

Practical Wireless

PW

amateur radio & more!

**New
Licensing
Structure
Announced
full details
inside**

Black Box Magic
Kenwood
TS-B2000
Reviewed

Plus
Madeira Operating
with SMOJHF
Laid Back Loops for HF

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SMITH CORSET

NOVEMBER 2001 £2.75

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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.

Z-11 Auto ATU for FT-817

160m - 10m



£199.95 carr.£6

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	£
Carriage charge £2 each	

OTT-1 One Touch Tune



£59.95 carr.£6

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

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



£69.95 carr.£6

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.

MFJ-Micro Key MFJ-561



£24.95 carr.£2

FT-817 Micro 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.

YAESU FT-1000MP Mk-V

200W HF All Mode Transceiver



£2899
Plus £8.00 Carr.

The New Industry Standard
Would a Serious DXer accept anything less ?

FT-1000MP AC 160-10m 100W Transceiver **£1699 C**

<u>FT-1000 Accessories</u>			
FTV-1000 6m (MKV)	£799 B	YF-110SN SSB	£95 B
MD-100ABX Mic	£110 B	YF-110CN CW	£106 B
SP-8 Speaker	£139 B	YF-115C Collins	£99 B
DVS-2 Vce message	£199 B	TXCQ-6 Ref Osc	£128 B
YF-114SN Fil SSB	£84 B	YH-77STA Phones	£56 B

KENWOOD TS-2000

160m - 70cms Plus 23cms option



£1695
Plus £8.00 Carr.

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.

ICOM IC-756PRO

1.8 - 52MHz 100W



£1895
Plus £8.00 Carr.

<u>IC-756PRO Accessories</u>			
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	£266 B

ICOM IC-775 DSP 200W HF

Last of The Many



£2099
Plus £8.00 Carr.

YAESU FT-920AF

HF 160m-6m-100w



£1099
Plus £8.00 Carr.

KENWOOD TS-570D6

160 - 10m All Mode



£849
Plus £8.00 Carr.

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

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YAESU MD-200ABX

The best microphone Yaesu have ever produced. Featuring Variable Side Pressure Control, you can adjust the audio response precisely. There is also provision for fitting and selecting an additional element, such as Heil.



£249
Plus £6.00 Carr.

10M OR 15M WHIPS

100W 10m Mobile Whip with mag mount. Built-in impedance transformer. Just over 1m long, complete with magnetic base, shock spring, 5m coax cable with PL259 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.



£19.95
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YAESU FT-847

160m - 70cm All Mode



£1199
Plus £8.00 Carr.

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

ICOM IC-746

160m - 2m All-mode



£1395
Plus £8.00 Carr.

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

ICOM IC-706IIG

160m - 70cm All Mode



£999
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

HS-706

<u>IC-706IIG Accessories</u>			
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	

ICOM 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-100D

160 - 70cm All Mode



£1249
Plus £6.00 Carr.

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

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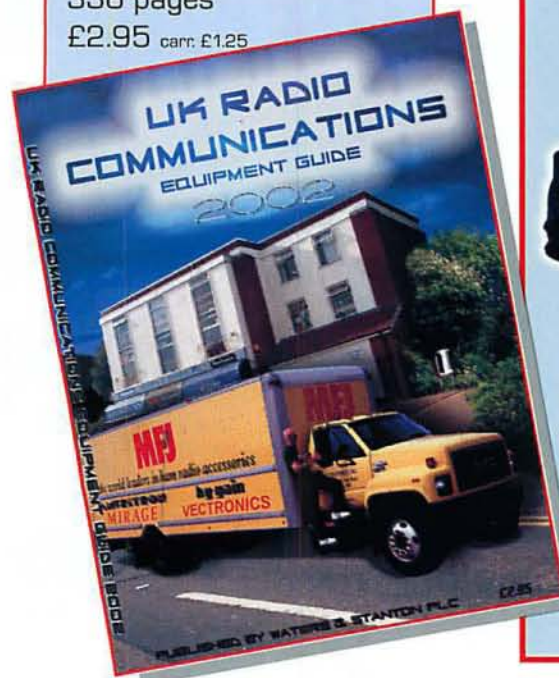
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Small, compact yet built like a Battleship! Should last for years. Look at the Price!

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A great budget class radio for VHF & UHF use.

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Rugged design with switched receive filters 12.5/25kHz

KENWOOD TM-D700E 2m + 70cm FM**£449**

Plus £8.00 Carr.

Large detached screen and APRS, make this a firm favourite. One of our best selling dual band mobile radios.

KENWOOD TM-G707E 2m + 70cm FM**£289**

Plus £8.00 Carr.

If you are looking for simplicity and low cost, here's the answer.

**TM-V7E 2m + 70cm FM****£359**

Plus £8.00 Carr.

A lovely cool blue display, easy to read and with 50/35W output. A great choice for kenwood fans.

ADI-AT-600**HOCKLEY WAREHOUSE EXCLUSIVE**

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

£169.95

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**ICOM****IC-T81E 6m, 2m, 70cm + 23cm FM****£299**

Plus £8.00 Carr.

Four bands in one very compact handheld. This enables you to take advantage of the UK's complete repeater network right up to 23cms. Also makes an ideal travel companion. AM air receive.

IC-T8E 6m, 2m + 70cm

Very similar in design to the IC-T81E, but without the 23cms band. And again, like its brother, it offers AM airband receive.

£199

Plus £8.00 Carr.

**KENWOOD TH-D7E 2m + 70cm****Data Communicator**

One of the most successful handhelds over the past few years, it even has a built-in TNC for Packet use. You can also use it for APRS operation in conjunction with an external GPS unit.

£299

Plus £8.00 Carr.

YAESU**Yaesu Handhelds**

VX-1R	2m/70cm handy	£165 B
VX-5R	6m/2m/70cm	£269 B
FT-11R	2m	£119 B
FT-41R	70cm	£119 B
FT-51R	2m/70cms	£315 B

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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

WMM-3 Data Modem

£69.95
Carr. £6.00



This modem permits a wide range of data to be sent and received. Starterdisc for SSTV, CW, RTTY, Pactor, 1200baud Packet etc included. The unit is powered from the PC serial socket.

WSA-1 PSK-31 Adaptor

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

£39.95
Carr. £6.00



Get in Front with HUSTLER

5BTV

4BTV



BASE STATION ANTENNAS

Spec	5BTV	4BTV
Bands	5	4
Coverage	80m-10m	40m-10m
Bandwidth	10-40m	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 G3QJV.
Customers are also telling us how pleased they are with the base verticals. Check the prices!



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 - 13dB 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. 8.9dB 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. 8dB 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. 8dB 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 element 10.37m 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. 6dB 7.3m radius 2kW	£699.95 C
Ten-3	10m 3 el. 8dB 3m radius 2kW	£189.95 C
ASL-2010	13.5-32MHz 8 el. log periodic 6.4dBd 5.66m radius	£749.95 D



The Mini-Beam For Small Gardens

Here's the best 3 element mini beam you will ever find. It gives 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 a maximum element length of 5.2m. Turning radius is just 2.7m. Uses a single feeder; this really works the DX. Get one up before winter!



MA5V A new mini vertical 5 bands from 10m-20m and stands just 3.7m. No radials needed and handles 500W. Great for portable use, backyards and patios. £229.95 C

Vertical Antennas

RB (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

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

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

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

80m + 40m Monoband Verticals

Ideal for small gardens, they will work at ground level with a single earth stake. Height adjustable from 3m to 6m approx. Power handling 400W

LOFA-80	£69.95
LOFA-40	Carr. £8.00

QS-112 Speaker Mic



Models for Yaesu, Kenwood, Icom, Alinco and Motorola.

£16.95
Carr. £2.00

WCT-321 Lapel Talker

Earpiece with combined lapel hanging mic and PTT. Models to suit most radios.

£19.95
Carr. £2.00



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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

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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 B-pin plug.

£59.95
Carr. £6.00



W-GMV Deluxe Key

A high quality Morse key made of brass with wood base. Full set of adjustments

£39.95
Carr. £2.00



SPM-102 Speaker Mic

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

£9.95
Carr. £2.00

Limited stocks.



WATSON

Great value mobile antennas

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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 tilt-over bases.

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

WSMA-450

Extremely low profile antenna with transmit (Tx) capability on three bands as well as useful wideband reception on additional bands. Ideal for use with covert transceivers/scanners.

*4.5 cm long

£12.95
Plus £2.00 Carr.

WATSON PBX-100 Portable HF 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. £99.95 C

Base Antennas

2m / 70cm fibre glass colinears with stainless steel fittings, 3 short radials and SO-239 sockets. Pre-tuned and all hardware for mast mounting.

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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/70cm		
W-2000	0/6/9dB 2.5m long	£69.95 C


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Key specifications			
Frequency range:	10Hz-2.5GHz	Sensitivity:	76MHz-2.5GHz <50mV
Display:	8 digit 0.5" liquid crystal display	Frequency accy:	± 4PPM + 1d
Measurements:	Frequency, period, data hold, rel, memory min/max/ave	Power requirements:	4x1.5AA batteries (not supplied), or 9V 300mA adapter
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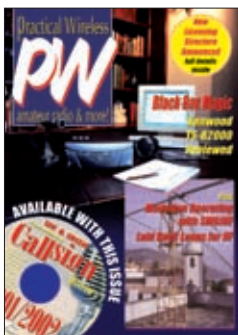
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Cover Subject

The black box version of Kenwood's TS-2000, the TS-B2000 and its remote head unit RC-2000 mean the transceiver can be used in portable operation, adding to the rig's versatility. Richard Newton G0RSN reckons its one of the best radios he's ever used out and about.

Photographs by: **Main image courtesy of Kenwood Electronics (UK), inset by Henryk Kotowski SM0JHF**

Design by: **Steve Hunt**

November features

17 Looking At....

Getting to grips with the audio-frequency filter is the order of the day for **Gordon King G4VFF**.

22 Radio Basics

Switching and switches is a subject that many newcomers to Amateur Radio find difficult to grasp. So without further ado **Rob Mannion G3XFD** sets out to take the misunderstanding out of the subject.

23 Licensing - The Future

Long talked about and highly rumoured the changes to the Amateur Radio Licensing Structure were finally unveiled at the Leicester Show. To keep you up-to-date with the the biggest changes for years we report the facts.... together with some of the reactions.

28 Review - The Kenwood TS-B2000 & RC-2000

Using a transceiver designed for main station use as portable is an unusual concept, however that's exactly what **Richard Newton G0RSN** did with Kenwood's Black Box version of the TS-2000 and RC-2000 remote head. Read his review to find out why he liked it so much.

32 Magical Madeira

Think of Madeira and images of flowers, fruit and wine come to mind but as **Henryk Kotowski SM0JHF** discovered it also boasts a high level of Amateur Radio activity too!

36 Laid Back Loops

Cheap to put up and offering several advantages over other antenna types.... horizontal loops often get overlooked says **Robin Trebilcock GW3ZCF**.

38 Careful With That Callsign!

Patrick Allely GW3KJW looks at the legal pitfalls lurking in waiting to trip up the unsuspecting radio operator.

42 The Morse Mode

Whatever your feelings on c.w. it's widely used on the bands everyday and with that in mind **Gerald Stancey G3MCK** delves into the arguments surrounding the mode.

44 A Classic Pair

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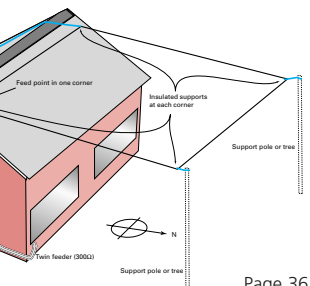
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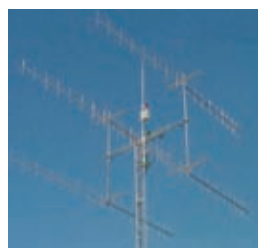
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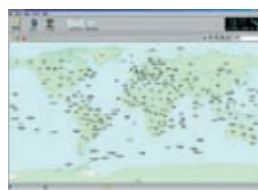
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author info

Our Radio Scene reporters' contact details in one easy reference point.

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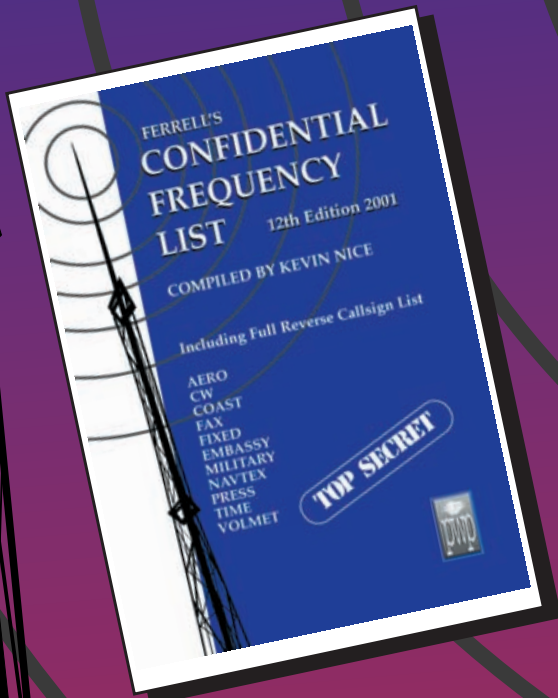
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rob mannion's **keylines**

Welcome to 'Keylines'! Each month Rob introduces topics of interest and comments on current news.

It's impossible for me to convey in writing the personal feeling of horror when I joined the millions of others watching the results of terrorism at the New York Trade Centre on Tuesday 11th of September. The result of a growing evil which has spread throughout the World, with its followers living (apparently) peacefully in the country they hate with such fervour - including our own Islands...what I heard on the radio, and saw in subsequent television broadcasts have left me in a state of shock.

However, by far the worst of the nightmare for me - was watching the North Tower suddenly crumble and collapse with devastating speed because **I'd actually once stood on top of that tower.** As I watched the North Tower fall, I remembered the occasion in 1996 when I was



- Pictured on the observation veranda of the Empire State building in 1996, Rob G3XFD was able to visit North Tower of the Trade Centre in New York (background left) soon after.



- Now a dramatically altered skyline. Rob G3XFD took this photograph of the Lower Manhattan shoreline -with the Staten Island ferry terminal arches prominently in the foreground. Viewed from one of the passenger vessels which provide circular cruises around New York City, the Trade Centre's North Tower is identified (second left taller building) by its red and white painted broadcasting mast.

standing alongside the tall broadcasting mast during a specially organised visit.

The visit to the North Tower came about because the *PW* Dayton HamVention holiday trip went via New York that year. Normally closed to the public because of the high power transmitting equipment, I'd got the chance to visit the tower's broadcasting installation courtesy of the Engineers, some of whom were Radio Amateurs and who also knew members of the Amateur Radio Club I provided a *PW* 'Club Talk' to during our three day stop-over. Coincidentally - and with a very sad irony - their clubroom was actually in a 'Fire House' (We'd call it a fire station) just over the George Washington Bridge and some of the members were also firemen.

Since the barbaric episode in New York I've not heard from any of my friends there. I'm hoping all is well, but my wife **Carol**, who lived and worked in New York for a number of years, has heard all her friends are safe, including one of the Godmothers of our eldest daughter **Charlotte**. Additionally, everyone here at *PW* Publishing Ltd. was very relieved indeed when we heard that **Bob Kemp** from our Art Dept, was safe. He'd been visiting New York and actually saw the catastrophic events...and we're all very thankful for his safe return.

Our deepest sympathy goes to all the bereaved.

Humanity can defeat evil...even when it lives amongst us...it can be overcome.

New Irish Beacon

During the summer I've had great fun on 'Ten' metres and have found the newly-introduced 28MHz beacon - callsign **EIOTEN** on 28.209MHz **running 25W or so at the moment** - from the Irish Republic to be extremely useful. Sponsored and operated by the Irish Transmitters' Society (I'm a member of both the RSGB and IRTS) this well-thought out initiative has already proved very useful for my own casual propagation studies.

Currently EIOTEN is the only 28MHz beacon on the air from the Islands we share. It's fascinating to hear it at 5 and 9 plus and hear the more distant

IBP beacons on 28.2MHz. It's a fascinating band and the dear little (it sounds so lonely and plaintive chirping its slow c.w.) **LU1FHH** beacon from Argentina on 28.199MHz is often heard at the **same signal strength at the same time**...(obviously a real mixture of short, mixed skip and multiple hop propagation). Thank you IRTS...the beacon is much appreciated! Try listening to the beacons readers...you'll also learn that the 28MHz band is open far more often than you imagine!

Please Be Patient!

The response by readers for the free Information Sheet on capacitors has been overwhelming - so I ask those of you who've sent in an s.a.e. to please be patient! The demand is such that **Tex Swann G1TEX** (responsible for the drawings) and I have decided to make the information as comprehensive as possible, as soon as possible!

Thank you for your interest...you'll be receiving the information soon. We're also very pleased you enjoy Radio Basics so much and there are some interesting projects on the way. Cheerio for now.

Rob G3XFD

practical wireless **services**

Just some of the services *Practical Wireless* offers to readers...

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Subscriptions are available at £30 per annum to UK addresses, £38 in Europe and £42 (Airsaver), £49 (Airmail) overseas. Subscription copies are despatched by accelerated Surface Post outside Europe. Airmail rates for overseas subscriptions can be quoted on request. Joint subscriptions to both *Practical Wireless* and *Short Wave Magazine* are available at £60 (UK) £73 (Europe) and £81 (rest of world), £85 (airmail).

Components For *PW* Projects

In general all components used in constructing *PW* projects are available from a variety of component suppliers. Where special, or difficult to obtain, components are specified, a supplier will be quoted in the article. The printed circuit boards for *PW* projects are available from the *PW* PCB Service, **Kanga Products, Sandford Works, Cobden Street, Long Eaton, Nottingham NG10 1BL. Tel: 0115 - 967 0918. Fax: 0870 - 056 8608.**

Photocopies & Back Issues

We have a selection of back issues, covering the past three years of *PW*. If you are looking for an article or review that you missed first time around, we can help. If we don't have the whole issue we can always supply a photocopy of the article. Back issues for *PW* are £2.50 each and photocopies are £2.50 per article.

Binders are also available (each binder takes one volume) for £6.50 plus £1 P&P for one binder, £2 P&P for two or more, UK or overseas. Prices include VAT where appropriate.

A complete review listing for *PW/SWM* is also available from the Editorial Offices for £1 inc P&P.

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Technical Help

We regret that due to Editorial time scales, replies to technical queries cannot be given over the telephone. Any technical queries by E-mail are very unlikely to receive immediate attention either. So, if you require help with problems relating to topics covered by *PW*, then please write to the Editorial Offices, we will do our best to help and reply by mail.

All other letters will receive a £5 voucher.



Dear Sir

Stephen Smith
Leeds

Air Tattoo Finalé

Dear Sir

Tuesday July 10 was a particularly good day for me, not only was it my birthday but through the post came two complimentary tickets to the International Air Tattoo at Cottesmore, courtesy of PW! My wife and her father suddenly became Mil-air enthusiasts so I had to buy a third ticket!

Although I am a very keen Airband listener - I rarely go to the Military shows so I spent some time on the Internet looking for appropriate frequencies to pre-install into my

scanner. Fortunately I discovered that RIAT had also been held at Cottesmore last year so I copied all those frequencies into my AOR 8000. On the day I used a Watson Super Gainer 881 antenna and an earpiece with the AOR 8000 and the set-up worked very well indeed.

The most active frequencies were those in use by the Tower, who co-ordinated both the flying displays and a team of about eight 'follow-me' vehicles. The vehicles were utilised to escort aircraft off the runway by the shortest route prior to the next display. Although very hectic at times - some

conversations the control tower and the vehicles were rather amusing! At one point the tower took great delight in accusing one follow-me car of losing the Hungarian MIG-21!

Undoubtedly the star performance of the day was a flypast by the Northrop Grumman Stealth Bomber- B-2A Spirit - eerily quiet as it crept across the sky like a large alien moth followed closely by the statically displayed F-117A NightHawk. During the show security guards and police officers permanently surrounded the Nighthawk, however at the end of the day, as most of the crowd were leaving it was decided to move this expensive piece of hardware from the public side of the airfield and store it in a secure hanger.

The follow-me vehicles by now in high spirits then took the opportunity to line up around the NightHawk in an impromptu aerobic style diamond shaped pattern - reminiscent, they concluded of the recently departed Red Arrows. This vehicular display team entertained the tower with their ability to stay in convoy for several hundred yards at 5mph using radio language more appropriate to 300mph displays. Of course the passing public missed all of this - unless they were listening in! Isn't Amateur Radio a wonderful hobby!

For interest some frequencies in use that day included:

118.6MHz	Cottesmore Tower
370.05MHz	Cottesmore Tower (for military aircraft not equipped with v.h.f)
386.725MHz	Departures
119.15MHz	Ground Operations/ Runway Clearance
412.15MHz	Refuelling

Many thanks for the prize and the opportunity to have a great day out. All three of us thoroughly enjoyed it. I have enclosed a selection of photos taken at the show by my XYL.

Nigel Cook
Southampton

Editor's comment: Although we've had many other grateful comments from Air Tattoo ticket winners - Nigel's letter and superb photography provide a fitting conclusion to an obvious great day out. We look forward to running the competition again next year. Good luck everyone!

The *PW* Film Shows

Dear Sir

I note with interest in June's issues the article (Topical Talk, page 77) on the *PW* film shows that were held in Caxton Hall Westminster and presented by Mullard. I've also noticed these adverts in my old *PW* magazines, they're of interest because along with my interest in radio and electronics I also collect and restore vintage cinema equipment, I also act as South West Co-ordinator for the projected picture trust.

Occasionally I give 16mm film shows to Engineering Societies and interested groups who have an interest in electrical/mechanical engineering, radio and electronics. And within my collection I do have a couple of Mullard titles which I was able to obtain from some of the film collectors fairs I attend.

I would be grateful if any reader can offer any help of shed any light on to what happened to the rest of the films within the Mullard film library as these would prove very interesting and educational as indeed the others have. Within reason I am prepared to give a film show to the other radio societies if they are interested and with some more material we could perhaps recreate the *PWW* film shows at Westminster?

Chris Plaister MW1CTP,
32 Eton Road,
Newport,
South Wales NP19 0BL

Editor: If you can help - please write directly to Chris. We hope he's successful -with your help.



Vintage TV

Dear Sir

On Thursday 1 September 1938 the *Sheffield Independent* (a paper no longer extant) carried an article, with a photograph of a wireless station and masts about a **Mr G. W. Bagshaw** who had been receiving television pictures with sound from Alexandra Palace. The Amateur Station was at Dore Moor on the outskirts of Sheffield and the receiver was 'not of commercial manufacture'. It was believed to be the greatest distance in the UK that television pictures had been received at that time.

The article continued by saying that Mr Bagshaw was a well known "radio expert", an Amateur transmitter and the manager of J. G. Graves Ltd wireless factory and further that he possessed several short wave receivers and transmitters. Interestingly he held out little prospect of Sheffield people being able to receive television!

May I therefore, through your column appeal for further information about this pioneer, particularly his callsign (which I feel he must have had), his address and the

location of J. G. Graves' wireless works where domestic radios were made during the 1930s.

**Syd Fenwick G3AIO,
28 Gimble Way,
Pembury,
Kent TN2 4BX**

Editor's comment: If Syd can solve the mystery it would make an interesting article for PW. If you can help, please write directly G3AIO.

Reviews In PW

Dear Sir

Reading the readers' letters (in the August *PW*) I see from the Editor's comment on (letter entitled FT-707 Appreciate' - pages 10 & 11) that the Editor says there's not a lot of feedback on the radio reviews you do in the magazine. Well Rob...I want to say thanks for all the reviews the editorial team produce in *PW* as I enjoy reading them very much indeed.

In fact the articles I have enjoyed the most recently are the reviews of the older radios in the It's A Classic series. I have looked at those and been able to say "oh yes that was a great radio, I had

one of those...in fact I still do". Reading those prompted me to rummage around and dig out my FT-290 Mk1, my FT-480 and FT-780. Oh....I had also forgotten how good they were! (and still are!).

I even went to Dayton HamVention this year and bought a new power supply for them to run on. And, as I've moved to the USA since I bought the sets, I flipped open the lids got out the old circuit diagrams (you notice how in those days full circuit diagrams and tune up instructions came with the radio?) and modified them all to run on 5/10kHz spacing. I had forgotten how much fun this all was!

Thanks for the great reviews keep them coming. How about someone covering the old FT-290 Mk1? I see those selling for £150 second-hand these days. That's a great bargain for a great radio.

**Kevin Jackson G4NEJ/W3
Maryland
USA**

Editor's comment: Pleased you enjoy 'It's A Classic' Kevin -the FT-290 will join the (long) list of future classic reviews. Nice to hear from you in the USA!

More Information Please

Dear Sir

Firstly, I would like to say I admire the Editor's new workshop! (Keylines September). However, I'd also like to make some suggestions for *PW*. Firstly...would it be possible for authors to give more info in any articles they publish? I mean things like frequencies and modes. It's all very well saying "I worked such and such on 50MHz" - but it does not tell me enough.

The September article on disguised antennas, a good article but lacking in such things like lengths of the inverted V, and does the 50Ω feed to the rig go via a balun or a.t.u.?

The equipment reviews in general are very good, but again lack basic info such as frequency, mode, etc., when air tested, they

also tend to go over the top sometimes with technical jargon. The average user wants to know the good and bad points and more to the point, is it worth buying? Or are they paying for the name?

Despite my suggestions...I really enjoy *PW*, particularly the articles on the older equipment. Thank you.

**Steve Bainbridge M1SWB
Liverpool**

Editor's comments: We'll continue to do our best to help you Steve. David G4ASR (VHF Report compiler/author) is already doing his best to help you, as can be seen in this month's column. Any other suggestions on how we can provide more information readers?

Keep your letters coming to fill *PW*'s postbag

Letters Received Via E-mail

A great deal of correspondence intended for 'letters' now arrives via E-mail, and although there's no problem in general, many correspondents are forgetting to provide their postal address. I have to remind readers that although we will not publish a full postal address (unless we are asked to do so), we require it if the letter is to be considered. So, please include your full postal address and callsign with your E-Mail. All letters intended for publication must be clearly marked 'For Publication'.

Editor

amateur radio rallies

Radio rallies are held throughout the UK. They're hard work to organise so visit one soon and support your clubs and organisations.

October 21

Blackwood & District ARS Annual Rally

Tel: (01495) 228516

The Blackwood Rally will take place at the Newport Centre, Gwent. Features will include special interest groups, parking, licensed bar, catering and trade stands. Doors open 1045 (1030 for disabled). Admission is £1.50 and talk-in will be on S22.

October 28

Galashiels and District ARS Annual Rally

Contact: Jim Keddie GM7LUN

Tel: (01896) 850245

E-mail: jimk@gm7lun.freemove.co.uk

This annual event takes place at the Volunteer Hall, St. Johns Street, Galashiels, Scottish Borders. Doors open 1100hrs (disabled access from 1045hrs). Admission is £2 and includes a free cash prize draw ticket. There will be all the usual attractions, Bring & Buy, traders and refreshments.

November 3/4

North Wales Radio & Electronics Show

Contact: M. Mee GW7NFY

Tel/FAX: (01745) 591704

The 15th North Wales Radio & Electronics Show is to be held at the North Wales Conference Centre, Llandudno. The show opens at 1000hrs both days and the entrance fee is £2 for adults, under 14s free, when accompanied by an adult. There will be an extensive Bring & Buy and clubroom. Why not go along?

November 11

11th Great Northern Hamfest

Contact: Ernie Bailey G4LUE

Tel: (01226) 716339 or (07787) 546515

The South Yorkshire Repeater Group presents the 11th Great Northern Hamfest at the Metrodome Leisure Complex, Queens Road, Barnsley, South Yorkshire. Doors open at 1000hrs and will feature trade stands, specialist interest groups and a large Bring & Buy. There will be Talk-in on 145.550MHz and Morse tests on demand.

November 18

The MARS 12th Radio & Computer Rally

Contact: Peter G6DRN

Tel: 0121-443 1189

The Midland Amateur Radio Society (MARS) 12th Radio and Computer Rally is taking place today. Doors will be open from 1000hrs with plenty of free parking, trade and club stands and refreshments.

November 24

Rochdale & District ARS Rally

Contact: John G7OAI

Tel: (01706) 376204

E-mail: radars@mbc.co.uk

The Rochdale & District Amateur Radio Society are holding their traditional radio rally at St. Vincent de Paul Catholic Church Hall, Caldershaw Road, off the A680 Edenfield Road, approx two miles west of Rochdale. Yes, this is a **Saturday** rally! Open from 1015/1030hrs, there will be a talk in on S22, Bring & Buy, refreshments, etc.

If you're travelling a long distance to a rally, it could be worth 'phoning the contact number to check all is well, before setting off.



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 (1/2 fitting).....**£16.95**
MR 444 4 Metre loaded 1/4 wave (Length 24") (1/2 fitting).....**£15.95**
 (SO239 fitting).....**£13.95**
MR 614 6 Metre loaded 1/4 wave (Length 56") (1/2 fitting).....**£13.95**
MR 644 6 Metre loaded 1/4 wave (Length 40") (1/2 fitting).....**£12.95**
 (SO239 fitting).....**£15.95**

1/2 WAVE VERTICAL FIBRE GLASS (GRP) BASE ANTENNA 3.5 dBd (without ground planes)

70 cms (Length 26").....**£24.95**
2 metre (Length 52").....**£24.95**
4 metre (Length 80") adjust top section.....**£36.95**
6 metre (Length 120") adjust top section.....**£46.95**

TRI BAND MOBILE ANTENNAS

MR 800 2 Metre 70 cms 6 Metres 5.0, 7.5 & 3.0 dBd Gain (1/4, 3 x 1/2, 1/4 wave) (Length 60") (SO239 fitting).....**£39.95**

PROFESSIONAL MOBILE GLASS MOUNT ANTENNAS

GF151 2mtr (length 20").....**£39.95**
GF401 70cms (length 11").....**£39.95**
GF233 23cms (length 9").....**£44.95**
GF270 Dual band 2/70 (length 31").....**£59.95**

SWR/WATT METER

KW220 Freq: 1.8 - 200 Mhz
 Pwr: 0.5 - 400 watts
 Swr: 1:1/1:3.....Price **£59.95**
KW520 Freq: 1.8 - 200 Mhz 140 - 525 Mhz
 Pwr: 0.5 - 400 watts
 Swr: 1:1/1:3.....Price **£119.95**

VERTICAL FIBRE GLASS (GRP) BASE ANTENNAS

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

BM100 Dual-Bander.....**£29.95**
 (2 mts 3dBd) (70cms 6dBd) (Length 39")
SQBM100 Dual-Bander.....**£39.95**
 (2 mts 3dBd) (70cms 6dBd) (Length 39")
BM200 Dual-Bander.....**£39.95**
 (2 mts 4.5dBd) (70cms 7.5dBd) (Length 62")
SQBM200 Dual-Bander.....**£49.95**
 (2 mts 4.5dBd) (70cms 7.5dBd) (Length 62")
SQBM500 Dual - Bander.....**£59.95**
 Super Gainer.....**£59.95**
 (2 mts 6.8dBd) (70cms 9.2dBd) (Length 100")
BM1000 Tri-Bander.....**£59.95**
 (2 mts 6.2dBd) (6 mts 3.0dBd) (70cms 8.4dBd) (Length 100")
SQBM1000* Tri-Bander.....**£69.95**
 (2 mts 6.2dBd) (6 mts 3.0dBd) (70cms 8.4dBd) (Length 100")
SQBM 100/200/500/1000
 are Polycoted Fibre Glass with Chrome & Stainless Steel Fittings. 2 years warranty.

2 METRE VERTICAL CO-LINEAR BASE ANTENNA

BM60 1/2 Wave, Length 62", 5.5dBd Gain.....**£49.95**
BM65 2 X 1/2 Wave, Length 100", 8.0 dBd Gain.....**£69.95**

70CMS VERTICAL CO-LINEAR BASE ANTENNAS

BM33 2 X 1/2 wave Length 39" 7.0 dBd Gain.....**£34.95**
BM45 3 X 1/2 wave Length 62" 8.5 dBd Gain.....**£49.95**
BM55 4 X 1/2 wave Length 100" 10 dBd Gain.....**£69.95**

TRI-BANDER BEAM 5dBd all bands

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

HAND-HELD ANTENNAS

MRW-300 Rubber Duck TX 2 Metre & 70 cms RX 25-1800 Mhz Length 21cm BNC fitting.....**£19.95**
MRW-301 Rubber Duck TX 2 Metre & 70 cms Super Gainer RX 25-1800 Length 40cm BNC fitting.....**£24.95**
MRW-232 Mini Miracle TX 2 Metre 70 & 23 cms RX 25-1800 Mhz Length just 4.5cm BNC fitting.....**£19.95**
MRW-250 Telescopic TX 2 Metre & 70 cms RX 25-1800 Mhz Length 14-41cm BNC fitting.....**£19.95**
MRW-200 Flexi TX 2 Metre & 70cms RX 25-1800 Mhz Length 21cm SMA fitting.....**£24.95**
MRW-210 Flexi TX 2 Metre & 70cms Super Gainer RX 25-1800 Mhz Length 37cm SMA fitting.....**£29.95**
 All of the above are suitable to any transceiver or scanner.
 Please add £2.00 p+p for H/Hand antennas.

HB9CV 2 ELEMENT BEAM 3.5 dBd

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

MINI HF DIPOLES (length 11' approx)

MD020 20mt.....**£39.95**
MD040 40mt.....**£44.95**
MD080 80mt.....**£49.95**

CROSSED YAGI BEAMS All fittings Stainless Steel

2 metre 5 Element
 (Boom 64") (Gain 7.5dBd).....**£74.95**
2 metre 8 Element
 (Boom 126") (Gain 11.5dBd).....**£94.95**
70 cms 13 Element
 (Boom 83") (Gain 12.5dBd).....**£74.95**

YAGI BEAMS All fittings Stainless Steel

2 metre 4 Element
 (Boom 48") (Gain 7dBd).....**£24.95**
2 metre 5 Element
 (Boom 63") (Gain 10dBd).....**£44.95**
2 metre 8 Element
 (Boom 125") (Gain 12dBd).....**£59.95**
2 metre 11 Element
 (Boom 185") (Gain 13dBd).....**£89.95**
4 metre 3 Element
 (Boom 45") (Gain 8dBd).....**£49.95**
4 metre 5 Element
 (Boom 128") (Gain 10dBd).....**£59.95**
6 metre 3 Element
 (Boom 72") (Gain 9.5dBd).....**£54.95**
6 metre 5 Element
 (Boom 142") (Gain 9.5dBd).....**£74.95**
70 cms 13 Element
 (Boom 76") (Gain 12.5dBd).....**£49.95**

ZL SPECIAL YAGI BEAMS ALL FITTINGS STAINLESS STEEL

2 metre 5 Element
 (Boom 38") (Gain 9.5dBd).....**£39.95**
2 metre 7 Element
 (Boom 60") (Gain 12dBd).....**£49.95**
2 metre 12 Element
 (Boom 126") (Gain 14dBd).....**£74.95**
70 cms 7 Element
 (Boom 28") (Gain 11.5dBd).....**£34.95**
70 cms 12 Element
 (Boom 48") (Gain 14dBd).....**£49.95**

HALO LOOPS

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

MULTI PURPOSE ANTENNAS

MSS-1 Freq RX 0-2000 Mhz, TX 2 mtr 2.5 dBd Gain, TX 70cms 4.0 dBd Gain, Length 39".....**£39.95**
MSS-2 Freq RX 0-2000 Mhz, TX 2 mtr 4.0 dBd Gain, TX 70cms 6.0 dBd Gain, Length 62".....**£49.95**
IVX-2000 Freq RX 0-2000 Mhz, TX 6 mtr 2.0 dBd Gain, 2 mtr 4dBd Gain, 70cms 6dBd Gain, Length 100".....**£89.95**

G5RV Wire Antenna (10-40/80 metre) All fittings Stainless Steel

	FULL	HALF
Standard	£22.95	£19.95
Hard Drawn	£24.95	£21.95
Flex Weave	£32.95	£27.95
PVC Coated		
Flex Weave	£37.95	£32.95
Deluxe 450 ohm PVC Flexweave	£49.95	£44.95

TS1 Stainless Steel Tension Springs (pair) for G5RV.....**£19.95**

INDUCTORS

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

SHORT WAVE RECEIVING ANTENNA

MD37 SKY WIRE (Receives 0-40Mhz).....**£29.95**
 Complete with 25 mts of enamelled wire, insulator and choke Balun Matches any long wire to 50 Ohms. All mode no A.T.U. required. 2 "S" points greater than other Baluns.

MWA-H.F. (Receives 0-30Mhz).....**£29.95**
 Adjustable to any length up to 60 metres. Comes complete with 50 mts of enamelled wire, guy rope, dog bones & connecting box.

MOUNTING HARDWARE ALL GALVANISED

6" Stand Off Bracket
 (complete with U Bolts).....**£6.95**
9" Stand off bracket
 (complete with U Bolts).....**£9.95**
12" T & K Bracket
 (complete with U Bolts).....**£11.95**
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 (complete with U Bolts).....**£17.95**
24" T & K Bracket
 (complete with U Bolts).....**£19.95**
36" T & K Bracket
 (complete with U Bolts).....**£29.95**
3-Way Pole Spider for Guy Rope/ wire.....**£3.95**
4-Way Pole Spider for Guy Rope/ wire.....**£4.95**
1 1/2" Mast Sleeve/Joiner.....**£8.95**
2" Mast Sleeve/Joiner.....**£9.95**
Solid copper earth rod 4'.....**£9.95**

POLES H/DUTY (SWAGED)

1 1/2" x 5' Heavy Duty Aluminium Swaged Poles (set of 4).....**£24.95**
1 1/2" x 5' Heavy Duty Aluminium Swaged Poles (set of 4).....**£34.95**
2" x 5' Heavy Duty Aluminium Swaged Poles (set of 4).....**£49.95**

REINFORCED HARDENED FIBRE GLASS MASTS (GRP)

1 1/2" Diameter 2 metres long.....**£16.95**
1 1/2" Diameter 2 metres long.....**£20.95**
2" Diameter 2 metres long.....**£24.95**

GUY ROPE 30 METRES

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

COAX

RG58 best quality standard per mt.....**35p**
RG58 best quality military spec per mt.....**60p**
Mini 8 best quality military spec best quality per mt.....**70p**
RG213 best quality military spec per mt.....**85p**
H200 best quality military coax cable per mt.....**£1.10**
PHONE FOR 100 METRE DISCOUNT PRICE.

10/11 METRE VERTICALS

G.A.P.12 1/2 wave aluminium (length 18' approx).....**£16.95**
G.A.P.58 5/8 wave aluminium (length 21' approx).....**£19.95**

BALUNS

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

RIBBON LADDER USA IMPORTED

300Ω Ribbon (20 Metres).....**£13.95**
450Ω Ribbon (20 Metres).....**£13.95**

TRI/DUPLEXER & ANTENNA SWITCHES

MD-24 (2 Way Internal Duplexer) (1.3-35 Mhz 500w) (50-225 Mhz 300w) (350-540 Mhz 300w) insert loss 0.2dB SO239 fittings.....**£24.95**
MD-24N same spec as MD-24 "N-type" fitting.....**£22.95**
MD-25 (2 Way external/Internal Duplexer) (1.3-35 Mhz 500w) (50-225 Mhz 300w) (350-540 Mhz 300w) insert loss 0.2dB.....**£24.95**
CS201 Two way antenna switch, frequency range 0-1Ghz, 2.5 Kw Power Handling SO239 fittings.....**£18.95**
CS201-N same spec as CS201 "N-type" fitting.....**£28.95**
Tri-plexer 1.6-60Mhz (800w) 110-170Mhz (800w) 300-950Mhz (500w) SO239 fitting.....**£49.95**
4 way antenna switch 0-500Mhz.....**£29.95**

ANTENNA ROTATORS

AR-300XL Light duty UHF.....**£49.95**
VHF.....**£79.95**
YS-130 Medium duty VHF.....**£79.95**
RC5-1 Heavy duty HF.....**£349.95**
RG5-3 Heavy Duty HF inc Pre Set Control Box.....**£449.95**
AR26 Alignment Bearing for the AR300XL.....**£18.95**
RC26 Alignment Bearing for RC5-1/3.....**£49.95**

ROTATOR CABLE

3 Core.....**0.45p** per metre
7 Core.....**0.80p** per metre

MOUNTS

Turbo mag mount
 (7") 1/2 or SO239.....**£14.95**
Tri-mag mount
 (3 x 5") 1/2 or SO239.....**£39.95**
Stainless Steel Heavy Duty Hatch Back Mount with 4 mts of coax and pl259 plug (1/2 or SO239 fully adjustable with turn knob).....**£29.95**
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BEST QUALITY ANTENNA WIRE

The Following Supplied in 50 metre lengths
Enamelled 16 gauge copper wire.....**£9.95**
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Flex Weave.....**£27.95**
Clear PVC Coated Flex Weave.....**£37.95**

POWER SUPPLIES

PS-20 20amp with 25amp surge Dual Meter & Adjustable Voltage 5-15v.....**£99.95**
PS-30 30amp with 35amp surge Dual Meter & Adjustable Voltage 5-15v.....**£119.95**

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10 metre trap 400W.....**£23.95**
15 metre trap 400W.....**£23.95**
20 metre trap 400W.....**£23.95**
40 metre trap 400W.....**£23.95**
80 metre trap 400W.....**£23.95**

SPECIAL OFFER SIRIO 27-4 YAGI BEAM

£79.95 £59.95

● Frequency 26 MHz - 28 MHz

● Dimensions 5725mm x 4030mm x 100mm

All prices plus £6.00 per order

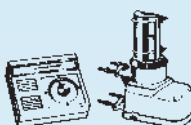


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£99.95**LOG PERIODIC MLP32**

Freq. Range 100-1300MHz
Length 1420mm Wide Band 16 Element directional beam which gives a maximum of 11-13dB Gain Forward and 15dB Gain Front to Back Ratio. Complete with mounting hardware. (The Ultimate Receiving Antenna - a must for the Dedicated Listener.)

**ROTATOR AR-300XL**

- * Rotation Torque-222Kg
 - * Vertical Load-45Kg
 - * Mast Size - 28-44mm
 - * Control Box-230v AC
 - * Cable-3 core
 - * Direct Compass Bearings
- (Ideal for Light to Medium Beams, i.e. LOG PERIODIC above.)

£49.95**6" STAND OFF BRACKET**

Complete with 'U' Bolts

9" STAND OFF BRACKET

Complete with 'U' Bolts

MD37 SKY WIRE (LONG WIRE BALUN KIT)

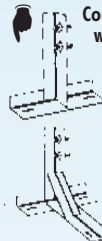
25 METRES OF ENAMELLED WIRE & INSULATOR



FOR USE ON WITH RECEIVER 0 - 40 Mhz. ALL MODE NO ATU REQUIRED 2 "S" POINTS GREATER SIGNAL THAN OTHER BALUNS. MATCHES ANY LONG WIRE TO 50 OHMS

£9.00**T&K BRACKETS**

Complete with 'U' Bolts

**£29.95****5' SWAGED POLES**

- Heavy Duty Ali (1.2mm wall)
- SINGLE 1 1/4"£7.00
 - SET OF FOUR 1 1/4"£24.95
 - SINGLE 1 1/2"£10.00
 - SET OF FOUR 1 1/2"£34.95

CONNECTORS

- PL259/90.75 each
- PL259/60.75 each
- PL259/7 for mini 81.00 each
- BNC (Screw Type)1.00 each
- BNC (Solder Type)1.00 each
- N TYPE for RG582.50 each
- N TYPE for RG2132.50 each
- SO239 to BNC1.50 each
- PL259 to BNC2.00 each
- N TYPE to SO2393.00 each
- Amalgam tape 10 metres£7.50

CABLE

- RG213 MILITARY0.85 per mtr.
- MINI RG80.85 per mtr.
- RG58 STANDARD0.35 per mtr.
- RG58 MILITARY0.60 per mtr.
- H100£1.10 per mtr.

WEATHER SATELLITE ANTENNA**TURNSTILE 137**

Freq. 137.5 MHz
Length 1000mm

This Antenna is designed for external use to receive weather satellite signals.

Complete with mounting hardware.

£39.95**MRW-40 (Rubber Duck)**

Dedicated for Civil & Military Airband VHF/UHF RX & TX Capabilities
Length 215mm. P.P £2.00

£19.95**UK SCANNING DIRECTORY**

7th edition

£19.50**£29.95****SUPER SCAN STICK**

Freq. Range 0-2000MHz
Length 1000mm

It will receive all frequencies at all levels unlike a mono band antenna. It has 4 capacitor loaded coils inside the vertical element to give maximum sensitivity to even the weakest of signals. (Ideal for the New Beginner and the Experienced Listener alike.)

£49.95**SUPER SCANAIR BASE (Airband)**

(Stainless Steel)
Freq. Range 117-140MHz
Transmit 117-140MHz
Length 825mm
Connector-N TYPE

This is a transmitting & receiving antenna designed for the aircraft frequency range. (For the control tower & aircraft listener.)

£39.95**SUPER SCAN STICK II**

Freq. Range 0-2000 MHz.
Length 1500mm.

This is designed for external use. It will receive all frequencies at all levels unlike a mono band antenna. It has 8 capacitor loaded coils inside the vertical element to give maximum sensitivity to even the weakest of signals plus there is an extra 3db gain over the standard super scan stick. (For the expert who wants that extra sensitivity)

MULTI SCAN STICK II

Freq. Range Receive (0-2000MHz) Transmit (144-146 MHz)
Gain 4.00dbd (420-430 MHz) Gain 6.00dbd Length 1500mm
Same as Super Scan Stick but with extra gain, makes it an even better antenna for the amateur and expert alike. (Ideal for the Ham Radio user)

£39.95**MULTISCAN STICK**

Freq. Range Receive - 0-2000 MHz.
Transmit 144 - 146 MHz

gain 2.5 DBd
420 - 430 MHz gain 4.5 DBd
Length 1000 mm.
Although marginally compromising sensitivity the multi scan stick has within its transmitting capabilities plus gain makes it an excellent antenna for the amateur and expert alike.

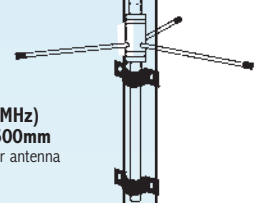
Comes complete with mounting hardware and brackets. (Ideal for the amateurs ham radio - user).

£89.95**IVX 2000**

Freq. Range Receive - 0-2000 MHz.
Transmit 50 - 52 MHz

gain 2.00DBd
144 - 146 MHz gain 4.00 DBh
420 - 430 MHz gain 6.00 DBd
Length 2.5 m.

For external use, but at a pinch can be used in the loft. It has been finely tuned to make this Antenna the best there is. It has stainless steel radials and hardware. (THE BEST)

**MWA HF Wire Antenna Mk11**

Freq 0.05MHz-40MHz Adjustable comes with 25 metres of H/Grade flexweave antenna wire, 10 metres of military spec RG58 coax cable feeder, insulated guy rope, dog bone & choke balun. All Mods No A.T.U. required. Super Short Wave Antenna.

£59.95**SWP 2000 FREQ. 25 - 2000 MHz. Length 515mm.**

Multiband good sensitivity for its small size. Fitted with two suction cups for ease of fitting to any smooth surface (i.e. inside of car window) comes with 5 metres of mini coax and BNC connector. (Good for the car user who doesn't want an external antenna.)

£29.95**SWP HF30**

Freq. Range 0.05-30MHz Length 770mm

Although small, surprisingly sensitive for the H.F. user. Fitted with two suction cups for ease of fitting to any smooth surface (i.e. inside of car window) comes with 5 metres of mini coax and BNC connector. (Good for the car user who doesn't want an external antenna.)

£39.95**TRI SCAN III**

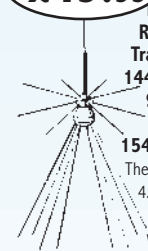
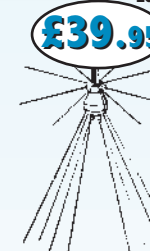
Freq. Range 25-2000MHz Length 720mm

Desk Top Antenna for indoor use with triple vertical loaded coils. The tri-pod legs are helically wound so as to give it its own unique ground plane. Complete with 5mts of low loss coax and BNC plug. (Ideal for Desk Top Use.)

£39.95**ROYAL DISCONE 2000 (Stainless Steel)**

Freq. Range Receive 25-2000MHz
Transmit 50-52MHz
144-146MHz 430-440MHz
900-986MHz 1240-1325MHz Length 1540mm Connector-N TYPE

The Ultimate Discone Design. 4.5DB GAIN OVER STANDARD DISCONE! Highly sensitive, with an amazing range of transmitting frequencies, comes complete with mounting hardware & brackets (The Best There is).

£49.95**£39.95****SUPER DISCONE**

Freq. Range 25-2000MHz
Length 1380mm

Internal or External use (A Tri-Plane Antenna). The angle of the ground planes are specially designed to give maximum receiving performance within the discone design. The Super Discone gives up to 3Db Gain over a standard conventional discone. Comes complete with mounting hardware and brackets. (Ideal for the Experienced Enthusiast.)

£19.95**MRW-100**

(Super Gainer) (Rubber Duck) Wideband extra sensitive
Dedicated VHF/UHF all mode Length 400mm. P.P £2.00

MRP-125 (Preamplifier)

Freq Range 118-137 Mhz
9-15v input (Battery not included) 14 db Gain Complete with lead and BNC connectors.

£44.95**CIVIL AND MILITARY RECEIVING ANTENNAS**

- AR30 (Length 1000mm GAIN 3.6 & 6.5)Price £39.95
- AR50 (Length 1500mm GAIN 5.0 & 7.5)Price £64.95



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E&OE.

VECTOR 4000

~~£79.95~~ **£59.95**

★ Type:- 7/8 wave ★ Frequency:- 26 MHz - 28 MHz ★ Impedance:- 50 ohms
★ Radiation:- Omni Directional
★ Polarization:- Vertical ★ V.S.W.R:- 1.2-1
★ Power Rating:- 1000 watts ★ Band Width:- 1350 kHz ★ Gain:- 7dBd Wind Resistance:- 130 km/h ★ Length:-9500mm ★ Weight:- 4.6 Kilos ★ Connector:- SO239 UHF



SIRIO 2012

~~£79.95~~ **£65.95**

★ Type 5/8 wave Frequency 26 MHz - 29 MHz ★ Radiation Omni Directional
★ Polarization Vertical ★ V.S.W.R 1.1-1
★ Power Rating 1000 watts ★ Band Width 1750 kHz Gain 6.5dBd ★ Wind Resistance 130 km/h ★ Length 6100mm Radial ★ Length 1320mm ★ Weight 5.3 Kilos ★ Connector SO239 UHF



SIGNAL KEEPER

~~£29.95~~ **£21.95**

★ Type 1/4 Wave Ground Plane
★ Frequency 27 MHz - 45 MHz
★ Radiation Omni ★ Directional
★ Polarization Vertical ★ V.S.W.R 1.2-1
★ Power Rating 1000 watts ★ Band Width 1750 kHz ★ Wind Resistance 130 km/h ★ Length 4730mm ★ Radial Length 2680mm ★ Weight 1.25 Kilos
★ Connector SO239 UHF



SIRIO 27-3 YAGI BEAM

~~£69.95~~ **£55.95**

★ Type Yagi ★ Frequency 26 MHz - 28 MHz ★ Impedance 50 ohms
★ Radiation Directional
★ Polarization:- Horizontal
★ V.S.W.R:-1.2-1 ★ Power Rating 1000 watts ★ Band Width 1800 kHz ★ Gain 8.5dBd ★ Boom Length 2710mm ★ Dimensions 584mm x 2710mm x 100mm ★ Weight 4.70 Kilos ★ Connector SO239 UHF



SIRIO 27-4 YAGI BEAM

~~£79.95~~ **£59.95**

SIRIO 827

~~£79.95~~ **£55.95**

★ Type 5/8 Wave Ground Plane
★ Frequency 26 MHz - 29 MHz
★ Radiation Omni Directional
★ Polarization Vertical ★ V.S.W.R 1.1-1
★ Power Rating 1000 watts ★ Band Width 2000 kHz ★ Gain 7.5dBd ★ Wind Resistance 130 km/h ★ Length 6700mm ★ Radial Length 1400mm ★ Weight 6.0 Kilos ★ Connector SO239 UHF

★ Type Yagi ★ Frequency 26 MHz - 28 MHz
★ Impedance 50 ohms ★ Radiation Directional
★ Polarization Horizontal ★ V.S.W.R 1.2-1
★ Power Rating 1000 watts
★ Band Width 600 kHz ★ Gain 11dBd ★ Boom Length 4030mm ★ Dimensions 5725mm x 4030mm x 100mm ★ Weight 6.10 Kilos
★ Connector SO239 UHF



SIRIO HI-POWER 3000

~~£29.00~~ **£24.95**

SIRIO HI-POWER 4000

~~£33.00~~ **£26.95**

★ Type:- Base Loaded ★ Frequency:- 26 - 28 MHz ★ Impedance:- 50 ohms
★ Polarization:- Vertical ★ V.S.W.R:- 1.2-1
★ Power Rating:- HP3000 400 watts
★ HP4000 600 watts ★ Gain:- HP3000 5.0dBd HP4000 5.5dBd ★ Length- HP3000 1740mm HP4000 2030mm
★ Weight:- 450gr ★ Connector:- PL259 UHF



MIDLAND 48

~~£129.95~~ **£104.00**

★ 80 Channel CB Radio ★ Frequency Read Out ★ Signal Strength Metre ★ RF Gain ★ Mike Gain ★ Scan Facility ★ Dual Watch ★ 5 Memory Channels ★ E.S.P. Noise Filter ★ Last Channel Recall.



MIDLAND 38

~~£79.95~~ **£66.00**

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Looking At...

The Audio Frequency Filter

In this instalment Gordon King G4VFF gets to grips with the Audio-Frequency Filter.

The audio frequency (a.f.) filter establishes the frequency response of an audio amplifier. In simplest form it consists of a capacitor (C) and a resistor (R), an inductor (L) and a resistor or an inductor and a capacitor, known respectively as an RC, RL or an LC filter.

The filter rolls-off the upper frequencies (low-pass) when C appears in parallel with the signal and the lower frequencies (high-pass) when C appears in series with the signal. The converse is the case when L is substituted for C.

Turnover Frequency

The turnover frequency occurs when the capacitive reactance (X_c) is $1/2p\pi fC$, while the inductive reactance (X_L) is $2p\pi fL$. For an elementary single-pole filter the ultimate rate of roll-off is 6dB/octave, such that the output voltage drops by a half each time the frequency is doubled.

The turnover frequency (f_{3dB}) corresponds to the frequency where the output power drops by half or -3dB. The basic filter is known as a passive filter, but it becomes an active filter when its design incorporates a transistor or integrated circuit (i.c.).

Let's look now at some frequency responses. For good fidelity sound reproduction, the frequency response must extend with minimal undulation from low bass to upper treble and possibly beyond, from around 20 or 30Hz up to at least 20kHz. This is shown by the full-line curve marked A in Fig. 1 and must happen without undue background noise, the production of spurious signals or distortion to blemish the reproduction over the full bandwidth.

Simple high and low-pass filters are used to keep the frequency response within these limits. I don't intend to preach the gospel of hi-fi, but in this area the basic single-pole 6dB/octave or the two-pole 12dB/octave filter is often preferred. More complicated filters with steep side skirts, especially low-pass, can give rise to disconcerting overshoot, ringing and transient distortion.

The greater the bandwidth, the poorer the signal-to-noise (S/N) ratio or, to put it another way, the wider the window is open, the greater the noise that gets in! Receivers designed particularly for communication purposes can get away with a narrow 'window' without undue impairment to intelligibility, but the hi-fi buff may demand

a low-pass f_{3dB} of at least two times that of the best upper-frequency hearing to reproduce the subtle overtones and harmonics.

Pre & De-Emphasis

An improvement in the S/N ratio of analogue frequency modulation (f.m.) radio broadcasting is achieved by the progressive boosting of the upper-frequencies of the modulation during transmission and then attenuating correspondingly the audio signals during reception. These functions are known respectively as pre-emphasis and de-emphasis, and they are referred to a time-constant (t) which relates to f_{3dB} .

Background noise or 'hiss' is subjectively more disturbing at the higher end of the frequency scale, but since the pre-emphasis tends to lift the higher frequencies of the audio modulation above this noise level, the annoyance value of the noise is neatly reduced by the de-emphasis as it restores the frequency response. In this way enhancing the S/N ratio!

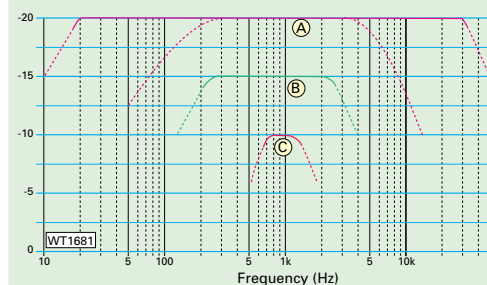


Fig. 1: Frequency response curves as described in the text.

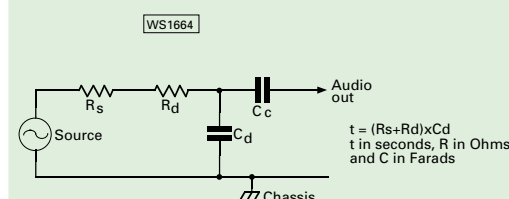


Fig. 2: Simple low-pass filter for f.m. de-emphasis, showing the time-constant calculation.

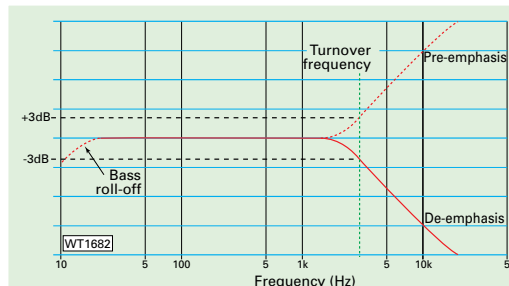


Fig. 3: Showing the principle of pre- and de-emphasis and the calculation of the turnover frequency.

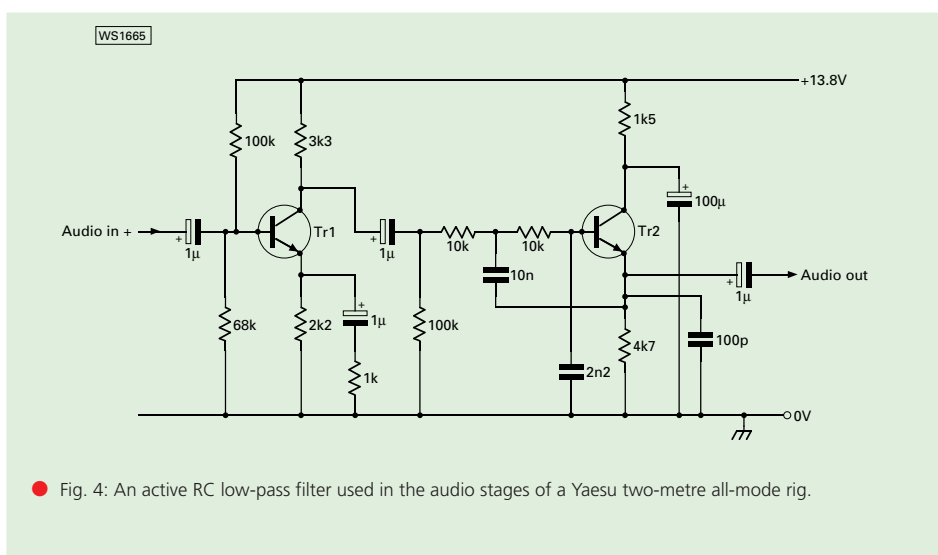


Fig. 4: An active RC low-pass filter used in the audio stages of a Yaesu two-metre all-mode rig.

The illustration, Fig. 2 shows a passive, low-pass RC filter, de-emphasis network, together with the arithmetic for calculating t. The pre- and de-emphasis frequency characteristics which, when integrated, produce the 'flat' overall frequency response, along with the arithmetic for calculating f_{3dB} are shown in Fig. 3. The standard for t in the UK is 50μs and in the USA 75μs, corresponding respectively to f_{3dB} of 3183 and 2122Hz.

Active RC Filters

Active RC a.f. filters designed around transistors or i.c.s are popular with latter day designers and constructors. They have several advantages over their passive counterpart. Design can be for low- or high-pass with adjustments for varying the Q-factor, the turnover frequency and the rate of roll-off. They can also yield a little gain instead of the insertion loss of some passive circuits.

The circuit of the active filter, used in the Yaesu 144MHz multi-mode transceiver referred to in my previous instalment (*PW* Aug) is shown in **Fig. 4**. Here the two 10k Ω resistors and the 10 and 2.2nF capacitors focused around TR2 base circuit, along with the transistor itself, form a two-pole low-pass filter to provide the sort of upper-frequency roll-off shown by curve B in Fig. 1. The idea is for the filter to eliminated the unwanted, upper-frequency noise portion of the signal.

The curtailed frequency response of curve A, shown by the broken-line lower and upper frequency sections, would facilitate excellent f.m. communications quality. Because of the nature of f.m. (see the FM Detector, Pt 1 & 2, July and September 2000), background noise fails to have the same subjective impact as it does on s.s.b.

For the reception of s.s.b., therefore, the more restricted response of curve B would be better. For c.w. reception the even narrower response of curve C would keep the noise well down and allow the reception of very weak signals.

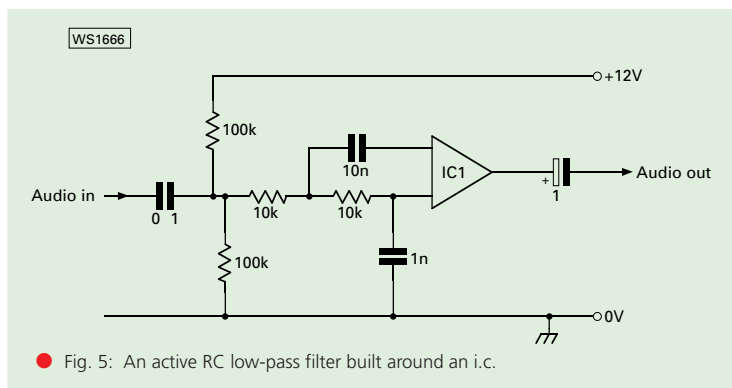
The circuit in **Fig. 5** shows an active filter using an i.c. Here the two 100k Ω resistors bias the i.c., while the two 10k Ω resistors and the 1nF and 10nF capacitors, along with the i.c., form a two-pole low-pass filter.

The high-pass equivalent is shown in **Fig. 6**, where the f_{3dB} and the Q-factor are established by the 5.6k Ω and 27k Ω resistors and the two 33nF capacitors. A fairly steep low-frequency roll-off is useful for the reduction of 'rumble' noise and hum from the mains supply frequency and its harmonics, sometimes encountered on v.h.f. repeaters!

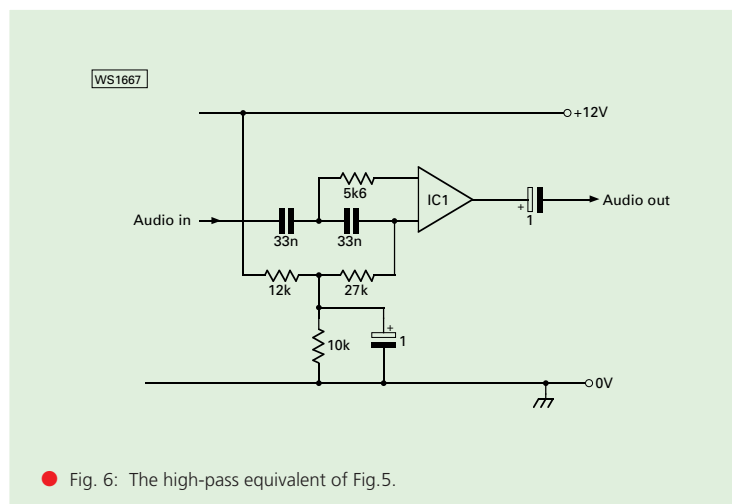
Greater rates of roll-off can be achieved by cascaded active filters. For c.w. activities two or more stages are desirable, but the high Q-values resulting from the use of, say, more than four sections tend to increase the 'ringing' tendency.

Well that's it for this month. In the January 2002 issue I'll be looking at the power supply. See you then.

PW



● Fig. 5: An active RC low-pass filter built around an i.c.



● Fig. 6: The high-pass equivalent of Fig.5.

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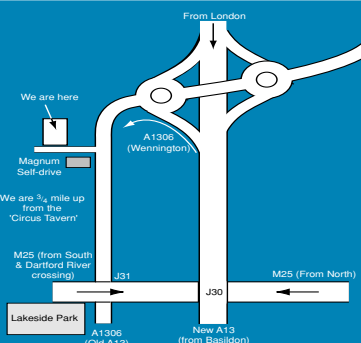
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Radio Basics

This month Rob Mannion G3XFD 'switches' to a subject, which although important, is often misunderstood by newcomers to the radio hobby. So, without further ado...let's look at switches and switching!

More experienced readers might scoff at the idea of someone becoming confused with simple switches. However, I don't think there are many of us who **can honestly say** they've never had their wires crossed wiring up a switch...especially when it involves a three or four pole unit for band change switching!

So, to start let's look at some really basic switch circuit symbols, **Fig. 1**. They range from the single pole (SP) single throw (ST) on/off type, to double pole (DP)

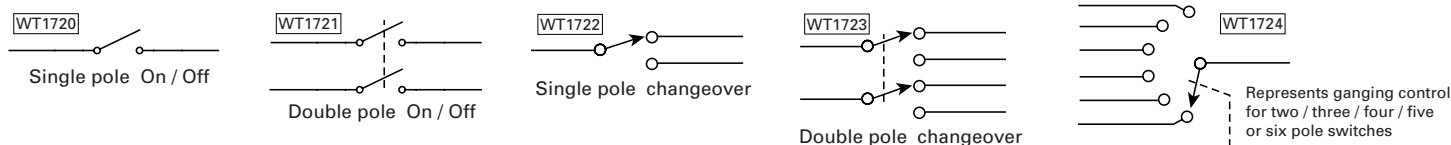
single pole type on/off is used in many simple projects. The double pole on/off is also commonly used - especially when complete isolation from the mains/battery power supply is required.

The single pole change-over is often used to switch one antenna to different input points. One common use for the double pole change-over is to switch an output from a receiver from headphones to a loudspeaker and vice-versa.

Most of the switches shown won't cause that many problems...but the idea of a project using examples such as the single pole six way frightens many constructors!

simple. Confusion comes when there's a switch which is actually operating two, three or more sections by the rotation of one shaft. But even that **perceived complexity** can be reduced to practical simplicity with the adoption of a simple 'sectioning' technique (I'm not talking about 'Sectioning' you under the Mental Health Act either!!).

'Sectioning' is something which is carried out all the time in radio circuitry, with *PW* and other magazines using it routinely. Simply speaking the technique is to prepare the circuit diagram of the project so as to present the multiple-way,



● Fig. 1: Switches are represented in circuit diagrams with straightforward symbols. The simplest is the single pole on/off (far left), with the double-pole version on the right. A single pole change-over is shown on the third left, with a double-pole change-over at the centre. A single pole six way switch is shown on the right of the diagram. If this switch was to form part of a switch of more than one section (mechanically linked or 'ganged') it would have the suffix a, b, or c, etc. added. (See text).

double throw (DT) types right up to the more complicated multiple-pole multiple way type, such as the version shown at the right of the diagram - representing a single pole six way switch.

Most readers will be already familiar with the first four circuit symbols. The

However, with a little forward planning, bearing in mind some of the projects I've got planned for you in the near future, we'll avoid some of the problems!

Multiple Pole Switches

I've been told many times by struggling constructors that they avoid projects with complex switching. Listening to some comments I gather that the description 'complex' could be applied to a switch with more than two sections, operating with more than four wires. **So, the idea here is to drive that confusion away forever.**

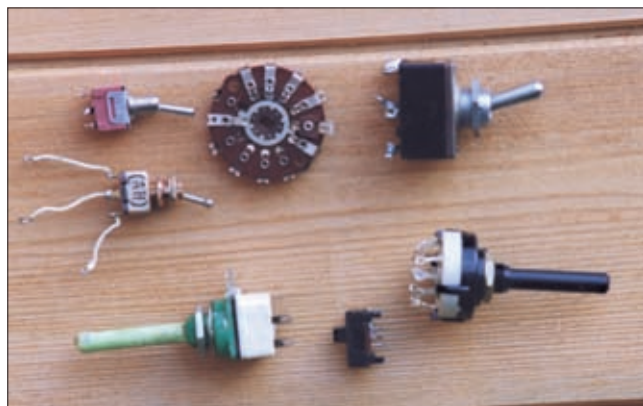
Looking again at the single pole six way switch at the right of Fig 1, you will see that in fact it's extremely

multiple switching circuit controlled by one knob/or control* (**please see the note at the end of this section**) as separate switching units...although of course in reality they are all the same switch operated by one shaft and control.

The 'sectioning' identifies the sections throughout with individual letters, usually in *PW* we use the lower case alphabet, starting with **a**, working upwards. So, if the switch had three sections of single pole (SP) six-way switching in the circuit it will be shown as (We'll assume it's the first switch in the circuit - hence S1) **S1a, S1b, S1c**, to indicate all three sections.

Multiple switches can incorporate special sections, and these are also indicated with the a, b, c section indicators. The special sections may short out coils, operate a separate circuit requiring heavier current, etc. **These separate sections will not necessarily be of the same configuration** (i.e. they could be change-over or simple on-off switches) but this will be immediately apparent in the circuit diagram.

The clue to the linking of switches mechanically will of course be the switch



● Fig. 2: Common switches. Top left sub-miniature SP change over, with similar wired example below. Top centres: Paxolin wafer switching element from a multiple switch. Top right DP C/O switch suitable for mains switching. Bottom left variable resistor with SP on/off switch. Bottom centre - miniature 'slide' SP C/O switch, bottom right DP six-way rotary switch (see text).



● Fig. 3: Combined variable resistor/potentiometer with DP On/Off switch (see text).

reduce the possibility of short circuits.

The six way rotary switch shown in close-up in **Fig. 5**, is a rear view of the switch at the bottom right hand of Fig. 2. Although wired as a SP switch, it's actually a DP six way. The second pole is left un-wired to help you identify the connections.

The orange wire (centre) is soldered to the first pole which the rotary shaft switches to one of the six positions - indicated by the red, yellow, violet, brown white and black wires. Again, identification is very straightforward - using your testmeter as a continuity checker you'll soon identify

how many switching poles there are, together with what the switch actually does (C/O, On/Off - multiple way, etc.).

Finally, in **Fig. 6** there's an older 'Yaxley' (trade name now adopted for general use) style switch. Although more robust than modern plastic encased types they can be more complicated, although you can usually see the switching elements - which can be helpful. Additionally, aerosol cleaners can be used to clean 'scratchy' contacts - not advisable on some plastic switches as some solvents can dissolve plastic!

Hopefully I've taken some of the mystery out of switching for you. So, get your soldering iron busy and try making up some simple switch circuits yourself...practice makes perfect (or helps anyway!).

PW

number - S1a, S1b, etc. **This tells you that it's on the same control shaft.** Additionally, **on some circuits** you'll see a dotted line linking separate sections - this indicates they are mechanically linked (on the same shaft) in the same way as a 'ganged' variable capacitor.

***Note:** The term 'switch' used in the context specifically written for RB readers refers to **mechanically** operated (i.e. finger-operated) switches. However, although out of the scope of this series at the moment, exactly the same 'sectioning' techniques are adopted for **relay switching circuitry**.

Switches On Sale

The photograph, **Fig. 2**, shows a selection of switching units you're likely to come across. There are very many types, but those shown are representative of the more common types.

At the top left of Fig. 2 is a sub-miniature switch of the single pole (SP) Single Throw (ST) change-over (C/O) configuration. **Note:** From now on I'll use the short form SP, ST, C/O, etc.). Immediately below is another of the same configuration with wires attached. The middle wire is the 'common' switched (see Fig. 1) connection.

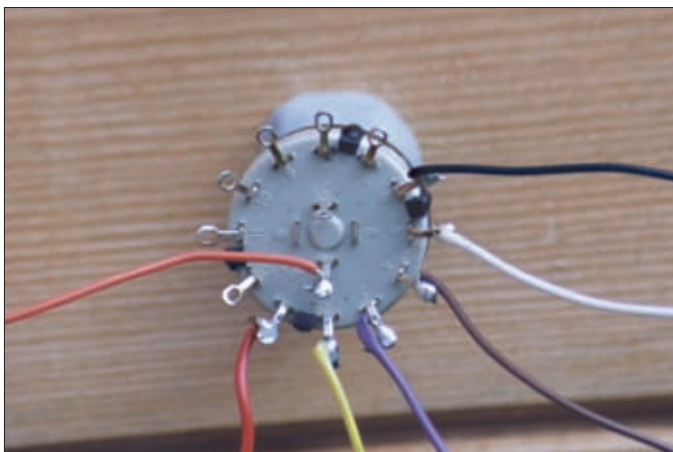
Warning: Never assume that the direction of the toggle (the switch's operating lever) indicates the 'on' direction - they can operate in either direction according to the design. Always check the switching circuit with the aid of a multimeter/testmeter set to the resistance ranges (Ω ohms range) as a continuity tester.

The photograph, **Fig. 3**, shows a DP On/Off switch mounted on the rear of a variable resistor/potentiometer. This is often found as a volume control/on/off switch. Always check the switching circuit with your testmeter. A simple check between contacts with your meter (continuity check) will identify what's what!

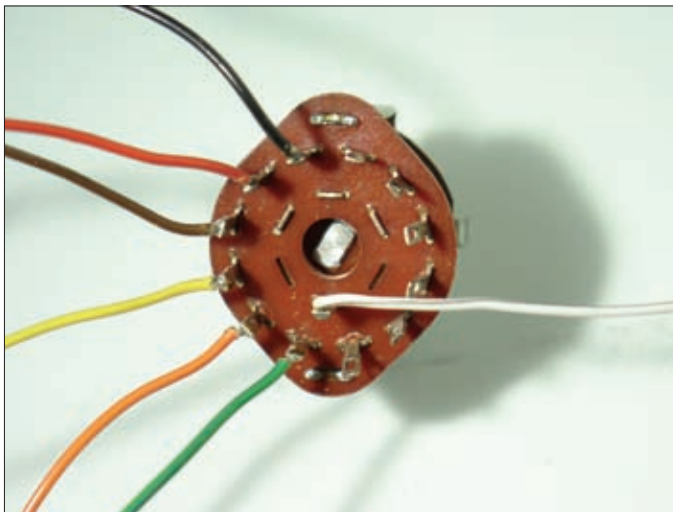
The sub-miniature switch in **Fig. 4**, is a SP change-over type. Although only suitable for light current loading, they're very useful. Insulating sleeving is essential (as shown) on the terminals to



● Fig. 4: Subminiature SP C/O switch (see text).



● Fig. 5: A DP six way rotary switch wired - for photography - as a SP six-way (see text).



● Fig. 6: An older 'Yaxley' type Paxolin material switch (see text).

Licensing - the future

Pactical Wireless looks at the long awaited changes to the Amateur Radio Licensing Structure.

The rumours have been rife and the jungle drums beating, so when the official announcement was made at the Leicester Show on Friday 21 September 2001 *PW* was there to gauge reaction and to see exactly what effect the changes would have on hobbyist radio. This is one of the biggest changes to the Licensing structure the world of Amateur Radio has ever seen in fact it's something of a revolution.

So read the RA's press release below and find it how the changes may effect you but above all how they should help to encourage many more into our hobby and take away many of the barriers.

A New Structure For Amateur Radio Licensing In The United Kingdom

The Radiocommunications Agency announced in September 2001 a series of changes to the radio amateur licensing regime, designed to make it more attractive as a technical hobby. The changes include lowering the Morse Code speed requirement for full licensees, amalgamating some licence categories, allowing trainees to operate while supervised before passing an examination and the introduction of a new Foundation Class licence.

For more than a hundred years radio amateurs have been at the forefront of developments in telecommunication. In the current information and communication technology expansion, the Radiocommunications Agency and the Radio Society of Great Britain (RSGB) have agreed that it is in the national interest that access to amateur radio be improved so that radio amateurs can continue to play a key role in these technologies.

Amateur Radio Offers:

- a source of ongoing investigation and innovation in radio communication;
- a way of drawing people into a technical activity which can result in them pursuing a career in engineering, so enhancing the technical skill base of the United Kingdom
- a source of emergency communications at times when conventional communications links are strained or out of action
- a contribution to international friendship; and
- a rewarding and challenging leisure activity

The current structure of licensing has been based on three levels, the Novice, Class A/B and the Full Licence. Both Novice and Full licences have two categories, one providing access to all amateur bands, the other restricted to those at 50MHz and above.

It is hoped that it may be possible to simplify this structure after the World Radio Conference in 2003. In the meantime the following changes are being made to the amateur radio licensing structure:

UK Class A and Class A/B Licences

Earlier this year the European Conference of Postal and Telecommunications Administrations (CEPT) recommended that the Morse requirement for their Class 1 licence (equivalent to a UK Class A) be reduced from 12 to 5 words per minute (w.p.m.). This has provided the Agency with an opportunity to review the amateur radio licensing structure. To this end the Agency intends from 1st October 2001 to reduce the Morse requirement for the Class A licence to 5 w.p.m. and to incorporate the Class A/B into the Class A licence. Class A/B licence holders will be offered the choice of either retaining their existing M5 callsign or change to an M0 callsign.

Additionally, to encourage the practical aspect of amateur radio training, unlicensed trainees (on a registered training course) may be supervised by full licence holders to operate a station and contact other UK licensed amateurs. There will be no time limit on the duration of any message.

Novice Licence

With effect from 1st October 2001 the Novice Amateur Radio Licence will be re-named the Intermediate Amateur Radio Licence. Intermediate (A) licensees will be allowed access to all amateur radio bands. Intermediate (B) will be allowed access to all amateur bands at 50MHz and above. All Intermediate licensees will be allowed 50 watts output in all bands except where a lower power limit already applies to

Amateur (A) licensees, in which case the lower level shall apply.

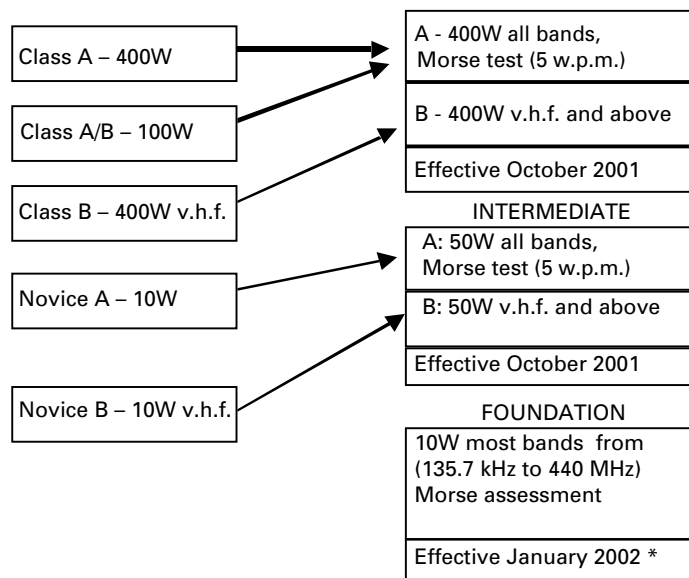
Foundation Licence

The final change to the amateur radio licensing structure prior to WRC 2003 will be the introduction of a new 'Foundation' licence at the beginning of 2002. This licence will provide access to most of the amateur bands, and restrict licensees to a maximum r.f. output power of 10watts r.f. output. Transmitting equipment will need to be commercially manufactured items, or properly designed commercial kits.

Study for the Foundation licence may be undertaken over a weekend, and is based on the tradition that amateur radio is a hobby learnt mainly through self-training. The Foundation syllabus is based on the concept of producing "safe and competent" radio amateurs.

- safe, in terms of understanding the personal safety issues involved.
- competent, in terms of understanding correct operating procedures and the need to ensure that transmissions do not interfere with other radio users, and being able to operate radio equipment efficiently and effectively.

With effect from 1st October 2001, pilot courses will be run to evaluate the syllabus and training material, and the Agency expects the full scheme to be operational from January 2002. The Radio Society of Great Britain is working with the Agency to organise these pilot courses, and will be handling much of the routine administration of the training and



examination process, with the Agency remaining as the licensing authority.

The resulting structure of amateur licensing is shown diagrammatically below.

The Agency and the RSGB hope that by introducing this new licence level, amateur radio will become more attractive and accessible to both young and old, and that by taking this first step onto the licensing ladder, Foundation licensees will be encouraged to undertake a process of self training to acquire higher licence privileges in due course. It is intended that from 1st January 2004, a revised integrated structure of qualifications and examinations for amateur radio in the UK will come into effect.

Details of bands, modes and powers for the Foundation Licence.

The Schedule to Terms, Provisions and Limitations Booklet (Amateur Radio (Foundation) Licence

Notes to the Schedule

(a) In all frequency bands, high intensities of RF radiation may be harmful and safety precautions should be taken, particularly in locations to which people have access. Advice concerning safe levels of exposure to RF radiation is provided by the National Radiological Protection Board.

(b) Primary, permitted and secondary services

For the purpose of this Licence, frequency bands allocated to the Amateur Service on a primary basis cannot claim protection from undue interference from any other authorised services, such protection being afforded only to users whose frequencies have been registered nationally or internationally. In the United Kingdom, individual frequency assignments are not registered in the Amateur Service, except for beacons and repeaters. This applies equally to all bands allocated on a secondary basis where stations of the Amateur Service are also required not to cause undue interference to stations of a primary or permitted service to which frequencies are already assigned or to which frequencies may be

assigned at a later date.

(c) Any modulation technique (except for pulse emissions) may be used for the types of transmission specified in the fourth column of the Schedule which are defined as follows:

Morse: hand or automatically-sent international morse code
 Telephony: speech, including selective calling signals using AM/FM or SSB modulation
 RTTY: radio teletype and AMTOR
 Data: digital codes representing numbers, text, speech, images, measurements, computer programmes or other information

authorised by the Licence
 Facsimile: transmission of fixed or graphic images
 SSTV: slow scan (i.e. reduced bandwidth) television

The Reaction

After the initial announcement was made, the Leicester Show was buzzing with mixed reaction and the air was full of questions. So later in the day when a Q&A session was held *PW* went along and here's a taster of the reaction together with opinions from potential instructors and candidates for the new Foundation Licence to gauge their opinion.

1	2	3	4	5
Frequency Bands in MHz	Status of Allocations in the United Kingdom to the Amateur Service	Status of Allocations in the United Kingdom to the Amateur Satellite Service (Unattended Operation not allowed)	Power	Mode of Transmission
0.1357-0.1378	Secondary. Available on the basis of non-interference to other services (inside or outside the United Kingdom)	(Not allocated)	1W (0dBW) erp	Morse, Telephony, RTTY, Data, Facsimile, SSTV
1.810-1.830	Primary. Available on the basis of non-interference to other services (outside the United Kingdom)	(Not allocated)	Power fed to the Antenna 10W (10dBW)	
1.830-1.850	Primary	(Not allocated)		
1.850-2.000	Primary Available on the basis of non-interference to other services (inside or outside the United Kingdom)	(Not allocated)		
3.500-3.800	Primary. Shared with other services	(Not allocated)		
7.000-7.100	Primary	Primary		
10.100-10.150	Secondary	(Not allocated)		Morse, Telephony, RTTY, Data, Facsimile, SSTV
14.000-14.250	Primary	Primary		
14.250-14.350	Primary	(Not allocated)		
18.068-18.168		Primary		
21.000-21.450		Primary		
24.890-24.990		Primary		
50.00-51.00	Primary. Available on the basis of non-interference to other services outside the United Kingdom	(Not allocated)	10W(10dBW)	
51.00-52.00	Secondary. Available on the basis of non-interference to other services inside or outside the United Kingdom	(Not allocated)		
70.00-70.50	Secondary. Available on the basis of non-interference to other services outside the United Kingdom	(Not allocated)		
144.0-146.0	Primary	Primary		
430.0-431.0	Secondary Not available for use within a 100km radius of Charing Cross, London (51°30'30"N, 00°07'24"W)	(Not allocated)		
431.0-432.0	Secondary.	(Not allocated)	10W(10dBW) erp	
432.0-438.0	Secondary	Secondary	10W(10dBW)	
1	2	3	4	5

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DK96	£5.25	EL84	£3.15	5Y3GT	£3.70
DL91	£2.95	EL86	£4.20	5Z4	£4.75
DL96	£3.15	EL95	£2.95	6AU6	£2.95
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EBF89	£2.95	EM80	£6.30	6BE6	£2.95
EBL1	£6.30	EM81	£6.30	6K7G	£4.00
EBL21	£8.65	EM84	£6.30	6K8G	£5.25
EBL31	£18.60	EM85	£6.30	6L6GTC	£6.30
ECC81	£3.15	EM87	£6.30	6Q7	£3.15
ECC82	£3.15	EZ41	£2.95	6SL7	£2.95
ECC83	£4.20	EZ80	£5.25	6SN7	£4.75
ECC85	£3.70	EZ81	£7.50	6X4	£2.95
ECC88	£2.95	EZ90	£2.95	6X5GT	£5.25
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ECC189	£2.95	GZ34	£10.00	12AU7	£3.50
ECF80	£2.95	UAF42	£3.70	12AX7	£4.20
ECF82	£2.95	UBC41	£6.30	12BH7A	£20.00
ECH35	£2.95	UBL21	£6.30	12BY7A	£7.90
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ECH81	£2.95	UCH21	£5.75	807	£5.25
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"Why is there no allocation on 28MHz?"

John M10IAZ

"The field force of the RA expressed their concerns that the 10W power restrictions on the Foundation Licence could be abused with the numbers of illegal amplifiers available for CB. The situation will be monitored and if the fears prove unfounded then the 28MHz section of the amateur spectrum will be opened up. The same restriction applied to the Novice Licence originally and was changed".

"If one retains an M5 callsign, what is the maximum power permitted?"

Charles M0BIN

"The user is entitled to full licence privileges, so will be able to use those privileges. M5 will be a rare callsign as they are no longer issued. All Class A/B operators should receive letters from the RA today or tomorrow (21/22 September) so they can decide whether to keep their original M5 callsign or change to an M0".

"Can a Novice Licence holder use all bands at 50W?"

Gordon G3HQG

"Yes. Novice licence holders retain their 2E callsigns and a Novice A licensee becomes an Intermediate A with 50W on all bands, a Novice B becomes an Intermediate B with 50W on v.h.f. and above".

"Your ideas for training seem optimistic. The number of clubs able to take part could be limited and Morse Camps are only available in three places".

M1EHD

"We quite agree. There are not enough places for training, but any Class A licence holder can

be the mentor for a Foundation Licence. Ideally it will be based at schools and radio clubs, but individuals can do the training themselves. A Class A can apply for the syllabus, train a new Foundation Licence candidate and then apply for the examination paper. We are introducing 100 satellite test centres to increase the number of places where the RAE can be taken and we are working towards remote learning material (CD/web based)".

"Class B licensees seem to get a bad deal".

G0THP

"International regulations state that you have a Morse requirement for h.f. class licences. Class B licensees are unaffected, which is disappointing but in 2003 it should change".

"The 28MHz restriction is a disappointment, the conversion of illegal rigs is a way of getting on to the air cheaply so the restriction should be removed as soon as possible".

G3XFD

"The field officers have raised the worries and only commercially manufactured equipment is permitted to start with, although we will be looking at properly designed commercial kits".

"It's frustrating that the Foundation Licensees get on h.f. with an 'appreciation of Morse' and I have to do a 5w.p.m. test, why? What's the difference?"

G8OGB

"The Foundation Licensees needs to appreciate what Morse is and have to recognise a Morse signal. With the use of a crib sheet they have to decipher and send some characters. It's not a test but you are assessed when you take the

exam. The RSGB know that Class Bs are disappointed, but numbers are declining and the Foundation Licence is important. We will keep trying on their behalf".

"The Foundation Licence holders do a weekend course and an 'appreciation of Morse' and get on all the bands, the Class B operators have to do a 5w.p.m. Morse test".

G8JAN

"This is still under discussion and we are trying to find ways of helping the Class B licensee. The RSGB is extremely disappointed that there is nothing for the Class B, we have been pushing for HF for Class Bs. Morse is not our idea it's an international agreement and the Government won't change it until the WARC in 2003 so we are stuck with it. The perception that we are not looking after the Class B is wrong".

"I am incensed with the RA's response. It seems to suggest that we're not responsible enough to go on h.f. Class Bs are out at the forefront of technology for microwave, laser, satellites, etc".

M1ANN

"There's a big pool of licensees who have lots of experience out there, the Class Bs. If Morse could be swept away the RA would, but it can't be done because of international agreement. We have managed to reduce the speed but are stuck with it for the time being. We have introduced the appreciation of Morse so that the Foundation Licence is not bogged down with the same problems as they other levels of licence."

"A great opportunity to encourage new blood into the hobby."

Bob Stockley, Sales & Marketing Director Icom (UK) Ltd

"Yaesu are very pleased to hear of the changes to the Radio Licensing regulations. We very much hope that this will encourage many new people into the hobby."

Ailsa Turbett, Yaesu (UK) Ltd

"Generally speaking I'm pleased with what the RA and the RSGB have come up with for the future of Amateur Radio in the UK. It's very good to see that the practical element previously present in the old Novice Licence will be introduced into the new Foundation Licence examination - making up for the lack of this element in the old RAE. I feel that the progressive licence structure will work if we in the hobby support it.

I was disappointed that the RA have decided, for the moment anyway, to withhold 28MHz operation, I hope that the new Foundation Licence holders will also be able to benefit from 28MHz very soon. Maybe we could persuade the RA to allow previously approved project circuits to be published in magazines? If this comes about, you can be sure that PW will be stepping into action with suitable projects.

Rob Mannion G3XFD, Editor of Practical Wireless, Britain's only independent amateur radio magazine

"The Society is delighted with the changes announced today especially the introduction of the Foundation Licence. This gives the amateur radio community in the UK, a golden opportunity to regenerate itself and to bring some badly needed new entrants into the hobby."

Peter Kirby, General Manager RSGB



"Anything that gets more people on the bands must be good thing. We need to keep our hobby alive."

Mark Francis G0GBY, Waters & Stanton

"Although I'm a member of the FCO, First Class Operators club, I think the new Morse requirements are a good thing. We need to see new blood in the hobby and get back some of the enthusiasm that was there when I first started. The Foundation licence will do just that for youngsters. There's nothing more exciting than getting on the radio."

Mike Devereux G3SED, Nevada

"The RA has always seen amateur radio as a source of engineers in the future of which there is a shortage.

.... The RA aims that the Foundation Licence will produce safe and competent amateurs.

Martin Cain, Head of the Specialist Unit Sector, Radiocommunications Agency



"We have had, for the most part, a positive response to the launch of the Foundation Licence this weekend. Hopefully that enthusiasm will remain and filter throughout the amateur radio community encouraging individuals to get out there and help others to look at amateur radio as a potential hobby. I emphasise that the Agency is not 'dumbing down' amateur radio.

The Foundation Licence is a new pathway designed, hopefully, to get individuals into the hobby with the knowledge of basic requirements and principals."

Aaron Abiaw, Radiocommunications Agency Licensing Department



Product:	The Kenwood TS-B2000 & RC-2000
Company:	Kenwood Electronics (UK)
Contact:	Sales
Tel:	Tel: (01923) 816444

Richard Newton GORSN takes a look at the TS-B2000, the computer 'black box' version of the Kenwood TS-2000 and the associated RC-2000 remote control head. It was quite an experience!

Black Box Radio

There've not been a great number of new radios to marvel at recently. This is perhaps the reason why I read the original Kenwood TS-2000 review in *PW* May 2001 so avidly. It seemed that this new multi-band multi-mode radio with built in modem had impressed the Editor **Rob Mannion G3XFD** (not a small feat – believe me!).

However, what caught my eye was the fact that the Kenwood TS-2000 not only covered the Amateur bands from h.f. to 50MHz, 144 and 430MHz and (as an option) 1.3GHz together with extended receive coverage..it was also available in a different format. The Kenwood TS-2000 with the traditional front panel appears as a rather impressive and comprehensive base station. However, I soon discovered it was even more versatile as the TS-B2000!

be taken mobile or portable? Surely not? - I had to find out.

I convinced *PW* that I should take the Kenwood TS-B2000 out and about...a tough job but someone had to do it! I intended to take the Kenwood TS-B2000 and the RC-2000 mobile controller away with me on a family caravan holiday we had booked in Norfolk. Unfortunately, due to moving house it was cancelled and with it went the chance to try the TS-B2000 and RC-2000 out and about.

Separate Manual

Longingly I opened the RC-2000 Mobile controller's box. I found the controller and connecting cable to be very neat and the control head is supplied with its own extensive handbook. This is on top of the even more extensive handbook that comes with the TS-B2000 itself.

The TS-B2000 weighs about 7.5kg, and measures 281 x 107 x 344.5mm...making it a little large to fit under the seat of a family saloon. However, it's easily small enough for a boot or tucked away under the seat of a larger vehicle like some people carriers, camper vans or a caravan.

So I had all this equipment and nowhere to operate! Or, as my wife **Diane** would say: "I had all the toys and nowhere to play"!

Then it struck me, in what little spare time I have I do voluntary work for St John Ambulance. Each year I help out on the residential staff of a field medical unit at The Great Dorset Steam Fair.

The Great Dorset Steam Fair spans a week at the end of August and is reputed to be one of the largest events of its type in the world, certainly in Europe. It covers a 500 acre site in a rural setting just outside Blandford Forum and attracts over 200,000 visitors from UK and overseas. Some 20,000 people are resident on the site for the duration of the event.

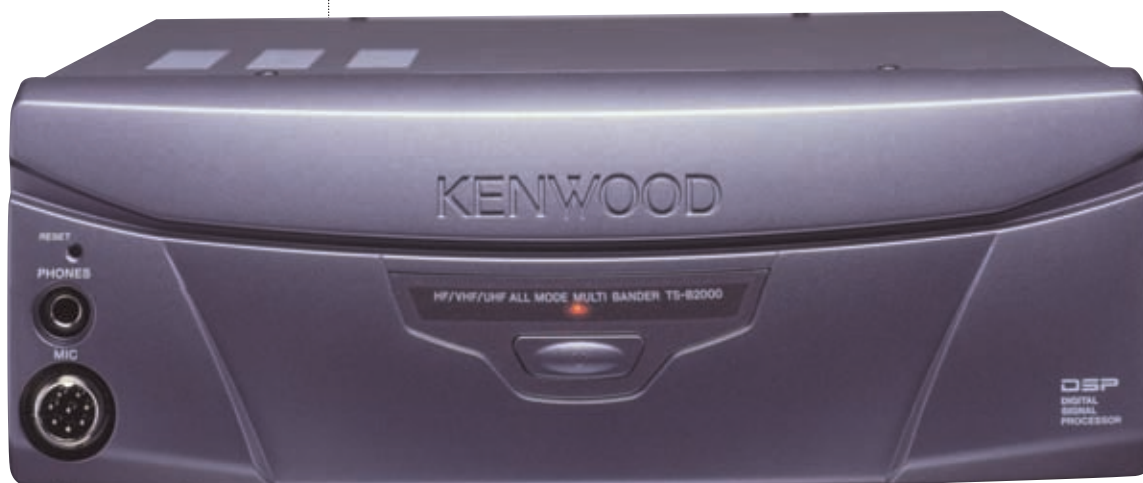
Emergency Communications

As I oversee the St John Ambulance emergency communications for the event I thought why not test the Kenwood TS-B2000 and RC-2000 versatility in a portable environment after all!

On my arrival **Terry**

Bain 2E1EJC and a St John colleague **David Sale**, (seriously thinking about his RAE) helped me set up. We erected my portable mast, mounting a small 144/430MHz colinear on the top and a Sandpiper mono band mini dipole for 21MHz underneath it. Both were about 5m above ground level.

Next, I then used the St John's mast to mount the home-brewed 14MHz wire dipole that's been so good to me in previous reviews. I



- Richard Newton GORSN discovered that there's tremendous potential hiding behind the innocent looking box! The TS-B2000 was to prove extremely versatile...especially as it was used with the associated RC-2000 remote control head.

Third Option

I found out - to my amazement - that there was also a third option with which the TS-B2000 could be controlled. This was in the form of a detachable head, the same size as that used to for the Kenwood TM-D700E 144 and 433MHz mobile transceiver.

So, were Kenwood suggesting that their flagship radio, this function-packed base station could

The mobile controller package also includes a 7m long d.c. power cable (to use with the main radio) a 5m microphone extension cable and a 5m speaker extension cable. There's also a mounting bracket for the RC-2000 mobile controller and a large mounting bracket for the radio itself.

Kenwood also supply some clip on ferrites that they call 'line filters' for attachment to the different extension lines. All in all it's a comprehensive package.

Product

The Kenwood TS-B2000 & RC-2000

Pros & Cons

Pros: The received audio and then entire performance from the TS-B2000 was wonderful...The Kenwood TS-B2000 is an example where people just want to say how good it sounds. As for the received audio quality, well it was just superb.

Cons: The (remote control) head itself is largely dependent on menus and the (separate) handbook recognises that most operators will need a while to get used to the controls.

Price

TS-B2000, £1595;
RC-2000, £200.

Summary

The TS-B2000 with the RC-2000 is by far the best radio I have ever used out and about. Antennas are always a problem when working portable, and considering the set-up I had I was frankly amazed at the results. The final acid test has got to be, would I spend my hard earned money on a Kenwood TS-B2000? The answer is **yes**, I would!

My thanks go to **Kenwood Electronics UK, Kenwood House, Dwight Road, Watford, Hertfordshire WD1 9EB.** for the loan of the review transceiver and the remote control head.



- Richard GORSN decided to try the Kenwood TS-B2000 with the RC-2000 remote control head and found that by doing so a main station transceiver could be used mobile/portable to great effect.

was assisted in this endeavour by another radio fan, **Aaron Mackie**.

Then I decided set up my shack in our now ageing control vehicle as we had set up the St John's communications in a nearby tent. We were only using the control vehicle as a source of power and a rather large antenna base plate!

The TS-B2000 was placed temporarily on the front passenger seat of the vehicle. Here it was safe, and protected from the terrible chalky dust that plagues the site on dry days (and the mud on the rainy days).

The Kenwood TS-B2000 has connections on the rear for two h.f./50MHz antennas; and separate connections for a 144 and a 433MHz antenna. Unfortunately, I'd not noticed this before going on site and hadn't taken a diplexer with me so had to manually change antennas when trying 430MHz.

There were no replies to my calls on the 430MHz, so I didn't worry too much. However, I was able to access and hear all the local 430MHz repeaters.

Other connectors include the standard accessory DIN sockets and a 9-pin RS232 for connecting to a computer. Incidentally, one little feature I especially liked was a separate, dedicated socket for the connection of a receive only h.f. antenna.

The RC-2000 control head is connected to the Kenwood TS-B2000 by the previously mentioned 5m long cable with modular plugs. All the cables supplied with the kit were easily long enough for most normal applications.

As already noted, the lead and head are very similar to that of the Kenwood TM-D700E. Kenwood have said that there will be a software upgrade* to enable those with older TM-D700E control heads to have them up-dated (a chargeable service) in order that the head can control both transceiver.

The Kenwood TS-B2000 was bonded to the vehicle by way of an earth cable. For this I used some high quality braid between the earth terminal on the rig and the other to the chassis of the van.

The set-up at the Steam Fair was to really test the rig, as the situation was far from ideal. Our compound was tight for space and we were right alongside the St. John's control room.

Nearby, other emergency services and the organisers were also using radio and there was also a maze of telephone and the power lines. I'm not sure whether it's a testament to the TS-B2000 or my antenna rigging...but it was amazing that we experienced no EMC problems whatsoever!

****Editorial note:** Since Richard GORSN prepared the review, Kenwood have informed us that the software up-grade is now being incorporated in new production models and the transceiver 'self detects' the connection of the remote head. Editor.*

Packed With Features

The Kenwood TS-B2000 is jam packed with features, including a built-in modem that receives and displays DX Cluster information on the sub band. There's also the option of Amateur Satellite operation, DSP noise reduction, dual v.f.o.s, memories and many other features.

All features are controlled from a small control head and Kenwood must have given their designers some headaches when they gave them the job! The head itself is

- Installation of the RC-2000 remote control head and kit is straightforward. New production models of the TS-B2000 even self-detect (recognise) that the unit has been fitted! (See text).



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- * Front to back ratio: 22dB (av)
- * VSWR: 1.2:1 (typical)
- * Boom length: 7.3m
- * Longest element: 11.2m
- * Turning radius: 6.7m
- * Mast size range: 48.2 - 63.5mm
- * Surface area: 1.16m²
- * Wind survival: 159kph
- * Weight: 40kg
- * Stainless steel hardware

TH7DX 7-Element Broadband
3-band Thunderbird **hy-gain**

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- * Gain, dBd 6.57
- * Power rating [W] 1500 PEP
- * Boom length [m] 7.3
- * Longest element [m] 9.4
- * Surface area [sq-m] 0.87
- * Mast size [mm] 48-63.5
- * Wind survival [kph] 160
- * Weight [kg] 34

AV-640 8-band Vertical **hy-gain**

£349.95



- * AV-640
- * Bands: 40, 30, 20, 17, 15, 12, 10, 6m
- * Power: 1500W, 300W 6m
- * Gain: 3dBi nominal
- * Vertical angle: 16 degs
- * Horizontal angle: 360 degs
- * 2:1 SWR Bandwidth [kHz]
- 40m 150
- 30m 175
- 20m 500
- 17m 500
- 15m 500
- 12m 500
- 10m 1500
- 6m 1500
- * VSWR: < 1.5:1 typical
- * Wind survival: 127 kph
- * Wind surface area: 0.22m²
- * Height: 7.87m
- * Weight: 9.9kg

hy-gain



▲ **hy-gain**

£649.95

TAILTWISTER Rotator Specifications

WindLoad capacity(inside tower)	20 square feet
Wind Load (w/ mast adapter)	10 square feet
Turning Power (in lbs.)	1000
Brake Power (in lbs.)	9000
Brake Construction	Electric Wedge
Bearing Assembly	Triple race/138 ball brngs
Mounting Hardware	Clamp plate/steel U-bolts
Control Cable Conductors	8
Shipping Weight (lbs.)	28
Effective Moment (in tower)	3400 ft/lbs.

£499.95

HAM IV Rotator Specifications

WindLoad capacity(inside tower)	15 square feet
Wind Load (w/ mast adapter)	7.5 square feet
Turning Power (in lbs.)	800
Brake Power (in lbs.)	5000
Brake Construction	Electric Wedge
Bearing Assembly	Dual race/96 ball bearings
Mounting Hardware	Clamp plate/steel U-bolts
Control Cable Conductors	8
Shipping Weight (lbs.)	24
Effective Moment (in tower)	2800 ft/lbs.

£399.95

CD-45II Rotator Specifications

WindLoad capacity(inside tower)	8.5 square feet
Wind Load (w/ mast adapter)	5.0 square feet
Turning Power (in lbs.)	600
Brake Power (in lbs.)	800
Brake Construction	Disc Brake
Bearing Assembly	Dual race/48 ball bearings
Mounting Hardware	plate clamps/steel U-bolts
Control Cable Conductors	8
Shipping Weight (lbs.)	22
Effective Moment (in tower)	1200 ft/lbs.

AV-620 6-band Vertical **hy-gain**

£269.95



- * AV-620
- * Bands: 20, 17, 15, 12, 10, 6m
- * Power: 1500W, 500W 6m
- * Gain: 3dBi nominal
- * Vertical angle: 17 degs
- * 2:1 SWR Bandwidth [kHz]
- 20m 500
- 17m 500
- 15m 500
- 12m 500
- 10m 1500
- 6m 3000
- * VSWR: < 1.5:1 typical
- * Wind survival: 127 kph
- * Wind surface area: 0.22m²
- * Height: 7.01m
- * Weight: 5.44kg

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largely dependent on menus and the handbook recognises that most operators will need a while to get used to the controls.

However, I found it possible to get on the air quickly, and if you're personally experienced in operating (let's say) the Icom IC-706 or Kenwood TM-D700E the concepts will be familiar and you'll be up and running a lot quicker.

The main band on the TS-B2000 has all the transceiver's operating modes - n.b.f.m., s.s.b., f.s.k., a.m. and c.w. The Sub band unit can receive in n.b.f.m. and a.m. but will only **transmit** in f.m. mode.

First Contact

After some familiarisation, including finding out how easy Kenwood had made the tuning (plus the excellent fast and slow tuning on the main tuning dial) I hunted for my first contact. Using the TS-B2000's internal automatic antenna tuning unit (a.a.t.u.) I was able to easily tune both h.f. antennas and I decided to try 21MHz first.

My first contact on 21MHz was with **Vlad UR6MX** in Alchersk in Ukraine, who provided a brief armchair type contact. This was quickly followed by a wonderful QSO with **Jim KE2C** in up-state New York, "in the rural bit and not the concrete jungle" Jim was keen to point out.

Jim was running a Kenwood TS-850 and was very complimentary about the signal received from the TS-B2000. Although the band was fading - causing both our signals to dip from peaks of 5 and 7 to lows of perhaps 3 and 4 - we still kept the contact going. I was very impressed as this was using my compact dipole for 21MHz that can be not much more than seven feet across in total!

My next contact was with **Zona RZ9MYL** a very friendly lady from Omsk. Zona remarked how clear the audio from the TS-B2000.

Spurred on by success on 21MHz I decided to go for a forage on the busier and meaner



- Although operating from a very cramped site, with possible EMC implications Richard GORSN was extremely satisfied with the results of his small-size 21MHz antenna and 14MHz portable dipole at the Great Dorset Steam Fair (see text).

- Taking a break from his St. John's Ambulance Brigade duties Richard GORSN enjoys using the TS-2000 transceiver.



14MHz band. Here I got a 5 and 9 report from **Karlo OK2BQX** (Czech Republic). Karlo actually asked me what rig I was using because the audio sounded so good. When I told him he could hardly contain himself...he'd been dreaming about owning a Kenwood TS-B2000 himself!

I then got hauled away to do some work but managed to get back to the radio later that day and had another very enjoyable chat with **George KZ1H** in Beverley, Massachusetts, USA. George told me "the audio is excellent".

The received audio and then entire performance from the TS-B2000 was wonderful. I had to pinch myself again, was I at home in the shack? No I was in the middle of a field!

Incidentally, it's noticeable when I review different radios I sometimes have to ask for reports, and with other radios people feel compelled to tell me how good the audio is without any prompting from me! The Kenwood TS-B2000 is an example where people just want to say how good it sounds. As for the received audio quality, well it was just superb.

On VHF

When on v.h.f. I was almost blown backwards out of my seat by a massive signal on 145.5MHz. It was **Mark 2E1MJH** operating (/P - stroke pedestrian?) walking around the Steam Fair...only 300m or so away from me! Mark and his Dad were down from Suffolk, they'd been regular visitors for about 15 years.

Mark had just acquired a Kenwood TH-25E hand-held and I was his first contact on the new rig. He said that the TS-B2000 sounded "Brilliant" but did go onto say that his report might not be too credible due to the distance between us!

Mark and his Dad visited the station and the medical compound

- it was a great pleasure to meet them. Incidentally, his Dad has also successfully completed his Novice RAE but has yet to apply for a callsign!

More distant contacts came on 144MHz when I called in on the end of 'The Waterside net', being run by **Anne G0VBL** from Fair Oaks near Eastleigh in Hampshire. Anne was talking with **Jack G4LTR** who was in Fordingbridge on the edge of the New Forest. I had a super QSO with both stations. Jack gave me a "Very good" report on the quality of the signal.

Anne also gave me a favourable report and also told me that her husband, **Charles G0URA** was in the shack listening, but rarely used the microphone. So imagine how delighted and honoured I was when Charles actually came on the air to say Richard, it sounds beautiful, superb, I have rarely heard a signal as good as this". Praise indeed!

Main Activity

Due to mobile and portable working being my main Amateur Radio activity, I've been lucky enough to use equipment from different manufacturers designed for this use. Most of the rigs have been great - some better than others - but they don't and (to be fair) are not designed to replace a main station transceiver. However, in contrast, the TS-B2000 is a main station rig that you can take almost anywhere.

pw

- Amateur Radio is a hobby to share and enjoy! Richard was helped by several friends and David Sale joined in with the TS-B2000 experience.



● Henrique CT3AB by his antenna in Old Town, Funchal.



● Madeira is and has been an important hub of intercontinental telecommunication. Before the age of satellites, Marconi Ltd operated a transatlantic cable which passed through Madeira.



● In front of the Madeira Radio Association. From left: CT3KU, CT3HF, CT3KT, CT3LG, CT3KB, CT3KN, lower row: CT3AB, CT3KR, CT3KJ.

Join Henryk Kotowski SM0JHF on his trip to Madeira. The visit, although unexpected turned out to be very fruitful in radio contacts!

Magical Madeira

The island of Madeira is no rarity on Amateur Radio bands. The 200 plus members of the local organisation, the Associacao de Radioamadores da Regiao da Madeira (ARRM) and countless European visitors maintain a steady stream of CT3 calls on the air, all bands and all modes.

Consequently, I was pleasantly surprised when I created a pile-up on h.f. bands using a random wire connected through an automatic antenna tuner to my IC-706 while on Madeira last December. It was my third visit there and was actually unplanned.

I'd originally booked a trip to the West Indies in December but the flight was delayed. I recalled delays the same airline had a few years ago that ended up in court, so I cancelled the trip. There wasn't much of a choice of alternative locations a few days before Christmas, so I set off for Madeira instead.

First Contacts

My first contact was with **Luis CT3EE** who I had met previously in 1993 and 1998. Luis became an Amateur Radio operator 20 years ago at the age of 22 and is now the backbone of both the local association and contesting teams in the islands.

The archipelago of Madeira consists of several islands; the main island Madeira, Porto Santo, uninhabited but well visible from Funchal Ilhas Desertas, and further south, the protected island of Ilhas Selvagens.

Luis was busy combining full time work at the airport, a large family and the approaching holiday season, but he guided me to another Luis. His namesake **Luis CT3DL**, the president of the local Amateur Radio association ARRM.

Luis CT3DL, an experienced tester, runs a flower shop in the hotel district of Funchal. His store acts as alternative meeting place for Radio Amateurs of the capital, at least in the pre-Christmas rush times.

Madeirans are deeply religious and Christmas celebrations are both intense and spectacular. The city of Funchal is decorated with more than one million coloured electric bulbs each December; just a hint of what they do.

Unfortunately neither Luis could make it on Saturday for the meeting at ARRM. But the club premises at 136A, Avenue of the USA in the borough of Nazare were filled with CT3s. Both old



● Luis CT3DL, The President of Madeira Radio Association in an appropriate for Madeira environment, his florist shop.

and young, but mostly newcomers to our hobby.

It gives a feeling of hope when you see so many enthusiastic people engaged in Amateur Radio. **Henrique CT3AB**, who lives in the Old Town of Funchal, having one leg of his dipole attached to the Church of Sao Tiago, actually inherited this callsign after his father, who was one of the first radio experimenters in the island in the 1920s.

Henrique's nephew, **Filipe CT3KB**, pointed out the main dilemma of present time radio enthusiasts of Madeira: "Finding teachers is difficult, people who have the knowledge and experience but also willing to conduct classes". This is where all the Amateur Radio visitors can gain appreciation and satisfaction - bring some literature and components, try to arrange a lecture on your favourite subject, make a demonstration of a technique or your know-how.

There is no electronic industry nor military surplus on Madeira, instead it seems to be a floating garden. Beautiful flowers, juicy fruit, vegetables of excellent quality, all these things are in abundance.

All electronics are imported, as is one member of the ARRM. **Ricardo CT3KN**, the shooting star of contesting in Madeira, came here from the mainland Portugal. His father was **PY1BHJ** in Brazil and Ricardo still remembers the smell of soldering from his childhood.

Somewhat Ricardo found his way into Amateur Radio in Madeira and passed the licence test in 1998. Two years later he won the Rookie awards in CQ WW WPX Contests, both c.w. and s.s.b., using borrowed equipment and antennas. He gained contest training by joining teams of CQ9K and later CQ9T. Ricardo has recently turned 30 and if he doesn't get discouraged, we are going to hear a lot of him on the air!

Duarte CT3HF is 28 years old

and actually started listening to short wave radio at the age of 11. When he was 15, Duarte acquired a 'walkie-talkie', two years later a CB radio and at the age of 20 he discovered Amateur Radio.

Shortly after Duarte made 120 countries on 50MHz occasionally joining the CQ9K contest team. At the end of 1990s, assisted by **Hernani CT3BX** and Luis CT3EE, Duarte and Ricardo CT3KN made some contest attempts as CQ9T team.

Giant Amateur

Hernani CT3BX is the local giant of Amateur Radio. For years, he had been arranging contest venues on the island of Madeira but winter storms were against him so he finally gave up and moved his towers and antennas to the flat and dry island of Porto Santo, some 50km north-east of Madeira.

Hernani's contest station is available for visitors when he's not on the air himself. The island of Porto Santo used to be home for Columbus before he went on to discover America.

The advantage of having Porto Santo as a QTH was discovered by **Cedric CT3FT** long before Hernani, when he moved there from Ireland. Some old timers might recall him as **GI3IVJ** or **El6AZ**. I have never met Cedric in person but I talked to him on air a number of times.

The islands of Selvagens, halfway between Madeira and the Canary Islands, belonging to the Madeira archipelago, have no transport connections at all. It is a Natural Reserve but a group led by Luis CT3DL made a short visit there last summer and activated Selvagens as **CQ9S**.

Serious Contesting

Serious contesting in Madeira was initiated by **Martin OH2BH** in the late 1970s. In those days Martin operated the callsign of CT3BZ, but recently changed to **CT3BH**, from the north coast of the island. I unknowingly followed his steps and went to the very hotel, Cabanas de S. Jorge, in December last year.

I threw a wire down the slope and 'had a ball'. I worked Japan and the USA, but most of my contacts were with Europe, obviously. Until the stormy

wind simply untangled my wire. I understand Hernani CT3BX's problems much better now.

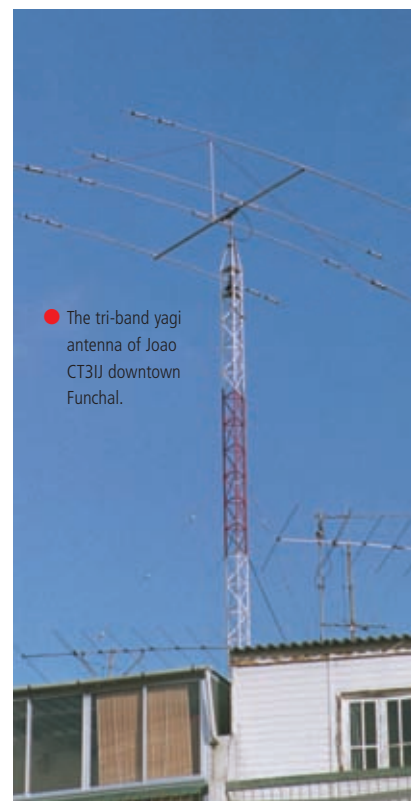
Most of the 300,000 people live on the southern side of the island. Radio signals are screened off by the high (and snowy in December) hills, so in spite of large number of Amateur Radio operators, their signals are not outstanding in the northern hemisphere. This is my explanation of having tremendous response during my activity from the north coast with a simple wire.

In downtown Funchal, I saw a tri-bandner on one of the houses. I located the owner and soon I was on the roof and in the radio nook of **Joao CT3IJ**, among onions and bananas.

Just like Duarte CT3HF, Joao CT3IJ, found his way to Amateur Radio via Citizen Band radio and has been licenced for a few years now. Citizen Band radio operators frequently upgrade to an Amateur Radio licence once they are given an opportunity and assistance.

Madiera has so many advantages that I am doubtlessly going to return here. The climate and the nature are very diversified, wines and food are excellent, the infrastructure is being improved all the time, the radio propagation is very attractive and the number of Amateur Radio friends that one can meet in person is increasing. After all, a radio contact is only a substitute for a face-to-face encounter.

PW



● The tri-band yagi antenna of Joao CT3IJ downtown Funchal.

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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
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Laid Back Loops

Robin Trebilcock
GW3ZCF discusses
horizontal loop
antennas and says they
offer advantages over
many other types,
especially as they're
cheap to put up!

The horizontal loop is an antenna which hardly ever gets a mention in most books about wire antennas. Yet it's capable of DX performance comparable with multi-element beams - and all for very little cost! The idea is not new, one of the earliest references I've found was an article by **W0MHS** in the November 1985 *QST*. And there's a form of the antenna described in *The ARRL Antenna Book*.

One of the first exponents of the horizontal loop in the UK was **Mike G4HOL**. Mike wrote about it in the December 1993 issue of the Royal Signals ARS magazine *Mercury*, though only a small proportion of *PW* readers will have seen that article.

My own interest in the antennas stems from QSOs I've had with Mike, who sent me some information. Mike has said that provided you send a largish stamped self-addressed envelope to him, he'll let you have a copy too.

The principle of the antenna could hardly be simpler. It consists of a continuous loop of wire one wavelength long (at the lowest frequency) and ideally in a square - but it's not critical. This is fed in one corner from good quality

slotted 300Ω twin feeder. But if you cannot manage a full square, use any shape that will fit in your garden, keeping it as open as possible.

Maximum Enclosed Space

The idea is to get the maximum enclosed space within the loop of the antenna. In his notes Mike suggest that you **don't** use a balun to feed the twin feeder, although I've had good results when using a 4:1 balun at the transmitter end of the feeder.

The lowest band you can set the antenna up

for, is very dependent on the size of your garden. But even a small garden should be adequate for a loop that will work from 7-28MHz. You'll find in **Table 1** the lengths for the three lowest h.f. bands upwards. When using this antenna, one thing to bear in mind is that on the lowest band that the loop is cut for,

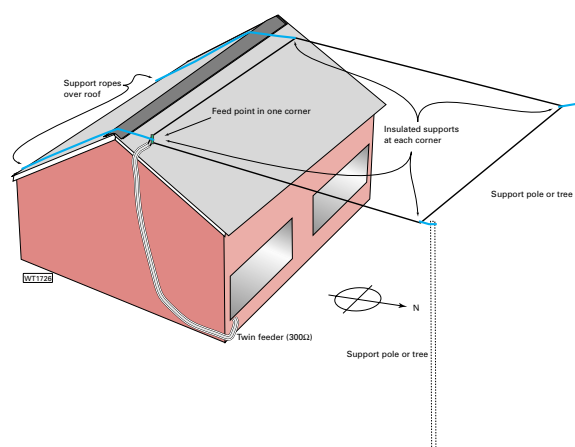


Fig. 1: The loop that Robin built to cover 7-28MHz, but can be used as a capacity hat loaded vertical for 3.5MHz too!

the angle of radiation is predominantly high.

The angle of radiation become progressively lower as you move up the bands, but for me it's the ideal compromise. In my own little bungalow garden I can just squeeze a loop antenna for the 7-28MHz bands which gives me very good coverage of the UK and Europe on 7MHz (although with occasional DX QSOs).

On the higher h.f. bands, I have very good DX performance due to a number of lobes all with low angle radiation. In these lobe directions the antenna compares well with a three-element Yagi-Uda array. Although you will have to accept the DX directions that the layout of your antenna defines. **This antenna is definitely not steerable.**

Non Rotating

Although the antenna cannot be rotated, **you can move the feed-point around** to see what difference that makes to the direction of DX. It might be possible to find a feed-point that has lobes favouring the part of the world that you're interested in. Each of the corners would be favourite start points.

The feed-point impedance of the antenna

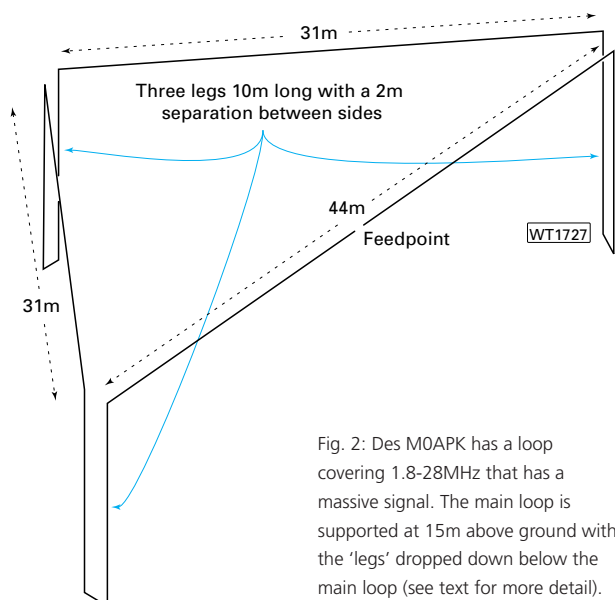


Fig. 2: Des M0APK has a loop covering 1.8-28MHz that has a massive signal. The main loop is supported at 15m above ground with the 'legs' dropped down below the main loop (see text for more detail).

does change over the range of frequencies, but it is still easy to tune. The table of impedances shown in **Table 2** shows the range of impedances that I've measured on my loop set-up. With the 4:1 balun in use, I've had no problems tuning the antenna, even on the 24MHz band. Originally I used some 20m of twin feeder and although there

Capacity Hat

When using the loop and feeder as a vertical antenna with a capacity hat, remember the vertical portion (the feeder) must run vertically as far as possible. So, when using the antenna this way it's unlikely to work well if the shack is upstairs near the feed-point.

Fed in the middle of the longest leg, very potent signals are radiated from the M0APK QTH...bearing testimony to the antenna's effectiveness. For comparison purposes Des has retained his full-sized Windom antenna with its 77m top. However, on all bands other than 7MHz his monster loop is around three S-points better than the Windom. Although on 7MHz the loop is "only slightly better".

Interesting Variation

Perhaps the most interesting variation of the loop I've come across, is from **Brian G0NSL** who has a 7MHz version cut a little longer than my 7MHz loop. Brian has his loop cut to 43.43m long and it's supported at around 7.9m above ground.

Some 4.9m below the main loop Brian has placed a second loop of wire as a reflector. This loop is a little over half a metre longer overall and is continuous. Feeding the upper loop with his 5W of r.f. via electrical twin wire (Z_0 approximately 120 Ω), Brian manages to cover the UK as effectively as other stations using 100W.

Brian's loop and reflector seems to be

Table 1

Bands Covered	1.8 - 28MHz	3.5 - 28MHz	7.0 - 28MHz
Total loop length	172.5m	86.25m	43.13m

Total loop lengths for loops covering the bands shown.

was more variation of impedance at the a.t.u. the antenna seemed to work as well in practice.

The loop is far less susceptible to electrical noise than a dipole fed with coaxial cable. It also is quite broadband in operation with slow changes of impedance. When you have tuned upon one part of the band, you can move some way in frequency without having to retune - very useful in today's crowded band conditions.

Set-up Simple

I've shown the set-up I have here at my location in **Fig. 1**. As you can see the set-up is quite simple, but you can use whatever support points are available to you. At each support point there's an 'egg' insulator through which the wire is allowed to slide. This allows the loop to be tightened or loosened from any one corner support.

The two points on the building are each merely a length of polypropylene rope passed over the apex of the bungalow roof. I have one advantage of a strategically placed tree in one corner of the property leaving only one support pole to be used. None of the corners are higher than about six metres, although the north-west corner is about one metre lower.

The slight incline on the plane of the loop due to the north-west corner does seem to enhance the sensitivity to the north and west, as I get good reports from both North and South America. I also find that both Asia and VK-land may be worked on long-path. Though this doesn't mean that other directions suffer, as I also get good reports from the east, with many contacts in China, Taiwan, Japan, India, Pakistan and the Philippines as well as other areas of Oceania!

I would, of course, like to put up a version that would cover 3.5MHz as well, but space does not allow this. However, I found all is not lost on this band, as by strapping both sides of the feeder together and using this as vertical antenna with a capacity hat against earth, works quite well too.

The amount of capacitive coupling to ground can be quite marked. I have on occasions, used a version of the 7MHz loop when operating portable from my caravan. On these occasions, no part of the antenna was over three metres above ground, and yet I still worked the DX with some 50-100W output.

There was one time, when on a caravan in Wales and the loop antenna I'd erected was flapping up and down in the wind. This

Table 2

F(MHz)	7.07	10.1	14.3	18.15	21.2	24.9	28.5
Z(Ω)	123	363	133	301	151	753	229

movement, with its changing capacitive loading, made it impossible to load to the output of my rig with a semiconductor output stage. (The s.w.r. bobbing up and down with the wire flapping caused rapidly changing feed-point impedances.)

There was no alternative under the windy conditions, I had to erect a long wire that, although it also flapped up and down in the breeze, caused less change on loading than the loop antenna had. Under these conditions, the longwire proved to be more effective.

Scope For Experimentation

The scope for experimentation to suit your area and circumstances is immense. Those who have heard signals from **Des M0APK** will know how effective this type of antenna can be. Des has a 172.5m version of the loop antenna that covers all bands from 1.8MHz upwards.

The format of the loop at the M0APK shack is in the form of a right angled triangle with total leg lengths of a little over 106m at a height of around 15m. The extra lengths of the antenna are hidden in three 22m 'tucks', one at each support point. Each of the tucks has the drop of around 10m with the wire legs of the tucks being kept about two metres apart.

Impedance measurements for Robin's loop antenna on various bands.

resonant on 7.07MHz presumably because of the coupling between the loops. His antenna works well at the frequency where he's often heard as net controller on the **Worked All Ireland** net. His is one of the few stations that can both hear, and be heard by all the other participants in the net.

So in summary, in my opinion the horizontal loop is a true multi-band antenna that costs only a few pounds to put up, and is capable of surprising performance. Since gaining my licence, I've tried many antennas with varying degrees of success, trying G5RVs, long wires, verticals, W8JK, etc., although I've never had the space for a rotary beam.

In many years of operating before using the horizontal loop, being the first station pulled out of the midst of a pile up was a comparatively rare experience for me. But since putting up the horizontal loop, it has happened surprisingly often.

I think the horizontal loop antenna is, without a doubt, the best limited space antenna I've ever used and I can thoroughly recommend it for almost all locations. *pw*

✉ Mike Holden GHOL, 74 Trevillis Park, Liskeard, Cornwall PL14 4EQ

Careful With That Call

Patrick Allely GW3KJW takes a look at the legal pitfalls which await the unwary in the Amateur Radio hobby. Although the subject's serious...Patrick's humour also breaks the surface!

How many times have you heard "Well I'll say 73 to you and all the listeners" as a QSO finishes? It's in the spirit of Amateur Radio...but the person making the remark is breaking the law!

For many years I was actively engaged in the process of law. I had to study various Acts of Parliament, define the meanings within the Acts and eventually produce prosecution files which would stand up to rigorous scrutiny by defence lawyers.

In other words **I had to get it right**. It was from this background that I took a look at Amateur Radio Licence and its various regulations.

Wireless Telegraphy Act

The Amateur Radio Licence is mainly derived from the Wireless Telegraphy Act 1949. This codified all the previous legislation and lumped it together.

The Act deals with such matters as varied as the transmission by State and commercial radio stations, British registered shipping communications and of course, British Radio Amateur transmissions.

Since 1949, other legislation has been introduced dealing with radio in some form and this has been incorporated into the main Act.

Consider, for example, the wonderfully titled: *The Wireless Telegraph (Citizens' Band and Amateur Apparatus) (Various Provisions) Order 1988*. This was a Statutory Instrument issued in 1988 and is now part of the original Act and must be interpreted in conjunction with the Act.

We must also be conversant with *Marine & Broadcasting (Offences) Act 1967*, the *Post Office Act 1969*, the *Wireless Telegraphy (Content of Transmission) Regulations 1988*, the *Telecommunications Act 1984* and of course the *CEPT recommendation T/R 61-01*.

Knowledge Of Law?

Most of us have no knowledge of the law and can see no good reason for understanding it! After all most laws are based on common sense and most of us will rarely transgress. Despite this, some people have peculiar ways of interpreting the law to suit their own needs, and here's some examples:

- 1: **G9ZZZ/MM**, operating on the Manchester ship canal from the radio cabin of a 20,000 ton cargo ship.
- 2: **G9ZZZ/M**, sitting on the top of a hill in his car operating in a contest.
- 3: **GX9XYZ/P**, a club station, participating in JOTA and allowing a unlicensed Scout to send a greeting message to a station in Germany.
- 4: **G9ZZZ**, operating from home and chatting to a friend allows a favourite grandchild to climb onto their knee to

gurgle a 'Goodbye'.

5: **G9ZZZ**: writing his transmitter's power in the log book as 25W.

6: **G9ZZZ/MM**, operating a hand-held QRP rig on the deck of a cross channel ferry. It's exactly 12 months and one day since the operator was first licensed and the renewal fee had been sent the previous day, i.e the anniversary of issue, but the new licence validation had not yet been received.

7: **G9ZZZ**, (a market gardener) using the callsign GB9TGC to celebrate the 10th anniversary of the Tomato Growers Combine.

8: **G9ZZZ/M**, is southbound on the M6 motorway in the outer lane, microphone in hand travelling at 75mph. The operator is also listening to the loudly-playing car stereo. While in QSO via the 144MHz local repeater the operator notices that there's northbound congestion because a wide load escorted by police cars is heading north and says "...for the benefit of anyone listening...the M6 is getting very congested northbound between...". The mobile telephone then rings, and the operator answers the incoming call.

9: **G9ZZZ/M**, is sitting on the top deck of an open topped bus, at the Aintree racecourse during the Grand National meeting, chatting to friends using 430MHz QRP transceiver.

Interpreting Legislation

Now let's look at the examples, starting with poor old G9ZZZ! The licensee has only been doing what the rest of us have done at various times...interpreting the legislation to our advantage.

Now, I'm cautious enough to **not commit myself absolutely** as far as any **Point of Law** is concerned. But I'm reasonably certain that the nine examples I've given are all transgressing the regulations governing the transmissions of Amateur Radio as stated in the Radiocommunications Agency (RA) booklet BR68.

To help, let's see what the law as explained in BR68 states. Bearing in mind that yet another act, the *Interpretation Act 1978* gives the definitive answers to most of the questions.

Looking at 1: Only in tidal waters will the suffix /MM be used. Note that **tidal waters means any part of a sea or river within the ebb and flow of the tide at ordinary spring tides.**

Inland Waters means any canal, river, lake, loch or navigation which is not tidal water.

At Sea is to be in tidal waters or territorial sea of the UK or in international waters. So, the correct callsign **should be**



callsign!



“Well I’ll say 73 to you and all the listeners”.....a remark which is harmless, friendly and in the spirit of Amateur Radio...but is technically illegal!

G9ZZZ/M, whilst in the canal.

Looking at 2: Here you must consider what the legislators intended and not what the Radio Amateur wants it to be! Someone who is moving is mobile, someone who is stationary is not...it’s as simple as that! There is /MM (Maritime Mobile) suffix **but there’s no such thing as static mobile or stationary mobile**. Again the simple way is the right way.

If someone is driving a car along the road and transmitting **they are /M**. If they then pull up at a traffic light with the intention of driving on when the light changes...**they are still /M**. However, if they take their transport (car, bicycle, donkey, etc.), to a spot, be it the top of a hill or a lay-by and transmits, **the suffix should /P**. **It matters not** that the power is derived from the car battery.

The Acts state that a “temporary location is any location other than the Main Station Address and in a fixed position”. (I fully realise that the same Act states that Mobile means “located in any vehicle, etc., **but it also implies being mobile in that vehicle**).

Now let’s look at 3: Here the callsign is correct, the club station is obviously G9XYZ, the holder being G9ZZZ and being in England, they’re using the secondary special locator ‘X’. **However, the facility for greetings messages to be transmitted by non licensed persons is strictly limited.**

Note that: The person sending the message must be under direct supervision by the licensee or other authorised club member. Each greeting message must not exceed two minutes, each person may only send one message to each station with which the station is in contact and these greetings messages

can only be sent between UK and stations in the USA, Canada, Falkland Islands and Pitcairn Island.

Looking at 4: Fairly obvious, the licensee has a strict obligation to follow the regulations. It happens, I fail to see much harm in it, but I suppose if you allow a grandchild to speak just two words you could then argue a case for your next door neighbour to chat for hours to his relatives in Australia, via your transmitter.

Looking at 5: For many years we entered power levels in Watts. Easy and convenient! Then the authorities declared the entry to be in dBW relative to 1W output. The power entry is a requirement in the logbook so G9ZZZ should have entered 14dB, the rough equivalent of 25W in his logbook. (I take perverse delight of writing 0dBW in logbook when I use 1W in QRP contacts!).

Looking at 6: Probably feeling seasick, the operator is also certainly operating illegally - for a start the operator has lost the licence. An Amateur Radio licence, is re-issued yearly, lasts only 12 months and is **renewed only if the renewal fee is paid to the Secretary of State before the anniversary date of the Date of Issue**. Since the fee was not paid in the manner required, the licence expired the day before the relevant anniversary of the Date of Issue.

The operator should surrender the Validation Document (the licence) to the Secretary of State. Furthermore since the operator also holds the club licence G9XYZ, this is also automatically revoked!

Remember also - on a vessel the licensee **shall install, use, make changes to the station only with the written permission of the Master and observe radio silence on the advice of the Master**. A vessel includes a hovercraft and any floating structure which is capable of being manned.

Looking at 7: Here, I consider that a number of GB callsigns are operated illegally and that the operators are unaware or uncaring of regulations. The law is quite clear, the licensee shall have no pecuniary interest in any operations conducted under this licence and except in the case of activities on behalf of a non-profit making organisation, established for the furtherance of Amateur Radio, shall not use the Station for business, advertisement or propaganda purposes. **This is a very stringent regulation** and it’s difficult to argue that an Amateur Radio station with a callsign being an acronym of a commercial set-up is totally within the spirit of the law.

Looking at 8: Road traffic offences apart, as far as the radio regulations are concerned the Amateur is transgressing. Firstly...some broadcasting material (from the stereo) will be transmitted plus a general broadcast describing the road congestion. Legally, to give out a **general message**, a net must first be established and that general message must be intended for the members of that net only, not **all listeners** as well.

I’m well aware of course, that Amateurs, often being the first on the scene of an accident have acted promptly and responsibly in giving out a call via Amateur Radio. By doing so they’ve often helped to save lives....and all praise to them.

Looking at 9: A day at the races...but unfortunately G9ZZZ is a loser in more ways than one! Whilst the bus was **moving** G9ZZZ/M was the correct callsign, **but now stopped** and in an ideal position to watch the race, the callsign should be G9ZZZ/P, a **Location...not Mobile**.

Additionally, was permission obtained to operate from the bus or in the grounds of the racecourse? The regulations state that holding a licence **does not absolve the licensee** from obtaining any necessary consent before entering on private or public property (including a public transport vehicle) with any apparatus.

Act Responsibly

To be fair, most people act responsibly and would not dream of intentionally breaking any of the laws, after all Amateur Radio is only a hobby. However, the power to be able to communicate is a privilege closely guarded by governments.

I acknowledge the help and advice given by the Radio Communications Agency in the form of *Amateur Radio Licence (A) or (B) Terms, Provisions and Limitations Booklet BR68*. Make sure you read yours now, or you could end up like G9ZZZ!

PW

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As a keen c.w. operator I thought it a sensible idea to take a really good look at the arguments that rage over the use (and advantages of either) of c.w. and the s.s.b. modes. And to start, I suggest you first refer to the RSGB *Amateur Radio Operating Manual* in which it's estimated that c.w. is at least 20dB superior to r.f.-clipped s.s.b. Other publications present figures between 11dB and 30dB.

So, I'll now take an in-depth look at what I think all these figures mean to the Amateur Radio fraternity. It makes an interesting topic, - and in my opinion - a very strong case for c.w.!

I think that the claim that c.w., watt for watt, is more effective than s.s.b. is fully justified. Three factors account for this claim. They are the narrower band-width of c.w. receivers, the lower average power output of a s.s.b. transmitter and the nature of a c.w. signal.

To answer the inevitable questions, let's now examine these in turn and try to quantify their individual contributions. Some answers will come as a surprises and some (no doubt) will prove controversial!

Signal Versus Noise

When operating on high frequencies (h.f.) Radio Amateurs are primarily concerned with the signal-to-noise ratio of the wanted signal. And here, an important basic fact comes into play because when using the c.w. mode, receivers use a narrower bandwidth than that employed for s.s.b. and this gives a significant improvement in the signal to noise ratio in favour of c.w. signals.

For example, comparing typical bandwidths used in



● Gerald Stancey G3MCK discusses the advantages that c.w. transmissions have over the s.s.b. mode. At the same time he pays tribute to the wonderful 'processing power' provided by the combination of the operator's ears and brain - whether it be using speech or the key!

The Morse Mode...

Gerald Stancey *Amateur Radio's Best Kept Secret?*

G3MCK delves

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Gerald's

opinions!

reception, namely 2.4kHz for a s.s.b. transmission and 500Hz for a c.w. signal, the improvement in the signal-to-noise ratio is $10\log(2400/500) = 6.8\text{dB}$. **However, both modes can use narrower bandwidths** and if they're reduced to 1.8kHz (s.s.b.) and 50Hz (c.w.) bandwidths it's then possible to obtain an improvement of 16dB in the signal-to-noise ratio in favour of c.w.

While not all Amateurs have the narrower bandwidth filters in their receivers it should be remembered that there's evidence that experienced c.w. operators can personally 'filter' down to bandwidths of 50Hz with the aid of that marvellous transducer-computer combination we call the ears and the brain! (This statement is supported by the ability of an experienced c.w. operator to copy signals which are inaudible to the beginner).

The effective peak power of a c.w. signal is simply the power output of the transmitter. For s.s.b. signals it's not so simple. It depends on the amount of compression and

speech processing used, but evidence tends to support an average power level of 3-6dB less than the peak output power.

Brain Power

The brain provides much 'processing power' which favours c.w. over s.s.b. Here, c.w. is characterised by the **presence** or **absence** of a signal which, providing correct shaping is used, makes it very easy to detect.

If the 'edges' of the dots/dashes are too rounded the characters lose clarity. The 'edging' technique was well understood when people made their own c.w. rigs, and a lot of time was spent in getting a clean but click-



● There are just as many different opinions on the subject of c.w. versus the s.s.b. modes as there is in the choice of Morse keys!

free waveform to ensure that this benefit was realised.

Another aspect of the brain's very powerful signal processing abilities is its ability to 'lock onto' a good c.w. signal. On this point experience shows that in bad conditions it's much easier to read a correctly spaced c.w. signal than one that is being sent in a slap-dash manner.

Finally, it's well known that **if you know what you are looking for it's easier to find it**. A c.w. operator only has to recognise about 45 clearly defined different characters. This is not the case for a phone operator who has a much wider range of sounds to recognise.

Dialects only compound the problem! However, although the three contributions are hard to quantify, even if each is only worth 1dB...there's another 3dB with which to credit c.w.!

Power Superiority

From my statements above it can be seen that the effective power superiority of c.w. over s.s.b. depends on the exact circumstances and that the major factors are under the control of the receiving operator. These facts can be summarised in **Table 1**.

Affecting Factor	Contribution (dB)	
	Minimum	Maximum
Bandwidth	7	22 **
Power	3	6
Brain power	0	3
Total	10	31
** Assumes coherent c.w. (c.c.w.) in 10Hz bandwidth and voice (s.s.b.) in 1.8kHz bandwidth		

The table shows that 20dB seems to be a good figure to take when comparing typical s.s.b. and c.w. stations.

Now let's look at what this means in practice by comparing two stations using the 14MHz band. One is a c.w. station running 100W into a dipole at 10m, the other a s.s.b. station running 400W p.e.p. into a three element tribander at 20m. At first sight the s.s.b. station appears to be about 18dB more effective than the c.w. station. As **Table 2** indicates, This comes from:

Advantages (given in dB) due to:	
Power output 400W against 100W	6
Antenna used Beam against a dipole	6 **
Height advantage Beam @20m - dipole @10m	6 **
Total (dB)	18
** See : <i>HF Antennas For All Locations</i> , Moxon	

However, against this must be set the 20dB superiority of c.w. over s.s.b. Hence both stations will put in signals of comparable signal-to-noise ratio at the receiving end of the circuit. This means that those who use modest c.w. stations can compete with those who have beams and linear amplifiers but use s.s.b. The c.w. users also avoid getting involved with the expense, planning problems and neighbour problems of installing a large station.

Another benefit is the ability of the c.w. user to minimise EMC problems by using lower power levels. The RSGB EMC people say that as a rule of thumb you should expect to have EMC problems when running 100W s.s.b. but to be clear when running 5W c.w. This is only 13dB down on the s.s.b. signal and, allowing for the 20dB c.w. advantage puts QRP c.w.



user in a very strong position compared with a run-of-the-mill s.s.b. station.

The advantages of using c.w., when used in conjunction with a lower power transmitter are many and in fact the combination has led to the growth of the low

power - usually referred to as QRP - scene worldwide. **The G-QRP Club**, the British-based society devoted to low power operation and equipment to suit (a great deal of it home-constructed) is in reality an International organisation as it has members all over the world.

The G-QRP club's journal *Sprat* reflects the growing interest in low power operating, and there are many circuits and projects to encourage builders and operators. And of course *PW* readers get a whiff of the flavour of the recipes in *Sprat* because the **Rev. George Dobbs G3RJV** - one of the founding fathers of the movement here in the UK - regularly writes the *Carrying On The Practical Way* series in the magazine. There's no conflict of interests because both *PW* and

Sprat promote the practical aspects of our hobby!

Recently, I enjoyed a QRP c.w. QSO on

7MHz with **Rob Mannion G3XFD**, the Editor of *PW*, as he was having a break from the editorial keyboard! Rob was parked in his new car at Matcham's Viewpoint near Ringwood, Hampshire - just a mile or so away from his home in Ferndown in Dorset.

Operating his Alinco DX-70 at lower power - around 10W or so *(see **note below**) Rob and I enjoyed a short QSO before he had to leave for a late lunch. It turned out that Rob had been busy working a number of stations and had

overstayed by an hour or so because he'd been so busy!

The advantages of low power and the partnership with c.w. are obvious and many operators - G3XFD included - are able to manage good two-way QSOs in conditions where it would be a real struggle with s.s.b. at low power levels. It also means that your hobby can go with you in a suitcase when on holiday - and then of course we wander into the possibilities of 'Adventure Radio'. The opportunities offered here - with home-brewed equipment and commercially made transceivers such as the new Yaesu FT-817 QRP transceiver are literally endless. Great fun for all I think!

***Editorial note:** Yes Gerald, in fact I was running the DX-70TH a little below 10W. on Saturday 15th of September Operating as G3XFD/P (see Patrick Alley's GW3KJW's *Careful With That Callsign!* article on page 38) using my Pro-AM selection of whips I'd had a great time on the band. While looking over the beautiful River Avon Valley, with Christchurch Priory towering on the horizon, I had the pleasure of working a number of M5 stations who were enjoying their own low power c.w. operations. It's a pleasure to operate on 7MHz c.w. nowadays...especially as the M5 calls have joined us on the bands. Now that I've got my new car I hope to be operating most evening on the band (for half an hour or so) on my way home from the office - around 1700 local time. See you on the band readers? **G3XFD.**

Fully Justified

To summarise...I think that the 20dB superiority claimed in the RSGB's *Operator's Guide* for c.w. over s.s.b. is **fully justified**. I also consider the benefits of using c.w. in these days of increasing EMC and planning problems should make it the preferred mode for all h.f. operators.

The only thing that puzzles me is why the advantages of c.w. seems to be one of Amateur Radio's best kept secrets! *PW*

A Classic Pair The Heathkit HW7 & 8



● A 'classic' family - the Heathkit HW transceiver with the original HW7 - bottom right), the HW9 above with the final HW9 model on the left.

Unusually for the 'It's A Classic' series - the Rev. George Dobbs G3RJV looks at two transceivers - the pioneering Heathkit HW7 and the later HW8 QRP Transceivers.

"When one tires of Amateur Radio - one tires of life" might be a suitable misquotation for our hobby. But we can all lapse and mine came in the early 1970s when I'd moved house twice in fairly quick succession, with no time to set up my station or antennas. In fact, on my second move when the chairman of the local radio club visited me to welcome me to the area, he ended up buying all my equipment...at bargain prices!

After a while I began to miss my radio, about the same time Heathkit introduced the HW7 transceiver kit, a simple, low power transceiver for the 7, 14 and 21MHz bands. I'd read the review of the HW7 by **Wilfred Scherer W2AEF**, in *CQ* magazine and he gave a good account of this simple transceiver with a direct conversion (DC) receiver.

Direct conversion was just coming back into the Amateur Radio vocabulary, although both the review I read and the Heathkit manual described the receiver as a Synchrodyne. This term came from an article by D. G. Tucker in the American magazine *Electronic Engineering*, in March 1947.

Kit Arrived

The kit I bought quickly arrived from Daystrom, the Heath representatives in Gloucester and I built it over a couple of evenings following the excellent manual. Heathkit were revered for their manual presentation.

Doubts about the HW7 grew as I worked - it seemed too simple! Additionally the Synchrodyne technique had me wondering about its viability on the Amateur bands.

The HW7's bench tests were successful, next came the 'on the air' trials. For the antenna I quickly took a reel of pvc covered wire and cut the lengths for a 14MHz dipole.

There wasn't any coaxial cable or a Morse key as I'd sold them! So, I attached the two legs of the dipole to a picture rail and draped them around the room...fortunately I lived in a large old house with big rooms and high ceilings!

Then I attached the two ends of the 'feeder-less' dipole to the antenna socket of the HW7 and switched on. Much to my surprise, I could hear lots of signals on the 14MHz

band. (Not realising then, that on a direct conversion receiver the signals appear twice!).

So, it received - but would the HW7 transmit? Keyless, I attached a clip lead to the key socket and tapped Morse, using the free end on the back of the metal case. The rudimentary power output meter, marked **Relative Power**, kicked over.

Then I heard a Swedish station calling CQ and throwing caution to the wind, using the clip lead 'key', I called him. To my surprise, he replied with a report of 569!

From that moment on I was hooked on QRP operation. And some 30 years later I'm still hooked... all due to the little HW7 transceiver!

Heathkit sold the HW7 from 1972 to 1975 and it provided many Radio Amateurs with their first real taste of QRP operation. The solid state technology itself encouraged the design of low powered equipment and the late **Doug DeMaw W1FB**, was already promoting the construction of simple solid state equipment in a series of articles in *QST* magazine.

In those days Heathkit were the doyen of electronic kit producers. Reasonably priced, the kits were very buildable using their legendary, step-by-step, manuals, cunningly designed so that the written instructions and layout diagrams were on facing pages.

Three Bands

The HW7 operates on the c.w. portions of the 7, 14 and 21MHz. Output is approximately 3W, dropping down to some 2W on 14MHz. A common v.f.o. is used for receive and transmit, but it could be switched out for crystal-controlled operation.

The v.f.o. is a f.e.t. with another f.e.t. as source follower driving a bipolar transistor acting as a frequency multiplier. For 7MHz operation the v.f.o. actually runs on 3.5MHz, doubling for 7MHz.

On 14 and 21MHz, the HW7's v.f.o. then runs on 7MHz with the output doubled for 14, and tripled for 21MHz. The multiplier circuits were simple and could give rise to harmonic problems.

The Transmitter

In the HW7 transmitter, the multiplied signal passes to an r.f. driver stage. This stage could also be used as a Pierce crystal oscillator for crystal controlled operation.

The power amplifier uses two parallel connected bipolar transistors terminated by a pi-network harmonic filter designed for a 50Ω output. Band-switching buttons change the component values of the pi-filter, and resonance is achieved by using a variable capacitor in the mid-section of the filter network.

Simple Receiver

The receiver is also simple - input filtering is achieved with just one tuned circuit tuning all three bands using a 300pF variable capacitor. This is best described as 'iffy' and has considerable difficulty in eliminating broadcast breakthrough on the 7MHz band during the evenings in Europe.

The mixer stage is a dual-gate m.o.s.f.e.t. which is

followed by an L/C (Inductance/Capacitance) passive audio filter feeding an audio i.c. Transmit-receive switching is electronic using a transistor switch operated by the key controlling a change-over relay, delayed enough to allow the transmitter to remain on during normal keying speeds.

Complete Rig

My brief description shows that the HW7 is more a 'Ford' than a 'Rolls Royce', but **it is a complete three band transceiver**. What amazes me is how many good QSOs I had with the HW7 using simple antennas!

My original HW7 was worked from home using simple wire antennas and worked over 60 countries in the mid 1970s. It wasn't always easy operating, and 7MHz was unusable at certain times, but it provided me with a lot of enjoyment and excitement.

In those days I had cottage holidays in Wales and my routine was to walk by day and operate on the h.f. bands in the evenings. The antenna would be a random long wire attached to a tree or a W3EDP antenna attached to the same tree and the results with the HW7 were **more than just reasonable**.

I set myself a target of working 25 different countries in my (usually) five evenings of operating and managed to achieve that every year. Eventually I sold the original HW7 in favour of better equipment but pure sentiment encouraged me to buy another, which now gets an occasional airing.

The HW8 Arrives

In 1976, Heathkit replaced the HW7 with the HW8 transceiver, which was produced until 1983. The HW8 was a considerable improvement on the original and although it still used a direct conversion receiver, the main improvements on the HW8 were the receiver's design and the addition of 3.5MHz.

The HW8 uses a v.f.o. with crystal mixing to determine the bands. The v.f.o. is more stable, and the transmit-receive frequency offset is accurate.

In addition to better input tuning for the receiver, the HW8 includes an r.f. gain control - a considerable help in preventing overload of the front end of the receiver. Another improvement was the addition of R/C active audio c.w. filter with a 'Wide-Narrow' switch which offers very reasonable c.w. selectivity on the bands.

The HW8's power output meter also doubles as an S-meter on receive. The receiver is certainly much easier to use than the HW7 receiver, and I know of QRP operators who have achieved DXCC using the HW8.

Good Account

I owned an HW8 in the early 1980s and it certainly gave a good account of itself at home and as a portable station. Oddly enough, I never got to like it quite as much as the HW7!

The HW8 was certainly better in use but I suspect I enjoyed the sense of having to win QSOs with the HW7. It was certainly the single most popular QRP transceiver in the USA where they became known as the Hot Water 7 and 8.

Because the HW7 and 8 are constructed in a very accessible manner they became probably the most owner modified pieces of Amateur Radio equipment of all time. A wide range of owner modifications for both transceivers were published.

Modifications were so common that it's difficult to buy a second-hand HW7 or HW8 that has not been modified! As a result, in the early 1980s **Fred Bonavita W5QJM**, published a complete book of modifications called the *Hot Water Handbook*. This was later up-dated and republished by **Mike Bryce WB8VGE**, as the *HW8 Handbook*, and included modifications for the HW7, HW8 and the later HW9.

The HW7 and HW8 are still available on the second-hand market **but don't pay a lot of money for them** – tens of pounds is the order of the day. Both will provide a lot of fun and will work a lot of stations.

After discontinuing the HW8, Heathkit introduced the HW9, another QRP transceiver. This time it came with a superhet receiver...but that's another story!

PRU



The Heathkit HW7 Transceiver

(Manufactured from 1972 to 1975)

Frequency Coverage : 7 to 7.2 MHz.
14.0 to 14.2MHz
21.0 to 21.3 MHz.

Transmitter

CW only

Power Input:

3W on 7MHz
2.5W on 14MHz
2W on 21MHz

VFO or crystal controlled

Output impedance

50Ω unbalanced

Sidetone - built-in

Receiver

Synchrodyne (Direct Conversion)

Sensitivity

<1μV provides a readable signal

Selectivity

- 1kHz. at 6db. down

Audio output impedance

1000Ω nominal

Frequency Stability

<100 Hz. drift after 10 minutes warm-up.

Power Requirements

13V d.c.

Current consumption

35mA receive and 450mA transmit.

Size:

108 x 235 x 216mm,

Weight:

2kg

The Heathkit HW8 Transceiver

(Manufactured from 1976 to 1983)

Frequency Coverage : 3.5 to 3.75 MHz
7 to 7.25MHz.
14 to 14.25MHz.
21 to 21.25MHz.

Transmitter:

CW only

DC Power Input:

2W [minimum] on all bands

VFO Controlled

(Crystal mixing for bands)

Output impedance

50Ω unbalanced

Sidetone

built-in

Receiver

Direct conversion

JFET r.f. amplifier, doubly-balanced i.c.

product detector, RC

active c.w. audio filter

Sensitivity:

0.1μV plainly audible on all bands

Audio output impedance:

8Ω nominal

Power Required:

13V d.c.

Current consumption:

90mA receive, 430mA transmit.

Dimensions:

108 x 235 x 216mm

Weight:

2kg

Fig. 1: The Heathkit HW8 in operation - with F6GGO/P on the key.

Helping Yourself To

Although Angus 'Gus' Taylor G8PG is already an exceptionally well known G-QRP Club stalwart, he's also had many years experience teaching RAE correspondence course students. Here he passes on helpful advice for tutors and students.

There was once a time when local education authorities smiled upon all forms of education for leisure activities. In those happy days any small group of would-be Radio Amateurs could go to the local education office and soon find themselves enrolled on an Radio Amateur's Examination (RAE) course, which would receive a considerable subsidy from the rates.

Nowadays things are very different! Subsidies from local councils are hard to come by and the name of the game is cost cutting. So, except in large centres of population it's increasingly difficult to find an RAE course and where one **does exist** fees and travel costs constantly increase. What, then can would-be RAE candidates do to overcome this problem?

Popular Solution

On increasingly popular solution is to move into the field of 'distance education' and enrol in a correspondence course. Although such courses may be unfamiliar to many readers they have a number of advantages some of which are as follows.

Unlike face-to-face courses, the whole of the past and current study material is permanently available - rather like having the Tutor living in your home. As the course does not have the fixed timetable constraints of a college course, special help for those who did not study maths and physics at school, or have forgotten these subjects, can be built-in. (And such maths are entirely electronic calculator based!).

Queries can be referred to the tutor either by letter or telephone and they can give them undivided attention. Study timetables can be adjusted to suit the pace of the individual student and quickly re-adjusted to take care of sickness, unexpected overtime or other interruptions.

I hardly need to mention other advantages such as no expenditure on text books (with some courses as they are in effect provided with the course material). Lack of travelling expenses and not having to try and find you way home from college in a winter snowstorm are also appealing!

Preparing A Course

Much of the preparation of a good course is done before any of the main text is written! This basic work is done at the synopsis stage, where two vital sets of decisions have to be made. These are (1) what's going to be presented in the study and (2) the order in which it will be presented and if you or your club are considering preparing a course...my advice might help.

The course must be broken into modules (let's call them 'lectures'). So it's first necessary to decide on the

overall content of each lecture, then to arrange them in the order in which they will be presented to the student.

For example there's no use talking about semiconductors to someone who does not know the difference between a conductor and an insulator!

Once the overall content of each lecture is known it must be arranged in logical order for assimilation by the student. This is done by breaking the lecture down into section headings and within each section sub-headings. All this takes time and thought, but if done properly it produces a course where logical progression helps ease the path of the student (and that of the course writer!).

In the course I most recently produced, for example, once the synopsis had been completed it was only necessary to transpose two sub-headings during the writing of several hundred pages of text. Once the main text of each lecture is completed three elements are added to it, namely the objectives, the summary and the self-test questions.

The lecture begins with the objectives which state precisely what the student will be able to do when they've completed the study of the lecture. The 'lectures' provide a set of goals which allow the student to monitor progress as the study of lecture proceeds.

The summary précis in a sentence or two each of the important areas of knowledge covered in the lecture. It's invaluable for revision - allowing a very quick check of knowledge recall to be made and highlights any areas requiring additional study. There are those who say, not without justification that if you can remember the summaries you should pass the exam with ease!

The Study Habit

As many students will not have attempted an exam for decades regaining the study habit is important! The course introduction explains the exam, and gives various tips on how to deal with multiple choice questions.

The first 'live training' exercises are the self-test questions at the end of each lecture. These are multiple choice questions designed to test knowledge of the lecture content, and answers are provided. The lectures can be grouped together in books/ring bound folders of convenient size and each ends with a test containing 60 multiple choice questions, designed to examine the student on what's been studied.

Next, the tests are marked and commented on by the Tutor and when they are returned the student also receives a set of specimen answers. Normally these not only explain the correct answer **but also why the other answers are wrong**.

o Success!

At the end of the course the student completes two high standard papers which together form a mock RAE. These are also Tutor marked and allow any late comments and final revision suggestions to be made.

Examination Requirements

As many readers will know, the RAE is (at the moment) divided into two Parts, each with its own examination paper. **Part 1** deals with Regulations, Interference and Electro-magnetic Compatibility (EMC). **Part 2** deals normally has a few questions on operating procedures, followed by questions covering the theory syllabus.

What **may not be known to all readers** is that Part 1 is marked to a higher standard than Part 2. This is not unreasonable considering the subjects covered in that part.

In the course I prepared, Regulations are presented in wording somewhat simpler than that used in the official pamphlet BR68 and this part of the course was regularly updated to reflect current changes in Regulations. Interference covers fully the interference that can be caused to nearby listeners and also to other Amateurs.

Step-by-step examples of how to deal with TVI problems are included. The complex EMC subject is covered fully, including interference to VCRs, TV amplifiers, audio systems, telephones, etc.

The operating procedures requirement of Part 2 has its own lecture, covering calling, signal reports, Q-code, band plans etc. There's also information on the nature of repeaters and satellites. The theory lectures cover the requirements of the remainder of Part 2 in detail.

In preparing these lectures the aim was twofold. Firstly I aimed to give the student a good enough grasp of radio theory to allow the exam to be tackled with confidence and a good chance to success. Secondly, I set out to give the student foundation training in radio techniques which can be used in the future, building upon them as part of the self-training in radio communications. Short cut courses may look attractive at first sight, but they often lead to disappointment!

Infinite Variety

From my point of view, part of the fascination in tutoring a distance learning RAE course was the infinite variety in the backgrounds of the students. The teenage girl taking the RAE as part of her Duke of Edinburgh Award, the retired machine-minder, the graduate in another discipline, the disabled housewife, the 80-year old antiques expert; all have completed the course and passed the RAE.

It was the diversity of successful students, all saying how helpful the course has been that make the handling of the course such a worthwhile experience. If you're

going to be a tutor in any subject, whether face-to-face or at a distance, there must be a very strong desire to see the students achieve success. You be prepared to go to great lengths to help them do so.

Tip For Tutors

One tip here for RAE (or any other subject) tutors is that **you should always praise success. This should be done - however small the success, before you start to correct failure.**

Additionally, always try and correct failure by using factual comments and helpful advice, **not censure**. If a student is having problems the Tutor must constantly offer encouragement and try to build up their confidence.

An Overview

Hopefully the information I've provided will have given would-be RAE candidates an overview of what distance learning can offer them. And although this article is basically concerned with distance education I hope it also contains much which may be of interest to those planing face-to-face RAE courses, particularly if they've had little previous experience in this field.

Remember that careful preparation is just as important as good presentation. Also remember that if you are new to teaching it will probably take three years to bring the course to a high standard.

Finally never try to bluff! If you don't know the answer to a question **say so** and that you'll have the answer for the next session - then make sure you do!

Good luck to all tutors and students. May you succeed together!



● Angus 'Gus' Taylor G8PG trying to hide (not successfully!) behind a hand-held transceiver belonging to PE1HMO in Rev. George Dobbs G3RVJ's vicarage hallway during one of the popular annual G-QRP Club Conventions in Rochdale! (Photograph courtesy of PE1HMO)

PW

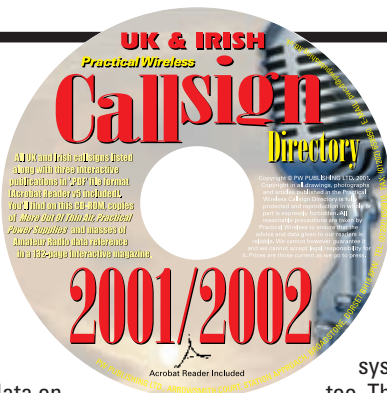


Rapid Results Correspondence Course

For many years Gus G8PG was the Tutor for the 'Rapid Results' (RR) RAE Correspondence Course and was also the original course author! I'm pleased to say that the RR RAE course for the RAE is now owned by PW Publishing Ltd. and is in the final stages of a re-design, awaiting completion of the necessary drawings and circuits by **Tex Swann G1TEX**, PW's technical draughtsman and Technical Projects Sub-editor. Please contact **Roger Hall G4TNT** (at PW Publishing Ltd) for further information on the course.

Distance learning: Any reader wishing to improve their mathematics or understanding of science with the help of a correspondence course is advised to contact the National Extension College (A non-profit making charitable foundation and the forerunner of the Open University) for their latest catalogue of courses. Write to NEC, Michael Young Centre, Purbeck Road, Cambridge CB2 2HN. Telephone (01223) 450200, FAX (01223) 313586. E-mail to info@nec.ac.uk and their website homepage is www.nec.ac.uk

Editor



Welcome to the second *Practical Wireless* Callsign CD-ROM, that's **bigger and better** than the first one of two years ago! On this CD-ROM you'll find a complete up-to-date UK and Irish callsign listing with a search and view option. But first what's the minimum system you will need to fully access the data on this CD-ROM?

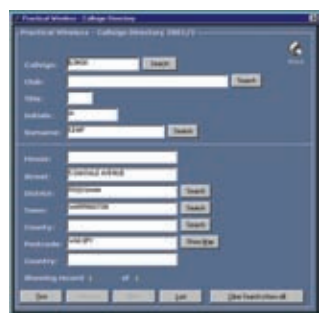
The minimum system you will need to access all of the data on this CD-ROM is shown in the separate panel. A good source of *Internet Explorer™* is one of the front-cover mounted CD-ROMs from an internet magazine.

So, let's get going! Put the CD-ROM into the drive and the autoplay function should start the installation process. If it doesn't, then by

using *Windows Explorer™* find and 'open' the CD-ROM and click on the Setup icon. You will then be guided through the set-up procedure to put all the files onto your machine.

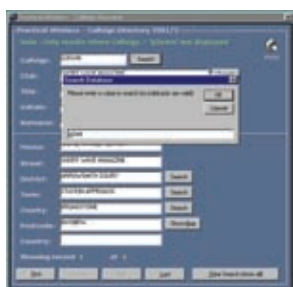
If you're running an older system, then some of the system components will probably need to be updated too. The complete install places all the files only on your hard disk so, the installation time will depend on the capability of the machine you're using, and several restarts may be needed if you system software needs extensive updating.

Finally, an entry will be made in the Start-menu on your machine. In testing we have found it's better to close the database down before reading the electronic magazine and vice-versa. The pictures and explanations on this page will give you a flavour of the whole *PW* CD-ROM experience. Enjoy!



Shown here is the well laid out database screen giving details of each station. To search the database for a callsign, surname, district, town or county, click the

mouse cursor on the button to the right of the field you want to search. A new small window opens for you to type the partial data in. To find one item, type in in (G1T* will find all G1 callsigns starting with a 'T') with the '*' character as the wildcard symbol. Clicking on the printer symbol (top right) will print out an individual record.



Clicking on the 'Show Map' button to the right of the Postcode windows will, if you have an internet connection, take you to viewing a map of the area where your contact lives. (Internet /telecom charges may apply when using this function).



Main startpoint screen - from here you can get to all the functions of reading the electronic magazines or search the database. If you do not have Adobe *Acrobat™* v5 installed, now is a good time to run this option, you need only run it once!



From here you can browse all three electronic magazines (if you have Adobe *Acrobat™* v5

installed). The magazines are all interlinked from their index screens (see individual screen grabs).

Fancy seeing some antenna projects? Here is an electronic version of *More*



Out of Thin Air, a collection of some 30 articles about antennas. Clicking on one of the small icons on the bottom of the index page will take you to the other magazine.



This has been out of print for some time - but now you have the opportunity to read how to make the *PW* Marchwood 12V/30A supply, and six other projects, plus other articles. Clicking on one of the small icons on the bottom of the index page will take you to the other magazines.



The original electronic *PW* magazine is here - over 120 pages of projects, articles and datasheets on antenna, electronic and radio related topics. Clicking on one of the small icons on the bottom of the index page will take you to the other magazines.

Minimum system requirements

Computer	IBM PC or clone
Processor	Pentium Class 90MHz (200MHz+ recommended)
CD-ROM	Drive needed
Memory	16Mb minimum (32Mb+ recommended)
Disk Space	100MB+ available on the hard disk.
Video	800x600 @16bit colour or better
Sound	No requirement
Operating system	Windows™ 95/98 or later <i>Internet Explorer</i> v4.5 or later
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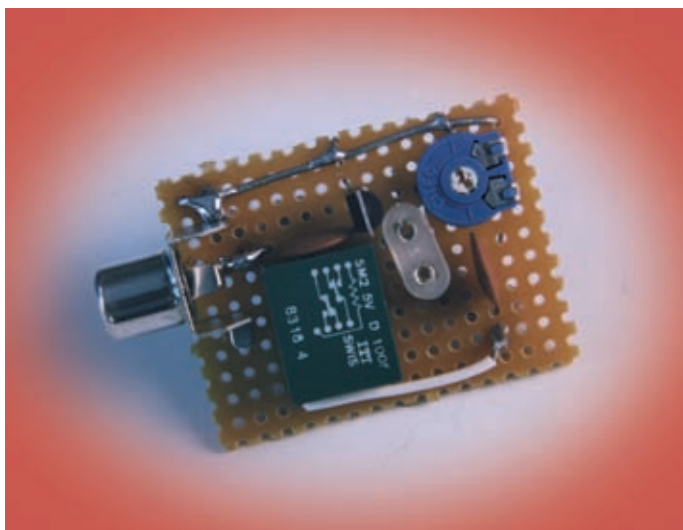


Carrying On The Practical Way

"The firm, the enduring, the simple, and the modest are near to virtue".

Confucius (551BC - 479BC)

This month the Rev. George Dobbs G3RJV describes what might be his simplest transmitter...a single VMOS transmitter with only six components plus one. The 7th being this month's appropriate quotation!



- This month's tiny transmitter project - you can judge the size by the phono socket - can get you on the air with only six components!

In last month's column pre-amble, I extolled the virtues of minimalist Amateur Radio, involving those little projects that can be built in a couple of hours with a few inexpensive components and still give a lot of satisfaction and fun. The feedback from this column suggests that many readers are interested in projects that are simple and quick to build and will cost them very little in financial outlay.

It would appear that many of you like to go to bed saying: "I built something this evening, and it worked". Perhaps this is because so few of us see anything tangible coming from our paid

employment. It is rare - isn't it? - to come home from work knowing that we made something ourselves and can see the end product of our labour

A recent reader's letter asked me for a simple fail-safe transmitter circuit, so I got to work on his behalf knowing also it would interest many other readers. Fortunately there are several circuits around in the QRP literature and some are available in kit form.

To fully answer the original request I'm returning to a little circuit I described a few months ago and will now carry it through to its logical conclusion as a stand-alone basic transmitter. It's a transmitter with only six parts and the minimum of setting up procedure.

The Circuit

The circuit of the simple transmitter is shown in **Fig. 1**. This is the basic version of the **Finger Transmitter** described by **George Burt GM3OXX**, in the G-QRP Club's journal *Sprat* several years ago.

In the original design a touch pad keying circuit was included, and this was driven by a p.m.o.s. device. The transmitter was activated by touching a section of copper on the specially designed printed circuit board (p.c.b.) - hence the Finger Transmitter title.

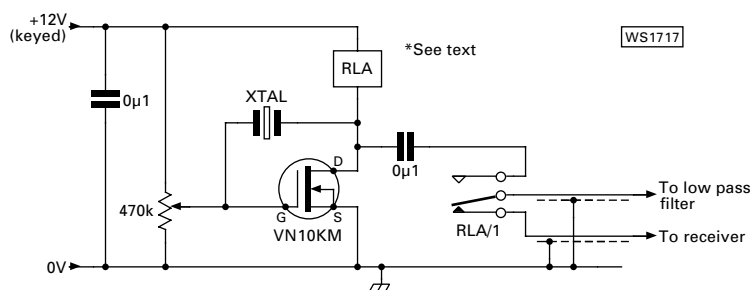
George's project uses a basic crystal oscillator employing a VN10KM N-Channel m.o.s.f.e.t.

Avid QRPers will know that the VN10KM was used for the power amplifier in the famous GM3OXX **Oner** transmitter.

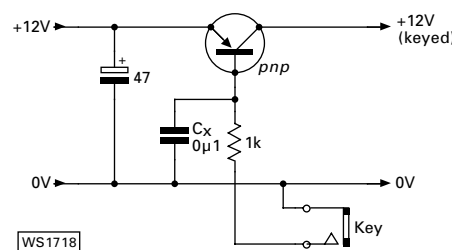
A beefy little m.o.s.f.e.t., the VN10KM is capable of about 1W of r.f. power without a heat sink, although a small heat sink tab is provided. It's designed as a medium power driver and switching device for relays, displays and small lamps with zener diode input protection. It fact we could call this circuit a very high speed switch but I guess any oscillator could have that designation!

In the circuit a fundamental crystal at the required frequency provides the feedback path for the oscillator. It maintains the oscillation and determines the frequency. Incidentally, I've tried this circuit on all bands from 3.5 to 14MHz and achieved good results in every case.

The novel feature of this circuit is that the r.f.



- Fig. 1: The VN10KM transmitter utilises an unusual r.f. load, the operating coil of a 5V relay. This enables simple relay transmit-receive switching to be incorporated (see text).



- Fig. 2: A suitable pnp transistor d.c. switching arrangement. Note that the use of Cx to reduce key click may be inappropriate (see text).

load in the drain of the VN10KM is provided by the **operating coil** of a 5V relay. This replaces the radio frequency choke (r.f.c.), which would be usually in such a circuit. My relay came out of the junk box, and diving into the depths of this Aladdin's Cave I found I had three types and they all worked well in the circuit.

I built my version of the transmitter, shown in the photograph, on a small piece of perf-board. It would lend itself well to 'ugly' construction using a piece of copper clad board as a ground-plane. A 470kΩ pre-set potentiometer sets the bias level of the VN10KM

Setting Up

Once you've built the project - setting up the transmitter is very simple. The crystal is removed from the circuit and the trim-pot is rotated, beginning with zero volts, until the relay clicks on.

An alternative method is to adjust the trim-pot until 5V can be measured across the relay coil. The crystal is then added to the circuit and the little transmitter is ready to go.

The circuit could be run at a higher voltage to achieve greater output, but the 12V supply produces about 100mW of r.f. output up to the 14MHz band. This is

adequate for many QSOs and well within the capabilities of the little m.o.s.f.e.t.

A simple keying arrangement – the power line is switched on and off – is shown in the circuit of Fig. 1. However, it's usual, and essential with solid-state keyers, to key transmitters to ground, requiring the addition of another transistor acting as a d.c. switch.

Switching Circuit

A suitable d.c. switching circuit is shown in **Fig. 2**. This is a basic *pnp* transistor switch. When the key is closed, 12V appears at the collector of the transistor. Any *pnp* transistor capable of passing the

required current will serve the purpose.

In my prototype I used a BC212 transistor but other common silicon devices like the 2N3906 would do the job. I also added a little decoupling, using a 47μF capacitor, on the supply line.

It's also usual to add a capacitor in parallel with the key (Cx) to reduce key clicks **although this may not be appropriate in this circuit** (see my later note). The transmitter can now be keyed with respect to ground.

Harmonic Filtering

The output from the little transmitter is taken, via a capacitor, from the drain of the VN10KM. However, for legal use on the Amateur bands, **even this low output transmitter requires harmonic filtering**.

For the filtering I turned to a favourite solution - often featured in this column, the W3NQN standard capacitor value Seven Element Low-Pass Filters. These filters, shown in the circuit of **Fig. 3**, might appear to be an over-kill solution but **they will**

provide the filtering required.

In reality, I did not have to make any of the low-pass filters for the bands I tried. The

reason? I keep a complete set of these filters for all the Amateur bands, built on scraps of old unetched p.c.b. and each having a phono plug at one end and a phone socket on the other end. My examples are built surface mount style on a small piece of copper clad board, which has 'islands' cut with a hacksaw blade

I usually terminate the output of little QRP transmitters with a phono socket and

use one of my pre-built filters. The values for the common bands are shown in **Table 1** and those shown in the table are suitable for transmitters capable of up to 10W r.f. output.

Relay Switching

As previously mentioned, the transmitter uses the 5V relay coil as an r.f. load and as the transmitter is keyed, the relay switches on and off. This can be very useful because if the relay contacts include a set of change-over switches they can be used to switch the antenna between the transmitter and a receiver.

When the transmitter is switched on, the contacts switch the antenna to the transmitter away from the receiver as shown in the diagram. If this arrangement is used, the capacitor, Cx, in Fig. 2. ought to be omitted as it will delay the switch over from transmit to receive. (This is the reason why I suggested the key-click filter may not be appropriate).

Keying Relay

The constant following of the keying, by the relay, produces a rather 'thumpy' change-over effect but it certainly does the job. It's send-receive switching at its simplest level.

So there we have it - about as simple a transmitter as it's possible to build. Although 100mW is not much of an output...don't forget that many QRP operators turn down their power to milliwatt levels just for fun and they often have quite amazing long distance QSOs. Have fun!

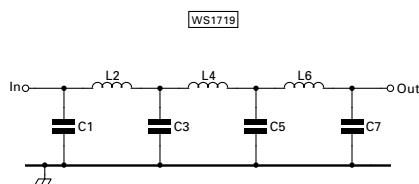
PW

Table 1

Band (MHz)	C1,7 (pF)	C3,5 (pF)	L2,6 (turns)	L4 (turns)	Core	Wire (mm/s.w.g.)
3.5	470	1200	25	27	T37-2	0.38/28
7.0	270	680	19	21	T37-6	0.45/26
10.1	270	560	19	20	T37-6	0.45/26
14.0	180	390	16	17	T37-6	0.45/24

● Filter Component Table

● Fig. 4: Completed projects ready for use. Top centre is one of G3RJV's 'ready for use' filter units (This example is for 14MHz), bottom left shows the VN10KM transmitter with relay switching, with the keying switch circuit on the right (see text).



● Fig. 3: Circuit of a suitable low-pass filter for the transmitter. Because of the nature of the transmitter circuit, harmonic filtering is a necessity when this design is used on air (see text).



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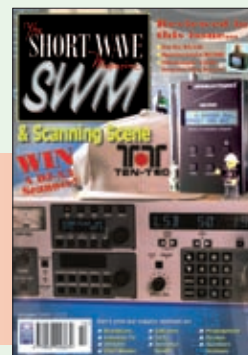


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Antenna Workshop

Having Fun With a Slinky!



**John Heys
G3BDQ has
been playing
with a popular
children's toy
to create an
antenna that
can crawl
downstairs!**

I'm sure that you have all seen the well known children's toy that can 'walk' downstairs, known usually by the generic name of Slinky. The toy is essentially a helix or coiled spring, usually made from metal or plastic (but we cannot use that form as an antenna for obvious reasons). But before embarking on descriptions of successful h.f. antennas that I've made from these Slinkies, a short description of their vital statistics may be in order.

The basic model, available in most toy shops is manufactured by James Industries Inc. of Hollidaysburg, Pennsylvania, USA. When looking for one it pays to look around in a variety of shops as the prices charged can vary quite a bit. My local stationer-newsagents, with a small toy department upstairs, charged a pound less than a leading toy shop!

Slinky Helix

The Slinky helix is made from a silver-grey metal that although it's magnetic never seems to rust, even after a long exposure to the great wet British outdoors. The metal itself may be easily soldered for connections. When at rest, the 230gm coil of metal fits easily into its small-almost cubic-card-box.

Made with an oblong cross-section (0.5mm thick and 2.5mm wide) the Slinky has 87 complete turns with an overall diameter of 69.5mm with a complete length of about 19m. The comparatively large surface area of the metal shape gives it the capability of being a good r.f. conductor. The length of one complete turn is some 218mm.

When building helically wound elements for antennas, a well known characteristic is that the length of wire needed for each element has to almost twice as long as the freespace wavelength. I've found that, on any band, the overall length needs to be some 69% (conveniently 70%) longer and that changing the

stretched out length of the Slinky makes negligible change to the resonant frequency of the antenna.

My experiments with Slinky coils have all been made indoors, which makes it easy to adjust for resonance without enduring the rigours of our climate. For checking resonance and bandwidth, I use my trusty Autek RF-1 antenna analyser, which makes things quite easy.

Dip Oscillator

If you do not have access to either an antenna analyser, then a dip oscillator and the station s.w.r. meter can be used as a substitute. I began by pulling the Slinky out to some 3.35m and strung it up above head height along the upstairs landing. The antenna analyser soon showed that it had a resonant frequency of 6.8MHz and when fed against the station earth had a feed-point impedance of 40Ω.

I didn't trim the helix to resonance, I just connected it directly to the a.t.u. On the receiver, some signals in the 7MHz band were

as strong as if I had used an external antenna, although other signals were some 6-18dB down. With just 60W of output power, I had many c.w. and voice contacts with European stations.

Encouraged with the results on 7MHz I turned to the 21MHz band, for which I decided to make a half-wave dipole. For this band a normal wire dipole would be some 6.75m long...however, the Slinky version was only 2m long!

The constructional details of this design are shown in **Fig. 1**. Initially I made each side 31 helical turns, but analysis with the Autek showed that the resonant frequency was too low. By shorting out a few turns, the correct length was soon discovered.

The unwanted turns on each side were held together with thin bare wire, which was soldered together. and I was pleasantly surprised to find the 70% rule held on this band too. The feed-point impedance turned out to be 45Ω and the midpoint so, I could use an eight metre length of 50Ω coaxial cable to the transceiver. A pair of clamp-on ferrite blocks at the feed-point formed an effective current balun.

Good Bandwidth

In use the antenna had a good bandwidth with a range of 150kHz in the centre of the 21MHz band where the s.w.r. was 1.4:1 or below. This tiny dipole gave an incoming signal reports of S6-S9+ with European stations and a few DX stations were also worked.

Oddly some signals were stronger on the Slinky than on a well placed outside tri-band dipole, others being some four S-points down. I had no problems finding c.w. stations to work and the voice contacts expressed surprise at the make-up and location of the antenna!

Should the overall length of the extended Slinky be over four metres long I can recommend that a length of heavy duty monofilament line is used as a support. If

so, run the monofilament along inside the coil, tie both ends down and extend the antenna along it.

Indian Rope Trick

Now to try something like the Indian Rope trick, by creating a vertical Slinky antenna for the 28MHz band. A vertical $\lambda/4$ for this band is normally about 5m high, so the

found that, with the two in line 180° apart and angled down 45° there was no loss of sensitivity in any one direction and the feed-point impedance was close to 50Ω .

The mounting pole for my 28MHz vertical was a broomstick arranged on the spare room adjacent to the upstairs shack, 'looking' out to the west through a big double glazed window. The s.w.r. curve was excellent, being 1.5:1 at 28.01, reducing to

32m if the 70% rule holds. So, to start, I soldered two Slinkies together to produce a double length helix of some 38m.

With a strong monofilament through the middle, I pulled the Slinkies out to cover some six metres, and tied a support line in the middle to counteract sag. The whole thing was slung along the landing and into the spare room.

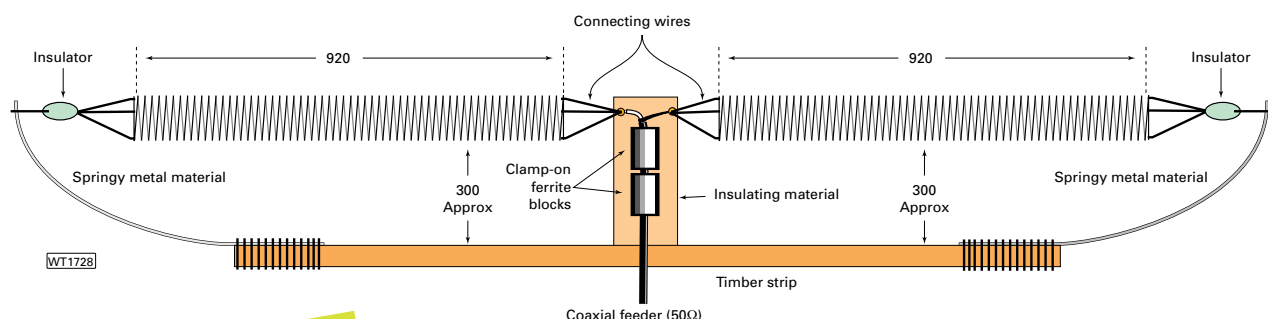


Fig. 1: Shortened dipoles for h.f. bands follow this general design. (See text for more details for band design principles).

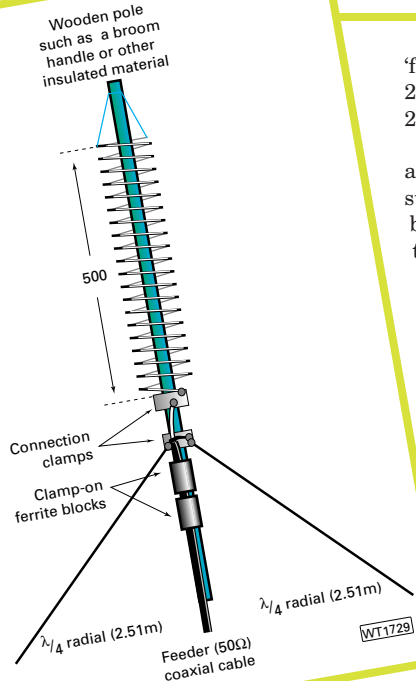


Fig. 2: A vertical for the 28MHz band, just the same length as a $\lambda/4$ for the 144MHz band.

Slinky was calculated being 70% longer, which turned out to be 20 helix turns.

I checked the Slinky for resonance above a $\lambda/4$ ground plane, and at 20 turns it was rather long, needing one less turn to bring it to resonance at 28.45MHz. I then added a second radial, the overall layout is shown in Fig. 2 and the photograph of Fig. 3. The vertical support I used was a short length of glass fibre (g.r.p.) tubing.

The Slinky was extended to cover just half a metre, the same length as a $\lambda/4$ vertical for the 144MHz band. The feed-point impedance however, depends on the layout of the two ground radials. I also

'flat' over the range 28.3-28.65MHz, rising slowly to 2:1 at 29MHz.

Normally an inductively loaded antenna would have a high Q and subsequently a narrow bandwidth, but not the case with the Slinky! This wider bandwidth, is due mainly to the resistance of the Slinky helix material. The resistance has the effect of increasing the losses so, reducing the Q , but which gives a wider bandwidth.

DX Potential

The DX potential of the Slinky vertical antenna was surprising as many stations were worked with only 60W of r.f. In round terms signals reports were from 1-2 S-points down on the signal from the outdoor tri-ARRL SSB Contest many American stations were worked first call.

Later contact with USA stations were interesting, when I got some 'real' reports which ranged from S4 to S7 rather than the somewhat rubber-stamp S9 contest report. Moving the antenna to my stairway landing area, with its eastwards looking window this allowed many solid contacts with European stations, often with S9 or S9+ signal reports.

Devising an indoor antenna for the 3.5MHz band is not easy! A quarter wave on this band is 19m long, needing a Slinky helix length of over



Fig. 3: Compare this photograph with the illustration of Fig. 2.

Antenna Analyser

On using the antenna analyser, I found that this double length was resonant a way under the 3.5MHz band. By using an a.t.u. and tuning against the station earth, I achieved a usable s.w.r. on the s.s.b. section of the 3.5MHz band and was soon operating, receiving S8 and S9+ signal reports.

By shorting out 10 turns, I was able to operate without an a.t.u. with an s.w.r. of 1.3: at 3.65MHz. Again only the station earth line was used without additional radials.

But what else can you do with Slinkies? Well to answer that question, although I've not actually tried it myself, there are enthusiasts that have made up Beverage type receiving antennas using several Slinkies soldered together. As a Beverage antenna has to be at least two wavelengths long, creating such a length, even for the lower bands should be quite simple.

A plot of land smaller than a football pitch would accommodate at some 27 to 30 Slinkies in line. They would need only to be just over head height so, a series of support poles around two metres long would be needed to hold the antenna up.

Slinkies could also be used as ground plane wires where space is very limited. What about other designs using Slinkies in place of elements? What about a really

'baby' quad for one of the h.f. bands? The possibilities are almost endless!

PNW

Value & Vintage

What's this then... Ben Nock G4BXD in Merchant Navy uniform? He's obviously all at sea in the vintage wireless shop this month and thoroughly enjoying himself!

Hello once again and I hope you had an enjoyable summer. By the time you'll be reading this I should be back from another field trip to Rhodes, not much in the way of surplus military gear there I fear but I go on holiday in hope!

However, it's down to marine business first this time and even writing from landlocked Kidderminster (although the River Severn is nearby!) I think all you need is a rolling deck, wind in the sail and a star to steer by. That's all that is needed for a good voyage, but if you need to "phone home" then a radio will help.

First offering this time is the RT142 from a well known marine manufacturer, SP Radio of Aalborg, Denmark. Their familiar green Sailor brand of radios are familiar the world over and it's always nice to play with examples. The RT142 is a 12V powered v.h.f. channelised transmitter-receiver, crystal controlled, producing approximately 20W of narrow band f.m. (n.b.f.m.) output at around 150 to 160MHz.

When I took the set out of its case I was in for a surprise as I found that the set opened up like a book. The receiver and transmitter sections are hinged, and laying the

set face-down on the bench, the two sections opened out to lay flat giving very easy access to all components.

The set is fully transistorised and comes with a sophisticated filter arrangement allowing full duplex operation. In other words when on the air you can talk and listen - just like on the phone, at the same time. I did have a brief thought about putting it on 144MHz but feel the filter arrangements on the transmitter-receiver might not tune down that low.

The controls are simple: **Off/On**, in the **On** position the transmitter output is approximately 20W, with a 500mW output option, with a spring biased position which inhibits the squelch. Channel, volume, display light dimmer and a switch for automatic monitoring of Channel 16 (the International calling/distress frequency) make up the other controls.

Another Sailor!

As well as the v.h.f. unit already described, another Sailor docked here at Cobden Quay! This time however, it was an h.f. version...the Type 86D. This transmitter is a bit of a beast, and it's a heavyweight too!

The 86D is a 24 or 12V 32 channel marine transmitter, operating, according to the handbook, between 1.6 and 4.2MHz. Here I have to say a very big "thank you" to the staff at SP Radio in Denmark. I approached them for circuits and information on

both sets and they responded with photocopies of just the right material, even going as far as to send them via an International Courier Service to me. Obviously service is a word still used in Denmark!

Interestingly, the 86D is a hybrid, with the oscillator, modulator and high tension (h.t.) power supplies being transistorised, with valves in the driver and power amplifier (p.a.) stages. Three valves which appear to be 6146 types are at the rear, one employed as a driver and two in the p.a. The valves are actually basically 12V heater versions of the 6146.

Two meters are mounted on the front panel. One measures antenna current, for tuning up the transmitter and the other monitors various stages within the set.

The controls are simple, comprising a channel switch, a full or reduced power switch, the test meter selector and a function switch giving loud hailer option and simplex or duplex operations. An antenna tune facility finishes off the controls.

There's no manual p.a. tuning provided on the 86D. Instead correct tuning is selected by a rotating drum driven from the channel switch, this pre-selects the correct coil tap and capacitor setting to match each working frequency.

After cleaning the 86D (it was so dirty I think it must have been used on a coal barge!) and before receiving the handbook information I was puzzled by how they selected the frequency. Although I couldn't see any crystals...they had to be there somewhere!

I then noticed some small thumb screws on the drum holding the channel number indicator visible in the little window. Sure enough, inside the drum were the crystals, connection to the oscillator being via two strips of



Fig. 1: The Danish 'Sailor' RT142 v.h.f. marine set, clean simple lines with the telephone type handset (see text).



● Fig. 2: The Type 86D transmitter-receiver - also from Denmark. The drum with the channel selection numbers on the right holds the crystals within it (see text).



● Fig. 3: The Racal PRM4090 v.h.f. transceiver. It's provided with 'dial up' frequency selection, two handset sockets and the various other controls select memories and modes (see text).

copper, which contact connector studs under the drum.

The channel switch is connected by a chain drive (!) to a large drum inside the p.a. compartment. This drum has numerous holes into which small plastic pins can be inserted. As the drum rotates the pins push on copper finger strips and make connections to the p.a. coil and capacitor bank.

The pins short out the p.a. coil, tuning it to the various channels. However, the correct hole selection is a laborious process, the handbook gives full details of this though and I did indeed manage to get the set on the air, at least on 3.5MHz.

I could only manage to get 40W out of the set though the handbook claims 70W is possible. Although it may well be that the valves I replaced were not up to 100% efficiency and certainly my 24V power supply was straining a bit at the 15A demands! It should make an ideal companion to my Sailor R-105 receiver though and a very nice talking point in the shack and when I cruise on the River Severn!

Nice Racal Companion

A nice companion to the Racal PRM-4031 that I mentioned recently is the PRM-4090. Quoting from *Janes 1991 Military Radio* reference source "The multi-role tactical v.h.f. fully-programmable set provides f.m. coverage from 20 to 80MHz. The PRM-4090 is a nine channel programmable set offering single or two frequency simplex (split frequency working) with a choice of 2400 synthesised frequencies at 25kHz spacing. A 16 kbits/s data capability and built-in pseudo-white-noise encryption option extends its repertoire as a secure tactical communications system".

"Frequencies and security codes can be pre loaded using the MA4073 programmer into the nine preset channels available. Alternatively, the operator can load the channels from the front panel frequency selecting controls".

The operation of loading the frequencies is quite simple and the set can even monitor a 'guard' channel whilst working normally. When it arrived I had a quick

look inside...and quickly put the covers back on!

The set should prove quite handy when 28MHz is open, with the additional use on 50 and 70MHz as well. Unfortunately someone had removed the whip antenna socket so I shall need to make a suitable replacement, unless of course someone out there has a spare?

GPO Measuring Set

My thanks go to **Stephen Potter** and **Angus Malcolm, G8DEC**, for info on the unknown GPO set mentioned last time. Stephen writes "This item was designated 'Measuring Set R1 No 1' also stamped with year, my example 48/1 (Jan 1948?). Front panel should show this stamping top centre and date stamp lower centre. [Mine has no such numbers] This item was used by The Interference Detection unit."

A telephone call from Angus gave similar information, including that the unit was used in the 1950s by the Radio Investigation Branch of the then GPO at regional level. It turns out that the line socket on the side was actually for checking on interference on the mains line, the 240V a.c. being fed to that socket. A filter and isolator device was fitted between the receiver power supply and the mains in that role, to provide screening from itself.

Eddystone Devices

Finally, how about a couple of vintage Eddystone measuring devices? - in **Fig. 4**. On the right there's the S696A Field Strength meter (f.s.m.) and on the left a Modulation Depth meter.

Both units used small plug-in coils to tune the appropriate bands, the field strength meter having a variable capacitor as well. The coaxial socket on top of the f.s.m. is an addition, other examples I've seen don't have this.

I've never seen another modulation meter but it could be that the coaxial socket there too, is also a later addition. The half round housing for the modulation meter is the same as the external S-meter unit available for several of the Eddystone receivers.

Well that's all I have space for now. I hope to meet one or two of you at either the Birmingham rally in November or the Worcester event in December. I shan't be in the vintage 'shop' again this year, so I wish a happy Christmas and a good New Year to you all.

As always I can be contacted at: **62 Cobden Street, Kidderminster, Worcestershire DY11 6RP**, or via E-mail at **G4BXD@qsl.net** and you're also welcome to have a look at my web pages at **www.qsl.net/g4bxd** Cheerio until 2002!

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● Fig. 4: The two Eddystone measuring units, modulation depth meter on the left, field strength meter on the right (see text).



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ICOM IC-737 Base Transceiver with Gen.Cov. 12V	£699
ICOM IC-746 HF6m,2m All Mode Base with Gen.Cov.	£999
Kenwood TS-440S Base Transceiver with Gen.Cov. 12V	£449
Kenwood TS-850S x3 Base Transceiver with Gen.Cov. and ATU 12V	£699
Kenwood TS-870S Base with Gen. Cov. + ATU/DSP in the IF (P/Sale)	£995
MFJ MFJ-8020 20m QRP SW Transceiver 12V	£115
Mizuno MX-3.5S 80m SSB / CW, 2W Handheld	£149
SGC SG-3200 QRP Transceiver SSB, CW 20W 12V	£485
Trio TS-120S HF SSB, CW Transceiver 100W 12V	£295
Yaesu FT-101ZD Base Transceiver 100W Mains	£299
Yaesu FT-840 Base Transceiver with Gen.Cov. 12V	£449

VHF/UHF BASE/MOBILE TRANSCEIVER

AKD 2001 x3 2m FM Mobile Channelised 25W	£145
Alinco DR-110E 2m FM Mobile Transceiver 25W 14Ch.	£125
Alinco DR-150E 2m FM Mobile 50W with Airband RX	£185
Alinco DR-M06SX 6m FM Mobile 10W	£159
ICOM IC-204H 2m All Mode Mobile 25W	£229
ICOM IC-821H 2m 70cm All Mode Base 45W, 40W 12V	£749
Kenwood TM-221ES 2m FM Mobile 45W	£149
Kenwood TS-811E 70cm All Mode Base Transceiver 25W mains	£495
Yaesu FT-225RD 2m All Mode Base 25W with Mutek Mains/12V	£499
Yaesu FT-290R 12 x 2m All Mode Portable 2.5W	£249
Yaesu FT-690R 12m 6m All Mode Portable 2.5W	£299
Yaesu FT-2600M 2m FM Mobile 60W	£169
Yaesu FT-3000M 2m FM Mobile 70W	£249
Yaesu FT-8100R 2m,70cm FM Mobile 50W,35W (Remote Head)	£299

VHF/UHF HAND HELD TRANSCEIVER

Alinco DJ-480 70cm FM H/Held	£99
ICOM IC-M11 VHF FM Marine 6W Transceiver	£199
ICOM IC-T7E x2 2m/70cm FM with wide RX	£199
Kenwood TH-D7E 2m,70cm FM Palm Held with Wide RX and TNC	£249
Trio TH-41E 70cm FM H/Held	£85
Yaesu FT-1R 2m FM H/Held	£125

SHORTWAVE RECEIVERS

Grundig YB-400PE Portable Receiver with FM stereo and SSB	£895
JRC NRD-455 100kHz-30MHz All Mode Receiver + DSP	£995
Low HF-225 x2 30kHz-30MHz All Mode Receiver 12V	£249
Low HF-250 30kHz-30MHz Receiver 12V PC Computable	£325
Roberts R-9914 Portable Receiver with SSB 45Ch.	£69
Sony ICF-SW1000T Portable Receiver + FM stereo & SSB + Cassette	£299
Sony ICF-SW6000 Portable Receiver with FM stereo and SSB	£79
Sony ICF-SW7600 Portable Receiver with FM stereo and SSB	£89
Sony WA-8000 Portable Receiver with FM stereo + Cassette	£199
Taiting TMR-7602 Portable Receiver with FM stereo and SSB	£59
Yaesu FRG-8800 150kHz-30MHz All Mode Mains	£299

Scanners Hand Held

Alinco DJ-X10 100kHz-2000MHz All Mode 1200Ch.	£199
Welz WS-1000 500kHz-1300MHz AM,FM,VHF 400Ch.	£89

STATION ACCESSORIES

AEA PK-232MBX PakRat Multimode Data Controller	£185
AEA PK-900 Simultaneous Dual Port TNC	£299
Alinco ELH-750G 70cm Amp 1-3W in, 30W out + Pre-amplifier	£89
BNOS LPM-144-5 100 2m Linear Amp 3W in, 100W out with Preamp	£139
Datsun ANF CW Automatic Notch Filter	£69
Heathkit Explorer 2m Valve 350W out Linear Amplifier	£499
ICOM SM-5 Electret Condenser Desk Mic	£49
ICS AMT-3 RTTY/AMTOR & CW Terminal (P/Sale)	£50
ICS FAX-1 Weather Fax, NAVTEX, RTTY Decoder	£125
JPS NTR-1 DSP Noise Reducer	£99
Kenit KMK Morse Keyer	£35
Kenwood IF-232C RS 232 Interface for Kenwood transceivers	£59
Kenwood PS-53 13.8V 22.5A Matching PSU	£129
MFJ MFJ-484C Memory Keyer	£89
MFJ MFJ-784B x2 Tunable DSP Audio Filter	£139
MFJ MFJ-1274 HF / VHF TNC + 1284M software (P/Sale)	£100
MFJ MFJ-1610 Theory Tutor (Novice)	£4
Microset PT-105A x2 12V Stabilized 5A PSU	£25
Microset PT-107A 12V Stabilized 7A PSU	£25
M.Modules MML-144-30LS 2m 1-3W in, 30W out Linear with Preamp	£69
M.Modules MML-144-100-S 2m 10W in, 100W out Linear with Preamp	£139
M.Modules MML-432-30L 70cm 1-3W in, 30W out Linear with Preamp	£120
M.Modules MMS-2 Morse Tutor	£49
Opto 2600HA 1MHz-2.6GHz Frequency Counter	£79
Opto Micro-RF Pager sized micro RF Detector	£69
Opto Model 40 Scout 10MHz-1.4GHz Freq Counter	£225
PacComm Pico-2 Miniature 1200 Baud Dual Port Packet Modem	£149
Sadelia Bravo Pro CB Base Desk Microphone + Pre-amp	£49
Sony AN-1 Active Shortwave Indoor/Outdoor Antenna	£49
SSB LF-23S 25cm Transverter IF 2m 10W out	£499
Star Mastekkey II Memory Keyer	£49
Timewave DSP-59s Audio Noise Filter with Auto Gain Control	£149
Trio THEFA-550 RTTY & CW Decoder + Monitor output	£75
Yaesu FC-700 3.5-30MHz 150W ATU with Dummy load	£109
Yaesu FIF-233C x2 CAT Interface Unit	£49
Yaesu FT-2025 2m clip-on 25W Linear (for FT-290R II)	£99
Yaesu FRT-7700 150kHz-30MHz Receive ATU for FRG-7700	£45

Miscellaneous

Academy WT-2C Pair of 2Ch. FM CB Hand Held Transceivers	£30
Albrecht AE-2850 40ch 4w CEPT Hand Held	£50
Eurosonic KH-104 80Ch. 4W UK CB Hand Helds	£60
Magellan GPS-3000 Handheld GPS system	£89

VHF DXER

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REPORTS & INFORMATION BY THE LAST SATURDAY OF EACH MONTH.

Conditions on the v.h.f. and u.h.f. bands were reasonably good during August. Although Sporadic-E propagation on the 50MHz band was much reduced many Sp-E openings still occurred during the period. Testament to this is a report from **Jim Rabbits GM8LFB** (Caithness IO88).

Jim GM8LFB uses a Yaesu FT-736R transceiver running 10W into a dipole antenna and reports that the 50MHz band was open at his QTH on at least 16 days during August. Among his s.s.b. contacts (incidentally these are usually made in the range between 50.100-50.200MHz) were the stations of EH1FT (Spain), ES1CW (Estonia), F5MMF (France), HB0/PI4TUE (Liechtenstein), HB9STY (Switzerland), I3LLH (Italy), LA5TFA (Norway), OE75MWS (Austria), OH5LK (Finland), OM3LO (Slovakia), SM3BEI (Sweden), SN0EX (Poland), S57AC (Slovenia), YL3AG (Latvia) and 9A0C (Croatia).

The beacon stations OX3VHF (Greenland) and TF3SIX (Iceland) were also heard but Jim reports that no operators were active at the time. This is an excellent example of what can be worked with low power and a basic antenna.

Jeremy Kewn G7TBJ (Cornwall IO70) also runs low power, 25W from an RN Electronics transverter and a 3-element Yagi. He had a good time during August working, amongst others, the stations of EH9IB (Melilla), K1SIX (USA), OH0V (Aland Is.), T95C (Bosnia-Herzegovina), PY5CC (Brazil), VO1NE (Canada) and 6W4RK (Senegal).

A report from **Mark Procter G1PIE** (Lancashire IO83) just missed last month's deadline. He reports that he was active on the 144MHz band during the evening Sp-E opening on July 28.

Using a Yaesu FT-100 transceiver, 50W and a small 4-element F9FT Yagi Mark made an s.s.b. contact with the station of LZ2FO (Bulgaria). The path distance for this QSO was around 2200km.

Tropospheric propagation was also good especially at the beginning of August with many long distance c.w. and s.s.b. contacts being made on the 144 and 430MHz bands. **Adrian Ball G8PSF** reports that he was active on the 144MHz band with the callsign EI/G8PSF/P. Although he couldn't get on the air as much as he wished (it was a family holiday!) he did make some long distance s.s.b. contacts during the evening of August 1.

Operating from Co.Wicklow (IO62) with an Icom IC-202S transceiver, 35W and a 5-

element Yagi Adrian's contacts in the s.s.b. section of the band included DJ2JS (900km), PA3CNX and PE1AHZ. He remarked that it was a pity that most UK stations were beaming towards the Continent and not towards Ireland as he was sure that many more contacts could have been made.

Derek Gilbert G0NFA (Hampshire IO91) mentions a good opening from 0430UTC on August 2. Running an Icom IC-271A transceiver, 150W and a 9-element F9FT Yagi he contacted the c.w. stations of DG5CST

Jeremy also worked HB9BA (Switzerland) for a new country.

METEOR SCATTER

Another propagation mode being used by operators during August was meteor scatter. There was much activity via this mode because one of the major meteor showers, the Perseids, peaked during the middle of the month.

The term 'meteor scatter' though is misleading. It's **not the meteors themselves**

THIS MONTH DAVID BUTLER G4ASR HAS YOUR BAND REPORTS AND DETAILS OF A NEW DIGITAL MODE FOR USE VIA METEOR SCATTER.

(923km), DJ7RI (825km), DL3WW (939km), OK1DIG (1046km) and OK2BFH (1380km).

At my QTH (Herefordshire IO81) similar c.w. contacts were made from 0750UTC with the stations of DL3LSM/P (1061km), DG5CST (1066km), OK1DIG (1191km), OK1VHF (1230km), OK1YA (1471km) and best DX of the morning, OK2BFH at 1525km.

Jeremy G7TBJ has also been active on the 144MHz band running 3W from a Kenwood TR-751E transceiver into a 12-element beam. He mentions having made a few contacts during August with the station of EB8BTV in the Canary Islands.

Cornwall is in an ideal location, making the near 3000km contacts almost routine during the summer months! During one long QSO with EB8BTV on August 11 Jeremy was called by EA8/DL4DWA/P who was on holiday at the time. Three thousand kilometres with three watts. Not bad at all! On August 28

which scatter signals beyond the horizon but the **ionised trails** which are left behind as these high velocity fragments burn up. The meteors that create these trails are in orbit around the Sun and are almost entirely of cometary origin.

When the particles strike the upper atmosphere the released energy raises the temperature of the gas molecules to a temperature at which they ionise. They then form a plasma of electrons and positive ions, not much different than that in the ionosphere.

Variations in mass, composition and velocity result in trails between 20-65km long and about one metre in diameter. Surprisingly an ionised trail can be created by a meteor with a typical mass of 0.001 grams and a diameter of 1mm, literally about the size of a grain of sand.

The general principle of scattering radio waves off meteor trails is relatively easy to understand. Two stations situated between 500-2000km apart direct their antennas towards each other. They then take it in turns using timed periods to transmit to each other using either s.s.b. speech or high speed Morse code.

When a meteor enters the atmosphere its trail may reflect the radio waves from the transmitter to the receiver. At the receiver, where the signal of the transmitter is not normally received, the transmissions can be received for a short period as long as the meteor trail is present. Such reflections, called bursts, last from a fraction of a second to several minutes. That's the general principle of meteor scatter, often called m.s. propagation.



● The antennas at the QTH of SV1BTR

DIGITAL MODE - WSJT

So, what equipment do you need to join in the fun? First and foremost you will require an c.w./s.s.b. transceiver or transverter. Medium power 50-100W will give good results especially if coupled with a good antenna and low-loss feeder cable.

Many of the latest all-band transceivers are capable of running this power level. Of course an amplifier always helps! A horizontally mounted Yagi antenna of between 8 to 18-elements will be sufficient but it will be necessary to rotate it towards selected activity areas throughout Europe.

Traditionally s.s.b. speech using one minute periods and high speed morse using 2.5 minute periods are used. However, a digital mode called WSJT using 30 second periods has recently taken the meteor scatter world by storm.

The term WSJT is an acronym for **Weak Signal communication by Joe Taylor K1JT**. It requires the same hardware and operating system requirements as PSK31 or SSTV.

The system simply uses a p.c. sound card to produce four-tone frequency shift keying at a 441 baud rate (FSK441). These audio tones are then applied to the microphone socket on your s.s.b. transceiver.

Short messages (conforming to existing meteor scatter procedures) are typed into buffer stores and are transmitted at a transmission speed of 147 characters per second, approximately 1764 words per minute. Needless to say at this speed you only require a very small meteor trail reflection to receive lots of information. Not only that but you don't need to copy the signal by ear or slow down the received signal as you would for high speed Morse code, you don't even need to be proficient in Morse at all!

Detected signals are analysed and the received messages displayed on the p.c. monitor screen. The real advantage of the WSJT mode is that it can convert barely audible pings into solid copy. This means that you can effectively run much lower power than would normally be acceptable for m.s. communication. You'll probably be able to use a smaller antenna as well.

The software is available free of charge from <http://pulsar.princeton.edu/~joe/K1JT> or from the European mirror site at <http://www.vhfdx.de/wsjt/>

FIRST ATTEMPTS

My first attempt with WSJT/FSK441 was made in the afternoon of July 18. There was no meteor shower at the time and I was just relying on sporadic meteors that may be present.

The afternoon is totally the wrong time of day for random meteors, the best time being the early morning. I arranged a schedule (via

the DX Cluster) on 50.210MHz with SM3JGG (Sweden) over a path of 1520km.

Running 50W from a Kenwood TS-690S transceiver into a 6-element Yagi the contact was completed in 45 minutes. This was a little longer than I had expected but reflections were few and far between.

Later in the evening I worked the station of OZ1PIF (Denmark) in 15 minutes and SP6ASD (Poland) in 10 minutes. Both stations were worked on 50.210MHz which seems to be the area of the band where WSJT is now being used. The next morning I noticed a spot on the DX Cluster that the station of TK5JJ (Corsica) was calling CQ WSJT on the 144MHz band. Running 100W into an 18-element Yagi I



● Eight Yagis for the 144MHz band at the QTH of Dan Gautschi HB9CRQ

called him and was able to complete the contact within 15 minutes.

Currently most activity on the 144MHz band is being carried out around 144.370MHz although this frequency is far from formalised. The use of WSJT is very effective and it certainly looks like increasing activity on the v.h.f. bands which can't be a bad thing at all.

Although the use of FSK441 is going to be very popular many operators prefer to use high speed c.w. At my station I use speeds up to 5000 letters per minute (1000 w.p.m.).

My high speed c.w. is generated from software written by 9A4GL and uses the p.c. soundcard to produce an audio c.w. tone at 2kHz. This is injected into the microphone socket of the v.h.f. transceiver in s.s.b. mode to

give a c.w. output.

When using a 2kHz tone the transmitter frequency needs to be set 2kHz low from your actual TX frequency. So, if I had a schedule on 144.264MHz I need to set the transceiver to 144.262MHz to give the correct transmitted frequency.

My holidays meant that I missed the Perseids meteor shower this year but I did have a quick foray on the 144MHz band before the main event. Using high speed c.w., contacts were made with the stations of EA6QB (Balearic Is.), ES1RF/3 (Estonia) at 1901km and ES2QH/8 over a path of 1833km.

Charles Coughlan EI5FK (IO51) reports that he was active during the Perseids shower and made twelve contacts using the new FSK441 mode. He was using a Yaesu FT-847 transceiver running 50W into a 19-element Yagi.

Amongst the DX worked on the 144MHz band were the stations of DD1JN (Germany), DF1IAZ, DL1UU, DG2NBN, DL2OM, DJ3LE, DH5MK, DK5WO, F6FHP (France), IK1SPR (Italy), IW2HAJ and OM3LQ (Slovakia). Contacts on s.s.b. around 144.200MHz were also made with EA1BFZ (Spain) and EA7GTF and on c.w. with the Swiss station HB9FAP.

Matthew Cabban G0XDI

(Hertfordshire IO91) spent most of his time around the s.s.b. calling frequency 144.200MHz. Operating in the period August 11-13 his contacts included the stations of EA1ABZ (Spain), ES0SM/3 (Estonia), IK1MTZ (Italy), IK1SPR, IK2DDR, IW2DVK, IW2HAJ, I8MPO, LA0BY/P (Norway), LA8KV/P, LY2SA (Lithuania), OH6MAZ (Finland), RK2FWA (Russia), S55AW (Slovenia), S57MU and YZ7MON (Yugoslavia).

Finally to wrap up your reports comes news from **Conrad Farlow G0RUZ** (Yorkshire IO93) that he managed to work SV/DL9AN operating from Corfu, Greece on the 144MHz band. The distance for this c.w. meteor scatter QSO was an amazing 2273km!

In a few weeks time the Earth is going to pass through the Leonids meteor stream. This meteor shower occurs every year in the period November 15-19 with peak activity on or around November 17. The shower rises above the horizon (in Europe) around 2300UTC and sets the next day around 1230UTC giving nearly 12 hours of activity. I'll give you more details next time around.

DEADLINES

That's it for this month. Good luck with any meteor scatter attempts that you make. Please let me know your results of these tests or any other news or comments to the address and by the date given at the top of the column.

Thanks for your letters and good luck with the DX. See you again next month.

73, David G4ASR

HF HIGHLIGHTS

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REPORTS, INFORMATION AND PHOTOGRAPHS TO ME PLEASE BY THE 15TH OF EACH MONTH.

You may remember the letter from **Len Boston M0BOS** in June's HF Highlights describing an operation from the small Island of Hilbre EU-120 (Dee Estuary off the Wirral Peninsula) which took place last year. The group, using the callsign **GB0HI** made just over 3000 QSOs.

John G4WYO, Paul G0WRE, Terry G0WAB, Tony G0VBD and Len decided to activate the Island again this year to see if they could do better. Learning from their previous experience, the group set up their station again and had an enjoyable weekend working some large pile-ups on both s.s.b. and c.w.

Band conditions were good and by the end of the weekend 4014 stations had been worked. The first of many direct cards arrived a few days later. Paul, the QSL manager, is in the process of sorting these now as he has just received the new cards from the printers. Len has promised some photographs of their DXpedition soon!

DX NEWS

Those of you who need to work Antarctica AN-016 should keep an ear open for **Mark VK0KMT**. Mark is stationed at the Australian Antarctic Davis Base and is active in his spare time, usually between 0400 and 1000UTC and can often be found on 14.180 and 18.120kHz.



● Don McLean G3NOF worked ZF2AH.

Any QSLs should go to Mark's home call **VK4KMT**.

Carlos Poinho CU3FT will be operating as **4W/CU3FT** from Dili, East Timor during a tour of duty as a Telecom Technician with the Portuguese Air Force. His licence was received from the United Nations in New York and he plans to be as active as possible, especially on the WARC bands and 50MHz.

Carlos will have the opportunity to help continue Amateur Radio in this new country

Crete, TF/DJ1FYK/P (Iceland), LY2PX (Lithuania), TK/IK1VCA (Corsica), EA6/DL2DXA (Balearic Islands), UA9CM (Asiatic Russia) and TA1MM (Turkey) between 1700 and 2230UTC.

Also operating on this band was **Ted Trowell G2HKU** on the Isle of Sheppy who used his Ten-Tec Omni 5 and G5RV to work CN8YR (Morocco) and OY3QN (Faroe Islands) around 2100UTC.

On to the 14MHz band now and the log of

CARL MASON GW0VSW HAS ALL THE LATEST NEWS AND REPORTS FROM THE HF BANDS.

and help the East Timor Amateur Radio Association (ETARA) to work closely with local authorities to set up a future licensing authority, after the full independence of East Timor. All QSLs should go to **CT1EEB, Jose Emanuel Ribeiro de Sa, POB 79, P-3860 Estarreja, Portugal**.



● Mike Baker G3SUK worked 5A1A.

YOUR REPORTS

On to your reports now and most of you agree that conditions have improved slightly this month, especially late in the afternoon and in the early evening. **Peter Lowrie MI5JYK**, Newtownabbey, Northern Ireland spent some time on 7MHz and fought the QRM to work YL800GP (Latvia) 2214 and UN7TX (Kazakhstan) on s.s.b. at 2218UTC for a new country.

Peter used his FT-101ZD with just 10W to a 40m sloper. Peter has been monitoring this band for sometime between 2000 and 2300UTC and has heard many South American stations with signals of S9 plus! However, the pile-ups have been just too big to break.

THE 10 & 14MHZ BANDS

Conditions on 10MHz were "very good" for **Roy Walker G0TAK** in Cleveleys near Blackpool. Using a QRP Plus and 5W c.w. into a G5RV, Roy worked OE1DIA (Austria), OH0/W3UR (Aland Island), DK4SY (Germany), J49R (Greece) on the island of

Don McLean G3NOF, Yeovil who used s.s.b. to work 9A/DL2VFK (Croatia) 0835, KL7AK/P (Alaska) on NA-053 Sitkinak Island at 1600, RW3TN/1 (European Russia) 1633 followed a little later by PJ2/G4FKA (Netherlands Antilles) at 2245UTC. Don used a TS950 and trapped dipole antenna.

Meanwhile, **Peter MI5JYK** used his 10W of s.s.b. to work CT1CIX (Portugal), OH2U (Finland), OH0Z (Aland Island), UX0KN (Ukraine) and EW1GA (Belarus) between 1500 and 1800UTC. Later on at 2325UTC VU3DJQ (India) gave Peter a 5/5 report from his QTH in New Delhi. It just goes to show what can be achieved with low power Peter!

THE 18 & 21MHZ BANDS

Mike Baker G3SUK has just returned from a week's holiday in Cornwall where he managed

to find time to operate on 7 and 14MHz using his IC-746 and magnetic mount whip antennas. The best DX was a RV6/Maritime Mobile just off the coast of Brazil. Operating from his home in Stowmarket, Suffolk, Mike enjoyed a few hours on 18MHz s.s.b. working 5A1A (Libya) 1524, JA2QXY (Japan) at 1740 and later 9K2ZZ (Kuwait), TA3D (Turkey), PZ5RA (Suriname), 7X2DG (Algeria) and J3/PA0ZH (Grenada) between 2000 and 2215UTC.

Don G3NOF worked FO5QB (French Polynesia), J3/PA0ZH (Grenada), K1USN (U.S.A.) onboard the USS Salem, R1FJV (Franz Josef Land), C6AJR (Bahamas), VE1RCV (Canada) and 3V8SM (Tunisia) on s.s.b. All contacts made between 0830 and 1530UTC.

Once again using QRP was Roy G0TAK who found 21MHz in good shape during the afternoon. Stations worked included 5B4/G3NKC (Cyprus), XM2CWI (Canada), RI6AAA (Uzbekistan), JA5PL (Japan) followed a little later on at 2049UTC with VK8AV (Australia) at 2049UTC using 100W.

Also finding the band "good" was Mike G3SUK who operated between 1800 and 1950 working ED9GRM (Ceuta & Melilla), 7Z1AC (Saudi Arabia), CN8NK (Morocco), 5A1A (Libya) and C56YT (The Gambia) all with s.s.b.

Using c.w. once again Ted G2HKU found 3W2LWS (Vietnam) and D2EB (Angola) at 2000UTC using a HF6 vertical antenna. Some interesting s.s.b. stations were worked by Don G3NOF on this band. A47RS (Oman) 0829, XU7ABV (Cambodia) 1657, 9N7ZK (Nepal) 1719, TU2DP (Ivory Coast) 1722, HL9DX/2 (South Korea) 1747, AP2IA (Pakistan) 1748 and ZF2AH (Cayman Islands) 2252UTC.

THE 24 & 28MHZ BANDS

On the 24MHz band Don's s.s.b. and Ted's c.w. reached the same station, J3/PA7FM (Grenada) at 1445 and 2100UTC. Using a President Lincoln transceiver and 20W of s.s.b. into a G5RV on 28MHz was **Jon Wheeler G0IUE** in Melksham who worked EA1AT (Spain), SP9XCN (Poland), LU1HF (Argentina), CX2DQ (Uruguay) and PS8HF (Brazil) between 1700 and 2100UTC.

Jon say's "I have been concentrating on this band using the Lincoln and G5RV just to see what can be done with simple equipment and low power. Results have been very good so far and I am convinced that most operators can work DX with any antenna. It's just a case of being in the right place at the right time"

I can only agree with Jon! The 28MHz band is full of surprises. When conditions are good it is possible to work all parts of the world with low power and some of the simplest antennas.

It was good to hear from **Leighton Smart GW0LBI**, Trelewis, Mid-Glamorgan this month. Leighton has been enjoying a few weeks off work and has spent a good deal of his time operating on the 28MHz band using simple home-brew dipoles or verticals mounted on the ground or in his loft.

In the past he has even loaded up the guttering of his house via the station a.t.u. to work DX very effectively on 28MHz. It's easy

PW LISTENING & OPERATING WATCH LIST. (ALL TIMES UTC)

Sean Gilbert G4UCJ operates most days around 0700-1100 and 2200-0200 on all bands using an IC-746 and 50W into a half-size G5RV, WARC inverted vee or HF6 vertical.

Rob Mannion G3FXD listens and operates weekdays and weekends, 1800-1830 on 3.7MHz with 50W s.s.b. and 3.530 or 3.560kHz and 18.105kHz QRP c.w. using an Alinco DX-70 transceiver and a long wire or mobile whips, working /P on the way home from the office.

Carl Mason GW0VSW listens and operates on 7.030 and 14.060 most evenings at 1800 with a Ten-Tec Argonaut 2 and inverted G5RV.

Don McLean G3NOF operates 1030 Saturdays on 3.685kHz on the ISWL Net or 1030 Sundays on the Yeovil ARC Net on 3.665kHz using a Kenwood TS-950 and trapped dipole antenna.

Leighton Smart GW0LBI operates most weekday evenings on 28.500kHz s.s.b regardless of conditions using a President Lincoln transceiver with 20W output to a 11m half-wave vertical.

Brian Williams GW0GHF operates most afternoons around 1400. He also simultaneously monitors 70.200kHz s.s.b. and 51.510kHz n.b.f.m at this time and is looking for weekly skeds especially on 70MHz. Contact Brian QTHR.

George Woods G3LPT operates an open net on 29.630kHz n.b.f.m. 0930 Tuesday to Friday.

Jon Wheeler G0IUE monitors 29.600kHz n.b.f.m. every evening between 1730 and 2230 regardless of conditions using a Yaesu FT-920 transceiver running 100W and 2-element tri-band beam.

Brian Parsons GW0KZK listens and operates on 14.250kHz 1000-1200 and 7075kHz 1400-1600 most days using an Yaesu FT-1000MP and 100W into a 4-element Mosely beam

to see why the 28MHz band is becoming more popular. It's wide frequency allocation means there is plenty of room to operate compared to the crowded lower frequency bands.

QSL CORNER

Here's this month's list of QSL information.

3DA0WPX via ZS6WPX, 8S4C/5 via SM4DD5, 9E1S via IV3TRK, C6AJR via W8GEX, CN2AC via F6BEE, GB2ELH via MM5PSL, GB5RO via GM4DZX, J75KG via KU9C, LV5D via LU7DS, LX9SW via PA1KW, LY0HQ via LY1DR, T30ES via W1QI, UE0LLH via Mike Filippov, POB 20, Vladivostok 690021, Russia., V8AAP via N2OO, W1F via KO4PY, XU7ABV via DL8KBJ and YL800AA via YL2AG.

TO RADIO	DATE	GMT	BAND/MHz	MODE	R.S.T.
GØTAK/OP SW					

● This is the QSL card used by Roy GØTAK.

SIGNING OFF

Well that's about it for now as it's signing off time again. Special thanks to all our reporters this month for their time and effort. Keep up the good work! My thanks also to **Bernie McClenny W3UR** and *The Weekly DX* and **Tedd Mirliotta KB8NW** and the *OPDX Bulletin* for the DX information.

73, Carl GW0VSW

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GC-038G Mast clamp (green)**RWP £25.00**

GC-048 Mast clamp for G-2800SDX**RWP £39.00**

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GS-065 Stay bearing (medium type)**RWP £45.00**

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TH-D7E

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TH-G71E

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USED EQUIPMENT PRICE LIST

MAKE	MODEL	PRICE	MAKE	MODEL	PRICE	MAKE	MODEL	PRICE
ADI	AR-146 2m FM 50W MOBILE	£130.00	KENWOOD	SP-120 LOUDSPEAKER	£30.00	SMC	T3-170L SWR & POWER METER	£20.00
AKD	4001 4m TRANSCEIVER	£130.00	KENWOOD	SP-430 LOUDSPEAKER	£40.00	SML	SWR-25 SWR & POWER METER	£20.00
AKD	6001 6m FM TRANSCEIVER	£135.00	KENWOOD	SP-950 LOUDSPEAKER	£90.00	SOMMERKAMP	FT290R 2m MULTI-MODE TRANSCEIVER	£180.00
ALINCO	DI-G1 HANDY TRANSCEIVER	£120.00	KENWOOD	TH-25E HANDY TRANSCEIVER	£49.00	SSB ELECTRONICS	LT-23 23cms TRANSVERTER	£450.00
ALINCO	DI-G5EY DUAL BAND HANDY	£199.00	KENWOOD	TH-47E HANDY TRANSCEIVER	£100.00	ST3 HEADPHONES	DELUXE HEADPHONES	£45.00
ALINCO	DI-X1 RECEIVER	£90.00	KENWOOD	TH-79E HANDY TRANSCEIVER	£189.00	STANDARD	AX-700E WIDE BAND RECEIVER - BASE	
ALINCO	DI-X10 WIDE BAND RECEIVER	£275.00	KENWOOD	TH-D7E 2m / 70cms HAND HELD BUILT-IN TNC	£195.00	SYNCRON	SCANNER	£170.00
ALINCO	DR-150E 2M 50W MOBILE TRANSCEIVER	£140.00	KENWOOD	TL-120 100W LOW DRIVE HF AMPLIFIER	£150.00	TAGRA	PS-1220VU 20 AMP POWER SUPPLY	£60.00
ALINCO	DR-M06 6M FM TRANSCEIVER	£140.00	KENWOOD	TL-922 HF LINEAR AMP 1Kw (AS NEW!)	£999.00	TIMEWAVE	22AMP POWER SUPPLY	£70.00
ALINCO	EDX-1 ATU	£140.00	KENWOOD	TM-251E MOBILE TRANSCEIVER	£140.00	TIMEWAVE	DSP-599Z TOP OF THE RANGE DSP UNIT	£250.00
AMERITRON	AL-1500 1.5KW AMPLIFIER	£1,499.00	KENWOOD	TM-255E 2m MULTI-MODE MOBILE TRANSCEIVER	£400.00	TOKYO HY-POWER	DSP-9+	£125.00
AOR	AR-3030 HF / VHF RECEIVER inc converter VHF	£450.00	KENWOOD	TM-455E 70CM MULTIMODE MOBILE TRANSCEIVER	£495.00	TOKYO HY-POWER	HL-166V 6m 160W LINEAR AMPLIFIER	£175.00
AOR	AR-3030 HF RECEIVER	£399.00	KENWOOD	TM-D700E 2/70 DUALBAND APRS Built-in TNC TRANSCEIVER	£375.00	TOKYO HY-POWER	HL-30V 2M and 25W AMPLIFIER	£75.00
AOR	AR-7030 TOP RECEIVER	£550.00	KENWOOD	TM-V7E MOBILE TRANSCEIVER	£290.00	TOKYO HY-POWER	HL-37V LINEAR AMPLIFIER	£60.00
AOR	AR-7030-HF RECEIVER (With AM Filter, Optical Encoder)	£650.00	KENWOOD	TR-9000 2m MULTIMODE MOBILE TRANSCEIVER	£240.00	TONNA	7000E TERMINAL	£130.00
AOR	AR-8000 WIDE BAND RECEIVER	£199.00	KENWOOD	TS-120 HF SOLID STATE MOBILE	£225.00	TRIO	TR-2300 2M PORTABLE TRANSCEIVER	£60.00
AOR	AR-8200 mkl WIDE BAND RECEIVER	£230.00	KENWOOD	TS-120 HF SOLID STATE MOBILE	£225.00	TRIO	TR-9130 2M ALL MODE TRANSCEIVER	£250.00
BEARCAT	UBC-860XLT SCANNER	£120.00	KENWOOD	TS-430 HF BASE / MOBILE INCLUDING FM	£375.00	TRIO	TS-940SAT HF TRANSCEIVER	£750.00
BEARCAT	UBC-9000XLT RECEIVER	£199.00	KENWOOD	TS-450AT HF TRANSCEIVER	£600.00	WELZ	AC-38M 200W MOBILE MATCHING NETWORK	£50.00
BNOS	LP-50 50MHz 50 Watt AMPLIFIER	£99.00	KENWOOD	TS-50S SMALL HF MOBILE 100W	£425.00	WELZ	SP-15M SWR & POWER METER	£20.00
DAIWA	CN-1001 AUTO ANTENNA TUNER	£140.00	KENWOOD	TS-570D HF DSP/ATU MOBILE-BASE TRANSCEIVER	£650.00	WELZ	FC-102 1.2KW ATU WITH 4 WAY SWITCHING UNIT	
DAIWA	CN-518 1KW AUTO ATU	£199.00	KENWOOD	TS-570DGE HF DSP BASE / MOBILE TRANSCEIVER	£725.00	YAESU	FC-20 AUTO ANTENNA TUNER FOR 847/FT100	
DAIWA	NS-660P SWR & PWR MTR	£40.00	KENWOOD	TS-710E 2m MULTIMODE BASE TRANSCEIVER	£399.00	YAESU	FC-757AT FULLY AUTOMATIC ATU	£180.00
DAIWA	CN-540 SWR & PWR MTR	£30.00	KENWOOD	TS-790E 2m / 70cm MULTIMODE BASE TRANSCEIVER	£799.00	YAESU	FC-902 ATU 500W	£140.00
DAIWA	CN-630 SWR & PWR MTR	£40.00	KENWOOD	TS-811E 70cms MULTIMODE BASE TRANSCEIVER	£399.00	YAESU	FEX-767-2M 2m MODULE for the FT-767GX	£140.00
DATONG	FL3 FILTER	£75.00	KENWOOD	TS-830S HF TRANSCEIVER	£325.00	YAESU	FEX-767-6M 6m MODULE for the FT-767GX	£140.00
DATONG	D-70 MORSE TUTOR	£25.00	KENWOOD	TS-850SAT HF BUILT IN ATU EXCELLENT TRANSCEIVER	£800.00	YAESU	FEX-767-70CM 70cms MODULE for the FT-767GX	
DATONG	AUTOMATIC RF SPEECH PROCESSOR	£80.00	KENWOOD	TS-870SAT HF/DSP-IF-100W BUILT IN ATU TRANSCEIVER	£999.00	YAESU	FL-2100Z HF AMPLIFIER	£450.00
DATONG	FL-2 FILTER	£60.00	KENWOOD	TS-940SAT HF BASE STATION BUILT IN ATU (CLASSIC!)	£700.00	YAESU	FP-107E POWER SUPPLY	£120.00
DIAWA	PS-304 PSU 20amp	£75.00	KENWOOD	TS-950SD HF/150W DSP BASE TRANSCEIVER	£1,100.00	YAESU	FP700 POWER SUPPLY	£100.00
DRAKE	R7 HF RECEIVER	£550.00	KENWOOD	TS-950SDX HF/150W MOSFET DSP TRANSCEIVER	£1,749.00	YAESU	FP-757HD HEAVY DUTY POWER SUPPLY	£120.00
DRAKE	SW-2 HF RECEIVER	£299.00	KENWOOD	TSU-8 TONE SQUELCH UNIT	£25.00	YAESU	FRG-100 HF RECEIVER	£300.00
FAIRHAVEN	RD-500 WIDE BAND RECEIVER	£575.00	KENWOOD	VFO-120	£50.00	YAESU	FRG-7 HF RECEIVER	£99.00
HARRIS	FR-590 TOP CLASS RECEIVER	£2,250.00	KENWOOD	VFO-180 EXTERNAL VFO	£75.00	YAESU	FRG-7700 HF RECEIVER	£220.00
HOWES	CTU8 ANTENNA TUNER UNIT	£20.00	KENWOOD	VS-1 VOICE SYNTHESISER	£30.00	YAESU	FRG-9600 60-905MHz All mode Receiver	£199.00
ICOM	AT-180 AUTOMATIC ANTENNA TUNER	£200.00	KENWOOD	VS-2 VOICE SYNTHESISER	£30.00	YAESU	FRG-1000MK5 200W DSP HF TRANSCEIVER	£2,600.00
ICOM	FL-100 500Hz CW NARROW FILTER	£40.00	KENWOOD	YK-455CN-1 270Hz CW CRYSTAL FILTER	£100.00	YAESU	FT-1000MP AC HF BASE DSP TRANSCEIVER (Late serial no)	£1,550.00
ICOM	FL-222 1.8KHz SSB NARROW FILTER	£100.00	KENWOOD	YK-88A-1 AM FILTER	£40.00	YAESU	FT-1000MP DC BASE TRANSCEIVER	£1,200.00
ICOM	FL-223 1.9KHz SSB FILTER	£40.00	KENWOOD	YK-88C-1 500Hz CW NARROW FILTER	£40.00	YAESU	FT-101 TRANSCEIVER MINT!	£200.00
ICOM	FL-52A 500Hz CW NARROW FILTER	£99.00	KENWOOD	YK-88CN1 270Hz CW FILTER 8.83MHz IF	£40.00	YAESU	FT-101Zmk111 HF TRANSCEIVER inc FM	£375.00
ICOM	FL-53A 250Hz CW FILTER	£100.00	KENWOOD	YK-88S-1 2.4KHz SSB NARROW FILTER	£40.00	YAESU	FT-23R HANDY TRANSCEIVER	£89.00
ICOM	IC-2100H 2M MOBILE TRANSCEIVER	£150.00	KENWOOD	8.83MHz IF	£40.00	YAESU	FT-2500M MOBILE TRANSCEIVER	£190.00
ICOM	IC-229H 2M / 50W FM Mobile TRANSCEIVER	£130.00	KENWOOD	YK-88SN 1.8K SSB FILTER (TS-440 / R5000)	£40.00	YAESU	FT-2500RMK1 2M ALL MODE TRANSCEIVER	£180.00
ICOM	IC-229H FM TRANSCEIVER	£140.00	KENWOOD	YK-88SN 1.8K SSB FILTER (TS-440 / R5000)	£40.00	YAESU	FT-290RMK1 Includes Bracket + FL-2010 LINEAR AMP	
ICOM	IC-251 2m MULTIMODE TRANSCEIVER	£295.00	KENWOOD	8.83MHz IF	£40.00	YAESU	FT-290RMK11 MOBILE 2M MULTIMODE	£275.00
ICOM	IC-275E 25W TRANSCEIVER	£525.00	KENWOOD	PS-430 POWER SUPPLY	£120.00	YAESU	FT-3000M 2m 70W MOBILE TRANSCEIVER	£175.00
ICOM	IC-290 2m MULTIMODE TRANSCEIVER	£240.00	KENWOOD	TM-G707E MOBILE TRANSCEIVER	£220.00	YAESU	FT-41R HANDY TRANSCEIVER	£120.00
ICOM	IC-2KL AUTOMATIC LINEAR AMPLIFIER + PSU	£999.00	KENWOOD	MCL1100 EASY READER	£75.00	YAESU	FT-470 DUALBAND HANDIE TRANSCEIVER	£150.00
ICOM	IC-490E 70cms MULTIMODE MOBILE TRANSCEIVER	£265.00	KENWOOD	MJF-1020B INDOOR ACTIVE ANTENNA	£40.00	YAESU	FT-690MK11 6M MULTIMODE MOBILE	£295.00
ICOM	IC-725 HF TRANSCEIVER	£375.00	KENWOOD	MJF-1278 MULTI MODE DATA CONTROLLER	£199.00	YAESU	FT-7 MINT! CONDITION	£275.00
ICOM	IC-728 HF TRANSCEIVER	£399.00	KENWOOD	MJF-462B MULTI READER	£140.00	YAESU	FT-726R 2 / 70 / 6m TRANSCEIVER	£375.00
ICOM	IC-735 HF TRANSCEIVER	£400.00	KENWOOD	MJF-462B MULTI-READER	£100.00	YAESU	FT-730R 70CM MOBILE TRANSCEIVER	£120.00
ICOM	IC-737 HF BASE BUILT IN ATU 100W	£595.00	KENWOOD	MJF-956 SWR AND ANTENNA TUNER	£30.00	YAESU	FT-736R 2m / 70cm TRANSCEIVER	£650.00
ICOM	IC-756 HF / 6m All Band Transceiver	£999.00	KENWOOD	MJF-986 ANTENNA TUNER	£195.00	YAESU	FT-736R 2m / 70cm / 6m TRANSCEIVER	£750.00
ICOM	IC-765 HF BASE TRANSCEIVER	£950.00	KENWOOD	MJF-989 3KW ROLLER COASTER ATU	£230.00	YAESU	FT-7400 70cm MOBILE TRANSCEIVER	£160.00
ICOM	IC-821H VHF / UHF MULTIMODE TRANSCEIVER	£699.00	KENWOOD	MJF-959B RECEIVER ANTENNA TUNER	£55.00	YAESU	FT-747GX HF TRANSCEIVER	£399.00
ICOM	IC-R10 HANDY WIDE BAND RECEIVER	£199.00	KENWOOD	PT-135 POWER SUPPLY	£80.00	YAESU	FT-757MK1GX HF TRANSCEIVER	£375.00
ICOM	IC-R7000 RECEIVER MINT! CONDITION	£550.00	KENWOOD	MICROWAVE MODULES MML-144/100 2m 100W LINEAR AMPLIFIER	£129.00	YAESU	FT-767GX HF BASE 100watt built-in ATU	£599.00
ICOM	IC-R72 RECEIVER	£399.00	KENWOOD	MICROWAVE MODULES MML-144/50S 2m 50W LINEAR AMPLIFIER	£80.00	YAESU	FT-790R 70CM MULTIMODE MOBILE TRANSCEIVER	
ICOM	IC-R75 HF / 6m RECEIVER	£475.00	KENWOOD	MICROWAVE MODULES 28/144 TRANSVERTER 28/144	£125.00	YAESU	FT-7B HF 50 W MOBILE TRANSCEIVER	£199.00
ICOM	IC-T81E QUAD BAND HANDY	£250.00	KENWOOD	NAIGAI NAG-144XL 2m 400W PEP LINEAR AMPLIFIER	£325.00	YAESU	FT-80C 0-30MHz COMMERCIAL TRANSCEIVER	
ICOM	IC-T8E HANDY TRANSCEIVER	£175.00	KENWOOD	OPTOELECTRONICS SCOUT FREQUENCY COUNTER	£220.00	YAESU	FT-840 HF MOBILE TRANSCEIVER	£450.00
ICOM	IC-W21E HANDY TRANSCEIVER	£199.00	KENWOOD	Inc MEMORIES	£220.00	YAESU	FT-847 HF 2 / 6 / 70cm BASE TRANSCEIVER	£999.00
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ICOM	PS-85 POWER SUPPLY	£175.00	KENWOOD	PACCOM TNC-320 TNC	£90.00	YAESU	FT-980 HF TRANSCEIVER	£495.00
ICOM	SP-21 LOUDSPEAKER, BOXED	£55.00	KENWOOD	PANASONIC DR-49 RECEIVER	£125.00	YAESU	FT-ONE HF BASE TRANSCEIVER	£450.00
ICOM	UT-102 VOICE SYNTHESISER	£20.00	KENWOOD	QM 70 28/144 TRANSVERTER	£100.00	YAESU	FTV-901 TRANSVERTER inc 2m Mod.	£165.00
ICOM	UT-84 TONE SQUELCH UNIT	£25.00	KENWOOD	SAGRA AMP-600 2M 1KW PEP MAINS AMPLIFIER	£750.00	YAESU	MD-1 DESK MICROPHONE	£75.00
ICOM	AT-120 ANTENNA TUNER	£200.00	KENWOOD	SEM TRANSMATCH Z MATCH ATU inc 160m	£75.00	YAESU	SP-5 LOUDSPEAKER Including Audio Filters	£100.00
ICOM	IC-R71E RECEIVER	£399.00	KENWOOD	SEM ANTENNA TUNING BRIDGE	£30.00	YAESU	SP-767 LOUDSPEAKER Including Audio Filters	£80.00
JRC	NRD-535 HF RECEIVER	£600.00	KENWOOD	SHURE SR-444 CLASSIC BASE MIC	£35.00	YAESU	SP-8 LOUDSPEAKER Including Audio Filters	£100.00
KANTRONICS	KAM PLUS TNC	£220.00	KENWOOD			YAESU	SP-980 LOUDSPEAKER Including Audio Filters	£55.00
KANTRONICS	KP-3 TNL	£89.00	KENWOOD			YAESU	VX-5R 2 / 70 / 6 HANDIE 5W	£220.00
KENWOOD	AT-250 AUTOMATIC ANTENNA TUNER	£200.00	KENWOOD			YAESU	XF-114SN 2KHz SSB FILTER	£60.00
KENWOOD	AT-50 AUTO ANTENNA TUNER	£175.00	KENWOOD			YAESU	YO-100 SCOPE VERY RARE!	£150.00
KENWOOD	AT-50 AUTO ATU	£175.00	KENWOOD			YAESU	YS-60 SWR METER 1.6 - 60MHz	£30.00
KENWOOD	DFC-230 FREQUENCY CONTROLLER	£70.00	KENWOOD			ZETAGI	B-132 10 / 11m LINEAR AMPLIFIER, MAINS	£60.00
KENWOOD	PS-20 10A POWER SUPPLY FITS TR-9130 ETC	£55.00	KENWOOD					
KENWOOD	PS-50 POWER SUPPLY	£145.00	KENWOOD					
KENWOOD	PS-52 POWER SUPPLY	£150.00	KENWOOD					
KENWOOD	SM-220 SCOPE 830 etc	£200.00	KENWOOD					

KEYBOARD COMMS

ROGER COOKE G3LDI

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Having a DX atlas available on-screen is something that can help find those elusive ever-changing prefixes and increase your country score and **Fig. 1** shows a screen shot of the map. This one can be downloaded from www.dxatlas.com

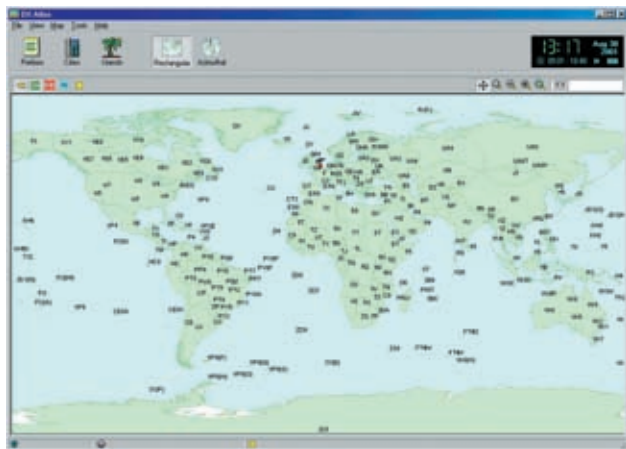
The program is written by **Alex Shovkoplyas VE3NEA** and is the copyright of Afreet Software. You have a 30-day free trial period after which you have to register. Registration is US \$29.95 and you can register on-line.

Azimuthal and Mercator projections are available, plus IOTA listings, information on major cities, beam headings, distances, prefixes etc. Date and time are displayed along the top and one major feature is a display of the gray-line. *Geo-clock* does a similar display of the line-line, but doesn't have the Amateur Radio connection that the DX atlas program does. Regular updates are also available to registered users.

Your own location can be set as centre of the map. This produces a very interesting representation of the line-line when viewed in Mercator projection. A very worthwhile program to have!

The second atlas program is a free one. **Earl K6SE**, writes it and it's available at: <http://dl.www.juno.com/get/tagj> See **Fig. 2** for an idea of the on-screen presentation.

Back in 1998 Earl searched the Web trying to find suitable software for keeping track of ARRL DXCC awards. A few were there, but none that were stand alone. So, Earl wrote an MS-DOS program that became quite popular.



• Fig. 1.

Many FT-1000MP owners who use the program requested that he write a Windows-based version of the program.

The program is a relational database that covers every DXCC award offered by the ARRL. It's in spreadsheet format and at a glance you can see what your Entity total is on any mode or band. It has many printout

Some Amateurs have problems with interfacing to the soundcard and dealing with audio can provide headaches if care isn't taken. There are several commercially produced units that do a good job. One I have reported on is the RigBlaster, which has proved to be very popular. Another that has just come to light is the SignalLink.

ROGER COOKE LOOKS AT THE BENEFITS OF HAVING A DX ATLAS, SOUNDCARD INTERFACING & NEWSLETTERS.

options, including a 'need' list of Entities for any of the DXCC awards.

The program also contains a method of tracking those unreceived QSL cards for new Entities that you've worked. Easy and a pleasure to use, the database includes all 334 current and 58 deleted Entities as presently defined by the ARRL.

SOUNDCARD INTERFACING

More and more programs are interfacing via soundcards. This is a relatively cheap way of gaining experience on different data modes without the expense of a multi-mode TNC. The results are quite outstanding and it can be very satisfying to work DX on modes like PSK31 with just a few watts and a piece of wire, with very good copy.

I was talking with my life-long friend and engineer, **Dick Bendicksen N7ZL**, who I first met on RTTY about 40 years ago. He has just got Digipan going on his PC and was completely amazed at the copy on signals that were barely audible.

Dick has used a huge selection of data equipment in his Amateur Radio work and says that this combination beats them all. At 83 he is discovering the benefits of using a PC and a soundcard!

SIGNALINK

Tigertronics is pleased to announce the availability of the SignalLink™ Sound Card to Radio Interface. The SignalLink opens up a whole new world of digital communications by allowing you to operate today's hottest modes with a minimal investment in new hardware!

In recent years there have been incredible advances in Digital Signal Processing (DSP) utilising desktop computers and SoundBlaster® compatible sound cards. This new DSP technology provides a level of signal processing that was simply impossible to achieve in older hardware based designs.

Software is now available for virtually all of the traditional digital modes including Packet, APRS®, AMTOR, CW, SSTV, WEFAX, ACARS and more. In addition the power of this technology has spawned a host of exciting new modes like PSK31, MT63, Hellschreiber and many others!

Tigertronics has developed the SignalLink Interface to help you take advantage of this cutting edge technology. SignalLink bridges the gap between your computer and your radio to provide the highest level of performance in all the new modes.

In addition to delivering basic functions found in other units, the SignalLink provides advanced features and design innovations that set it apart from all the rest! The SignalLink comes fully assembled and tested. It is not a kit!

The design employs state of the art surface mount construction for maximum performance and reliability. See **Fig. 3** for a front panel view.

The SignalLink has a number of unique features that eliminate the common problems associated with connecting your radio and computer. It also provides some advanced features not available on other units. **The following is a direct quote from their publicity material:**

- * **"Complete Isolation:** SignalLink truly isolates your computer from your radio. This eliminates troublesome ground loops and prevents hum and noise from degrading the signals.
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- * **External Speaker Support:** If you like to listen to your radio's audio while operating, then you'll appreciate the front panel auxiliary audio output jack. This jack will accept an external speaker or headphone and can be configured to be active when the SignalLink is on or off. It can also be set to **always on**.
- * **Flexible Power Requirements:** SignalLink consumes so little power that it can be powered by the accessory voltage found on most radio mic connectors. This makes for a very simple and clean installation. On radios that don't have power available, we have provided an external power jack on the rear panel.
- * **Front Panel Switches and Indicators:** A front panel on/off switch is provided to prevent accidental transmissions. The receive signals are still enabled in the off position for convenience in monitoring activity. Bright l.e.d.s are provided to indicate when power is on and when the p.t.t. is active during transmit".

Information is not always easy to find, but if you have problems with interfacing, take a look at www.qsl.net/wm2u/interface.html see Fig. 4.

This site is full of information on problems with various transceivers, with links to other sites with further information.

Ernie Mills WM2U produces the site and is always looking for further information to update it. If you have anything that you think would be useful, why not send it along?

NEW RTTY SITE

The website of N1RCT has been QRT for some time. This site was dedicated to all things RTTY and was much used and it was a sad day when it closed.

However, **Bob NT1V** is attempting to replace it. The new site is up at: www.rttyinfo.net It is open now, so take a look. The front page looks like Fig. 5.

NEWSLETTERS

The latest newsletter from MAXPAK has reproduced the PW article on UI-View and it seems to be gaining interest in the UK's Midlands. It was good to read that membership of MAXPAK has not declined too much and I was quite pleased to see that there are no plans to open a TELNET port on GB7MAX.

The Victoria (Australia) Amateur Radio Packet Newsletter also has lots of information on UI-View and APRS again this month, but is also packed with lots of other useful information. The Suffolk Data Group look as if they are going from strength to strength, all credit to them for maintaining such an impressive membership list.

A mention is made about the effect of changing to 12.5kHz channel spacing. The problems are surmountable however and my core of regular users have no problems. A full 14 page newsletter provides some interesting reading.

DIGIPEAT, the Newsletter of the Australian Amateur Packet Radio Association (AAPRA), has the usual pot-pourri of articles. A mention is made in the latest of the use of the Internet and the Vice-President, **Barry White VK2AAB**, suggests that if we use the Internet, we may as well switch off our radios. Good point, is this the way to go? I think not!

MY SURVEY

I shall be compiling the information from my survey from the September column and producing the results in December. It won't take too long!

The response was predictably quite disappointing. Perhaps I asked at the wrong time of year, with the deadline for the Inland Revenue forms approaching fast and the typical British aversion to filling in forms!

AND FINALLY

Compaq is considering changing the command 'Press Any Key' to 'Press Return Key' because of the flood of calls asking where the 'Any' key is!

The technical support for AST had a caller

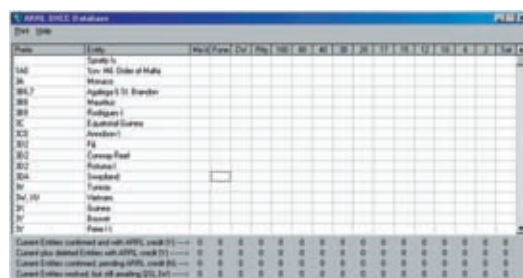


Fig.2.



Fig.3.



Fig.4.



Fig.5.

complaining that her mouse was hard to control with the dust cover on. The cover turned out to be the plastic bag the mouse was packaged in!

Roger G3LDI

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The rumpus over the closure of some **BBC World Service** short wave frequencies goes on. Recently, the Coalition to Save the BBC (www.savebbc.com), a grouping of radio enthusiasts in the United States, wrote for the second time to **Mark Byford**, director of the World Service. The Coalition asked Mr Byford to have the courage to admit that the cuts may have been made a bit prematurely. The letter continues:

"As you point out in your letter of 4 July, some frequencies are working quite well in the regions ostensibly cut off, even though they are directed elsewhere. While there is still a need for restoration of frequencies targeted to these areas to preserve World Service audibility there, it has become apparent that the level of restoration required is considerably less than what was thought prior to 1 July. What better outcome than for the World Service to be seen, at home and abroad, as both responsive to its listeners and responsible with its budget?"

The Coalition believes that the restoration of just two frequencies: 9.515MHz at 1200-1700UTC (Sackville to North America) and

at 500 often doesn't significantly extend the geographical range. The schedule for Al Dhabayya is as follows:

Southwards to Africa at 0300-0330 on 11.975; Amharic at 1700-1800 on 17.875; Afar and Oro at 0300-0400 on 11.945; Oro and Tigrigna at 1630-1800 on 15.520MHz Somali, Amharic, Tigrigna. On easterly bearings, South Asia at 1300-1400 on 15.495 English; 1400-1430 on 15.385MHz.

Using all the regular means of transmission, including radio, satellite, rebroadcast and internet, AWR claims to be audible to more than 70% of the world's population. So they must be doing something right. To be fair to the BBC, they too intend to keep plugging away on short wave to areas such as Africa and Asia.

RADIO PRAGUE

Just about as old as the BBC is **Radio Prague**, whose 65th anniversary was in late August. Regular broadcasts to expatriates began in 1936, but these had been preceded in the early 1920s by some interesting experimental transmissions.

broadcasting service of the Czech Republic, with transmissions in six languages: English, French, German, Spanish, Russian or Czech and Prague can be heard in most parts of the world.

Radio Prague uses satellite, cable, short wave, internet and f.m. and makes recorded programmes for use where radio reception is not so good. Last winter's short wave schedule was: 0100-0127 & 0200-0227 on 6.200, 7.345; 0400-0427 on 7.345, 7.385, 9.435; 0430-0457 on 9.865, 11.600; 0800-0827 on 11.600, 15.255, 1000-1029 on 21.745; 1130-1157 on 11.640, 21.745; 1400-1429 on 21.745; 1700-1727 on 5.930, 17.485; 1800-1827 on 5.930, 7.315; 2100-2127 on 5.930, 9.430; 2230-2257 & 2330-2357 on 7.345 and 9.435MHz. Of course, that's not to say that the current schedule will be the same - propagation conditions are constantly changing - but at the time of writing in September the new schedule was not available.

Radio Free Europe/Radio Liberty (RFE/RL), on the other hand, believes that short wave does not have a great future. As the local news hotted up recently, they established a Macedonian service (the 26th language for RFE/RL), but its three daily 15-minute transmissions are heard only on a network of 19 f.m. stations, covering all parts of Macedonia. But then Macedonia is a small area, squeezed between Serbia, Kosovo, Albania, Greece and Bulgaria and the politics allow RFE/RL to get f.m. rebroadcast facilities.

TOM WALTERS HAS ALL THE LATEST NEWS FROM AROUND THE WORLD OF BROADCASTING.

9.740MHz at 1800-2000UTC (Singapore to Australasia) could provide a limited but effective service in the regions affected. The coalition adds:

"It is our sincere intention to work to support the BBC World Service, which has provided us with so much in the way of information, education, and enrichment over many years. We thank you again for your response and hope you can see your way clear to make the adjustments we recommend and, beyond that, accept our offer of future support".

Adventist World Radio (AWR) meanwhile is using short wave aplenty. They're now pushing out signals from transmitters at Al Dhabayya, in the United Arab Emirates.

The transmitters are capable of 500kW, but AWR is content to operate at 250kW - the gain

As the medium wave band was then so empty, a 5kW transmitter was seriously powerful, and music relays from Prague could be heard loud and clear in North America on 368 metres. In those years also, transmissions on short wave, a band considered useless for broadcasting, and using powers of just 10-50W, could be heard as far away as the British Isles!

Prague's full-scale service was

interrupted during the Nazi occupation of the Second World War and then reflected the political upheavals of the Cold War, during which Czechoslovakia was again occupied. The brief 'Prague Spring' of 1968 was a foretaste of the freedom that Radio Prague now enjoys. It's now the foreign-language



NEW DEVELOPMENTS

News of two new radio developments now, both of which, if they work well, promise revolutionary improvements in reception. First is **Digital Radio Mondiale (DRM)**.

The DRM system for getting digital quality sound on long medium and short waves, was demonstrated at the huge electronics show **IFA** in Berlin, recently. The transmission was from medium wave stations near Berlin, plus short wave from Juelich.

One report said that reception was better than a.m., but not as good as f.m. (Still needs some work, then?).

Here's a wonderful scare story for the new satellite radio services based in the USA, **Sirius** and **XM**. According to the *Wall Street Journal*, a new kind of energy-saving light bulb for street lighting may block reception of Sirius and XM. This could cause problems, as the satellite radio systems are designed to be installed in cars. Proud owners of the new receivers may have to limit their listening to daytime only!

Tom

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The Publishers of *Practical Wireless* also wish to point out that it is the responsibility of the buyer to ascertain the suitability of goods offered for purchase.

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Books! I am still disposing of my lifetime collection of books. List No 4 will soon be available, please send large s.a.e. Richard Marris, 35 Kingswood House, Farnham Road, Slough SL2 1DA.

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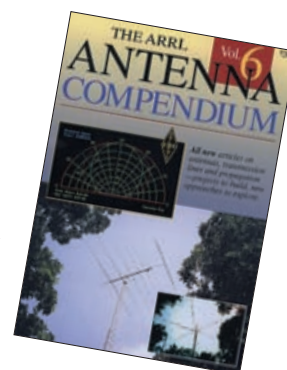
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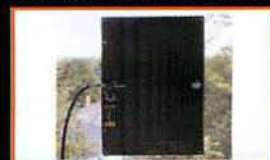
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Steve Nichols GOKYA monitored the terrible events in New York from his shack in Norwich.

Remembering America

Many of us have never experienced anything close to what the city of New York went through on 11 September 2001 and hopefully never will. The television images and news reports shook us all, leaving us numb and with thoughts of our fellow Radio Amateurs, friends and families who may have been caught up in the World Trade Centre Disaster.

At times like these Radio Amateurs are renowned for rallying round, monitoring the situation and forming a vital line of communication. In fact the ARRL reported that US Amateur Radio Emergency Service (ARES) and the Radio Amateur Civil Emergency Service (RACES) had set-up emergency communication Nets.

Steve Nichols G0KYA from Norwich, was one Amateur who was monitoring 28MHz. Here's his account of the events as they unfolded:

"I was listening to the KQ2H repeater on 29.620MHz at about 2pm on the day of the World Trade Centre disaster. I work from home a lot of the time and the rig is nearly always on. The 10m repeater is situated in Manhattan and I had only just had an exchange of E-mails with the repeater owner **Alex Muzyka** the day before, telling him how strong it was in the UK. I had no idea what I would hear the next time I listened.

Anyone who has listened to a 10 metre repeater will know that they are pretty chaotic as stations fight to get access and then others join

in as propagation changes. At first, there was a Russian station trying to get in, but then I heard an American mobile station (I don't know his callsign) saying that he was "trying to confirm a rumour about the World Trade Centre". He said: "I'm going there now, but it sounds like an aeroplane has hit it"

Another station came on air and said he could see the WTC from his location and yes, it was on fire. It was all rather confusing, especially as foreign stations were still trying to call CQ on the f.m. input frequency of 29.520MHz.

A few minutes later one of the hams was live on air as the second aircraft hit and virtually broke down on the repeater. He just kept repeating "Oh my God!" I think he must have been quite close. Chaos then reigned as local hams in the area tried to verify what was happening while Russian stations, oblivious to the events still tried to call CQ DX. It seems that local hams were operating 10m mobile from their cars.

At this point propagation shifted and the W10J repeater from Boston (on the same frequency) started to get stronger than KQ2H and I lost the signal. I rang the BBC who already knew about the incident and they told me it was live on their News 24 channel and I was able to see what I had been listening to earlier, live on the 10m repeater. After that I quickly QSYd to the 10-10 International frequency on 28.425MHz to see if I could get any more news out of the USA.

Tom RA6AR was calling CQ and as I know that he has many friends in the US, gained via 10-10. I answered his call and told him the news - he didn't know anything about it and rushed off to tell local hams on 144MHZ and to watch the Russian TV.

It was a sheer fluke that I was listening to 29.620MHz at the time of the incident and a fluke that propagation favoured the UK. But it is not something I would wish to repeat".

Steve Nichols
GOKYA



next month

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