Practical Wireless
PW
amateur radio & more!

Treasure ...or Tip?

Silent key sales

Icom IC-E90

- Tri-band magic!

Majestic Masts!

Inside Rugby radio

January 2003 £2.85
01
9 770141 085068

WATERS & STANTON

FREEPHONE ORDER LINE:
08000 73 73

WEBORDERING
www.wsplc.com

NEW YAESU

FT-897 £999

100W HF
50W 2m and
20W 70cm
Plus 20W on
(optional)
Internal
Battery

Tokyo Hi Power HL-50B 50W Linear Amplifier

This model has been specifically designed for the FT-817. Enjoy up to 50 Watts output

NEW LOW PRICE
£265.95 C

SGC

SPECIAL OFFER until 15th Jan 2003

Buy an SG2020
SAVE £100
or SG2020 ADSP
SAVE £100
+ Stealth Antenna Kit
SAVE £90

SAVE UP TO
£190 ! !

FT-1000MP MKV FIELD £2199

NEW YAESU

SPECIAL OFFER

WITH MKV FIELD
EITHER 2 FREE FILTERS
OR
£150 OFF MD-200A8X MICROPHONE
OR
FREE VX1R TRANSCEIVER

UK's largest Selection of HF Transceivers

We will price match on any currently advertised in-stock items that are of UK origin. **Beware of non UK sourced items.** If the dealer cannot get supplies from the UK distributors, then there may be a reason! All our gear is UK sourced with full manufacturers warranties.

ICOM HF Transceivers

IC-756-PRO	160m - 6m 100W	LAST ONE	£1799.95 C

IC-756-PRO II
The flag ship of the ICOM range.
Lovely big easy to read display

IC-756-PROII	160m - 6m 100W 12V	£2495.95 C
SP-20	Speaker with filters	£164.95 B
SP-21	Speaker for IC-756	£74.95 B
SM-8	Base microphone	£129.95 B
SM-20	Base microphone	£144.95 B
PS-125	Icom tcvr PSU	£295.95 C
IC-7400	160m - 2m 100W 12V	£1449.95 C
IC-706	160m - 70cm Tcvr with DSP 12V	£799.95 C
IC-718	160m - 10m 100W 12V	£599.00 C

Yaesu HF Transceivers etc.

FT-1000mkV	160m - 10m 200W 230V	£2799.95 C
VL-1000	Quadra HF - 6m 1kW linear	£3799.00 D
FTV-1000	6m transvertor 200W	£499.95 C
FT-1000 Field	160m - 10m 100W 230V	£2199.95 C
MD-200ABX	Desk mic	£249.95 B
MD-100ABX	Desk mic	£110.00 B
FT-920AF	160m - 6m 100W 12V	£1099.95 C
FT-847	160m - 70cm 100W etc 12V	£1199.95 C
FT-817	160m - 70cm 5W Batt.	£595.95 B

FT-817
All bands & All modes gives you a totally portable HF DX or VHF/UHF station. *Ours includes* battery and charger.

FT-840	160m - 10m 100W 12V	£499.95 B

Kenwood HF Transceivers etc.

TS-870S	160m - 10m DSP 100W 12V	£1399.00 C
PS-33	AC power supply	£199.95 C
PS-53	AC power supply	£229.95 C
MC-60A	Desk mic	£117.95 B
MC-80	Desk mic	£72.95 B
MC-90	Desk mic	£187.95 B
TS-570DGE	160m - 10m 100W 12V	£849.00 C
YK-88CN-1	270Hz CW filter	£61.95 B
YK-88SN-1	1.8kHz SSB filter	£61.95 B
TS-50S	160m - 10m 100W 12V	£629.00 C
TS-2000	160m - 70cm <100W	£1695.00 C
TS-2000X	150m - 23cm <100W	£1999.00 C
TSB-2000	Computer controlled	£1549.00 C
RC-2000	Remote head for TS-2000	£199.95 B
ARCP-2000	TS-2000 software	£44.95 B

Power Tank

FD-7021 **£24.95 B**

4 Ah supply with built-in 3/6/9V output plus 12V DC. Has built-in lantern and computer controlled battery state. Compact size: 180w x 85d x 210h mm, 3kg. Shoulder strap.

AC chargers included

Special Offer AR-147

2m
50W
Output
£149.95
Carriage £6.00

AM Airband Receive

The AR-147 offers a top performance 2m FM transceiver plus VHF air-band receiver. You get CTCSS, (auto reading), and DTMF complete with keypad microphone. 12.5 and 25KHz steps plus 1750Hz tone makes it truly universal. Power levels of 10 Watts and 5 Watts are also selectable. Includes mobile mounting hardware and full warranty.

29 YEARS IN THE BUSINESS
WINNER OF KENWOOD 2002 AWARD
YAESU'S LARGEST UK DEALER
PLAY SAFE, GO TO W&S

NEW YAESU VX-7R

Waterproof 3-Band Radio
6m - 2m - 70cm
The new robust handy from Yaesu

£329.00

ICOM E-90

NEW

3-Band Radio

At last, the new Icom handy has arrived for 6m-2m-70cms plus general coverage and TV sound!

£269.00

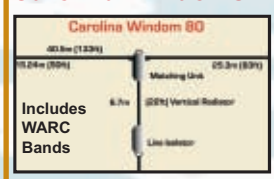
Triple Mag Mounts *Upgraded*

£39.95

Ideal for HF whips and large VHF whips. Amazing adhesion even at 70mph! SO-239 or 3/8" available

W-300T = 3/8" **W-300S** = SO-239

Carolina Windoms - DX from a wire!



Outperforms G5RVs and "Del-Boy" designs! The only antenna to give both high and low angle radiation even at 20ft above ground. Rated at 1kW, there's a model for you.

CW-160	160-10m 80.1m	**£139.95 C**
CWS-160	160-10m 40.5m	**£134.95 C**
CW-80	80m-10m 40.5m	**£99.95 C**
CWS-80	80m-10m 20.1m	**£119.95 C**
CW-40	40m-10m 10.3m	**£94.95 C**

Many more in our 2003 Radio Communications Guide 336 pages! £2.95 plus post

HEAD OFFICE • 22 MAIN RD, HOCKLEY • ESSEX • SS5 4QS
ENQUIRIES: 01702 206835/204965 FAX: 01702 205843
MIDLANDS + NORTH SHOP • BENTLEY BRIDGE • CHESTERFIELD RD • MATLOCK
DERBYSHIRE • DE43 5LE ENQUIRIES: 01629 582380 FAX: 01629 580020
SCOTLAND + BORDERS SHOP • 20 WOODSIDE WAY • GLENROTHES • FIFE KY7 5DF
ENQUIRIES: 01592 756962 FAX: 01592 610451-CLOSED MONDAYS

WON'T BE DISCOUNT... CUSTOMER SERVICE THE ONLY THING WE

CARRIAGE CHARGE CODES: A=£2.75, B=£6, C=£9 D=£12

YAESU

FT-1500M 2m FM Mobile £159 C

SPECIAL OFFER SAVE £70

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

KENWOOD

TM-D700E 2m + 70cm FM £449 C

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

TM-G707E 2m + 70cm FM £289 C

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

TM-V7E 2m + 70cm FM £359 C

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

ICOM

IC-207H 2m + 70cm FM £279 C

A great budget class radio for VHF & UHF use.

IC-2800H 2m + 70cm FM £419 C

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

IC-2100H 2m FM Mobile £229 C

Rugged design with switched receive filters 12.5/25kHz

IC-910 2m + 70cm All Mode £1249 C

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

YAESU

FT-7100 £299 C

SPECIAL OFFER £299

Just arrived is this new dual band radio that has extended rx. Power is 50/35W. Features dual in-band reception and detachable display (requires YSK-7100).

AMAZING VALUE

One of the Best Buys in Dual Band Mobile!

KENWOOD

TH-D7E 2m + 70cm £299 C

DATA COMMUNICATOR

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

TH-F7E 2m + 70cm £249.95 C

NEW

WITH EXTRA WIDE RX COVERAGE

- 144-146MHz Tx/Rx: FM
- 430-440MHz Tx/Rx: FM

Up to 6W out with Li-ion battery and "scanner" style coverage from 100kHz to 1300MHz including SSB on receive! This is a great radio to have at all times when you are on your travels.

THG-71E £199 B

- 144 - 146MHz FM
- 430 - 440MHz FM
- 3 power levels
- 6W (13.8V) 5.5W (UHF) HI
- 0.5W LO • 50mW EL
- 200 multi-function memories
- Freq. deviation: ±5kHz
- CTCSS tone encoder/decoder
- Illuminated keypad,
- memory name function
- Auto power off • Auto batt. saver
- Time-out timer
- 5.5 - 16V DC (13.8V)

NEW DSP SPEAKER

NES10-2 (includes 12V AC adaptor)

Kills noise Brings up Signals.

£99.95 Carriage £6

Just plug it into your speaker or headphone socket and hear the noise drop away. Dip switches offer variable settings. Works with any receiver.

NEW "CB" VERSION - £79.95

YAESU

YAESU FT100D £799 C

AMAZING VALUE

The FT100D must be one of the smallest HF/VHF/UHF rigs on the market covering 160m-70cm all modes plus a general coverage receive capability of 100kHz-970MHz

YAESU VX1R 2m/70cm £159 B

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

W-25SM 25AMP SWITCH-MODE POWER SUPPLY

THE QUIET ONE

£79.95 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)

RIGblaster

IT'S NOT A TNC

PSK31, MFSK, MT63, SSTV, RTTY,AMTOR, CW, PACKET-APRS,HELLSCHREIBER, REMOTE BASE, METEOR SCATTER, CLUB QST'S, REPEATER CONTROLLER, VOICE KEYER.

RIGblaster Plus	£139.95B
RIGblaster M8	£109.95B
RIGblaster nomic RJ	£62.95 B

CHECK OUR WEBSITE FOR FULL DETAILS

RT-11 REMOTE AUTOTUNER £239 B

NEW

NEW FROM LDG

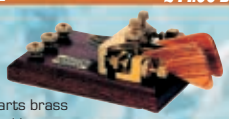
ASK FOR DETAILS.
ALSO AVAILABLE IN KIT FORM.

GZV-4000 40A 5-15V Switch Mode

- Output voltage 5 - 15V DC
- Output current 40A continuous
- Built-in cooling fan
- Supply 230V AC 50Hz
- Size 210 x 110 x 300mm
- Weight 3.5kg

£159 C

W-CRI PADDLE KEY £44.95 B



- Metal parts brass
- Hardwood base
- Size 145 x 80 x 50mm
- Weight 375g

W-GMP MORSE KEY £29 A

- Metal parts brass
- Hardwood base
- Miniature size
- Size 100 x 50 x 45mm
- Weight 150g

Kent Morse Practice Oscillator

- Size 160 x 55 x 97mm
- Weight 260g

£19.50 A

'Amazing' MP-1 Variable Antenna 7MHz - 430MHz! 150 Watts

Use Portable, Mobile, Home or even balcony!

SLIDE TO CHANGE BANDS!!

It's sweeping America as the most versatile antenna for any location. Kit includes telescopi whip, variable coil, lower mast, base bracket (SO-239), clamp and optional wire radials (3m approx). Total height approx 2m. Will also screw directly into 3/8" mobile mounts. The whole antenna packs down to pocket size, yet puts together in a couple of minutes. And with the high Q coil, you get high efficiency. Take it with your FT-817 as hand luggage!!

£149.95 carr.£9

FT-817 Accessories

W4RT FT-817 Products

One Big Punch

Speech processor to boost your transmit audio. Fitted in rig by us. Price includes fitting by us. **£59.95 B**

One Board Filter

NEW

A Collins SSB 2.3kHz and CW 500Hz mechanical filter on one board. Much steeper curves and flatter response than the original 2.7kHz ceramic filter. Plus improved transmit audio! Price includes installation by us. **£259 B**

MP-1 Options

TRIPOD **£19.95 A**

Compact tripod for free standing MP1

MP-80M **£22.95 A**

80m Coil for MP-1 3.4MHz - 4MHz

FT-817 BRACKET **£19.95 A**

MP1 bracket mounts on side of FT-817

WATERS & STANTON

PRICE MATCH

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

Freephone Orders 08000 73 73 88

Get in Front with HUSTLER

CARRIAGE CHARGE CODES: A=£2.75, B=£6, C=£9, D: £12

5BTV

£209.95
Carr. £9.00

HUSTLER

BASE STATION ANTENNAS

NEW

Spec	4-BTV	5-BTV	6-BTV
Bands	4	5	6
Coverage	40m-10m	80m-10m	80m-10m
Bandwidth 10-40m	Full	Full	Full
Bandwidth 80m	N/A	100kHz	100kHz
Resonance	1.5:1	1.5:1	1.5:1
Power	1kW CW	1kW CW	1kW CW
Traps	1" forms	1" forms	1"forms
Tubing	1.25"	1.25"	1.25"
Bracket size	1.75"	1.75"	1.75"
Height	21ft 5" (8.52m)	25ft 1" (7.84m)	24ft (7.3m)
Weight	8.8kg	7.7kg	7.5kg
Wind (112kph)	-	13kg	-

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

HUSTLER Mobile Antennas

Model	Band	Bandwidth	Price
RM-10	10m	150-250kHz	£19.95 B
RM-11	11m	150-250kHz	£19.95 B
RM-12	12m	90-120kHz	£19.95 B
RM-15	15m	100-150kHz	£19.95 B
RM-17	17m	120-150kHz	£24.95 B
RM-20	20m	80-100kHz	£24.95 B
RM-30	30m	50-60kHz	£26.95 B
RM-40	40m	40-50kHz	£26.95 B
RM-80	80m	25-30kHz	£29.95 B

Model	Band	Bandwidth	Price
RM-10-S	10m	250-400kHz	£24.95 C
RM-15-S	15m	150-200kHz	£26.95 C
RM-20-S	20m	100-150kHz	£31.95 C
RM-40-S	40m	50-80kHz	£37.95 C
RM-80-S	80m	50-60kHz	£51.95 C

Lower mast sections

MO-1	54" (FOLD @ 22")	£33.95 C
MO-2	54" (FOLD @ 27")	£33.95 C
MO-3	54" (NON FOLD)	£26.95 C
MO-4	27" (NON FOLD)	£22.95 C

AMERITRON USA

AL811 XCE 160-10M 600W PEP

£799

AL811 HXCE 160-10M 800W	£989
AL800 XCE 160-10M1250W	£1995
AL1200 XCE 160-1-M 1500W	£2695

WE ONLY SELL EUROPEAN CE VERSIONS WITH FULL 10 METRE COVERAGE

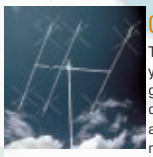
CUSHCRAFT COMMUNICATIONS ANTENNAS

HF HORIZONTAL BEAMS + DIPOLES

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

MA5B	10-20m (5 band) 3 el 2.7m radius 1.2kW	£349.95 C
X-7	10-20m 7 el. 12.5 - 13dBi 2kW 6.09m radius	£669.95 D
X-740	40m add on kit for X-7	£299.95 C
A4-S	10-20m 4 el. 8.9dBi 2kW 5.49m radius	£599.95 D
A-744	Gives 40m or 30m operation from A-4S	£159.95 C
A3-S	10-20m 3 el. 8dBi 2kW 4.72m radius	£499.95 D
A-743	Gives 40m or 30m operation from A3-S	£159.95 C
A3-WS	12 & 17m 3 el. 8dBi 2kW 4.4m radius	£399.95 D
A-103	Gives 30m operation from A3-WS	£159.95 C
D-3	10-20m dipole element 7.86m 2kW	£249.95 C
D-3W	12, 17, 30m 17m dipole element10.37m 2kW	£249.95 C
D-4	10-40m dipole element 10.92m 2kW	£329.95 C
D-40	40m dipole element 12.88m 2kW	£299.95 C
Ten-3	10m 3 el 8dBi 3m radius 2kW	£189.95 C
ASL-2010	13.5-32MHz 8 el. log periodic6.4dBd 5.86m radius	£799.95 D

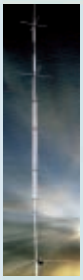
THE MINI-BEAM FOR SMALL GARDENS



Cushcraft MA5B

The best 3 element mini beam you will ever find. 2 element gain on 10, 15 & 20m, and dipole performance on 12m and 17m. Up to 25dB F/B ratio, it accepts 1.2kW yet has a boom length of only 2.2m and element length of just 5.2m Turning radius is 2.7m. Uses a single feeder, this really works the DX. Get one up before winter! £349.95 C

CUSHCRAFT VERTICALS



R8 (Illustrated), covers 8 bands from 6m - 40m, stands 8.7m high and requires no radials. You can feed it with 1.5kW and typical VSWR is around 1.2:1 £499.95 C

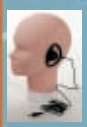
R8-GK Optional guy kit for R8 £49.00 B

R-6000 6 band 6m-20m that requires no radials and handles 1.5kW. Stands just 5.8m high and was chosen for the RSGB GB4FUN vehicle antenna. It works!! £349.95 C

NEW MA5V VERTICAL 20-10m **£229.95 C**

WATSON

WEP-300B EARPIECES £2.95 A



Over-the-ear earpiece, popular for security and emergency use. Its low cost and firm mounting even in arduous conditions make this a popular item. Fitted with 3.5mm jack plug.

WSA-1 PSK-31 ADAPTOR £39.95 B

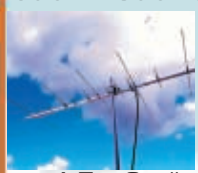
All you need to connect up to your sound card and run PSK-31. Includes CD software.

SPECIAL OFFER

WATSON **DBY-2759**

2m + 70cms dual band Yagi single feed.

5 el on 2m 9 el on 70cm 2.15m long



~~£79~~
£49 c

A Top Quality Antenna At a Bargain Price

MASPRO VHF/UHF YAGIS

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

Take a look at our prices!

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

To compare with dBi figures, add 2.4dB

WATSON

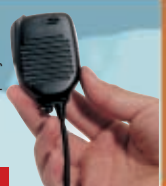
QS-112 SPEAKER MIC £16.95 A

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

SPM-102 SPEAKER MIC £9.95 A

Incredible value!

Has 4-way 3.5mm plug for VX-1, VX-5, FT-50 and IC-Q7E Handies



Limited stocks.

WM-308 BASE MIC £59.95 B

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

WCT-321 LAPEL TALKER £19.95 A

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

AVAIR VSWR POWER METERS

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

AV-200 1.8 - 200MHz 5/20/200/400W £49.95 B
AV-400 140 - 525MHz 5/20/200/400W £49.95 B
All fitted with SO-239, PEP/RMS readings, 3W for FSD approx.
Also available AV20 & AV40 compact meters

WATSON

ATX WALKABOUTS

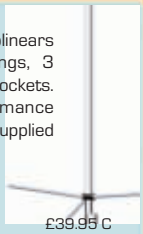
WALKABOUT PORTABLES

Multi & single telescopic whips. Covers 80m to 6m BNC. Ideal for FT-817 and similar QRP radios.

ATX Walkabout 80 - 6m	£69.95B
AT-80 Single band	£24.95B
AT-40 Single band	£24.95B
AT-20 Single band	£19.95A
AT-17 Single band	£19.95A
AT-15 Single band	£19.95A
AT-12 Single band	£19.95A
AT-10 Single band	£19.95A

BASE VHF/UHF VERTICALS

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



Dual Band 2m/70cms

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

Triple band 6m/2m/70cms

W-2000	0/6/9dB 2.5m long	£69.95 C

CREATE ROTATORS

CHOOSE A CREATE ROTATOR FOR RELIABILITY AND STRENGTH

RC5-1 Medium Duty	£349 C
RC5-3 Medium Duty + Variable Presets	£449 C
RC5A-3 Heavy Duty + Variable Presets	£649 C

MC-2 Optional Lower Mast Clamps (if needed).

£59 B

HEIL SOUND

THE SCIENCE OF AUDIO

CLASSIC

Quality
Retro-Look
Desk Mic

NEW

Fitted standard element plus HC4 DX or HC5 or ICOM type. Acclaimed as the "Best Yet" with soft touch PTT and voucher for call-sign transfer. Requires CC-1 adaptor to match your radio. (£29.95)

£259

When Bob Heil came to the Donington show this year, he gave a seminar on the art of good audio. He didn't have to sell, he just demonstrated! That was enough to convince everybody!

GOLDLINE

Hand/desk
Microphone
GM-4/GM-5/GM-V

The Gold Line range brings distinctive quality to your transmissions. Choose between HC-4 for DX work or HC-5 for normal response, or GM-V for high impedance vintage radios. Either way you will experience the Heil amazing audio quality, famous around the world. Requires CC-1 adaptor for your radio £29.95)

£129

TRAVELER

Headset Boom
Microphones
for FT817/
IC706/ICOM 8pin

NEW

Nothing more to buy. Ready wired for your choice of rig above. Includes PTT in-line switch. Great audio that will punch through and be loved!

£89-95

BM-10-4/5

Lightweight
Dual headset
/Boom Mic

Now everybody can experience the convenience and quality of "hands-free" operation, plus Heil quality. Choose the DX (HC-4) or normal (HC-5) insert. You will need an AD-1 adaptor to match your radio (£16.95).

£89.95

PRO-SET PLUS & IC

Headset
Dual Inserts
Switchable
Phasing

NEW

Not only do you get dual inserts (HC-4 & HC-5), you also get the unique phase switch for DX monitoring in the earpieces. Amazing! Requires AD-1 adaptors for your choice of radio.

£199.95
£219.95 ICOM type

BM 5-4/5-5

Lightweight
Single
Headset

A single earpiece version lets you communicate with others in the room but gives "hands-free" operation, plus Heil quality. Choose the DX (HC-4) or normal (HC-5) insert. You will need an AD-1 adaptor to match your radio (£16.95).

£69.95

AVAILABLE FROM WATERS & STANTON & ALL GOOD DEALERS

Waters & Stanton PLC, Spa House, 22 Main Rd, Hockley, Essex, SS5 4QS.
Tel: 01702 206835 Fax: 01702 205843 E-mail: sales@wsplc.com Web: www.wsplc.com

PW

JANUARY 2003
(ON SALE DECEMBER 12)
VOL. 80 NO 1 ISSUE 1150
NEXT ISSUE (FEBRUARY)
ON SALE JANUARY 9

EDITORIAL OFFICES
Practical Wireless
Arrowsmith Court, Station Approach
Broadstone, Dorset BH18 8PW

☎ (01202) 659910
(Out-of-hours service by answering machine)
FAX: (01202) 659950

Editor
Rob Mannion G3XFD/EI5IW
Technical Projects Sub-Editor
NG ("Tex") Swann G1TEX/M3NGS
News & Production Editor
Donna Vincent G7TZB/M3TZB

ADVERTISEMENT DEPARTMENT
ADVERT SALES & PRODUCTION
(General Enquiries to Broadstone Office)
Eileen Saunders
Art & Layouts: Steve Hunt & Bob Kemp
Typesetting/Production:
Peter Eldrett

☎ (01202) 659920
(9.30am - 5.30pm)
FAX: (01202) 659950

ADVERTISING MANAGER
Roger Hall G4TNT
PO Box 948, London SW6 2DS

☎ 020-7731 6222
FAX: 020-7384 1031
Mobile: (07885) 851385

ACCOUNTS
FINANCE/OFFICE MANAGER:
Alan Burgess
Tel: (01202) 659940
FAX: (01202) 659950

BOOKS & SUBSCRIPTIONS
CREDIT CARD ORDERS
☎ (01202) 659930
(Out-of-hours service by answering machine)
FAX: (01202) 659950

SUBSCRIPTION ADMIN
Kathy Moore
Tel: (01590) 641148
E-Mail: subs@pwpublishing.ltd.uk

E-MAIL
PW's Internet address is:
pwpublishing.ltd.uk
You can send mail to anyone at *PW*, just insert their name at the beginning of the address,
e.g. rob@pwpublishing.ltd.uk

Cover Subject

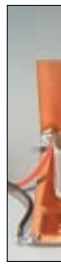
Christmas is coming, the geese are getting fat, please put a radio in the Amateur's shack! Well, something like that anyway.... Everyone on *PW* wishes you all a very Happy Christmas and a peaceful New Year. With that in mind and many of us dreaming of gifts, we thought you'd all like the Icom IC-E90 as gift from us, so we've got all festive and dressed up the cover in a festive manner - hope you like it!

Design: **Bob Kemp**
Photograph: **Tex Swann G1TEX/M3NGS**

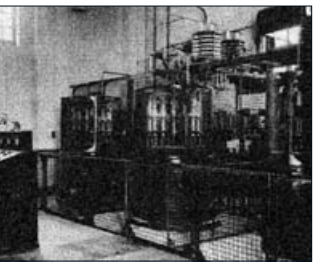
January features



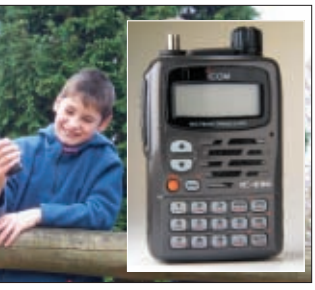




Page 22

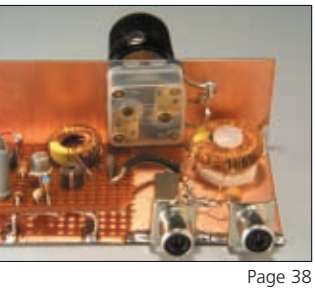


Page 24



Page 29

Page 34



Page 38

Page 49

Page 51

January regulars

Page 60

Page 62

Page 64

Page 68

Page 77

author info

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

VHF DXer
David Butler G4ASR
Yew Tree Cottage
Lower Maescoed
Herefordshire
HR2 0HP
Tel: (01873) 860679
E-mail: g4asr@btinternet.com

HF Highlights
Carl Mason GW0VSW
12 Llwyn-y-Bryn
Crymlyn Parc
Skewen
West Glamorgan
SA10 6DX
Tel: (01792) 817321
E-mail: carl@gw0vsw.freeserve.co.uk

Keyboard Comms
Roger Cooke G3LDI
The Old Nursey
The Drift
Swardeston
Norwich,
Norfolk NR14 8LQ
Tel: (01508) 570278
E-mail: rcooke@g3ldi.freeserve.co.uk
Packet: G3LDI@GB7LDI

Tune-in
Tom Walters
PO Box 4440
Walton
Essex
CO14 8BX
E-mail: tom.walters@aib.org.uk

In Vision
Graham Hankins G8EMX
17 Cottesbrook Road
Acocks Green
Birmingham
B27 6LE
E-mail:graham@ghank.demon.co.uk

DX Destination
Ed Taylor G3SQX
C/o PW Editorial Offices
Arrowsmith Court
Station Approach
Broadstone
Dorset
BH18 8PW
E-mail: g3sqx@email.com

Published on the second Thursday of each month by PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW. Tel: (01202) 659910. Printed in England by Warners Midlands PLC, Lincolnshire. Distributed by Seymour, 86 Newman Street, London , W1P 3LD, Tel: 0207-396 8000, Fax: 0207-306 8002, Web: http://www.seymour.co.uk. Sole Agents for Australia and New Zealand - Gordon and Gotch (Asia) Ltd.; South Africa - Central News Agency. Subscriptions INLAND £31, EUROPE £39, REST OF WORLD £43 (Airsaver), REST OF WORLD £50 (Airmail), payable to PRACTICAL WIRELESS, Subscription Department. PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW. Tel: (01202) 659930. PRACTICAL WIRELESS is sold subject to the following conditions, namely that it shall not, without written consent of the publishers first having been given, be lent, re-sold, hired out or otherwise disposed of by way of trade at more than the recommended selling price shown on the cover, and that it shall not be lent, re-sold, hired out or otherwise disposed of in a mutilated condition or in any unauthorised cover by way of Trade, or affixed to or as part of any publication or advertising, literary or pictorial matter whatsoever. *Practical Wireless* is Published monthly for $50 per year by PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW, Royal Mail International, c/o Yellowstone International, 87 Burlews Court, Hackensack, NJ 07601. UK Second Class Postage paid at South Hackensack. Send USA address changes to Royal Mail International, c/oYellowstone International, 2375 Pratt Boulevard, Elk Grove Village, IL 60007-5937. The USPS (United States Postal Service) number for Practical Wireless is: 007075.

rob mannion's keylines

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

Although, as I write this edition of the Keylines Editorial we're still in 2002...the magazine has entered 2003 (Life passes by very quickly in publishing I can tell you!). So it seems appropriate to update readers on some interesting changes taking place from the March issue of *PW*.

Firstly, because of the tremendous growth in activity from Amateur Radio Clubs - especially in the amount of news and information coming from this source - it's become obvious we need to expand our news pages to accommodate the growing amount of news, etc., clubs are sending in to the office. News & Production Editor **Donna Vincent G7TZB/M3TZB** is already extremely busy preparing the news, and to ensure she always has enough for our planned extra pages...we ask you to keep the information flowing!

Secondly, because of the growing interest in keyboard and computer based Amateur Radio communications...it has again become very obvious that one author alone cannot cover all the topics. **Roger Cooke G3LDI** has been working very hard over the past years with a column which originally was aimed at covering the Amateur Radio Teleprinter mode, along with packet, etc. Unfortunately, the subject material involving the 'etc' has now placed an intolerable pressure of space within the column. Indeed, so much so that Roger's incoming article 'overflows' each month and we have to cut material.

Obviously, cutting interesting material is not a good idea and with full co-operation from Roger, we've decided to introduce the Rotating Author scheme which has been so successful in the long running Antenna Workshop and the Valve & Vintage columns. Taking V&V as the example it works in the following way: the team of three authors specialise in fairly broad areas - allowing their expertise to used to the full. (**Phil Cadman G4JCP** covers post Second World War, 1950s, 1960s, and 1970s, while **Charles Miller** writes on the really early days and up to the end of the Second World War, with **Ben Nock G4BXD perhaps** providing the broadest coverage, dealing with Military (in particular), Marine and associated commercial equipment produced (literally) any time during the last century.

The V&V columns are consistently one of the most popular in *PW* and the Editorial team consider that the new series - to be entitled **Data Burst** - will be just as successful. **Roger G3LDI** will continue to comment, report and provide news on RTTY, packet and associated software and computer items in his new three monthly slot.

Joining the regular authors on the new column will be **Robin Trebilcock GW3ZCF**, who has already written on PSK31 in *PW*. Robin will be covering PSK31, MSSK, Hellscreiber, THROB, MT63 and the software associated with these soundcard modes. And although he's never tried SSTV or any of the TORS...he'll be pleased to report (and perhaps even join in) with the help of reports from enthusiasts already operating on those modes. You can contact Robin directly at **15 Broadmead Crescent, Bishopston, Swansea, South Wales SA3 3BA**. I'm sure he'll be pleased to hear from you!

The third member of the rotating team of authors (like me he's in a spin already, as we're always so busy here!) will be **Tex Swann G1TEX/M3NGS**. Tex is ideal for the job as he's into computers and looks after the systems here at *PW*!

In his author's slot Tex will be looking at software, news, new associated products of interest to the radio enthusiast your letters and comments on all things computerised, including interfacing problems. Additionally, Tex will report on your news and activity on Internet linking of Amateur Radio...so make sure he's kept up-to-date please!

Hoax E-Mailer

Recently, readers have contacted the *PW* office mentioning the (truly evil) hoax E-mails which are being received - supposedly sent from **Brian Jones G8ASO,** a retired journalist who lives in Worcester**. And I can assure readers...Brian is NOT responsible for the E-mails...even though they seem to originate from him.**

We've also received the E-mails here in the *PW* offices and they are an on-going problem...indeed they were a major topic during a *PW* Club visit, to the **Wythall Club** (South of Birmingham) recently. I don't intend to provide further publicity by discussing the contents of the latest hoax...but Brian confirms that investigations are under way by the appropriate authorities.

In his latest E-mail to me, Brian invites readers to look at his own website **http://www.worcester.demon.co.uk** and if you've got any information which could further enquiries, please E-mail him direct at **brian_jones@worcester.demon.co.uk** (Brian is also QTHR).

practical wireless services

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

Subscriptions

Subscriptions are available at £31 per annum to UK addresses, £39 in Europe and £43 (Airsaver), £50 (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 £61 (UK) £74 (Europe) and £82 (rest of world), £94 (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.

Placing An Order

Orders for back numbers, binders and items from our Book Store should be sent to: **PW Publishing Ltd., Post Sales Department, Arrowsmith Court, Station Approach, Broadstone Dorset BH18 8PW**, with details of your credit card or a cheque or postal order payable to PW Publishing Ltd. Cheques with overseas orders must be drawn on a London Clearing Bank and in Sterling. Credit card orders (Access, Mastercard, Eurocard, AMEX or Visa) are also welcome by telephone to Broadstone **(01202) 659930**. An answering machine will accept your order out of office hours and during busy periods in the office. You can also FAX an order, giving full details to Broadstone **(01202) 659950**.

The E-mail address is **bookstore@pwpublishing.ltd.uk**

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.

amateur radio waves

Make your own 'waves' by writing into *PW* with your comments, ideas, opinions and general 'feedback'.

The Star Letter will receive a voucher worth £20 to spend on items from our Book or other services offered by *Practical Wireless*.

Editorial Announcement

No 'Star Letter' award will be given this month. I've taken this decision because the award could be (and has been) wrongly construed that the choice has been made by Editorial bias, rather than by the merits of the actual letter. **Please be assured...the award of Star Letter status is given because it either shows originality, a well prepared and balanced argument, and above all is interesting**. You can assist by ensuring you send in yours...helping to produce a good balance of opinions!

Editor

The M3 Debate

● **Dear Sir**

After all the recent debate concerning M3 licensees and the foundation licence I had to write about a recent experience having just returned from Spain where I operated EA5/P with a hand-held QRP station on 28MHz s.s.b.

After some time calling "CQ" on a very busy band I was eventually called by a GX Special Event station in Wakefield working as a Jamboree On Air (JOTA) station. The operator was very professional and we spent some time chatting and exchanging messages with some of the young Cub Scouts who were present.

The operator told me that he couldn't believe that no one was responding to my CQ call as I was a very strong signal. We could have talked all day, but due to the Special Event station he had to press on. I was very impressed with the way he handled the whole QSO, and towards the end he told me that he was a newly licensed M3 and would QSL.

At home I received a very nice long letter from the M3 with QSL cards for our GX contact. He was very apologetic and hoped that I didn't mind the direct approach, but felt he had to let me know just how much he enjoyed our contact. I was delighted...why should I mind receiving such a complimentary letter telling me all sorts of info about my received signal, and information about himself and his interests in Amateur Radio in general?

The M3 had only been licensed for four weeks and in his own words was "eating, drinking and dreaming Amateur Radio". His enthusiasm was infectious and to be commended (it took me back to my first weeks of being licensed). He'd had an interest in Amateur Radio for some time but had little knowledge of radio and electronics and (as he said) "I thought Amateur Radio to be out of my league". He took the plunge and enrolled on a course taking longer than the normal eight hours.

The extra hours have allowed him to gain extra knowledge and put him well in front of that needed for the Intermediate course which he's now enrolled on. But now on a sour note, (from his letter) he's obviously had some bad experiences on air with his M3 call as he mentions 'M3 avoidance group'.

Why are some experienced Radio Amateurs behaving this way? Judging by my own experience the operator I worked will be a pleasure for any Amateur to work...as I'm sure are other newly licensed M3 stations.

To me, this new M3's attitude to Amateur Radio is bringing in a breath of fresh air. I really appreciated his courtesy in writing to me and I have responded accordingly, thanking and encouraging him and many years of operating.

Amateur Radio has moved forward now into the 21st Century and we must welcome new enthusiasm into the hobby. So, I look forward to working this M3 again...along with many others. Hopefully you'll publish this letter as an encouragement to newly licensed Amateurs...some of whom I know are disillusioned.

Terry Ibbitson G0VTI
Wakefield
West Yorkshire

Disgruntled M3

● **Dear Sir**

I'm writing in response to the star letter by **Brian Matthews M3DMV** in the November 2002 edition entitled 'A Disgruntled M3'. Had this M3 been a junior of any kind I would have been concerned, **but he isn't, he's a grown man**.

The G3 callsigns are amongst one of our most senior, and I have always found them to be good ambassadors for the hobby. When I was first operating I made mistakes. I was corrected on the air, but I never took offence at this, in fact it made me keen to get it right.

I'm seven years senior to Brian Matthews, and I too run my own business, and have a young family. Amazing then, that my interest in radio has led to me holding a full B for some 16 years.

Why do the RA/RSGB consider it so important to get people on the bands? If you look at the numbers of Amateurs, some 60,000 or so, CEPT licence holders, in a country of say 60,000,000, I wonder when the ratio has been higher? How long did it take to get from G3AAA to G3ZZZ? Was there a panic to get people into the hobby? I know there was a good spell in the 1980s, but where are they now? (most of them weren't really interested and just dropped by the wayside).

If the RA/RSGB were at all concerned about International feelings, the Novice and Foundation stuff would have waited until after the next (WARC) conference. I supported the Novice Scheme in the early days, and was even an Instructor for the RSGB, but they got carried away, just giving more and more away.

If I was a Foundation Licence course instructor now, at the end of the weekend they would have more access to the bands than I have! The result of all this is I haven't even put the power on in my shack for 18 months, and only operate 144MHz mobile while working, and do my best to avoid any contact with non CEPT stations (**I do however, make exceptions if they are juniors**).

My own two daughters, aged 11 and 9, have been pestering me about the Foundation Licence ever since it became available. I relented a couple of weeks ago and spoke to G0JWJ, my senior instructor, he was amazed I didn't have the packs and contacted the RSGB, they informed him that I had been crossed off the list and would have to re-apply! That's two M3's they have lost!

I never had a problem with being a class B, but I'll be dammed if I'll ever be happy about being outranked by anything the RA/RSGB can drag off the street. Nowadays I don't teach, operate from my station, or take part in any events for the scouts or guides...of which I did all three. So from this end at least the Foundation Licence hasn't achieved much.

Nigel Woolard G1ZFS
Ronkswood
Worcestershire

The Foundation Licence

● **Dear Sir**

I have recently acquired my Foundation Licence (callsign MM3SCO) with the great help of **GM3WKZ**. I've also been buying *PW* since March, after hearing about the Foundation Licence.

Since buying *PW* I always look forward to the letters page, especially the for/against debate on the Foundation

Licence. But I'm saddened to read with regularity the treatment new licensees are getting on the h.f. bands, especially on 7MHz.

I have been a short wave listener, and I must say that throughout all my listening on the h.f. bands **I have not yet heard** any derogatory remarks to any M3s on any band. However, I have heard plenty of M3s on the band and through listening I've noted nothing but welcoming comments from A Class operators.

Amateur Radio operators (to me personally) have been absolutely brilliant. An example of this is (and this is whole reason for the letter) when I recently wrote to **Roy Mansell G0OVK**..whose article I read in the August 2002 *PW* concerning the use of the vertical Antron A99 antenna.

As I had access to an Antron I wrote to G0OVK asking for some information on his set-up and how he worked it, i.e a.t.u.s, etc. Roy didn't have to answer my letters...but nine days later a reply popped through my letter box. He thanked me for my letter and went on to welcome me to the hobby, and described how he works the antenna on h.f. Roy closed the letter by giving some very useful advice and the offer to telephone or write to him again if any more advice was needed.

The point I'm coming to is that although I realise that a lot of new licensees are being treated badly...I want to let readers know that there's a good side to the hobby (and I'm sure in time the good will totally out number the few). Thanks again to Roy and Colin GM3WKZ for all their help, and to *PW* for the way you put all sides across to people in the manner you do. I'm now collecting all of the home study course being published in *Radio Active* magazine in the hope of sitting my full RAE Exam.

Gary Macleod MM3SCO
Tongue
Scotland

Foundation Licence Student

● **Dear Sir**
I don't currently hold an Amateur Licence, but I am doing a Foundation Course. As a result, I listen to the Amateur bands, and to the West London 144MHz Repeater in particular, hoping I'll pick up some good practice from the more established operators.

However, what I 'm hearing on the repeater is not very encouraging as there's a lot of baiting and aggression towards the younger M3s. It's as if the more established operators are unhappy and resentful that their little piece of the radio spectrum is being invaded by beginners.

There certainly seems to be a few teething problems with the way the Foundation Licence Course is being taught...if listening to the new graduates is anything to go by. The young M3's I listen to stick rigidly to operating procedure which seems to be the practice on h.f., **but is definitely not the custom on the repeater**.

I've heard many complaints about the endless repetition of callsigns and the over use of Q codes. The young M3s also seem not to be aware that their endless requests for radio checks first at 1W, then at 5W, that at 10W, are not appreciated. It seems what is missing from the course are some guidelines on etiquette and custom.

So, **please, please**...can we have a little bit of guidance rather than intolerance from the experts. The help would quickly improve the situation for everyone!

Peter Jenner
Battersea Park
London

Totally Devastated

● **Dear Sir**
I was totally devastated to read M3DMV's letter in *PW* November. I've been licensed since 1982 as a G6 and more recently as an MW3 and my 20 years experience of Amateur Radio has taught me to ignore closed minds!

My experience from the past has been that when change is introduced there will always be some who seek to buck the change and enforce it with an attitude problem.

The old school who are anti-M3 would do well to explain why two stations apparently quite close to each other, Portsmouth/Isle of Wight were running full power for a local chinwag 1kHz away from a special event call **GB0BOB** on 7MHz recently, causing problems.

They were too self interested to listen on frequency before operating. Conclusion: poor operating/bullying occurs on all bands for all reasons.

So, I encourage M3DMV to get back on 7MHz, I use the *PW* published G5IJ antenna as a vertical. My best contact has been UT7CA on 24MHz, and I can work most of the UK...safely ignoring the bigots who will mostly ignore me anyway.

I enjoy a challenge, 10W is a challenge and I like it! Brian M3DMV...please join me on the bands!, MW3HMJ (aka GW6HMJ).

Arthur Upcott MW3HMJ
Bridgend
South Wales

● 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.

February 2
South Essex Amateur Radio Society
Contact: Brian G7IIO/M3IIO
Tel: (01268) 756331
E-mail: briang7iio@yahoo.com
Website: www.southessex.ars.btinternet.co.uk
The South Essex Amateur Radio Society are holding their Radio and Computer Rally at The Paddocks, Long Road, Canvey Island, Essex. The Paddocks are situated at the end of the A130. Admission is £1.50 and doors open at 1030 - features include Amateur Radio, computer and electronic component exhibitors, there will also be home-made refreshments, free car parking with disabled access, RSGB Morse tests (two passport photos and fee required).

February 16
The Northern Cross Radio Rally
Contact: John G7JTH
Tel: (01924) 251822
E-mail: g7jth@wdrs.org.uk
Website: www.wdrs.org.uk
The Northern Cross Radio Rally is to be held at Thornes Park Athletics Stadium, Wakefield, West Yorkshire. The event is held in one large hall - just out of town on the Horbury Road. Easy access from M1 J39 & J40 - well signposted and with talk-in on 144 and 430MHz. Doors open at 1100 (1030 for disabled visitors and Bring & Buy). There will be the usual attractions plus Morse tests on demand.

February 16
The Cambridge & District ARC Rally
Website: www.cdarc.org.uk
The Cambridge & District Amateur Radio Club are holding their rally at Britten Arena, Wood Green Animal Shelter, King's Bush Farm, London Road, Godmanchetser at 1000hours. Entrance fee is £2, concessions £1.50. There is enough free parking for 2000 cars, there will also be two bars, a restaurant, animal shelter, water garden and lake. A great day out for all the family.

March 8
The Crystal Palace Spring Radio Fair
Contact: Bob
Tel: (01737) 552170
Website: http://www.members.aol.com/rfcburns
The Crystal Palace Radio and Electronics Club Spring Radio Fair at St. John's Hall, Sylvan Road, London SE19. Doors open at 1030 until 1330hours. Traders Tables £5 in advance. Admission £1 includes a free drink. Children under 16 free. Free local parking.

March 9
West Wales Amateur Radio & Computer Rally
Contact: Ray GW7AGG
Tel: (01686) 628788
FAX: (01686) 621880
E-mail: mwmg01@aber.ac.uk
The 9th West Wales Amateur Radio & Computer Rally will be held at Penparcau School, Aberystwyth (as part of National Science Week). Doors open 1000 until 1530 hours and admission is just £1. There will be good parking facilities with easy access for disabled visitors and traders for all stalls. See GB4FUN Amateur Radio on the Move, demonstrations on h.f., v.h.f., on the air, Amateur Radio and Computer Traders, Bring & Buy, Clubs and Special Interest Groups, including Motorcycle Display. Catering facilities. Talk-in on S22.

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.

amateur radio **news**

A comprehensive look at what's new in our hobby this month.

Service to Fellow PW Readers

Yaesu Manuals

If you are looking for a manual for a piece of older Yaesu equipment the chances are that Geoff Brown G4ICD can help you out!

Having collected and purchased, over the years, many of the original manuals for Yaesu Amateur Radio equipment Geoff G4ICD approached Yaesu for permission to copy them. In 2001 he was granted permission to copy any non current production Yaesu radio manual.

Since 2001 Geoff has copied hundreds of operating and workshop manuals, as well as saving them electronically in pdf format onto CD for those who want large collections. The library that Geoff has built up covers over 40 years of Amateur Radio, and there are some very rare manuals available in hard copy and CD format.

Some very special manuals can be found on the CD Roms, such as the FT-36R workshop service manual, which is in colour with over 200 pages and shows the signal lines by colour! The library is expanding day by day, preserving a history of obsolete information.

A full listing of Geoff's 'library' can be found at: **www.amateurmanuals.co.uk** or by sending a s.a.s.e. (UK), send 1 x IRC if abroad to the address below.

Geoff Brown G4CID,
17 Grove Gardens,
Sholing, Southampton
SO19 9QZ

Help out your Fellow Amateurs

Can You Help?

John Storey G8SH needs your help!

John has a 'low band' PYE A200 amplifier which he wants to use on s.s.b. Can anyone out there tell him how to do this or do you have a wiring diagram and/or mod sheets?

If you can help please contact John direct at: **26 Orwell Drive, West Heath, Birmingham B38 8HZ. Tel: 0121-475 6793** or E-mail: **john.g8sh@virgin.net**

Club Activities

ATV Antenna Talk

The interest in Amateur Television seems to be growing, as a recent talk at Chelmsford Amateur Radio Club showed.

Paul Prior G8IXC with 2400MHz ATV Camcorder and Video Sender.

The ever active Chelmsford Club recently hosted a talk by **Paul Prior G8IXC** on ATV antennas for 1240 and 2400MHz. The subject was obviously of great interest to the members, as around 70 people went along to find out more.

During his talk Paul showed how antennas could be made for the 1240 and 2400MHz bands and gave a live demonstration of ATV from a car outside in the car-park. He also demonstrated an ATV station for 2.4GHz based on a cheap Video Sender available from most d.i.y. stores.

The Chelmsford club meet on the first Tuesday of each month at the Marconi Social Club, Beehive Lane, Great Baddow, Chelmsford. The doors open at 1915hours and a bar is available for refreshments. Also keen to encourage new blood into the Amateur Radio hobby the club are running a Foundation evening course at Danbury starting on Thursday 6 March, for more information on this or any of the club's other activities please contact the Dave M0BQC direct.

David Bradley M0BQC
Tel: (01245) 602838
E-mail: cars@g0mwt.org.uk

Stop Press!

Reprieve for Longleat Rally!

Following on from the announcement made in PW last month that the Longleat Amateur Radio Rally would not be held in 2003, the news of a reprieve has been welcomed.

Following a meeting on 4 November 2002 between **Martyn Phillips** Honorary Secretary of the Bristol RSGB group and **Lord Bath**, it has been agreed by Lord Bath to let the rally take place at Longleat for 2003. The date for the rally will be **Sunday 29 June**.

It will, however, be the **last** rally to be held in the grounds of Longleat House, Warminster, Wiltshire and the organisers are actively looking for a new venue for 2004 and beyond. **Meanwhile, it's very definitely all systems go for Longleat 2003!**

The rally will open at 1000hours and overnight camping is available on-site over the weekend at a cost of £5 per night. Almost 4000 people usually attend the event - not bad for a one-day rally!

For further details and info see the Longleat Rally website at **www.longleatrally.co.uk**

University Radio

Subcity Takes to the Air

Independent broadcaster Subcity Radio has returned to Glasgow's airwaves with a licence to entertain for the coming five months.

Subcity Radio are currently broadcasting live to the city of Glasgow on 1350 a.m., as well as online world-wide via **www.subcity.org** These broadcasts are in addition to the station's usual 28 day f.m. broadcast, which is scheduled to take place during February 2003.

Based at Glasgow University, Subcity has already established itself as an important player in the Glasgow music scene, acting as a launch-pad for some of the city's most talented radio presenters, DJs and live bands. And this year the station hopes to build on their f.m. success with a pioneering five-month a.m. broadcast with the aim being to push the boundaries of modern music radio, whilst offering their listeners a healthy diversity of aural delights.

Don't forget many of today's leading radio presenters started in commercial radio and several are also enthusiastic Radio Amateurs. So if you can receive SubCity, make sure you tune—in and lend your support.

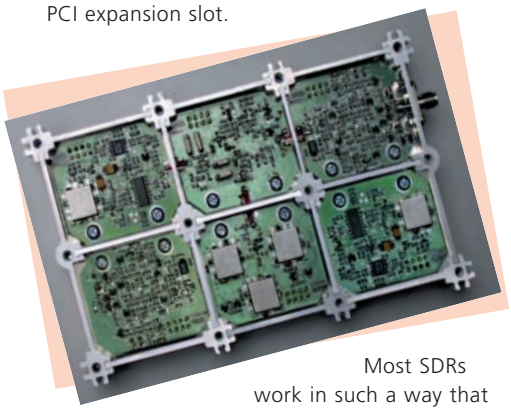
Subcity
Tel: 0141-339 8541
Website: www.subcity.org

Winradio News

New Low-cost Receiver

Australian receiver company, Winradio, introduce the WR-G303i, a PC short wave receiver.

The WR-G303i is a low-cost receiver covering 9kHz to 30MHz and is the first of the G3 series of Software Defined Receivers (SDR). The receiver simply fits into most desktop PCs, and occupies a single PCI expansion slot.



Most SDRs work in such a way that the demodulation and last i.f. (intermediate frequency) processing are done entirely in software. Usually this means using a DSP, but in the WR-G303i, the processing is done on a personal computer using a sound card.

The receiver was recently involved in receiving experiment in Australia using the digital short wave service, DRM, which offers f.m. quality within a small bandwidth, and is likely to revolutionise short wave broadcasting in years to come.

Further information on the WR-G303i is available via the link at **www.winradio.co.uk** or by calling the UK distributor.

Falcon Equipment and Systems
Tel: (01684) 295807.

Product News

Programmable Roberts

Although Roberts are primarily known for their short wave receivers their latest product should appeal to many PW readers. Read on to find out more....

The Roberts C9950 is a dual-speed programmable cassette recorder with the following features:

- Dual record speed
- Six seperate timed recordings
- Voice activated recording
- Timed voice activated recording
- Remote switching of other equipment

The recorder can be left hooked up to a radio and make either timed or voice activated recordings, while you are away from the set. It can also switch the radio on via its internal timer switch.

The C9950 is available now from Nevada and costs £80. Look out for a review of the C9950 coming soon in *PW*! For more information on the C9950 contact Nevada direct at:

Nevada
Tel: 0239-231 3090 / Fax: 0239-231 3091
Website: www.nevada.co.uk

Jamboree on the Air

Scouting Amateurs

Keen to encourage new blood into Amateur Radio the Dundee Amateur Radio Club took part in the Scout JOTA 2002 with great success.

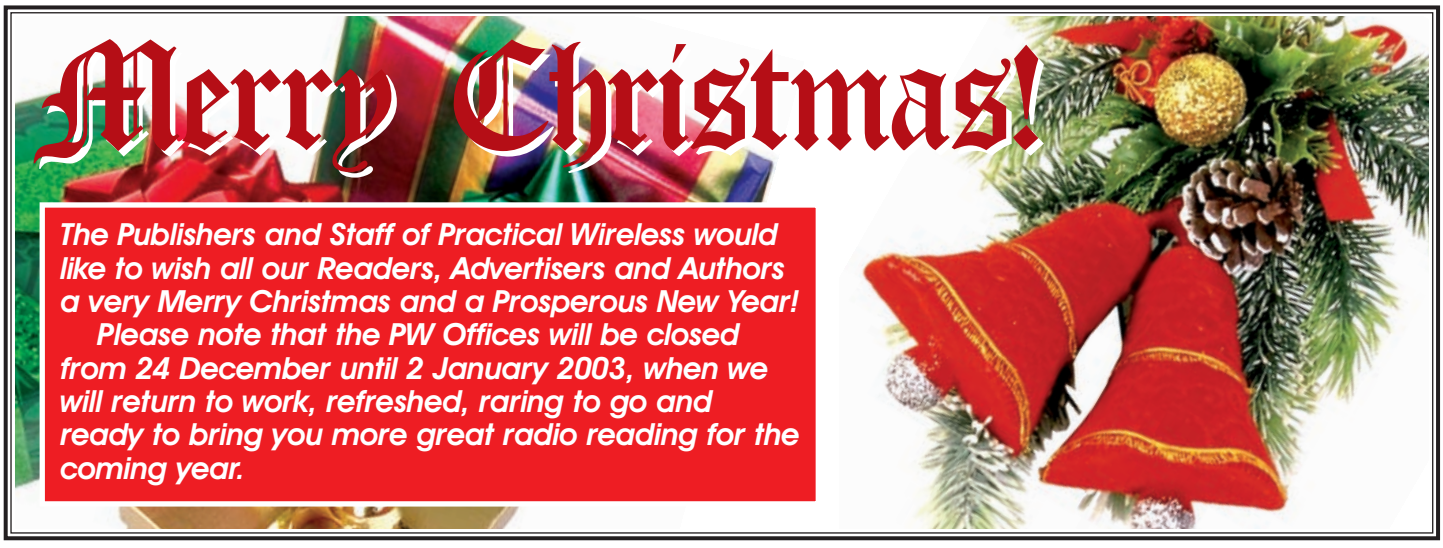
Jamboree On The Air (JOTA) is a world-wide annual Amateur Radio event, taking place in mid-October. Popular among Scout groups JOTA is often used to help Scouts 'earn' their Communications Badge. In keeping with this, the Dundee Amateur Radio Club took part in the 2002 event with five Dundee Scout Groups.

During the event the Dundee club carried out instruction classes and demonstration and operation of h.f. Amateur Radio equipment under the direct supervision and guidance of Club Technical Expert **Tom Harrison GM3NHQ**. The event ended with an examination for 21 Scouts, which they all passed, earning their Communications Badges.

Thanks go to the Scouts and Leaders of the following Scout Groups for making it an enjoyable JOTA:

7th Dundee (Stobswells) Scout Group
12th Dundee (Maryfield) Scout Group
22nd Dundee (Mains of Fintry) Scout Group
20th Dundee (St. Peter & Paul) Scout Group
45th Dundee Scout Group

As well as the ladies of the catering department for supplying refreshments during the event.



Joining In 2002

The Radiocommunications Agency took to the road again in the latter part of 2002 and when they reached the South Coast PW's News Editor Donna G7TZB/M3TZB picked up the roadshow trail....

A bright sunny November morning greeted those attending the Radiocommunications Agency's (RA) roadshow in Southampton on 7 November 2002. This was the penultimate presentation in the roadshow tour, which is designed to give all users of the radio spectrum a chance to find out what the latest developments are on the use (and abuse) of the spectrum and to find out how the RA manage the civil radio spectrum.

Although by invitation, Joining In is open to anyone with a vested interest and the Southampton event was well attended (register at **www.joining.org.uk**). Attendees included representatives from the manufacturing side of Amateur Radio to mobile, phone and PMR dealers, RAYNET representatives and professional radio users.

● Rolande Anderson, Chief Executive's presentation concentrated on the background of the RadioCommunications Agency's work, the spectrum users and continuing developments within the industry.

The 'show' was opened by **Barry Maxwell**, Director of Customer Services, who introduced the format for the roadshow and explained that this year things would be slightly different in that more audience participation was required! A hush fell over the room as the audience sank lower into their seats, but we needn't have worried as Barry went onto explain that a Digivote system would be used throughout the presentations to gauge audience feedback and reaction.

● Developments in Ofcom were discussed and it looks like the new independent statutory regulatory body will be up and running, as predicted at last year's roadshow, by the end of 2003.

● The audience took part in several Digivote's throughout the roadshow, this slide shows the results of a licensing pricing vote.

Next on the stage was the newly appointed Chief Executive of the RA, **Rolande Anderson** who presented a background of their work, the spectrum users and the continuing developments of Ofcom, the new independent statutory regulatory body. The news that Ofcom is on target to complete its convergence by the end of 2003 and that the Chairman, **David Currie** was appointed in July and the board members appointed in September 2002 was well received. Rolande stressed that Ofcom are aiming for improved customer service, a unified and simplified regulation, cumulating in a 'One-stop-shop' for all its customers.

It was then time for **Mike Goddard,** Director of Spectrum and International Policy to deliver his presentation. Entitled 'The Wider Perspective' this included information on the UK Spectrum Strategy, European Union frequency harmonisation and policy objectives, the forthcoming World Radio Conference and the much talked about abolishment of the Morse requirement (no clues here I'm afraid!).

Hazel Canter, Director of Spectrum Services, concentrated on the themes for the future, namely 'Putting the Customer in Charge', 'Making the best use of the Spectrum', 'Increasing the use of economic incentives for encouraging efficient spectrum management' and 'Deregulation where possible'. One of the main announcements here covered the proposed deregulation of CB by 2005 following consultations over the international and UK bands. The first draft of the proposal is expected in early 2003 - watch this space!

There was also news of the development of the 5GHz band. Split into Band A (5.1 - 5.3GHz), Band B (5.4 - 5.7GHz) these bands will be available for use on a deregulated basis by January 2003 and temporary licences are available now for those wishing to trial equipment. There will also be a Band C (5.7 - 5.8GHz) allocation for higher power use and a light licensing regime, although this will not be in place until July 2003.

Other topics of interest included news of the Agency's enforcement policies and the news that Pirate Radio is still a major problem. It was also pointed out that strategic monitoring and direction finding are still a high priority, as is technical research.

In addition to the presentations there was an exhibition area featuring some of the aspects of the RA's work. These included the MASTS E-licensing system accessed remotely via an RLAN, Sitefinder for finding cellular telephone transmitters and IR 2008, allowing eight PMR users to share one frequency.

Overall the day was very interesting, comprehensive and continues to show that the Radiocommunications Agency really are striving for reliable radio communications for **all** spectrum users.

● Taking a well deserved break during the proceedings, Hazel Canter, Mike Goddard and Barry Maxwell.

For the full presentation take a look at the Joining In website at **www.joiningin.org.uk** where a large **Powerpoint** file is available for download.

Radiocommunications Agency,
Wyndham House, 189 Marsh Wall,
London E14 9SX
Tel: 0207-211 0211 Website: www.radio.gov.uk

amateur radio clubs

Keep up-to-date with your local club's activities and meet new friends by joining in!

DUMFRIES & GALLOWAY
Wigtownshire Amateur Radio Club
Contact: Ian Macdonald, MM5WIG
E-mail: weebooks@global.net.co.uk
Why not join the Wigtownshire Amateur Radio Club's Foundation Course? The next weekend course is taking place over the weekend of Jan 18/19th at the Aird Building., Stranraer Academy, Cairnport Road, Stranraer. For enrolment and further details please contact Ian Macdonald MM5WIG.

HAMPSHIRE
The Three Counties ARC
Contact Damian M0BKV
Tel: (01428) 724456
The Three Counties Amateur Radio Club meet at the Bramshott Parish Club & Institute, 4 Headley Road, Liphook, Hants. GU30 7NP. Meetings are held on the 2nd & 4th Thursdays of the month at 2000hours. Why not go along on the **Jan 23** to the 'Arks & Sparks' demonstration of Static electricity, etc,. with **Graham G4WNT** and **Frank G7CND**? Graham and Frank will be demonstrating the effect of static electricity on our lives. Learn how to stop Lightning from hitting your chimney and redirecting it to your neighbors tree instead! Frank will be bringing along some fascinating equipment for the demonstration.

KENT
Bredhurst Receiving & Transmitting Society
Contact: Mr T. Wheeler G7MIM
Website: www.the-brats.net or www.wig1.co.uk
The BRATS meet every thursday from 2015 hours at the Rock Avenue Club, Rock Avenue Working Mans Club, Gillingham, Kent. For full details of all their club events and meetings check out the website addresses given above and follow the links.

Dover Amateur Radio Club
Contact: Jim Cairns M1BKI/Ian Keyser G3ROO
Tel: (01304) 852773/(01304) 821588
Website: www.DARC.org.uk
The Dover Amateur Radio Club meet every Wednesday at 1930hours during term time in the Dover Boy's Grammar School. The Club is a centre for the Foundation Course, the Intermediate Training Course as well as the Morse Training and Assessment centre for the South East. The club are also the RAE Exam Centre for the area.

LANCASHIRE
Fylde Amateur Radio Society
Contact: KenRandall G3RFH
Tel: (01253) 407952
Fylde Amateur Radio Society meet on the 2nd & 4th Thursdays of the month at teh ANT Flying Clubhouse at Blackpool Airport. Meetings start at 2000hours and new members are welcomed. The club's Annual Gneral Meeting takes place on Jan 14.

Keep those details coming in!

Antenna Loading

Part 1

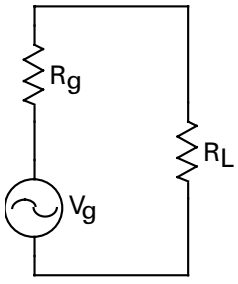
Gordon King G4VFV continues his series with a look at the principles of Antenna Loading.

A primary requirement of any transmitter lies in coupling its generated radio-frequency (r.f.) output signal to the transmitting antenna with the least possible loss to provide the maximum effective radiated power (e.r.p.). For this to happen successfully, the load presented by the antenna system to the output of the transmitter (TX), or by the output of the TX to the antenna system, must result in an 'effective' match.

Although this may appear to be a relatively simple matching problem, the full mathematical implications are remarkably complex. However, let's start from first principles by considering the simple circuit in **Fig. 1**.

In Fig. 1 the r.f. generator whose internal or source resistance R_g yields an r.f. voltage V_g. This is the voltage before the load R_L is connected, and is known as the open-circuit voltage. When the load is connected a volts drop occurs across R_g, which reduces the voltage correspondingly across R_g.

WS1998

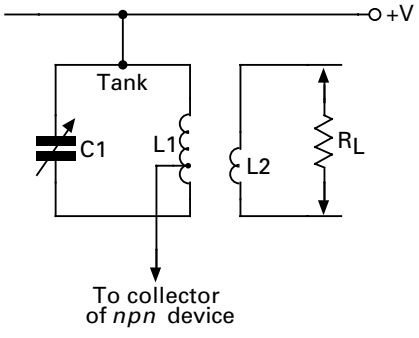


● Fig. 1: Showing the elementary aspects of matching a load to a generator.

Dipole At Resonance

Now, let's pretend that R_g and V_g relate to the power amplifier (p.a.) of a TX tuned to a particular frequency, and that R_L relates to a dipole antenna resonant at the same frequency. Because a dipole antenna at resonance has an impedance close to that of a 73Ω resistor, the r.f. current flowing through it and the r.f. voltage across are phase coincident. This means that R_L would possess neither capacitive nor inductive reactance. The load would be solely resistive.

WS1999



● Fig. 2: Basic high-Q tank circuit coupled to an external load by way of a coupling inductor.

The plan then, is to consider the requirement for the transfer of maximum power from such an r.f. generator to the load. Ohm's law tells us that the current in amperes (I) flowing through a circuit is equal to the voltage divided by the current or, in the case in question, to $V_g/(R_g+R_L)$.

Therefore the power in watts (W) delivered to the load R_L (antenna) corresponds to $(V_g)^2 \times R_L/(R_L + R_g)^2$, which means that the power in the load is maximum when R_L equals R_g. It's noteworthy that under this condition, and provided there's zero reactance, the load power relates to the maximum power available from the generator.

So, how does this basic illustration resolve in practice? Well, the little circuit in **Fig. 2** gives the fundamental idea. Here L1 and C1 represent the parallel-tuned tank circuit of a transmitter's p.a., across which is developed the oscillatory energy. This is coupled to the transmitting antenna by way of L2. In effect, L1/L2 form an impedance matching transformer for coupling the high impedance of the tank circuit to the lower impedance of the antenna.

High *Q* Factor

The basic tank circuit idea was particularly popular in the early years of Amateur Radio when thermionic valves were in vogue. However, somewhat modified antenna couplings, more suitable for solid-state power amplifiers and requiring only minimal retuning with frequency change, are more the order of the present day.

Even so, the tank circuit notion is still perfectly valid. A primary advantage is that its relatively high *Q* (goodness) factor, and hence sharp selectivity, diminishes the transmission of harmonics and other higher-order spurious signals either side of the tuned frequency.

Component R_L in Fig. 2 might well represent the termination impedance of a length of coaxial cable feeding a resonant antenna. With fairly tight coupling between L1 and L2, this elementary scheme would be satisfactory with a tank circuit of a reasonably high *Q* factor (say a figure of 10 or more).

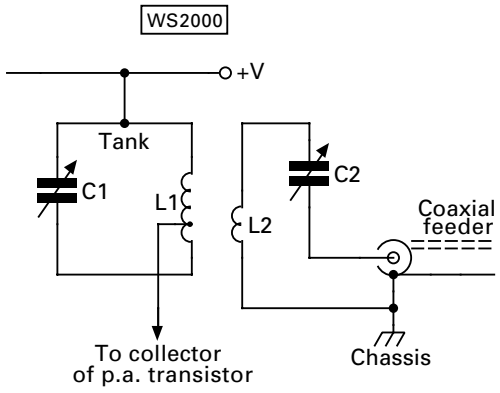
The number of turns on the coupling coil L2 would then relate to the characteristic impedance (Z_o) of the feeder at the operating frequency. Under these conditions maximum power is transferred from the p.a. to the antenna, signified by a low voltage standing-wave ratio (v.s.w.r.).

In **Fig. 3** you can see at (a) and (b) respectively how any inductive or capacitive reactance in series with the load can be 'tuned out' by the variable capacitor C2 or by the variable inductor L3. Such reactance reduces the load current proportionally.

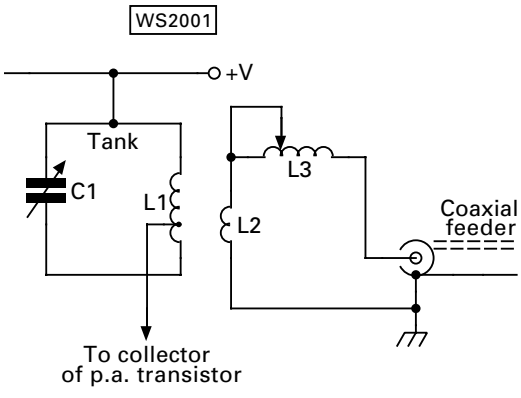
These, then, are the very basic elements of an antenna 'tuner' required to achieve an effectively resistive loading situation from R ± jX, where R is the pure resistive content, X the capacitive or inductive

● Fig. 3: Showing at (a) and (b) respectively how unwanted inductive or capacitive components of the antenna load can be 'phased out' so that the p.a. 'sees' essentially a resistive load.

WS2000



WS2001



CONTINUED ON PAGE 18

SALES 01908 281705

★★ All prices plus £6.00 P&P per order ★★

E&OE

G5RV INDUCTORS

Convert your half size g5rv into a full size with just 8ft either side. Ideal for the small garden.....£19.95

SHORT WAVE RECEIVING ANTENNA

MD37 SKY WIRE (Receives 0-40Mhz).....£39.95
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)*.....£6.00
9" Stand off bracket *(complete with U Bolts)*.....£9.00
12" Stand off bracket *(complete with U Bolts)*.....£12.00
12" T & K Bracket *(complete with U Bolts)*.....£11.95
18" T & K Bracket *(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
Chimney lashing kit.....£24.95
Double chimney lashing kit.....£12.95
3-Way Pole Spider for Guy Rope/ wire.....£3.95
4-Way Pole Spider for Guy Rope/ wire.....£4.95
11/2" Mast Sleeve/Joiner.....£8.95
2" Mast Sleeve/Joiner.....£9.95
Solid copper earth rod 4'.....£9.95
Pole to pole clamp 2"-1.5".....£4.95
Di-pole centre (for wire).....£4.95
Di-pole centre (for aluminium rod).....£4.95
Dog bone insulator.....£1.00
Dog bone insulator heavy duty.....£2.00

POLES H/DUTY (SWAGED)

Heavy Duty Ali (1.2mm wall)
1 1/4" single ali pole.....£7.00
1 1/4" set of four.....£24.95
1 1/2" single ali pole.....£10.00
1 1/2" set of four.....£34.95
2" single ali pole.....£15.00
2" set of four.....£49.95

REINFORCED HARDENED FIBRE GLASS MASTS (GRP)

1 1/2" Diameter 2 metres long.....£16.00
1 3/4" Diameter 2 metres long.....£20.00
2" Diameter 2 metres long.....£24.00

GUY ROPE 30 METRES

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

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.

CONNECTORS & ADAPTERS

PL259/9.....£0.75 each
PL259/6.....£0.75 each
PL259/7 for mini 8.....£1.00 each
BNC (Screw Type).....£1.00 each
BNC (Solder Type).....£1.00 each
BNC for 9mm (RG213).....£2.50
N TYPE for RG58.....£2.50 each
N TYPE for RG213.....£2.50 each
SO239 to BNC.....£1.50 each
PL259 to BNC.....£2.00 each
N TYPE to SO239.....£3.00 each
BNC to N-type.....£2.50
SMA to BNC.....£3.95
SMA to SO239.....£3.95
SMA to PL259.....£3.95
SMA to BNC (male).....£3.95
SO239 chasis socket round.....£1.00
N-type chasis socket round.....£2.50
SO239 double female.....£1.00
N-type double female.....£2.50
SO239 double female.....£1.00

YAGI COUPLERS

YC-6m For 2 x 50MHz Yagi.....£29.95
YC-2m For 2 x 144MHz Yagi.....£24.95
YC-7m For 2 x 70cm Yagi.....£19.95

10/11 METRE VERTICALS

G.A.P.12 1/2 wave alumimum (length 18' approx).....£19.95
G.A.P.58 5/8 wave aluminium (length 21' approx).....£24.95

BALUNS

MB-1 1:1 Balun 400 watts power.....£24.95
MB-4 4:1 Balun 400 watts power.....£24.95
MB-6 6:1 Balun 400 watts power.....£24.95
MB-1X 1:1 Balun 1000 watts power.....£29.95
MB-4X 4:1 Balun 1000 watts power.....£29.95
MB-6X 6:1 Balun 1000 watts power.....£29.95
MB-Y2 Yagi Balun 1.5 to 50MHz 1kW.....£24.95

RIBBON LADDER USA IMPORTED

300Ω 20 metre pack.....£15.00
450Ω 20 metre pack.....£15.00
(Other lengths available please phone for details)

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 0.2dBd SO239 fittings.....£22.95
MD-24N same spec as MD-24 "N-type" fitting.....£24.95
MD-25 (2 Way external/Internal Duplexer) (1.3-35 Mhz 500w) (50-225 Mhz 300w) (350-540 Mhz 300w) insert loss 0.2dBd.....£24.95
MX2000 Tri-plexer 1.6-60Mhz (800w) 110-170Mhz (800w) 300-950Mhz (500w) SO239 fitting.....£49.95
CS201-N same spec as CS201 "N-type" fitting.....£28.95
CS401 4-way antenna switch.....£29.95

ANTENNA ROTATORS

AR-31050 Very light duty TV/UHF.....£24.95
AR-300XL Light duty UHF\VHF.....£49.95
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.....1.00 per metre
(Please phone for 100 metre discount price)

MOUNTS

Turbo mag mount 7" 4mtrs coax/PL259 3/8 or SO239.....£14.95
Tri-mag mount 3 x 5" 4mtrs coax/PL259 3/8 or SO239.....£39.95
Hatch Back Mount (stainless steel) 4 mts coax/PL259 3/8 or SO239 fully adjustable with turn knob.....£29.95
Gutter Mount (same as above).....£29.95
Rail Mount (aluminium) 4mtrs coax/PL259 sutiable for up to 1inch roof bars or poles 3/8 fitting.....£12.95
SO259 fitting.....£14.95
Gutter Mount (cast aluminium) 4mtrs coax/PL259 3/8 fitting.....£9.95
SO259 fitting.....£12.95
Hatch Back Mount 3/8 4mtrs coax/PL259.....£12.95
Roof stud Mount 4mts coax/PL259 3/8 or SO239 fitting.....£12.95

BEST QUALITY ANTENNA WIRE

The Following Supplied in 50 metre lengths
Enamelled 16 gauge copper wire.....£9.95
Hard Drawn 16 gauge copper wire.....£12.95
Multi Stranded Equipment wire.....£9.95
Flex Weave.....£27.95
Clear PVC Coated Flex Weave.....£37.95

TRAPS

10 metre trap 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

HF BALCONY ANTENNA

BAHF-4 FREQ:10-15-20-40 Mtrs LENGTH: 1.70m HEIGHT: 1.20m POWER: 300 Watts.....£129.95

HF YAGI

HBV-2 2 BAND 2 ELEMENT TRAPPED BEAM FREQ:20-40 Mtrs GAIN:4dBd BOOM:5.00m LONGEST ELEMENT:13.00m POWER:1600 Watts.....£329.95

ADEX-3300 3 BAND 3 ELEMENT TRAPPED BEAM FREQ:10-15-20 Mtrs GAIN:8 dBd BOOM:4.42m LONGEST ELE:8.46m POWER:2000 Watts.....£269.95

ADEX-6400 6 BAND 4 ELEMENT TRAPPED BEAM FREQ:10-12-15-17-20-30 Mtrs GAIN:7.5 dBd BOOM:4.27m LONGEST ELE:10.00m POWER:2000 Watts.....£499.95
40 Mtr RADIAL KIT FOR ABOVE.....£99.00

HF VERTICALS

VR3000 3 BAND VERTICAL FREQ: 10-15-20 Mtrs GAIN: 3.8 dBd HEIGHT:3.80m POWER:2000 Watts (without radials) POWER: 500 Watts (with optional radials).....£89.95
OPTIONAL 10-15-20mtr radial kit.....£34.95

VR5000 5 BAND VERTICAL FREQ:10-15-20-40-80 Mtrs GAIN:3.5 dBd HEIGHT:4.00m RADIAL LENGTH:2.30m (included). POWER: 500 Watts.....£169.95

EVX4000 4 BAND VERTICAL FREQ:10-15-20-40 Mtrs GAIN:3.5 dBd HEIGHT:6.50m POWER:2000 Watts (without radials) POWER:500 Watts (with optional radials).....£99.95
OPTIONAL 10-15-20mtr radial kit.....£34.95
OPTIONAL 40mtr radial kit.....£12.95

EVX5000 5 BAND VERTICAL FREQ:10-15-20-40-80 Mtrs GAIN:3.5 dBd HEIGHT:7.30m POWER:2000 Watts (without radials) POWER:500 Watts (with optional radials)..... £139.95
OPTIONAL 10-15-20mtr radial kit.....£34.95
OPTIONAL 40mtr radial kit.....£12.95
OPTIONAL 80mtr radial kit.....£14.95

EVX6000 6 BAND VERTICAL FREQ:10-15-20-30-40-80 Mtrs HEIGHT:5.00m RADIAL LENGTH:1.70m(included) POWER:800 Watts.....£249.95

EVX8000 8 BAND VERTICAL FREQ:10-12-15-17-20-30-40 Mtrs (80m optional) HEIGHT: 4.90m RADIAL LENGTH: 1.80m (included) POWER: 2000 Watts.....£269.95
80 MTR RADIAL KIT FOR ABOVE.....£79.00
(All verticals require grounding if optional radials are not purchased to obtain a good VSWR)

TRAPPED WIRE DI-POLE ANTENNAS

(Hi Grade Heavy Duty Commercial Antennas)

UTD160 FREQ:160 Mtrs LENGTH:28m POWER:1000 Watts.....£44.95
MTD-1 (3 BAND) FREQ:10-15-20 Mtrs LENGTH:7.40 Mtrs POWER:1000 Watts.....£39.95
MTD-2 (2 BAND) FREQ:40-80 Mtrs LENGTH: 20Mtrs POWER:1000 Watts.....£44.95
MTD-3 (3 BAND) FREQ:40-80-160 Mtrs LENGTH: 32.5m POWER: 1000 Watts.....£79.95
MTD-4 (3 BAND) FREQ: 12-17-30 Mtrs LENGTH: 10.5m POWER: 1000 Watts.....£44.95
MTD-5 (5 BAND) FREQ: 10-15-20-40-80 Mtrs LENGTH: 20m POWER:1000 Watts.....£69.95
(MTD-5 is a crossed di-pole with 4 legs)

MISCELLANEOUS ITEMS

CDX Lightening arrestor 500 watts.....£19.95
MDX Lightening arrestor 1000 watts.....£24.95
AKD TV1 filter.....£9.95
Amalgamating tape (10mtrs).....£7.50
Desoldering pump.....£2.99
Alignment 5pc kit.....£1.99

TELESCOPIC MASTS (aluminium & fibreglass options)

TMA3 3" to 1 1/4" heavy duty aluminium telescopic mast set, approx 40ft when erect, 6ft collapsed.....£149.95
TMA2 2 1/2" to 1 1/4" heavy duty aluminium telescopic mast set, approx 30ft when erect, 6ft collapsed.....£129.95
TMA1 2" to 1 1/4" heavy duty aluminium telescopic mast set, approx 20ft when erect, 6ft collapsed.....£99.95
TMAF 2" to 1 1/4" heavy duty fibreglass telescopic mast set, approx 20ft when erect, 6ft collapsed.....£99.95

reactance content, and j which serves to show that there's an imaginary 'component' of reactance.

Rarely as Straightforward

Sadly, the antenna-loading situation is rarely as straightforward as the basic principles imply. For one thing the source resistance of the p.a. is rarely a fixed value since most operate around class C, where conduction of the active device does not occur over a full signal cycle.

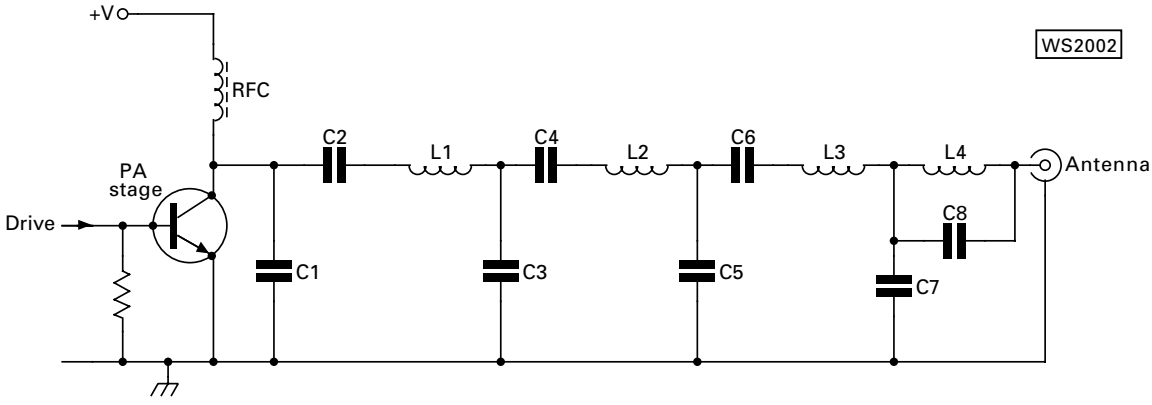
Moreover, later-day solid-state p.a. stages tend to opt for shunt antenna coupling (except, perhaps, some QRP rigs), rather than the tank circuit with its inherent flywheel effect, where the signal is developed across an r.f. choke and passed to the antenna through a coupling capacitor.

Then, of course, there's the reactive nature of the antenna and its feeder to consider. Unlike a signal generator whose source resistance and hence output impedance are well defined by the nature of the design and application, the antenna loading equation is a compound of the design of both the p.a. and the antenna system.

Illustration **Fig. 4** gives an impression of shunt-feeding. In this circuit a whole network of inductors and capacitors provide low-pass filtering for the attenuation of harmonics and other higher-order components. The resonant rejector L4/C8 helps to tailor the overall response characteristic relative to a specified frequency band.

Some antenna couplings include a low-*Q* broad-band ferrite transformer; but they fail to compete with the rejection capability of a high-*Q* tank circuit! However, broad-band couplings do have the advantage of not requiring retuning each time the transmit frequency is changed.

I will be continuing along this fascinating theme of antenna loading, coupling and tuning in the next Looking At article. Until then have fun! *PW*



● Fig. 4: An illustration of 'shunt coupling' to the antenna from the collector of a p.a. amplifier. The response is tailored to prevent the transmission of harmonics and other high-order products by the multi-stage low-pass filter. Further tailoring is provided by the resonant rejector circuit L4/C8.

HAYDON Communications

PRICES SUBJECT TO CHANGE WITHOUT PRIOR NOTICE. PLEASE VERIFY BEFORE ORDERING. E&OE.

Mail order: 01708 862524

See over for address

NEXT DAY DELIVERY TO MOST AREAS, £10.00.

New MOBILE PENETRATOR

1.8-30MHz (200W PEP) mobile antenna – no ATU required. Length 102" (52" collapsed). Fits 3/8 mount (SO239 feed point)

INTRO PRICE **£129.95** delivery £10

Mag mount £24.95	Body mount £12.99
"Roof bar" mount £9.95	Cable kit £9.99

Q-TEK PENETRATOR

"WE'VE SOLD 100S ALL OVER EUROPE"

★ 1.8 - 60MHz HF vertical ★ 15 foot high ★ No ATU or ground radials required ★ (200W PEP).

ONLY **£179.95** delivery £10

SEND SAE FOR LEAFLET

Wire version now available 45ft long end fed. (1.8-60MHz) spec. as above. Price £159.95.

Q-TEK ZL SPECIALS

Delivery £10.00

2m	5ele (boom 45"/9.9dBd)	£49.95
2m	7ele (boom 60"/12.5dBd)	£54.95
2m	12ele (boom 126"/14.5dBd)	£79.95
70cm	7ele (boom 28"/12.5dBd)	£39.95
70cm	12ele (boom 48"/14.5dBd)	£59.95

Q-TEK YAGIS

Delivery £10.00

2m	5ele (boom 63"/10.5dBd)	£49.95
2m	8ele (boom 125"/13dBd)	£64.95
2m	11ele (boom 156"/13.5dBd)	£94.95
2m	5ele crossed (boom 64"/10.5dBd)	£79.95
2m	8ele crossed (boom 126"/13dBd)	£99.95
4m	3ele (boom 45"/8.5dBd)	£56.95
4m	5ele (boom 128"/11.5dBd)	£69.95
6m	3ele (boom 72"/8.5dBd)	£59.95
6m	5ele (boom 142"/11.5dBd)	£79.95
70cm	13ele (boom 76"/14.9dBd)	£46.95
70cm	13ele crossed (boom 83"/14.9dBd)	£79.95

DELUXE G5RV

Multi-stranded heavy duty flexweave wire. All parts replaceable. Stainless steel and galvanised fittings. Full size - 102ft. (80-10M).

ONLY **£42.95**

Half size 51ft. Only **£36.95** (40-10M). *Carriage £6.50.*

Choke Balun — Inline balun for G5RV .....£24.95 P&P £3

STANDARD G5RV

Full size 102ft (now includes heavy duty 300Ω ribbon)....£28.95 P&P £6

Half size 51ft (now includes heavy duty 300Ω ribbon).....£24.95 P&P £6

Q-TEK INDUCTORS

80mtr inductors + wire to convert ½ size G5RV into full size. (Adds 8ft either end).....£24.95 P&P £2.50 (a pair)

DIPOLE CENTRE PIECES

Open wire.....£5.99

SO-239.....£5.99

300Ω HEAVY DUTY FEEDER

5m length.....£5.00 P&P £3.00

10m length.....£10.00 P&P £3.00

BALUNS & TRAPS

1.1 Balun		£25.00 P&P £2
4.1 Balun		£25.00 P&P £2
6.1 Balun		£25.00 P&P £2
40 mtrs	Traps	(a pair) £25.00 P&P £4
80 mtrs	Traps	(a pair) £25.00 P&P £4
10 mtrs	Traps	(a pair) £25.00 P&P £4
15 mtrs	Traps	(a pair) £25.00 P&P £4
20 mtrs	Traps	(a pair) £25.00 P&P £4
5.35MHz	Traps	£25.00 (a pair)

1kw Handling

CUSHCRAFT ANTENNA SALE

MA5V	New vertical 10, 12, 15, 17, 20m	~~£229.95~~	£215.00
MA5B	Mini beam 10, 12, 15, 17, 20m	~~£349.00~~	£299.95
A3S	3 ele beam 10, 15, 20m	~~£499.95~~	£449.95
A4S	4 ele beam (10-20m)	~~£599.95~~	£529.95
R-6000	Vertical 6, 10, 12, 15, 17, 20m	~~£349.95~~	£315.95
R-8E	Vertical (14-10m)	~~£499.95~~	£449.95
X-7	7 ele 10, 15, 20m	~~£699.00~~	£599.95

Q-TEK COLINEARS

P&P £10.00

Glassfibre construction

QT-100 GF 144/70, 3/6dB (1.1m)	£39.95
QT-200 GF 144/70, 4.5/7.2dB (1.7m)	£54.95
QT-300 GF 144/70,6.5/9dB (3m)	£69.95
QT-500 GF 144/70, 8.5/11dB (5.4m)	£125.95
QT-627 GF 50/144/70, 2.15/6.2/8.4dBi (2.4m)	£69.95

MOBILE ANTENNAS

P&P £7.00

DB-770M	2m/70cm (3.5 - 5.8dB) 1m PL-259	£24.95
DB-7900	2m/70cm (5.5 - 7.2dB) 1.6m PL-259	£39.95
PL-62M	6m + 2m (1.4m) PL-259	£19.99

NEW: MOBILE HF WHIPS THAT REALLY WORK

PLT-20	20m mobile whip (56" long)	£24.95
PLT-40	40m mobile whip (64" long)	£24.95
PLT-80	80m mobile whip (64" long)	£24.95
New, PLT-5MHz	5MHz mobile whip	£27.95
PLT-259	PL-259 converter for above	£5.95

COPPER ANTENNA WIRE ETC

Enamelled (50m roll)	£12.95 P&P £5
Hard drawn (50m roll)	£13.95 P&P £5
Multi-Stranded (Grey PVC) (50m roll)	£9.95 P&P £4
Flexweave (H/duty 50 mtrs)	£30.00 P&P £5
Flexweave H/duty (20 mtrs)	£15.95 P&P £5
Flexweave (PVC coated 20 mtrs)	£18.95 P&P £5
Flexweave (PVC coated 50 mtrs)	£40.00 P&P £6
Special 200mtr roll PVC coated flexweave	£99.00 P&P £10
Copper plated earth rod (4ft)	£13.00 P&P £6
Copper plated earth rod (4ft) + earth wire	£18.99 P&P £6
15m pack of earth wire	£10.00 P&P £6

NEW NOISE FILTER!

A superb TDK 'snap fix' ferrite clamp for use in Radio/TV/Mains/PC/Phone etc.

On thin cable simply wind cable round clamp 1-to-2 times. Simple yet effective!

Simply close shut over cables and notice the difference!

Will fit cables up to 13mm diameter. Ideal on power supply leads/mic leads/audio leads/phone leads - YOU NAME IT!

SRP: ~~£24/pair~~ OUR PRICE: 2 for £10 (p&p £2.50)

COAX BARGAINS

RG-213 Mil spec x 100m. MILITARY SPEC

ONLY **£69.95** P&P £10

RG-58 Mil spec x 100m.

ONLY **£35.00** P&P £10.00

Genuine high quality coax

COAX SWITCHES (P&P £4.50)

2 way CX-201 (0-1GHz) SO239	£18.95
2 way CX-201 'N' (0-1GHz) 'N'	£24.95
4 way CX-401 (0-500MHz) SO239	£54.95
4 way CX-401 'N' (0-500MHz) 'N'	£59.95

NISSEI PWR/SWR METERS

RS-502 1.8-525MHz (200W)	£79.95 P&P £5
RS-102 1.8-150MHz (200W)	£59.95 P&P £5
RS-402 125-525MHz (200W)	£59.95 P&P £5
RS-3000 1.8-60MHz (3kW) Incls mod meter	£79.95 P&P £5
RS-40 144/430MHz Pocket PWR/SWR	£34.95 P&P £2

CAROLINA WINDOM

CW-160S	(160-10m) 40m long	£139.00 P&P £8.50
CW-160	(160-10m) 80m long	£134.95 P&P £8.50
CW-80	(80-10m) 40m long	£99.95 P&P £8.50
CW-80S	(80-10m) 20m long	£119.95 P&P £8.50
CW-40	(40-10m) 20m long	£94.95 P&P £8.50

INTERFERENCE STOP IT

Rectangular snap-fixing ferrite cores suitable for :- Radio coax/TV/mains/telephone/PC & data cables. Plastic teeth prevent it from sliding on cable. Simply snap close onto cable and job is done!

2 for £10.00 (P&P £2.50)

FERRITE RINGS

10 for **£10.00** P&P £3.00 *or*

20 for **£15.00** P&P £4.00 *Superb quality*

TELESCOPIC MASTS

6 section telescopic masts. Starting at 2½" in diameter and finishing with a top section of 1¼" diameter we offer a 8 metre and a 12 metre version. Each mast is supplied with guy rings and stainless steel pins for locking the sections when erected. The closed height of the 8 metre mast is just 5 feet and the 12 metre version at 8 feet. All sections are extruded aluminium tube with a 16 gauge wall thickness.

8 mtrs **£109.95** 12 mtrs **£149.95** *Carriage £12.00.*

Telescopic mast lengths are approx.

Tripod for telescopic masts.....£89.95

20ft BARGAIN MAST SET

4 x 5' lengths of approx 2" extruded (16 gauge) heavy duty aluminium, swaged at one end to give a very heavy duty mast set.

OUR LOW PRICE **£39.95** Del £10

TWO FOR £79.95 THREE FOR £109.95

2 for £79.95 Del £12.50

3 for £109.95 Del £15.00

NEW 20' (approx) SLOT TOGETHER MAST SET

A heavy duty-sleeved, mast set that will tightly slot together. 4 x 5' (2" dia) 16 guage heavy duty aluminuim tubes (dim. approx).

£49.99 Del £10.00. TWO FOR £90.00

ALUMINIUM POLES

ALL MEASUREMENTS ARE APPROX.

2" x 1.5m length	2mm wall thickness	£12.50 P&P £10
2" x 2.5m length	2mm wall thickness	£19.99 P&P £10
2" x 10ft collection only	2mm wall thickness	£24.99
2" x 12ft collection only	2mm wall thickness	£29.99
2" x 20ft collection only	2mm wall thickness	£39.99

FIBRE GLASS POLES

Del £10.00

	1½"	1¾"	2"
1m	£8.50	£10.50	£12.50
2m	£16.00	£20.00	£24.00

NEW EASY FIT WALL PULLEY

Pulley will hang freely and take most rope up to 6mm. (Wall bracket not supplied).

PULLEY **£7.99** + P&P £2.50

Wall bracket, screws not supplied. Simply screw to outside wall and hang pulley on

£2.99 P&P £1.00

METAL WORK & BITS

MAST HEAD PULLEY

A simple to fit but very handy mast pulley with rope guides to avoid tangling. (Fits up to 2" mast).

£8.95 + P&P £2.50

2"	Mast base plate	£12.95 P&P £5
6"	Stand off	£6.95 P&P £5
9"	Stand off	£8.95 P&P £5
12"	T&K Brackets	£12.00 P&P £8
18"	T&K Brackets	£18.00 P&P £8
24"	T&K Brackets	£20.00 P&P £8
10mm fixing bolts		£1.40 each
U bolts (1½" or 2")		£1.20 each
8 nut universal clamp (2" - 2")		£5.95
2" - 2" cross over plate		£10.95
3-way guy ring		£3.95
4-way guy ring		£4.95
2" mast sleeve		£9.95
1½" mast sleeve		£8.95
Standard guy kits (with wire)		£24.95 P&P £6
Heavy duty guy kits (with wire)		£29.95 P&P £6
Ground fixing spikes (3 set) powdered coated		£24.00 P&P £8
30m pack nylon guy 4.4m/B/load 480kg		£10.00 P&P £2
30m pack (3mm dia) winch wire		£16.00 P&P £4
Self amalgamating tape (roll)		£6.50
'Nylon' dog bone insulators		£1.00 each
Chimney lashing kit		£12.99

SONY SW-30

The ideal holiday partner! ★ Fully digital world receiver ★ FM/MW/SW ★ Covers all short wave broadcast/MW plus FM stereo (on h/phones) ★ Programmable memories ★ Sleep timer + alarm function ★ 1kHz tuning for short wave. RRP £79.95.

HALF PRICE **£39.95** P&P £10.00

SONY SW-100E

★ Miniature portable all mode SW receiver ★ Station presets for 50 frequencies ★ Single side band system ★ Synchronous detector ★ Tuning in 100Hz + 1kHz steps ★ Incl's compact antenna/stereo earphones/ carrying case.

£159.95 P&P £10

ACE-30 Power supply unit for above.....£26.95
AN-100 Active antenna.....£64.95

NEW - EVOKE-1

SEND SAE FOR COLOUR BROCHURE

Using the latest third-generation D.A.B. technology, Evoke-1 delivers outstanding digital sound quality at an affordable price. A stylish, mains powered receiver without the normal hiss, crackle and fade of old AM/FM broadcast. Transform your radio listening.

OUR PRICE **£99.95** P&P £10.00

SANGEAN ATS-909

A superb performance portable/ base synthesized world receiver with true SSB and 40Hz tunning for ultra clean reception. The same radio is sold under the Roberts name at nearly twice the price. Other features include RDS facility, 306 memories and FM stereo through headphones.

OUR PRICE **£139.95** P&P £10.00
Optional power supply.....£16.95

portable receivers

REALISTIC DX-394

★ Superb performance SW receiver ★ 0.2-30MHz (all mode) ★ Selectable tuning steps (down to 100Hz) ★ 240 or 12V ★ Digital S-meter ★ Attenuator ★ Key pad entry ★ 160 memories ★ Noise blanker.

OUR PRICE **£199.95** P&P £10
OUR BEST SELLING LOW PRICED RECEIVER
HD-1010 optional headphones.....£9.99

JRC NRD-545 DSP

The ultimate short wave receiver with DSP - for the real perfectionist.

OUR PRICE **£1299.00** Del £10.00
NVA-319 Extention speaker.....£189.00
CHE-199 VHF/UHF converter.....£279.00

desktop receivers

YAESU VR-5000

0.1-2.6GHz all mode receiver with DSP (optional) plus bandscope/world clock and too much more to print

OUR PRICE **£575.00** (INCL' PSU)
Optional DSP unit.....£79.99
VR-500.....£199.99

AOR AR8600 MkII

Extremely versatile all mode receiver (530kHz-2040MHz). Optional power supply.....£19.95

AR5000	£1295
AR5000+3	£1449
SDU5500	£799
AR-8200MkIII Now in stock	£389

OUR PRICE **£649.95**

UBC-780XLT

New comprehensive scanner (25-1300MHz)/slight gaps. Alpha Tag, PC clonning control. Smart scanner + trunk track facilty.

~~£349.00~~ OUR PRICE **£299.99**
Optional software.....£34.99
BC9000XLT.....£235.00

ALINCO DJ-X3

Micro-handy scanner. 100kHz-1300MHz. 700 memories/stereo FM (earphones)/ attenuator/bug detector/audio descrambler. AM/FM/WFM/ Selectable tuning steps (incl's 8.33kHz).

SALE PRICE **£99.95**
Optional battery pack and drop in charger £39.99

Soft case.....£15.99
PC interface.....£42.95

MVT-7100EU

Wideband hand-held scanner covers 500kHz-1650MHz. (All mode). Includes nicad/car charger/charger/antenna. Extremely user-friendly hand-held reciever with outstanding performance unmatched by its rivals.

OUR PRICE **£199.95**
Soft case for 7100EU/9000 - specify £19.99
MVT-9000 MkII.....sale price £325.00

AR-8200 SERIES-3

Never before has one hand portable offered so much. ★ Covers 100kHz-3GHz (all mode) ★ Computer control caperbility ★ 8-33kHz steps for the new airband spacing ★ Reaction tune caperbility ★ Includes nicads/charger/ antenna and car lead.

OUR PRICE **£399.00**
Optional case.....£19.99
CC-8200 PC interface.....£79.99

scanners

GARMIN GPSIII+

Powered by AA cells or 13.8V, this compact navigational system gives detailed maps of the UK & Europe. Supplied with data lead and on-board maps.

SALE PRICE **£279.00**

M-75 SCANNER PRE-AMP

Superb BNC in-line amplifier to boost signals! Fits on top of your scanner and away you go. (Powered by PP-3 battery - not supplied). Freq: 24MHz–2.1GHz. Gain: -10dB to +20dB.

OUR PRICE **£79.95** P&P £5.00

T-127 ROTATOR KIT

Easy, rapid fit aerial rotator for domestic and mobile application. Ideal for lightweight antennas/cameras. Supplied with:- fitting hardware, 10m cable & control box. (requires 4AA or 6V DC).

OUR PRICE **£25.00** P&P £5

gizmos

REGULAR-GAINER RH-770

BNC 21cm flexible whip that is ideal as replacement. Rx:- 25MHz-2GHz. Tx:- 2m/70cm

OUR PRICE **£16.95** P&P £1.50

SUPER-GAINER RH-9000

BNC 40cm flexible whip for the ultimate in gain. (Rx:- 25MHz-2GHz). Tx:- 2m/70cm

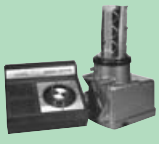
OUR PRICE **£21.95** P&P £1.50

QS-300

A fully adjustable desk top stand for use with all hand-helds. Fitted coxial lead with BNC + SO239 connections.

OUR PRICE **£10.00** P&P £3.00

AR788 *NEW MODEL*



Quality rotator for VHF/UHF. Superb for most VHF-UHF yagis, 3 core cable required. £49.99. 3 core cable 50p per mtr.

OUR PRICE **£39.99**
AR-201.....Thrust bearing for above only £13.99

MM-1
MICRO MAG ANTENNA

Micro magnetic base with (19") whip. Rx:- 0.5MHz-2GHz. Ideal for all scanners supplied with minature coax lead & BNC (all fitted). Tx:- 2m/70cm.

OUR PRICE **£24.95** P&P £5.00

SGC-230

200W instant auto ATU. Tune any length of wire with this superb ATU. (Minimum length applies.)

£349.95

SGC-237 HF+6m Tuner.....£379.00
SGC-239 Mini Tower.....£269.00
SGC-231 HF + 6m.....£379.00
Smart lock.....£62.95
Earth Stake.....£13.99

BARGAIN WINCH

500kg brake winch.
BARGAIN PRICE ~~£129.95~~.

OUR PRICE **£59.95** del £8.50

Winch wall bracket.....£19.99

special interest

Radio Basics

This month Rob Mannion G3XFD provides the first details of the next project for Radio Basics readers...a rather different type of simple h.f. receiver which provides good results. There's also a chance of winning a construction-related prize!

When trying to think of ideas for Radio Basics (RB) readers - especially for receivers - I'm often at a loss on how to get the most out of the least on your behalf! Personally, I'm not keen on the over-use of Direct Conversion (DC) receivers, especially as they appear so often in relation to the home-brewing aspect of our hobby.

Don't get me wrong...I do know just how well the DC receiver can work. In fact, I think I was one of the earliest owners in the UK of a Heathkit HW-7 DC transceiver rig. It covered 7, 14 and 21MHz with a supposed maximum of around 3W output and worked exceptionally well for what it was. It provided me with QRP c.w. QSOs all over the world...close on 30 years ago.

The HW7 was my first experience with the DC technique...but not my last! So, you'll realise I write from experience which also backs up my comment.

There are many techniques which can be adopted to provide the home-brewer with a suitable receiver for minimum cost and/or simple construction. In this column during the years I've written it, techniques as varied as using a car radio as a tuneable intermediate frequency (i.f.) - thus saving the construction of a tuneable i.f. with detectors and amplifiers - right round to single integrated circuit (i.c.) receivers and tuned radio frequency (t.r.f.) types have appeared.

The time has now come for us (together) to be a little more adventurous and adopt a particular idea which - **while not new or original in any way** - is very clever indeed and can provide superb results

Crystal Controlled

If you've been following this series from its inception, you'll remember the crystal-controlled converter idea I published. Using a PAL television chrominance (colour) sub carrier crystal (4.43MHz) it provided accurate tuning by converting (or mixing/heterodyning) the 3.5MHz band down to 1MHz.

A car radio switched to the medium wave band was then tuned over the band where the down-converted signal (in effect the if.) appeared. The results were excellent because of the double-superhet effect...although the i.f.s were both low in frequency the selectivity of the arrangement was perfectly satisfactory.

The only problem I found in practice was providing a beat frequency oscillator (b.f.o.) for c.w. and s.s.b. reception. This was because the external oscillator providing the 'beat note' (itself another use of the frequency changing/mixing technique) for reception of Morse, and carrier re-insertion for reception of single sideband transmissions...effected the car radio.

The reason why the car radio was effected was due to the receiver's automatic gain control (a.g.c.) reacting to the separate carrier of the b.f.o. as it of course senses it a strong signal, and so reduces the gain in the circuit. Incidentally, the a.g.c. is often referred to as automatic volume control (a.v.c.)...especially in broadcast reception equipment, but properly in our context **it is an a.g.c. system**.

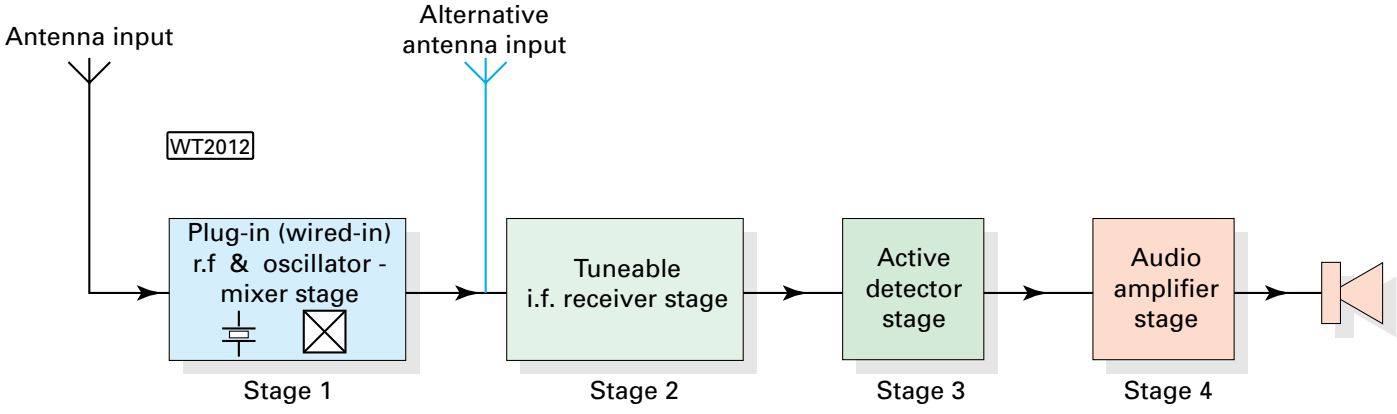
Without playing around with, and modifying the a.g.c. circuitry in the tuneable i.f. (apart from the a.g.c. drawback a car radio is absolutely ideal for this application) there's not much that can be done. However, the effect isn't too bad and won't stop anyone enjoying the using the project.

Having discussed the use of the crystal-controlled 'front-end' (The term usually employed to describe the antenna input, frequency selecting and mixing stages) we can now progress on to another use of the same idea. This time however, it's presented in a more compact, user friendly approach...while keeping many of the advantages of the original idea, overcoming the de-sensitising effecting side effect and adding a lot of extra gain.

The Basic-4 Receiver

The Basic-4 Receiver's title comes from the fact that it's basically a four stage receiver. Despite this, as you'll see from the block diagram, **Fig. 1**, there's a lot going in the apparently relatively simple design. And to be honest...stage 3 (the Active Detector) holds a secret which provided a 'Magic Ingredient' to a famous Second World War man-pack transmitter receiver...the 18 Set.

As mentioned in this month's introduction...the ideas I've used are not original...in fact they've been around for many years. All I



have done is to adapt them for use in the RB series. I say this because *PW*'s **Tex Swann G1TEX/M3NGS** reminded me of the famous White Rose Receiver project, designed by the very well known **John Heyes G3TDZ** (a much respected designer, and supporter of the G QRP Club) is very similar in concept. And although I've never seen the circuit, built or used his design...as a matter of common courtesy it should be mentioned as it's an extremely well established project.

The Basic-4 receiver uses a separate (either plug-in for multi-band use) crystal-controlled mixer/oscillator with tuned r.f. amplifying stage front end which then feeds into a variable frequency i.f. stage (to provide some gain) followed by an active detector which then drives an audio amplifier.

None of the circuitry will be complex. Indeed, without exception all the separate circuits for the Basic-4 have been used in RB projects already. The audio amplifier will use the LM386 employed many times before, the tuneable i.f. receiver stage will use (wait for it!)...my old favourite the MPF102 field effect transistor (f.e.t.), and the front-end r.f. and mixer stage, together with the crystal oscillator were used with the car radio project. So...nothing difficult there!

Secret Ingredient

The only stage I've not really fully detailed is the 'Active Detector'...and in effect this could be considered to be the Secret Ingredient! **I say this because the form of detector actually used (a regenerative type) is rather neglected nowadays in this application within an - albeit simple - i.f. chain**. And although it's not obvious in the block diagram, I've effectively combined stage 2 and 3, making it a tuneable amplifier and detector.

Once upon a time the fixed tuned - or in the case of the Basics-4 receiver - tuneable over a relatively narrow range of frequencies - active detector/detector amplifier was very commonly used. Anyone who owned/operated a surplus Wireless Set No. 18 will know that the so-called audio volume control on the receiver...is actually a very clever gain control operating on the i.f. amplifier valve.

The 18 Set's i.f. stage has a fixed about of positive feedback (output feeding back into the input). The variable gain then permits controlled amplification and re-amplification of the i.f. signal...providing exceptional gain and an extremely useful improvement of *Q* (selectivity).

Eventually, with the increasing gain the i.f. stage (due to the fixed amount of feedback) will start to oscillate as it passes the 'threshold' point (this, on reception, is the point just before the soft 'rushing' sound appears - and is the best setting for reception of a.m).

With this form of detector, adjustment just past the threshold is ideal for c.w. and even s.s.b. reception. It works best (it's easier to control and adjust) when used on a fixed-tuned i.f. stage, but still proves very effective on a tuneable detector operating on a relatively narrow frequency range. This reduces many of the tuning problems associated with regenerative detectors while using the advantages.

Next time, I'll provide some more details on how you can make your own version of the Basic-4. It's such a flexible approach that you'll be able to buy off-the shelf crystals, or use literally any crystals found in the junk box...leaving the choice of intermediate frequency to you! Cheerio for now. *PW*

● Fig. 1: The block diagram of the Radio Basics crystal-controlled front-end receiver, the Basic-4. In practice (for the simplest version of this receiver) Stage 2 and 3 are combined as a tuneable regenerative detector (see text).

Win A Suggestion Prize!

This time my title isn't original! Any of our readers who has worked for the (late, and now much lamented) British Railways will remember their famous staff suggestion scheme 'Win A Suggestion Prize' system. Fondly remembered as WASP the suggestion scheme brought many new inventive ideas and suggestions from staff. Some were lifesavers, and others saved BR money. Similar schemes were operated throughout industry, particularly n car production.

Following the successful 'Win A Wurzel' competition, I realised there was a chance for you to help me with ideas for the column. I realised I'd also indirectly learn of any problems you have through those suggestions...and also provide you with a chance of winning a suitable prize! The award - kindly donated by **Duncan Walters G4DFV** will be one of his Copper Islands Construction Outfits (CICO) which have featured in the column.

To enter the competition: All you have to do is to is suggest ideas which I can develop to help you, or have helped in the past and you'd like to see featured, or explained in the RB series. Send the idea in on a postcard (postcards only, and to help me...only one idea per postcard please!) **along with the corner flash to Radio Basics Suggestions Competition, at the *PW* offices**.

All the ideas will be appreciated, and I'll use as many as possible and keep them for reference. However, the winner will be the sender of the card chosen at random from the box containing all entries. **Closing date is Friday 10 January 2003. Editor's decision will be final and no correspondence will be entered into. Good luck!**

Rugby Radio - Serving Britain For

Stan Brown G4LU provides the background on the internationally famous Rugby transmitting station. As he worked there...Stan's the best man for the job...providing much technical information and some amusing anecdotes!

The origins of Rugby Radio Station began early last century with an article in *The Times* in June 1909. It suggested that news could be more cheaply transmitted throughout the Empire and colonies by radio stations approximately 2000 miles (3200km) apart rather than by cable. Each station would cost £55,000 to build.

The article by-lined "From a Correspondent" was probably written by **R. N. Vyvyan**, Marconi's Chief Engineer at the time. He admitted in his book (**1 - see reference panel**) that the Company, at the time, was short of work and in financial difficulties so he obviously saw some advantage in his suggestions being taken up. This had been preceded by a letter from Ambrose Fleming on the merits of spark versus arc, and a vigorous response then followed in *The Times* (**2**, **3**).

Where the Post Office, who would advise the Government, stood in this controversy is not clear. But it does seem they favoured the arc. Nevertheless, the Government was impressed and decided that an Imperial Communications system was necessary.

Chain Underway

The chain got underway, after a slight hiatus caused by the "Marconi Scandal" **(4)** when Ministers were accused of profiteering in American Marconi shares. Then came the First World War in 1914 and only the station at Abu Zabel, Egypt, was completed and the masts and buildings at Leafield (in Oxfordshire) being erected but was only used for interception until the arc was installed when peace came.

After the Armistice, the Wireless Telegraphy Committee reported on the Chain. It was then decided to build a large single high-powered station with world-wide coverage.

A site near Bourne in Lincolnshire **was considered**. However, when he wrote to the organiser of the IEE sub-centre Centenary Celebration, held at the Rugby station in 1971, **Sir Archibald Gill** said that he was given the job of finding a suitable site: "I immediately remembered the Hilmorton Aerodrome which had been used as a training ground for pilots during the war". (It became the Rugby site).

What he didn't say...was that he married a Rugby lady. So it will not be known if the choice of site was made on personal or technical grounds!

Work Started 1924

Work started on the Rugby site in 1924 and it first radiated on 1st January 1926. The transmitter, **Fig. 1**, comprised, a tuning fork oscillator whose frequency was multiplied nine times in low power stages to produce the final frequency of 16kHz.

The fork was made from Invar, a metal alloy of low temperature coefficient. Small adjustments of frequency could be made to compensate for ageing by removing or replacing screws in the arms of the fork.

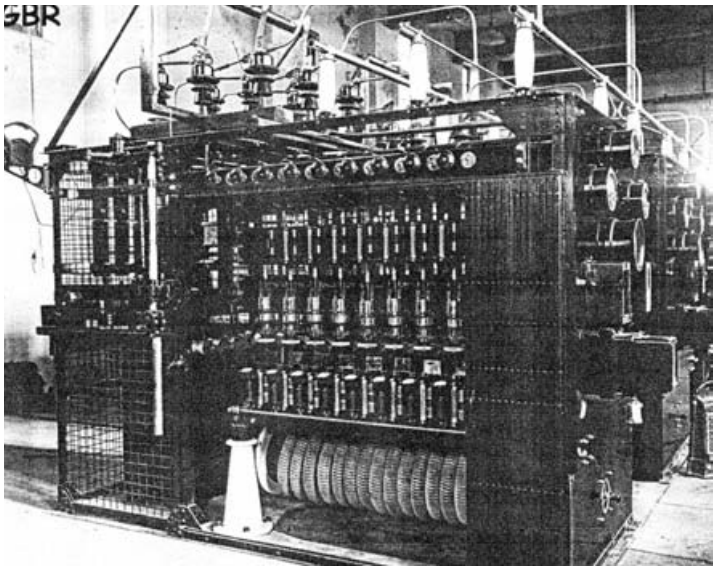


Fig. 1: Rugby (GBR) Power panel No 1 - there were five in all - of the GBR transmitter. Each utilised 18-10kW valves (9 each side). Normally only three panels were used to give an aerial current of 720A. (All photos courtesy of British Telecom)

The signal was then further amplified in low power stages and then in a 4kW stage and a 50kW stage to drive one or more of five power units. The last two stages used water-cooled valves, three in the 50kW stage and 18 valves in each of the power units with the valves and the power units operating in parallel.

Filament Supplies

Filament supplies for the water cooled valves were derived via transformers in each unit from a 416V 100Hz supply. These were provided by a rotary frequency changer machine in the Power Room, **Fig. 2**.

Grid bias supplies and lower voltage high tension (h.t.) came from duplicated machines situated in the Auxiliary Power Room. The h.t. voltage was provided from one of

three machines in the Power Room, but these could be put in series if a higher voltage was required.

Each machine set comprised two 3.5kV d.c. generators situated either side of a synchronous motor. The motor and generator and their exciters were all in line on a single bedplate which was set up on insulators to isolate it from earth.

The a.c. supply to each motor was 2kV from a directly connected secondary of a transformer, the primary of which was switched to the 11kV mains. The secondaries were highly insulated to enable the machine sets to be connected in series for the higher voltage.

Fig. 2: A general view of the power plant. Three large sets at the rear were for GBR, each being capable of 500kW at 7kV d.c. A fourth large machine could supply 500kW at 12kV d.c. for GBY. In the foreground (left) are 2-200kW machines which generated (at 100Hz) the filament supplies for GBR and GBY and (right) smaller sets that provided lower voltage auxiliary supplies.

75 Years

Three Power Amplifiers

The usual arrangement was for three of the transmitter's power amplifiers to be used on traffic. The failure of any one would result in a break in the service. Provision was then made so that any valve or power panel could be quickly isolated from the circuit for maintenance later, at some convenient time.

A single demountable valve, **Fig. 3**, with its own pumping plant, was first tried in the 50kW stage and then a 500kW unit (6) was installed. The single valve had nine filaments each surrounded with its own grid electrode working inside a single anode. The working h.t. voltage was 18kV d.c. - hence the reason for putting the generators in series.

Flash Arc

Both sealed-off and demountable valves at this period suffered from a condition known as flash-arc or Rocky Point effect which presented itself as a spontaneous high current discharge within the valve. Despite this, provided the h.t. could be removed quickly enough...no permanent damage was done to the valve except some feather-like markings on the internal structures (**7**).

One device to limit the flash-arcing effect in a working valve was to have a series resistance in the anode supply. With the big demountable valve this took the form of a water resistance made from two thick brass plates separated by a porcelain pot about a foot long and about a foot in diameter. On one occasion, this valve took a discharge and the steam generated within the pot caused it to crack. The transmitter room was then showered with water and lethal sized pieces of porcelain. The valve involved was never put to traffic again!

Tank Circuit

At Rugby the tank circuit tuning capacitors were mica units immersed in oil, **Fig. 4**. They were arranged to be interconnected so that they could carry 630A corresponding to a peak voltage of 46.5kV.

The coils were wound from Litz wire of 6561 strands, consisting of 36s.w.g. enamel and silk covered. The cable was wound on 'spiders' of 14ft. 6ins (4.42m) in width in an arrangement to enable the spacing between spiders to be varied for tuning purposes.

Similarly, the aerial coupling coil could be moved relative to the tank coils to vary the coupling. Normally the aerial current was around 720A.

In practice it was often the junior staff who were sent aloft to tune the aerial tuning inductance (ATI) in response to observations shouted up from the control desk below, **and this meant standing on a platform on the axis of the coil**. You could then feel the warmth induced in the whole of your body as the aerial came into tune! (As I'm now in my early 80s...perhaps you can understand why I remain sceptical about the alleged dangers from electromagnetic heating of the body!).

The aerial was arranged as cages of 7/14s.w.g. silicon bronze wire on spreaders 12ft (3.65m) in diameter and strung between the twelve, 820ft (250m), masts spaced at quarter mile (400m) intervals.

Beneath the aerial system a comprehensive earth mat of 100lb copper wire was ploughed in. This extended some 250 yards (229m) either side of the line joining each pair of masts.

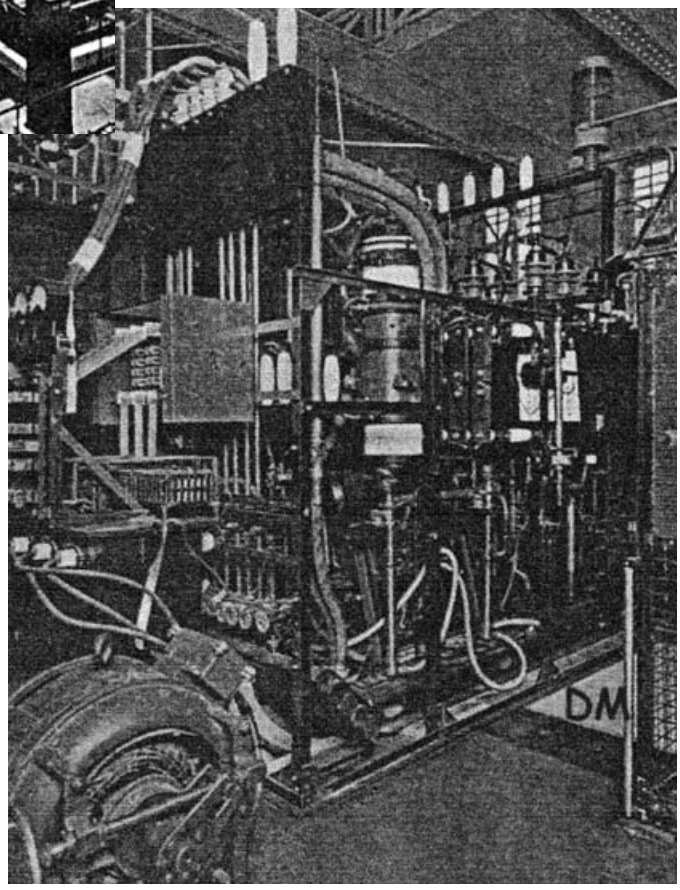


Fig. 3: The large demountable valve which could replace GBR's power panels (see text).

Ship Traffic

Telegraph traffic for ships was usually transmitted at 22 words per minute (w.p.m.) by machine generated Morse from the Central Telegraph Office in London. Occasionally though, messages were sent for Halifax (Nova Scotia) Press at about 70w.p.m.

Almost concurrently with the installation of the telegraph transmitter it was decided to install a single side-band suppressed carrier (s.s.b.s.c.) transmitter, **Fig. 5**. This was for transatlantic (TAT) telephony.

Initially it was decided to use a nominal carrier of 60kHz both ways, relying on the voice operated devices (similar to VOX on our transceivers) to keep only one channel open at a time. If they became out of step it was possible for singing to take place round the distant and local loops - transmitter to receiver. So to avoid this Rugby's frequency was changed to 68kHz. (Callsign GBY from GBT on the lower frequency).

After initial amplification, the signal was further amplified in a trio of 10kW valves driving two banks of 15 similar valves in each. The aerial cages were similar in form to those of the GBR telegraph transmitter, but were strung between four masts (shared with GBR) on the north side of the building.

The tuning coils and condensers were similar to those of GBR but smaller because of the higher frequency. The bandwidth was just about adequate for commercial telephony.

Radiated Power

The radiated power was of the order of 250kW. About 1930 the two output stages were replaced by three CAT10, 100kW valves.

The CAT10s needed to have their filament seals water-cooled as well as their anodes. To that end the small flow of water was directed on to a small container with a hole in its base at the end of a balanced arm.

Provided the flow was adequate the water depressed the arm and closed a control circuit on the other end. If it failed the contact opened and shut down the transmitter. Unfortunately, in summertime, when the windows, were open birds would come in for a drink, perch on the arm and do the same. Believe it or not... the device was accredited to a "Mr. Pidlar"!

The 1943 Fire

The descriptions I've provided refer to the telegraph and telephony transmitters as originally installed. Unfortunately, along with an l.f. transmitter, GBV, installed for European telegraphy, they were virtually destroyed by the fire which developed due to arcing in the roof in 1943.

All were subsequently rebuilt and more recently rebuilt again or replaced by more modern equipment. Travellers passing the station on the A5 road nowadays will also note that the aerial cages have gone and a mast type aerial has replaced them.

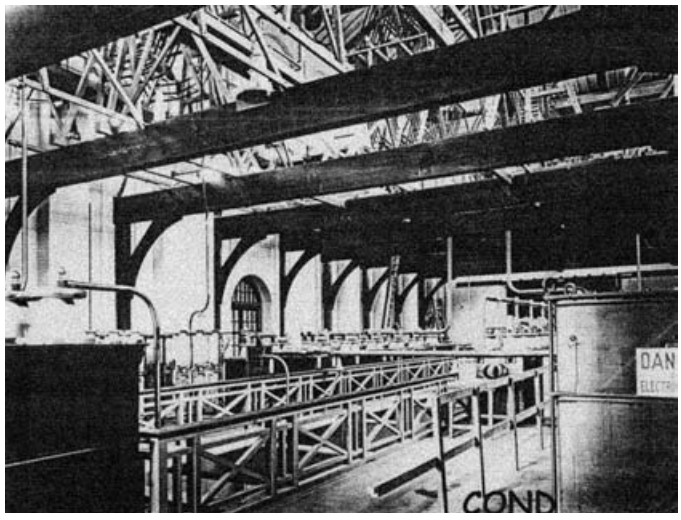


Fig. 4: The VLF condenser floor below the coils. The large tanks in the foreground are the blocking and tuning capacitors for the telephony transmitter above which is its tank coil. Beyond are the tuning condensers for GBR above which is the tank coil with its spiders lengthwise on the building.

Marconi Beam System

The mid-1920s saw the development of the beam system by the Marconi Company which from a civil telegraphy point of view was more efficient and faster than the v.l.f. and l.f. systems. At the same time the Post Office was developing short wave telephony systems.

The Marconi aerial and feeder systems (excellent though they were) were more expensive initially and more costlier and time-consuming to maintain. The Post Office used smaller and simpler aerials fed with open wire transmission lines, instead of coaxial feeders. Together with higher powered transmitters, they could provide a stronger signal to distant receivers.

Annex Building

Apart from an experimental short wave transmitter installed at Handley Cross Farm on the site, the first two transmitters were installed in an annex to the main building. One was a Type 4 ST&C (Standard Telephones & Cables) transmitter of 60kW input for use on the TAT circuit. The other was built by the PO and had a pair of triode demountable valves in the output stage also capable of 60kW input.

The PO built transmitter was used for South American transmissions to Buenos Aires and Rio de Janeiro. Its aerial was a Koomans type and was fed in two parts from the building. (By reversing the feed to one part, by means of a switch in the transmitter room, the beam could be changed from one destination to the other).

However, just prior to the installation a new building, called the Telephony Building, was built about three quarters of a mile (1.2km) nearer to Hillmorton with the intention of installing a second l.f. telephony transmitter. This never materialised ...except for the drive equipment supplied by the Marconi Company.

The site was then turned over to short-wave transmitters... 60kW transmitters by ST&C being installed, one for the South African Service (No. 5) and one for TAT (No. 3). Another transmitter (No. 7) - similar except for the 60kW stage, and rated at 20kW, was installed for the Maritime Service.

The PO also built and installed transmitters for the Australian Service (No. 4), and the Canadian Service (No. 6) as well as rebuilding the experimental transmitter from Handley Cross (No. 8) for use on the Egyptian and Kenyan Services. They used the double sideband mode, and for privacy speech was sent up from Radio Terminal in London in inverted form.

Clever people soon discovered that by heterodyning the signal the inversion could be destroyed. To stop this malpractice the carrier crystal oscillator frequency was wobbled slightly by a parallel capacitor driven by a small motor.

However, apart from the big liners, privacy equipment wasn't available on the smaller vessels. So plain language was used...much to the amusement of staff who listened to intimate conversations of VIPs and film stars!

Double Sideband

Double sideband (d.s.b.) transmissions are wasteful of power if no traffic is passing since only the carrier is radiated. Reducing this inefficiency on both the Australian transmitters and the TAT transmitter was achieved by electronically increasing the bias voltage on one of the early power stages, suppressing the carrier in the absence of speech.

When signals arrived over the land-line the carrier was restored, but to avoid clipping...the input to the modulator stages was delayed by passing the audio through an artificial line. It worked at the transmitter but the system fell down because the distant receivers drifted in frequency and, because there was no means to keep them in tune, the initial words could be lost.

American SSB Transmitter

About 1934 a 2kW Western Electric (WE) SSB transmitter was purchased from the USA and was used to drive the 20kW stage of No 3 transmitter for experimental transmissions. The WE transmitter had two Metropolitan-Vickers type 43 screen grid demountable valves in its final stage with automatic pumping equipment. When the tests ceased, the low power stages were used, until a PO built drive unit was available. This transmitter was built in 1936/7 using two Metropolitan-Vickers Type 43 demountable valves in its final stage with automatic pumping equipment.

During 1938 a second PO transmitter was built (No. 10) ...similar to No. 9 but with mercury vapour rectifiers for HT. This was the only transmitter used on telephony during wartime...for a limited amount of important traffic to the USA.

Double Modulation

The PO s.s.b. drive units produced a signal at 3.1MHz as the result of a double modulation process, first at 100kHz and then at 3MHz. This was then 'piped' to the transmitter to be mixed with the output of another crystal oscillator, or its multiples, to produce the final nominal carrier emission.

Initially the PO drive units were for s.s.b., but later (by providing a second 100kHz modulator and an appropriate filter to select the other sideband) a two channel independent sideband (i.s.b.) output resulted. This became the norm for all PO telephony transmitters.

Since each sideband occupied 6kHz, the London terminal (on some services) could send down two channels in each 6kHz band allowing four channels to be used on routes that had dense traffic. (To control the distant receiver, a subdued carrier 20db down on peak sideband level was radiated on i.s.b. and 10db on s.s.b. systems).

Specific Frequencies

Before the Second World War all the aerials were designed for specific frequencies and they took various forms. Among the commonest ones were the Sterba and TW (named after Thomas Walmsley, a PO engineer) arrays.

Basically speaking, the aerials were bent wire types arranged so that the currents in particular lengths augmented the radiation in a particular plane and current in other parts of the wire nullified the radiation in an undesired plane. (The Sterba also used a reflecting curtain behind it).

Another favourite was the Kooman's or Pine Tree aerial. This comprised half wave dipoles on either side of a vertically disposed transmission line with other dipoles erected a half wavelength higher, but with the connection crossed over so that the radiation was in phase with the lower counterpart. (Often four units would be erected one above the other and then connected in parallel with other similar bays).

Transmission Lines

All the Rugby h.f. aerials were fed by 600Ω transmission lines terminated on plugs in a plate glass window associated with a particular transmitter. Transmitter frequency changes were achieved by using flexible leads (fitted with appropriate sockets) from the unit to the window. This means of disconnection was essential when maintenance was carried out on transmitters to avoid danger as they could be brought up accidentally without the aerial being connected! (Not uncommon on the Canadian transmitter, which often due to lack of traffic, was brought up only for five minutes in each hour).

Strangely, on its usual frequency, the Canadian transmitter was stable with only the transmission line up to the aerial window connected to its output. Equally surprisingly...the receiver at Yamachiche in Canada could hear the signal and it's staff would ask for the Rugby aerial to be connected! On another occasion during the winter of 1940/41 traffic was carried with the aerial collapsed on the snow-covered ground until it was discovered by the rigging staff.

Wartime Years

The wartime years between 1939 and 1945 saw great changes in what Rugby did. The v.l.f. and l.f. transmitters carried Military traffic and the existing h.f. transmitters (all but one) were converted to telegraph working, mainly for press services, along with new transmitters.

Some were used on more esoteric work. One of the most interesting installations was a 20kW ST&C high level modulated transmitter which was used for modulated continuous wave (m.c.w.) telegraphy.

The transmitter's modulation choke, which otherwise would have been subjected to transient increases in voltage as the current to the final stage was keyed, was replaced by an 800Hz tuned circuit. The audio modulation was then reduced in level during space periods in keying to avoid overloading the high power modulation valves and the modulation transformer.

Tremendous Surge

Post war there was a tremendous surge in telephony traffic from Rugby. Multi-channel telegraphy traffic also greatly increased and was carried on i.s.b. transmitters so that in some cases mixed traffic could be sent to some destinations.

To cope with the increase a new station was built on the eastern side of Watling Street (the A5) to house 28 Marconi HS 51 transmitters. It was the intention that these should be remotely wave changed either from the centrally situated control desk and possibly, eventually, from the London Terminal.

The wave changing was effected by preset controls similar to those used in the war-time 1154 equipment. In the event they were not precise enough (nor trouble free) for the intended purpose.

In addition, comparator equipment (dubbed tin-technicians) were provided which would give an alarm if the output of a transmitter differed from its input within specified limits. Again a good idea ahead of its time, but because the equipment used valves...they had no greater reliability than those they were monitoring!

The aerial picture changed too, and instead of the fixed frequency type of aerial used pre-war, rhombic aerials came into fashion. These had the advantage that by exploiting the design constants of size and width, the beam width required for a particular service could be pre-determined.

Often two log-periodic were mounted on four masts, one above the other. The higher one being used on the low frequencies for that service and that below, of higher gain, for the higher frequencies.

On some routes the direction of radiation could be reversed by field switches operated from the building. The terminating resistance took the form of an iron wire transmission line zig-zagged on poles in the aerial plot.

Satellites Take Over

As satellites took over the international traffic, the basis for the h.f. transmitters was changed to maritime requirements operated from Burnham in Somerset. This meant a change of aerial systems which was accommodated by replacing directional rhombic aerials by omni-directional stacked quadrant types and in some cases by rotary log periodic beams.

Even that traffic is now carried by satellite and the h.f. building operations have passed out of BT hands. It's mooted that the station will close in 2003 with the MSF Standard Frequency transmissions continuing until 2007.

The End?

The end of 75 years of service from Rugby to the UK and its people, here and overseas, in peace and war! What will become of Rugby and its equipment?

It will be sad if everything disappears...but Mammon is now paramount and history costs money. Yet if Sweden can keep its Grimeton l.f. alternators in pristine working condition ...should not Great Britain retain some memory of its former radio pre-eminence? I for one fervently hope we do! *PW*

Stan Brown G4LU, a career in radio: Started at Rugby in 1936 in apprentice grade (Youths In Training...the famous YITs). After two year graduated Junior Transmitter Attendant. Achieved the senior grade. In 1942, when Criggion became operational with two h.f. transmitters moved there (same grade) and in 1945 was promoted to First Level Engineer grade in charge of the construction workshop building h.f. transmitters and improving the v.l.f. transmitter. In 1952 reverted to station staff as Shift Duty Engineer until January 1967. Then became the Clerk of Works for the rebuilding of GBZ and erection of three additional masts.

In March 1968, promoted to the Executive Engineer Grade as Station Manager (Maintenance) at Rugby. In 1972 asked to form a unit to bring riggers at all the stations under one central control away. Stayed until 1976. In 1976 promoted to Area Manager, Central Group of Transmitting Stations (Rugby, Criggion, Anthorn, Leafield and Ongar).
Note: (Stan retired in January 1983 just before BT took over...and says "Thank God!....I'm looking forward to a halo and wings as the next uplift, if I can keep my sins under wraps!

Editor

References & Further Reading

(1) *Marconi and Wireless*. R.N. Vyvyan Routledge and Kegan Paul 1933 republished EP Publishing Ltd 1974.
(2) *The Times* Feb.24 1909
(3) *The Times* March 3 &17 1909
(4) *The Marconi Scandal* by Frances Donaldson. pub. Rupert hart-Davis.
(5) Shaughnessy. *The Rugby Radio Station of the British Post Office*. Journal IEE 1926 vol 64. See also *A History of Valve Making* by Vyse & Jessop p192. pub Vyse
(6) Col. A.S. Angwin. IEE Wireless Section, Chairman's Address.1931 Vol 70 p33.
(7) Gossling, Journal IEE, 1932, vol.71 p460
(8) *The Times* March 21-27 1930 Editorials, Parl. Reports and letters.

WORLD RADIO TV HANDBOOK

Some comments on WRTH 2002:

Thanks for the new WRTH, which is an excellent book
HAROLD ORT, EDITOR, *POPULAR COMMUNICATIONS*

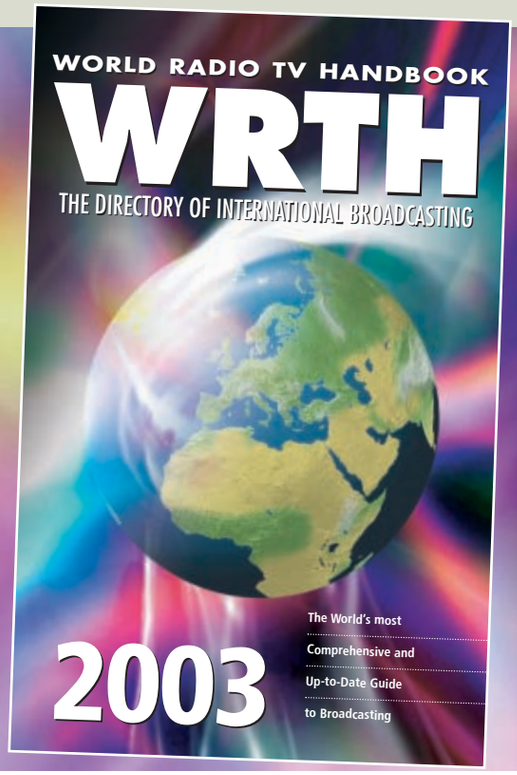
The 2002 edition is, overall, a beautiful book **W.H., USA**

WRTH is the best DX book going **J.F., UK**

WRTH 2002 is my first, you are simply fantastic! **M.H., CZECH REPUBLIC**

Best of information is available in WRTH **S.P., INDIA**

The handbook is perfect as it is **H.E., GERMANY**



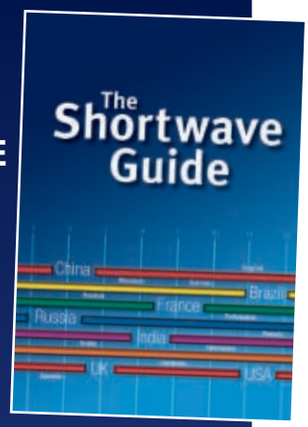
Updated with the help of some of the world's leading DXers and SWLs, we are proud to present the 2003 edition of the bestselling directory of world broadcasting on MW, SW and FM.

- 672 pages with:
- Equipment reviews and articles
- National and International broadcasts and broadcasters by country
- MW listings by region
- SW listings by frequency
- International SW broadcasts in English, French, German and Spanish listed by UTC
- TV by country
- Extensive reference section

Available in December from all good bookshops and electronic retailers or contact:
Order on-line at **www.wrth.com**
Fax: +44 (0) 1865 516717
Write to: WRTH Publications, PO Box 290, Oxford OX2 7FT

New from the publishers of WRTH…

THE SHORTWAVE GUIDE



208 pages of colour bar graphs showing AO2 and domestic frequencies by UTC and language, and other information.

"This brand new volume is … very easy to read and you can make quick reference for any and every shortwave frequency … the 'Shortwave Guide' is outstanding and a very valuable addition to the current library of every DXer, shortwave listener and international radio monitor. We would ardently hope … that we will see a new edition every year"
(Adrian Michael Petersen,
AWR Wavescan 400)

Find out more by visiting
www.wrth.com
NEW EDITION JUNE 2003.

Icom IC-E90

A transceiver and a general coverage receiver in the hand! Yes it's true...it's possible to transmit on 50, 144 and 430MHz and have extended receive coverage on both f.m. and a.m. modes from 495kHz through to 999.990MHz!

Multi-band f.m. Transceiver

Richard Newton G0RSN took a late caravan holiday - taking parents-in-law too! - and thoroughly enjoyed using the latest hand-held from Icom. The rig also seemed to be a favourite with the newest Amateur to join the Newton clan!

I've been enjoying myself using the latest offering from...the Icom IC-E90 multi-band f.m. transceiver. It's the new hand-held from Icom. It provides transmit and receive capability on the 50, 144 and 430MHz Amateur bands along with extended receive coverage in both f.m. and a.m. modes from 495kHz through to 999.990MHz. The IC-E90 presents itself as a rugged well-made unit. Finished in black and grey the transceiver has a rather impressive and professional feel about it. Weighing in at a reassuring 280g it's what I call one of the short stubby hand-helds and measures 58 wide x 87 high x 29mm deep.

The IC-E90 is supplied with a 7.4V 1300mAh lithium Ion battery, a wall charger, and rather stylish swivel belt clip. There's also a hand strap and a helical antenna, which itself has a choice of two extensions, one for 144/430MHz and the other covering all bands including 50MHz.

The handbook supplied with the Icom IC-E90 includes a handy pocket guide. This is very useful as it also acts as a crib sheet for the more common commands.

Impressive Power

The IC-E90 offers an impressive 5W output power...even when running on the supplied battery pack. It also boasts being 'splash proof'... although I didn't feel like putting this to the test!

On getting the rig out of the box I was impressed with the look and the feel....and to be honest there's a definite aura of quality about it. One of the first things that impressed me was the size of the display and the rig's ease-of-use. The read-out was a good size and despite the radio being compact the buttons are relatively large and well labelled.

I discovered that the Icom IC-E90 offers the operator two separate v.f.o.s. Although these cannot be simultaneously monitored, they do provide the operator with access to two frequencies on a tuneable band very quickly.

The quick access feature is useful as the IC-E90 covers many bands. For example, toggling between the 144 band 430MHz bands would be somewhat laborious had I not been able to set one v.f.o to 145.500MHz and the other to 433.500MHz.

The IC-E90 offers an impressive memory system to go with the considerable frequency coverage. It offers 25 pairs of band edge memories for programmed scanning between two given frequencies, it offers five **Call** channels and 500 standard memories.

In practice the 500 memories can be organised using 18 banks identified by letters of the alphabet. Each of these 18 banks gives 100 locations to provides the user with a great deal of flexibility.

● A close-up view of the IC-E90. Richard G0RSN says "The front panel, display and controls are extremely well laid-out". Even 9-year old Thomas Newton M3TJN found it both easy to operate and to hold in his small hands (See text).

● Rear view of the IC-E90, with the battery detached. The special moulded clip for the belt attachment (see text) can also be seen.

● The IC-E90 and the two supplied antennas posed alongside the transceiver itself (the belt clip is shown attached to the transceiver).

The IC-E90 does not have a function key to access an individual key's secondary job. Instead, all you need to do is keep a key depressed for a second or so to have instant access to the secondary feature. This makes one-handed operation much easier!

Even the menu on the IC-E90 can be simplified and less essential settings (such as changing the backlight colour), can be disabled until the operator feels more confident or just for ease and simplicity of operation. Incidentally the keys can be very effectively backlit with a choice of three colours, red, orange or green.

The extended receive coverage on this radio does make it a good companion for travel. Especially so if the operator is interested in things such as Air band and Marine band operation. The other plus points are pre-programmed TV audio channels and wide f.m. (w.f.m.) mode selection available for broadcast band radio.

An impressive choice of tuning steps to compliment the IC-E90's extended receive capability. It will tune using 5, 6.25, 8.33, 9, 10, 12.5, 15, 20, 25, 30, 50, 100 and 200kHz steps. Really comprehensive eh?

Out & About

Having checked everything...it was time to take the IC-E90 out and about and for the first evaluation I decided to take the rig to work. (I work in Poole, Dorset and sometimes listen to the Marine band during my occasional breaks).

I was very impressed at the IC-E90's on air performance...even with just the helical antenna it performed just as well as my AOR8000 receiver. I listened on the perhaps most commonly monitored frequencies of 156, 156.8, and 156.375MHz together with the local harbour control on 156.700MHz.

My wife **Diane** and I then decided to take the caravan away for one last trip before packing it away for the winter. Father-in-law **Terry G7VJJ** and Mother-in-law **Barbara** were also joining us on this weekend trip to Surrey.

So one Friday in October off we set, with our two boys **Thomas** and **Oliver** and the IC-E90. At this point I would like to proudly announce that Thomas, aged just 9 years has recently become **M3TJN* (see note)** and takes Amateur Radio into its third generation in our family.

The weekend proved to be rather interesting as this was the weekend that the storms hit the British Isles! Did this deter me, oh no, whatever the weather...the review must go on!

Thomas was very keen to get his hands on the IC-E90 and give it a go. Incidentally, when away in the caravans Terry and I normally keep in contact between 'vans using an 'out of the way' 145MHz frequency.

Thomas really enjoyed using the IC-E90 to keep in touch with grandad. He seemed to master the main controls very quickly and the rig became his contact companion around the site, even when going for his shower (good job it was splash proof in the end!).

To bring a young Amateur's perspective on the review I asked Thomas to tell me what he thought the best thing about the IC-E90 was. He thought hard and said... "Well Daddy, the way you can make the buttons light up red was really cool"! So - there you go...a youngster's opinion!

It was interesting to note that Thomas could easily operate the rig with one hand. It seemed to fit as snugly into his small hands as it did in my shovel-sized versions.

***Note:** See news item 'Newton's New Recruit', page 15 December PW. **Editor**.*

Air & Broadcast

The caravan site we stayed on was just to the North of Redhill and Reigate and was not too far away from Gatwick and Heathrow airports. So Air band listening was too much of a temptation to ignore.

I lost track of counting the number of strong signals I could hear across the air band. I had at least 17 in memories. The receive audio was excellent in a.m. Again the IC-E90

"Amateur Radio is great fun" says Thomas M3TJN to his brother Oliver during an Autumn caravan holiday where he enjoyed using the IC-E90.

compared very favourably indeed with my AOR8000.

Apart from listening round to the air band the Icom IC-E90 was very useful for listening into the broadcast band radio. The BBC Radio 2 on Band II v.h.f. w.f.m. reception using the supplied helical whip was much better than I had expected.

However, besides listening round I knew it was nearly time to put the IC-E90 to the test on transmit. So, early one evening, plaintiff calls went out on 51.51 and 433.500MHz with no effect. I then tuned around on the 145MHz band and found **Ivor M0IMT** and **George G1FXP** in conversation on the Royal Naval Amateur Radio Society (RNARS) net.

I was only using the helical antenna, while standing outside in the freezing cold and the pitch black I might add! Ivor was in Warlington about 9km away from me and George was in Hanwell, a distance of about 30km. I was amazed that Ivor was a 5 and 9 signal with me and I could hear George although he was only just lifting the squelch.

Ivor was very kind and let me in for a quick chat, George could just hear I was there but we could not make a contact. Ivor however reported that there was: "no problem at all". I was delighted to hear that he considered the audio from the Icom IC-E90 was... "very clear indeed". (Not bad for 5 watts into a helical whip!).

The following morning I decided to have another look round for some local repeater activity. I heard two stations talking on the West Sussex repeater on 145.750MHz; which was situated in Crawley about 17km to the south of me.

The repeater was about a 5 and 5 signal at my location and the two stations were **Nick M0NIK/M** and his son **Jamie M3JRT**. Nick seemed to be on the way home and his son had just gone off to get the kettle on.

I was lying in bed in the caravan and tongue-in-cheek I called Nick – and got a reply! The IC-E90 never ceased to amaze me, as I then noticed it was on **low power, just 500mW!**

Nick came back to me and immediately commented on the "cracking audio". I explained my operating conditions and Nick said: "Well it's absolutely beautiful, if you hadn't said it was a hand-held I wouldn't have known". He added..."Good trip on a hand-held"!

I then had a thoroughly enjoyable chat to Nick, during which I had to put the power up to the high setting to maintain the contact This meant the rig did warm up a bit the more I waffled, but at least it kept my hands warm!

Enjoyed Evaluation

I really enjoyed evaluating the IC-E90...and if I could change anything it would be an addition to the output power settings. The output power of 5W on battery was useful but I would have liked to see a mid setting of about 2W for those occasions where 500mW is not quite enough, but 5W is too much considering the heat produced, and battery power used. And on this topic, the radio operates at around 11V, which requires a special adapter (car cigarette lighter style) to charge it from the standard 13.8V system on modern vehicles.

In conclusion, I think that the IC-E90 is a cracking little rig. It **is small** but no matter what mode or band, the audio quality on receive seemed excellent. It performed brilliantly for a hand-held and got excellent reports on the transmitted audio. In short – I liked it and so did Thomas!

PW

Product

Icom IC-E90 50, 144 and 430MHz transceiver

Company

Icom (UK) Ltd.

Contact

Tel: (01227) 741741

Pros and Cons

Pros: *...a rugged well-made unit....The extended receive coverage on this radio does make it a good companion for travel. Especially so if the operator is interested in things such as Air band and Marine band operation. The other plus points are pre-programmed TV audio channels and wide f.m. (w.f.m) mode selection available for broadcast band radio. It performed brilliantly for a hand-held and got excellent reports on the transmitted audio. In short – I liked it and so did Thomas!*

Cons: *... "if I could change anything it would be an addition to the output power settings. The output power of 5W on battery was useful but I would have liked to see a mid setting of about 2W for those occasions where 500mW is not quite enough, but 5W is too much.....A separate In-Car (d.c. to d.c. converter fitted with cigarette lighter style plug) adapter line cord is required to run the rig from 13.8V d.c.*

Price

£339.99 r.r.p.

Summary

The Icom IC-E90 is a cracking little rig. It is small but no matter what mode or band, the audio quality on receive seemed excellent.

Accessories

In-car adapter power cord with in-line d.c. to d.c. converter (see text). £19.99 r.r.p.

Supplier

Icom UK Ltd,
Sea Street,
Herne Bay,
Kent CT6 8LD.
Tel: (01227) 741741,
FAX: (01227) 741742.
E-mail: info@icomuk.co.uk

THE SITE YOU CAN TRUST

SECURE ONLINE ORDERING

24hr SHOPPING

NEVADA ONLINE STORE

www.nevada.co.uk

Order ONLINE, PHONE, FAX, POST - or come and see us at our WA

ICOM IC-756 Pro

~~£2695~~ **£2495** P&P £10 | 3 CHEQUES OF **£835.00**

PAY BY CHEQUESPREAD INTEREST FREE!

KENWOOD TS-2000

£1695 P&P £10 | 3 CHEQUES OF **£568.33**

PAY BY CHEQUESPREAD INTEREST FREE!

YAESU FT-1000MP MkV FIELD

£2195 P&P £10 | 3 CHEQUES OF **£735.00**

PAY BY CHEQUESPREAD INTEREST FREE!

ICOM IC-910

1.2GHZ & DSP OPTIONAL

~~£1399~~ **£1249** P&P £10 | 3 CHEQUES OF **£419.66**

PAY BY CHEQUESPREAD INTEREST FREE!

KENWOOD TS-570 DGE

~~£999.95~~ **£849** P&P £10 | 3 CHEQUES OF **£286.33**

PAY BY CHEQUESPREAD INTEREST FREE!

YAESU FT-1000MP MkV

NOW WITH FREE ACCESSORIES

£2799 P&P £10 | 3 CHEQUES OF **£936.33**

PAY BY CHEQUESPREAD INTEREST FREE!

ICOM IC-706 Mk IIG

~~£1299~~ **£849** P&P £10 | 3 CHEQUES OF **£286.33**

PAY BY CHEQUESPREAD INTEREST FREE!

KENWOOD D700E

£449 P&P £10 | 3 CHEQUES OF **£153.00**

PAY BY CHEQUESPREAD INTEREST FREE!

YAESU FT-920

~~£1199~~ **£1099** P&P £10 | 3 CHEQUES OF **£369.66**

PAY BY CHEQUESPREAD INTEREST FREE!

ICOM IC-7400

PRICE MATCH

£1449 P&P £10 | 3 CHEQUES OF **£486.33**

PAY BY CHEQUESPREAD INTEREST FREE!

KENWOOD TH-F7E

£259 P&P £10

3 CHEQUES OF **£89.66**

PAY BY CHEQUESPREAD INTEREST FREE!

YAESU FTV-1000

£799 P&P £10 | 3 CHEQUES OF **£269.67**

PAY BY CHEQUESPREAD INTEREST FREE!

ICOM IC-718

~~£699~~ **£549** P&P £10 | 3 CHEQUES OF **£186.33**

PAY BY CHEQUESPREAD INTEREST FREE!

KENWOOD TH-D7E

£319 P&P £10

3 CHEQUES OF **£109.66**

PAY BY CHEQUESPREAD INTEREST FREE!

YAESU FT-100D

£799 P&P £10 | 3 CHEQUES OF **£269.66**

PAY BY CHEQUESPREAD INTEREST FREE!

USED EQUIPMENT

BUY WITH CONFIDENCE!

All safety tested & guaranteed for 3 months

VHF EQUIPMENT

AKD 7003	70CM 3W TRANSCEIVER	89.00
ALINCO DJ-G5EY	2M/70CM HANDI TRANSCEIVER	195.00
ALINCO DJ-SR1	PMR 446 TRANSCEIVER	79.00
ICOM IC-2800H	2M/70CM MOBILE TRANSCEIVER	299.00
ICOM IC-T8E	6M/2M/70CM HANDI	225.00
KENWOOD TM241E	2M MOBILE TRANSCEIVER	159.00
TRIO TR-7800	2M FM 25W TRANSCEIVER	149.00
YAESU FT290RII	2M MULTIMODE PORTABLE	249.00
YAESU FT40R	70CM HANDHELD	119.00
YAESU FT4700RH	2M/70CM FM MOBILE W/SEP KIT	225.00
YAESU FT-690R+FL6020&MB		
6M MULTIMODE+AMP & MOB MNT		299.00
YAESU FT-90R	M/70CM MOBILE TRANSCEIVER	285.00

RECEIVERS & SCANNERS

ALINCO DJX-2	HANDHELD SCANNER	125.00
AOR AR-8000	HANDHELD SCANNER	169.00
YUPITERU MVT-7100	HANDHELD SCANNER	169.00
HITACHI KH-WS1	WORLDSPACE RECEIVER	100.00
JRC NRD345	HF RECEIVER	375.00
KENWOOD R-5000V	HF RECEIVER+VHF FLT&IF-232	599.00
LOWE HF225	+CASE, FM&K PAD HF RECEIVER+ACC	329.00
REALISTIC DX-394	HF RECEIVER	99.00
ROBERTS R-861	SHORTWAVE RECEIVER	129.00
YAESU FRG-100	HF RECEIVER	299.00
YAESU FRG-9600	BASE SCANNING RECEIVER	299.00

HF TRANSCEIVERS

ALBRECHT AT485S	10M MULTIMODE TRANSCEIVER	129.00
ICOM IC-746	HF/6M/2M 100W TRANSCEIVER	899.00
ICOM IC-775DSP	200W HF BASE TRANSCEIVER	1695.00
KENWOOD TS-50S	HF MOBILE TRANSCEIVER	425.00
KENWOOD TS-680S	HF + 6M TRANSCEIVER	475.00
KENWOOD TS-850S	100W HF TRANSCEIVER	499.00
KENWOOD TS-950S	150W HF BASE TRANSCEIVER	899.00
PRESIDENT LINCOLN	10M MULTIMODE TRANSCEIVER	159.00
YAESU FT-1000	200W HF TRANSCEIVER	1199.00
YAESU FT-757GXII	100W HF TRANSCEIVER	399.00
YAESU FT-817	HF-70CM PORTABLE TRANSCVR	499.00
YAESU FT-920AF	HF/6M 100W TRANSCEIVER	899.00

ACCESSORIES

ALINCO EME -12	HEADSET/MIC	25.00
DAIWA LA-2080H	2M 80W AMPLIFIER+PREAMP	85.00
DAIWA PS-300	25-30AMP PSU	79.00
DATONG FL2	AUDIO FILTER	55.00
DATONG FL3	AUDIO FILTER	59.00
GLOBAL AT-2000	RX ANTENNA TUNER	69.00
HITACHI KH-YG1	WORLDSPACE YAGI KIT	39.00
ICOM BC-135	BASE CHARGER UNIT	29.95
ICOM PS-85	20A POWER SUPPLY	159.00
KENWOOD AT-250	AUTO ATU	175.00
MANSON EP-15	15A POWER SUPPLY	49.00
MFJ 1020C	ACTIVE ANTENNA TUNER	59.00
MFJ 971 TUNER	MOBILE PORTABLE ATU	69.00
MIRAGE B3016	2M 10-160W AMPLIFIER	179.00
REACE FS1-5	SWR/POWER METER	19.00
SGC SG-230	AUTO ANTENNA TUNER	299.00
TOKYO HL100B/21-28	LINEAR AMP 10-100W 21-28MHZ	129.00
WATSON WS-2090H	2M 5W-80W LINEAR AMP	89.00
YAESU FF-501DX	1KW PEP LPF UNIT	20.00
YAESU FIF232C VAN	COMPUTER INTERFACE (FT736)	59.00
YAESU MD-1C8	BASE MIC YAESU 8 PIN	59.00
YAESU MF-1+SB10	BOOM MIC & SWITCH BOX	35.00
YAESU MH-1B8	HANDHELD MICROPHONE	19.00

antennas and accessories

Noise Killers from TIMEWAVE

NOW with PSK31 INTERFACE

TIMEWAVE DSP 599ZX

DSP Noise & QRM Filter, RTTY Modem, Radio/Sound Card Interface

- Eliminate heterodynes
- Filters QRM
- Brickwall PSK31 filter
- Sound card interface
- Binaural CW
- CW spotlight
- Enhanced noise reduction

£389.95 P&P £10 | 3 CHEQUES OF **£133.31**

PAY BY CHEQUESPREAD INTEREST FREE!

ANC-4

Antenna Noise Canceller & Diversity Combiner

- Cancels S-9 line noise
- Nulls strong interfering signals
- Makes two antennas into phased array
- Wipes out noise before it hits your receiver
- Works with any transceiver/receiver +LOTS MORE!

£199.95 P&P £10 | 3 CHEQUES OF **£69.98**

PAY BY CHEQUESPREAD INTEREST FREE!

CABLE DEALS

per 100 metre drums

SPECIAL PRICE!

RG58 C/U Mil spec	~~£38~~	**£25**
RG213TM Low Loss	~~£75~~	**£55**
H100 Semi Airspaced	~~£95~~	**£65**
Westflex 103 Ultra Low Loss	~~£99~~	**£89**
300 Ohm Twin feeder (slotted)	~~£89~~	**£69**
450 Ohm Twin feeder (slotted)	~~£99~~	**£79**

Postage & Packing £10

DAIWA SWR/POWER METERS

CN801H 1.8 - 200MHZ 2KW **£109.95**

CN801V 140 - 525MHZ 200W **£119.95**

CN101L 1.8 - 150MHZ 1.5KW **£59.95**

CN103LN 140 - 525MHZ 200W **£65.95**

Please add £6 P&P (UK mainland)

SGC SG-230 AUTO ATU

- 1.8 - 30MHz • 200W PEP

£359.95 P&P £10 | 3 CHEQUES OF **£123.31**

PAY BY CHEQUESPREAD INTEREST FREE!

Iron Horse ATA270

Dual band glass mounted antenna

- FREQUENCY: 144-148/440-450MHz
- GAIN: 2.6dB over 1/4 l at 2m 4dB over 1/4 l at 70cm
- TYPICAL VSWR: Less than 2.0:1 through the bands
- MAX POWER: 50 Watts
- Field tuneable
- 14ft RG58 cable with PL259
- 26in copper plated whip, black finish

£29.95 *Postage & Packing £4*

MFJ Antenna Tuners & Accessories

MFJ-259B	Antenna Analyser 1.8-170MHz	£249.95
MFJ-269	Antenna Analyser HF/VHF/UHF	£369.95
MFJ-914	Auto Tuner extender 300W	£64.95
MFJ-914E	1.8-30MHz 300W Tuner	£129.95
MFJ-945E	1.8-60MHz 300W Tuner	£119.95
MFJ-948	1.8-30MHz 300W Tuner w/Balun	£139.95
MFJ-949E	1.8-30MHz 300W Tuner+D/load	£159.95
MFJ-969	1.8-60MHz 300W Tuner	£199.95
MFJ-971	1.8-30MHz 200W Portable Tuner	£99.95
MFJ-986	1.8-30MHz 1500W Tuner	£349.95
MFJ-989C	1.8-30MHz 1500W Tuner+D/load	£379.95

COMET

Comet Base Antennas

GP-15N	50, 144, 430MHz, L: 2.4m 300W PEP	£89.95
GP-1	144/430MHz 3/6dB 1.25mtrs 200W	£49.00
GP-3	144/430MHz 4.5/7.2 1.78mtrs 200W	£59.95
GP-6	144/430MHz 6.5/9.0 3.07mtrs 200W	£89.95
GP-98	144/430/1.2GHz 2.94mtrs	£129.95

Comet Filters

CF-30S	32MHz low pass filter, 150W CW	£19.95
CF-30MR	32MHz Low pass, 1kw PEP	£37.50
CF-50S	50MHz low pass filter, 150W CW	£21.50
CF-50MR	50MHz low pass, 1kw PEP	£37.50

Comet Baluns

CBL-2000	0.5 - 60MHz 2kW 1:1	£27.50
CBL-30	1.7 - 30MHz 1kW 1:1	£21.95

Comet Duplexers

CF-416A	144/430MHz SO239/PL/PL	£27.50
CF-416B	144/430MHz SO239/PL/'N'	£28.50
CF-360A	1.3-30MHz/49-470MHz SO239/PL/PL	£37.95
CF-530	1.3-90MHz/125-470MHz SO239/PL/PL	£39.95

Comet Triplexers

Comet CFX-431A 144/430/1200MHz £46.00

HEIL PRO SET 4

For contesters & DX'ers who want to cut through the pile ups. Using Hc4 insert. ***£129.95***

HEIL PRO SET 5

A fuller range insert for rag chewers who want quality with clarity. Hc5 insert. ***£129.95***

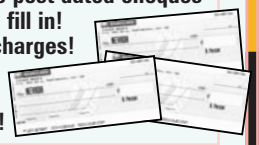
Postage & Packing £7.50

CHEQUESPREAD

- Simply divide the price *(including carriage)* into 3 equal payments.
- Write 3 cheques dated in consecutive months starting with today's date.
- Write your telephone number, cheque card number and expiry date on the back of each cheque.
- Post them to us, enclosing your name & address & we will *(subject to status)* send your goods immediately.

INTEREST FREE!

- **Pay by three post dated cheques**
- **No forms to fill in!**
- **No hidden charges!**
- **No hassle!**
- **No catch!**
- **No problem!**



CHEQUESPREAD prices quoted include postage & packing CHEQUESPREAD minimum order: £99

• LARGE STOCKS • FAST DELIVERY • EXPERT ADVICE • USE YOUR CREDIT CARD FOR SAME DAY DESPATCH • LARGE STOCKS • FAST DELIVERY

AREHOUSE ORDER HOTLINE 023 9231 3090

yaesu

YAESU FT-897

£1199 P&P £10 | 3 CHEQUES OF £403.00
PAY BY CHEQUESPREAD INTEREST FREE!

hitachi

KH-WS1

£149 P&P £10 | 3 CHEQUES OF £53.00
PAY BY CHEQUESPREAD INTEREST FREE!

yaesu

YAESU VX-7R

£329 P&P £10
3 CHEQUES OF £113.00
PAY BY CHEQUESPREAD INTEREST FREE!

joyeaer

WS-2000

£129.95 P&P £10 | 3 CHEQUES OF £46.65
PAY BY CHEQUESPREAD INTEREST FREE!

yaesu

YAESU FT-847

~~£1699~~ £1199 P&P £10 | 3 CHEQUES OF £403.00
PAY BY CHEQUESPREAD INTEREST FREE!

timewave

ICOM 2725

£349 P&P £10 | 3 CHEQUES OF £119.66
PAY BY CHEQUESPREAD INTEREST FREE!

yaesu

YAESU FT-817

~~£799~~ £595 P&P £10 | 3 CHEQUES OF £201.66
PAY BY CHEQUESPREAD INTEREST FREE!

timewave

ICOM E-90

£299 P&P £10
3 CHEQUES OF £103.00
PAY BY CHEQUESPREAD INTEREST FREE!

yeasu

YAESU FT-8900

£399 P&P £10 | 3 CHEQUES OF £136.33
PAY BY CHEQUESPREAD INTEREST FREE!

president

PRESIDENT LINCOLN

21W 10 Mtr Multimode Transceiver

~~£225~~ £199 P&P £10 | 3 CHEQUES OF £69.66
PAY BY CHEQUESPREAD INTEREST FREE!

Buy an FT1000MP Mk V Field before 31st December and we will give you either -

- Two filters of your choice **FREE OF CHARGE** - or
- VX1R Dual Band Handheld **FREE OF CHARGE** - or
- MD-200ABX Base Mic - **for just £99** *(A DISCOUNT OF £155.95!)*

£2195 OR PAY BY 3 CHEQUES OF £735

ALINCO DX-70TH

Fully Featured Portable HF+6mtr Transceiver

- TX - all HF + 6mtr
- 100W output on HF & 6mtrs
- RX - general coverage 150kHz - 30-MHz, 50MHz - 54MHz
- SSB, CW, AM, FM and digital modes
- 100 memories
- Narrow filters fitted as standard

10W-100W SWITCHABLE

~~£699~~ SPECIAL £599

KENWOOD THF-7E

SAVE £31

PAY BY 3 CHEQUES OF £89.66

YAESU VX-7R

THE WORLD'S FIRST SUBMERSIBLE* TRIPLE BAND HANDHELD

- Tough magnesium body
- Dual Receive, 50/144/430 MHz operation plus wide-band RX
- Internet key for quick access to the new WIRES™ repeater-internet linking system

** RATED FOR 30 MINS SUBMERSION AT A DEPTH OF 3FT*

NEW!

£329

MAHA *the worlds best chargers!*

£79.95 P&P £7.50

£39.95 P&P £6.50

MAHA MH-C777 Plus MkII

with NEW features!

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

MH-C204F Plus

3 HOUR INTELLIGENT CHARGER

- Rapid charge 2 or 4 AA/AAA NiCD/NiMH batteries
- Rejuvenate and restore dead batteries
- Can be used on a 12V power supply
- Supplied with: Set of 4 AA 1800 mAH NIMH High Power Batteries, UK AC Adaptor, Car Cigar Adaptor Kit

Yaesu FT817 - Heavy Duty Battery Pack MH-FNB72

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

£59.95 P&P £2.75

PALSTAR *where QUALITY counts*

NEW! IMPROVED VERSION

PALSTAR PS-50

£149 £10 P&P
3 CHEQUES OF £53.00

40/50 Amp, 13.8V DC heavy duty precision bench supply with meters. Featuring both short circuit and overload protection, has a thermostatically controlled fan cooling system. Precision voltage and current metres allow accurate voltage and current monitoring.

PALSTAR PS-30

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

£99.95 £10 P&P
3 CHEQUES OF £36.65

PS-15 *15 Amp 13.8 Volt*

- 12A/15A max
- Foldback current protection
- Thermostatically controlled cooling fan
- DC output 4mm sockets & 2 pairs of snap in terminals

£59.95

PS-06 *6 Amp 13.8 Volt*

- 4/6A max
- Foldback current protection
- DC output 4mm sockets and cigar socket
- 2.4kg, Size: 160 x 92 x 165mm

£29.95

PS-04 *4 Amp 13.8 Volt*

Ideal for basic CB Radios. As PS-06 except:
• 2A/4A max • Size: 160 x 92 x 150mm *£19.95*

Palstar AA30

Active Antenna Matcher for Receiver use only. A low loss antenna tuner suitable for random long wire, dipoles, Beveridges, Delta loops, inverted V's, Verticals, G5RV and most receiving antennas. Or use as a standalone active antenna.
• Frequency 100kHz-30MHz *£69.95*

PALSTAR AT1500 CV

1.5kW HF Antenna Tuner

- Now with heavy duty edge-wound **silver plated roller inductor** for ***ultra high efficiency*** and ***reliability***
- Matches dipoles, centre fed doublets, G5RV's balanced feeders, Verticals, single wire, delta loops, beams, windoms, Inverted V's
- Built in 4:1 balun for balanced wire feeders
- Bypass position for quick straight-through antenna connection with SWR/POWER monitoring
- 6 position antenna selector switching
- Average power meter reading to 3000W
- Vernier dial plates for more accurate settings

£389 £10 P&P
3 CHEQUES OF £133.00

Palstar WM150

High Power X needle SWR/Power Meter
Frequency: 1.8 - 150 MHz
Power: 300w/3Kw (Average or Peak)
£69.95 *Postage & Packing £7.50*

Palstar External Baluns

B1500	1.5Kw	4:1	(1.8 - 30)MHz	£35.95
B1500C	1.5Kw	1:1	(1.8 - 30)MHz	£35.95
B4000	4.0Kw	4:1	(1.8 - 30)Mhz	£79.95
B400/4	200w	6:1	(3.0 - 30)MHz	£19.95
LWB	100w	6:1	Long wire	£29.95

Palstar Wire Antennas

Windom	40 - 10 Mtrs (3 band)	£49.95
Windom	80 - 10 Mtrs (6 band)	£59.95
G5RV 1/2	40 - 10 Mtrs (Flexweave)	£29.95
G5RV full	80 - 10 Mtrs (Flexweave)	£34.95

Palstar Low Pass Filter

FL30	1.5Kw (1.8 - 30)MHz	£49.95
Roller Inductor R128C	28 micro H Ceramic Inductor	£99.95

Palstar Capacitors

VC350	350 Pf 6Kv Variable	£69.95
VC220	220 Pf 4Kv Variable	£49.95

Palstar Dummy Load

DL300	300W (1.8 - 30)MHz	£29.95

Palstar Insulators

Hi Q	6" Ribbed	£2.95
INS03	3" Strain insulator Black	£1.70

www.nevada.co.uk

nevada®

MORE than a radio store

ALL GOODS SHIPPED FOR 24 HR DELIVERY P&P: £10 (UK Mainland) unless otherwise stated E&OE

ORDER HOTLINE

023 9231 3090

Unit 1 • Fitzherbert Spur • Farlington • Portsmouth • PO6 1TT
e-mail: info@nevada.co.uk website: www.nevada.co.uk fax: 023 9231 3091

• EXPERT ADVICE • USE YOUR CREDIT CARD FOR SAME DAY DESPATCH

silent key SALES

One of the major problems - when it comes to disposing of 'Silent Key' Amateur Radio equipment - is that the families of the late Amateur often see it as junk, just fit for the skip. However, as Worthington our sardonic cartoonist has graphically illustrated...others can often see the junk as treasure! But with a little help from the right people...many problems can be overcome and the vultures kept at bay.

Helping at a very difficult time - an introduction from G3XFD

The Editor writes: This article has been under preparation for a long time. Its origins lie in the increasing numbers of 'Can you help' enquiries from (very often) the widows and (occasionally) the families of Radio Amateurs who had died. Unfortunately, sometimes we were only contacted **after the equipment had been disposed of**...from the families concerned when they were beginning to think they had been 'ripped off' or had been taken advantage of. In those cases we weren't able to help.

We're aiming to provide a guide compiled from information from those who've been directly involved with Silent Key (SK) sales, cataloguing, etc, or have suffered at the hands of our hobby's equivalent of the 'Antique Knockers'. The Knockers are often truly despicable characters who literally knock on the doors of homes - mostly in the country and away from big cities - offering to value and buy antiques for cash. This they usually do, **but mostly offering only a tiny fraction of the item's worth**. The Knockers have been a real problem for many years...particularly in the remoter parts of England, Wales, Scotland and in the Republic of Ireland.

You may think there's only a tenuous connecton between someone (perhaps) parting with a valuable clock to Knockers and SK sales...but you'd be wrong! I say this because amongst all the goodwill and friendship in Amateur Radio there's **a very small** minority of opportunist 'sharks' waiting to pounce on the unwary. The idea of this article is to help you and your family avoid meeting them!

Rob Mannion G3XFD

With a great deal o there...done that" compilation of idea the Amateur Radio

Firstly, I should mention that the vast majority of disposal sales, etc., are both honest and successful. Most radio enthusiasts are keen, honest and not likely to try and rip off other enthusiasts, **or the families of SK operators**. Experience has also shown that the clubs which we contact to help relatives organise disposal sales...**do their very best to assist.**

Unfortunately it's usually the tiny minority who cause problems. **They must be discouraged**.

Remember also, that there's often a fine dividing line between a keen collector and an avaricious bargain hunter, determined to get what they want come hell or high water! Additionally, some collectors - because of their activities and through-flow of equipment - often may seem to be commercial radio traders. **This causes great fricton**...and I speak from experience again...because it's often my ear that's bent when readers complain!

All the contributors to this compilation article wish to remain anonymous and I respect their wishes. After all it's in a good cause and the information is needed, so that others can avoid the pitfalls.

To set the scene, I now want to pass on one particular story which both **Tex Swann G1TEX** and I know to be 100% true. **It will clearly demonstrate to you that unscrupulous people exist on both sides of the sales counter!**

Large House & Sale

The story revolves around a large house in the west country some 10 years ago...which was literally stuffed to the eaves with radio equipment, much of it Amateur Radio biased. The widow of the SK asked for help, and because of connections to a particular school...the organiser of the school radio club, a Radio Amateur himself, became deeply involved.

Not only did the Amateur himself become the organiser of the SK sale...he also had the full support of his young family (they attended the school) and colleagues from his office. Indeed, they all gave up several Saturdays to catalogue material and help. One young colleague - not involved in any way with the hobby - ended up becoming a (very busy) car parking attendant!

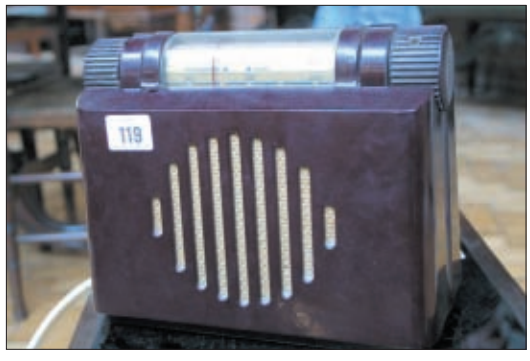
On the sale day, the organising Amateur and his supporters got the sale going. The event was a tremendous success...raising well over £5000, and apart from some over-keen collectors slavering after military equipment...it was mostly very good natured.

At the end of the day however, (everyone was exhausted) none of the equipment that had been **specifically promised for the school radio club** was forthcoming...as the widow had

● Business is always brisk at local auctions! At the start of a busy day Auctioneer Keith Harris begins work on behalf of Riddetts of Bournemouth. *Photographic facilities courtesy of Riddetts, Auctioneers & Valuers, Bournemouth.*

● "Your bid Sir"? Keith Harris in full swing during the very professional, honest auction sale in Bournemouth. But...need Silent Key equipment end up in an auction sale at all? (see text). *Photographic facilities courtesy of Riddetts Auctioneers & Valuers*

f assistance and advice from PW readers who have "been regarding organising Silent Key Sales, the Editor presents a ns and suggestions dealing with this often distressing aspect of Hobby.



● Much sought after nowadays... these Bakelite cabinet receivers could have easily ended up in a skip 15 to 20 years ago. Good prices can be achieved at local auctions - for the buyer! It's always worthwhile considering attending specialised sales...you could get a better price (See text).
Photo facilities courtesy of Riddetts.

sold it all! No 'Thank Yous' were offered for all the hard work, and there was even worse to come!

Once home the organising Amateur was told by his wife that just as the sale started...the daughter-in-law of the SK appeared. The daughter-in-law positioned herself behind the organiser's wife - who was acting as cashier and keeping a record and issuing receipts.

It was fortunate that the organiser wasn't told of this at the time...because his wife told him she was being closely observed throughout the sale...obviously just in case fraud was involved. The organiser was very upset at this distrust...and I'm sure there would have been an immediate walk out of all the volunteers if this had come light during the event. Great anger - mixed with sadness - was expressed and the distrust that was shown left a stain on an otherwise successful day.

Trust Needed

So, it's obvious and essential...that there must be a great degree of trust between everyone involved in a SK sale.

Trust comes easily with friendship...although this isn't so easy to achieve when a SK has not been involved in the local club scene or carried on their hobby without any contact with other Amateurs. Here on the south coast we often have retired people who've moved in recently and didn't have time to

establish contact with the 'locals'.

Our Advice

So, when we are contacted for our advice by the family of a SK - usually on the telephone in the first instance...we're at a great disadvantage. **Firstly**, None of the *PW* team will have seen the equipment - often all described as 'Junk' (see the heading cartoon to get the idea!). **Secondly** the family wants to get rid of it as soon as possible, and **Thirdly**...the equipment always seems to be many hundreds of miles away from Dorset!

Often, the family have already made contact with local auctioneers who, as far as their expertise goes in the specialised area occupied by Amateur Radio equipment - try their very best to help. Incidentally, local **Auctioneers & Valuers Riddetts of Bournemouth,** through their Auctioneer **Keith Harris,** proved to be superbly helpful in providing photographic facilities for **Tex G1TEX** our staff photographer.

Amongst many pictures taken on the day, Tex also photographed the Auction house's trading licence (which lays down the ethics, the law appertaining to the profession, and its regulation very clearly indeed). Although we weren't able to use it in the magazine it clearly indicated to Tex just how seriously the Auctioneers take the job. Every effort is taken to provide the best service to their clients...from whichever side of the business transaction they are.

The Best Option?

The next obvious question must surely be: **Is selling specialised Amateur Radio equipment through a local auction house going to be the best option?** In answering (from personal experience) and from the reports sent in from readers...the answer on the whole has to be **"No"**.

The negative response does not reflect on the auction house themselves. Instead, it's directly due to our specialised hobby.

The only time it's usually worth sending equipment to auction would be if a quick sale is needed or if it's an older broadcast receiver - especially those manufactured in the pioneering plastic Bakelite. Additionally, really old equipment - **usually manufactured before 1930** - should only go into specialised auctions, and entered into a published catalogue which will provide maximum publicity and attract potential buyers.

Even then it must clearly be stated that entering a spceialised auction will all take time - sometimes many months. Take note also that the best price will only be achieved at an auction aimed at attracting buyers keen to purchase the increasingly collectable radios. These sales **are occasionally** held in the regions, but mostly they're held in London by companies such as **Bonhams**, **Christies** and **Sotheby's** (**See adverts in national press, especially at weekends for details)**.

Local Club

My advice to SK families is that they immediately contact

Cataloguing Your Equipment

A personal friend of mine, **John**, who is also a very great supporter of *PW* - wrote to me from the north west of England with an excellent idea dealing with cataloguing equipment. And he says...by doing it yourself you can help your family and friends when the time comes.

For obvious reasons John has to remain anonymous apart from his Christian name. But I'm sure you'll appreciate the reasons why I also think that his ideas **will assist you in future years**!

I can also assure you that John is literally full of life - enjoys the hobby very much and has not written himself off so to speak. He's just planning for the future in a common sense way...**and is certainly not a doom and gloom type**.

John writes: "I lost my wife seven years ago and now, at 75 years of age I need no persuading that I am in the final quarter of my life. Since my wife's death, I've thought frequently about my own mortality and in particular about the disposal of my Amateur Radio gear...and how I can make it easier for my three daughters to carry out the job.

All sensible people make a Will (as I have). As part of this they often leave instructions for the funeral arrangements and give directives about who is to receive specific items from the estate. It seems to me that it's not only desirable **but essential that the same sort of practical consideration be given to the Amateur Radio gear as part of the estate**. This will enable the grieving family to know what to do when the time comes and so avoid the 'rip off' situations we are so concerned about.

Most people will have a fairly good idea of what the usual house contents, etc., are worth...but won't have a clue when it comes to Amateur Radio equipment. Writing this and previous letters to you at the *PW* offices on the same subject...has made me sit down and think carefully! As a result I've come up with some practical steps which an Amateur could take to help their fmailieis in the future.

1: Nominate a personally known fellow Amateur, or alternatively a local Amateur Radio Club which the family can approach for help when the time comes.

2: Identify which items of your equipment you consider to have a saleable value so that anything else can be considered as junk.

3: On the base or rear of the saleable items, place a fluorescent yellow or orange sticker which will bear a number written in indelible ink to avoid fading.

4: Make a list of each item against its number. This list will give a brief description of the item, whether or not its home-brewed or commercial, its function, its working condition, its accessories (e.g. microphone), whether or not it has a box, or a manual, or any other details which you may consider applicable.

5: Do not place a value on the items you catalogue. This is because it will not be possible to know what future values will be at the time of death. It can be expected that commercial items will have the market value of the day. However, non-commercial items would be valued at the discretion of whoever is carrying out the sale.

6: Items exterior to the shack, e.g., beams, rotators, masts, antennas, etc., would be impractical to number but can be separately identified by description.

Rather Tedious?

John continued: "This may all appear to be rather tedious, but taken slowly over many weeks compiling the list should not be too difficult. There is however, one very important requirement for all this...**and that's having the courage to do it!**

Some may feel that they cannot face up to the reality of death...but I think it's wrong to simply to leave it all to chance **as so many do**. The result could be your grieving family struggling with something they don't understand.

All my suggestions are designed to help both the Amateur and non-enthusiasts who may become involved in the sale, to find out fairly quickly just what's what. We all know exactly what's in our shacks....but the 'other Amateur's shack' can be a complete mystery!

My suggested list should be a help towards the identification process, especially with home-brewed equipment. Furthermore, just as the contents of a will are made known after death, in the same way the Silent Key's instructions about their equipment should be known to the family. **Indeed they should be known before death**.

One important lesson I've learned from all this is that under the extreme stress of their bereavement all the widows want to do is "Get rid of everything". The 'Sharks' know this and move in for the kill. **That's why the widow of a deceased Amateur must never try to undertake the sale herself**.

The help of a friend, or as already suggested - the help of a good club must be sought. Any honourable club will undertake such a sale, and in my experience they won't take a commission for the service".

the local Amateur Radio Club. I will then usually write to the club concerned, telling them of my advice...and do my very best to get both sides together.

The club help idea relies entirely on goodwill. Despite this I also suggest - **from the very start** - that the family of the SK should be prepared to make a donation to the club's funds (although many clubs won't accept this offer).

Occasionally when I suggest the donation idea...I can detect a slight hesitation from the caller. This reaction brings me down-to-earth with the realisation that not everyone considers the collection of radio to be worthless junk...and that they don't want to share the proceeds!

Clubs are also advised to make sure that terms associated with any help offered are formally agreed. Whatever you do...**do not enter into the organising of a SK sale assuming anything!**

Incidentally, if a club is ever contacted by a Solicitor acting on behalf of a family (very rare)...a full contract should be agreed and signed... ensuring that there are no awkward clauses in the contract which could effect you or your club members. After all... you can be sure the Solicitor won't be acting on their behalf for free!

Nowadays full insurance has to be considered - we're fast beoming a nation of litigants - following where America leads! You should ensure you have both public liability and also possible accident cover, together with fire and theft.

Make sure every possible problem has been discussed and understood before you commit yourself. Don't forget, although you're doing it for the goodwill involved, to a great extent...the SK disposal is a way of raising money and also forms part of the family's grieving process. **Nerves can be taut and tempers fraught on occasions!**

Help Team

One club wrote to me to say that they've formed a 'Help Team' for possible SK sales. It's formed from a group of members - there's no really tight rules except one: **Only the members of the Help Team can deal directly with the family of the SK**.

The idea seemed a good one...but what prompted it? Did they perhaps have a spate of deaths? The answer came back as 'No'...our death rate in no higher than the average!

Instead, the decision was taken following an incident a few years back. This was when the club was contacted by the family of an Amateur who although known to the club...wasn't a member..

The request for help was mentioned at a monthly meeting and it was decided that a group would visit the home of the SK to see just what they could offer. Unfortunately, they were beaten to it by a club member! He had - by quoting the club name and the help requested - already visited the house and bought the entire collection as a 'job lot'! The equipment was then sold on almost immediately ...at an inflated price.

The club acted quickly and the errant member had his membership revoked because although he hadn't broken any laws...his actions were extremely unethical. The next step was to form the special Help Team which, although only in action a few times in the past ten years...has proved very effective.

The help team comprises of the Club Treasurer advising on the money side, someone wth knowledge of older and vintage equipment, a home-brew equipment enthusiast, and a member who has organised local rallies and club junk sales.

Ethical Approach

A strict ethical approach is adopted. None of the members are able to buy or become personally involved when a SK disposal sale is organised.

The system works well. The more saleable items are advertised for sale through special adverts - including *PW* - with the junk continuing on its migratory way through various shacks thanks to club junk sales!

Any surplus is donated to the **Radio Amateur's Invalid & Blind Club (RAIBC)**, or other radio charity for sale at the rallies they attend. Here it will again help to raise more funds - for someone else!

Last Words

My friend John rounded off his helpful letter (**reproduced in the box opposite left**), and also provides the last words in this article (after all he's deserved them hasn't he?) by saying: "Finally Rob...you know what they say..."There are only two certainties in life...death and taxes. You can try to avoid the latter and incur the wrath of the Inland Revenue...but there's no way you can avoid the former"! PW

● Although not radio orienthated...it's still of interest because old typewriters are becoming really collectable nowadays. Only a few years ago this typewriter could have ended up (like some radio equipment) in a skip. Fortunately, it's now being cherished by a collector. Moral?...Check before you dump...your 'junk' could be someone else's treasure! *Photo facilities courtesy of Riddetts.*

● Viewing time - potential buyers walk around the various lots to be auctioned. You can be sure that there's bound to be someone at the auction who is either a keen radio equipment collector...or knows who they can sell on to. Your decision to sell at a local auction has to be governed by your requirements: A quick sale and return for minimum fuss...or a longer wait for a more specialised sale? It's your choice (See text). *Photo facilities courtesy of Riddetts.*

● Because they appealed to many non-specialist users...the Eddystone EC10 receiver (and its variants) proved to be popular with the general public and they often feature at local auctions. However, even though they are not nowadays considered to considered true 'Amateur' equipment - the advice is "buy...but not sell" at local auctions. With this approach you might attend and find yourself a bargain! *Photographic facilities courtesy of Ken O'Brien.*

● Radio Amateurs and listeners alike know that 'collectables' such as the Eddystone 770R shown here are sought by avid collectors. Unfortunately...the families who organise Silent Key sales may not be aware of this...but it is possible the original owner of the equipment to help by cataloguing their own equipment (see text). *Photographic facilities courtesy of Ken O'Brien.*

Carrying On The Practical Way

For his first session of the new year the Rev. George Dobbs G3RJV is aiming to "Get you on Top Band"...with a converter to fill the gap. After you've read the quotation first of course!

"Trust the still, small voice that says, 'this might work and I'll try it".

Diane Mariechild

● This month's project...a simple converter is aimed at getting you on 1.8MHz if you've got an older receiver without the band.

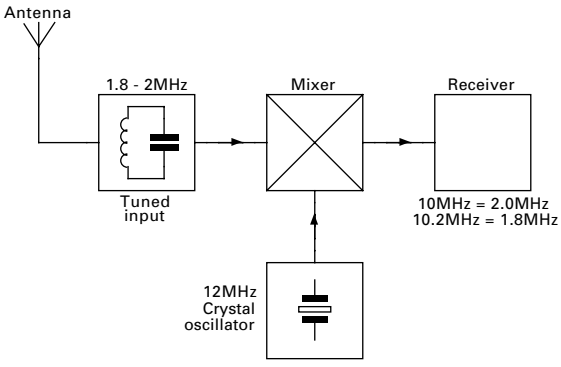
When I began my time as a Radio Amateur, the first signals I transmitted were on 1.8MHz...'Top Band'. In those days it was the usual band for beginners. Like many others of my generation, I began with c.w. (Morse) operation and then graduated to amplitude modulated (a.m.) signals.

'Top Band' was the local 'chat band'. It was the place where many Radio Amateurs gathered to talk to local friends and to work others station further afield. The band was also good for construction, as in those days much of our equipment was home built, because the low frequency enabled easier frequency stability.

Sadly 1.8MHz fell out of favour with many Radio Amateurs, although it's now regaining its popularity. And following this trend...a few months ago a reader of this column wrote to ask me about a circuit for a Top Band converter. The reader owned one of the many transceivers - produced some 10 or 20 years ago - that were made without the 1.8 to 2MHz band.

Together with a surprising number of people, the reader was about to build a valved transmitter for the band but lacked the means to receive signals. So, to help I referred him to a basic converter circuit that I'd used some years ago and sketched out several versions that would do what he required.
That's when I thought I would share those ideas with *PW* readers!

WS2003



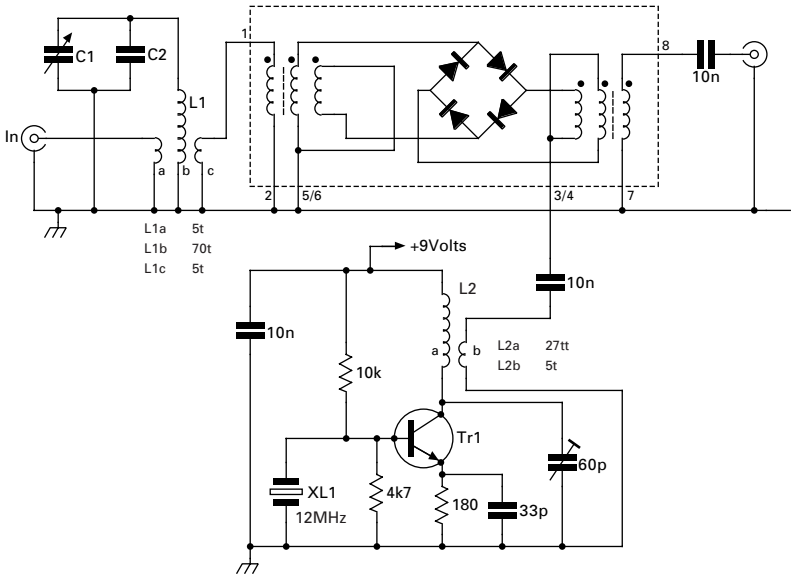
● Fig. 1: Block diagram showing the 1.8MHz converter. A tuned input filter selects the 1.8-2MHz signals from the antenna and are then fed to a mixer. The Top Band signals are mixed with a crystal controlled local oscillator signal, producing an i.f. output on the 10MHz band (see text).

The 1.8MHz Converter

The easiest way to begin, is to look at the block diagram in **Fig. 1**, which shows how the 1.8MHz converter does the job. Firstly, a tuned input filter selects the 1.8 – 2MHz signals from the antenna and these are fed to a mixer. Here the band signals are mixed with a crystal controlled local oscillator signal.

The mixed output will contain the sum (local oscillator + band) and the difference (local oscillator

WS2004



● Fig. 2: The circuit of the converter. There are some options to allow readers to build versions according to which components they can find, or choose to use (see text).

– band) together with both original signals. The mixed signals then pass to a receiver, the input tuning of which selects the desired signal.

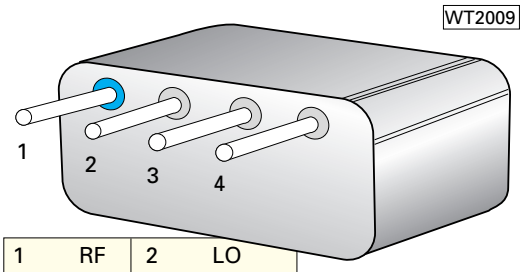
For this project I chose a 12MHz crystal oscillator because this is an inexpensive off-the-shelf crystal. Using this, the difference product from the mixer (local oscillator – band signal) will produce a signal in the 10MHz range.

Signals at 2MHz will appear at 10MHz and signals at 1.8MHz will appear at 10.2MHz. This is of course 'reverse tuning', but on the other hand the signals do appear in the 10.1MHz Amateur band, available on most receivers nowadays.

The circuit compare to the first mixer in a superhet with the receiver acting as a tuneable intermediate frequency (i.f.). Incidentally, the technique of using a crystal-controlled converter ahead of a receiver was once very common in Amateur Radio receivers.

The 'opposite product' from a mixer can cause problems (in this case 12MHz + band signal signals). However, I found that the receiver input tuning was sufficient to eliminate unwanted products without the need for extra filtering.

WT2009



1	RF	2	LO
3	IF	4	Ground

● Fig. 3: Illustrating options for two commercial mixers. The information provided refers to the two commonest types (see text). The drawings show the connections for the input (RF), oscillator (LO) and output (IF) for a TUF-1 and pin connectors for an SBL-1.

The Circuit

The circuit of the converter is shown in **Fig. 2**. There are some options to allow readers to build versions according to which components they can find or choose to use.

Following the optional approach, the mixer can be made from a choice of commercial or home-made and the input filter can be a hand wound coil or commercial inductors. In my project the mixer is a passive double balanced mixer (shown inside a box, within the block diagram in Fig. 1).

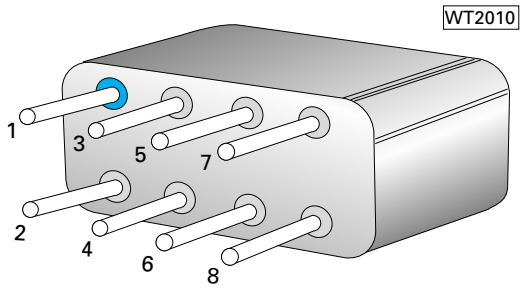
One of the problems when using receive converters is signals at the tuneable i.f. frequency leaking through the mixer and masking the signals of the required band. To overcome this a double balanced mixer provides good isolation between the input and output. The input and output impedances of the mixer are 50Ω, which not only aids isolation but is also convenient for coupling to the input filter and the receiver.

The input filter shown in Fig. 2 is a simple home-made filter which proved to be more than adequate in use. A single tuned circuit selects the band signals and two coupling coils (L1a and L1b) provide low impedance links for the antenna input and mixer output.

The tuning coil, L1b, is wound using 70 turns of 0.27mm (32s.w.g.) enamelled copper wire wound on a T68-2 core. The winding should occupy about three-quarters of the core.

Yes, it is a lot of turns on a small toroid! And to help I find it useful to hold such windings in place using beeswax. I melt a little wax with the tip of a soldering iron and let it drip on to the winding to hold it firmly.

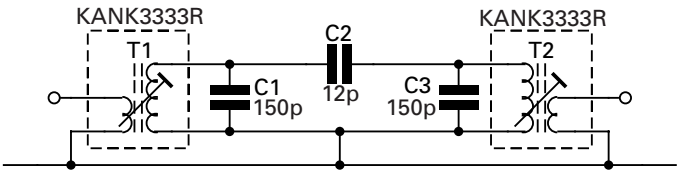
WT2010



Both link windings L1a and L1c, are five turns of the same wire and should be wound over the bottom end of the main winding. When building my project I found it easier to hold two lengths of wire together and wind both coils at the same time. (In practice they embed quite nicely into the soft beeswax on the main winding).

The capacitor C1 is a polyvaricon variable capacitor of the type so often used in small medium waveband radios. It's used for peaking the band signals

WS2005



● Fig. 4: An alternative input filter using Toko commercial inductors...a band-pass filter using two Toko KANK3333A coils (see text). Capacitors C1 and C3 should be 150pF, C2 around 12pF.

Crystal Oscillator

The crystal oscillator is very simple and should oscillate without any problems. However, since the i.f. is tuneable, I've made no provision to 'pull' the oscillator to exactly 12MHz.

In use the output is tuned and a link winding provides the low impedance input to the mixer. The tuning coil is 27 turns of 0.45mm (26 s.w.g.) wire with a five turn link.

As the oscillator is the only powered part of the converter a 9V PP3 battery is the simplest power source. A whole variety of transistors could be used for Tr1, my prototype used the common 2N2222A but almost any generic *npn* transistor will work.

The diagram, **Fig. 3**, shows options for two commercial mixers. Double balanced mixers are not cheap devices so I include information on what are probably the two commonest types. The drawings show the connections for the input (RF), oscillator (LO) and output (IF) for a TUF-1 and an SBL-1.

I used the TUF-1 simply because I had one. It's also possible to make your own double balanced mixer*. It's fiddley, but is cheaper!

* I offered a 'blow-by-blow account' for building such a mixer in this column together with comprehensive diagrams, in the April 1999 *PW*. (*We've still got copies of this issue available via the Book Service. **Editor***).

Alternative Input

The diagram, **Fig. 4**, shows an alternative input filter using Toko commercial inductors. This is a band-pass filter using two Toko KANK3333A coils.

In the diagram, the values shown allow the cores of the inductors to be peaked to provide almost flat coverage of the whole band. The loose top coupling (C2) allows good selectivity of band signals. **In theory** this is a better input filter than that shown in Fig. 2, but in practice I found that the filtering in Fig. 2 did all that was required of it.

My prototype was built using a combination of perf-board and 'Ugly type' construction on a scrap piece of printed circuit board (p.c.b.) material. Ideally the whole converter should be mounted in a screen box with input and output sockets mounted at either end.

So there you are...a simple way to sort out 1.8MHz-less receivers! I look forward to working you on Top Band soon! *PW*

ML&S martin lynch

128, 140-142 Northfield Aven

☎ 0208

IC-R3

ML&S £399 ZERO DEPOSIT! 36 x £14.51

The latest scanner from Icom offering audio and Visual scanning facilities. Listening to your local repeater or watching Crossroads it does the lot.

IC-7400

ML&S £1499 ZERO DEPOSIT! 36 x £52.68

With 32 bit DSP and 100W on HF/50MHz and 144MHz plus a built in ATU this radio offers performance at a value for money price.

zero DEPOSIT

ICOM IC-718

ML&S £649 ZERO DEPOSIT! 36 x £23.60

If you are not fussed about FM and want an HF radio that performs well with minimal controls then the IC-718 could be the radio for you. With DSP and Keypad frequecy entry this is a popular choice with people who just want to connect up go!

IC-756 Pro Mk2

ML&S £2495 ZERO DEPOSIT! 36 x £90.71

zero DEPOSIT

The Icom Flagship is proving to be very popular with the SSB Audio fanatics on 20 metres.It is also a very popular CW radio with some of our CW only customers. Equally at home with newcomers as well as experienced operators! The 756 Pro 2 (or IC-756 MK3) offers Dual receive, multicolour TFT display,100W HF & 6m and built in ATU. This radio requires a good quality 25 amp 13.8v PSU. The features of this radio can not be given full justice in a few lines so call for a brochure.

ICOM R-75

ML&S £599 ZERO DEPOSIT! 36 x £21.78

PC Programmable Requires PC-R10 at £39.95

NEW!

Yet another winner from Yaesu. The all new FT-8900 offers 2m, 6m, 70cms and 10m. 50 Watts output (35 Watts UHF). Full duplex between bands. The features are endless! Call for a brochure today!
Before you ask who makes a quad band mobile whip for it?
Maldol do of course.

ICOM IC-R10

Covering 100kHz to 1300MHz with AM/FM/WFM and SSB. Complete with Nicads,Charger and rubber helical wide band antenna all for only £319.99 Add the Super Searcher (£99.95) and RT-R10 (£109.99) for reaction tuning to nearby transmitters

ML&S £279 ZERO DEPOSIT 36 x £10.14

KENWOOD TM-G707

ML&S £289 ZERO DEPOSIT! 36 x £10.51

Simple Twin Band VHF/UHF Mobile with large easy to read display. With the addition of the VS-3 Voice synthesiser this is an excellent radio for blind operators!

KENWOOD TH-F7E

ML&S £259 ZERO DEPOSIT! 36 x £9.42

A dual band hand held with built in Scanner. Full VHF/ UHF Dual band coverage plus 100kHz to 1300MHz scanner built in. SSB receive on all frequencies up to 470 MHz. Built in ferrite antenna for short wave.

KENWOOD THD7E

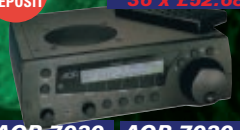
An excellent 6 Watt Dual band VHF/UHF hand held with built in TNC. Ideal for APRS or DX cluster watching.

ML&S £319 ZERO DEPOSIT! 36 x £11.60

AOR 5000

ML&S £1449 ZERO DEPOSIT! 36 x £52.68

zero DEPOSIT



AOR 7030

ML&S £749 ZERO DEPOSIT! 36 x £27.23

AOR 7030+

ML&S £879 ZERO DEPOSIT! 36 x £31.96

PC Programmable

AOR 8600 MK II

ML&S £699 ZERO DEPOSIT! 36 x £25.41

AOR AR 8200 MkIII

ML&S £389 ZERO DEPOSIT! 36 x £14.14

KENWOOD TS-2000E

ALSO AVAILABLE: 23cm version CALL FOR DEAL!

Kenwood bought us the first full DSP hf radio and now TS-2000 is the first DSP all band radio! Coverage is 160m-70cms with built in ATU (HF & 6m), Built in TNC, 100 Watts HF, 6 & 2m 50W 70cms!

TS-2000X

Same as the TS-2000E but with 10W23cms as well!

ML&S £1695 STD UNIT
ZERO DEPOSIT!
36 x £61.93

KENWOOD B2000

zero DEPOSIT

TS-B2000E and TS-B2000X Same spec as the TS-2000E and X but with no controls on the main unit. Operation is either via a PC or optional remote mobile head kit!

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

ML&S £1599
ZERO DEPOSIT!
36 x £69.42

YAESU FT-1000MP MK5

zero DEPOSIT

The flagship of the Yaesu range goes from strength to strength and is the only 200 Watt base station in production.
Built in ATU

ML&S £2799
ZERO DEPOSIT!
36 x £101.76

YAESU QUADRA VL1000

zero DEPOSIT

This state of the art 1000W HF & 6m amplifier is in a class of its own. Couple it to any 100W HF or 6m radio and within seconds the ATU has tuned and you are ready to crack the pile ups *(in fact you will probably create a few of your own)*. Just because Yaesu make the amp you do not need a Yaesu to drive it. *(Not cheap but then the best never is!)*

ML&S £3999
ZERO DEPOSIT!
36 x £173.62

YAESU FT-847

zero DEPOSIT

This radio has established itself as a very popular Shack in a box! All bands 160m to 70cms *(including 4 metres)*. With DSP and options for Collins filters this radio is a serious DX machine with full Satellite capability

RRP £1699 ML&S £1199
ZERO DEPOSIT!
36 x £43.59

KENWOOD TM-D700E

zero DEPOSIT

Dual band VHF/UHF mobile with built in TNC! Ideal for Packet or APRS. The latest version can connect to the TS-870 and TS-570 for DX cluster auto QSY.
(FREE X band repeat for Raynet operators on request)

ML&S £449
ZERO DEPOSIT!
36 x £16.32

KENWOOD TS-570DGE

zero DEPOSIT

This is one of our most popular HF radios. Offering an excellent blend of simplified operation with state of the art performance. An ideal 1st radio as well as an excellent portable DX station! Built in ATU

ML&S £849
ZERO DEPOSIT!
36 x £30.87

ICOM IC-910H

zero DEPOSIT

The Only VHF/UHF base station Still in production. With full all mode dual receive. 100 watts VHF & 75 watts UHF. You can add the UX-910 to give 10 Watts of vb23cms.
UX-910 price £349

ML&S £1249 STD UNIT
ZERO DEPOSIT!
36 x £45.41

ICOM IC-7400

zero DEPOSIT

NEW ICOM RADIO!

The replacement for the popular IC-746 has 100 Watts HF, 6m and 2 metres all mode operation,
Built in ATU for HF and 6m.
Full IF DSP
Fast becoming a hot seller!

ML&S £1449
ZERO DEPOSIT!
36 x £52.68

ICOM IC-706 MK2G

zero DEPOSIT

Why did they not just call it the Mk3? Call it what you like this is one of the best mobile radios available with HF ,6m, 2m & 70cms plus DSP. All mode operation and DSP

ML&S £849
ZERO DEPOSIT!
36 x £30.87

KENWOOD TS-50S

zero DEPOSIT

If you do not want DSP or built in ATU but want a straight forward no nonsence 100 Watt HF radio look no further! The TS-50 is at home in the shack or in a mobile installation. 160m-10m all mode ML&S price £629

ML&S £629
ZERO DEPOSIT!
36 x £22.87

KENWOOD TS-870S

zero DEPOSIT

The original DSP radio Still a popular choice among serious HF operators. Covering 160m to 10 metres all modes.
Built in ATU
ML&S Price £1399.00

ML&S £1399
ZERO DEPOSIT!
36 x £50.86

ICOM PCR-1000

zero DEPOSIT

Computer controlled receiver 100kHz-1300MHz

ML&S £309
ZERO DEPOSIT!
36 x £11.23

ICOM IC-R8500

zero DEPOSIT

Covering 100kHz-2000MHz

ML&S £1299
ZERO DEPOSIT!
36 x £47.23

ICOM IC-R2E

This little handy scanner is very simple to operate and is very popular among our commercial customers

LAST FEW AVAILABLE
£139

MORSE TESTS

at Martin Lynch & Sons

ML&S provide the facility for Morse tests ON DEMAND on the morning of the last Saturday of every month *(except December)*. We offer the **5 WORD per MINUTE MORSE TEST** and the **Foundation Morse Assessment**. This is a unique opportunity to take your morse test in a relaxed environment. *Any questions call* ***CHRIS TAYLOR*** *on* **0208 566 1120** *or email:* **morse@hamradio.co.uk**

The BEST RADIO EQUIPMENT at the

E&OE

nue • Ealing • London W13 9SB

566 1120

website: www.hamradio.co.uk

email: sales@hamradio.co.uk

fax: 0208 566 1207

& sons

Have a trade in? We PAY TOP MONEY

call the sales desk or EMAIL your request to sales@hamradio.co.uk

YAESU FT-8900

zero DEPOSIT

ML&S £429
ZERO DEPOSIT!
36 x £15.60

NEW! YAESU VX-7R

ML&S £329
ZERO DEPOSIT!
36 x £11.96

Do those engineers at Yaesu ever sleep? The best 3 band radio we have ever seen is here and user reports are excellent. The first fully water-proof hand held has all the features the famous VX-5R had but has the addition of a second receiver. 2, 70 & 6 at 5 Watts from a Lithium Ion Battery This radio will last you for years. Call for a brochure!

YAESU VR-500

ML&S £199

YAESU VR-120D

100Hz-1300MHz AM/FM and WFM, a good all round pocket scanner with World Broadcast AM reception and a host of new features for a budget scanner

ML&S £159

Accessories

MD-100 Desk mike for most Yeasu radios £110.00
MD-200 Elite Desk Nike for most Yaesu HF radio's £249.00
SP-8 Matching Speaker for the FT-1000MP, FT-1000MP MkV , FT-1000MP mkV field and FT-920 radios £139.00
FP-1030 30 amp PSU Ideal for any 100 watt HF radio £229.00
MC-60A Amplified Desk Microphone for the Kenwood range of radio's. (Sounds good on the Yaesu FT-920 too) ML&S price.....£117.95
PS-52 PSU matches the TS-570,870 and TS2000 .....ML&S Price £229.95
SP-23 Matching Speaker for the TS-570 & TS-2000 .....ML&S price £68.95
SP-31 Matching Speaker for the TS-870S .....ML&S price £82.95

From the London showroom, Martin G4HKS & Chris G0WTZ proudly present the very first FT-897 in the U.K. Martin commented "With all the restrictions and difficulties the modern Radio Amateur faces putting up antenna systems at home, the whole concept of the "Transportable" FT-897 removes this obstacle. Take the transceiver with you, sling a wire up at any location from a hilltop to a supermarket car park and operate all day!" Well done Yaesu, another first rate product.

MALDOL ANTENNAS

We have just received our new delivery from Maldol. Call today for a catalogue of the range.

YAESU FT-V1000

The Yaesu 200 Watt transverter will work with The FT-1000MP, FT-1000MP MkV, FT-1000MP Field. Covering the entire 6 metre band giving you 200 Watts of clean RF!

FP-29 *(required for FT-1000MP and FT-1000MP MkV Field)* £349

ML&S £799
CALL FOR A DEAL

YAESU FT-840 FM

zero DEPOSIT

now with FM!

This is an excellent starter radio is sadly discontinued so we are offering the TS-50S from Kenwood at £629 or we have a few used units available.

CALL FOR AVAILABILITY

YAESU FT-817

choose a package to suit you

The Yaesu masterpiece! This little radio offers 160m to 70cms For less than £600 you can have a take away shack !

Package 1

FT-817,Nicads,Charger,DC lead,Microphone,Shoulder strap & AA cell tray. Only £595.00

Package 2

As package 1 but with Miracle whip,Case,PSU and a choice of Palm Mini Paddle or DTMF Microphone! Only £799

Package 3

Package 1 plus 50 watt Tokyo Hi power amp, LDG Z11 ATU,SP-817 Speaker Plus Samlex SEC-1223 PSU. All for £1199

FT-817 Accessories

THP 50 watt amp £299.00
LDG-Z11 ATU £209.00
Miracle whip antenna (MkII) ...£129.95
SP-817 Spealer £19.95
MP-817 Palm Mini paddle £49.95
ATX Walkabout antenna £69.95
CSC-83 protective case £19.95
MH-36E8J DTMF Microphone ... £51.00
YF-122S Collins SSB Filter £99.00
YF-122C Collins 500Hz CW filter £99.00

YAESU FT-920AFC

zero DEPOSIT

Offering 100 watts HF and 6metres this radio is a delight to operate. Fitted with FM,6kHz AM filter and 500hz CW filter plus simple to operate DSP this is an excellent base radio. (Requires 25a 13.8v PSU). Built in ATU

ML&S £1199
ZERO DEPOSIT!
36 x £43.59

YAESU FT-100D

zero DEPOSIT

Following on from the FT-100 the D offers 500Hz CW filter CTCSS Decode and bigger speaker for that extra punch. 160m-70cms all mode with wide band receive (100kHz to 999MHz) An absolute bargain at £849!

ML&S £899
ZERO DEPOSIT!
36 x £32.68

YAESU FT-897

NEW!

At last the New Multiband Yaesu has arrived. 160m-70cms all mode with DSP. Designed by the same team that gave us the amazing FT-817 - you know it will be good.
Options available are:- Internal PSU, Internal batteries, Matching bolt on ATU, Collins CW filter, Collins SSB Filter,DTMF Microphone.
Order yours today for only £1099!

ML&S £1099
ZERO DEPOSIT!
36 x £39.96

FT-1000 Mark V Field

zero DEPOSIT

ML&S £2199
ZERO DEPOSIT!
36 x £79.95

Following on from the sucess of the amazing FT-1000MP the new FT-1000MP Mk V Field gives 100 watts plus all the features of The FT-1000 MP MkV ! This is the only HF radio available with a built in PSU! Built in ATU

- *High Efficiency Cooling system*
- *Conservative 100 Watt Low Distortion Final Amplifier Design*
- *High Speed Automatic Antenna Tuning System*
- *Dual Receive With Independent AGC Systems*
- *Enhanced Digital Signal Processing*
- *Selectable SSB Pattern Contour Filters*
- *Industry-Leading RF Front End Design*
- *3 RF Preamp Modes+ IPO (Direct Mixer Feed)*
- *Outstanding IF Filter Chain*
- *Full Breaking CW and Electronic Keyer*
- *Multifunction Display with Improved Contrast*
- *Enhanced Shuttle Jog Tuning Dial*
- *Direct Keypad Frequency Entry*
- *Twin Stacked VFO Registers*
- *Easy Digital Mode Interfacing*
- *And MORE.....*

LOOK! New Miracle Antenna has arrived!

MIRACLE WHIP MkII

This antenna has been designed with the FT-817 in mind and is a 55 inch whip with a tuning box at the base. The performance is staggering and it will work with any radio from 3.5-460MHz (25W max). It even works without a counter poise. Call for full details!

ML&S £129.95 IN STOCK!

YAESU VX-1R

Still the smallest handheld around with built in scanner offering up to 1 Watt on 2 & 70 and Lithium ion battery that last for ages this is the ultimate pocket radio at only £159!

zero DEPOSIT

ML&S £159
ZERO DEPOSIT!
36 x £5.78

YAESU FT-7100

zero DEPOSIT

For the same price most other manufacturers offer a twin band Yaesu offer a full blown Dual band mobile. With CTCSS, switchable deviation, dual receive, Built in Duplexer plus remote head *(requires YSK-7100 at £39)*

ML&S £329
ZERO DEPOSIT!
36 x £11.96

YAESU VR-5000

zero DEPOSIT

The new desktop scanner from Yaesu all bands and all mode with a host of features.

ML&S £599
ZERO DEPOSIT!
36 x £21.78

Icom IC-T90E

The new 3 band hand held from Icom is long over due and well worth the wait. The buttons have a very positive feel and audio is good on both TX and RX. With lithium Ion Battery giving 5 watts on 2,70 & 6 "Another winner from the Icom stable" ML&S price £299.
ZERO DEPOSIT, 36 x £10.87

Kenwood TM-V7E

Dual Band Mobile giving VHF & UHF coverage with dual receive of VHF & UHF or HF & VHF/UHF & UHF.
Free wide band Receive on request!
ML&S price: £359.
ZERO DEPOSIT, 36 x £13.05

FT-1500M

50 watt 2m FM mobile with DTMF mike and CTCSS making it ideal for internet linking (See www.g7wfm.co.uk <http://www.g7wfm.co.uk> for details on internet linking)
ML&S price still only £159.00 ZERO DEPOSIT, 36 x £5.78

Icom IC-2725E

When I first saw the IC-2725 I thought it was just another dual band radio! When I connected it to an ariel I soon discovered it was the Dual Band Radio. The first radio I have seen to be able to monitor 2 Airband signals at the same time. Pagers do not seem to bother it at all. The remote head puts all the controls where you want them. The mike can completely operate the radio (including frequency entry and DTMF). If you want a serious dual band radio with excellent scanning facilities then the IC-2725 is ideal. ML&S price £349.ZERO DEPOSIT, 36 x £12.69

FINANCE EXAMPLE VX-7R AT £329.00
PAYMENT ILLUSTRATION: ZERO DEPOSIT: 36 payments of £11.96 *TOTAL AMOUNT PAYABLE:* £430.56
APR:19.9%. ML&S is a licenced credit broker.
Finance offered subject to status. Full written details on request. E&OE

BEST PRICES at ML&S - *where else!*

High Power Notch Filter

To make sure his 50MHz signal was as clean as possible, Nick Moldon G1BVI made himself an effective filter using stub techniques.

Fig. 1: Looking very simple, this filter is capable of excellent rejection at harmonic frequencies. See text for more details.

Since space limits the size of the antenna at my location, I've had to make do with a 3-ele antenna for 50MHz. To increase my outgoing signal further, I've built a full legal limit, semiconductor (f.e.t.) r.f. power amplifier to get over this low forward gain problem.

Built with a view to the future, the amplifier itself is a broadband unit, working from 1.6MHz upwards and its response doesn't start to 'fall off' until around 70MHz. It can also produce a full legal output right up through the 50MHz band, though I've not tested it at higher than 70MHz.

Major Problem

The major problem that affects users of the 50MHz band is, that second harmonic output from 50MHz transmissions are notorious for causing interference to Band II domestic f.m. radio. It's therefore most desirable that the various harmonic outputs are suppressed as much as possible.

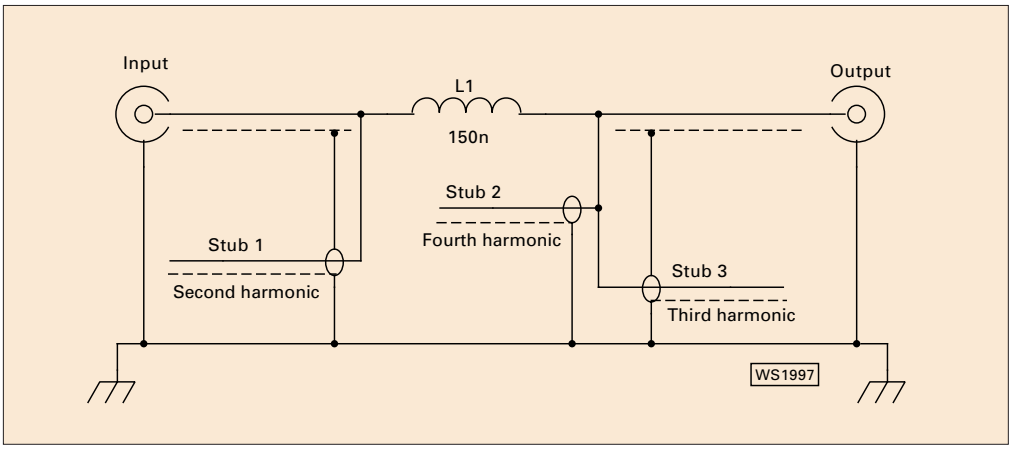
When running full legal limit power it's also vital to ensure that only a clean harmonic free output is allowed to reach the antenna. By keeping the out-of-band signals to a minimum, neighbours should experience the fewest TVI/BCI problems.

My amplifier being broadband, covering up to at least 70MHz, would seem to be a possible candidate for TVI/BCI problems. When it was designed, the specification was that it should have a frequency response that started to roll off from about 70MHz. Given this parameter, a signal at 100MHz, present at the input, should have very low gain through the amplifier.

External Filter

However, in spite of the amplifier's design specifications, some kind of external filter must be added to ensure that the signal has the minimum harmonics as possible (generated or amplified). So, I decided that a low-pass filter with a roll-off starting at about 55MHz should be constructed for the output of the amplifier.

The filter had to be a good suppressor of any potential second harmonic from 50MHz operation. But useful extra suppression can be brought about with the filter described here. I've incorporated other notch filters, designed to reduce the second, third and fourth



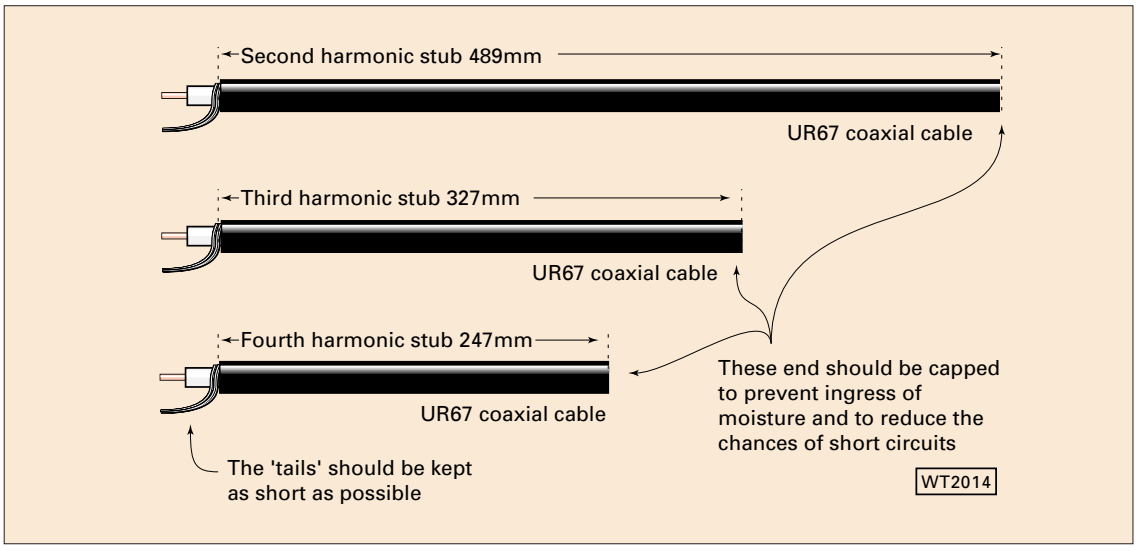


Fig. 2: The three quarter-wave stubs should have their open ends capped with insulating material to reduce the chance of shorting across.

harmonic of 50MHz output too.

The potential harmonics from 50MHz operation are at 100-104MHz, 150-156MHz, and 200-208MHz. Of course any second harmonic is likely to cause interference to Band II reception in your area (and don't forget, the 100-104MHz section is used for many local and low power radio stations).

Disastrous Effects

If you live near, or operate near coastal waters, then potentially disastrous effects, may be experienced, as the third harmonic of the 50MHz band occurs near the the v.h.f. marine band of 156MHz. There could also be problems with some rigs in the Amateur band at 144-146MHz too.

Higher in frequency, the fourth harmonic, at 200-208MHz might cause some problems for any official users of that band. So, I decided that the fourth harmonic had to go too!

As the amplifier is high powered, any harmonics generated could potentially still be at a fairly high level. So, I decided not to use discrete component filters, but to use tuned coaxial lines for each notch frequency. These filters were cut from good quality new, UR67 coaxial cable.

If you're only intending to use a less than full legal output, then thinner cable could be used. **But please choose good quality cable** even when 'low' power (up to 100W) is to be used. The quality of the cable will tend to control the effectiveness of the filter itself, as well as its power handling capabilities.

When you're considering making stub filters using coaxial cable, you must remember that the velocity factor of the cable has to be taken into account, especially if you intend to use different coaxial cable. See the separate panel for more information about making filters for other frequency bands.

Junk Sale

My filter is built in an aluminium box approximately 300×130×80mm that I bought at one of the club junk sales. I've used N-Type socket, one at each end for both input and output connections. To give a sufficiently good 'earth' connection between all the various components, a one millimetre thick, 30mm wide copper strip was added.

The copper strip was bent into a 'U' shape between the two input/outputs sockets. In my initial design, it was envisaged that the coaxial stubs, when fitted, the 'inner' end of the braid would be soldered direct to the copper strip. But since then I've found that the strip is not essential.

An insulating block is secured in the centre of the filter onto which is mounted the coil L1. As mentioned earlier, my original idea was to solder the braid to the copper strip, but in practice, due to the stiffness of the coaxial cable, this was not possible. So, I ended up adding solder tags at the points where the braid was to be secured.

So, enough of the design ideas, let's look at the circuit of the

Metallic Insulators

Stub lines or coaxial stubs can act rather like metallic insulators when used correctly in one band, or close to one design frequency. In fact λ\4 stubs are often used at high u.h.f. and microwave frequencies, where the lengths of quarter-wave stubs are quite short.

To design a quarter-wave (λ/4) stub is quite simple. Start by looking at the idealised current and voltage graph of an electrical quarter-wave **Fig. 4**. At point A, which would equate to the open end of the line, there's lots of voltage, but little, or no current. From Ohm's Law you will know that this represents a very high resistance.

And yet a quarter wave-length away at the point B, there's no voltage, but the current is now at a maximum. Again from Ohm's Law we can see that these conditions would only occur at a very low resistance point. If this is a very low resistance point, then shorting the the two conductors together at this point would not significantly alter anything.

Now if you bear in mind that we are dealing with physical distances then if we stick close to one frequency whose λ/4 is equal to the distance between A and B, then if one end is open circuit, the other appears, **at that one frequency**, to have a short circuit at the other point.

In feeder of any description, the electric wave travels slightly slower than in free-space. This has the effect of **shortening** the physical λ/4 (although it's still an electrical λ/4). The relationship between the speed of travel of an electric wave in the feeder to the speed of propagation in free space is called the Velocity Factor (often shown as V_f) which is always less than one.

For Unirad67 coaxial cable (UR67) the velocity factor is 0.67. So, to calculate a quarter-wave stub in UR67 we can use the formula:

$$\text{Stub } (\lambda/4) \text{ length} = \left\{ \frac{300}{f_{(\text{MHz})} \times 4} \times V_f \right\} \text{m}$$

Now verify this, with say our second harmonic stub. Take the centre frequency of 102MHz, and fit into the above equation. The answer comes out to within one millimetre at 490mm. This answer is closer than one quarter of one percent. And as our band is almost four percent wide (50-52MHz), this is accurate enough.

G1TEX

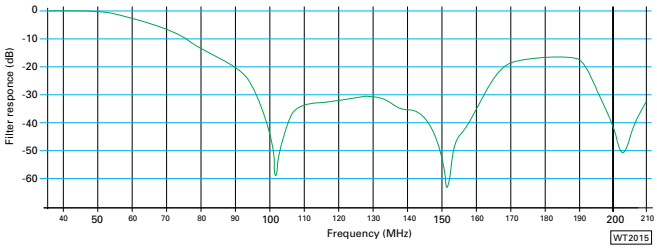


Fig. 3: Note the three deep rejection notches due to the open ended stubs.

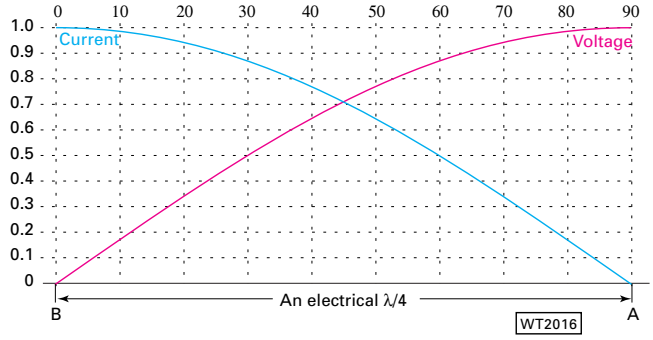


Fig. 4: Voltage and current curves on a quarter-wave section of unterminated feeder (see text for more details).

Notch Filter is shown in **Fig. 1**. the coil, L1 is a 150 nano Henry (nH) air-cored inductor, and was made using 1.5 mm diameter copper wire. As I intended this filter to handle a lot of power, I first threaded PVC sleeving over the wire before winding the coil.

Suitable Former

To wind the coil, I needed a suitable former and I found a twist drill shank rather handy for this. By luck more than judgement I found that four turns close wound on the shank of a 9.5mm drill gave me the required value coil.

Now to the stub filters themselves. All the Coaxial stubs are of the 'open circuit', λ/4 type. See the separate box for more details of how they work and how they may be constructed. The table, **Table 1**, and the illustration, **Fig. 2,** give the lengths and dimensions for the stub filters using UR67 coaxial cable.

Note: For safety reasons, the open ends of the coaxial cables should be capped or insulated to avoid shorting to the metal box.

As you will see if you read the separate panel about coaxial stub filters, the stubs should all be cut as accurately as you can. The 'tails' connections should all be made as short as possible. And all measurements are taken from open end of the cable, to the separation of the braid from the inner.

And although you could use other types of plugs and sockets, I'd advise anyone contemplating working with high power equipment up to and including u.h.f. to use N-Type connections rather than SO239/PL259 types.

Slightly Long

I think that I may have cut the third and fourth harmonic stubs slightly on the long side. This moved the third harmonic notch lower in frequency, nearer to the 144MHz Amateur band. Despite this, I was very impressed with the results from such a simple filter.

The measured filter parameters, agreed quite closely with the designed filter passband as shown in the graph of **Fig. 3**. If you have other bands or other frequencies that you need to filter out then see the separate panel.

The filter has been tested to 1kW with no problems, and does not get warm in normal use. So, if you work 50MHz then you should definitely consider one of these filters.

pw

1st Anniversary

OF THE FOUNDATION LICENCE

It is hard to believe but the M3 licence has now been with us for a year. Over 5500 people have taken up the new licence with ages ranging from 8 to 80 and over half the total being completely new amateurs. Even those who have been amateurs for years

Top: Andrew Finch, M3FMA, with Scout leaders Nigel Hull and Christopher Chapman.
Right: Andrew (seen here with his parents) proudly shows his new Yaesu FT-817.
Bottom: Alan Betts, G0HIQ (RA); RSGB President Bob Whelan,G3PJT; Scout leaders Christopher Chapman, Nigel Hull and Martyn Medcalf, and Yaesu (UK)'s Paul Bigwood, G3WYW, with Andrew.

and who have taken the simple Morse assessment to add to their licence are impressed. One amateur recently commented "My MW3 call has given my amateur radio a new lease of life, I am like a kid with a new toy again!" The Foundation Licence is easily the fastest growing licence category ever in the UK and probably worldwide. The new licence is grabbing attention around the world and is a credit to both the RSGB and the Radiocommunications Agency for the joint efforts in bringing in the new licence. The RSGB also takes a huge amount of credit for the implementation of the scheme through the tireless efforts of its affiliated clubs.

To commemorate the huge success of the Foundation Licence a special award was made by the RA, RSGB and Yaesu to the 5000th M3 licence holder. Andrew Finch, M3FMA, an 11-year old Scout from Chelmsford became the 5000th licence holder after a course with the Chelmsford Scout Amateur Radio Fellowship (ScARF). Despite being dyslexic, Andrew managed to pass the multiple-choice exam at his first attempt, an outstanding achievement on his part. Andrew's pass also highlights the efforts of individual amateurs up and down the country who have been enthusiastically bringing new people into the hobby with the accessible new licence.

Hundreds of courses are being run up and down the country so access to the exam has never been better. If you are an avid shortwave listener or just someone who is interested in the possibilities in amateur radio, take the opportunity and get your own Foundation Licence. A list of suitable courses and assessors can be found on our web site www.rsgb.org or you can phone 0870 904 7373 and ask for more information.

We all look forward to continued massive growth in amateur radio numbers in the years to come, but as a start the Foundation Licence has proved a huge success!

TEN THINGS ABOUT THE FOUNDATION LICENCE

1. M3s can access HF radio at 10 watts through to 70cm (not 28MHz and satellite)
2. Foundation Licensees get 1 watt on 136kHz
3. Beginners can be on the air in a single weekend
4. A course fee for beginners is £10 (normally)
5. VHF licensees go straight to Foundation Licence with only a Morse Assessment (if held 1 year).
6. Morse Assessment is a short course NOT an examination
7. Your local club and the RSGB are holding Morse Assessment sessions right NOW
8. Morse Assessment fee is only £5 (normally)
9. M3 callsign prefix, pick your own suffix (if available)
10. Fast turn round for new licences.

RADIO

42 Brook Lane, Great Wyrley, Walsall, West Midlands WS6 6BQ
Phone: 01922 414796 Fax: 01922 417829
E-mail: sales@radioworld.co.uk Web: www.radioworld.co.uk

MODEL	PRICE
FT-1000mkV	PHONE
FT-1000-FIELD	£2,299.00
FT-847	£1,149.00
FT-920	£1,099.00
FT-100D	£849.00
FT-817	£575.00
FRG-100	£399.00
FC-10	£299.00
FT-7100M	£299.00
VX-5R	£239.00
MD-200A8X	£225.00
VX-1R	£165.00
VR-120D	£159.00
FT-1500M	£159.00
VR-120	£129.00
SP-8	£125.00
MD-100A8X	£100.00
TS-2000	£1,575.00
TSB-2000	£1,499.00
TS-50S	£599.00
TM-D700E	£429.00
TM-V7E	£375.00
TH-D7E	£299.00

MODEL	PRICE
TMG-707E	£279.00
THF-7E	£249.00
THG-71E	£210.00
RC-2000	£199.00
MC-90	£175.00
MC-85	£125.00
MC-60A	£110.00
MC-80	£69.95
PS-52	£229.00
PS-53	£229.00
PS-33	£199.00
IC-756ProII	£2,400.00
IC-7400	£1,400.00
IC-R8500	£1,199.00
IC-910H	£1,129.00
IC-706mkIIG	£849.00
IC-R75	£599.00
IC-718	£549.00
IC-2725E	£399.00
IC-2800H	£395.00
AT-180	£329.00
PCR-1000	£319.00
IC-207	£295.00

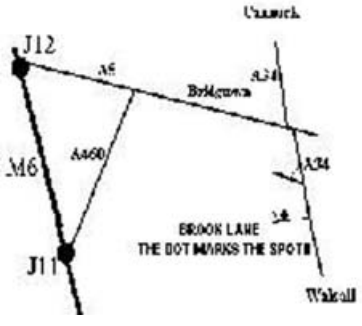
MODEL	PRICE
IC-T3H	£155.00
SM-20	£125.00
SM-8	£125.00
CT-17	£99.00
SP-21	£69.00
DX-701	£629.00
DX-70TH	£599.00
DX-77	£599.00
DR-610	£369.00
DR-605	£269.00
DJ-G5E	£265.00
DR-150	£259.00
DJ-X2000	£449.00
DJ-X10	£249.00
DJ-V5	£239.00
DR-MO6	£229.00
DJ-C5	£189.00
DJ-195	£159.00
DJ-193	£139.00
DJ-X3	£115.00
DR-135	£229.00
DJ-496	£175.00

FINANCE NOW AVAILABLE

PHONE DAVE FOR DETAILS!

MJF-16010 £56.95	MFJ-989C £379.95	MFJ-986 £349.95	MFJ-969 £199.95	MFJ-962D £279.95	MFJ-949E £159.95	MFJ-948 £139.95	MFJ-945E £119.95	MFJ-941E £129.95
MFJ-934 £189.95	MFJ-924 £74.95	MFJ-921 £74.95	MFJ-914 £64.95	MFJ-910 £24.95	MFJ-906 £89.95	MFJ-903 £54.95	MFJ-901B £85.95	MFJ-212 £79.95

MFJ



WE ARE HERE

There is NO CHARGE for using credit cards

We accept all major plastic!!!

WORLD

E&OE

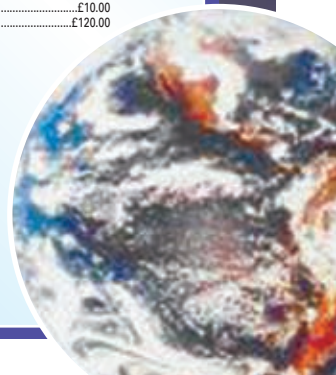
USED EQUIPMENT

ADI	AR-146	2m FM 50W MOBILE	£130.00
AKD	6001	6m FM TRANSCEIVER	£135.00
ALINCO	DJ-580E	2/70CM HANDY TRANSCEIVER	£140.00
ALINCO	DJ-G5EY	DUAL BAND HANDY	£199.00
ALINCO	DJ-X10	WIDE BAND RECEIVER	£275.00
ALINCO	DR-140	2M MOBILE TRANSCEIVER	£120.00
ALINCO	DR-605E	2M / 70CMS MOBILE	£200.00
ALINCO	DX-70	HF MOBILE + 6M	£399.00
ALINCO	DX-70TH	HF MOBILE + 6M	£475.00
AMERITRON	QSK-5	AMPLIFIER SWITCH / PRE HEAT	£200.00
AOR	AR-3000A	WIDE RECEIVER	£475.00
AOR	AR-3030	HF / VHF RECEIVER Inc converter VHF	£450.00
AOR	AR-3030	HF RECEIVER	£399.00
AOR	AR-7030	TOP RECEIVER	£550.00
AOR	AR-8000	WIDE BAND RECEIVER	£199.00
AOR	AR-8200 mk1	WIDE BAND RECEIVER	£230.00
AOR	AR-8200II	WIDE BAND SCANNER	£275.00
AOR	AR5000	TOP CLASS RECEIVER	£999.00
AZDEN	PCS-4000	2M TRANSCEIVER	£99.00
BNOS	AMPLIFIER	432-10-50 70CM 50Watt	£99.00
CAPLO	SPL-3000	ANTENNA TUNING UNIT	£199.00
DAIWA	CNW-419	ATU	£190.00
DATONG	FL-2	FILTER	£60.00
DIAMOND	SX-1000	POWER METER - HF TO 23CMS	£110.00
DRAKE	SW-2	RECEIVER	£275.00
FAIRHAVEN	RD-500	WIDE BAND RECEIVER	£575.00
GRUNDIG	SAT800	SATELITE 800 MILLENIUM	£400.00
ICOM	1C-R9000	TOP CLASS COMMUNICATIOS RECEIVER	£2,995.00
ICOM	AT-100	AUTO TUNER SUITE IC-751 etc	£225.00
ICOM	AT-150	AUTO ATU	£175.00
ICOM	AT-180	ATU	£250.00
ICOM	AT180	MATCHING ATU FOR THE IC706	£250.00
ICOM	IC-2100H	2M MOBILE TRANSCEIVER	£150.00
ICOM	IC-251	2m MULTIMODE TRANSCEIVER	£295.00
ICOM	IC-271E	2m MULTIMODE TRANSCEIVER	£325.00
ICOM	IC-271E	ALL MODE TRANSCEIVER	£299.00
ICOM	IC-275E	25W TRANSCEIVER	£525.00
ICOM	IC-471E	70CM BASE MULITMODE TRANSCEIVER	£299.00
ICOM	IC-706MK1	HF / 6M / 2M (10w) TRANSCEIVER	£450.00
ICOM	IC-706MK11	HF / 6M/ 2M TRANSCEIVER	£550.00
ICOM	IC-706MKIIG	HF / VHF / UHF TRANSCEIVER	£699.00
ICOM	IC-706mkIIG	HF / 6M/ 70CMS / 2M TRANSCEIVER	£750.00
ICOM	IC-728	HF TRANSCEIVER	£399.00
ICOM	IC-737	HF inc ATU BASE STATION TRANSCEIVER	£575.00
ICOM	IC-756	HF / 6m All Band Transceiver	£999.00
ICOM	IC-756PRO	ICOM TRANSCEIVER	£1,600.00
ICOM	IC-756ProII	HF / 6M DSP BUILT IN ATU	£2,000.00
ICOM	IC-775DSP	HF 200W BASE STATION TRANSCEIVER	£1,499.00
ICOM	IC-8500	WIDE BAND RECEIVER	£899.00
ICOM	IC-910	2/70 CM BASE TRANSCEIVER	£999.00
ICOM	IC-R2	HANDY SCANNER	£99.00
ICOM	IC-R3	HANDHELD RECEIVER	£299.00
ICOM	IC-R7000	RECEIVER MINT! CONDITION	£550.00
ICOM	IC-R71E	RECEIVER	£399.00
ICOM	IC-R72	RECEIVER	£399.00
ICOM	IC-R75	HF / 6m RECEIVER	£475.00
ICOM	IC-T81E	QUAD BAND HANDY 2m/6m/23cm/70cm	£250.00
ICOM	IC-T8E	HANDY TRANSCEIVER	£175.00
ICOM	ICT-7E	2/70CM HANDY TRANSCEIVER	£170.00
ICOM	PCR-1000	COMPUTER SCANNER	£200.00
ICOM	PS-15	20A POWER SUPPLY FITS ALL ICOM	£110.00
ICOM	RC-7000	REMOTE CONTROL	£40.00
ICOM	UT-84	TONE SQUELCH UNIT	£25.00
JRC	JST-245	HF 50MHz 1500w AC BASE TRANSCEIVER	£1,295.00
JRC	NRD-345	RECEIVER	£299.00
JRC	NRD-535	HF RECEIVER	£600.00
KENWOOD	AT-120	ANTENNA TUNER	£75.00
KENWOOD	AT-230	ANTENNA TUNER	£120.00
KENWOOD	DFC-230	FREQUENCY CONTROLLER	£70.00
KENWOOD	PS-430	POWER SUPPLY	£100.00
KENWOOD	PS-50	POWER SUPPLY	£145.00
KENWOOD	PS-52	POWER SUPPLY	£175.00
KENWOOD	R-2000	RECEIVER	£225.00
KENWOOD	R-5000	RECEIVER + CONVERTER	£600.00
KENWOOD	R-5000	RECEIVER	£499.00
KENWOOD	SM-220	SCOPE - TS-940 etc.	£200.00
KENWOOD	SP-31	SPEAKER	£60.00
KENWOOD	SW-100E	SWR METER	£25.00
KENWOOD	TH-22E	2M HANDY TRANSCEIVER	£99.00
KENWOOD	TH-251E	HANDHELD 2M	£140.00
KENWOOD	TH-77E	DUALBAND 2M/70CMS HANDHELD	£130.00
KENWOOD	TH-79E	HANDY TRANSCEIVER	£189.00
KENWOOD	TL-120	LINEAR LOW DRIVE AMPLIFIER 100W HF	£150.00
KENWOOD	TM-231E	2M MOBILE TRANSCEIVER	£120.00
KENWOOD	TM-241E	2M MOBILE TRANSCEIVER	£120.00
KENWOOD	TM-251E	MOBILE TRANSCEIVER	£140.00
KENWOOD	TM-255E	TRANSCEIVER 2M MULTIMODE	£395.00
KENWOOD	TM-455E	70CM MULTIMODE MOBILE TRANSCEIVER	£450.00
KENWOOD	TM-741E	DUALBAND TRANSCEIVER WITH DETATCHABLE FRONT	£275.00
KENWOOD	TM-751E	TRANSCEIVER 2M MULTIMODE	£325.00
KENWOOD	TR-751E	2M MULTIMODE TRANSCEIVER	£350.00
KENWOOD	TR-851E	70CM MULTIMODE MOBILE TRANSCEIVER	£395.00
KENWOOD	TS-2000	HF / VHF / UHF ALL MODE MULTIBANDER	£1,350.00
KENWOOD	TS-440SAT	TRANSCEIVER WITH BUILT IN ATU	£499.00
KENWOOD	TS-50	HF TRANSCEIVER	£425.00
KENWOOD	TS-570D	TRANSCEIVER HF DSP ATU MOBILE/BASE	£650.00
KENWOOD	TS-680	HF 6M MOBILE/BASE TRANSCEIVER	£400.00
KENWOOD	TS-690	HF 6M Inc ATU	£550.00
KENWOOD	TS-711E	SM BASE STATION TRANSCEIVER	£399.00
KENWOOD	TS-790E	2/70CM BASE STATION TRANSCEIVER	£699.00
KENWOOD	TS-790E	2m / 70cm/23cm BASE TRANSCEIVER	£999.00
KENWOOD	TS-850SAT	HF TRANSCEIVER - MINT!	£800.00
KENWOOD	TS-950SD	HF/ 150W DSP BASE TRANSCEIVER	£1,100.00
KENWOOD	TS-950SDX	HF 150W DSP FULLY LOADED LATE S.NUMBER	£1,700.00
KENWOOD	VFO-120	TS120 VFO	£50.00
KENWOOD	VS-1	VOICE SYTHESISER	£30.00
KENWOOD	VS-2	VOICE SYTHESISER	£30.00
KENWOOD	YG-455CN-1	270Hz CW CRYSTAL FILTER	£100.00
KENWOOD	YK-88A-1	AM FILTER	£40.00
KENWOOD	YK-88C-1	500Hz CW NARROW FILTER	£40.00
KENWOOD	YK-88CN1	270Hz CW FILTER 8.83MHz IF	£40.00
KENWOOD	YK-88S-1	2.4KHz SSB NARROW FILTER 8.83MHz IF	£40.00
KENWOOD	YK-88SN	1.8K SSB FILTER (TS-440 /R5000)	£40.00
KENWOOD	YK-88SN-1	1.8KHz SSB NARROW FILTER 8.83MHz IF	£40.00
MAGNUM	DELTAFORCE	10M MOBILE AM/FM/USB/LSB/CW	£149.00
MICROSET	RU-20	70 CMS AMP	£60.00
MICROWAVE MODULES	28/144	TRANSVERTER 28/144 £125.00	£125.00
MIDLAND	MIDLAND 48	80 CHANNEL CB	£55.00
PACCOM	TINY 11	TNC	£99.00
PACCOM	TNC-320	TNC	£90.00
PLESSEY	PR-2250	HF RECEIVER BEST QUALITY CLASSIC!	£1,200.00
REALISTIC	PRO-2006	400 CHANNEL SCANNER	£110.00
REALISTIC	PRO-394	HF RECIEVER	£99.00
SGC	SGC-2020	HF TRANSCEIVER	£450.00
SOMMERKAMP	FT290R	2m MULTI-MODE TRANSCEIVER	£180.00
SONY	ICF-SW77	FM/SW/MW/LW PORTABLE AS NEW!	£250.00
SONY	SW-100E	FM/SW/MW/LW PORTABLE	£90.00
SYNCRON	PS-1220VU	20 AMP POWER SUPPLY	£60.00
TOKYO HY-POWER	HL-30V	2M and 25W AMPLIFIER	£75.00
TOKYO HY-POWER	HL-37V	LINEAR AMPLIFIER	£60.00
TONNA	7000E	TERMINAL	£130.00
TRANSVERTER	QM 70	28/144 TRANSVERTER	£100.00
TRIO	R-2000	RECEIVER + CONVERTER	£300.00
TRIO	TR-2300	TRANSCEIVER PLUS AMPLIFIER 2M	£99.00
TRIO	TR-9000	2M MULTI MODE	£199.00
TRIO	TR-9130	2M ALL MODE TRANSCEIVER	£250.00
TRIO	TS-780	DUAL BAND BASE TRANSCEIVER	£275.00
WELZ	AC-38M	200W MOBILE MATCHING NETWORK	£50.00
YAESU	FP-757HD	HEAVY DUTY POWER SUPPLY	£120.00
YAESU	FP700	POWER SUPPLY	£100.00
YAESU	FRG-100	HF RECEIVER	£300.00
YAESU	FRG-7700	HF RECEIVER	£220.00
YAESU	FRG-8800	RECEIVER INCLUDES CONVERTER	£399.00
YAESU	FRG-9600	RECEIVER	£200.00
YAESU	FT-100	HF / VHF / UHF ALL MODE TRANSCEIVER	£599.00
YAESU	FT-1000MK5	200W DSP HF TRANSCEIVER	£2,000.00
YAESU	FT-1000MP AC	HF BASE DSP TRANSCEIVER(Late serial no)	£1,550.00
YAESU	FT-1000MP	BASE TRANSCEIVER	£1,300.00
YAESU	FT-1000MP V	200W DSP HF TRANSCEIVER	£1,900.00
YAESU	FT-101Z	MINT CONDITION!!	£250.00
YAESU	FT-101ZDmkIII	HF TRANSCEIVER inc FM	£375.00
YAESU	FT-225RD	2M BASE MULTIMODE CLASSIC!	£399.00
YAESU	FT-23R	HANDY TRANSCEIVER	£180.00
YAESU	FT-2500M	MOBILE TRANSCEIVER	£190.00
YAESU	FT-290RMKII	2M ALL MODE TRANSCEIVER	£180.00
YAESU	FT-290RMKII	MOBILE 2M MULTIMODE TRANSCEIVER	£275.00
YAESU	FT-41R	HANDY TRANSCEIVER	£120.00
YAESU	FT-470	2/70CM HANDY TRANSCEIVER	£140.00
YAESU	FT-480R	2M TRANSCEIVER	£199.00
YAESU	FT-650AC	26-50MHz 100w BASE SATATION TRANSCEIVER	£599.00
YAESU	FT-690RMKI	6M MULTIMODE MOBILE TRANSCEIVER	£250.00
YAESU	FT-690RMKII	6M PORTABLE	£375.00
YAESU	FT-7100	2M / 70CMS DUALBAND TRANSCEIVER	£249.00
YAESU	FT-726R	2 / 70 / 6m TRANSCEIVER	£575.00
YAESU	FT-726R	2 / 70 / HF TRANSCEIVER	£400.00
YAESU	FT-730R	70CM MOBILE TRANSCEIVER	£120.00
YAESU	FT-736R	2m / 70cm / 6m TRANSCEIVER	£750.00
YAESU	FT-736R	2m / 70cm TRANSCEIVER	£650.00
YAESU	FT-747GX	TRANSCEIVER	£299.00
YAESU	FT-757GXMKII	TRANSCEIVER	£395.00
YAESU	FT-757MK1GX	HF TRANSCEIVER	£375.00
YAESU	FT-767GX	HF BASE 100watt built-in ATU	£599.00
YAESU	FT-77	INCLUDES FM MINT!	£275.00
YAESU	FT-790R	70CM MULTIMODE MOBILE TRANSCEIVER	£225.00
YAESU	FT-80C	0-30MHz COMMERCIAL TRANSCEIVER	£375.00
YAESU	FT-840	HF TRANSCEIVER	£425.00
YAESU	FT-847	HF / 2 / 6 / 70cm BASE TRANSCEIVER	£900.00
YAESU	FT-920AF	HF/6M BASE WITH DSP	£899.00
YAESU	FT-ONE	HF BASE TRANSCEIVER	£450.00
YAESU	FTV-901	TRANSVERTER Inc 2m Mod	£165.00
YAESU	FV-707	VFO UNIT	£99.00
YAESU	MD-100A8X	DESK MICROPHONE	£80.00
YAESU	MH-34B4B	SPEAKER MICROPHONE For VX5R VX-1R	£15.00
YAESU	MH-35	SPEAKER MICROPHONE	£10.00
YAESU	MMB-16	MOUNTING BRACKET	£20.00
YAESU	NT-29	CHARGER	£30.00
YAESU	PA11U	PSU FOR FRG-100	£20.00
YAESU	VR-120	RECEIVER FM /WFM/AM	£99.00
YAESU	VR-5000	TOP RANGE SCANNER RECEIVER	£450.00
YAESU	VX-1R	HANDHELD TRANSCEIVER	£120.00
YAESU	VX-5R	2 / 70 / 6 HANDIE 5W	£220.00
YAESU	XF-114SN	2KHz SSB FILTER	£60.00
YAESU	YO-100	SCOPE VERY RARE!	£150.00
YUPITERU	MVT-225	AIRBAND SCANNER	£150.00
YUPITERU	MVT-7300	MULTIBAND HANDHELD SCANNER	£199.00
YUPITERU	OP-90	CASE	£10.00
YUPITERU	VT-125	AIRBAND SCANNER	£120.00

Please note, the equipment listed may

have been sold / updated, please ring

01922-414796 to check availabilty



RADIOWORLD

E&OE

42 BROOK LANE, GREAT WYRLEY, WALSALL, WEST MIDLANDS WS6 6BQ.

Tel sales & service: 01922 414796 Fax: 01922 417829

Merry Christmas from all the fun-loving guys at Radioworld

YAESU FT1000 MkV

200W output comes with external supply.

£Best UK price

YAESU FT-847

Best selling multiband. 160-6m/100W, 2-70cm/50W, 4m/10W. All mode satellite operation. Base/mobile.

£1149.00

YAESU FT-920AF

HF and 6m base station. Built-in ATU, DSP, 100W outputs, 2 antenna sockets, large amber display. High-tech front end receiver adopted from the FT-1000MP.

£1099.00

YAESU QUADRA AMP

The amplifier adored through the industry. 1kW, solid state transmit power on HF-500W, 6m, LCD read-out. Price smash.

£3999.00

YAESU FT-8900

Yaesu's new 4-band radio 28/50/144/430. Built to the usual quality excellent display. Built-in quadplexer.

£429.00

YAESU FT-817

The all new multi-band manpack, 5 watts, multi-mode, transceiver with lithium pack and charger, smaller than the FT-290, but can replace the whole shack!

Radioworld price **£549.00**

YAESU FT-7100

The latest of Yaesu's pedigree dual band, dual receive 50W output.

£299.00

YAESU FT-840

HF and mobile base. An absolute joy to use. Excellent front end, 100W, 100 memories.

Easy to use. A bargain at **£569.00**

YAESU FT-100D

Yaesu's latest mobile transceiver. HF, VHF, UHF, DSP, TX, RX, built-in CW filter, TCXO & larger speaker For that tailored transmit audio derived from the FT-1000MP.

£749.00

YAESU VR-5000

HF/VHF/UHF wideband scanner built-in wave meter. Real time band scope. 0.1-2.6GHz.

Bargain at **£549.00**

YAESU VX-1R

The world has never seen a dual-band amateur hand-held transceiver which provides such an incredible small size combined with ultra-wide frequency coverage until now. Weighs just over 4 ounces. 1W output. 10hrs of operation, wide band receive.

£159.00

YAESU FT-1500M

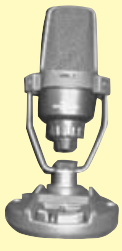
- 50W output power
- Four power levels
- Rugged construction
- Keyboard entry from microphone
- 175 memories
- Built-in CTCSS
- Smart search
- Wide/narrow deviation select
- Packet ready

RWP **£159.00**

YAESU VX-5R

Tri-band transmission. Short wave to microwave reception. 5W output off the lythium battery, spectrum scope, dot matrix, LCD, CTCSS, optional barometric pressure sensor.

£239.00



YAESU MB-200BX

YAESU'S all new desk top microphone built for broadcast quality, large diaphragm, a must for DSP transceivers, it has the build quality and sound of Top End studio mic's,

RWP **£225.00**

IN STOCK

Scratching Around

Gerald Stancey G3MCK looks at a simple, non-etch way of making printed circuit boards. Get scratching he says!

In his series Radio Basics, Rob G3XFD has written some excellent articles showing how easy it is to etch boards. But etching doesn't fit into my life style, I'm an enthusiastic user of printed circuit boards (p.c.b.s), but I shy away from etching. I bash metal in the garage and solder in the shack.

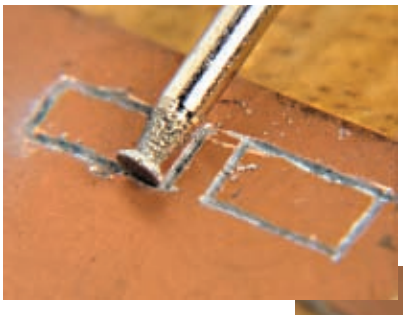
In the past I've used several non-etch techniques, such as 'stick-on islands' and solder tag, as well as 'ugly' or 'dead bug' style. Each method requires little or no cutting of copper. I've also tried the cut & scratch method using hack-saw blades. Although they're successful, they all have limitations, especially when it requires mounting integrated circuits (i.c.s).

My Salvation

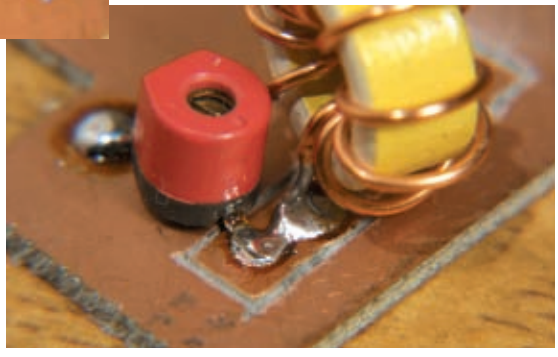
Then, some time ago I purchased, from a model shop, a 12V electric drill which has turned out to be my salvation! This type of drill is about the size of a large cotton bobbin and often comes with a do-it-yourself dentist's kit of assorted drills, grindstones, etc. I've shown a collection of similar, but diamond tipped, tools in the photograph above right.

I really purchased the drill to make holes in p.c.b. however, I soon discovered that, by using the edge of a grinding tool I could grind off foil and do a better job than scratching with the broken hacksaw blade. The lines were rather broad but quite acceptable for making r.f. boards for QRP transmitters.

Further investigation of the 'dental tools' revealed a small milling cutter. With this tool it's possible to cut very fine lines in the copper material. In fact I can easily cut lines that allow me to mount i.c. sockets. Two islands are shown 'growing out 'of the material in **Fig. 1**.



- Fig. 1: Keeping the 'wheel' of the tool as vertical as possible, the islands are cut out of the p.c.b. material. Note the dust produced may cause lung damage.



- Fig. 2: A close-up photo-graph of components mounted onto the islands created by this method.

Helpful Tools

In addition to the above drill and cutters the following tools are helpful:

- automatic centre punch
- scriber
- magnifying glass
- circuit tester
- model-maker's clamp
- small piece of Veroboard or perfboard.

The above tools are not essential but they make life easier. The automatic centre punch, is used to mark the locations of holes to be drilled. The scriber is used to run round a cut line to ensure that it's clean and free from rubbish. Finally, there's the magnifying glass, to visually check that the cut is clean (you may not need it but I sure do!).

The small piece of Veroboard is clamped on the p.c.b. as a jig when drilling holes for i.c.s - very simple and gives excellent results. The circuit tester is a 100µA meter in series with a 9V battery and a 100kΩ resistor. It's used for checking that an isolated area is really isolated. A good ohm-meter will work but be sure that you use the high voltage ohms range.

Begin by getting a suitable piece of p.c.b. material and decide roughly where components will go. Then drill a few holes and solder in the appropriate components. some of these will be 'earthed' at one end but the 'hot' ends will need to be isolated by cutting away the foil to form an island.

You may of course decide to form the islands first. In which case, a check for isolation with the circuit tester is all that's needed. Otherwise the magnifying glass and scriber will be needed. That's really all there is to it. Just carry on until the project is finished.

What To Do Next

I prefer to mount a few components then think what to do next. However, you may decide to do all the drilling and cutting first before mounting anything. The cutter works best when the drill is moved in one direction due to its rotary action. You should firmly hold the drill at a flat angle to the board.

Note. The dust created can cause lung damage - make sure you don't inhale it!

I like to combine this technique with ugly construction. That is, not only do I mount components on the copper side as normal with this method ... but additionally where it's easier, I mount components on both sides of the board. Wire links are used to simplify the layout, giving me considerable freedom with placing my components which from the r.f. layout point of view may be the better option.

Don't forget that professional p.c.b. technology is really a mass production technique and that much trouble is taken to avoid using linking wires to save on production costs. But my method is simple and is well suited to amateur construction. A close-up of the island with fitted components is shown in **Fig. 2.**

Try it ... and your construction problems could well be over!

PW

Getting The Drift

John Worthington GW3COI, in his usual tongue-in-cheek style, points out the benefits of chirp and drift based on his experiences as a Second World War RAF radio operator.

Despite being a radio operator myself I was surprised to learn that in the Second World War some 1154 transceivers had been modified to use crystals. It was this that got me thinking about the modern insistence for having a rig that doesn't drift off frequency or whose tone is a chirp. As a matter of fact, I now like to listen to a drifting signal with chirp for the simple reason that it makes a nice change not to have to listen to a rock solid signal with only a single pure note!

These days when I receive a signal that is a pure note I usually fiddle with the Independent Receiver Tuning control (IRT) on my rig to alter the pitch every now and then. This is because my ear just doesn't like a signal of a fixed frequency. I suppose it's because the fixed frequency tone eventually begins to wear out the part of the ear concerned and then in time it actually begins to become painful.

I've actually discussed the problem with our highly esteemed Editor (well...he's 'high' anyway!) and it seems that I don't suffer the problem alone. Rob drew my attention to the article - published in the April 2001 issue of *PW* extolling the virtues of the MFJ-616 Speech Intelligibility enhancer.

The author of the article - the **Rev. Hubert Makin G3FDC** explained his own hearing problems which are directly due to war time service, and how he overcame them as effectively as he could. And at the same time the Editor, **Rob G3XFD** (who I like to 'pounce on' using c.w. on 7MHz!) told me something that surprised me...that very often, he too suffers irritation with a pure note on c.w. reception!

Rob often adjusts his rig's IRT...and during a longer c.w. QSO often changes from using headphones, to an external loudspeaker. Sometimes he'll also switch a filter in - whether or not reception conditions warrant its use. That's the Editor's approach...perhaps you can share yours by writing a letter for publication? There's no doubt we're not alone!

Drifting Chirp

Now back to my own methods! A drifting chirp doesn't have the same effect on the ears as that of a pure note tone. During the Second World War I was an operator on a direction finding (DF) station working aircraft that were fitted with 1154 transmitters.

My receiver was a quite a grand affair. It stood almost a metre tall (3ft) and boasted the same measurements in depth, with massive knobs and no method of narrowing the pass-band whatever. I don't know whether the designer of the R1155 deliberately made it this way but it was an excellent idea because it meant you could hear an aircraft radio operator calling even if he was up to 10kHz off frequency!

Being an 1154 transmitter when the air radio operator called you, he would start to 'drift' slowly throughout the QSO. The drift would take him past all the QRM (interference), which in those far off days was pretty fierce and taking a position bearing was often much hampered by it.

So, the drift certainly helped you stick with the QSO. I'm convinced a steady pure note wouldn't have been for the best, as one signal could have easily have been close or under another and being crystal driven would mean the operator couldn't QSY (change frequency) easily.

In those days the air operators usually had other things on their minds to stop them considering about an easy QSY etc. A lot of the QRM that was generated came from fixed stations with stable transceivers, which often made things difficult. However, despite the present QRM the old 'drifting' 1154 moved it all like a ghost.

Off-frequency Following

The air operators knew that our transceiver was crystal controlled so were not too concerned, knowing that we would 'follow them' no matter how much off-frequency they went. This was a very good thing!

If you have ever tried using an 1155 receiver with its light tuning and tiny frequency read-out - imagine using one when you wore thick leather gloves with which you were issued. I can't imagine what drift sounded like to an airborne operator - maybe he had a side-tone which blew his ears off - poor bloke!

It was more likely of course that the air operator had no side-tone at all and just read his key 'thumps'. I had quite a few long QSOs with some aircraft who wanted a bearing every ten seconds for perhaps half-an-hour and the drift went on and on and may have eventually stopped and gone into reverse ...but who knows? Perhaps someone can say whether this would be the case?

Anyway, long live the drift and chirp in this land of pure notes. I am waiting for the next ripe example to whom I can give RST 597C to!

PW

COMPETITION TIME!

Do you dream of crystal clear radio communications? Then this could be the answer.....

WIN! AN NES10-2 SPEAKER

The NES10-2 Noise Eliminating Speaker, manufactured by **bhi Ltd.,** incorporates new Digital Signal Processing technology to remove unwanted background noise from speech. This compact, easy-to-install speaker has been designed to greatly improve the clarity and intelligibility of speech in a variety of radio applications including Radio Amateur base stations, CB, marine communications and taxi base stations. It not only removes unwanted interference from the radio signal, but also truck, car engines and road and wind noise.

The NES10-2 costs **£99.95 plus £6.95 P&P** but thanks to the generiosity of bhi you could win one this month!

Specifications

Number of attenuation levels:	8
Noise attenuation:	20dB (typical)
Audio input power:	5W r.m.s. max.
Power:	12-28V d.c.
Size:	110 x 65 x 55mm
Weight:	200gm

For a full review of the NES10-2 see **G3XFD**'s review in *PW* September 2002. Please note that since the review appeared bhi have added a 3.5mm mono headphone socket and a bi-colour l.e.d. to indicate power on and noise cancellation status to the unit.

To be in with a chance of winning ... just take part in our easy to enter competition! If you're not lucky enough to win contact bhi on **(01923) 530147** or via their website at **www.bhinstrumentation.co.uk** for details of how to order.

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

Words To Find:

BACKGROUND
BHI
COMPACT
DSP
EARPIECE
ELIMINATING
IMPROVED
INTERFERENCE
NES
NOISE
SPEAKER

Rules

Ten of the eleven words listed have been hidden in the letter grid. They have been printed across (forwards or backwards), up and down, diagonally, but they are always in a straight line without odd letters between. You can use the letters in the grid more than once for different words. Once you have found all **11 words**, mark them on the grid, note the missing word and send it, along with your name and address (photocopies accepted with the corner flash) to: **NES10-2 Competition, *Practical Wireless,* PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW**. Editor's decision on the winner is final and no correspondence will be entered into.

Entries to reach us by 8 January 2003.

The missing word is: .....

Name .....

Callsign .....

Address .....

.....

.....

Postcode .....

☐ If you do not wish to receive future correspondence as a result of entering this competition please tick.

PW Jan '03 Competition

From Zeppelins to CONCORDE...

Editorial note: Frank G2CVO felt unable to write an article for *PW* - but I persuaded him to sit down and 'ramble' (his term!) into a cassette recorder. I don't often work this way...but it was a fascinating job although two pages cannot do full credit to a 94 year old's life...a true Zeppelin to Concorde story! (He even visited the first British Concorde's flight deck at Filton, in Bristol and met Brian Trubshaw the test Pilot). Thank you Frank...I was spellbound listening to the memories on the tape cassette!

G3XFD

Looking Back With G2CVO Frank Osborn G2CVO is a sprightly 94-year old Radio Amateur with many memories. He's seen Zeppelin airships in action and Concorde flying...but wishes he'd had enough money to by some of that 'First World War' surplus!

Frank Osborn - aged about 17 - and his first short wave set. Note the precautions against hand capacity when tuning (see text).

Frank Osborn - later to become G2CVO - was born on 21 February 1908, in Stratford, Essex (now in Greater London). Frank's earliest memories go back to when he was around four years old. However, one stands out, taking place when he and his parents were on holiday in Southend-on-Sea.

They had walked out the full length of Southend pier - which is 2km (1.25 miles) long. The family had been able to see the fleet of Royal Navy battleships and other men-of-war anchored off the Kent Coast. However, while they were enjoying the view...a newspaper boy came by shouting "War Declared...War Declared". It was that fateful day ... 4 August ... and they left for home immediately.

Freezing Privy

At that time Frank and his parents lived in a terraced house three rooms-up, three rooms down. The outside loo was freezing in the winter and full of huge hairy ("Giant" Frank called them!) spiders during the summer!

During the Great War (as his generation remembers the conflict) Frank remembers is father calling him outside one night to see a German Zeppelin airship caught in the searchlights. They were just able to see an aircraft - it turned out to be a Bristol Fighter- climbing above the low-flying airship...shooting it down in flames over Essex.

Air raid precautions were rudimentary in those days and Frank remembers local policemen running through the streets blowing their whistles to announce the air raids. He also remembers the anti-aircraft guns mounted on lorries in the streets - cease firing when British aircraft were seen approaching the Zeppelins.

On another occasion Frank recalls seeing a formation of German Gotha bombers - one of the larger aircraft flying during the 1914-1918 War, atacking England. Alongside the Gotha bombers he could see the Taube fighters which accompanied them...they were so close and low that Frank can clearly remember seeing "The little pilot's heads sticking out of the cockpits"!

School Very Strict!

Frank remembers that discipline in school was very strict. You were never allowed to utter a word...unless you were asked to speak by the teacher who was treated like a God. The cane was frequently used - and some discipline order was quickly instilled and "It never did me any harm" he says!

Frank also remembered the Winkle Man announcing his arrival in the street by shouting "Winkles All Fresh" to all and sundry. His barrow also carried fresh shrimps, mussels, and cockles...all available by the pint making a tasty snack or meal.

The famous Muffin man came too...carrying his wares balanced on a large tray on his head. "They were lovely toasted, with margarine spread on them"...says Frank..."My parents couldn't afford butter as it was very scarce because of the war".

Frank also remembers the milk arriving in a giant churn, mounted on a handcart. No bottles...instead the milk was ladled into a jug by the milkman. No refrigerators in those days of course..."Mother used to keep the jug of milk in a perforated zinc-lined meat-safe type of cupboard in the scullery".

No washing machine either..."Just a large coal-fired copper in which the washing was boiled. Then it was 'All hands to the mangle handle to squeeze out as much water as possible"...he told me.

Frank recalls that in those days the seasons seemed to occur naturally and in a never varying parade of Spring, Summer, Autumn and Winter. He remembers "April Showers leading to May flowers, and then eventually to November's thick, clinging, choking yellow fog - indeed so thick that you couldn't see eight feet ahead of you". It always seemed to snow at Christmas and family entertainment "was always great fun" he says..."what a difference nowadays though"!

Castrol Oils

Frank - as was often the case in those days - left school at 14 years old and started a career which led to him working with the same company for 46 years. He was based in the City of

London working for C. C. Wakefield & Company...the manufacturers of Castrol Oils.

Castrol of course made high quality lubricating oils for all branches of industry, from cars to railways and aeroplanes. "Sir Charles Wakefield - the company chairman - regularly met the famous aviators Amy Johnson and Jim Mollison, as they flew using Castrol oils - so sponsoring isn't a new idea" said Frank!

At this time Frank was an office boy, working 8.30am to 6pm. This required an early start from home - leaving on the 'Workman's Train' from Essex at about 6.30. Huge bags of mail had to to distributed at work...and he was exhausted at the end of the day - literally having his evening meal and then going to bed.

Early Osborn Radio

"I built my first crystal set in the early 1920s, and had carried the 18 foot long (5.4m) long wooden pole for the necessary mast home over my shoulder" Frank says..."When 2LO came on Dad had to act as Guarantor for the Licence to build the receiver...a whopping 10 shillings (50p)...a lot of money in those days"!

Frank remembered Captain Eckersley from 2LO. "I met him many years later at the Ilford Radio Club - very flamboyant in dress...a real character and ladies man I felt" said Frank, looking back over nearly 80 years.

Frank spent his Saturdays and lunch hours at street markets looking at surplus gear and bits and pieces. "I wish I could have afforded some of those beautiful Ebonite-panelled Great War sets " he said. "But at 15 shillings (75 pence) a week, I only ever had a few coppers in my pocket.

When *Popular Wireless* was launched Frank remembers having to queue in the newsagents! "Went like hot cakes it did" he told me.. and they quickly sold out because of the tremendous interest in wireless". Frank enjoyed *Popular Wireless* until it finally merged with *Practical Wireless*, eventually becoming the title we all know today.

Short Waves

Continuing the story Frank said: "I then progressed on to short wave, and built a two-valver...helped by promotion at work...so I could buy the materials. I remember listening after going to bed - at about midnight - to KDKA in Pittsburgh and hearing 'Little Orphan Annie', and W2XA in Schenectady in New York State. I also remember W3XAL in Boundbrook New Jersey with their interval signal - huge generators winding up and the sound of an arc discharging 12 million volts across a spark gap!

Keen on motorbikes Frank bought his first bike for £18! Marriage in 1935 to his wife **Violet** (now 89) and family responsibilities took over while they brought up their two sons - **Derek** and **Roy** on £5 a week! Their first bungalow cost £750, mortgaged for £4 a month but there were modest pay increases until 1939!

Licensed as an Artificial Aerial callsign 2CVO in 1935, Frank built and re-built different designs as they came out, "Make do and mend", he says!

Frank saw intensive duty in the National Fire Service during the war (counted as part of the War time defence services) - especially in the East End of London. He rejoined Castrol at the end of the War and eventually (after being given a lift by an Esso Oil Rep in his company car) got his own company car after his boss heard of the lift! Frank retired from Castrol Oils, as Sales Manager, aged 60 in 1958.

Post War Radio

Frank's AA Licence became G2CVO after the War and he helped organise the very well-known **Silverthorne Radio Club** which is still going strong today. He remembered demonstrating all the American Command equipment he had converted, during one show at the Silverthorne Club. Franks also regrets parting company with his B2 Spy set (no suitcase or power pack) for £10. (A complete set can fetch £200 now he told me).

Operating from a corrugated iron, steel framed shack - Frank was warm and comfortable inside as it was lined with wooden board. Much 1.8MHz work was done in those days, using a long wire antennas.

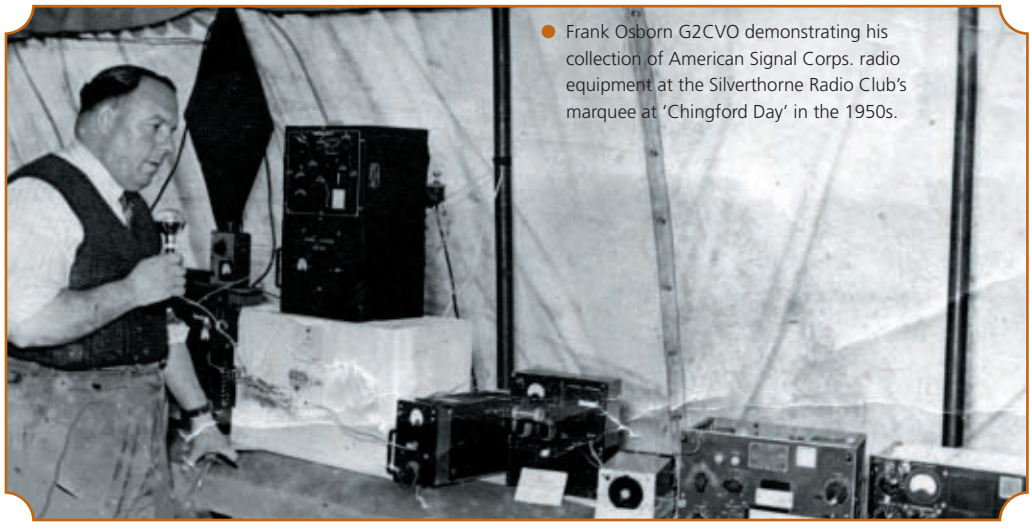
The family moved to West Mersea, after having a caravan there for some years, in 1970. They'd found a nice bungalow "With plenty of land" Frank told me. He'd made a mobile unit using a Command Receiver and home-brewed transmitter. "Came in useful when my brand new Vauxhall developed gear box trouble. Radio help on 1.8MHz, for possible rescue, was available offered all the way to the garage"!

Public Life

Frank spent 12 years on the West Mersea Town Council, including one year as Deputy Mayor and another three as the Mayor. He was also a keen member of the **Colchester Radio Amateurs club**.

Although he's still active on the air on h.f. and 144MHz, he greatly misses his constructional work. "Building those circuits from *Radio Constructor* - a great little magazine, and *Short Wave Magazine*...made a life long hobby for me so enjoyable. Indeed so much is owed by so many to magazines like *PW* and the others which have long since closed. And I really enjoyed *PW*'s 70th anniversary issue in September 2002" Thank you Editorial team, and your predecessors, for what you've done! *PW*

● Frank's original 1935 'Artificial Aerial' licence station 2CVO.



● Frank Osborn G2CVO demonstrating his collection of American Signal Corps. radio equipment at the Silverthorne Radio Club's marquee at 'Chingford Day' in the 1950s.

● The Popular Wireless WLS2 receiver project as built by Frank Osborn (see text).

Antenna Workshop

A MONO-BAND MOXON

David Butler G4ASR offers hope for operators who cannot erect a conventional 28MHz Yagi because local obstructions or small gardens limit the size of antenna to less than the six metres required for this band. Try it and see!

There's many an Amateur who looks for a beam antenna with a good performance that will fit into a small garden or as small a space as possible. Perhaps even a space that's smaller than your average dining room? For those who have this requirement, there is indeed a 28MHz antenna that fits this description almost perfectly.

The antenna I'm about to describe, possesses the gain of a 2-element Yagi, has an excellent front-to-back ratio and matches well (v.s.w.r. of below 2:1) over the entire 28MHz band. It requires no matching system and the antenna connects directly to a 50Ω feeder. Even better is that you can make the antenna yourself from easily obtainable materials and components.

The beam antenna is 3.8m wide and measures less than a metre and a half, from front to rear elements. It's lightweight and can be turned with a small rotator. This fantastic antenna is ... the rectangular shaped Moxon beam.

Moxon Derivative

The Moxon rectangle is a derivative of the VK2ABQ square. **Fred Caton VK2ABQ** took a quad loop antenna and laid it horizontally. He then cut the loop at each side in the front-to-back mid-line and then insulated the resulting two half-wavelength wires from each other by using large buttons as insulators. He then found that the beam antenna possessed some directivity and gain in the direction of the feed-point.

Then, **Les Moxon G6XN** looked at VK2ABQ's design and made two very significant discoveries about the antenna. His experiments showed that a rectangular shape improved the forward gain and that the spacing between the ends of the wires had to be much greater than that provided by coat buttons. In effect the Moxon rectangle is a two element beam, which is approximately 70% the length of a full size 2-element Yagi.

The design is quite accommodating, in that the

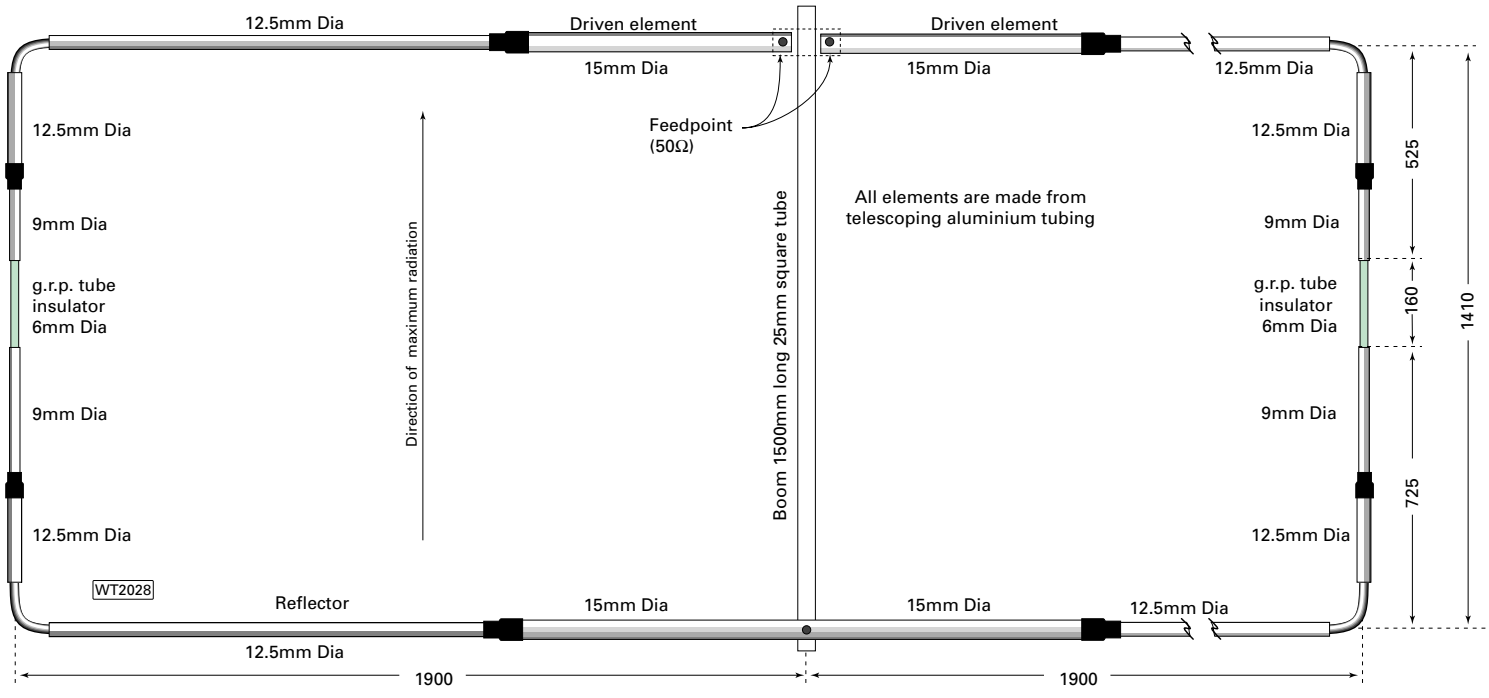


Fig. 1: The dimensions and layout of the Sandpiper design of 28MHz Moxon antenna.

antenna can be built as a wire array for the lower frequency bands or as a beam made from aluminium tubing for higher frequencies. The individual components or the complete kit of parts for the antenna that I'm about to describe are all available from **Sandpiper Communications** (see separate box).

Rectangle Elements

The elements of this Moxon rectangle, shown in **Fig. 1**, are made from various lengths of 15mm (5/8in), 12.5mm (1/2in) and 9(10)mm (3/8in) diameter tubing as shown in the diagram. The tubing and the insulator sections are sized so that they slide into each other. The main boom is made from a 1.5m length of 25mm (1in) square aluminium tube.

One of the two largest diameter tubes is cut in half and separated and insulated along a 300mm length of fibreglass rod that fits neatly inside the tubes. The two halves of the inner of the driven element are joined to the main boom using insulating components.

The feed-point assembly consists of a moulded dipole centre with integral SO-239 coaxial connector. Short wire links are attached to the split driven element as shown in the photograph, **Fig. 2**. The main element sections consists of four 1700mm lengths of tubing that are slid into the ends of the two central elements.

Time Consuming

The corners of any designed antenna, are probably the most time consuming aspect of building this or any antenna. You could bend your own by filling suitable aluminium tube with sand and bending the tube around a 15mm wheel or pulley, working slowly and by keeping the sand well packed in the tube to prevent pinch bends.

Alternatively, you could do what I did and use radius-bent aluminium tube sections obtained from Sandpiper Communications. The side sections of the rectangle consists of a 600mm length of 12.5mm tubing for the reflector, a 400mm length for the driven element, two 300mm lengths of 10mm tubing and a 300mm length of 6mm fibreglass rod for the insulator.

To set the element lengths and element spacing I used plastic couplers with integral screws, again available separately from Sandpiper if building your own antenna. They are available in diameters to suit various sizes of tubing and fibreglass rod used.

Very Straightforward

Tuning up a Moxon rectangle is very straightforward. The antenna is connected directly to 50Ω feeder. Although a 1:1 choke balun is recommended for this and indeed any fully balanced antenna, you can work without one. As a start point just adjust all elements to the dimensions given in Fig. 1.

The side-to-side dimension is the key to centring the v.s.w.r curve for lowest reading. The centre frequency changes approximately 50kHz for every 10mm of width adjustment. The spacing between the element tips has the greatest affect on the place of the deepest front-back ratio null within the 28MHz band.

To tune up the antenna at ground level I fastened the antenna to a short mast section clamped to a pair of step ladders as shown in the photograph **Fig. 3**. This arrangement made it very easy to alter the antenna without putting it on a large pole or tower. Adjustments were made to the elements at ground level and then the antenna was tilted upwards at 45° to check the v.s.w.r. readings.

When a good match is achieved, tighten up all joints and waterproof the coaxial cable connector with self-amalgamating tape. When the antenna is positioned on its permanent mast there should be no noticeable difference in v.s.w.r. performance.

Other Bands

If you're intent on making Moxon beams for other bands, a program that calculates the dimensions of a Moxon rectangle has been written by **Dan Maguire AC6LA**. You can find this on his website (**www.qsl.net/ac6la/moxgen.html**). All you have to do is just input the design frequency and diameter of the wire or tubing and the program will provide all the dimensions.

Note that if you want to build a Moxon rectangle with different size tubing, as shown here, then altering the element diameter will result in slight changes for the required spacing of the element tips. Different size tubing changes the coupling between the tips.

To achieve the same coupling with larger tubing the tails will need to be further apart but without significantly changing the overall final design length of the reflector element. Anything more than small changes in element diameter may require juggling all of the dimensions to maintain performance and still have a near 50Ω feed-point impedance.

So, get building that Mono-band Moxon

PW

Fig. 2: A close up of the feed-point arrangement, the two sides of the driven elements are separated and mounted on an insulating g.r.p. strengthener.

Fig. 3: Mounted angled upwards at around 45°, the antenna is quite easy to adjust for matching and band centre.

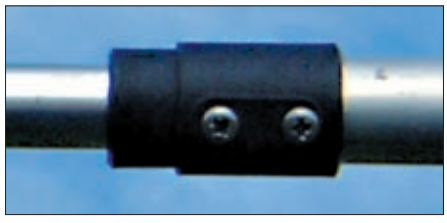


Fig. 4: Using pre-moulded joining pieces allows adjustments to be made before finally screwing the parts firmly together for permanent use.

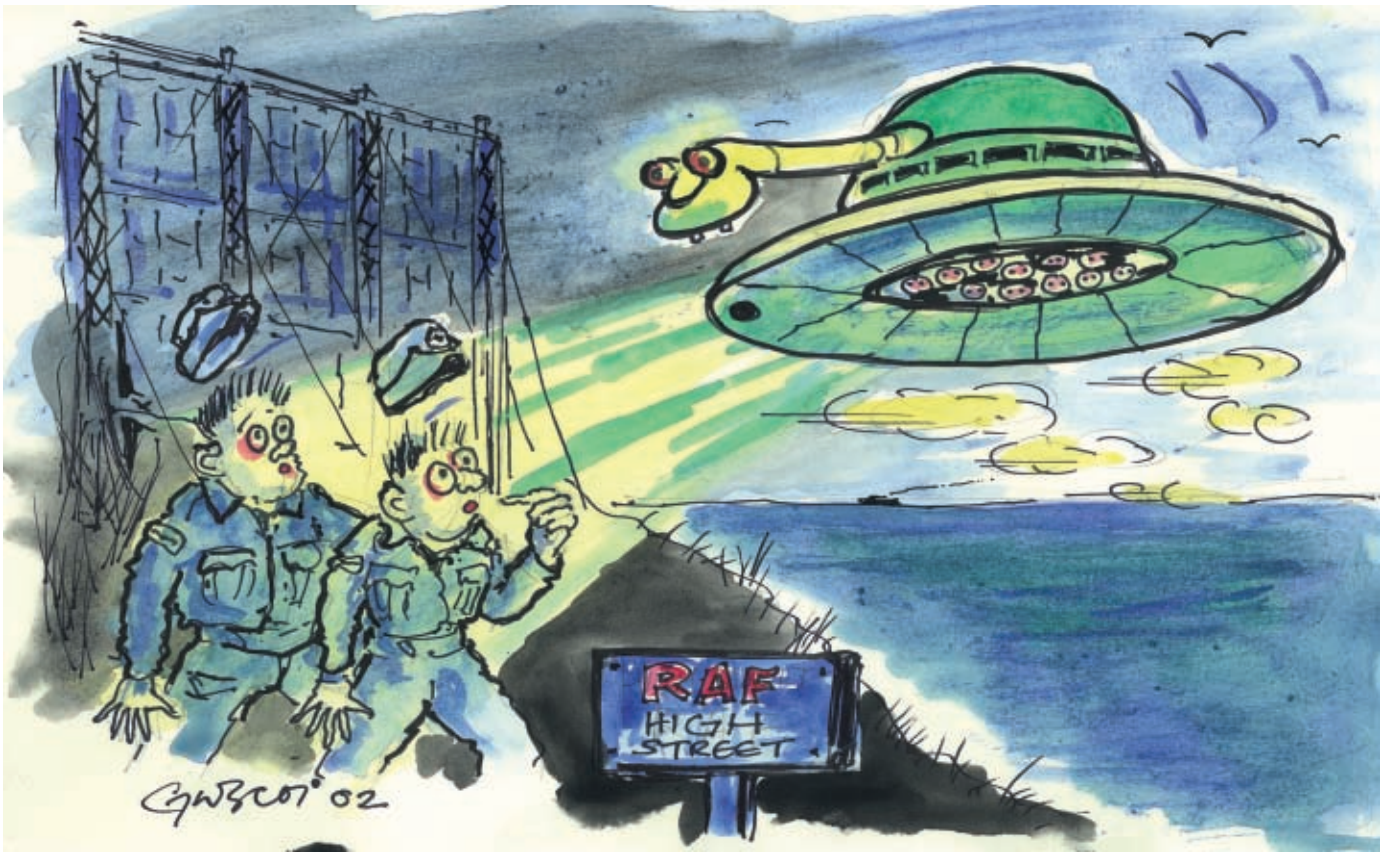
Fig. 5: These radius-formed bends make the finished design look good as well as giving a sturdy construction.

A complete kit of parts to make the Moxon 28MHz beam antenna described here, may be obtained from **Sandpiper Communications, Unit 5, Enterprise House, Cwmbach Industrial Estate, Aberdare CF44 0AE, Tel: (01685)870425**. There's a special introductory price of £47.50 including carriage.

Sandpiper are aiming to develop this Moxon rectangle into a dual-band 28MHz and 50MHz antenna, which will consist of the above 28MHz Moxon rectangle with two additional parasitic elements for the 50MHz band.

Valve & Vintage

This month the possibilities of inter-stellar travel enters the story in the latest part of Charles Miller's Royal Air Force memoirs. Why?...believe it or not... it seems that RAF High Street tracked an unidentified flying object!



...”It had not been there a moment before, so from where had it come”?.....” at around 1,350 m.p.h., it was a speed far in excess of any aircraft of the period”.....”the object disappeared as abruptly as it had arrived”.....”We sat stunned for a long time”.....”This was before the term UFO had come into general use”.

Inter-stellar UFOs!

I'm pleased you've joined me again as I recount my RAF memories! And Although I've spoken mainly of the radar transmitters at RAF High Street, we did, of course, have to maintain the receivers as well. This was nowhere near such an exacting task and it was actually quite pleasant to spend the occasional week coasting along in R Block.

Two or three radar 'ops' (operators) were on the strength at High Street to instruct the reservists when they came for their fortnight's training; in between they had nothing much to do apart from play cards with us. If this palled we used to spend the odd hour using the gear to watch for aircraft in the area, and this was how we came, one day, to track an unidentified flying object UFO (**I am not making this up!**). First, though, I need to give you some idea of how the tracking process worked.

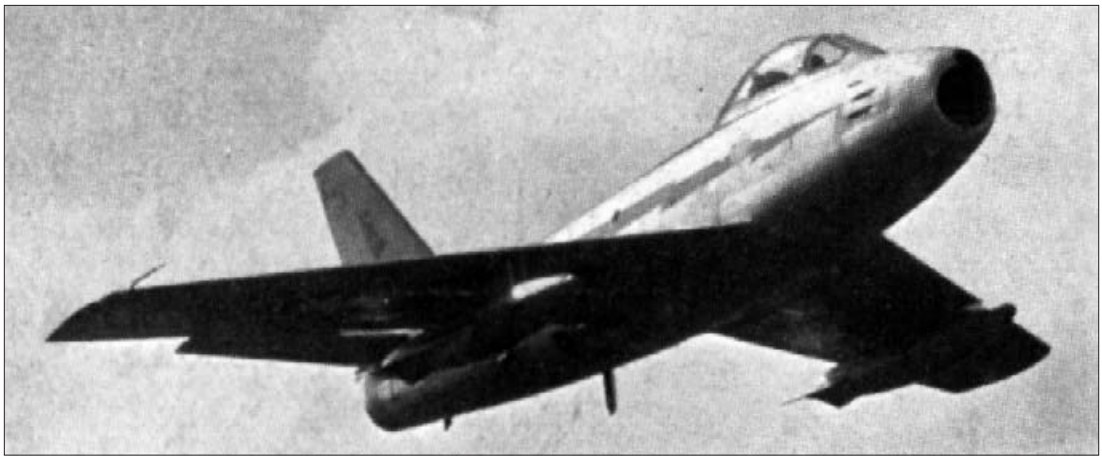
Display System

The receiver display system consisted of a vertically mounted large cathode ray tube (c.r.t.), in front of which sat an operator (myself, in the event to be described). A horizontal trace across the screen of the c.r.t. was deflected vertically when a response was registered, i.e., the signal from the transmitter was bounced back off an object such as an aircraft.

I say 'such as', because other objects like ground features might also produce responses known as 'permanent echoes' or p.e.s for short. There was also likely to be clutter of spurious responses near the left hand side of the trace known as 'grass'. Experience soon familiarised an operator with the local p.e.s and they could safely be ignored.

The distance of a response from the left hand side of the trace was exactly proportionate to its real distance from the transmitter, and thus accurate ranging could be established. In the early receivers a mechanical pointer was employed, moved across the screen by means of a large control knob to coincide with the response.

Later on the mechanical pointer was replaced by a 'marker pip' displayed on the c.r.t. beneath the main trace. In either case the same control knob operated electrical devices which translated the



A North American F-86 Sabre. It was fitted with a General Electric J-47-GE-27 pure jet engine which developed 5,800lbs thrust normally and 7,000lbs with water injection. It was capable of 680 m.p.h. at sea level and 630 m.p.h. at 35,000 feet. The service ceiling was 52,000 feet and the initial rate of climb 8,000 feet per minute. Compared with North American's famous P-51 Mustang this was pretty good, but not fast enough to catch a UFO!

range into signals fed to an enormous electro-mechanical calculator made up of a myriad of telephone type switches and relays. (It had in fact been installed and was maintained on a daily basis by the old General Post Office (GPO) telephone service.

At the press of a key the c.r.t. operator could set this behemoth working. Within seconds it would grind out positional information in the form of national grid co-ordinates to be displayed on a console and map table at which the rest of the ops were sitting.

The surface of the table was covered with a very large map showing the coverage of the particular radar station, divided into the squares of the national grid. When the calculator produced its figures, the position of whatever was producing the response could be determined again within seconds. (It was 1930s technology, devised without the dubious benefit of computers...and it worked).

Another basically simple but highly effective arrangement enabled the speed of a moving response to be calculated. It consisted of a large electric stop-clock which could be started and stopped by the c.r.t operator.

To give a very simple example, if the clock recorded 60 seconds for a response to move an indicated five miles closer to the left hand side of the main trace, you knew that whatever was causing it was approaching at 300m.p.h. In fact, an experienced operator could estimate with fair accuracy from the size of the response on the screen what was producing it, from a single small aircraft to a squadron of bombers.

The UFO Sighting

The scene is now set for the UFO sighting. As mentioned above, I was sitting at the c.r.t., Derek and three ops were at the console. We were running the gear more to make sure that everything was in order for the next intake of reservists.

As usual, the c.r.t. was showing only grass and p.e.s, and we expected nothing more given the low level of air activity in that area at that particular time. Suddenly however, I was astonished to see a large response appear at a range of around 20 miles. It had not been there a moment before, so from where had it come?

Given that CH did not give low-level coverage, the only explanation appeared to be that whatever was causing it had suddenly ascended from near ground level to a stationary position. However, the sheer size of the response precluded its being produced by the small helicopters in service at the time.

I hit the key to start the calculator and the co-ordinates it produced gave the position of the object as being off the coast near Aldeburgh. We had perhaps a minute to ponder what it possibly could be when it suddenly started to move away at speed.

I started the clock and clicked it off when the object had travelled 20 miles. The reading was a shade over 54 seconds, and had we not all seen this with our own eyes we would have said it was incredible, for it worked out at around 1,350 m.p.h., a speed far in excess of any aircraft of the period. Whilst we were still marvelling at this, the object disappeared as abruptly as it had arrived, presumably either by dropping to sea level or rising to an immense altitude.

We sat stunned for a long time. This was before the term UFO had come into general use and all we could only conclude that we had in fact tracked what had been some highly advanced top secret military device.

Because we were all subject to the Official Secrets Act, we were inhibited from passing on information of this nature except to authorised persons. And given the informality of RAF High Street, there appeared to be none who measured up to this requirement!

We then agreed unanimously that we'd better keep quiet about the matter...and as far as I am aware this is the first time it has been mentioned in print. In fact, it had all but slipped my mind when, some 30 years later I discovered that on the same day as when we had tracked the object it had also been located on radar gear on one of the American Air Force bases in Norfolk.

Jets Scrambled

In fact, F-86 Sabre jets had been scrambled in an attempt to intercept the UFO. Unfortunately, although these aircraft had a high performance for the day, with a maximum speed of 680 m.p.h. at sea level, they had no chance of catching up with it.

From the day I learned of the American action I've had no doubt whatsoever that what we tracked was a genuine UFO. I also think that the American's 'close encounter' was hushed up by the authorities to prevent the public knowing about it.

Finally for this time....if the story should prompt someone else to recall curious events off East Anglia in 1952, I would be most interested to hear of them.

PW

"Because we were all subject to the Official Secrets Act, we were inhibited from passing on information of this nature except to authorised persons".

Trader's Table

THE SHORTWAVE SHOP

01202 490099

TRANSCEIVERS

ICOM IC746 HF/6M/2M TRANSCEIVER £749
ICOM IC575A 28/50Mhz TRANSCEIVER £495
ICOM Q7 VHF/UHF H/H TRANSCEIVER £85
ICOM IC1271 1200Mhz TRANSCEIVER £695
YAESU FT790R UHF TRANSCEIVER £125
YAESU FT767 HF TRANSCEIVER £250
YAESU FT101Z HF TRANSCEIVER £185
YAESU FT736 VHF/UHF TRANSCEIVER £495
KENWOOD TS680 HF TCVR £375
KENWOOD TS850SAT HF TCVR £795
KENWOOD TS530S HF TCVR £225
FDK MULTI 700EX MOBILE VHF TCVR £85
KDK 2030 VHF MOBILE TRANSCEIVER £95
KENWOOD 9130 VHF MULTIMODE £225
KENWOOD TM231E VHF MOBILE £99
KENWOOD TS700 VHF MULTIMODE £145
KENWOOD TH 215E VHF HANDHELD £95
ALINCO DR 140 VHF MOBILE TCVR £95

RECEIVERS

ICOM IC7100 VHF UHF RCVR + HF £349
ICOM ICR 8500 HF/VHF/UHF RECEIVER £945
JRC NRD 545DSP HF RECEIVER £995
JRC NRD 515 RECEIVER C/W KEYPAD MEMORY UNIT and MATCHING SPKR. £899
KENWOOD R2000 HF RECEIVER £225
KENWOOD R5000 HF RECEIVER £375
KENWOOD R600 HF RECEIVER £185
AKD HF3 HF RECEIVER £95
AOR AR3000A HF VHF UHF RECEIVER £425
AOR AR2700 WIDE BAND H/H RCVR £135
AOR AR8000 H/H RX + PC INTERFACE £195
YUPITERU MVT7300 H/H RCVR £185
YUPITERU MVT7100 H/H RECEIVER £125
YAESU FRG100 RECEIVER inc PSU £295
YAESU VR500 WIDE BAND H/H RCVR £145
YAESU FRG 7700 HF RECEIVER £125
YAESU FRG 7 HF RECEIVER £95
YUPITERU MVT 2000 H/H RECEIVER £325
BEARCAT 9000XLT BASE SCANNER £185
BEARCAT UBC120XLT. H/H SCANNER £95

ACCESSORIES

KENWOOD BC15A CHARGER/TH28/78 .....£39
KENWOOD SP31 SPEAKER 850/870 .....£75
KENWOOD PS31 PSU 850/870 .....£135
YAESU FTV107R VHF TRANSVERTER £99
MFJ 931 ARTIFICIAL EARTH UNIT £89
AMERITON AL811 600W. HF AMPLIFIER £495
MFJ931 ARTIFICIAL GROUND £89
YAESU FP707 POWER SUPPLY £85
WATSON SUPER SEARCHER COUNTER £65
MFJ 9593 ACTIVE ANTENNA UNIT £85
TIMEWAVE DSP59PLUS DSP UNIT £89
BNOS 144/180 VHF LINEAR AMPLIFIER £95
BNOS 50/50 6M. LINEAR AMPLIFIER £85
TINY 2 PACKET TNC £95
KENWOOD TL922 LINEAR AMPLFIER £899
NRD RTTY BOARD FOR NRD 525/535 .....£95
NRD RTTY TUNING INDICATOR UNIT £35
YAESU FL2100Z HF AMPLIFIER £399
AMERITON HF LINEAR AMP 600W+ £499

Visit www.shortwave.co.uk for latest list.

NEVADA

023-9231 3090

AKD 7003 70CM 3W TRANSCEIVER £89
ALINCO DJ-191E 2M HANDHELD TRANSCEIVER £99
ALINCO DJ-SR1 PMR 446 TRANSCEIVER £79
ICOM IC-2800H 2M/70CM MOBILE TRANSCEIVER £299
KENWOOD TM-241E 2M FM TRANSCEIVER £129
TRIO TR-7500 2M FM 10W TRANSCEIVER £99
TRIO TR-7800 2M FM 25W TRANSCEIVER £149.90
TRIO TR-9500 70 CM 10W MULTIMODE TRANSCEIVER £199
YAESU FT-1500M 2M MOBILE TRANSCEIVER 129
YAESU FT290RII 2M MULTIMODE PORTABLE £225
YAESU FT290RII 2M MULTIMODE PORTABLE £249
YAESU FT40R 70CM HANDHELD £119
YAESU FT4700RH 2M/70CM FM MOBILE W/SEP KIT£259
YAESU FT-480R 2M 10W MULTIMODE TRANSCEIVER £169
YAESU FT8100 2M/70CM MOBILE TRANSCEIVER £275
YAESU FT-90R 2M/70CM MOBILE TRANSCEIVER £285
YAESU FTL2014 VHF PMR TRANSCEIVER £75
ALINCO DJX-10E HANDHELD SCANNER 225
ALINCO DJX-10E HANDHELD SCANNER £169
ALINCO DJX-2 HANDHELD SCANNER £125
BEARCAT BC220XLT HANDHELD SCANNER £89.95
HITACHI KH-WS1 WORLDSPACE RECEIVER £100
ICOM ICR-7000 WIDEBAND RECEIVER £399
ICOM IC-R71E HF RECEIVER £399
JRC NRD345 HF RECEIVER £375
KENWOOD R-5000V HF RECEIVER + VHF CONVERTER £499
LOWE HF150 + K PAD HF RECEIVER £179
LOWE HF225+CASE,FM&K PAD HF RECEIVER + ACC £329
REALISTIC DX-394 HF RECEIVER £99
ROBERTS R-861 SHORTWAVE RECEIVER £129
YAESU FRG-7 HF RECEIVER £99
ALBRECHT AT485S 10M SSB MOBILE £129
ICOM IC-746 HF/6M/2M 100W TRANSCEIVER £899
ICOM IC-775DSP 200W HF BASE TRANSCEIVER £1695
KENWOOD TS-130S 100W HF TRANSCEIVER £375
KENWOOD TS-680S HF + 6M TRANSCEIVER £475
KENWOOD TS-950S 150W HF BASE TRANSCEIVER.£899
MIDLAND ALAN 8001+ 10M MOBILE TRANSCEIVER £159
YAESU FT-1000 200W HF TRANSCEIVER £1199
YAESU FT-817 HF-70CM PORTABLE TRANSCEIVER £499
YAESU FT920AF HF/6M 100W DSP TRANSCEIVER £899
ALINCO EME -12 HEADSET/MIC £25
DAIWA LA-2080H 2M 80W AMPLIFIER+PREAMP £85
DAIWA PS-300 25-30AMP PSU £79
DATONG FL3 FILTER £59
ICOM AT-150 AUTO ANTENNA TUNER £175
ICOM BC-135 BASE CHARGER UNIT £29.95
ICOM PS-85 20A POWER SUPPLY £159
ICOM RS-8500 IC-R8500 INTERFACE 7 SOFTWARE £32
KENWOOD AT-250 AUTO ATU £175
MIRAGE B3016 2M 10-160W AMPLIFIER £179
MML144-30LS 2M 30W LINEAR AMP £59
SGC SG-239 AUTO ATU £175
TOKYO HL100B/21-28 LINEAR AMP 10-100W 21-28MHZ £129
TOKYO HL37VSX 2M 5W-30W LINEAR AMP £49
WATSON WS-2090H 2M 5W-80W LINEAR AMP £89
YAESU FC-707 ANTENNA TUNER £89
YAESU FF-501DX 1KW PEP LPF UNIT £20
YAESU FIF232C VAN COMPUTER INTERFACE (FT736) £59
YAESU MD1B8 BASE MIC YAESU 8 PIN £59
YAESU MF-1+SB10 BOOM MIC & SWITCH BOX £35

E&OE

PLEASE CHECK OUT OUR WEB SITE FOR LATEST ITEMS AVAILABLE
www.nevada.co.uk

SOUTH EAST COMMUNICATIONS

00353 51 871278

STATION ACCESSORIES

Global AT2000 SWL ATU £69
Ameritron AL-800XCE 1.25kw amp save £750, now .£1249
Ameritron AL-811XCE 10-160m 600watt amp £499
Garmin GPS3 handheld GPS with road maps £249
Garmin Street Pilot 16MB card DC lead mint £399
Garmin 48XL boxed as new £149
Microset 70cm amp cost new £499 .....now £250
Revex WS40 2m/70cm SWR/PWR meter £49
Paccomm Spirit2 9600 baud TNC £99
Watson 30-35amp PSU with meters £89
MFJ941D 300 watt mobile ATU £79
Opto Electronics DS1000 digital frequency counter £299
Datong FL-3 multimode filter £99
Watson WMM-3 multimode data decoder £45
Icom SP-21 speaker £60
Yaesu MD-200 desk mic £199
Icom FL-100 CW filter £39

VHF/UHF TRANSCEIVERS

Uniden MC1010 marine VHF 25w transceiver new £129
Yaesu FT1500M 2 meter 50 watt mobile new £159
Icom IC229 50watt 2m mobile £149
Kenwood TM741 2m/70cm 50w/35w £249
Yaesu VX1R tiny 2m/70cm handi wide RX £129
Icom IC2800 2m/70cm colour TFT screen £299
Kenwood TM251E 50watt 2m mobile mint £199
Alinco DJG52m/70cm hand held drop in charger £219
Yaesu FT1500 50watt 2m mobile £119
Kenwood TS790 2m/70cm base all mode £799
Alinco DJV5 2m/70cm h/h with wide RX £169
Icom IC275H 25watt multi mode £499
Yaesu FT3000 70w 2m mobile wide Rx £199
Kenwood TR751E 2m 25watt multimode mobile £349
Kenwood THD7E version 2 2m/70cm mint £229
Yaesu FT736R ,2m,70cm,6m all fitted £799

HF TRANSCEIVERS

Alinco DX701 100 mobile HF transceiver £399
President Lincoln 10m Amateur transceiver new £199
Kenwood TS50 0-30mhz 100w all mode mobile £399
FT100 HF to 70cm all mode demo £749

Shortwave Receivers

Yaesu FRG100 with PSU boxed mint £349
Hitachi worldspace satellite RX for radio stations £129
Icom ICR75 0-60mhz all mode £499
Sony SW77 shortwave portable +VHF mint £249
Lowe HF250E remote control £339
JRC NRD535 0-30mhz top class receiver £549

SCANNERS BASE/MOBILES

Fairhaven RD500 0-1750mhz all mode £699
Uniden Bearcat 220XLT 66-956mhz £99
Bearcat 9000XLT base 25-1300mhz as new £199
Icom IC7100 25-2000mhz all mode base £599
Realistic Pro2042 25-1300mhz 1000memories £249
Icom IC8500 0-2000mhz all mode and mint £999
Bearcat 780XLT 25-1300mhz trunk tracker £249
AOR 8600 500khz-2040mhz all mode £525

All prices in Sterling

WATERS & STANTON

01702 206835

HF TRANSCEIVERS

Icom IC-706 Mk II HF, 6m, 2m All Mode Mobile/Base with Gen.Cov. .£549
Kenwood TS-50S HF Mobile/Base Transceiver with Gen.Cov. £429
Kenwood TS-850SAT Base Transceiver with Gen.Cov. and ATU 12V £749
Mizuho MX-21S 15m SSB / CW, 2W Handheld £189
Yaesu FT-840 x2 Base Transceiver with Gen.Cov. 12V £449
Yaesu FT-847 HF,6m,2m,70cm All Mode with Gen.Cov. 12V £995

VHF/UHF BASE/MOBILE TRANSCEIVER

AKD 2001 x5 2m FM Mobile Channelised 25W £99
AKD 6001 6m FM Mobile Channelised 25W £125
AKD 7003 x2 70cm FM Mobile Channelised 3W £99
Alinco DR-M06TH 6m FM Mobile 10W CTCSS £165
Icom IC-207H 2m,70cm FM Mobile 50W,35W (Remote Head) £199
Kenwood TM-251E 2m FM Mobile 50W £239
Yaesu FT-290R II x4 2m All Mode Portable 2.5W £249
Yaesu FT-690R II 6m All Mode Portable 2.5W £299
Yaesu FT-736R 2m,70cm and 6m All Mode Base Transceiver £749

VHF/UHF HAND HELD TRANSCEIVER

ADI AT-201 2m FM Battery box 130-170MHz RX £99
ADI AT-400 70cm FM Battery box 420-465MHz RX £115
Alinco DJ-S11 x2 2m FM Palm Transceiver with 136-174MHz RX £59
Icom IC-2SRE 2m FM H/Held £99
Kenwood TH-77E 2m/70cm FM H/Held with Sp.mic Full Duplex £125
Kenwood TH-D7E 2m,70cm FM Palm Held with Wide RX and TNC £249
Palstar KH-6 6m FM H/Held with CTCSS £75
Yaesu FT-41R x2 70cm FM Handy with Wide RX £99
Yaesu VX-1R 2m/70cm FM micro Wide RX £125

SHORTWAVE RECEIVERS

Icom IC-R71E 100kHz-30MHz All Mode Receiver Mains £349
JRC NRD-525 x3 90kHz-34MHz All Mode Receiver 200Ch. Mains £529
Lowe HF-250 30kHz-30MHz Receiver 12V PC Compatable £325
Roberts R-861 Portable 150kHz-30MHz SSB , FM stereo RDS £149
Sony ICF-SW35 Portable FM Stereo,MW,LW,SW Radio £49
Sony ICF-SW100E Pocket Receiver with FM stereo and SSB £115

SCANNERS MOBILE/BASE

Fairhaven RD-500VX 10kHz-1750MHz All mode, 13000+ Ch. 12V + PSU £599
Signal R-535 108-143,220-380MHz Airband Receiver 60Ch. 12V £149

SCANNERS HAND HELD

Alinco DJ-X3 100kHz-1300MHz AM, FM, WFM 700Ch + 8.33kHz step .£89
AOR AR-8000 x2 500kHz-1300MHz All Mode 1000Ch £199
AOR AR-8200 530kHz-2040MHz All Mode 1000Ch £259
Commtel Com-307 108 - 180MHz AM, FM 99Ch £49
Icom IC-R2 x2 0.495-1309MHz AM,FM & WFM 450Ch £109
Uniden UBC-120XLT 66-512MHz (with gaps) FM 100Ch £69
Yupiteru MVT-3300 x2 66-1000MHz (with gaps) AM,FM 200Ch £89
Yupiteru VT-150 142-170MHz FM, Marine Band, 30Ch £99

STATION ACCESSORIES

AEA PK-232MBX PakRat Multimode Data Controller £185
Datong ASP Auto Speech Processor £95
Datong FL-3 x2 Multimode Filter with Auto Notch £99
FDK KP-100 Twin Paddle " Squeeze " Keyer £59
Hi-Mound Manipulator Morse Paddle Key £39
Hi-Mound MK-702 Deluxe Morse Paddle on Marble Base £49
Howes CTU-8 500kHz-30MHz Receiver ATU £25
ICS AMT-3 RTTY,AMTOR & CW Terminal (P.Sale) £50
ICS FAX-1 Weather Fax , NAVTEX , RTTY Decoder £125
JPS NIR-10 x2 Noise / Interference Reduction Unit £199
JPS NTR-1 DSP Noise Reducer £99
Kantronics KAM Plus x2 Multimode Data Controller with Pactor, Dual Port £199
Kantronics KPC-4 Dual Port Packet TNC £149
Kantronics KPC-9612 Dual port Dual speed Packet TNC Controller £285
Kent EK-4 Electonic Morse Keyer £35
Kenwood IF-10D RS 232 Interface for Kenwood TS-50 transceivers £49
Kenwood IF-232C RS 232 Interface for Kenwood transceivers £59
MFJ MFJ-418 Pager size Morse Tutor with LCD Display £49
MFJ MFJ-422BX Compact Electronic Paddle Keyer (fit your own key) £49
MFJ MFJ-452 CW K/board + Perpetual Memory & LCD display £99
MFJ MFJ-490X Compact Memory Keyer (fit your own key) £79
MFJ MFJ-1020A 0-30MHz Indoor Active SWL Antenna £65
MFJ MFJ-1276 HF / VHF TNC with Precision Tuning + Pactor £129
MFJ MFJ-1278 Multimode 10 mode Data Controller £175
MFJ MFJ-1278BX Multimode 10 mode Data Controller with Pactor .£225
MFJ MFJ-1289M IBM Multimode Control Software £49
MFJ MFJ-1610 Theory Tutor (Novice) £4
MFJ MFJ-8621 2m Packet Transceiver only £129
Microset RU-432-95 70cm 3-25W in,95W out Linear + GaAsFET Preamp £149
Opto 3000A + 10Hz-3GHz Frequency Counter £289
Opto Micro-RF Pager sized micro RF Detector £69
PacComm Pico-2 Miniature 1200 Baud Dual Port Packet Modem £149
SGC SG-237 1.8-60MHz Microprocessor controled ATU 100W £329
SGC PowerClear DSP Audio Filter with 5W Amp,Band Pass Filter £199
Sony AN-1 Active Shortwave Indoor/Outdoor Antenna £49
Standard P-335 2m Amp 3W in , 30W out £39
Watson Super Searcher 10MHz-3GHz RF Finder + Frequency Counter £69
Watson W-10SM 12V Variable 10A Switch-Mode PSU £35
Watson W50-RM 2m,70cm SWR/PWR meter + ATU £29
Welz AC-38M 3.5-30MHz 200W ATU £79
Yaesu FL-2025 2m clip-on 25W Linear (for FT-290R II) £99
Yaesu FRV-7700 140-170MHz Converter for FRG-7700 .....£45
Yaesu SP-6 Matching Filtered Extension Speaker £99

MISCELLANEOUS

Albrecht AE-2850 40ch 4w CEPT Hand Held £50
Cobra UK-75-ST 80ch 4w UK/CEPT CB Mobile £60
Garmin GPS-12CX Hand held 12Ch. 500 Waypoints with 4 colour screen £179

VHF DXER

DAVID BUTLER G4ASR
YEW TREE COTTAGE
LOWER MAESCOED
HEREFORDSHIRE
HR2 0HP
TEL: (01873) 860679
E-MAIL: g4asr@btinternet.com

REPORTS & INFORMATION BY THE LAST SATURDAY OF EACH MONTH.

Ionospheric F2-layer propagation is used by h.f. operators to contact stations around the world and its fluctuations are well known to any listener to the short-wave bands. When all the factors are favourable the maximum usable frequency (m.u.f.) extends to the 50MHz band and sometimes beyond. Under these conditions the 50MHz band can resemble that of an open 28MHz band, although propagation is very much more geographically selective.

The F-layer propagation on the 50MHz band depends greatly on solar activity and is associated with the well-known 11 year peak in solar activity. Contrary to popular belief the day-to-day m.u.f. does not follow solar activity up and down. The ionosphere acts like a large capacitor, taking time to charge up and time to decay.

Rather than being beneficial, sudden increases in solar activity can produce ionospheric disturbances which have a deleterious effect on the band. The F2-layer m.u.f. reaches a maximum around the equinoxes (October and March) and peaks considerably before or after local noon. Look for openings to Australia and the Far East mid-morning, Africa around midday, the Caribbean some time after midday and the USA later in the afternoon.

FIRST SIGN

The first sign that this winter's F2 propagation season had commenced came on September 28 when UK operators contacted the Australian station of VK6JQ between 0930-1030UTC. Although the c.w. signals were weak, peaking 529 at best, he was worked by a number of stations in southern England and Wales. Two days later on September 30 there was a brief F2 opening to North America between 1615-1645UTC. Stations known to have worked into the UK included K1SIX, W1JJM and W3EP.

All c.w. contacts were made on a skewed path of 235° instead of the direct great-circle path at 290° Six Metre operators frequently observe that F2 signals do not arrive via the great-circle path. There are several possible reasons for this. Except on direct North-South paths there will be some sideways refraction through the equatorial F-layer belts which will effect the direction from which signals arrive.

Also the concentration of ionisation where the Sun is directly overhead produces a 'tilt' in all directions, rather like a domed convex mirror. Finally, there are many smaller fluctuations in ionisation density from place-to-place. The idealised picture of a smooth horizontal ionospheric layer at a constant height is entirely false, especially at the 50MHz band where only the extremes of electron density give propagation.

During October there were seven days when long-distance F2 openings were reported with stations located in Australia (VK) and Japan (JA). All openings occurred between the hours of 0900 to 1200UTC and occurred on October 18, 20-23, 25, 30.

Most, if not all, were tenuously weak and required absolute dedication to the band as signals often peaked for only a few minutes before disappearing into the noise. Please don't get the impression that there were many DX stations worked. The fact is that only a very few stations were heard in the UK, the most consistent being that of VK6JQ in West Australia. He was worked by stations in England and Wales on October 18, 20, 22 and 23.

Two other Australian stations, VK4ABW and VK4JH, were also worked in the opening on October 22 between 0900-1000UTC. At 1100UTC the stations of YB5QZ (Indonesia) and VU2ZAP (India) were both heard in the UK but it does not appear that any two-way contact was made.

The station of VK4CP/6 was also heard on October 30 at 0930UTC but no QSOs were made. Contacts from the UK with JA5AIE, JA5DRW, JA5FIS, JA6TEX and JO6EDD were made on October 21, 23 and 25. All of the c.w. QSOs were made on a beam heading of around 85° instead of the true heading of 35° as is often the case when working into Japan on the 50MHz band. Other DX stations worked during October included UN6P (Kazakhstan) on October 23 and A45XR (Sultanate of Oman) on October 25.

WORLD-WIDE CONTACTS

Although F2 propagation enables world-wide contacts to be made on the 50MHz band there is another DX mode that involves reflection from the ionospheric F-layer. Trans-equatorial propagation (t.e.p.) has become an interesting mode for UK Amateurs since the release of the 50MHz band. As the name infers it involves propagation across the equator via two belts of ionisation located north and south of the geomagnetic equator. The regions form in the morning, are well developed by noon and decay after sunset to reach a minimum just before dawn.

THIS MONTH DAVID BUTLER G4ASR REPORTS THAT WORLD-WIDE DX HAS RETURNED TO THE 50MHZ BAND

Trans-equatorial propagation is at its best when the intensity of the two regions are greatest, which is around the equinoxes. For stations located in the UK the typical t.e.p. paths lie south to Africa and south-west to South America.

Look for openings to southern Africa (Namibia, South Africa, Zimbabwe) around 1200-1400UTC and again between 1600-1700UTC. Openings to South America (Argentina, Brazil) occur later in evening normally between 2000-2200UTC.

Andy Swiffin GM8OEG (Dundee IO86) reports that after an absence of some 20 years he is active on the 50MHz band. He is using a Kenwood TS-830 transceiver at 28MHz driving a Microwave Modules transverter into a converted Collins 618T amplifier running a pair of 4CX250 tetrodes. A small 3-element G8VR-design Yagi completes the set-up.

Since May Andy has worked over 230 locator squares and nearly 50 countries. On August 24 he heard two Spanish speaking stations on 50.110MHz and a quick QRZ found out that they were the Argentinean stations of AY2DEK and LW3DX.

During October there were 20 days when t.e.p. openings were spotted on the 50MHz band. They were reported on October 3-5, 8-12, 15-16, 18-19, 22-29 and enabled contacts to be made with stations in Argentina (LU), Brazil (PY) and South Africa (ZS). Although not strictly t.e.p. (as they are located north of the equator) the African stations of S9TX (Sao Tome), TR8CA, TR8KPJ (Gabon), TY0T (Benin) and 6W4RK

(Senegal) were also worked during the month.

The best of the t.e.p. openings occurred on October 22 and followed a two hour morning F2-opening to Australia (VK), India (VU) and Indonesia (YB). At 1150UTC the South African beacon ZS6TWB (50.044MHz) was heard by stations on the south coast of England. The propagation then spread northwards over the next two hours to as far north as GM0EWX located on the Isle of Skye.

Among the c.w. and s.s.b. stations worked at this time were ZS6AVP, ZS6AXT, ZS6DN, ZS6RAD and ZS6XJ. The band faded out around 1400UTC but brief pulses of activity were reported later at 1530UTC and 1745UTC.

Between 1800-1830UTC stations reported a Sporadic-E opening to Italy, Portugal and Spain. This was then being followed by an evening t.e.p. opening to South Africa which lasted for over two hours.

At 2100UTC the station of ZD7MY (St.Helena) popped up on 50.116MHz and was worked by UK stations for over an hour. Just after ZD7MY faded out the path opened up to South America with the Brazilian stations of PP1CZ, PY1RO, PY2NQ, PY2NQ, PY2XB and PY5CC working many stations in southern and central England. The last station reported was at 2355UTC. Quite an amazing day!

The 144MHz antenna array at the expedition station of C31TLT in Andorra.

DOWN TO THE E-LAYER!

Now let's head down to the E-layer! Aurora, Auroral-E and Sporadic-E occur here and all these modes were reported during October on the 50MHz band. Although the main Sp-E season was virtually over by August there were four short openings during the month to stations in southern Europe.

Contacts were made into Bulgaria (LZ), Italy (I), Malta (9H), Portugal (CT), Romania (YO), Sardinia (IS0), Slovenia (S5), Spain (EH) and Yugoslavia (YU). October is really the time for auroras and events were reported every day during the first week of the month and also in the period October 14-16 and 24-27.

Contacts on the 50MHz band were mainly restricted to inter-UK QSOs with a smattering of Scandinavian DX thrown in. This is completely unlike the 144MHz band where some very good DX contacts can often be made even in the weaker events. I cannot explain why this should be the case but your reports prove it's a fact. In my experience it's only during the larger scale events that stations in excess of 1000kms away are worked on the 50MHz band.

Andy Swiffin GM8OEG reports that he spotted auroral activity on the 50MHz band for six consecutive days at the beginning of October. Most of his contacts were into central and southern England although he was hoping to work into Germany as he still has many locator squares there to work. Andy mentions that on the 144MHz band he always makes numerous contacts with German stations but hardly any on the 50MHz band.

Let's take a look in more detail at one of the auroral openings and make comparisons between DX activity on the 50 and 144MHz bands. The event on October 1 was quite intense starting in the UK around 1230UTC and continuing through to midnight.

There was a fair amount of activity on the 50MHz band with the majority of contacts being made between Scotland, Wales and England. Very few Scandinavian stations were reported, the most active being LA6HL, OH2RF, SM5HJZ, SM6EHY and SM7SCJ. Hardly any German stations were worked and the only other European stations reported were ES2RW, F5NLY, LX2UN and ON4ANT.

Activity on the 144MHz band was considerably better with many German and Scandinavian stations making c.w. and s.s.b. contacts throughout the UK. The stations included LA0BY, LA2Z, OH2KW, OH7HDU, OY9JD, OZ2TF, OZ9PP, SM1IRS, SK6DK and SK6QW.

There were also many more DX countries being worked such as ES6RQ (Estonia), HA5OV (Hungary), HB9DFG, HB9RDE (Switzerland), LY2BIL (Lithuania), OE2XRM (Austria), OK1VT (Czech Republic), OM3TZZ (Slovakia), RA3LE, RU1AA (Russia), YL3AG (Latvia) and 9A1CAL (Croatia). Other auroral contacts made on the 144MHz band during October included the stations of LA0BY, SM4RPP and SK6DK on October 3, OH2KW and OH5LK on October 4, LA2PHA, LA6BB and SM1NJC on October 5, LA6BB and SK6DK on October 7.

An opening on October 24 between 1500-1800UTC also found the 144MHz stations of ES6RQ, OH1JCS, OH2KW and OH6PA. I rest my case. The 50MHz band is next to useless when it comes to working DX via aurora!

However, that's not the case when it comes to Auroral-E propagation. This mode is almost unique to the 50MHz band and can provide some excellent long-distance contacts. Towards the end of the auroral back-scatter opening on October 1 stations in northern England, Wales and Scotland heard signals from the JX7DFA (Jan Mayen Island), OX3SIX, OX3VHF (Greenland) and VE8BY (Canada) 50MHz beacons.

A similar Au-Es opening occurred between 2100-2130UTC on October 2, again with signals being heard from these northerly beacons. On the following evening no beacons were reported but Scottish operators reported working the stations of OY4TN, OY9JD (Faroe Islands), K1MIA (USA) and VE2PEP (Canada).

The month of October was quite good for 50MHz operators with contacts being made into Africa, Asia, Australia, Europe, North America and South America. During December and January the predominant path will be to the Caribbean and North America. Look for contacts in this direction from midday onwards.

Openings to Australia and the Far East should recommence in February but my experience tells me that this will only last for four or five weeks so make the most of it. By March the best paths will be to the south with t.e.p. contacts into Africa.

If all this 50MHz DX whets your appetite and you want to learn more then why not join the UK Six Metre Group. **Dave Toombs G8FXM** (UKSMG Secretary) informs me that their website has recently been improved with a new chat page, picture gallery and discussion forum. There's also an announcement page for latest news and an ability to update your own entry on-line in the 50MHz all-time standings table.

The 'Coming Home' page has also been completely revamped. This is the first place to go when you get home from work to find out what you may have missed or indeed what is happening right now! The UKSMG website is at **www.uksmg.org** and is available to everyone whether a member or not.

Thank you for your letters and do have a peaceful Christmas. See you again in the New Year.

73 David G4ASR

HF HIGHLIGHTS

CARL MASON GW0VSW
12 LLWYN-Y-BRYN
CRYMLYN PARC
SKEWEN
WEST GLAMORGAN
SA10 6DZ
Tel: (01792) 817321
E-MAIL: carl@gw0vsw.freeserve.co.uk

REPORTS, INFORMATION AND PHOTOGRAPHS TO ME PLEASE BY THE 15TH OF EACH MONTH.

CARL MASON GW0VSW ROUNDS-UP THE LATEST NEWS FROM THE HF BANDS.

You may remember in September's column that *PW* reader **Chris Vernon** was active from Afghanistan as **YA/G0TQJ**. Now safely back in the UK Chris has sent in details of his operation from Kabul Airport. Chris begins: "I was in Afghanistan as part of the International Security Assistance Force (ISAF) arriving on in the morning of 12 April. I had only been there for four hours when we were hit by a large earthquake, which measured 6.4 on the Richter scale and was large enough to wake me, even after 16 hours travel and no sleep!

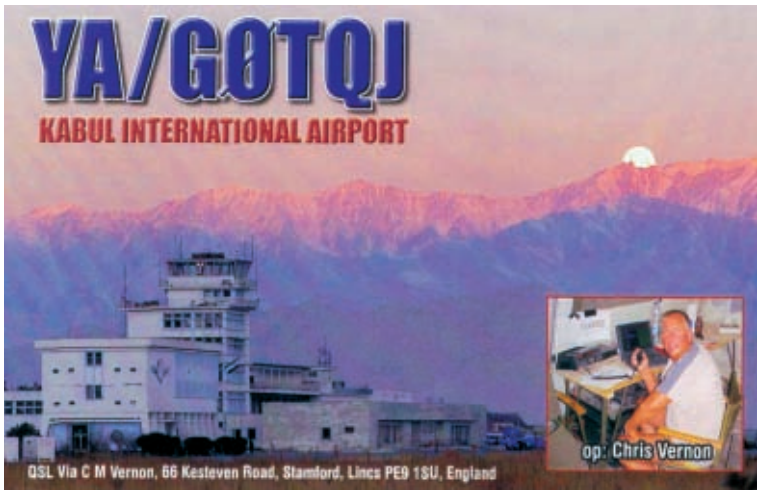
"Due to the nature of my work I had a special contact in Afghanistan who could help me gain authority to operate. I had also received help and information from Robert YA5K via E-mail whilst at home in the UK. It was not long before an application was sent requesting official permission to use the YA prefix.

"It took just three weeks for a letter granting me permission to arrive. During this time a tent has been located which had an electricity supply and was some distance from the worst of the locally produced QRN. There was access to a large structure nearby that had a tie-off point at 18m (60ft). This proved ideal for one end of the 3.5–28MHz Windom antenna I was going to use. The other end would be secured to a convenient street lamp at around 12m (40ft)".

Chris continues: "My equipment included a Yaesu FT-890 with SEC Switch Mode Power Supply which would allow me to run 100W s.s.b. and 50W RTTY. A small laptop computer with the Shacklog logging programme would help me keep track of all my contacts and MTTY version 1.61 (Thanks JE3HHT) would allow me to operate RTTY via the computers soundcard. With everything installed and tested I was ready to put out my first CQ as YA/G0TQJ.

"Within 10 minutes 30 QSOs were in the log covering four continents. Not bad going as I was only demonstrating to some of my colleagues just what Amateur Radio was all about! Time went by and after a good spell on s.s.b. I decided to change to RTTY. Wow, the world went crazy as calls came in from all over the globe. E-mail requests for skeds started to arrive especially from North America.

I later found out that it had been nearly twenty years since the last RTTY activity from Afghanistan so there going to be a good number of Amateurs looking for a contact! Arrangements were made to meet Robert YA5KI and I'm pleased to say he managed to drop in on a number of occasions while visiting Kabul on business. All told the log holds nearly 2400 QSOs with 110 DXCC countries and all continents were worked. Not bad when you consider my operating hours had to be cut as my working day got longer and the temperatures gradually crept up to nearly 35C".



● Chris Vernon was active from Afghanistan as YA/G0TQJ

Chris returned to the UK in July and has had all his documents checked by the ARRL for DXCC credit for the period 30 April – 12 July. Any readers who worked YA/G0TQJ can get the contact confirmed via the bureau or direct to **66 Kesteven Road, Stamford PE9 1SU**. Thanks for the information Chris and I look forward to hearing of your next trip to the Arctic Circle early in the New Year.

DXERS WEBSITE

Japanese operator Mako Iseki 7N2UTO has just established a small search engine for Dxers, which could prove very useful. Called The DX Rankers the site is a collection of website links and a Bulletin Board which accepts image files. You can visit his Web page at:
http://isweb31.infoseek.co.jp/sports/rankers/

DX NEWS

If you need to work Kuwait look out for **John Harden W4NU**, who has been **W4NU/9K2** since July. He only operates on two Sundays per month due to work commitments and can usually be found after 1800UTC on or around 21.250MHz until about 2300z. He then moves on to 14MHz around 14.200MHz as the band opens up to North America. He will be in Kuwait until January and all QSLs should go to his QSL Manager Nancy NK4U.

Special event station **6F1LM**, Mexico is active until the end of the year at weekends. The special station is to commemorate the 70th Anniversary of Federacion Mexicana de Radio Experimentadores (FMRE). Activity is on c.w. and the digital modes RTTY, PSK31 and MFSK.

The callsign will be activated on several bands and modes by different Mexican Amateurs and radio clubs. Look for them around 7.003, 10.107, 14.012, 14.085, 18.071 and 21.015MHz. A special QSL card with this very rare prefix will be sent to each and every contact they make and if

you want to send them your QSL card please do so via the bureau only. You don't need to send them your card to receive their QSL. However, they would very much appreciate if you did.

American Amateurs W9VA, K9BG, W9JUV and W9UZ will operate as PJ2T from Netherlands Antilles in the ARRL 10m Contest over the weekend of 14-15th December as a Multi-Operator/High Power entry. Operation will be both s.s.b. and c.w. If you work them you need to give a signal report and consecutive serial number i.e. 59/001. Their QSL manager will be **Scott Lehman N9AG, POB 803, Greenville, OH 45331, USA**.

Vladimir Bykov UA4WHX/AC4LN has operated from a number of countries in Central America and the Caribbean this year between 29 May and 2 September. Over 18,000 QSOs were made and some of the callsigns used include 8P9/AC4LN, 8P9BV, 8P/AC4LN (from both NA-025 and NA-109), AC4LN/6Y5, AC4LN/HR2, J73/AC4LN, 8R1/AC4LN, 9Y4/AC4LN, TG4/AC4LN, HI8/AC4LN, V31BV andVK8VB.

Vladimir says that "All the operations are 100% legal and that all the relevant papers are available and can be shown to those interested. QSL cards have been ordered and are currently being printed". Your cards should be sent via the bureau to **UA4WHX or direct to Vladimir M. Bykov, P.O. Box 2040, 426000 Izhevsk, Russia.**

NORLFOLK ISLAND - AUSTRALIA

Norlfolk Island OC-005 lies in the South Pacific Ocean just off the East Coast of Australia. The sub tropical island has an area of just over 34 square kilometres and only 1,866 inhabitants live there. It can be difficult to work especially as there are currently only two active Amateurs, **Jim Smith VK9NS** and his wife **Kristy VK9NL** who operate c.w. only. Jim can usually be found on the key between 1000 and 1330UTC on 7.005, 10.105 and 18.070MHz. Two other licensed Amateurs are also on the island, VK9NT and VK9JA, but are not very active.

SIMPLE ANTENNA

In November's column I asked for your experiences when using simple antennas. Well *PW* reader **Alex Shillito G2FRY**, Nottingham wrote in with some details of his indoor station.

"The antenna is a 8ft rod mounted to one side of a wardrobe which also houses my transceiver, an FT-101E. I live in a bungalow and with this simple antenna on 14, 21 and 28MHz I have worked over 176 DX countries including HC8N (Galapagos Island), D68C (Comoros), FM/G3TXF (Martinique), VK4JS (Australia), E21EJC (Thailand) and HF0POL (Antarctica) which are all confirmed (using c.w., at around 100W). I have Worked All Continents many times and have had well over 10,000 QSOs. It just goes to show that you can still work the DX no matter what restrictions you have!"

Alex is certainly doing well. I hope this will encourage many more of you to try some simple antennas.

YOUR REPORTS

First off this time is all c.w. man **Ted Trowell G2HKU** on the Isle of Sheppy in Kent who tried the 1.8MHz band despite the high static noise on his antenna. Ted worked LX/PA3DKC/P (Luxembourg) and TK/DL4FF (Corsica) at 2000UTC. A change to 3.5MHz found JX7DFA (Jan Mayen) looking for contacts at 2100 and on 7MHz Ted worked JW0HU (Svalbard) at 2110UTC using a Ten-Tec Omni V and Butternut HF6 vertical antenna.

THE 14 & 18MHZ BANDS

Driving a steamboat on Lake Windermere was the preferred option for **Roy Walker G0TAK** this month, although he did find some time for his digital activities using a new computer and soundcard. On 14MHz Roy worked SP9EBQ (Poland) 1300, OZ1AJV (Denmark) 1820, DK5ZI (Germany) 1836 and OK1OX (Czech Republic) at 1930UTC. The equipment was a TS-570DG and 80m long wire loop.

Rob Hastings M3AHH in Chelmsford, Essex say's "Band conditions are improving and I am starting to hear more stations from outside Europe with my inverted Carolina Windom 80 Special". A Kenwood TS-50S, MFJ-945E and 10W s.s.b. found VE3EXY/P (Canada) at 1215UTC. Slightly later on 18MHz followed Rob's first stateside contact, WB6KOK in Vermont at 1342UTC.

Also on the band was **Michael Knight M3KGT** who has had a good deal of success operating mobile around his home in Wellingborough, Northamptonshire. Stations worked using a IC-706MkIIG connected to a Icom AH-4 auto tuner and 2.7m (9ft) stainless steel CB whip antenna include VK3XQ (Australia) 0836, SV8/ON5JE (Greece) 1025, 3A2BF (Monaco) 1325, 9H3RK (Malta) 1557, TK/DL7HZ (Corsica), CU1AX (Azores) 1830 and VE3OWV (Canada) at 1840UTC. All contacts were s.s.b. using just 10W QRP.

THE 21 & 24MHZ BANDS

The 21MHz band had plenty of activity for **Martyn Medcalf M3VAM**, Chelmsford, Essex found. His log shows contacts with KQ2M (USA) in Connecticut, LZ9W (Bulgaria) 1121, ZC4DW (UK Sovereign Bases on Cyprus) 1154, ER1QQ (Moldovia) 1319, I8ARA (Italy) 1402, EM5UIA (Ukraine) 1451 and 3V8ST (Tunisia) 1813UTC using an IC-746 with 10W s.s.b. and an SGC-237 tuner with 8.2m of wire.

The PSK of **Robin Trebilcock GW3ZCF**, Bishopston, near Swansea found YB0AI (Indonesia) 1608, DU9KHD (Philippines) 1616, VU2TRI (India) 1642, VA7SW (Canada) 1623, HS0ZBS (Thailand) 1652 and PU2NTC (Brazil) at 2152UTC. Robin's rig was an IC-775 with 50W output to a horizontal loop.

On to the logbook of **Mark Taylor G0LGJ**, Dereham, who operated mobile once again this month trying out a new antenna for 24MHz. Using a FT-100 with 100W output Mark found plenty of DX to work including ZP5MAL (Paraguay) 1128, VE3ODC (Canada) 1440, 9K2ZZ (Kuwait) 1448, AP2JZB (Pakistan) 1449, J75ZH (Dominica) 1453, A41LZ (Oman) 1511, ZV9DT (Vietnam) 1538, C98DC (Mozambique) at 1618UTC.

THE 28MHZ BAND

The 28MHz band was where **Mike Baker G3SUK**, Stowmarket spent most of his time. Contacts here with s.s.b. include US4LHP (Ukraine) at 0850UTC followed a little later with YY5OIE (Venezuela) 1851, 6J1UN (Mexico) 1857, ZW100J (Brazil) 1920, LU6DKC (Argentina) 1922 and N6HR/7 operating in Washington State from NA-065 at 1945UTC using a IC-746 and 100W to a Carolina Windom.

Paul Burgess M0CCQ, Ellesmere, Shropshire used an FT-920 and amplifier at 200W and a five-element mono band ZX Yagi to work s.s.b. stations ZD7CY(St. Helena), VK8DA (Australia), TU2IG (Ivory Coast), 3B8CF (Mauritius), CO8TW (Cuba), ZS1OCI (South Africa), HR1RMG (Honduras), ZD8Z (Ascension Island), J75WP (Dominica) and MU/DL3NBL (Guernsey).

Finally, to Newtonabbey in Northern Ireland where **Peter Lowrie MI5JYK** has been trying out his new FT-817 with around 4W QRP to a fixed dipole. Judging by his log he has been doing very well, even though band conditions were not so good when he was able to operate. Stations worked on s.s.b. include VU2XO (India) 1314 with reports of 5/7 both ways, UN0LE (Kazakhstan) 1322, 9K2ZZ (Kuwait) 1335, HA8LIF (Hungary) 1408, EW1AQ (Belarus) 1412, YO2LAH (Romania) 1427 and CT2HMN (Portugal) at 1621UTC.

SIGNING OFF

That's about it for this month. Another year has just flown by and once again there has been plenty of activity on the h.f. bands.

I am pleased to see that many of you, including those newly licensed, are working their fair share of DX. Thanks to all reporters and everyone who has supported the column. Have a good DX filled month and have a very Happy Christmas.

73.Carl GW0VSW

KEYBOARD COMMS

ROGER COOKE G3LDI
THE OLD NURSERY
THE DRIFT
SWARDESTON
NORWICH
NORFOLK
NR14 8LQ
TEL: (01508) 570278
E-MAIL: rcooke@g3ldi.freeserve.co.uk
PACKET: G3LDI @ GB7LDI

ROGER COOKE G3LDI LOOKS AT THE DEVELOPMENT OF WIRELESS LAN'S AND ENCOURAGES YOU TO GET CONTESTING

Data modes have expanded so much over the years that you can be heavily involved in the particular mode that you are interested in, and never come across another Amateur who is likewise involved in some other data mode. In 1959, RTTY was the only data mode available, other than c.w.

Computers were devices that we read about in science fiction. The RTTY mode was just as fascinating in 1959 as it still is in 2002, but about 98db louder!

As well as the main teleprinter, we also used an auto-sender using perforated paper tape for auto-sending brag tapes, pictures etc. Then we had a re-perforator and a perforator, both normally housed on the bottom shelf. When this was all running in a lengthy contest, you can imagine the noise! How things have changed.

Now, to run RTTY, all you need is the PC with *Windows 98*, MMTTY and an interface, operating in near silence. No paper waste, no machinery taking up vast amounts of space, and no oil!

Fig. 1

Packet Radio has been very nearly stagnant since its inception as far as speed is concerned. In fact it has been in decline over the last year or so with users migrating to landlines and using Telnet. Nodes and BBS have closed and users have become disenchanted with what is left of our network. Not surprising really when mail is held up, or returned as 'undeliverable'.

Satellite Gateways have closed due to lack of use or interest. The amount of mail passing through GB7LDI, the only UK Satgate, for a week could be counted on one hand. As for speed, there are some 9k6 links about, some user ports at that speed and also some links at 19.2kb. However, there is no way we can compete or even come close to the V90 standard on the Internet. Or is there?

THE WIRELESS LAN

Inexpensive high-speed data could be just around the corner in the form of the Wireless Lan (WLAN). It could knock the Internet into a cocked hat, and would be cheaper to run than a dedicated multi-mode TNC. The only thing that is required is **you**!

Experiments have already taken place, here and in the USA, using a basic Ethernet connection using radio. A WLAN enables somebody with a laptop to wander around the house or garden and have access to the Internet via the PC indoors.

The cards operate on 2.4GHz and use IEEE 802.11 standards. The speed that these cards operate at is in the range of 2 to 11Mbps and enhancements are already in place for that to increase to 54Mbps. As things stand the WLAN cards can be used **without** a licence, as they are intended for access on a local basis.

However, Amateurs both here and in the USA have already modified them and added an external high-gain antenna – not difficult to obtain at these frequencies – and extended the range to around 15-25km. They are essentially low power, ranging from 100mW to about 4W for the high power version.

Obviously the frequencies are line-of-sight only, and this is why we need **lots** of interest. If we could get enough people interested, running a few back-to-back nodes we could have a superb network. Several channels are available, six of which are already in the Amateur part of the band. With careful thought and planning the throughput could rejuvenate the hobby once again.

Ordinary, AX25 traffic can be ported over a wireless Ethernet link using AXIP encapsulation, you would be able to mimic the Internet, with Web pages, conferencing, FTP, and a much more lively presentation, not to mention the possibility of digital speech too. Access points can be installed at the top of towers without the worry of long high-cost feeder lengths, just a lead to power it from below. The possibilities are very attractive, and it could bring a lot of users back to Amateur Radio once again.

Further information is becoming available and if you're really keen to get started, then please join the Yahoo group RF_LAN. This group was started a while back by **Harry Bloomfield**, **M1BYT@GB7FCR.#16.GBR.EU** and there are quite a few members already, swapping ideas and information. Check out these websites for more information:

http://www.qsl.net/ke5fx/#uwave

http://www.telexwireless.com/wlanfaq.htm

http://www.wirelessanarchy.com/

http://www.bbwexchange.com/tutorials/index.asp

http://cedars.spoo.org/wardriving/index.html

http://www.wlan.org.uk/simple_double_quad.gif

http://www.wlan.org.uk (see **Fig. 1**)

If you are using an old Sky dish as a 2.4GHz antenna take a look at **http://www.frars.org.uk/cgi-bin/render.pl?pageid=1160** or a home-made 2.4Ghz antenna from double-sided p.c.b. try **http://www.frars.org.uk/cgi-bin/render.pl?pageid=1162** (see **Fig. 2**).
To see what's going on in the USA take a look at **www.qsl.net/kb9mwr/projects/wireless/plan.html** or **www.gbppr.org** (see **Fig. 3**).

Harry M1BYT has approached the RA to ascertain their thoughts on the licensing aspect of using the WLAN cards, and apparently they

were not very interested. I guess as long as we don't interfere with other users of this system, this will remain the case.

As interest and activity grows, particularly in high population areas, I can see some problems. However, if we are operating within our band, we should be able to overcome most of them.

In order to have a national network of this type, people are needed to overcome the distances. Even with a high-gain antenna on the Access Point (AP) at the top of the tower, range would be limited to about 32kms (20 miles), so although at present we don't have enough interest to have such a network,

interest is growing and the potential is enormous. Personally I would much rather have an Amateur Radio based network, with the ability to mimic Internet presentation, than use the Internet and thereby support a commercial enterprise.

I do use the Internet and it definitely has a place, but in my opinion, passing mail, chatting, DX Cluster and so on gives me much more satisfaction if done via radio. If you are interested, and I hope lots of you are, then please join in – the more the merrier.

There's also a very good book called *Build Your Own Wireless LAN* with projects by James Trulove, which describes the basics, the types of LAN cards available, antennas to add on, how to make best use of the channels available, and so on. It's published by McGraw Hill and the ISBN number is 0-07-138045-0.

Most Amateurs have a computer in their shack and this would be a superb project to kick some life back into our data network. Distance is the limiting factor; hence the need for **lots** of involved people, with APs at just about every Amateur location.

We could even negotiate a bulk purchase deal on the cards! Even if the overall throughput dropped from 11Mbits to around 1Mbits, well that has to be better than 1200 bauds!

CONTEST SEASON

I am re-vamping my station, and hope to be taking part in some of the up-and-coming RTTY contests this year. It has been years since I last took part and although I should now have a bit more time now to enter I'll have to do a lot of station improvements and re-training!

John Barber GW4SKA, the Contest Manager for BARTG has sent in the rules for the two BARTG contests for this year. The first of these is the BARTG Sprint Contest:

TIME: 1200GMT Saturday 25 January to 1200GMT Sunday 26 January 2003.

CLASSES:
SOE: Single Operator Expert All Band
SOAB: Single Operator All Band
MO: Multi-operator
SWL: Short Wave Listener
Any single operator with a top ten all-band placing in any BARTG contest during the years 2000/2001/2002 must enter as an expert in SOE; other stations may choose to enter the expert class if they wish. The class entered must be shown in the log. Single operator entrants may only have one signal on the air at any time. The SOAB entrants may only change band once in any 5-minute period.

BANDS: 3.5, 7, 14, 21 and 28MHz Amateur bands.

EXCHANGE: Serial number only.

QSO POINTS: Each completed QSO scores one point. Stations may be contacted again on other bands. Duplicate contacts on the same band must be clearly marked.

MULTIPLIERS: All DXCC countries and JA, W, VE and VK areas count as multipliers. **Multipliers and continents count only once in the contest regardless of band. US stations must use correct call or suffix for area of operation.**

SCORING: QSO points x Multipliers x Continents (max 6).

LOG SUBMISSION: Logs should be submitted in **Cabrillo** format by E-mail to: **ska@bartg.demon.co.uk** Mail should be sent to: **John Barber Gw4ska, Po Box 611, Cardiff CF24 4UN, Wales.**

All logs must be received by 1 March 2003 in order to qualify.

The second contest that you may like to take part in is the BARTG HF RTTY Contest 2003, the details are:

TIME: 0200GMT Saturday 15 March to 0200GMT Monday 17 March 2003. Single operator and s.w.l. stations are permitted a maximum 30 hours operation. Rest periods may not be less than 3 hours per period. Multi-operator stations may work the full 48-hour contest period.

CLASSES:
SOE Single Operator Expert All Band
SOAB Single Operator All Band
SS10, SS15, SS20, SS40, SS80 Single Operator Single band
MS Multi-operator Single TX
MM Multi-operator Multi TX
SWL Short Wave Listener

BANDS: 3.5, 7, 14, 21 and 28MHz Amateur bands.

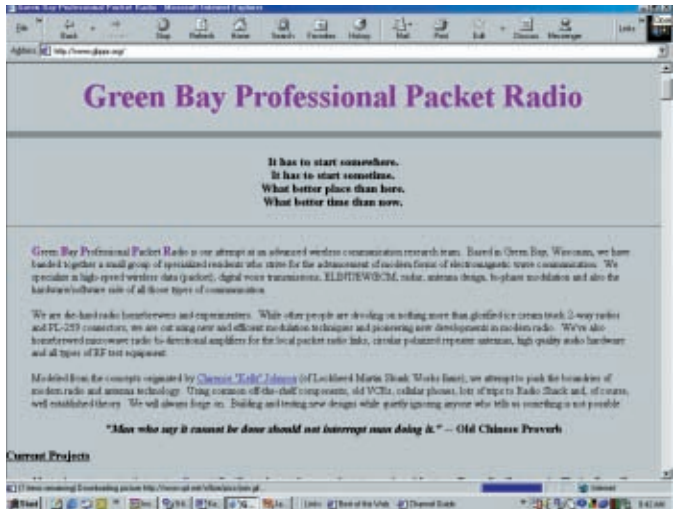
MESSAGES: Messages will consist of:
(A) RST/ MESSAGE NUMBER. The number must be a three-figure group and start with 001 for the first contact made.
(B) TIME GMT. A full four-figure GMT time must be sent as part of each message.

QSO POINTS: Each completed QSO scores one point. Stations may be contacted again on other bands. Duplicate contacts on the same band must be clearly marked.

MULTIPLIERS: All DXCC countries (including JA, W, VE and VK) and all JA, W, VE and VK areas count as multipliers on each band. Any country or JA, W, VE or VK area may be counted again if worked on a different band, but continents are counted once only. **US stations must use correct call or suffix for area of operation.**

SCORING: QSO points x multipliers x continents (max 6).

LOG SUBMISSION: Same as for The BARTG Sprint Contest.



All logs must be received by 1 May 2003 in order to qualify.

Details of all BARTG awards and full details of contests can be found on the website at: **http://www.bartg.demon.co.uk/**

So, go on why not join in the fun and have a go? That's all for this month, so until next time 'Happy Keyboarding'.

Roger G3LDI

DX DESTINATION

ED TAYLOR G3SQX
C/O *PW* EDITORIAL OFFICES
ARROWSMITH COURT
STATION APPROACH
BROADSTONE
DORSET
BH18 8PW
E-MAIL: ed@g3sqx.net

In this series I've talked about equipment, travel, antennas and operating. If you're thinking of going somewhere with your radio, you need to do a bit of work in advance. And it's a good idea to sort out a few things before you pack your bags! So to begin, here are some thoughts about choosing a location.

FORWARD PLANNING

Most of us will be in the situation when we are going on holiday that we'll want to take a rig and go on the air for a while. Perhaps you're planning a business trip and want to know if there is somewhere to operate nearby, and maybe find out if the place you are staying at will be feasible for Amateur Radio.

Of course, you could be in the lucky position of choosing a trip from several alternatives, making radio operation an integral part of the experience. For example, if your family are interested in sun and sand, you might be able to select somewhere with great beaches that also has some radio potential.

I've taken a couple of trips whose main purpose is radio. I like to look at the calendar of h.f. contests, and see if I can set up a visit somewhere during one of the big weekends.

If you dislike contests, you'll do the opposite, and arrange to go when there isn't one. Anyway, you will undoubtedly have some strange and interesting experiences if you head

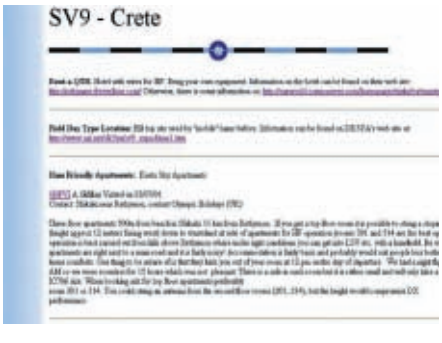


Fig. 2: An example of one of the useful web pages at DXholiday.com

for places with good DX potential!

Regardless of your ultimate goal, consider finding somewhere that has other attractions beside radio. Even the most ardent operator will probably want to take a break from time-to-time. In all cases, the research you do beforehand will help you to enjoy your experience. Get out a large piece of paper and start jotting down some ideas!

If you're a first-time DX-holidaymaker, I would advise you not to be over-ambitious in your plans. It's unrealistic to think you can take equipment for 'Top Band' to 23cm, run a kW, and put up antennas 20 metres high, while on a package tour to the Mediterranean! Start with something modest, and you'll be successful, surprising yourself with what you were able to do.

Even experienced DX travellers have to be realistic and considerate. If you are in a quiet hotel or beach cottage, you will probably be very unpopular shouting 'CQ DX' in the middle of the night! Using c.w. or data will be the best bet, and for the same reason, you will usually have to use headphones, not the speaker, when operating from accommodation that houses other guests.

PLANNING A TRIP WITH YOUR RADIO? IN THE LAST COLUMN OF THIS SERIES, ED G3SQX GIVES MORE TIPS AND USEFUL SOURCES OF INFORMATION. PW READERS ALSO TELL US WHERE THEY'VE BEEN

ASK FOR HELP!

If you want one single piece of advice in organising a DX Holiday, it would be this: Ask for help! There are two main sources: people who have done something similar to what you want to do, and people who live in the place you are planning to visit.

Don't be shy - pick their brains! Most Amateurs are delighted to talk - ask about successes and disasters, then plan accordingly.

The Internet is a great tool in researching trips and some useful links are provided in **Fig. 1**. The Search Engines, used intelligently, will also point you to many sources of information.

Suppose you want to see what the possibilities are for operating in Crete. You could search for 'Crete', and this would give you thousands of hits, 99% of which are irrelevant. Try searching for 'SV9' (the Amateur prefix for Crete), and you are more likely to find resources about Crete with Amateur Radio content.

I particularly want to recommend a website run by **Kenny K2KW**, called **www.DXholiday.com** It lists places where you can go and operate, with descriptions arranged by continent. There are articles about related topics and sources of information, some on other websites.

Kenny is trying to make the information on his site as comprehensive as possible, so if you can add anything, please let him know. An example of one of the pages from this excellent website can be seen in **Fig. 2.**

If you're looking for a place to operate, you are likely to have some questions and you should be able to locate someone through the Internet who can answer them. This might be a local person, or a visitor who has done the hard work of investigating on the spot.

Perhaps you will have queries about equipment, licensing and so on. Approach the 'experts' directly, and they'll generally be very helpful.

These days, E-mail is probably the best way of contacting Amateurs you don't know. You are asking a favour, so write in such a way that a two or three line response is all that's needed.

Use QSO style language if you are writing to someone who may not understand much English. Ask just one or two questions, maybe adding that if you have E-mailed the wrong person, is there someone else who could help. Remember that these are busy people, so be concise, friendly and polite, and get directly to the point.

There is a useful website, **www.qrz.com** where Amateurs can list their callsigns and some information about themselves. This frequently includes web and E-mail addresses, so it's a useful place to look for contact information.

Many of the websites are hosted by **www.qsl.net**, which is also good for tracking people down. By the way, if you find these web resources useful, and can afford to do so, it's considered good form to make a donation to the Amateurs who run such sites for everyone's benefit. They generally spend a lot of time and money keeping things going - at least a note of thanks is always appreciated.

Probably the best source of assistance when visiting a new place will be the members of a local radio club. They will know of possible

QTHs, which may include their own club shack, and they might be able to give you a hand with getting things set up.

Of course, you don't (generally speaking) have to ask permission from the locals, but it is a reasonable courtesy to 'check-in' with the Amateurs already living there. I have had marvellous hospitality from Amateurs in several continents, who are usually delighted to welcome visitors from elsewhere.

Website Address	Details
www.dxholiday.com	Much useful information about DX holidays, together with links to other web sites.
www.qrz.com	Contains data about amateurs around the world, the Internet version of a world-wide callbook. Some of the entries include E-mail and website addresses.
www.qsl.net	General information for Radio Amateurs, including a free web hosting service. Try www.qsl.net/gw9xx if you need information about a station, using the appropriate call.
www.morokulien.com/english/index.html	Website for the town of Morokulien
www.east.no/priv/la7tia/arim/engarim.htm	The Amateur Radio facilities at Morokulien

● Fig. 1: Useful Websites for DX Destination readers

IT'S FUN!

The interesting and fun part of any DX Holiday is that things are much easier than they used to be. Several factors have combined to make life easier, for example, equipment has become a lot more compact, particularly h.f. and v.h.f. portable rigs. You can get amazing performance from a small box these days. Secondly, you can operate around the world with a reciprocal licence, either by prior application, or (increasingly) with no formality and little paperwork, under the CEPT scheme. Thirdly, the world-wide web and E-mail have made it possible to plan a successful DX holiday from home.

● Fig. 3: Morokulien - the monument to friendship between Norway and Sweden

I've covered most of this in previous columns, and have also discussed how to choose and carry appropriate antennas. **However, one thing which a reader has pointed out is that it's sensible to find out what insurance you have for equipment**. Some policies exclude the sort of radio gear that we use, and some do not apply to certain parts of the world.

The Radio Society of Great Britain promote a policy specifically designed for Radio Amateurs. In any case you need to check everything carefully before leaving and it may be worth paying a bit extra to protect yourself in case of loss or damage while away.

MOROKULIEN

One of the more unusual places to operate in the world is called Morokulien. **Roy G4UNL**, told me about this location, on the border between Norway and Sweden. He was enthusiastic about his visit, and told me, "The whole thing started in 1914. The inhabitants of the area decided to celebrate 100 years of peace between the two countries. They erected a granite monument, 18 metres high, symbolising a handshake across the border (**see Fig. 3**), and 12,000 people came to celebrate".

Roy went on to explain how Radio Amateurs became involved. "In 1959, the local people decided they would take the idea further, and so created a zone of peace encompassing land from both countries. They named it after the Norwegian word 'moro"and the Swedish 'kul', which have the same meaning, 'fun'. What more natural than to put a radio shack on the border, and let Amateurs operate from both countries?".

The shack is open to guest operators, who can choose which special callsign to use: **SJ9WL** (Sweden) or **LG5LG** (Norway). This is logical, since the boundary runs down the center of the building! (**Fig. 4**)

As well as providing equipment and antennas for visitors, a small cottage is available for Amateurs who want to stay overnight, and everything is wheelchair-accessible. The facilities are maintained by Amateurs from both sides of the border, who use the modest charges for upkeep and repairs.

There are other curiosities about Morokulien, such as the 'passport', which proves membership of the world's smallest country, obtainable form the Information Centre. The radio station and the town both have websites explaining what you can do.

● Fig. 4: The radio shack at Morokulien - SJ9WL or LG5LG

MORE TRAVELS ABROAD

Another correspondent, **John M0AAO**, started travelling with radios in the days when you had to get a licence from each country. His first forays were into the Netherlands, where he was entertained by a very hospitable Dutch family. Then he had many QSOs from Belgium, and explained the hazards of claiming to speak a foreign language.

John says, "I made the mistake of responding to a French Amateur who asked if I spoke French (O-level standard many years ago) with 'Un peu'. There followed a long, difficult conversation with me getting a headache trying to follow what he was saying. He then switched to excellent English"!

John adds that operating in Sweden can be confusing, as your callsign changes as you move around the regions of the country. I suppose it can also be confusing for visitors to the UK, who have to be careful to use the correct prefix as they drive over the land borders between Scotland and England, for example.

John is convinced that radio can add to international understanding. "It's another dimension to being an Amateur, and it gave my family (who tolerated my operating) a different insight into some aspects of the countries we visited. I would recommend it to anyone.".

SIGN-OFF

This is the final DX Destination column. I hope you've enjoyed reading about operating away from home. Thanks to G4UNL and M0AAO for their help, and to everyone for correspondence and support.

In the future I'll be writing occasional articles about my favourite mode, Morse code. Look out for the first article, with a bit of history, and some tips for Foundation Licensees who want to get going with Morse. The compliments of the season to all readers, and I hope to 'see you' on the air soon.

73, Ed G3SZX

TUNE-IN

TOM WALTERS
P.O. BOX 4440
WALTON
ESSEX
CO14 8BX
E-mail: tom.walters@aib.org.uk

TOM WALTERS HAS POSITIVE NEWS THIS MONTH AS WELL AS UPDATES ON THE PROGRESSION OF DAB

Let's start off with this month some good news and a return to good sense. International radio is too important to be allowed to just drift. Someone needs to be out there on the airwaves, keeping an eye on things, and informing listeners of developments.

So, it's with great pleasure that I announce the return from the 'dead' of **Kim Elliott** of the **Voice of America** with a weekly segment about broadcasting and media. Kim used to host the substantial weekly programme *Communications World*. His time on air will be much reduced, to only four or five minutes on Sundays in the *Main Street* programme, but it's step towards better information.

Times to listen are at 0433: on 4.960, 6.080, 7.290, 7.415, 9.575, 9.775; 0633: on 6.035, 6.080, 6.105, 7.295, 11.835, 11.995, 13.710; 1033: 5.745, 5.985, 7.370, 9.590MHz. The programme is also available in Real Audio at **http://www.voanews.com/MainStreet/**

DIGITAL REVOLUTION

So, how's the great digital revolution going? In television, nations across Europe and elsewhere plan to switch off the analogue as soon as 2003 (Berlin), with further planned shut-downs spread over the following 10 years. It remains to be seen whether this will actually happen.

Digital Radio Mondiale (DRM) continues to make progress, and looks very much like a winner, in terms of reviving the possibilities of listening to transmissions world-wide. The system has received an unusually broad recommendation from the International Telecommunications Union (ITU), a move that marks another milestone in DRM's development towards universal standardisation.

As I've reported previously you can already sign-up to join in the initial experiments with DRM and now there are ways to modify your existing a.m. receiver too. In October, DRM issued the first technical modifications. These are for: Icom IC-756, Kenwood R1000, Grundig Yacht Boy 400 and JRC NRD 525. Documents are available on the DRM Software Radio website in high- and low-res PDF files.

More documents will probably be available by now. Forums are open for discussion on arising issues. Check out the website at **www.drm.org**

GOODMANS LAUNCH

Of course, in radio the whole digital thing is bedevilled by competing systems, each needing its own receiver. **Goodmans** have launched four digital radios in the UK that will work on the **DAB** f.m. system. At least Goodmans have had the sense not to offer stand-alone DAB radios, which have not proved popular, because they don't seem to work very well!

Goodmans have incorporated DAB into their radios with f.m. and m.w., a hi-fi system, and a model including a CD player. Mains and battery models are available. Prices are anticipated at between £100 - £200. More details on their website at **www.goodmansdigital.co.uk**

You should be able to receive the **BBC World Service** on DAB in some areas of the UK and other countries, and the opportunity exists to make more international broadcasting available. But will this happen?

In the USA, the **IBOC** system, whihc is a competitor to DAB, has received Federal Communications Commission (FDC) blessing as the method of bringing digital radio to f.m. and m.w. So, there's another clash.

The satellite systems **XM** and **Sirius** (yet two more proprietary systems) seem to be losing pots of money. Not a pretty scene at the moment. Meanwhile, **WorldSpace** seem to be hanging in there. But whether they are selling anything like enough receivers to stay afloat seems very questionable.

SCHEDULES

Let's get back to systems that actually work! Like a.m., short and medium wave. **Radio Prague** has taken over the medium wave frequencies formerly used by Radio Free Europe for Czech transmissions within the Czech Republic. The transmissions may be audible outside the country: English can be heard at: 1130-1200, 1730-1800 (Mon-Fri), 1830-1900; Spanish: 1000-1030; French: 1030-1100; Russian: 1100-1130; German 1800-1830. Frequencies: 1.071, 1.233, 1.287MHz

Radio Prague's current s.w. schedule is: 0100-0127 & 0200-0227 at 6.200, 7.345; 0400-0427 on 7.345, 9.435; 0430-0457 on 0.865, 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 7.315; 1800-1827 & 2100-2127 on 5.930, 9.430 and 2230-2357 on 7.345, 9.435MHz.

Short and medium wave work well as long as they are not jammed. This pestilential form of interference has now hit most of the **BBC's** transmissions in **Uzbek** to Uzbekistan and Afghanistan. The jamming comes from China, but is not so effective in the capital city Tashkent, because of local f.m and m.w. relays.

Local relays are increasingly popular with international broadcasters. The BBC in particular is setting them up in major locations all over the world. But the broadcasters don't have total control, as has been seen in the **Ivory Coast**, where local political 'hotheads' destroyed the f.m. relays of the **BBC World Service** and **Radio France International**.

Vatican Radio has started broadcasting in the Nigerian language Hausa for the first time. Transmissions are aimed at northern Nigeria, but should also reach millions of Hausa speakers in countries in the region. Much of northern Nigeria has been under Islamic law since 1999 so this is a Catholic counterblast. The transmissions are at: **0700-0715 on 11.625, 13.765, and 15.570MHz**. It's so easy to achieve results with conventional radio!

Radio Vlaanderen Internationaal (RVi) have branched out with a new website. On the new site you can find all sort of things that will add to your radio listening enjoyment.

The new RVi site offers news, in text, images and audio, about Flanders, Belgium and Europe, in Dutch, English, French and German. There are also a number of links to organisations that carry useful information about Flanders and Belgium. Before you start worrying, RVi are not planning to give up international radio broadcasting, see the new website at **www.rvi.be** as a useful complement to the radio programming. That's the way it goes these days!

Bye for now. Tom

SEND YOUR ADVERT TO PRACTICAL WIRELESS, BARGAIN BASEMENT, ARROWSMITH COURT, STATION APPROACH, BROADSTONE, DORSET BH18 8PW

Bargain Basement

For your advert in Bargain Basement please remember to include your dated, coloured corner flash from this page along with your entry.

YOUR ATTENTION PLEASE!

Bargain Basement rules - £4 per advert.

Please write your advert **clearly** in **BLOCK CAPITALS** up to a maximum of **30 words**, plus **12 words f**or your contact details on the form provided and send it together with the dated corner flash and your **payment of £4** (**subscribers** can place their advert **free of charge** as long as they provide their **subs number and corner flash**), cheques should be made payable to **PW Publishing Ltd**, credit card payments also accepted. Send your advert to **Bargain Basement, Practical Wireless, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW** or E-mail your advert to **donna@pwpublishing.ltd.uk** (If you don't want to include your credit card details on your E-mail, just 'phone us on **(01202) 659910**).

Please help us to help you by preparing your advert carefully. Any advert which contains **??** marks indicates that the Editorial staff could not read/interpret the wording.

Please avoid FAXing your advert - it could delay publication.

We reserve the right to edit, shorten and correct for clarity of style of any advert submitted. All adverts accepted and published are done so under these conditions. Advertisements from traders or for equipment that it is illegal to possess, use or which cannot be licensed in the UK, will not be accepted. **No responsibility will be taken for errors and no correspondence will be entered into on any decision taken by the Editor on any of these conditions.**

You should state clearly in your advert whether equipment is professionally built, home-brewed or modified. 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.

FOR SALE

Alinco 50MHz f.m. TX/RX 25W high, 5W low. One year old, used once. Move forces sale, News £249 sell for £170, original box, etc., post paid. Tel: Michael on (01273) 880287.

AOR 3030 RX, boxed, absolute mint condition with manual, hardly used, Collins filters fitted, £300 inc, postage. Tel: (01902) 567070 or E-mail: sf004b7064@blueyonder.co.uk

Bencher Key, chrome including memory keyer, £85 o.n.o. Yaesu table mic MD-1, £75 o.n.o. All in as new condition. Tel: (01626) 873673.

Chelcom CA501 6 metre (50MHz) vertical adjustable whip complete with fittings, £20 buyer to collect. AKD WA2 wavemeter, also covers 6m (50MHz) complete with antenna and battery, £20 includes postage. Geoff M5GAC, Derby area. Tel: (01332) 672245.

FT-750D transceiver with FT-767 tuner. Aerials G5RV long wire and five-band vertical, must sell, any reasonable offer. Bob G3ZUA, Herts. Tel: (01707) 881693.

G4ENA 160 TCVR unfinished project, board complete, needs wiring to finish, ring for full details, bargain, cheap to good home. Tel: George on (01284) 768084.

Heath HW9 with home-brewed p.s.u. and mini Z-match, many spares, £150. This combo has worked USA and UK lots of times from EA6 on 80 metres (3.5MHz) QRP. Pete G2CNN, Norfolk, Tel: (01842) 878326.

Hewlett Packard oscilloscopes 54100D 1GHz, £300. 54501A 100MHz, £150. HP universal counter 5316A, 100MHz, £20. Philips PM5326 125Mhz signal generator a.m./f.m. as new, £60. All with manuals. Bill, Hertfordshire. Tel: 0208-953 4994.

Icom 207H dual-band 144/432 TCVR including remote head cable, boxed, mint, £190. Nissel linear 30Amp p.s.u. 0-13V controllable, mint, £65. Tel: (01395) 265356 or (07747) 603282 or E-mail: sschofield@talk21.com

JRC NSD515D h.f. 100W TX with NBD515 a.c. p.s.u., perfect, boxed with manuals and leads for use with NRD515 RX. Shure 201 mic, £325 plus carriage at cost. Tel: (01743) 884858 after 6pm.

Kenwood TR-751E 2m (144MHz) multi-mode transceiver 25W TX, as new and boxed, never used mobile, £275. RS Coaxial switch d.c.-1.5GHz, £10. 50W dummy load, £10. Tel: (01928) 787154 or E-mail: chris.d.davies@talk21.com

Kenwood TS-450S built-in a.t.u., Sharmans p.s.u. 20A, Kenwood mic, 75m RG8 Coax, vertical Antron 99 10-11m, manuals, all mint condition, still working set-up, £500 no offers, first to see will buy. Paul, Tyneside area. Tel: 0191-257 7971.

Kenwood TS-50 transceiver in as new condition, £400. Icom IC-2800H transceiver, new, £325. Tel: Putney 0208-785 7314.

Kenwood TS-860S trans, boxed with manuals, £450. Garmin GPS12 personal navigator, very little use, £60. Delivery within 50 miles or pay carriage. Tel: Dave on (01443) 683912.

Marconi Atalanta spares repair, offers. Eddystone 770R Mk2 spares/repair, £offers. Universal M900 decoder monitor, £200. Icom R7000 v.g.c., £325. Wanted Eddystone 880, 830, 1650/9, top condition only. Tel: Essex (01279) 815020.

MFJ-462B multi-reader, very good condition. Comes with plug lead, power adapter, manual, etc., £100o.v.n.o. Darren, Herts. Tel: 0208-4497 446.

MK123 Spy set, mains leads, headphones, manual, also Palstar AT200, a.t.u. 1.8-30MHz also MFJ artificial ground, £any offers? Ross, Cornwall. Tel: (01726) 891320.

MK123 TX/RX also Palstar AT200 a.t.u. 1.8 to 30MHz also MFJ artificial ground, also manuals for all three items above £any offers? Tel: Ross on (01726) 891320.

PCR MkI & MkII, Philips/Pye communications receiver, £95 each plus, £15 carriage. MkII has 1 to 4MHz b.f.o. r.f. gain. Oscilloscope Textronix D-beam, 50MHz + probe, accept, £250. BC221 inc. mains unit, mahogany cabinet, £48 + £10 carriage. Tel: (01872) 862291.

Rare collectors items Spy set type A MkIII suitcase model (smaller than B2) complete with 6V vibrator pack + mains input, spare valves, key, headphones and booklet, £2,200. Also Admirality transmitter in very good condition, Type 5G 1944 vintage, £320. Tel: (01872) 862291.

Sangean ATS 909RX s.w., new, £80. Akai reel-to-reel tape recorder 400DS, Mk2, £50. Trio stereo amplifier, £20.

Sphinx s.s.b. transmitter, nice condition 20/80/160 (14/3.5/1.8MHz) and Delta control, handbook, cheap to good home, ring for details. Tel: George on (01284) 768084.

Tower 35ft winch Lattice Tower complete with HD rotator and controller with h.f. mini beam, £450. Mono-pole two section tower, rigging and full size, G5RV, £55. Tel: (01277) 651313 or (07979) 708331.

Trio TS-520S h.f. transceiver, 1.8-28MHz plus antenna tuning unit complete with manuals in mint condition. All you need to get on the air, £350. John G0LMH, Worthing, Sussex. Tel: (01903) 785644.

Yaesu FRG-100 h.f. receiver exc condition, £270. Howes CTU8 a.t.u., £20. Tel: 0121-745 9849.

Yaesu FT-2500 mobile transceiver boxed with all hardware and paperwork in excellent condition, £130 including postage within UK. Neil M0CJM. Tel: (07810) 515749 or E-mail: neil.toombes@ntlworld.com

Yaesu FT-290 MkII NiCads, charger, soft case, handbook, boxed, exc condition, £175 to include P&P - a real bargain! George, Rhondda Valley. Tel: (01443) 437345.

Yaesu FT-726R mulit-mode base v.h.f./u.h.f./50 desk microphone MD1, £325. Icom IC-290E 2m (144MHz) multi-mode, £125. FDK700 2m f.m. 10/15/20 beam, £150. Hansen FS-200, £20. Silent Key Sale. Tel: Hampshire (01329) 833992.

Yaesu FT-840 with a.t.u. FC10, £400. Tel: 0161-688 9680.

EXCHANGE

Offering Walkie-Talkie set, will accept s.s.b. Amateur bands receiver for 160, 80, 40 (1.8, 3.5, 7MHz). Please write with offers and description. must be delivered. Gebbsqyzz, 35 Pinfold Road, Streatham, London SW16 2SL.

WANTED

1970s Electronics mags: *Practical Wireless, Practical Electronics, Everyday Electronics, Wireless World, Television* and the mag with the Smithy's Workshop articles. Also Heathkit catalogues from same era, cash paid. Chris, derby. Tel: (07813) 624277.

Circuit diagram, hand-book, any information for Telequipment D61A 'scope will pay costs as required. Tel: Daventy, Northants (01327) 702265 or E-mail: cyril.earl@btopenworld.com

Eddystone EC958/7 or EC958/7E would consider the original EC958. Also required S.G.Brown Headphones, types A and P. Tony, Chesham. Tel: (01494) 778352 evenings.

FV101 - ext/v.f.o. YP150 dummy load and Watt meter. FT-V250 2metre (144MHz) transverter. YC601 digital read-out. FLZ100Z linear amplifier. All to match FT-101E. Martin Williams, 8 Caiach Terrace, Trelewis, Treharris, Mid-Glamorgan, South Wales. Tel: (01443) 412695.

Good heavy duty p.s.u (30A) will pay fair price. Also Ex-MOD straight Morse Key or similar. Also looking for following: Hammurland equip HQ170A Rx, HX150 TX, must be in good condition. Tel: Malcolm on 0113-265 2088 or (07932) 736799.

Have circuits for R1155 but need values of Caps and resistors which are not given. Photocopy or address of source needed. Costs and postage refunded. Ron Metcalf, 31717 Rodman Ave., Mission BC, Canada V4S 1E8 or E-mail: ron_metcalf@telus.net

Old half inch ferrite rods, willing to pay good money for them. Tel: Peter on (07931) 463823 9am to 10pm.

Operating/Manufactuers instruction manual for telequipment D619 oscilloscope. David Macro, Corner Cottage, Gunnerside, Richmond, North Yorkshire DL11 6LE. Tel: (01748) 886115.

Pensioner offers good home for dual-band u.h.f./v.h.f. mobile radio, boxed as new, priced reasonably with postage included or close to Glos, Cheltenham to be seen working. Tel: Bill on (01684) 295770 or (07817) 252048 or E-mail: billross@aol.com

S-meter for AR88. Tel: Bob on (01244) 549946.

PHOTOS

Now's your chance to send in a photograph of your equipment (a good idea if it's really unusual) to accompany your advert. Please note that **all photos** will ony be **published at our discretion** and are **non-returnable.**
When sending in your advert, please write **clearly** in **BLOCK CAPITALS** up to a maximum of 30 words, plus state your contact details. Please use the order form provided.

BARGAIN BASEMENT ORDER FORM

Please insert this advertisement in the next available issue of *Practical Wireless.*

❑ **For Sale** ❑ **Wanted** ❑ **Exchange**

Don't forget the corner flash!!

Name .....

Address .....

.....

..... Post Code .....

Telephone Number .....

CARD NUMBER

Signature .....

Expiry date of card.....

My Subs Number is .....

(or mailer label).....

please write in block capitals

	(30)		

CONTACT DETAILS FOR ADVERT.

Please only write in the contact details you wish to be published with your advert, ie. do you want your name & address, or just your telephone number?

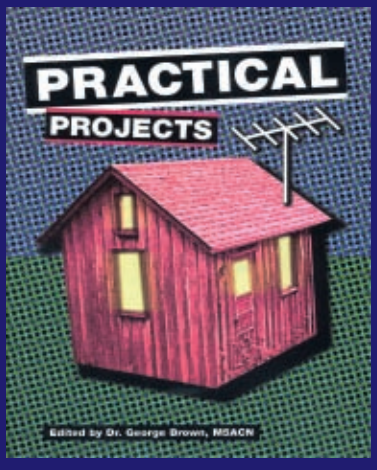
Your advert, you decide! ***PLEASE - No FAXed Ads!***

			(12)

Book Store

THE BOOKS LISTED HAVE BEEN SELECTED AS BEING OF SPECIAL INTEREST TO OUR READERS. THEY ARE SUPPLIED DIRECT TO YOUR DOOR. MANY TITLES ARE OVERSEAS IN ORIGIN.

Buy of the Month



Practical Projects
NEW - IN STOCK NOW!
Edited by **George Brown M5ACN** and published by the Radio Society of Great Britain *Practical Projects* contains 50 'weekend projects' for the Radio Amateur and anyone with a general interest in electronics. Projects include an 3.5MHz transceiver, antennas, a.t.u.s as well as mobile microphones, meters and simple electronic keyers. This book is a must for enthusiasts looking to expand their knowledge.
Practical Projects costs **£13.99 plus £1.50 P&P UK, £2.75 P&P overseas**. Order your copy today! To order call **(01202) 659930** or post your order to: **Book Store, PW Publishing Ltd, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW**. Remember to include your payment (in Sterling, cash not accepted), name, address and telephone number with your order.

LISTENING

Airband

	pages	price	code
AIRWAVES 2002	144	£9.95	AIR22
AIRBAND RADIO GUIDE (abc) 5th Edition	112	£8.99	ABRG5
AIRBAND RADIO HANDBOOK (Haynes)	190	£12.99	ABRHB
AIR TRAFFIC CONTROL (abc) 8th Edition	112	£8.99	ATC8
CALLSIGN 2002	144	£9.95	CAL22
CIVIL AIRCRAFT MARKINGS (abc)	384	£7.99	CIVAIR
FLIGHT ROUTINGS 2002 Williams	160	£7.95	FR22
MILITARY AIRCRAFT MARKINGS 2002 (abc)	224	£7.99	MILAIR
NORTH ATLANTIC ROUTE CHART	740 x 520mm	£9.00	NAROUT
WORLD AIRLINE FLEET & SELCAL DIRECTORY + UPDATE	300	£16.00	WAFSEL
MILITARY AIR SCAN 2002	348	£15.99	MILSCN

Frequency Guides

FERRELL'S CONFIDENTIAL FREQUENCY LIST 12th Edition	514	£19.99	FERR12
GLOBAL BROADCAST GUIDE (January 2003 Issue)	32	£2.75	GBGJA3
KLINGENFUSS GUIDE TO UTILITY STATIONS 2003		£26.50	KFUTIL
KLINGENFUSS SHORTWAVE FREQUENCY GUIDE 2003		£23.50	KFSWFG
PASSPORT TO WORLD BAND RADIO 2003	592	£15.50	PASS23
PROMA SCANNING SCENE CD	-	£4.75	PROMCD
RADIO LISTENERS GUIDE 2003	128	£5.25	RLG23
UK SCANNING DIRECTORY 8th Edition	700	£19.75	UK8TH
WORLD RADIO TV HANDBOOK 2003	672	£19.95	WRTH23

Scanning & Short Wave

BUYING A USED SHORT WAVE RECEIVER - New 4th Edition F. Osterman	78	£5.95	BUSWRX
RECEIVING (VALUE) STATION LOGBOOK (RSGB)	80	£4.95	RXLOG
SCANNERS 4 SCANNING INTO THE FUTURE Bill Robertson	245	£9.95	SCAN4
SHORT WAVE COMMUNICATIONS Peter Rouse GU1DKD	187	£4.50	SWCOM
SHORTWAVE RECEIVERS PAST & PRESENT 3rd Edition	450	£25.95	SWRXPP
THE SUPERHET RADIO HANDBOOK I.D. Poole	104	£4.95	BP370

Weather

FAX & RTTY WEATHER REPORTS Philip Mitchell	88	£11.50	FXTWR
WEATHER SATELLITE HANDBOOK 5th Edition. Dr Ralph E. Taggart WB8DQT	192	£15.50	WSATHB
WEATHER REPORTS FROM RADIO SOURCES. 3rd Edition. Philip Mitchell	32	£7.50	WRFRSO

AMATEUR RADIO

Amateur Television

AN INTRODUCTION TO AMATEUR TELEVISION. Mike Wooding G6IQM & Trevor Brown G8CJS	156	£5.00	INTATV
THE AMATEUR TV COMPENDIUM. Mike Wooding G6IQM	104	£3.50	ATVCOM

Antennas/Transmission Lines/Propagation

25 SIMPLE AMATEUR BAND AERIALS E.M. Noll	63	£1.95	BP125
25 SIMPLE INDOOR AND WINDOW AERIALS E.M. Noll	50	£1.75	BP136
25 SIMPLE TROPICAL AND MW BAND AERIALS E.M. Noll	54	£1.75	BP145
ANTENNA FILE (RSGB)	285	£18.99	ANTFIL
ANTENNA TOOLKIT (inc. CD-ROM) Joseph J. Carr	214	£25.00	ANTOOL
ARRL ANTENNA BOOK 19th Edition	732	£24.00	RRAB19
BACKYARD ANTENNAS Peter Dodd G3LDO	200	£18.99	BYANTS
BEAM ANTENNA HANDBOOK W.I. Orr W6SAI & S.D. Cowan W2LX	268	£8.95	BMANHB
BUILDING & USING BALUNS Jerry Sevick	125	£18.95	BUBALS
EXPERIMENTAL ANTENNA TOPICS H.C. Wright	70	£3.50	BP278
HF ANTENNA COLLECTION (RSGB) Edited by Erwin David G4LQI	233	£9.99	HFANTC
HF ANTENNAS FOR ALL LOCATIONS (RSGB) Les Moxon G6XN	322	£7.99	HFAFAL
INTRODUCTION TO RADIO WAVE PROPAGATION J.G. Lee	116	£3.95	BP293
MORE OUT OF THIN AIR (PWP).	112	£6.95	MOOTA
PHYSICAL DESIGN OF YAGI ANTENNAS (Hardback) D.B. Leeson W6QHS	200	£15.50	PDYAGI
RECEIVING ANTENNA HANDBOOK Joe Carr	189	£17.50	RXANHB
VERTICAL ANTENNAS W.I. Orr W6SAI & S.D. Cowan W2LX	192	£8.95	VERANT
VHF UHF ANTENNAS I.D. Poole	128	£13.99	VUANTS

Beginners/Novice/RAE

AMATEUR RADIO EXPLAINED. Ian Poole	150	£9.90	AREXPL
AN INTRODUCTION TO AMATEUR RADIO Ian Poole G3YWX	150	£4.99	BP257
AN RAE STUDENTS NOTEBOOK Bob Griffiths G7NHB	76	£6.95	RAESNB
FOUNDATION LICENCE NOW! (RSGB)		£3.95	FLNOW
HF AMATEUR RADIO. Ian Poole	120	£13.99	HFAR
RADIO AMATEURS EXAMINATION/END OF COURSE TEST PAPERS Ray Petri G0OAT	104	£13.95	RAECTP
RAE MANUAL (RSGB) 16th Edition	127	£15.00	RAEMAN
RAE REVISION NOTES (RSGB)	92	£5.00	RAERVN
SECRET OF LEARNING MORSE CODE Mark Francis	84	£6.95	SOLMC
THE NOVICE LICENCE STUDENT'S NOTEBOOK John Case GW4HWR	124	£6.00	NOVSTU
THE NOVICE RADIO AMATEURS EXAMINATION HANDBOOK Ian Poole G3YWX	150	£4.95	BP375
THE RADIO AMATEURS' QUESTION & ANSWER REFERENCE MANUAL. 5th Edition Ray Petri G0OAT	208	£13.95	RAQARM
TRAINING FOR THE NOVICE LICENCE A MANUAL FOR THE INSTRUCTOR (RSGB) John Case GW4HWR	101	£6.75	TNOVIM

To order please call the PW Book Store (01202) 659930 and quote PW 01

	pages	price	code
Call Directories			
PW UK/EIRE CALLSIGN CD	-	£4.75	PWCALL
RSGB YEARBOOK. 2003 Edition	462	£15.95	RSYB23
Design & Construction			
COIL DESIGN & CONSTRUCTION MANUAL B.B. Babani	106	£3.95	BP160
LF EXPERIMENTERS HANDBOOK	112	£18.99	LFEXHB
PRACTICAL PROJECTS G. Brown (RSGB)	21-	£13.95	PRPROJ
PRACTICAL RECEIVERS FOR BEGINNERS (RSGB) John Case GW4HWR	165	£14.99	PRRXFB
PRACTICAL TRANSMITTERS FOR NOVICES John Case GW4HWR	126	£12.50	PTXNOV
PROJECTS FOR RADIO AMATEURS & SWL. R.A. Penfold	92	£3.95	BP304
RADIO & ELECTRONICS COOKBOOK (RSGB)	319	£16.99	RECOOK
RADIO RECEIVER PROJECTS YOU CAN BUILD	312	£20.95	RRPYCB
RF COMPONENTS & CIRCUITS Joe Carr (RSGB-Newnes)	398	£22.50	RFCOMP
TECHNICAL COMPENDIUM (RSGB)	288	£17.99	RSTECO
TECHNICAL TOPICS SCRAPBOOK (RSGB). 1995-99 Pat Hawker	310	£14.99	TT9599
THE ART OF SOLDERING R. Brewster	84	£3.99	BP324
UNDERSTANDING BASIC ELECTRONICS (ARRL)	314	£15.50	UNDBEL
Shack Essentials			
AMATEUR RADIO MOBILE HB (RSGB)	114	£14.99	MOBHB
AMATEUR RADIO OPERATING MANUAL (RSGB)	257	£24.99	AROPM
ARRL OPERATING MANUAL 7th Edition	420	£18.50	RROPM
ARRL HANDBOOK 2003 79th Edition	1216	£28.00	RRHB22
AMATEUR RADIO (VALUE) LOGBOOK (RSGB)	80	£4.95	TXLOG
AMATEUR RADIO WORLD ATLAS (A4 size)	20	£8.00	ARWAT
GREAT CIRCLE MAP	400 x 400mm	£1.50	GCMAP
IOTA DIRECTORY 11th Edition (RSGB)	128	£9.95	IOTA11
RADIO AMATEURS MAP OF THE WORLD 2002 (Traxel)	980 x 680mm	£7.00	RAMAPW
RADIO COMMUNICATIONS HANDBOOK 7th Edition. Dick Biddulph/Chris Lorek	580	£29.99	RCOMHB
RSGB PREFIX GUIDE	34	£8.95	PFXGDE
Microwaves			
AN INTRODUCTION TO MICROWAVES F.A. Wilson	134	£3.95	BP312
INTERNATIONAL MICROWAVE HANDBOOK A. Barter (RSGB-ARRL)	474	£24.95	IMWHB
MICROWAVE HANDBOOK - CONSTRUCTION & TESTING VOL 2 (RSGB)	120	£18.99	MWHBV2
MICROWAVE HANDBOOK - BANDS & EQUIPMENT VOL 3 (RSGB)	140	£18.99	MWHBV3
QRP			
LOW POWER SCRAPBOOK (RSGB)	320	£12.99	LPSCRA
QRP POWER (ARRL)	188	£11.50	QRPPWR
INTRODUCING QRP Dick Pascoe G0BPS	48	£4.95	INTQRP
VHF & Higher			
ALL ABOUT VHF AMATEUR RADIO W. I. Orr W6SAI.	163	£8.95	AAVHF
GUIDE TO VHF/UHF AMATEUR RADIO Ian Poole G3YWX	180	£8.99	GTVUHF
NOS INTRO: TCP/IP OVER PACKET RADIO Ian Wade G3NRW	356	£11.50	NOSINT

VINTAGE & WIRELESS

Crystal Sets			
THE XTAL SET SOCIETY NEWSLETTER Volume 1 & 2 Combined. Phil Anderson W0XI	96	£14.00	XTNL12
THE CRYSTAL SET HANDBOOK & VOL. 3 XTAL SET SOCIETY NEWSLETTER. Phil Anderson W0XI	134	£8.00	XTNL3
THE XTAL SET SOCIETY NEWSLETTER Volume 4. Phil Anderson W0XI	88	£7.00	XTNL4
CRYSTAL RECEIVING SETS & HOW TO MAKE THEM	124	£7.95	XTHTM
CRYSTAL SETS. The Xtal Set Society Newsletter, Volume 5. Phil Anderson W0XI	88	£7.00	XTNL5
CRYSTAL SET BONANZA VOL 9,10,11 XTAL SET SOCIETY NEWSLETTER	226	£15.00	XTBON2
CRYSTAL SET BUILDING & MORE	168	£10.50	XTNL67
CRYSTAL SET PROJECTS	160	£10.00	XTPROJ
CRYSTAL RADIO HISTORY, FUNDAMENTALS AND DESIGN P.A. Kinzie	122	£8.00	XTHIST
CRYSTAL SET LOOPERS, A THREE TUBER & MORE Volume 8 Xtal Set Society Newsletter	128	£10.50	XTLOOP
Historical			
100 RADIO HOOK UPS 2nd Edition (reprinted)	48	£3.35	100RHU
1934 OFFICIAL SHORT WAVE RADIO MANUAL Edited by Hugo Gernsback	260	£11.85	1934SW
COMMUNICATIONS RECEIVERS - THE VACUUM TUBE ERA R.S. Moore	141	£17.95	COMRXV
MARCONI'S ATLANTIC LEAP (H/B)	96	£6.99	MALEAP
POP WENT THE PIRATES Keith Skues	568	£14.99	POPPIR
SAGA OF MARCONI OSRAM VALVE (Paperback) B Vyse	346	£25.00	SMOV
SEEING BY WIRELESS - THE STORY OF BAIRD TELEVISION Ray Herbert	27	£3.70	SBYWIR
THOSE GREAT OLD HANDBOOK RECEIVERS (1929 & 1934)	94	£6.95	TGOHRX
Valves			
HENLEYS 222 RADIO CIRCUIT DIAGRAMS (1924)	271	£9.95	222RAD
HOW TO BUILD THE TWINPLEX REGENERATIVE RECEIVER Lindsay	63	£6.75	HTBTRR
HOW TO BUILD YOUR FIRST VACUUM TUBE REGENERATIVE RECEIVER T.J. Lindsay	127	£8.25	HTBFVA
HOW TO BUILD YOUR RADIO RECEIVER (A4) (Popular Radio Handbook No. 1)	100	£6.70	HTBYRR
HOW TO MAKE A NEUTRODYNE RECEIVER Webb	63	£5.95	HTMNRX
SECRETS OF HOMEBUILT REGENERATIVE RECEIVERS (Rockey)	127	£8.75	SHBRRX

ELECTRONICS

BASIC RADIO PRINCIPLES & TECHNOLOGY Ian Poole G3YWX	262	£15.99	BRPRIN
ELECTRONIC PROJECT BUILDING FOR BEGINNERS R. Penfold. (BP392)	110	£4.95	BP392
GETTING THE MOST FROM YOUR MULTIMETER	102	£3.99	BP239
SCROGGIES - FOUNDATIONS OF WIRELESS & ELECTRONICS 11th Edition	292	£20.99	SCROGY
TEST EQUIPMENT FOR THE RADIO AMATEUR Clive Smith G4FZH	170	£12.99	TESTEQ

To advertise on this page see the booking form below.

Classified Ads

Whilst prices of goods shown in advertisements are correct at the time of going to press, readers are advised to check both prices and availability of goods with the advertiser before ordering from non-current issues of the magazine.

Valves

VALVES GALORE Most valves available from stock. Otherwise obtained quickly. Please send SAE stating requirements or telephone.

VALVE & ELECTRONIC SUPPLIES Chevet Books, 157 Dickson Road, Blackpool FY1 2EU.
Tel: (01253) 751858 or Fax: (01253) 302979.
E-mail: chevet@globalnet.co.uk

VALVES:- OVER 50000 STOCKED Ham, Vintage, Military, Audio. SAE for FREE list to: Wilson Valves, (Jim Fish G4MH), 28 Banks Ave., Golcar, Huddersfield, West Yorks HD7 4LZ.
Tel: 01484 654650/844554/650725.
Mobile:- 07733 283084.
Fax: 01484 655699.
E-mail: wilsonv@zoo.co.uk
Visa etc. Fast & personal service.

VALVES AND ELECTRONIC COMPONENTS Large stocks. Send for list to: Stuart Scott, 19 Portway, Steying, W. Sussex BN44 3QF.
Tel/Fax: 01903 815118.
E-mail: triumph.76@btinternet.com

VALVES WANTED NEW AND BOXED!! KT66 GEC £35, KT88 GEC £60, EL34 & EL37 Mullard £27, EL84 £4, DA30, DO30, PS25 all at £120 each. PX4 globe shape £70. DA100 GEC £150, ECC83 Mullard £5, GZ32 & GZ34 Mullard £10, ECC32 & ECC33 Mullard £15. Other types wanted.
Colomor (Electronics) Ltd.
Tel: 01403 786559.
E-mail sales@colomor.demon.co.uk

VALVES AND ALLIED COMPONENTS in stock - please ring for free list. Valve equipment repaired. Geoff Davies (Radio). Tel: 01788 574774.

THE SUPPLY OF VINTAGE COMPONENT parts/valves. Valve communications receiver service. Also vintage radio/audio equipment service. A one year guarantee on service. Write to: Vintage British Radio Components, 132 Lincoln Way, Corby, Northants NN18 9HW.

TOP PRICES PAID
for all your valves, tubes, semi-conductors and ICs.
Langrex Supplies Ltd.
1 Mayo Road, Croydon Surrey CR0 2QP.
TEL: 0208-684 1166. FAX: 0208-684 3056.

For Sale

THE RF-KIT CATALOGUE. send 2x 2nd class stamps or browse www.rf-kits.demon.co.uk
Hands Electronics, Tegryn, Llanfyrnach, Pembs SA35 OBL. Tel 01239 698427.

QUARTZ CRYSTALS. 455.2kHz/£1.75. 1MHz/£2.95. 1.4MHz/£9.95. 4.0MHz/£0.25. 4.194304MHz/£0.10. 4.9152MHz/£1.70. 6.0MHz/£1.54. 7.025MHz/£3.95. 7.03MHz/£3.95. 8.9985MHz/£2.95. 9.0MHz/£2.95. 9.0015MHz/£2.95. 10.0MHz/£1.54. 10.106MHz/£3.50. 10.245MHz/£1.54. 10.7MHz/£1.54. 11.155MHz/£3.50. 21.040MHz/£3.95. 21.060MHz/£3.95. 28.060MHz Fund /£3.75. All 30pF, HC49. Matched X-tals, Filter Application. 9MHz & 10MHz ±50Hz £20/8. 1.4MHz USB/LSB Filters. £15.00 10.7MHz, 10kHz Filters. £10.50. X-Tal Circuits, Applications Booklet. £5.00. Ceramic Resonators, Applications Booklet. £3.50.
Add P&P: £1.50 + VAT.
IQ-Electonic Design.
Tel: 020-8391 0545.
Fax: 020 8391 5258.
E-mail: japj69@netscapeonline.co.uk

COPPER ISLAND CONSTRUCTION OUTFITS
Build electronics circuits easily without etching or drilling.
Full instructions enclosed.
Just £17.95. Duncan Walters, 11 King George V Avenue, Mansfield NG18 4ER.
Further information phone 01623 465443
www.copperisland.biz

FIBREGLASS TUBES High strength tube, square box, rod and other sections all from stock in 6m lengths. Engineered Composites Ltd, Chester.
Tel: 01244 676000.
www.engineered-composites.co.uk

MAST, 40FT PUMP UP free standing Clarke, ex-army, heavy duty. £300.00 ono. Buyer collects.
Tel: 01454 326869 (Bristol) M5JON.

HAMEG SPECTRUM ANALYSER (boxed, unused) £1000. Hameg HZ530 Nearfield Probe Kit (boxed, unused) £300. Hameg 20MHz HM203-6 oscilloscope (calibrated) £125. Thurlby-Thander 1750 DMM (boxed, unused) £175, Thurlby-Thander single output bench power supply £50.
Telephone 01922 631465.

Wanted

WANTED FOR CASH Valve or solid state communication receivers Pre-1980. Preferably working and in good condition. Non working sets considered also domestic valve radios. Items of Government surplus wireless equipment and obsolete test equipment. Pre-1965 wireless and audio components and accessories. Pre-1975 wireless and TV books and magazines. Also, most valves wanted for cash. Must be unused and boxed. CBS, 157 Dickson Road, Blackpool, FY1 2EU.
Tel: (01253) 751858 or Fax: (01253) 302979.
E-mail: chevet@globalnet.co.uk

MARCONI SCIENTIFIC INSTRUMENT CO LTD 1919-1927 wireless equipment, parts, documents, photos wanted by researcher. Tel: David Butler 01462 432813 (Hitchin).

WANTED OLD HALF INCH FERRITE RODS. Willing to pay good money for them. Contact Peter on (mobile) 0793 1463 823. 9am to 10.00pm.

Aerials

H.F. TRIBAND QUAD ALLOY CENTRE BRACKET info send SAE G3WKF, Richards, Wayside, Penwithick Road, Penwithick, St. Austell, Cornwall PL26 8UH.

Miscellaneous

GAREX ELECTRONICS VHF/UHF accessories and aerials, PMR equipment and spares. www.garex.co.uk
PO Box 52, Exeter EX4 5FD.

CLASSIFIED ADS

PLEASE WRITE YOUR ADVERT AND OTHER DETAILS IN BLOCK CAPITALS

The prepaid rate for classified advertisements is 42 pence per word (minimum 12 words), box number 70p extra. Semi-display setting £13.90 per single column centimetre (minimum 3cm). Please add 17.5% VAT to the total. All cheques, postal orders, etc., to be made payable to PW Publishing Ltd. Advertisements, together with remittance, should be sent to the Classified Advertisement Dept., Practical Wireless, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW. Tel: (01202) 659920, Fax: (01202) 659950

1. **Please write your advert clearly, in block capitals and make sure you also provide us with the following details:**
2. Which issue of Practical Wireless .... (if you do not specify an issue we will insert it in the next available issue of PW) for ..... insertion/s.
3. Category heading for your advertisement.
4. Enclose your Cheque/P.O. (42p per word, 12 minimum, please add 17.5% VAT to total).
5. Your name, address & telephone number.
6. If you require a Box No. (70p extra).

...OR SEE AN ORDER FORM FROM A PREVIOUS ISSUE OF PRACTICAL WIRELESS.

Subscribe Here

to Practical Wireless / Short Wave Magazine / Radio Active

- *Never miss an issue*
- *Have it delivered to your door*
- *Subscribers get their copies before they reach the shops*
- ***PW** is Britain's best selling amateur radio magazine*
- ***SWM** - The UK's only magazine dedicated solely to listening*
- ***RA** covers all aspects of radio communications, scanners, cb, amateur, 446, sw listening, and more - it's all here!*

***CREDIT CARD ORDERS TAKEN ON (01202) 659930** between the hours of 9.00am - 5.00pm. Outside these hours your order will be recorded on an answering machine.*

***FAX ORDERS TAKEN ON (01202) 659950** or please fill in the details ticking the relevant boxes, a photocopy will be acceptable to save you cutting your beloved copy!*

*To: **PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW***

Subscription Rates

(Please tick appropriate box)

		PW	SWM	PW+ SWM	RA	RA+ PW	RA+ SWM	PW+ RA+ SWM
1 YEAR	UK	£31 ❑	£36 ❑	£61 ❑	£25 ❑	£50 ❑	£55 ❑	£83 ❑
	Europe Airmail	£39 ❑	£43 ❑	£74 ❑	£32 ❑	£63 ❑	£68 ❑	£103 ❑
	ROW Airmail	£50 ❑	£54 ❑	£94 ❑	£37 ❑	£77 ❑	£82 ❑	£127 ❑
	ROW Airsaver	£43 ❑	£48 ❑	£82 ❑	£34 ❑	£68 ❑	£74 ❑	£113 ❑
3 YEARS	UK	£83 ❑	£95 ❑	£163 ❑	£68 ❑	£135 ❑	£149 ❑	£222 ❑
	Europe Airmail	£108 ❑	£115 ❑	£213 ❑	£87 ❑	£175 ❑	£184 ❑	£280 ❑
	ROW Aimail	£145 ❑	£155 ❑	£263 ❑	£105 ❑	£208 ❑	£220 ❑	£365 ❑
	ROW Airsaver	£118 ❑	£130 ❑	£233 ❑	£97 ❑	£184 ❑	£200 ❑	£311 ❑

*I wish to order a.....**1/3 year***.....subscription to.....**PW/SWM/RA***..starting with the.....issue.*

Payment Details

I enclose my Cheque/Postal Order for £.....*

made payable to PW Publishing Ltd.
or please debit my Access/Visa/Amex card No.

☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐☐

Expiry Date.....

or please debit my Switch card No.

☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐

Date.....Switch Issue Number (if on card) .....

Switch Expiry Date.....

Signature .....

Name .....

Address .....

.....

.....

.....

.....

Postcode .....

Daytime Tel. No .....

Orders are normally despatched by return of post but please allow 28 days for delivery. Prices correct at time of going to press.
Please note: all payments must be made in Sterling. Cash not accepted.

*(*Delete as necessary)*

Photocopies of this page are acceptable

topical talk

Antenna Damage

If you look after them...a telescopic fibreglass fishing rod antenna mast can stand very strong winds...but there is a limit!

This month the discussion in the *PW* Editorial office has been one which has been discussed by most of us recently...it's the weather of course! And unfortunately...the onset of the winter's gales temporarily put the Editor off the air!

Getting into the PW Publishing Ltd offices has been rather trying recently...firstly due to very heavy rain and flooding, and (in the week of 11-15th November) latterly extremely strong winds, gusting to Force 8 and above. The floods were bad enough...and the wind made it worse.

The extremely gusty wind conditions unfortunately led to our Editor losing his 10m long fibreglass fishing rod (supporting a vertical wire antenna) mast during a particularly fierce storm. (overnight on Wednesday/Thursday 13/14th of November).

Rob had his last QSO (on 7MHz, using 5W c.w. to a Yugoslavian station) not long before midnight. Radio conditions were excellent...even though the weather was foul. Just after 3am he was woken by a huge crash as a complete six-pot chimney stack had crashed to the ground nearby. The same gust brought G3XFD's telescopic mast down. (One of the prices you pay for living only 400m or so back from the cliff top on Bournemouth sea front we told him!).

Winter Precautions

The demise of the Editor's telescopic fishing rod antenna - which has stood many such gales and has provided excellent service - **could have been avoided if he'd remembered to lower it!** Sensibly, the mast was mounted on the garage at the rear of the house, using a large TV antenna bracket) so it could be lowered rapidly during bad weather. Unfortunately Rob's safety sense let him down because he went to bed... forgetting the weather was worsening.

However, G3XFD's misfortune made us all think...have we winterised our own antenna systems? As it was made from lightweight - but very strong - glass fibre material, the Editor's mast splintered and split in the 80mph gusts and did not damage the neighbour's garage which it fell across. **But if your mast/pole system is made from heavier material...have you remembered to check guys/stays and any essential supporting metal work?**

Fortunately Rob has a spare fishing rod antenna...**Robin G3NFV** from **Sycom** delivered it during the Leicester show. But you can be sure...the Editor will be fair to his new portable mast in future, lowering it to a safer height next time!

Fortunate Editor

Rob realised he'd been fortunate as the mast couldn't really do any damage as it collapsed. Would this be the case with your own antennas?

Have you ensured that if wires break free, poles fall, or towers fold in the middle (yes...wind loading with metal towers, especially if they support beam antennas can cause catastrophic damage) that no danger occurs to you or others? Would power lines/telephone cable be fouled?

The Editorial team strongly advise you to **Think Safety!** Consider the worse case possibility...be prepared. Check to see if your household insurance covers possible damage...and don't forget that there's always someone who'll remember the time your hobby inconvenienced them. Make sure you deny them the memory...think ahead. **Be safe**! *PW*

YOUR SPECIALIST & LOCAL DEALERS

Phone Eileen on **01202 659920** for all of your advertising needs.

BIRMINGHAM

SRP TRADING

1175 Bristol Road South
Northfield
Birmingham B31 2SL

PHONE 0121-475 9898

CORNWALL

WORSLEY COMMUNICATIONS
Robin C Worsley G0 MYR

'Onaru', Pennance Road,
Lanner, Redruth,
Cornwall TR16 5TQ

www.hamradiosales.co.uk
Tel: 01209 820118

DORSET

THE SHORTWAVE SHOP

Amateur/C.B./Scanning equipment/Shortwave listening.
Full range secondhand equipment always available.
18 Fairmile Road, Christchurch, Dorset BH23 2LJ
Tel/Fax: 01202 490099

EASTERN ENGLAND

WATERS & STANTON PLC
Spa House, 22 Main Road, Hockley
Essex SS5 4QS
Tel: (01702) 206835/204965
Fax: (01702) 205843
Web: http//www.waters-and-stanton.co.uk
E-mail: sales@wsplc.demon.co.uk
Open 9am to 5.30pm Monday to Saturday inclusive
MAIN AGENTS – ALL BRANDS
PHONE/FAX FOR FREE PRICE LIST

LONDON

MARTIN LYNCH & Sons
For all your amateur radio needs
128 & 140-142 Northfield Avenue Ealing London W13 9SB
Tel:
0181-566 1120
Fax:
0181-566 1207

LONDON

HAYDON COMMUNICATIONS
For all your amateur radio equipment.
NEW, SECONDHAND, EX-DEMO
Unit 1, Thurrock Commercial Centre, Purfleet Ind. Est., Nr Aveley, South Ockendon, Essex RM15 4YD.
Tel: 01708 862524 Fax: 01708 868441
Open Mon-Fri 8.00am - 4.30pm. Sat 8.00am - 1.00pm

MID GLAMORGAN

SANDPIPER COMMUNICATIONS

Unit 5, Enterprise House, Cwmbach Industrial Estate, Aberdare, Mid Glamorgan CF44 0AE
Tel: (01685) 870425
Fax:(01685) 876104
A full range of transmitting & receiving antennas available for the amateur commercial market.

NORTHWEST

ARC Ltd.
Everything for the radio amateur under one roof!
38 Bridge Street, Earlestown, Newton-le-Willows,
Merseyside WA12 9BA
Tel: 01925 229881
Fax: 01925 229882

NOTTINGHAMSHIRE

KANGA PRODUCTS
QRP kits and components including the **MK484 with data sheet at £1.00 each**
SEND TWO FIRST CLASS STAMPS FOR OUR FREE CATALOGUE TO:
Sandford Works, Cobden Street, Long Eaton, Nottingham NG10 1BL
Tel: 0115-967 0918 (evenings/weekends)
Mobile: 07710 898970 Fax: 0870-056 8608
http://www.kanga.demon.co.uk

SCOTLAND

TENNAMAST SCOTLAND LTD
Masts from 25ft - 40ft
Adapt-A-Mast
(01505) 503824
81 Mains Road, Beith, Ayrshire. KA15 2HT
E-mail: nbrown@tennamast.com
Web site: www.tennamast.com

SCOTLAND

JAYCEE ELECTRONICS LTD
20 Woodside Way, Glenrothes, Fife KY7 5DF
Tel: (01592) 756962 (Day or Night)
Fax No. (01592) 610451
New opening hours: Tuesday-Friday 9am to 5pm. Saturday 9am to 4pm. Closed Sunday & Monday.
KENWOOD, YAESU & ICOM APPROVED DEALERS
A good stock of new and secondhand equipment always in stock

SOUTHWEST & WALES

QSL COMMUNICATIONS
- For all amateur radio and listener needs.
- New and secondhand equipment.
- Part exchange welcome.

Unit 6, Worle Industrial Centre, Coker Road, Worle, Weston-Super-Mare BS22 6BX
Tel/Fax: (01934) 512757

WEST MIDLANDS

RADIOWORLD
42 Brook Lane, Great Wyrley,
Walsall, West Midlands WS6 6BQ
Tel: (01922) 414796
Fax: (01922) 417829
WE ARE 5 MINS AWAY FROM J11, M6

WEST SUSSEX

Adur Communications
Belmont Buildings, The Street,
Bramber, W. Sussex BN44 3WE.
Tel: (01903) 879526
E-mail: service@adurcomms.com
Repairs and alignment to all amateur and commercial radio equipment.

EASTERN ENGLAND

GREENWELD LIMITED
Electrical / Electronic components and kits, plus surplus electronics, tools, materials, hardware and much more.
Call now for our FREE CATALOGUE
01277 811 053
Mail to: bargains@greenweld.co.uk
www.greenweld.co.uk
Unit 14, West Horndon Business Park, West Horndon, Brentwood, Essex CM13 3XD

WEST SUSSEX

Cooke International
www.cooke-int.com
Electronic Test & Measuring Equipment
Tel: (+44) 0 1243 55 55 90
Operating & Service Manuals.

Index to Advertisers

ICOM

IC-2725E

IC-2725E Dual-Band FM Transceiver

Twice the versatility - twice the fun!

Get on the move with the new IC-2725E. This unique dual-band mobile provides VHF/VHF, UHF/UHF simultaneous receive capability along with VHF/UHF full duplex operation. The HM-133 hand-mic allows remote-control operation. Simply touch a button to change the main (transmit) band and sub-band. Operating two bands simultaneously is very simple with the symmetric layout and the wide, dual-colour LCD showing both band settings in an easy-to-read, side-by-side format. The IC-2725E provides separate tuning, volume, squelch knobs and function buttons for the left and right side bands. You can also listen to both bands independantly through separate left and right audio jacks.

Other features include...

- Dynamic Memory Scan (DMS)
- HM-133 Remote Control Microphone
- DTCS and CTCSS
- Access socket for 9600bps Packet Data
- 10dB RF Attenuator
- Selectable Squelch Delay
- 14 DTMF Memory Channels (24 digits)
- Sub-band Auto-mute function
- Wide/narrow Channel Spacing (Left side only)
- Newly-adopted MOS-FET Power Amplifier
- ...and so much more!!!

Icom UK Ltd. Sea Street, Herne Bay, Kent CT6 8LD. Telephone: 01227 741741.
Fax: 01227 741742. e-mail: info@icomuk.co.uk ...or visit our website: www.icomuk.co.uk

Count on us!

Christmas... not just a time for receiving

VX-7R

FM 5W HANDHELD
50/144/430MHz 5W

FT-897

PORTABLE ALL MODE
1.8 - 430MHz Transceiver

FT-8900R

MOBILE QUADBAND
29/50/144/430MHz FM Transceiver

YAESU UK Ltd, Unit 12,
Sun Valley Business Park,
Winnall Close, Winchester,
Hampshire, SO23 0LB

Visit us on the internet at www.yaesu.co.uk

YAESU

Choice of the World's top DX'ers