass the 5WPM Morse test, with much help from the RSGB and dear golden oldies at my local club, I am now a very happy MM5 type on HF.

The RA has now given me the chance of swapping my MM5 for a nice new shiny MM0 licence. Sorry - no way! I am so proud of my MM5 licence and the challenge to get it that I am keeping it for as long as legislation allows.

May I express my gratitude to all those in the RSGB and the RA that have carried out the task of consultation and wise counsel in making the changes to the licence structure *before* WRC 2003. The future of our hobby does rely on being sensitive to new needs if we are to excite the younger generation about radio. The new licensing indicates a well-balanced restructuring for present-day requirements and shows that those in authority were listening to the views of *all* radio amateurs.

Ian Macdonald, MM5WIG

Antenna-Less Amateur Radio

I am nearing 82 and been an amateur since 1972. I have decided to pack up my station for several reasons. One is that after a slight stroke my CW is very bad. Also I am now too old to go up ladders and deal with antennas, so all of them are now down.

I have taken to working stations via the Internet and *I-Link* software and I am doing very well, with ZL, VK, VE and mobiles in USA and Hawaii. My link is via W7WFM and it is very good.

I worked a G4 the other day who has just moved into sheltered accommodation. He can't put up antennas, but it keeps him 'on the air', so it will be a boon to those chaps and flat dwellers.

Bill Trenchard, G4EHU

Keep in Touch

I would like to apologise to the few members who arrived here hoping to enjoy the 'QRP Beside the Seaside' function. Unfortunately the meeting was cancelled at short notice because four of the organisers were admitted to hospital within three weeks of the event.

All the local clubs whose members had expressed an interest were told, the cancellation was announced on the Society's GB2RS news broadcasts and was also kindly broadcast by BBC Radio Norfolk.

The moral of this sad story suggests it is a good idea to keep in touch with your club and to listen to the Society's news broadcasts.

David Buddery, G3OEP

PCB Assembly Fumes

Whilst prevention is better than cure; Industrial Disablement Benefit may be granted, paid as a pension for life, to those who experience reduced tolerance to workplace fumes during employment.

Bob Houlston, G4PVB

Lost

Old faithful standard NATO / ITU phonetics
Not seen or heard of late from many UK stations
Was taught for RAE examinations but seldom used since
Beware of weird and wonderful substitutions
From George Mike Zero Japan - oops!

Mike Thorogood, GM0JKF

Morse Conundrum

I notice that 80% of the people featured on the front cover of the September *RadCom* are wearing spectacles. I am a Morse aficionado and also am a wearer of spectacles. Is Morse bad for the eye-sight?!

Bryan Harris, G3GTF

Don't Lose the Thread

I was amused by the report ('Technical Topics', August) on quite extensive experiments with trees as antennas, and was not surprised by their signal lack of success. I fell to wondering how many experiments have been done with the traditional 'wet string'? After all, a ball of string is easily portable and there is usually water around, especially in the UK!

This raises the question, how long does a length of wet string stay wet with RF running through it? What kind of string works best? Does it work better in rain or in sunshine? A vast field of possible experiment lies waiting for someone!

John Allison, G0LYY

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MFJ

PHONE OR FAX FOR A FREE MFJ CATALOGUE
MFJ - HYGAIN - AMERITRON - MIRAGE

MFJ-Cubs
£89.95 (KIT)
£139.95 (BUILT) + £8.00 carr

Single band QRP Rigs

Case etc. included.

VFO controlled up to 2W(1W on 15m), you can adjust it down to milliwatts. Measure just 90 x 47 x 98mm and requires 12v DC. Models for 80m, 40m, 30m, 20m & 15m. Order MFJ-9380, 9340, 9330, 9320 or 9315 (plus "K" for kit or "W" for built).

MFJ 5W QRP
£189.95
Plus £8.00 Carr.

Low Power CW Transceivers

VFO control, single band, 12V 750Hz xtal filter, sidetone, break-in, speaker, 162 x 60 x 150mm. Great value!
Order MFJ-9040, 9030, 9020, 9015 or 9010. All ready built.

MFJ-989C ATU
£349.95
Plus £8.00 Carr.

3kW 1.8- 30MHz "T" Match

This design has a roller coaster coil and a 4:1 balun to match balanced line. Ideal for coax, end fed wires and open wire feeder. Features PEP or RMS power measurement VSWR, antenna switch, bypass, built-in dummy load etc. Size 270 x 375 x 115mm.

MFJ-986 ATU
£319.95
Plus £8.00 Carr.

3kW Differential 1.8 - 30MHz

One less knob to twiddle, but all the facilities of the MFJ-989C

MFJ-969 ATU
£189.95
Plus £8.00 Carr.

HF + 6m! 300W "T" Match ATU

It has a very accurate PEP meter built-in, (PP3 battery needed) Includes VSWR cross needle meter; dummy load and lovely roller coaster for critical adjustment. Handles coax, balanced an wire. Size 268 x 242 x 95mm.

MFJ-949E ATU
£149.95
Plus £8.00 Carr.

1.8 - 30MHz 300W "T" Match ATU

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-934 + MFJ-931 ARTIFICIAL GROUNDS
MFJ-934 £169.95
MFJ-931 £89.95
Plus £8.00 Carr.

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-8100 Short Wave Receiver
£75.95 (KIT)
£99.95 (BUILT)carr. £8.00

Case etc. included.

Experience the thrill of short wave listening on this regenerative receiver that has amazing sensitivity. Brand new solid state design. Just a short length of wire will bring good signals in. Covers all the major short wave general and ham bands. Simple to build and operate.

MFJ-962D ATU
£259.95
Plus £8.00 Carr.

1.8 - 30MHz 1.5kW "T" Match

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-941E HF 300W Budget ATU
£109.95
Plus £8.00 Carr.

Matches all types of antennas.

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-1700B Tx - Rx 6-way Switch
£79.95
Plus £8.00 Carr.

2kW from 1.8 - 30MHz, use it to select up to 6 antennas and 6 transceivers in any combination. Unselected terminals are automatically grounded

MFJ Dummy Loads

MFJ-264 or MFJ-264N
1.5-150MHz 1.5kW £64.95
"N" version of above £69.95
MFJ-260C or MFJ-260CN
1.5 - 150MHz 300W£32.95
"N" version of above £39.95
Carr. £8.00

MFJ-914 Auto ATU Extender
£59.95
Plus £8.00 Carr.

Match into that G5RV or similar

If your internal auto atu is having trouble matching your G5RV or similar antenna. this should solve the problem. Just place it in series with the coax feed to the rear of your transceiver. Magic!

MFJ-382 Amp + Speaker
£39.95
Plus £8.00 Carr.

This desktop speaker will amplify and improve the audio of scanners and QRP radios etc. Powered from 9V batt (extra) or external 12V supply, it measures 89 x 45 x 114mm comes with mono - mono lead.

MFJ-418
£69.95
Plus £8.00 Carr.

The easy way to learn CW

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.

MFJ-269 and MFJ-259B

The most advanced antenna analysers

MFJ-259 £249.95 Carr. £8.00
MFJ-269 £329.95 Carr. £8.00

Connect it to your antenna and get all the information you need to optimise it for best performance including resonance, VSWR and impedance. Totally portable (using AA cells), you can work right up by the antenna. The MFJ-259 is the basic design covering 1.8 - 170MHz. The MFJ-269 has extended coverage up to 470MHz and gives an extremely wide range of measurements, even indicating where a break is in a coax cable.

MFJ-1704 4-way switch
£59.95
Plus £6.00 Carr.

DC - 500MHz 2.5kW

This is a heavy duty die-cast 4-way switch with SO-239 sockets, central earth position and built-in static discharge protector. Makes changing antennas a breeze!

MFJ-392 Mono Padded Communications Earphones
£22.95
Plus £3.00 Carr.

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.

AMERITRON - FULL RANGE OF HF LINEAR AMPLIFIERS IN STOCK - SEND FOR MFJ CATALOGUE FOR DETAILS

MFJ

MFJ-1025 "Local Noise" Canceller
£119.95
Plus £8.00 Carr.

Kills local noise, but lets signals through. Handles electrical noise, TV time-base etc. Short length of wire picks only local interference and cancels it out.

MFJ-1026 As MFJ-1025, but has active whip antenna for picking up noise signals (as illustrated above). £159.95
Carr. £8.00

MFJ Compact Verticals

MFJ verticals are compact, yet offer a large number of bands. Being vertical dipoles, they offer exceptionally low angle of radiation for DX. They are rated up to 1kW on the HF bands.

MFJ-1796 (40, 20, 15, 10, 6 & 2m)
Just 3.65m long, it is the ideal antenna for really small spaces.VSWR typically 1.2:1
£209.95 Carr. £8.00

MFJ-1798 (80, 40, 30, 20, 17, 15, 12, 10, 6 & 2m!)
Only 6.7m long, it covers every popular band. No radials and no ground needed. £279.95 Carr. £8.00

MFJ-616 Speech Intelligibility Enhancer
£169.95
Plus £8.00 Carr.

HEAR SIGNALS BETTER

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!

MFJ-461 MORSE CODE READER
£84.95
Plus £6.00 Carr.

The MFJ-461 is a stand-alone pocket sized Morse code reader. Similar in size to the MFJ Morse tutors, all you do is hold it close to your receiver and it instantly displays CW on the 32 character high contrast LCD. It has automatic speed tracking, a serial port - if you wish to connect to a computer to display the text on a bigger screen. It can also be connected to your receivers audio if required. Truly pocket sized at 57 x 82.5 x 25.5mm and 156g.

MFJ-1786-1788

MFJ-1788

MFJ-1786

MAGNETIC LOOP ANTENNAS
MFJ-1786 10-30MHz £369
MFJ-1788 7-21MHZ £419
Ideal for restricted space locations. Rugged all welded aluminium construction, they are fully weatherproof and don't require a separate control cable, the coax carries the signal and the DC control signals for tuning. You can remotely tune to the amateur bands. They have very narrow bandwidth