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review

ideal for today's amateur... the FT-857

wooferton's wireless wonder

radio basics goes VHF!

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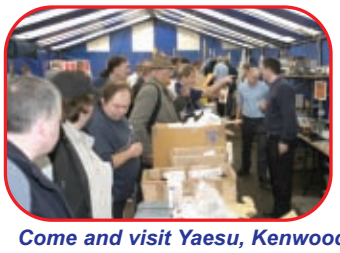

LOWE

Come and visit Yaesu, Kenwood & Icom stands. FREE food and bargain prices. Opens at 10 am. Be there!

BRAND NEW ! ! !

NEW HEIL QUIET PHONES

Active Noise Cancelling Headphones

Ambient noise drops away as you switch NR unit on. Amazing reduction! Fitted 3.5mm / 1/4" jacks. Requires 1xAA battery.

£99.95 B

NEW YAESU FT-8800R

Dual Band Mobile 50/35W

AVAILABLE SOON

NEW IC-703

HF/50MHz Transceiver

0.1-10W Portable, Mobile, Base-Station. (9-15.87V DC)

Designed especially for the Foundation Licence/QRP.

Built-in features auto ATU, DSP memory keyer. (5W when using 9.6V batts)

£599 c

NEW FT-857

HF/50/144/430MHz Mobile Transceiver

HF/6m 100W, 2m 50W, 70cm 20W. (13.8V DC)

Developed on the FT-897 and FT-817 transceivers. Built-in features 32 colour display, spectrum scope, AM airband receive, built-in memory keyer, detachable front panel, DSP unit supplied.

£799 c

ICOM IC-756 PRO II £1999 C

Flagship of the Icom range of HF transceivers. HF & 50MHz, features large colour LCD with spectrum scope, auto ATU and 32-bit floating point DSP unit.

ICOM IC-7400 £1249 C

HF/VHF 100W transceiver. Features large LCD with spectrum scope, auto ATU and same DSP system as IC-756PRO II.

ICOM IC-706 IIG DSP £789 C

HF/VHF/UHF mobile DSP transceiver. Its relative small size not only makes it a great mobile rig but also for fixed station use as well. HF general coverage Rx and VHF & UHF.

ICOM IC-718 £499 C

HF 100W transceiver. Covers all HF bands plus wideband receive. C/w auto notch, dual VFO, SWR meter etc. Options include extnl ATU DSP & filters.

ICOM IC-910X with 23cm £1249 C

Icom's all mode VHF/UHF transceiver with 23cm. Large clear LCD with lots of facilities. 100W on VHF and 75W on UHF, 10W on 23cm. IC-910H version £1149

KENWOOD TS-2000 £1599 C

Top-of-the-range 100W Kenwood transceiver. HF/VHF/UHF or up to 23cm with the optional module. Built-in auto ATU, DSP and its unique TNC.

KENWOOD TS-870S DSP £1399 C

HF DSP 100W base station. Excellent all round rig great for DX working with its ability to winkle out weak stations using its true IF DSP. No filters to buy.

KENWOOD TS-570DGE £849 C

HF100W base station with built-in auto ATU. Very popular rig, excellent performance on SSB and CW. Two fitted antenna sockets - very handy.

YAESU FT-1000 MKV £2349 C

200W HF transceiver, EDSP, Collins filter, auto ATU, 220V AC PSU - Acknowledged as one of the finest DX rigs on the market. Superb tailored audio and the ability to select Class A bias for dramatic signal purity.

YAESU FT-1000 FIELD £1749 C

100W HF transceiver, EDSP, Collins filter, auto ATU, 220V AC / 13.8V DC - Building on the success of the FT-1000MkV, the Field has become a respected leader in its class.

YAESU FT-897 NEW £989 C

100W HF rig plus 2m and 70cms (50W/20W) 13.8V external supply / internal optional FP-30V AC power supply / self powered portable using optional Ni-MH pack at 20W output. Compatible with FC-30 auto ATU and ATAS 120/100 antennas. The "must have" radio for 2003.

YAESU FT-847 £1199 C

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

YAESU FT-817 £539 C

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

LINEAR AMP UK RANGER 811H £895 C

HF linear amp 160-10m including WARC bands. Drive 10-100W, output 800W (max) CW. Soft start on switch-on. Compatible with all modern 100W HF rigs. Silent running Papst fan.

AMERITRON AL-82XCE £2595 C

1.5KW HF Linear amplifier 160-10m inc. WARC. Uses 2 Eimac 3-500Z. Built-in power supply with in-rush current limiting for greater valve life. Designed to give you years of trouble free operation.

AMERITRON AL811 XCE £799 C

Ideal 600W HF Linear more than enough for the full UK limit. 160-10m including WARC bands. Uses 3x 811A low-cost valves. Matches all modern 100W solid state HF rigs. Silent running cooling fan.

HY-GAIN HDR-300AX NEW £1595 C

Mega rotator for large HF beams and antenna arrays up to 2.3m² (25sq ft). Heavy duty self-centring steel mast clamp and hardware. Control box with digital display accurate to one degree. North or South centred callibration.

FD-7021 POWER TANK £24.95 B

12V DC 4Ah supply, ideal for FT-817 and the new IC-703.

**2x 12V, 12A Cigar lighter sockets *+3/6/9V outputs *Computer controlled battery state *Built-in lantern *AC charger & cigar lighter power cord included *Shoulder strap *Compact size: 180 x 85 x 210mm *2.3kg*

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PRICE MATCH

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carriage charges: A=£2.75, B=£6, C=£10

ICOM IC-2725E NEW £309 C

The Icom IC-2725 dual band FM transceiver is proving very popular. Easy to install, the controller is separated from the main unit - great where space is limited.

ICOM IC-207H £249 C

Great budget price dual band FM 50W/35W transceiver. Simple band operation. Front panel detachable from main unit if required.

ICOM IC-2100H £229 C

2m 55W FM mobile. Commercial grade, rugged construction. One piece die-cast aluminium chassis. Selectable green or amber display.

YAESU FT-8900R NEW £349 C

Want the best of all worlds then the FT-8900R is just the ticket! A rig with four of the most popular mobile bands - 10m/6m/2m & 70cm. Detachable head. Airband Receive.

YAESU FT-2800M NEW £159 C

The FT-2800M 2m FM 65W High Power mobile transceiver. Rugged construction, excellent receiver performance and direct keypad entry.

YAESU FT-1500M £179 B

Remarkably small and compact, yet built like a Battleship!
Should last for years.

KENWOOD TMD-700E £449 C

Certainly the best dual band mobile transceiver with APRS. Does not need extra high cost boards to function. The only extra if required is a compatible GPS receiver.

KENWOOD TM-V7E £359 C

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

KENWOOD TM-G707E £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!

IC-E208 NEW £319 B

VHF/UHF FM Dual Band Mobile Transceiver **Freq range 144-146MHz, 430-440MHz Tx *55/50W (3 pwr steps each band) *Wideband Rx 118-173, 230-549 & 810-999MHz *512 memories *FM narrow capability *104x2 DTCS, 50 CTCSS tone squelch *16 DTMF channels *HM-133 remote control mic *Packet ready for 9600/1200bps-mini DIN or 1200bps-mic socket *Supply 13.8V*

YAESU VX-7R NEW £299 B

6m/2m/70cm

Available in Silver or Black

The VX-7R is the best outdoor handie ever. The case, keypad, speaker and connectors are all sealed against water damage. Wide Frequency coverage from 500kHz to 900MHz the VX-7R is ideal for monitoring a variety of broadcasts. The display is a dazzling 132x64 dot matrix providing easy-to-read frequencies and information plus pictorial graphics.

YAESU VX-110 £109 B

Combining the ruggedness of the VX-150 with the simplicity of 8-Key operation, the VX-110 is a fully featured 2m handheld ideal for the most demanding of applications. It has a die-cast csae, large speaker and illuminated keypad.

ICOM IC-E90 NEW £269 B

The new E-90 offers triple band coverage of 6m, 2m and 70cms. Up to 5W output and rx coverage from 495kHz - 999MHz makes this a very attractive rig.

ICOM IC-T3H £129 B

The IC-T3H 2m handheld features tough quality but with slim looks. Its striking green polycarbonate case has been ergonomically designed. The rig is capable of providing a powerful 5.5W output with either Ni-Cad or Ni-MH battery packs. Supplied with charger and rechargeable battery.

KENWOOD TH-D7E £319 B

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.

KENWOOD TH-F7E £259 B

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.

KENWOOD TH-G71E £199 B

If you want an excellent 2m/70cm dual-bander then you can't go wrong with the TH-G71. Fully functional with three power levels, 200 memories, CTCSS tone encoder/decoder, illuminated keypad and backlit LED.

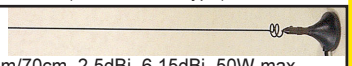
MOTOROLA T-5512 £69.99 B

Motorola Dual Pack PMR-446 Recreational 2-Way radio
·No Licence Fee or Airtime Charges
·8 Channels and 38 Codes
·3km Range
·Lightweight
·Water Resistant
·Handsfree use (VOX)
(with optional accessory)
·Supplied with 2 belt clips

MOBILE ANTENNAS

WATSON ANTENNAS (PL-259 base type)

Comes with coax & BNC



WSM-270. 2m/70cm, 2.5dBi, 6.15dBi, 50W max, micro-magnetic 29mm base, length 0.46m. **£19.95** A

W-2LE	2m quarter wave 2.1dBi 0.45m	**£9.95**	A
W-285S	2m 3.4dB 0.48m (fold over base)	**£14.95**	B
W-77LS	2m/70cm 0/2.5dB 0.42m	**£14.95**	B
W-770HB	2m/79cm 3/5.5dB 1.1m	**£24.95**	B
W-7900	2m/70cm 5.6/7.6dB	**£32.95**	B
W-627	6m/2m/70cm 2.15/4.8/7.2dB 1.6m	**£34.95**	B
WGM-270 NEW	2m/70cm On glass 3.7m coax 50W	**£29.95**	B

MOBILE BASES

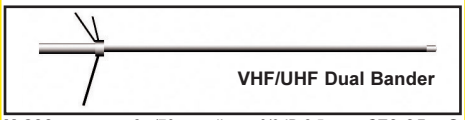
WATSON

WM-14B.
Large diameter 14cm magnetic mount SO-239, c/w 5m RG-58 & PL-259

W-3HM	Adjustable hatch mount	**£14.95**	A
WM-08B	8cm mag mount, 5m cable PL-259	**£9.95**	A
WM-14B	14cm hvy duty mag mount+cable	**£12.95**	A
WSM-88V	BNC mag mount plus 3m cable	**£14.95**	A
W-3CK	5m 5D-FB cable assembly+pigtail	**£18.95**	A
W-ECH	5m standard cable kit assembly	**£12.95**	A

BASE STATION ANTENNAS

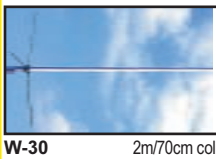
DIAMOND



VHF/UHF Dual Bander

X-200	2m/70cm colinear 6/8dB 2.5m	**£79.95**	C
X-300	2m/70cm colinear 6.5/9dB 3.1m	**£99.95**	C
V-2000	6m/2m/70cm 2.15/6.2/8.4dB 2.5m	**£89.95**	C

WATSON



W-300.
Very popular dualband base antenna. Supplied with u-bolts for mast fixing.

W-30	2m/70cm colinear 3/6dB 1.15m long	**£39.95**	C
W-50	2m/70cm colinear 4.5/7.2dB 1.8m long	**£49.95**	C
W-300	2m/70cm colinear 6.5/9dB 3.1m long	**£64.95**	C
W-2000	6m/2m/70cm 2.15/6.2/8.4dBi 2.5m	**£69.95**	C

WATSON SAFE-2-WAY NEW £89.95 B

AT LAST ! !
A HANDS FREE SYSTEM THAT REALLY WORKS!

**Widely used commercially *Approved to Pan-European Standards *True Hands-Free *Noise Reducing *Acoustic Tailored Mic *Remote (3m) Latching PTT *Boom mic (3m) with Velcro *Adjustable gain *Adjustable Time-Out *Powered from rig mic socket *Ready made rig leads (£14.95 extra) *Also matches handhelds.*

The **Safe-2-Way** mobile Interface is made for Watson in the UK by the same company that equips UK Police and Emergency services with similar units. Purchase the ready-made lead to match your radio and tuck the unit out of sight. The plug-in PTT and boom mic both have 3m leads for dressing around vehicle. Don't risk your Licence or people's lives! Drive with **Safe-2-Way**.

CHECK OUR WEBSITE WWW.WSPLC.COM FOR MORE DETAILS OF THESE PRODUCTS

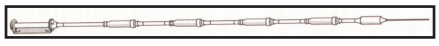
WATERS & STANTON

1973 WATERS & STANTON PLC 30th ANNIVERSARY 2003

PRICE MATCH

VERTICAL ANTENNAS

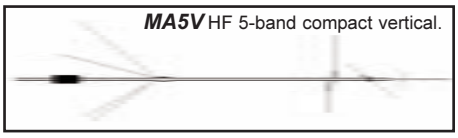
HUSTLER



6-BTV. HF 6-band vertical

6-BTV *NEW*	80-40-30-20-15-10m 1kW PEP	**£239.95**	C
5-BTV	80-40-20-15-10m 7.64m 1kW	**£209.95**	C
4-BTV	40-20-15-10m 6.52m 1kW PEP	**£169.95**	C

CUSHCRAFT



MA5V HF 5-band compact vertical.

MA5V	20-17-14-12-10m 250W PEP	**£229.95**	C
R8	40-30-20-17-15-12-10-6m 1.5kW	**£529.95**	C
R6000	20-17-15-12-10-6m 1.5kW PEP	**£349.95**	C

HORIZONTAL BEAMS & DIPOLES

CUSHCRAFT

Not got the space for a full sized HF beam antenna, then the mini beam MA-5B should be considered.

MA-5B	10-12-15-17-20m 4 el. Yagi 2kW	**£349.95**	C
A4-S	10-15 & 20m 4 el. Yagi 2kW	**£599.95**	C
A3-WS	12 & 17m 3 el. Yagi 2kW	**£399.95**	C
X-7	20/15/10m 7 el. Yagi 2kW	**£699.95**	C
TEN-3	10m 3 el. Yagi 2kW	**£219.95**	C

RADIO WORKS

A choice of quality wire antennas available to fit almost any circumstances.

CW-160	160-10m 76.8m long	**£139.95**	C
CWS-160	160-10m 40.5m long	**£134.95**	C
CW-80	80-10m 40.5m long	**£99.95**	C
CWS-80	80-10m 20.1m long	**£119.95**	C
CW-40	40-10m 20.1m long	**£94.95**	C
CW-20	20-10m 10.36m long	**£84.95**	C
CW-620	20-6m 9.7m (32ft) long	**£94.95**	C
G5RV PLUS	80-10m with balun 31m (102ft) long	**£64.95**	B

MOBILE ANTENNAS

HUSTLER

Standard Resonator 400W (mast sections not included)

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

Super Resonator 1kW (mast sections not included)

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

Mobile Mount Accessories

SSM-1	Ball mnt stainless steel spring&stud	**£45.95**	B
SSM-2	Ball mount	**£28.95**	A
SSM-3	Stainless steel spring & stud	**£24.95**	A
HOT	Trunk lip mount	**£24.95**	A
RSS-2	Stainless steel resonator impact spring	**£10.95**	A
QD-2	Quick disconnect adaptor	**£19.95**	A
VP-1	Multi-band adaptor	**£7.95**	A

MANSON EP-925 PSU £99.95 C

A general purpose 3-15V DC, 25A (30A peak) power supply able to provide the needs of the modern 100W HF transceiver.
**Dual analogue meters *Over current protection *Large power terminals for rigs *Quick snap connectors for ancillaries*

WATSON FC-130 Frequency Counter £59.95 B

SPECIAL PRICE

The FC-130 is an ideal frequency counter for the shack, mobile or portable use. Supplied complete with Ni-Cads, charger and telescopic whip.

MFJ-461 Morse Code Reader £84.95 B

**Stand alone unit *Built-in mic *32char high contrast LCD *Automatic speed tracking *Serial port *Built-in speaker *9V PP3 (not included)*
Simple PC program available (user supplies disk)

bhi NES10-2 & NES-5 DSP Speakers

NES10-2 **£99.95 B**

**Speaker with built-in DSP noise filters *Dip switches for 8 filter settings (NES10-2) *DSP settings preset, no user adjustment (NES-5) *Plugs directly into 3.5mm speaker socket *Handles up to 5 Watts input *Max 2.5 Watts output *Requires 12V at 0.4 Amps max*

NES-5 **£79.95 B**

bhi NEIM1031 £129.95 B

NOISE ELIMINATING IN-LINE MODULE
** Noise attn -20dB (typical) * Noise Attn levels 8 * Audio output power 2.5W RMS max (8 Ohms) * Audio connections: Line level in/out (RCA Phono), Audio in/out 3.5mm mono jack * Line i/p impedance 10K * Line o/p impedance 100 Ohms * Line in sensitivity 300mV -2V RMS * Headphone socket 3.5mm mono jack * Power 12-24V DC 500mA*

bhi 1042 SWITCH BOX £29.95 B

Connect more than one piece of equipment to your bhi noise eliminating speaker with the 1042 Switch Box.
Allows 6 pieces of equipment to be connected, 3 inputs loaded at 8 Ohms and 3 unloaded inputs (for low level signals). Two audio leads provided.

WEST MOUNTAIN RIGBLASTERS

RIGblaster pro	Data interface 8-pin/mod, Cd & cables	**£229.95**	B

RIGblaster Plus	Data interface 8-pin/mod, Cd & cables	**£139.95**	B
RIGblaster M8	Data interface 8-pin, software & cables	**£109.95**	B
RIGblaster M4	Data interface 4-pin, software & cables	**£109.95**	B
Rigblaster RJ	Data interface RJ45, software & cables	**£109.95**	B
RIGblaster nomic8P	Data interface 8-pin, software & cables	**£59.95**	B
RIGblaster nomicRJ	Data interface RJ, software & cables	**£59.95**	B
FT100-CBL	Adapts all units to FT100 input	**£12.95**	A

AUDIO ACCESSORIES

HEIL


HCL-5/4


GM-4/5


HST-817


PROSET +

Desk Microphones

HCL-5/4	Classic retro-look HC-5/4 desk mic	**£259.95**	B

Hand Microphones

GM-4/5	Goldline HC-4/HC-5 hand mic	**£129.95**	B

Headsets & Boom microphones

HST-817	Traveler single side headset for FT-817	**£89.95**	B
HST-706	Traveler single side headset for IC-706	**£89.95**	B

Headphones & Boom Microphones

PRO-SET-PLUS	Large H/phones with HC-4 & HC-5	**£199.95**	B

WATSON


WM-308


WEP-300B


QS-112

Base Microphones

WM-308	Desk electret mic c/w ML-308	**£59.95**	B

Earpieces

WEP-300B	Over the ear, 3.5mm mono jk-plug	**£2.95**	A

Speaker Microphones

QS-112(Y,K,I,M)	H/held spkr/mic (state which model)	**£16.95**	A

TRANSMITTING LOGBOOK £4.99 A

Traditional Logbook for Radio Amateurs, A4 size, spiral bound for ease of use plus updated Prefix List and room for extra notes. A log is a legal requirement for any radio station.

LDG Electronics

NEW AT-897

**1.8 to 54MHz *Power rating 10mW to 100W *Dual function tune control button *Tunes 6-800 Ohm loads *Coax fed ants, dipoles, verticals & beams *Latching relays *Provides extra CAT port *Dual cross needle meters, illuminated *Sockets: SO-239 *Supply: 11-15V DC @ 300mA *Size: 292 x 82 x38.1mm *Weight: 907g*

£249.95 B

NEW AT-1000

**1.8 to 54MHz *Power rating 1000W SSB, 750W CW, 500W RTTY, Packet - 150W *Power rating 100W (6m) *Minimum tune drive 20W *6-800 Ohm loads *Handles up to 10:1 VSWR *Coax fed ants, dipoles, verticals & beams *Tuning time 0.1 to 5 seconds, 3.0 average *SO-239 sockets *Supply: 11 to 15V DC @ 1A max *Size: 230 x 75 x 330mm *Weight: 2.35kg*

£599.95 C

AT-11MP

**1.8 to 30MHz *5 - 150W *RF sensed or optional leads Alinco/Icom rigs *6 to 800 Ohm loads *Coax fed ants, dipoles, verticals & beams *Dual cross needle meters illuminated *Sockets: SO-239 *Tuning aid for the visually impaired (requires IC & LS) *Supply: 11 to 15V DC *Size: 242 x 210 x 64mm *Weight 1.5kg (approx)*

Asm £269.95 B
Kit £209.95 B

RT-11

**1.8-54MHz *5-150W *6-800 Ohm loads *Remote Autotuner *RF sensed *Dipoles, Verticals, Beams *Water resistant enclosure *built-in Icom and Alinco connectivity *Supply 11-15V DC *Size 216 x 140 x 76mm *Weight 1.14Kg*

Asm £239.95 B
Kit £209.95 B

CHECK OUR 2003 PRODUCT GUIDE FOR MORE DETAILS OF THESE PRODUCTS

KENWOOD

STRONG FOUNDATIONS

To build your hobby you need to start from a strong foundation. No matter how new or how old your callsign is, the TS-570DG is the perfect mid-size rig for mobile or station operations. Designed to answer the call in any application, this heavy-duty HF transceiver boasts a large heatsink and improved heat dissipation characteristics for extra reliability. But most importantly, the TS-570DG incorporates Kenwood's own 16-bit DSP AF signal processing that enables it to provide you with extremely effective interference reduction plus high-quality TX and RX audio. Additionally, a central frequency control system offers high frequency stability while a large, positive-type LCD display ensures greater visibility for easy operation. Completely equipped with a preset auto antenna tuner and ideally sized, the TS-570DG is sure to become standard equipment for operators who demand the very best.

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E-mail: comms@kenwood-electronics.co.uk

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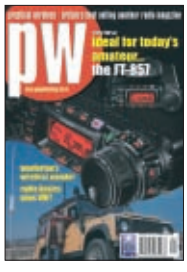

Whether you want to operate mobile, portable, or are looking for a new base station transceiver the Yaesu FT-857 would be a good choice says **Carl Mason GW0VSW** in his review of possibily the world's smallest h.f. to v.h.f. Amateur Radio rig.

We hope you enjoy this issue, don't forget we're always pleased to hear from you and enjoy receiving your comments and suggestions for topics you'd like covered in *PW*.

Design: Steve Hunt
Photograph: Courtesy of Yaesu UK Ltd.

September features

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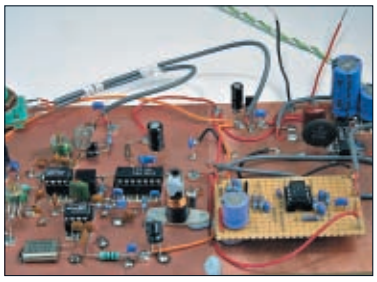

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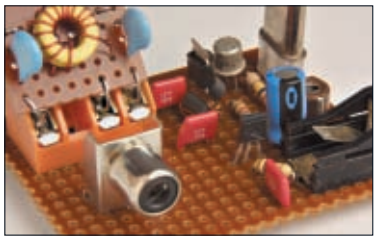

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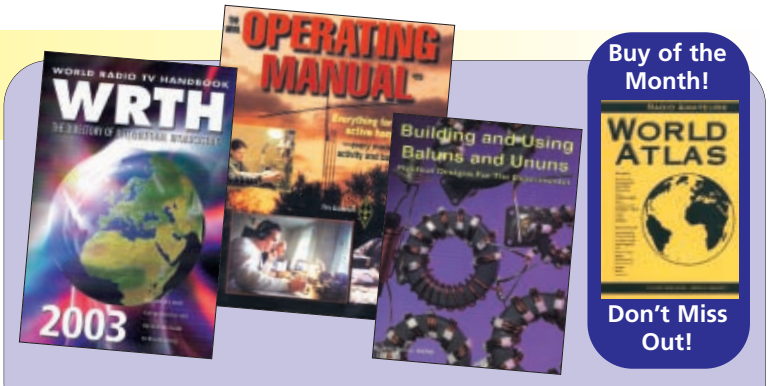

Page 70. The biggest and best selection of radio related books anywhere!

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ANOTHER PACKED ISSUE

rob mannion's keylines

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

So, the long expected announcement has come...the International requirement for Morse has been officially dropped. In future it will be up to each nation's individual decision as to whether or not a Morse proficiency requirement will be required for their nationals.

However, even though I've noticed (and heard!) that some Radio Amateurs regard that the announcement will soon be followed by the "Death of Morse on the bands"...I can confidently say this won't be the case!

Morse - now that it's unlikely to be a legal requirement - won't die! It's nonsense to suggest it will in my opinion. Instead, I feel that along with the other modes available to us...those who want to enjoy the Morse Mode (including me) will continue to do so.

Indeed, I've noticed already that some M3 stations are venturing onto c.w. and enjoying themselves. They're doing so because they want to...and there's no pressure on them. I like to try any mode open to me...and I welcome anyone - whatever speed they like to operate at - onto c.w. The choice is ours!

More worrying than the Morse/No Morse debate...is the possible deregulation of our hobby in the future, as the **Radiocommunications Agency** as we know it...disappears into the new **OffCom** entity. It's going to be a whole new world...and I've already heard (half serious?) worrying suggestions such as "You want an Amateur Radio Licence? - That'll be £25 please...off you go and enjoy yourself on the bands"!

Maybe the completely deregulated £25 Licence suggestion is far-fetched...but time will tell! As I've said many times before....watch this space.

Meeting At Rallies

I'm looking forward to meeting readers at the **Stourbridge & District Club** on Thursday 18 September, and the **Leicester Show** on the 19 & 20th. Next comes the **Oldham Club** on Thursday 9 October, and the **Rochdale QRP Convention** on Saturday 11 October.

Finally, I'm pleased to say I'll be attending the **Mayo Radio Experimenter's** (MREN) Knock Rally in County Mayo, Ireland on Sunday 17 November. It was a splendid first event last year and this time I'm flying via Bristol, Dublin and onto Knock, returning on Monday 18th.

Incidentally, the photograph in **Fig. 1**, shows members and guests of the MREN following the inaugural DX Dinner I enjoyed with them on Saturday 31st May in Knock. So, I'm looking forward to meeting readers and friends again in November...see you there!

Saturday On Seventy

Looking through my diary, and at other possible clashes...I've decided on 30 August for the 'Saturday On Seventy', 70MHz activity afternoon. I hope you can join in this very informal, fun event! Please see 'Topical Talk' this month to see a photograph which 'sets the scene' and further discussions on the idea.

Editorial Team Changes

Finally this month, I would like to announce that **Zoë Shortland**, from *Short Wave Magazine* is now part of the team of staff working on *PW*. Zoë, as many readers will remember, provided superb back-up for me when she helped organise my *PW* Club Visit diary, in past years .

From this issue Zoë has now joined **Donna Vincent G7TZB/M3TZB** and **Tex Swann G1TEX/M3NGS** on the team producing *PW*, *Short Wave Magazine* and *Radio Active*.

As before, my work will concentrate on *PW* and I'm very pleased to have Zoë working on the magazine again. She's already helped me prepare a bumper issue of reader's letters. Welcome Zoë!

Rob G3XFD

Fig. 1 The Mayo Radio Experimenters' Group, with guests, following the inaugural DX Dinner in May (see text).

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 £49 (Airmail) overseas. Subscription copies are despatched by accelerated Surface Post outside Europe. Airmail rates for overseas subscriptions can be quoted on request. Joint subscriptions to both Practical Wireless and Short Wave Magazine are available at £61 (UK) £74 (Europe) and £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.

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 £3.35 each (inc. P&P) and photocopies are £3.00 per article. Binders are also available (each binder takes one volume) for £6.50 plus £1.50 P&P for one binder, £2.75 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 £2 inc. P&P.

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Technical Help

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

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*.

Oliver G3TPJ Wins RSGB Accolade!

● **Dear Sir**

Just a line to let you know that I won the **RSGB National Constructor's Cup** at the Epsom Rally. The previous cup was lost years ago...so my name will be first on the new one. It's a grand looking thing, quite a whopper! I entered my Beacon Receiver (as described in the March and April 2003 issues of *PW*).

As the trophy was presented to me....I reminded **Peter Kirby G0TWW** (RSGB GM) that if he wanted a technical article, it had already been published in *PW*. (The RSGB having turned down the offer on the basis that my text was too long). *Practical Wireless* showed the way by doing what I expect an editor is best at, doing a credible synopsis.

I haven't been on 144MHz yet, so my next project was to be a suitable transmitter to match my recently finished receiver. Along with the cup, I was presented with a cardboard box containing an FT 'something or other.' I told my travelling companions I had won one of those "2m walkie talkie things that can bolt in a car" (certainly not in keeping with my 1935 Austin Ten).

My friends laughed and told me the Yaesu FT-817 is a bit more than a walkie-talkie....more like a comprehensive mobile shack! It seems now I may go on 144MHz first with a commercial rig (not my preferred way of doing things - another dilemma). It will take a month or two to work out what buttons to press! Nevertheless, my thanks go to the 'someone' who provided the prize (**very nice indeed**) Yaesu I suppose, and there was me thinking they only made gel type batteries!

PS: Yes I know it's **Yuasa** for batteries, just my little joke. I really don't go with all this commercial stuff, so I've never memorised the model numbers, etc. Still, the FT-817 should go well with my Helium balloons and electric fence wire for a portable antenna. I feel an outing is called for....thanks to Yaesu's generous prize!

Oliver Tillett G3TPJ
Romford
Essex

Editor's envious reply: Yaesu's generosity in supporting the RSGB's competition rightly reflects the innovative approach in your project Oliver! Let's hope the important National Constructor's Cup competition continues to encourage more innovative ideas. Good luck and maybe we'll see a G3TPJ 144MHz beacon receiver project soon?

Bugs - Reply From RA

● **Dear Sir**

Having seen **Ian Johnson**'s letter (July 2003 *PW*) I thought it may be helpful if I explained the regulations governing the sale and use of radio equipment in the UK. You'll be pleased to hear I am not sending you loads of leaflets, as they are all on our website.

Since 8 April 2000 all radio equipment placed on the market has had to comply with the European Commission Radio Equipment and Telecommunications Terminal Equipment (RTTE) Directive. This Directive subsumes the provisions in the EMC Directive in respect of radio equipment and is implemented in the UK by the RTTE Regulations 2000 SI No 730. Under these Regulations radio equipment may only lawfully be placed on the UK market if it complies with the essential and administrative requirements of the Directive.

The essential requirements require that the radio equipment when used does not cause harmful interference to other authorised radio use. The administrative requirements require that sufficient information must be provided on the equipment, with the manual and/or instructions for use and on the packaging to inform the user as to the intended and proper use of the equipment.

Any RTTE compliant equipment must bear the 'CE' mark and, in the majority of cases, an alert symbol to show that its use is subject to national regulations. Under the Regulations persons placing non-compliant equipment on the market are liable to prosecution. The maximum penalty for such an offence is three months' imprisonment, a £5,000 fine and forfeiture of the stock.

In the case of devices intended for the purposes of 'eaves dropping' it is quite common for these products to be designed to operate in a frequency band immediately in and above 88-108MHz. This covers both the f.m. broadcast band and the exclusive aeronautical radio band. Radio transmitting devices operating at these frequencies can transmit over long ranges if the line-of-sight path is not obstructed. The radio horizon of an aircraft flying at, for example, 20000 feet is 200 miles and there are many instances where an aircraft has had interference to radio communications as a result of receiving unwanted signals.

Consequentially, the Agency must take action to eliminate the potential for such interference. Furthermore, as all inappropriate use of the radio spectrum presents an interference potential, it is Agency policy to remove from the market, wherever possible, equipment which can contribute to such use. End users of radio equipment are responsible for ensuring that their use complies with the UK radio licensing requirements. Under section 1 of the Wireless Telegraphy Act 1949 it is an offence to use radio equipment without a licence unless that use has specifically been exempted from licensing under the Act. In either case the use must be in accordance with the relevant UK Interface Requirement which details the technical parameters pertaining to the use. Offences, on summary conviction, carry a maximum penalty of six months' imprisonment, a £5,000 fine and forfeiture of anything used in the offence.

Use of radio by the police and Secret Intelligence Service should not conflict with other authorised radio use except where specifically provided by statute.

Further information about the supply and use of radio equipment in the UK can be obtained on the Agency's website **www.radio.gov.uk** In particular, on the 'Topic Pages', detailed information can be found on the different types of radio services, including test and development, permitted for use and the Agency's enforcement of the RTTE Regulations and Wireless Telegraphy Act 1949 and, on the 'Publications' page, the UK Interface Requirements

Finally, Mr Johnson asks about local oscillators and signal generators. In short, the Act defines wireless telegraphy as electromagnetic energy

used for conveying messages, sound or visual images, controlling apparatus or for obtaining positional information. Electrical equipment that is not wireless telegraphy apparatus does not need a licence or exemption, but will need to comply with the appropriate EMC or RTTE Directive requirements and must not be used deliberately to cause interference.

Derek German
Senior Enforcement Policy Manager
Radiocommunications Agency
Wyndham House
189 Marsh Wall
London E14 9SX

Using The Right Stroke?

● **Dear Sir**
Before I get to the point, I'd like to thank you for the way that *PW* was instrumental in making me wish to return to Amateur Radio after over ten years off. I picked up a copy of *PW* last autumn in Smith's, because I was curious about the fact that it had a commercial Amateur transceiver on the cover. This was not the sort of adornment that I would have expected from 'Camm's Comic', which I learned my radio from in the 1950s before graduating to *SWM*! Anyway, the blend of topics and general atmosphere of *PW* brought back to me just how much fun it had all been, and showed me that **it still was great fun**.

I had allowed my Licence to lapse by accident and allowed it to stay that way by sheer inertia at a time when spare time was almost non-existent for me. But *PW* gave me the motivation to look into getting it reissued. So once again **G8ADD** can be heard on v.h.f./u.h.f., and I am sure that as long as the existing editorial team are at the helm of *PW*, many other people will discover the fun and discovery that amateur radio provides in such abundance. I'm sure you have heard this often before, but keep on with the good work, **you are making a difference!**

I will now turn to the main reason for writing...**G4CNK's** article 'Using The Right Stroke' covers ground that has been a fruitful source of discussion and argument for 40 years to my knowledge! Whilst in general I think the article is full of good sense, I suspect that some of his comments about the use of '/M' are misleading.

For example, G4CNK believes that if you drive to a good location and then operate from a stationary vehicle for a period of time, this constitutes a temporary location and you should sign '/P'. However, BR68 seems to contradict him. If I can quote from page 3, "1(ii)(c) While mobile ("Mobile means located in the United Kingdom in any vehicle, as a pedestrian or on any vessel in Inland Waters)".

Note that there is no mention of motion; you may be parked whilst operating, but you are still in a vehicle, so you are mobile. Mobile does not mean moving, it means able to move.

Let us look at two critical examples. Firstly, if you are making a motorway journey and operating, you are obviously '/M', but if you get caught up in a horrendous traffic jam and are stationary for a few hours, you continue to operate '/M'. You have the intention of moving and the vehicle has the potential to move.

Secondly, if you hire a static caravan for a holiday, you can plug your rig into the mains and you will then operate '/P'. You have no intention of moving and the caravan, although equipped with wheels, is immobilised. However, I believe that if you operate from a vehicle but use it as a support for a mast and beam or long wire, perhaps using one wheel to anchor a mast support system as shown recently in the antenna supplement, then the vehicle is effectively immobilised and it is proper to sign '/P'.

Having said all the above, I am sure that the RA would not penalise anyone for using the 'wrong stroke' in good faith.

Brian Carter G8ADD
Hall Green
Birmingham

Editor's comment: Although this subject was declared as 'Correspondence Closed' in the August issue...I soon realised it was too early as readers - still wishing to comment - would not have seen the August issue in time. I've no doubt this debate will 'roll on'...in both portable or mobile fashion!

Hand Held Microphones

● **Dear Sir**
With new legislation to be introduced to prevent the use of mobile 'phones in cars - and hence hand-held microphones for radios - I think I've come up with an invention that may help readers to continue their hobby whilst on the move cheaply and without fear of litigation.

Whilst '/P' rather than '/M' on the M25 the other day, I spotted two activities that most motorists do. I decided if I could adapt these to allow the use of a transceiver, nobody could detect it. Hence my new mic/speaker/p.t.t. device. The size of a 5p piece it contains a gravity switch, an earphone and a mic. It is stuck to your preferred finger tip with one of those double sided adhesive pads. To listen place finger in ear - rotate if the mood takes you. To transmit, remove from ear and stick up nostril. The gravity switch automatically operates the p.t.t.

Sound is a bit muffled, but everybody else thinks you're behaving quite normally! A tissue near to hand is advisable.

John Loade M3LOA (AKA Professor Brainstorm)
Fordham
Cambridgeshire

Editor's comment: John's humorous suggestion won't be necessary now that the RSGB has negotiated a dispensation for Radio Amateurs to use hand-held microphones when operating mobile. In return...we have to ensure we do the utmost to ensure our own safety and the safety of others by operating sensibly.

Crystal Sets & Detectors

● **Dear Sir**
I'm writing with reference to *PW* July 2003 page 10, regarding letters from Messrs **Graham Galgraith** and **Liam O'Mahony** concerning crystal sets and detectors, and I must say that I have found them very interesting. However, there are one or two points which may be of interest.

Experiments have shown that the diodes type OA73 and OA47 offer the best results in an ordinary crystal set. It has not been found necessary to apply bias to germanium diodes, but silicon and Schottky types require some forward bias. If this is applied via a variable resistor, the latter type needs to be bypassed with a capacitor of value 0.22µF

Regarding headphones, about 70 years ago there were plenty of these about, values were 2kΩ, 4kΩ and 8kΩ types. The 4kΩ were the most popular and were usually supplied with the set. They were often used in series or parallel - to permit 'family' listening.

These headphones are now, of course, old and the permanent magnets are weaker than they once were. So it's a good idea to look around for something a bit more modern. The old 'Army' headphones, with about 40Ω to 100Ω work very well with a

little help from an LT44 miniature transformer. This is connected with low winding to the earphones. This has the advantage of keeping d.c. out of the headphone bobbin windings. Probably the best pair of such earphones are the low impedance DLR5s types...and I doubt if these can be improved upon. If 8Ω impedance headphones are to be used, then an LT700 transformer may be used.

There's a lot more than can be said, but this must await some future occasion!

Martin Lindars
Crewkerne
Somerset

Editors' reply: Thank you Martin! I shall be looking at headphones (including home-brewing your own) in Radio Basics again in the future.

Newcomer's Treatment

● **Dear Sir**

Recently, *PW* has published much comment about how new M3 operators are treated by the older Amateurs. I have been a s.w.l. now for 35 years and enjoyed every minute of the hobby. I was listening on 3.775MHz on Sunday 30 March at 1120 and heard a group of (old devils) who were really 'having a go'.....for example..."Did you know....I heard a seven year-old had passed the test and a friend of mine had to have a drink after hearing an M3"!

Why don't the old codgers give the youngster a chance? These people (the old codgers) won't live forever and we need the young to carry on with Amateur Radio when we are gone. If you don't give the young a chance, Amateur Radio will be finished in a very short time.

F. Steele
Shipston-On-Stour
Warwickshire

Simple Projects Best?

● **Dear Sir**

I love looking through the *PW* magazine letters, and although we are in the super digital age of radio, etc., it seems the simple projects capture the most interest. And along these lines...I wonder if there are any experimenters out there that have delved into what have been termed 'Crystodyne' radios?

Now there are many out there who will wonder what I'm talking about! However, although I don't profess to know a great deal about the Crystodyne receivers...it seems there were constructors who were experimenting with crystals as far back as 1906 to get amplification from them....a Mr O. V. Lossev - a Russian engineer - being among the first.

Apparently, the term Crystodyne was coined by *Radio News* magazine in the USA. *Wireless World* and *Radio News* both carried articles in 1924 on these amazing experimental radios. It had been known for sometime that certain crystals - if contact was made with their surfaces by a steel cat's whisker or carbon - they would oscillate. Some would do so at audio frequency, but of interest to us...the could also oscillate well into the radio frequency spectrum.

I've been following recent experiments of **Nyle Steiner K7NS** in the USA. He's been successful in making such oscillators work audio through to radio frequencies and it's published on the web. Incidentally, I find the best way to find the website is using the search engine 'Google' and typing in two words - **Nyle Pyrites**.

I've had some success myself with Nyle's heat treated zinc plated metal and steel wire cat's whisker arrangement. Harking back to the early 20th century pioneers it was predicted then that the crystal would one day supersede the valve. What seems to be happening in the Crystodyne is that the crystal contact acts like the tunnel diode (patented in the early 1970s) and operates in a negative region as a 'negistor'. In this region, it can also be made to amplify.

Whilst on the subject of negistors, some *npn* transistors can be used as a two pole oscillating device between the collector and emitter connected in reverse polarity, i.e. positive to the emitter and negative to the collector with say 0.1 capacitor across and a 10kΩ variable resistor in series, using a power source of 9V. (I made a code practice oscillator this way. Try BC182/4 or 2N2222). They work well!

The Crystodyne, built from simple materials and a surplus of time and patience, can indeed fill many hours with experiments. You can keep busy trying different crystals and metal to carbon contacts...not only as detectors, but oscillators and 'crude' amplifiers. I've read somewhere that very early Naval radio operators used carborundum, a battery and three contacts to the crystal to resolve and amplify c.w. transmissions. The big question remains - **who really invented the transistor?** The principles had been known well before 1948 and was not from some downed UFO in 1947 as some people have rumoured!

Perhaps someone who has done some work on (transistor) negistors and home-made Crystodyne radios may like to run an article or two on their history and principles for a future *PW*?

Rod Williams GW8YPR
Brecon
Powys

Editor's comments: An interesting letter Rod. There's been much debate on this subject...and I'm sure that readers would like to hear more on the subject. However, I doubt that the Bell Laboratory staff in the USA (who publicised and patented the first commercial transistor) would claim to be aliens from a UFO!

Eddystone Memories

● **Dear Sir**

I was in the newsagents recently when the Eddystone badge on the *PW* July cover jumped out at me. I enjoyed your feature on the EA12 in May so much that I grabbed the July issue without a second thought and well worth it was too! **Rob Mannion G3XFD's** feature on the Eddystone 750 was pure pleasure, as were **Charles Miller's** exploits in 'Valve & Vintage' and **Ralph Hague's** story on his home-brew receiver was most enjoyable.

I bought an Eddystone 888A last year because I wanted a valve set to 'play with'. It has given me nothing but pleasure since and it's a joy to use. Rob's experience with the cooked mains transformer spurred me to check the fuse in my own Eddystone. It turned out to be a

● 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

bog standard 1A, not the 250mA prescribed. Out with it! I'll not be firing her up until I've got a proper magnesium-nickel job in there!

I used to live near Plymouth and have been up Smeaton's tower on the Hoe and also to the Eddystone Inn on the coast (is it still there?). I joined the **Eddystone User Group** last year and they've been of invaluable help. I'm a 'technophobic' s.w.l., resistors and capacitors all look alike to me, but the EUG has been most patient and understanding. *The Lighthouse* magazine is outstanding value and I strongly recommend subscribing to it. Graeme Wormald and the others in the group are a treasure house of knowledge. Catch them on 3.695MHz first Sunday of the month from about 0900UTC - well worth a listen. Thanks again *PW*!

Ian Evans
Ebbw Vale
Gwent

Editor's comment: Glad you enjoyed the Eddystone features Ian. I managed to get a replacement transformer for my 750...just got to find time to fit it now!

Mike Votes For 75Ω Twin!

● **Dear Sir**

Many thanks for a great magazine. I look forward each month and every issue, but I must take issue with **Rob Mannion G3XFD's** comments regarding 75Ω twin feeder in his 'Licensed & Ready To Go' (part 4) article, pages 34-36 July *PW*.

Contrary to Rob's comments, one of the many advantages of 75Ω twin is it does **not** radiate r.f. Unlike coaxial cable, it is not prone to picking up man made noise such as TV time base, etc. It can be taped to a metal mast, attached to a wooden fence or clipped to a brick wall and does **not** need to be 'spaced' off like 300Ω or 450Ω ladder line. There are however, some rules to be observed.

* Feed line length is critical and for a W3DZZ trap dipole, the lengths are: 70, 96, 108, 128 and 140 feet.

* Any surplus feeder must **not** be coiled.

* The 'rig end' of the feeder should preferably be connected to a balanced a.t.u., e.g. SEM Z Match, EW Ezematch, etc. As they stand, the dipole terminals of the MFJ range of a.t.u.s are not suitable as they have an internal 4:1 balun.

* If you have an MFJ a.t.u. (as indeed I have), then the 'rig end' of the feeder should be attached to a 1:1 balun and the output of the balun connected to one of the a.t.u.'s coaxial cable terminals.

A tri-filar wound balun 1:1 balun will give best results with equal r.f. output to each leg of the dipole. With a toroidal balun, one leg of the dipole will radiate less r.f. energy than the other.

My own dipole installation has a 128ft 75Ω twin feed line. This runs 20ft down (taped to) a fibreglass mast, then 60ft attached to a wooden fence with telephone cable clips, 27ft up the side of the house (attached to the brickwork with telephone cable clips, drops through 5ft of loft space and then another 6ft into the 'shack' (an upstairs bedroom). Using an r.f. 'sniffer' I can detect no radiation from the feeder. The feed line, at one point, runs only 6 inches from the main telephone line input cable - I have no TVI, BCI or RFI problems, (aren't I the lucky one?). The proof of the pudding?

Richard Benham-Holman G2DYM has promoted this type of installation with his own 'G2DYM' dipole antenna for many years and after my own experimentation, I concur with him (and his superior skill and knowledge) 100%. Looking forward to the next issue of *PW*.

Mike Swift G4MJA
Chester-le-Street
County Durham

Editor's comment: A number of other readers have contacted me on the same subject Mike. However, although I fully agree with the sentiment that balanced feeders (including 75Ω twin) can provide excellent results...my comments have been misinterpreted. In the article I actually recommend that readers (it is aimed at newcomers to h.f.) stick with coaxial cable fed antennas until they've gained more experience. Such advice is based on experience....as we've had many h.f. novices running into problems trying to use balanced feed systems and then contacting *PW* for help. Hence my advice (and please forgive the term) to use the relatively 'foolproof' coaxial cable feed first (despite its own problems) before going on to use balanced feed systems. Incidentally, this is a truly fascinating subject...and we would like to receive as many opinions as possible. It promises to be a very interesting debate if Mike's, and the other letters are anything to go by!

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.

August 24
Coleraine & District Amateur Radio Society
Contact: Peter/James
Tel: 0287-035 1335/0287-035 2393
The Coleraine & DARS will be holding their annual rally at the Bohill Hotel, Coleraine, Northern Ireland. Doors open at 12 noon (1130 for any disabled visitors).

August 25
Huntingdonshire ARS Annual Bank Holiday Monday Rally
Contact: Peter Herbert M5ABN
Tel: (01480) 457347
E-mail: peterherbert@aol.com
This Annual Bank Holiday Monday Rally is to be held at Ernulf School, St. Neots, Cambridgeshire (near Tesco superstore on A428). Doors open at 1000 and admission is £1.50. Hot and cold refreshments will be available, as will a talk-in on S22.

August 31
Telford Rally
Contact: M0RJS, QTHR
E-mail: bob@somrob.u-net.com
The Telford Rally will be held at RAF Cosford, Aerospace Museum, one mile south of J3 M54 on A41. As in previous years, entrance and parking will be **free**.

September 14
The Anglian Five Esses Rally
Contact: Peter G8HUE
Tel: (01473) 631313
Website: www.suffolkdatagroup.freeserve.co.uk
This Rally is sponsored by Suffolk Data Group and they are holding their Suffolk Super September Rally & Surplus Sale on the Raceway Centre Green at Foxhall Stadium, near Ipswich, Suffolk. There will be Amateur Radio, computers, electronics, computer jumble and surplus equipment and on-site refreshments. Traders admission from 0800 - £5 car booters' admission from 0800 - £5. Visitors admissions from 0930 - £1. Everyone is welcome to attend.

September 21
Annual Blarney Rally
Contact: Con EI7DJB, QTHR
Tel: 00 353-12 4270136/00 353-86 1071312
E-mail: conmac@engineer.com
Website: www.blarneyrally.com
The Annual Blarney Rally takes place at the Blarney Park Hotel, Blarney, Co. Cork, Republic of Ireland. Organised by the Cork Radio Club the proceedings begin at 1100.

October 12
Great Lumley Amateur Radio and Electronics Society Rally
Contact: Nancy Bone
Tel: 0191-477 0036 (home) or (07990) 760920 (mobile)
E-mail: nancybone2001@yahoo.co.uk
This rally is being held at the Community Centre, Front Street, Great Lumley, Chester-le-Street, County Durham. Doors open 1030. There will be free parking, plus easy access, good, inexpensive food and drink. There will be a flying display by Chester-le-Street Model Aircraft Club with a stand. Bring & Buy in two sections, radio, hobbies, electronics, computer, satellite and component stalls. Admission is £2. Free of charge for under 14s if accompanied by adult.

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.

All in Aid of Charity

Icom Trailwalkers

Icom (UK) Ltd., are well known for supplying radio equipment for various events and dedicated staff are also keen to get involved in charity work. Read on to find out more.....

Four members of staff from **Icom (UK) Ltd.**, recently took part in Trailwalker UK 2003, an epic charity walk in aid of Oxfam and the Gurkha Welfare Trust. The Icom team, called **Icom Hernias**, comprised of **Virgil Parker** (Parts Manager), **Peter Broadhurst** (Warehouse Manager), **Sam Taylor Nobbs** (Sales Manager) and **Richard Owen** (Company Accountant). They walked along 65 hilly miles of the South Downs Way between Petersfield and Brighton.

Trailwalker is one of the world's greatest team challenges. Those taking part in the challenge have to complete 100km in less than 30 hours as a team of four people and in doing so raise significant funds to help overcome poverty and suffering.

The physical element of the Trailwalker challenge is said to be equivalent to running two and a half marathons and climbing Ben Nevis – all without sleep! It takes months of training and the challenge is so tough that in 2002 only two thirds of the teams participating successfully completed the course.

The *PW* 'team' would like to congratulate the Icom Hernias on their efforts and hope that they have been succesful in raising lots of funds for the Oxfam and the Gurkha Welfare Trust.

Digital News

DAB With Style

Digital radio is really starting to take-off with many new models hitting the market place. So, if you fancy seeing what all the fuss is about why not check out the PG-01?

New from Intempo the PG-01 DAB Digital radio will, the manufacturers say, give its predecessors a 'run for their money'. Nicknamed 'Peggy' by the all female design team at Intempo this stylish radio is affordable and offers good quality reception.

Radio listening has been revolutionised with the advent of DAB technology, giving more choice of stations, and better reception quality. The Intempo PG-01 can receive both DAB digital and f.m. stereo, including the new digital *BBC7* and *Five Live* programmes.

Billed as simple to use with large push buttons, the PG-01 also boasts a clear display screen showing the programme information. The sound quality is said to be perfect through the two stereo speakers, without the crackling fuzz often heard on regular analogue radio.

Costing £119 with twin speakers, DAB Digital, f.m. radio and a two-year guarantee, 'Peggy' is sure to be popular! For more information or details on stockists telephone: **023-9231 3090** or check out **www.nevada-radios.co.uk**

Irish Radio

Mayo Radio Experimenters Network

The Mayo Radio Experimenters Network has recently announced plans to establish an h.f. Net. Interested... read on.....

The Mayo Radio Experimenters' Network are establishing a Sunday afternoon Net at 1230hours on 3.670MHz s.s.b. The idea of the Net is to get as many members as possible on the air and promote '80' metre activity within the county. So, go on join in!

The Mayo club meets on the first Wednesday of each month at 2100hours, upstairs in the Meeting Room at Stenson's Lounge, Ballyvary, County Mayo, on the N5. Visitors are always welcome.

Radio Amateurs of the Future

Intermediate First

The first Intermediate course run by the Chelmsford Amateur Radio Society was so popular it was heavily over-subscribed!

To cope with demand the **Chelmsford Amateur Radio Society** club have now planned another four Intermediate Courses over the next 18 months. However, they have had so many enquires from enthusiastic would-be Radio Amateurs that even this will not be enough to cope with the backlog so, the club hope to introduce a fast-track system. The idea of the fast-track system is that some candidates will be able to study at home and just turn up to do the assessments and the written exam.

The Chelmsford Club have put together a set of *PowerPoint* Intermediate Slides which are available for other Clubs or Course Tutors to use. For a copy of the slides please send four first class stamps to **CARS, PO Box 112, Danbury, Chelmsford CM3 4DF**.

These are the Radio Amateurs of the future,! So if your club wants to bring in 'new blood', why not take a leaf out to Chelmsford's book and offer Foundation courses for your members?

For further details on CARS Intermediate and Foundation courses please contact the training officer:
Clive Ward M0SIX
Tel: (01245) 224577
E-mail: training@g0mwt.org.uk
Website: www.g0mwt.org.uk

Get Studying!

Courses in Your Area

It's that time again! Whether you are interested in signing up for the final round of RAE courses or the new Foundation courses here's a couple we know about....

The **North Bristol ARC** will be running a Foundation Licence course starting in September 2003 and candidates of all ages will be welcome. The club are also preparing candidates for the very last RAE exam in December this year. For more details contact **Dick Elford G0XAY**, Chairman on **(01454) 218362** or via E-mail: **g0xay@aol.com**

The City College Coventry, Tile Hill Cente, Tile Hill Lane, Coventry, West Midlands will be running Amateur Radio Classes from September 2003. The Classes will offer tuition for the Foundation Licence, Intemediate (Novice) Licence, Full Licence, Morse (5 & 12w.p.m.) and Amateur Radio constructional classes. More details are available from the course tutor **Michael Dixon G4GHJ** via e-mail **m.dixon@staffcovcollege.ac.uk** or by calling the course enquiry team on **(02476) 791138**.

Party on!

30 Years in Business

On a hot, sultry Saturday evening in July, Waters & Stanton threw a party to celebrate 30 years in business.

Peter Waters & **Jeff Stanton** have been trading for 30 years and to mark this occasion they decided to throw a party for fellow traders, friends, customers and colleagues who have helped shape their 30 years in the radio business. To help things along there was an Hawaiian theme to the evening and many partygoers dressed appropriately for the occasion.

Visitors came from far and wide, the furthest visitor was **Roy Charlesworth G4UNL** who is now a resident of the Phillipines, but was home on 'leave' and so was able to join in the fun along with his wife, **Marie**. Congratulations W & S - here's to the next 30 years!

Mark Francis G0GBY on the left, Peter Waters G3OJV, centre and Jeff Stanton M3JJS after presentations had been made.

Taking a breathe of fresh air, David Wilkins G5HF of Kenwood, on the left with Chris Ridley G8GKC from Icom, then Mike Wheaton G4ZPE Waters & Stanton Service Manager, with John Turner G0KFO also from Icom (UK)Ltd.

Joining in the festivities, *PW* Editor Rob Mannion G3XFD, took a glass of non-alcoholic beverage (which looked very much like Guinness!) having made the 300 mile round trip to Essex.

Kit Radio

Low Power Transmitter

Why settle for one band when you can have three?

The KRC-X-1 is the latest kit from the Kit Radio Company and covers 7, 10 and 14MHz just by plugging in a different crystal assembly and retuning the antenna. The KRC-X-1 comes with a die-cut and labelled case, measuring 7 x 4 x 3in.

Building the KRC-X-1 should be straightforward as there's no coil winding or tricky alignment or test equipment required to complete the project. There is, however, a 25 page step-by-step construction booklet and KRC say that anyone who can solder, whether a novice or expert, should be able to complete the project without a problem.

The kit comes supplied with a crystal covering the 14.280 to 14.290MHz band with additional crystals available on request. The KRC-X-1 costs £64.99 plus £4 P&P.

Kit Radio Company,
Unit 11, Marlborough Court, Westerham,
Kent TN16 1EU.
Tel: (01959) 563023. Website:
http://hometown.aol.co.uk/kitradioco/uk.htm

In Memory

Dundee's Sad Loss

The Dundee Amateur Radio Club would like to pay tribute to Jack Nicholson GM0MFE who sadly passed away on 6 July 2003.

Jack Nicholson GM0MFE, a long standing member of the **Dundee Amateur Radio Club** passed away on Sunday 6 July after a long illness. Jack was 78 years old and had been a valued member of the Dundee Club for over 20 years.

Having served in the posts of Chairman, Secretary and Treasurer and more recently being presented with an Honorary Membership in reflection of his commitment to Amateur Radio and to Dundee Amateur Radio Club, Jack will be missed by all of the Members. Jack's name was also synonymous with bikes and biking in Dundee for more than 50 years, he attended Morgan Academy and was bitten by the cycling bug in his first job, a wholesale firm which dealt in motor and cycle accessories.

Jack was a huge influence in the teaching of Morse to members of the Dundee Amateur Radio Club. He will be sadly missed by all who knew him.

The *PW* team's condoloences also go out to Jack's family and friends.

Stop Press!

Class Bs Gain HF

With effect from 25 July 2003 all Class B Radio Amateurs have access to the h.f. bands in the UK.

The Radio Society of Great Britain have announced that with effect from 25 July there would no longer be a requirement for Radio Amateurs to have passed a Morse Code test in order to operate on the h.f. bands in the UK. This means that all full and intermediate Class B licensees are therefore automatically granted their respective Class A operating privileges and may now operate on the h.f. bands using their exisiting callsigns.

The decision was taken at the recent World Radiocommunication Conference in Geneva, which agreed that a Morse code test should no longer be an international requirement in order to hold an h.f. Amateur licence. **Please note the changes do not affect Foundation Licensees**.

Additionally in Switzerland the Federal Office for Communications has authorised the Swiss CEPT Class 2 licensees to operate on the h.f. bands without taking a Morse test which took effect from 15 July 2003.

amateur radio news

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

Special Event News

HMS *Caroline* On Air

This year 2003, is the centenary year of the foundation of the Royal Naval Volunteer Reserve (in 1958, the name was changed to Royal Naval Reserve) and to mark the occasion the Royal Naval (Ulster) Amateur Radio Club will be operating a special event station GB100RNR during September.

The Royal Naval (Ulster) Amateur Radio Club GI0URN-RNARS have obtained permission from the Radiocommunications Agency to operate a Special (Special) Event Station from HMS *Caroline* in Belfast and have also received a Letter of Variation from the RSGB issuing the callsign GB100RNR for the period 1st - 28th September 2003.

The Royal Naval Reserve (RNR) supports the Royal Navy in meeting its operational commitments in times of stretch, crisis and tension by the timely provision of the required number of trained RNR personnel. The only surviving ship from the Battle of Jutland in the First World War, HMS *Caroline* now berthed in Alexandra Dock within Belfast harbour serves Northern Ireland with a weekly training night for some 120 reservists.

A Caroline Class Light Cruiser of 3,750 tons displacement, HMS *Caroline* was launched at Birkenhead on 28 January 1914. Oil-fired boilers driving geared steam turbines developing 40,000-shaft horsepower (4 propeller shafts) gave her a maximum speed of 29 knots. Her main armament originally consisted of two 6in, seven 4in, one three inch gun and 2 x twin 21in torpedo tubes.

With a ship's company of 17 officers and 272 ratings, she spent most of the Great War as part of the 4th Light Cruiser Squadron which played an active role in the Battle of Jutland (May 1916). HMS *Caroline* was converted to her present role in 1924 as a Depot and Training Ship- becoming the Headquarters of Ulster Division Royal Naval Volunteer Reserve (RNVR).

Members of the Royal Naval (Ulster) Amateur Radio Club will air GB100RNR on all h.f. bands, so listen out for them. A special QSL card has been designed for the event. Unfortunately, due to the nature of HMS *Caroline* and its location, members of the general public will not be able to view the station in operation.

Chelmsford Charlie

The Show Must Go On!

When the speaker who was due to give a talk to the Chelmsford Amateur Radio Society on APRS was forced to cancel at the very last minute Charlie Davy M0PZT came forward and offered to do the talk on APRS instead.

Although Charlie M0PZT only had four days to prepare for his presentation he produced a professional PowerPoint APRS presentation from scratch and gave the club a fascinating talk, explaining the capabilities of APRS and how to get started in this fast growing aspect of our hobby. If you'd like to see Charlie's presentation it can be downloaded from **www.charliedavy.co.uk**

The very active **Chelmsford Amateur Radio Society** meet on the 1st Tuesday of each month at 1915hours in the **Marconi Social Club, Beehive Lane, Great Baddow**. For further details on the clubs activities contact the secretary.

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

Repeater News

Yorkshire on Air

There's a new 144MHz repeater now in service in Richmond, Yorkshire.

The new 144MHz repeater, **GB3IR,** is on 145.7625MHz, is only 15 miles north of the existing 144MHz repeater **GB3HG** and has a similar coverage area. However, Repeater Keeper **Chris G4FZN** hopes that GB3IR will provide a different service from that of GB3HG, which is, and will continue to be, the main choice for mobiles and fixed stations around North Yorkshire.

Repeater GB3IR, on the other hand, will spend much of its time connected to the Internet with IRLP, Echolink and eQSO software. Chris hopes that the international nature of the QSOs and the interesting range of prefixes heard through the repeater will encourage newly-licensed Amateurs to take up an interest in h.f.

Royal International Air Tattoo Winners

Flying High!

We've no doubt that the lucky winners of our recent Royal International Air Tattoo competition were 'flying high' when they received the news that they'd be attending the ultimate airshow experience.

Pictured alongside the Grob tutor plane are (L-R) Corporal Andrew Sullivan, Cadet Piers Charman, Flight Sergeant Ashley Mitchell, Corporal Liam Searle, Cadet Ben Sheppard (sat in plane), Corporal John Sullivan, Cadet Lyndsey Harris, Warrant Officer Jamie Green and Pilot Officer Kevin Mitchell.

One of the winners, **Kevin Mitchell**, was so thrilled at his prize he decided to share it with fellow members of the **130 Bournemouth Squadron Oakmead Flight Air Training Corps** by getting together a group of young cadets and making it a day to remember for them all. Among the hundreds of exhibits on display the Squadron members were lucky enough to see a Grob tutor plane at the Air Tattoo. The Grob is the backbone of the Air Training Corps and most cadets get the opportunity to experience flying it during their time with the Corps.

If you are between the ages of 13-18 of age, or you would like to become an adult volunteer and would like to find out more about the Air Cadets, who have over 1000 squadrons located all over the country, contact **Headquarters Air Cadets, Royal Air Force College, Cranwell, Sleaford, Lincolnshire NG34 8HB. Tel: (01400) 261201 ext 7630** or take a look at **www.aircadets.org** If you are interested in finding out more about the 130 Bournemouth Squadron Oakmead Flight Air Training Corps, who have been in existence for 62 years, contact Kevin Mitchell at **cimitchell130@hotmail.com**

The full list of lucky Air Tattoo winners was: **Mr & Mrs Z Jarenicz,** Hampshire; **Mr G. Henson**, Peterborough; **Mrs Jean Jones**, Swindon; **Mr C. Dixon**, West Midlands; **Mrs L Walker**, Portsmouth; **David Traynor**, Cheshire; **Mr M. W. Capewell**, Wirral; **J. H. Stacey**, Devon; **Kevin Mitchell**, Dorset and **Mr R. Potter**, Staffs. Well done to you all - the *PW* 'team' hope you had a great day out!

Coming Soon

Preliminary Product Info

Just as this issue of PW was going to pess we received preliminary product information from Kenwood of their forthcoming all-mode transceiver.

Due to be launched this autumn the new h.f./50MHz all-mode transceiver from Kenwood will be available in 100W and 200W models. Features of this new transceiver will include:

* Continuous RX 500kHz to 60MHz
* Transmitter covers all bands from 1.8 - 50MHz
* Compact design with detached faceplate
* Electronic memory keyer
* Large alphanumeric l.c.d.
* a.f. d.s.p. processing

The 100W model will feature a built-in h.f.-50MHz automatic antenna tuner while the 200W model will featue 100W on 50MHz. No details on price or model number were available at the time of going to press, as soon as we know more it will be published here!

Historic Radio Site

Criggion....The End!

Rob Mannion G3XFD brings the latest news and his opinion on the imminent demise of British Telecom International's Criggion l.f. transmitter - a truly historic radio site.

The loss of historically important technical historic sites continues...as *PW* has been alerted to the imminent demolition (due sometime in August it's believed) of the huge l.f. antenna towers at Criggion in North Wales. The news came from *PW* reader **Quentin Cruse GW3BV,** based in Wales, who visited the station recently. The photographs taken by his friend **Ben Ward** clearly indicate the stripping of the station.

Criggion, built during the Second World War, supplemented the service from the Rugby l.f. transmitter in Warwickshire and was unique in using a small mountain as an antenna anchoring point. Although not officially confirmed, the Criggion transmitter is well known to have been involved in providing communications to the Royal Navy's nuclear powered submarine force. De-commissioning started early this year and stripping of equipment began immediately. It's reported that the masts will be toppled using explosives during August.

Original 1940s mast (photo courtesy Ben Ward).

The company **VT Merlin Communications Ltd.** - whose Wooferton short wave broadcasting station features elsewhere in this issue - has recently gained a contract to provide l.f. services in the future. As this service - few details are available as yet - will not use the existing Rugby transmitting station - the future of yet another historic radio site is in question. However, if Sweden can show initiative by preserving its vintage l.f. transmitter technology...why can't it be done in the United Kingdom?

Personally, I feel that it reflects our national attitudes...where pop singers and footballers are heroes placed on pedestals...whereas science and technology subjects are poor relations and kept in the proverbial 'black boxes'!

Without radio the pop singer's audience would be small...and without television the footballer frantically chasing the ball...would only have a small crowd watching. And when they become 'has beens' there would be no commentaries to broadcast. Let's not forget our debt to technology and also deny the use of the term 'Anorak' for anyone with a technical passion!

Rob Mannion G3XFD

"Steering" wheels used to adjust frequency (photo courtesy Ben Ward).

amateur radio clubs

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

DORSET

Bournemouth Radio Society
Contact: Chris R Ellis M5AGG
Tel: (01202) 893126
Website: brswebsite.freeserve.co.uk
The Bournemouth Radio Society meet on the 1st and 3rd Fridays of every month at the Kinson Community Centre, Milhams Road, Kinson, Bournemouth. Doors open at 1930hours with meetings starting at 2000hours. Forthcoming meetings include:**Sept 5:** Dorset Air Ambulance A talk by John Hoyle and **Oct 3:** Construction by members.

HOVE

The Brighton Radio Club
Contact: G0RNS
Tel: (01273) 699104
The Brighton Radio Club (which has replaced the Brighton & District Amateur Radio Society) meet on the second and fourth Tuesdays of each month at the **Vallance Community Centre, Sackville Road, junction of Connaught Road, Hove**. Meetings start at 1930 and finish at 2130hours. Free refreshments are provided and full disability access and facilties are available. The club also provide low cost bus trips to rallies and other events.

MIDLANDS

MaxPak
Contact: Miles G4GSB
Tel: (01952) 585447
Website: www.maxpakgb.org.uk/
MaxPak is the name of the Midlands AX25 User Group. Formed in 1983, the group is now one of the oldest Packet Radio groups in the UK, possibly the oldest. The AX25 is the protocol used all over the world, by Radio Amateurs to communicate with each other. Messages can include text, graphics, data and binary files. The MaxPak group meet on the first Monday of each month, at the Sir Robert Peel Public House, located on the main A4124 Bell Lane adjacent to the Lichfield Road/Broad Lane Junction/traffic lights (opposite the old Tildesley Ford Garage). All members and visitors are most welcome.

SHROPSHIRE

Telford and District ARS
Contact: **Mike Street**
Tel: (01952) 299677
E-mail: mstreet@g3jkx.freeserve.co.uk
Website: www.tdars.org.uk
The Telford and District Amateur Radio Society meet every Wednesday at the Community Centre, Bank Rd, Dawley, Telford, Shropshire. Meetings start at 2000hours unless otherwise stated and new members are always welcome. Why not go along to one of these meetings?
Aug 20: Telford Rally planning meeting and **27th**: Digital picture show. Bring your Digital camera... complete with video output connector that fits it!

Keep those details coming in!

FREQUENCY CONTROL AND BUFFERING

In this instalment Gordon King G4VFV delves into the theory behind frequency generation and buffering.

In the previous instalment I looked at how the piezo-electric effect of quartz crystal is commonly used to control the output frequency of a transmitter. I also mentioned how filtered harmonics of a given crystal can provide the oscillatory energy for other, harmonically-related, Amateur bands. It was also common for early 144MHz to provide the required v.h.f. channel.

A crystal of high accuracy was necessary to yield the frequency closely corresponding to the required channel. For instance, to operate on channel 20 (145.500MHz), the multiplication chain would probably have been a crystal oscillator running at 8.0833MHz, followed by a tripler giving 24.2499MHz, a further tripler giving 72.7497MHz, and then a doubler giving 145.4994MHz, which is mighty close to the requirement! A bank of switched crystals would have endowed the rig with a range of operational channels.

Happily, the advent of indirect synthesis, as distinct from the much more recent Direct Digital Synthesis (DDS), made such a procedure unnecessary, since this system, currently used in the majority of Amateur equipment, can provide and control virtually any frequency with a solitary reference crystal. Indirect synthesis adopts an oscillator, known as a voltage-controlled oscillator (v.c.o.), whose output frequency is controlled by an input voltage. An oscillator of this kind, based on a parallel-tuned Colpitts circuit, is shown in **Fig. 1**.

The main difference between the indirect synthesis circuit and any other, non-crystal-controlled, Colpitts configuration is that the capacitive element of the oscillatory circuit consists of the two diodes, D1 and D2 across L1, instead of the more usual capacitor.

The Diodes D1 and D2 are designed to exploit the capacitance effect of junction diodes, which results from a widening of the depletion layer with increasing reverse-bias. As the reverse-bias is increased, so the capacitance across the diode decreases.

Diodes of the kind in Fig. 1 are known as varicaps or capacitor diodes. They are frequently employed for tuning radio receivers by means of a potentiometer instead of a variable capacitor, for automatic frequency correction (a.f.c.) and for a variety of other capacitor-related functions.

With indirect synthesis the two diodes in Fig. 1 are shown connected back-to-back. This helps to prevent the oscillatory signals from affecting the capacitive function, while also enhancing the capacitance swing. The positive-going voltage required for frequency control is provided by a phase-locked loop (p.l.l.), a block diagram, which is shown in **Fig. 2**.

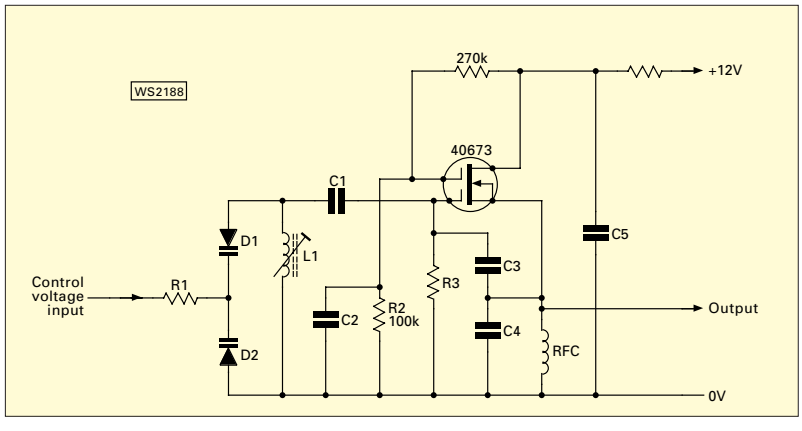

Fig. 1: Voltage-controlled oscillator based on a parallel-tuned Colpitts circuit, where L1 is resonated by the series-connected pair of capacitor-diodes, D1 and D2.

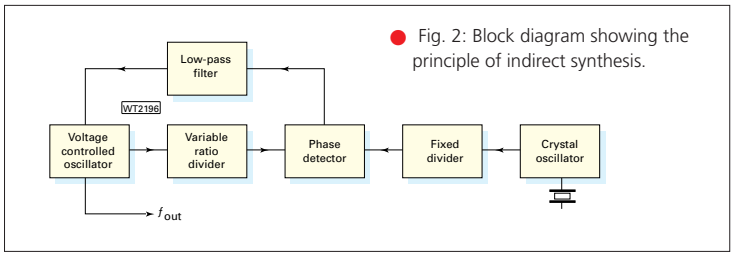

Fig. 2: Block diagram showing the principle of indirect synthesis.

Phase-Locked Loop

In the phase-locked loop system the v.c.o. signal is divided by a selected ratio, and its phase compared with that of the divided crystal reference signal. The phase comparison takes place in a circuit known as a phase-sensitive detector (p.s.d.), and it is this that produces the voltage for controlling the frequency of the v.c.o.

A phase error between the signals of the v.c.o. and the crystal reference causes the p.s.d. to produce an output voltage that adjusts the phase of the v.c.o. output until it relates to that of the crystal reference. In this way the frequency of the v.c.o. is effectively controlled by the crystal oscillator. The system can be regarded as a kind of closed loop 'servo control' where a state of equilibrium occurs when the v.c.o. locks to the crystal reference.

As a simple example, let's suppose that we require an output in the 3.5MHz band from 3.5 to 3.8MHz, switchable in 1kHz steps. Here a reference crystal of 1MHz with a fixed divide-down of 1000 could be used. The output signal from the fixed divider would then be 1kHz to relate to the required frequency steps, while the divide-down value of the variable ratio divider would range from 3,500 (3.5m/1k=3,500) for a v.c.o. output of 3.5MHz to 3,800 (3.8m/1k=3,800) for a v.c.o output of 3.8MHz.

In a more practical situation, the synthesiser would probably combine several p.l.l. configurations and divider stages to provide the required frequency ranges and switching resolutions. Output frequency is changed digitally by programmed press-buttons, scanned electronically or changed in discrete steps by a rotary control.

Each time the variable ratio divider is changed one step by the switching logic, the output frequency of the v.c.o. changes accordingly. My own h.f. rig, for example, has three switched steps of 1kHz, 100 and 10Hz on all bands.

A wide range of output frequencies can be synthesised from a single crystal, and when the switching resolution is high and activated by a rotary control, the 'smoothness of tuning' differs little from that of a variable capacitor and control knob! The phase detector is commonly an integrated circuit (IC), which may be a part of

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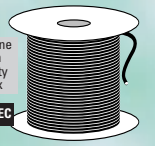

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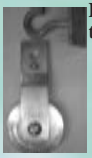

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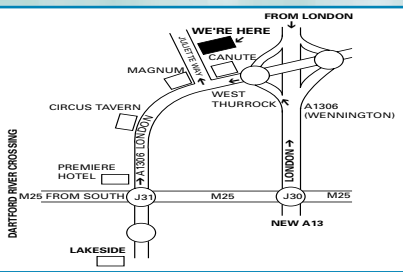

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ICOM IC-R5

New pocket hand-held scanner (0.1-1310MHz) AM/FM/WFM. Superb high-speed scanning featuring alpha tag and much more. Includes nicads & charger.

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Optional soft case £17.99

IC-R3 with TV screen.....OUR PRICE £329.99

YUPITERU MVT-7100

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 .....Our price £325.00
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ALINCO DJ-X2000

The intelligent scanner! 100kHz-2.15GHz. All mode incl's SSB, "Flash Tune" reads frequency of nearly of nearby signal & tunes the handie for you. Incl's battery, charger & loads more. Includes 8.33kHz spacing

£439.95

Optional case £15.00
Optional battery box.....£14.99
Cigar lead £19.99
PC interface £42.95

desktop receivers

ICOM PCR-1000

100kHz-1300MHz. AM, FM, WFM, SSB, CW. Superb short wave performance. Real-time bandscope now "XP" compatable. (Requires suitable PC). Software included on CD ROM.

OUR PRICE £329.99

REALISTIC DX-394

★ Superb performance SW receiver ★ 0.2-30MHz (all mode) ★ Selectable tuning steps

OUR BEST SELLING LOW PRICED RECEIVER

OUR PRICE £199.95

ICOM IC-R75

The short wave receiver for the true enthusiast. Incl's free power unit. ● 0.03-60MHz (all mode).

OUR BEST SELLING RECEIVER

OUR PRICE £589.00

SANGEAN ATS-505

DUAL CONVERSION

NEW! Wins Dutch "Automobile" award. Excellent small short wave receiver (digital). 0.15-30MHz (AM, USB, LSB, CW). 88-108MHz FM stereo. Includes carry case.

BEST BUY

£79.95 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/earphones/case.

£159.95 Del £10

ACE-30 Power supply unit for above £26.95
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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".

OUR PRICE £139.95 Del £10

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HD-1010 optional mono/stereo h/phones £9.99

EVOKE-1

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 listening.

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portable radios

AR788 *NEW MODEL*

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

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AR-201 .....Thrust bearing for above only £13.99

SUPER-GAINER RH-9090

SMA 40cm flexible whip that is ideal as replacement.

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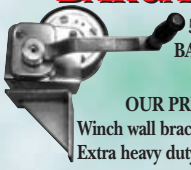
SUPER-GAINER RH-9000

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

OUR PRICE £21.95 P&P £1.50

BARGAIN WINCH



500kg brake winch. BARGAIN PRICE

OUR PRICE £59.95 del £8.50

Winch wall bracket.....£19.99
Extra heavy duty "hanging pulley" £14.50

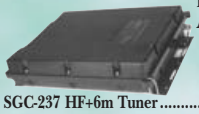
EP-300

A high quality superb 'police style' earpiece that hangs over the ear. (3.5mm straight plug fitted).

£9.95 P&P £2.00

SGC SALE

SGC-230



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

Connect a wire and away you go!

£329.95

SGC-237 HF+6m Tuner £289.95
SGC-239 Mini Tower (1.8-30MHz) £179.95
SGC-231 HF + 6m.....£339.95

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

special interest

the synthesiser IC or a more sophisticated semiconductor device. The dividers work digitally, rather like counters.

These days the transmitter output frequency is digitally displayed, while in transceivers the local oscillator of the receive section generally shares the same synthesiser with a suitable frequency displacement to account for the i.f. (intermediate frequency). More information on the frequency synthesiser can be found in the September 1999 instalment of Looking At.

The low-pass filter (l.p.f.) between the outputs of the p.s.d. and the control input of the v.c.o. in **Fig. 2** has the job of ridding the d.c. control voltage of unwanted r.f. signal. The 40673 m.o.s.f.e.t., indicated in Fig. 1, is an RCA device which is basically equivalent to the Texas Instrument 3N211. But any of the more recent m.o.s.f.e.t.s would be suitable.

To enhance the overall stability of the oscillator, a zener diode might well be included across C5. In this case the associated supply feed resistor would be chosen to correspond to the zener voltage required by the v.c.o. More information on zener stabilisation can be found in the March 2002 instalment of Looking At. Stability should also be a primary consideration when selecting and positioning the frequency-determining components in any oscillator, ensuring that the critical capacitors, for example, are of a temperature-stable type.

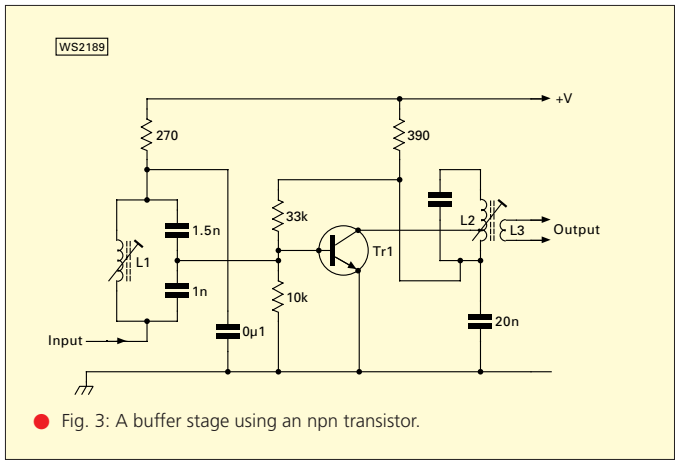


Fig. 3: A buffer stage using an npn transistor.

Buffer Stage

To conclude this instalment... a few words about 'buffering' wouldn't be amiss. It's always desirable to run an oscillator with the least possible feedback, and then to lift the amplitude to the required level by a subsequent amplifier stage. In simple transmitter designs this may be the power amplifier (p.a.), but in more detailed designs, and where a greater p.a. drive is demanded, an intermediate stage, known as a buffer amplifier, is commonly used.

The circuit of a stage of this nature is shown in **Fig. 3**. Here the oscillator is tuned by inductor L1 in parallel with the two series-connected capacitors.

The two capacitors provide a suitable impedance match to Tr1 base. Amplified r.f. signal is developed across L2 and its associated tuning capacitor. Tr1 collector being connected to a tap on L2 avoids undue damping of this tuned circuit and the drive signal is delivered to the subsequent stage by the coupling winding L3. A circuit of this sort might also be used as a frequency multiplier or driver amplifier.

This concludes this instalment. I look forward to catching up with you all again in the November 2003 issue.

PW

Diamond Jubilee
For Wooferton's Wireless Wonder

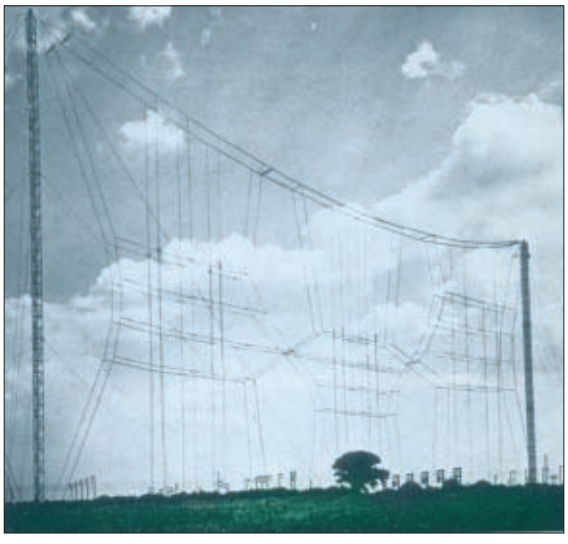
In late June 2003 Rob Mannion G3XFD, fulfilled a long held ambition to visit the Wooferton short wave broadcasting station in Shropshire. Although no longer owned by the BBC, it still transmits the World Service...and many other programmes too!

The former BBC Wooferton h.f. transmitter station, which celebrates 60 years service in October 2003, is located right on the Shropshire/ Herefordshire border, directly alongside the main A49 Hereford to Shrewsbury Road and has always fascinated me. During my days with the former Independent Broadcasting Authority (IBA) I was privileged to visit all of the 'Wartime Three' high power short wave transmitters...**except** Wooferton.

Anyone - let alone a radio enthusiast - could not fail to be impressed at the 300 plus acre site which seems to dominate the area alongside the A49. Indeed, whenever I've stayed at the Wooferton Travelodge - only separated from the massive antenna farm by the main Hereford to Shrewsbury railway - I find it amusing to hear the familiar tones of the BBC World Service coming from the front door intercom system's loudspeaker as the station transmits programmes on frequencies ranging from 6 to 21MHz.

So, after many years of admiring the station from a distance - I was delighted to visit the installation along with **Kevin Nice G7TZC/M3SWM**, Editor of *Short Wave Magazine*. Kevin and I weren't to be disappointed...we had a truly fascinating day.

I should also mention that **Tex Swann G1TEX/M3NGS**, who along with his other work, acts as the PW Publishing staff photographer was also invited and was very much looking forward to attending. However, just a week before the visit...I suddenly remembered that Tex has a heart pacemaker...the significance of which we'd all temporarily overlooked!



● Fig. 2: The Daventry transmitting 'beam' antennas circa 1937 - taken from a contemporary postcard (see text). Although no known photographs of the early antenna arrays at Wooferton were available to G3XFD - this array is fairly typical for the period.

Unfortunately, it was soon confirmed from the staff at Wooferton that it was inadvisable for Tex to enter the station. **In fact...a warning notice is clearly visible at the front gate to warn visitors of the possible dangers to pacemaker wearers.** Tex - although cleared to be able to operate his Amateur Radio equipment safely...was wise to avoid problems because during our visit (to the antenna farm in particular) the field strengths were being measured at up to 60V per metre!

Incidentally, Kevin and I were told during our visit that until health and safety rules were tightened...the staff often encountered field strengths of over 200V per metre...with no apparent ill-effects. And to back this up...I saw one car (full of healthy children) obviously leaving Wooferton after dropping Dad off for his shift. All the Wooferton team looked in the best of health too...so I leave you to draw your own conclusions!

● Fig. 1. The man behind the Wooferton visit...Dave Porter G4OYX. When Rob G3XFD arrived with Kevin G7TZC at Wooferton he couldn't resist photographing the G4OYX call-sign number plate, and the 'reception' notice. Dave is one of the few Radio Amateurs who regular operates 300kW plus a.m. transmitters!

Great Welcome

The Wooferton transmitter site is actually situated on the borders of Shropshire and Herefordshire. Apparently the transmitter buildings are in Herefordshire, with the antenna farm standing entirely in Shropshire...with the latter county claiming the rates!

On arrival, Kevin and I received a great welcome, including friendly greetings from **Barry Elding**, the Engineering Manager of the station. We also had the opportunity to meet a large proportion of the 26 staff during lunch which was served on our arrival.

Our host for the day, and in fact the prime mover of the event, was Senior Transmitter Engineer (STE) **Dave Porter G4OYX**. Dave, a dedicated professional Engineer since the early 1970s is seen posed alongside his car, **Fig. 1**. I couldn't resist photographing the G40YX callsign number plate, and the 'reception' notice too! He's one of the few Radio Amateurs who regularly - and legally - operates 300kW plus a.m. transmitters!

The photograph also shows one of the 92 metre (300ft) main masts in the background. Incidentally, at this point I should mention that Wooferton is a very difficult site to photograph...or at least to end up with pictures showing the grandeur of the antenna farm to its best advantage. This is because the site is actually built onto the bed of a one time lake...in effect a shallow bowl with no really high ground nearby for effective photography.

I've even tried to photograph the site from the very popular v.h.f. site at Clee Hill which is about 16km (10 miles) away. It didn't work, the masts can be seen, but the telephoto pictures lose the details of the antenna systems.

Incidentally, the transmitter buildings directly behind Dave G4OYX, are interesting as they're of war Second World War vintage. Unusually for broadcasting, the whole site had to be engineered without the use of basements and underground work because of the very high water table. (Water can be found literally less than one metre down on this site!).

The 'Utility' style of the brickwork provides a strong clue to the origins of Wooferton. And in fact, the site came into existence directly as a result of the 'Radio War'.

However, before I go any further I must pay tribute to my favourite, and extremely valuable, reference source...*BBC Engineering 1922 - 1972*, (*BBCEng*) by **Edward Pawley**. This absolutely superb, fascinating to read book (now a standard reference work) is unfortunately now out-of-print but can be purchased second-hand (Nothing can persuade the BBC to re-publish it).

Whilst mentioning *BBCEng*...if any of our readers has a spare copy for sale...Kevin G7TZC from *SWM* would like to hear from you! (I was fortunate enough to buy mine from a reader who answered my advert for a copy in *PW* during 1990).

It's also worth noting that *BBCEng* pays tribute to the work of Radio Amateurs in Chapter 5, (entitled Short Wave Broadcasting). Here the author

Fig. 3: Dwarfed by the main masts at Wooferton, Dave Porter G4OYX describes to Kevin G7TZC how the multiple wire dipole, stacked array antennas work together with their associated curtain reflectors. (see inset and text). The satellite dish antennas are used for transmission and reception of programmes to be re-broadcast, onward broadcasting abroad, and linking to other former BBC transmitters around the world (see text). 'Ground Maintenance Staff' (sheep) can be seen at work...keeping the grass short amongst the antennas.

Fig. 4: The antennas are fed by open wire feeders. Some feeders are of the familiar parallel wire type, although some sections (for matching and transformation purposes) are formed from caged wires. All feeders are carried on poles - well above head height.

Fig. 5: All antenna switching and transmission beam 'slewing' is carried out remotely with the aid of air operated switch gear. A slewing system for one of the main antennas is shown here (see text).

lists many well known Amateur pioneers who were also on the staff of the BBC itself.

However, in sharp contrast to the present day BBC (who paid scant tribute to the pioneers during the recent 70th anniversary of the short wave services) Pawley provided a well written tribute to the pioneers. He particularly draws attention to the work of **Gerald Marcuse G2NM**.

It was G2NM who, after he'd established regular h.f. contacts with another Amateur in Bermuda, had the idea of broadcasting to the Empire. From that initiative...with special permission from the then Postmaster General...the reliability of short waves for this purposes was realised.

Book recommendation: If you're interested in this aspect of Amateur Radio history, together with an informed look back at the hobby...I thoroughly recommend the excellent *World At Their Fingertips* book, written by the late **John Clarricoats G6CL** and published by **the Radio Society of Great Britain**. First published in 1967, and in paperback during 1993...this book is truly absorbing and informative. In my opinion it's a real 'must have' for your bookshelf!

The Big Three

During the Second World War it became obvious that the British had been left behind in the propaganda front - hence the eventual construction of the 'Big Three' transmitter sites. These joined the pioneering original (now closed and demolished) Daventry transmitter and numerous other temporary short wave sites - (mainly at existing transmitters).

Although often referred to as 'The Big Three'...in practice Wooferton, Rampisham Down in Dorset, are in reality four. This is because the other station - Skelton - in Cumbria is made up from two separate transmitter units on one large site.

Note: The 189 acre Rampisham Down site, near Maiden Newton in Dorset, was acquired in November 1939. The 320 acre site at Skelton accommodated two separate stations, one mile apart and was at the time the largest short wave transmitting complex in the world.

Fascinating History

Wooferton, the main subject of this article, has a particularly interesting history. And part of this was due to the high water table on the site.

Unable to use Marconi transmitters - which required basement 'crypts' to house the valve cooling plant - the BBC ordered 50kW transmitters from the Radio Corporation of America (RCA) in 1942. The wartime supply of the transmitters caused (to quote *BBCEng*) "*Some anxiety...and by January 1943 only one had arrived...but the remaining five were delivered in time for the station to opened on 17th October 1943*".

The typical understatement regarding the "*anxiety*" somewhat disguises the tragedy behind the prolonged delivery of the transmitters. The true facts are chilling...because the ship carrying the originals from the USA was in a convoy attacked by German U-boats and was sunk. My research indicates it took another five separate attempts to get all the RCA transmitters to the UK....by sending them in individual shipments. A classic example of not carrying all your eggs in one basket.

Antenna Arrays

The original antennas at Wooferton had 26 separate arrays for world coverage. They were supported between 15 stayed lattice masts ranging in height from 48 metres (150ft) to 99 metres (325ft).

The illustration, **Fig. 2**, is from a contemporary black and white postcard, originally owned by my Grandfather **Fred Durnford 2FD**, and now in my collection. It depicts a typical beam antenna array of the period, but at Daventry in 1937. (A photograph of the same installation appears on plate VII between pages 42 and 43 in *BBCEng*).

The modern antenna systems in use at the station comprise single band, dual band and four band arrays working within the station's 6 to 21MHz frequency coverage. However, there is one 'odd man out' antenna fitted between all the h.f. antennas...and this is the medium wave radiator for the BBC local service for Shropshire.

Although - when viewed from the nearby roads - the antennas look incredibly complicated...Dave G4OYX soon removed the mysteries. In fact he made sure we understood that nothing on site was complicated...it's just larger, and uses higher power when compared to our own transmitters and antenna systems.

Put simply...the antennas use arrays of 'stacked' wire dipoles arranged above each other. The system is then fed and phased so that maximum forward gain is provided. They are also extremely difficult to photograph, although Kevin G7TZC, in the **Fig. 3** (inset), made an excellent attempt!

Each array has a reflector curtain mounted one quarter wave (on the operating frequency) behind it. The Four band arrays can be directionally slewed electrically (by altering the phasing) to a maximum of 30°, whilst the single and dual band arrays can achieve between 10 to 15°. Dave commented that it might not seem much...but enabled (for example) the beamed coverage to be changed from Czechoslovakia (Now the separate countries of The Czech Republic and Slovakia) to the former Yugoslavia.

The antennas are fed by open wire feeders, **Fig. 4**. All antenna switching and slewing is carried out remotely nowadays and is achieved with the aid of compressed air operated switch gear. A slewing system in the main antenna farm features in **Fig. 5**.

The photograph, **Fig. 6**, illustrates part of the antenna slewing system and although it may not be immediately obvious...the pole supported open feeder wires in the immediate foreground form a Pawsey stub! (The shorting link of the stub can be seen almost exactly in line with the mast in the background).

Another stub was directly above my head - as you can see - as I took the photograph. The other equipment - looking like a miniature guillotine assembly (but using concrete blocks) is part of the feeder tensioning system).

And, as you can imagine...Kevin and I were truly fascinated with this large scale antenna engineering. Our

interest seemed at the same level as the high voltage r.f. above us...as the occasional crackling we could hear coming from the massive working arrays high above our heads!

Power Supplies

The power supply for the station was originally usually taken from the then public supply, but three 750hp diesel alternator sets were installed for emergency purposes. The turbo-charged diesel units were fully capable of powering the station on full load when working together.

Nowadays Wooferton is a very much valued customer of the regional electricity supply company. The supply comes in via the station's own substation from the 33kV/11kV distribution network.

Many Programmes

Many programmes, from a wide variety of countries and service providers are transmitted from Wooferton - and some of them proved to be a surprise! For example, although I realised there was a great deal of co-operation between broadcasters...I had no idea that Wooferton could sometimes be transmitting Radio Netherlands (RN) service (either in English or Dutch) to assist, while maintenance takes place in Holland.

The station has also had a long association with the Voice of America service which started in 1942. Indeed, for a period in the 1960s and 1970s the transmitter was heavily involved with VOA services.

Obviously, the main work is for the BBC, as Wooferton is contracted to transmit on behalf of the BBC. However, we also found out that along with carrying a number of religious broadcasters' programmes...an International short wave service for Wales is transmitted!

While were at the station some transmissions were being beamed to Iraq. It was fascinating to see the control room where programme links, and feeds were being monitored. The equipment here is ultra-modern and we were even able to change the beam direction on one (not on the air!) antenna array within a few seconds. It's even possible (via satellite and computer links) to get received signal field strengths from monitoring points many thousands of miles away!

Land-lines can be used for incoming services from the BBC's Bush House Centre...but nowadays a great deal of material comes via satellite links. In the control room Kevin and I were able to see many miniature (l.c.d.) TV screens associated with satellite links where - along with the television pictures - sound programme links are also transmitted.

Marconi Stalwarts

Although Wooferton has more recent, almost state-of-the-art - high power valved transmitters in its magnificent main hall, **Fig. 7**, some of the older Marconi 'Senders' are remarkable.

Incidentally, the term 'Sender' is a historic term for transmitters dating from the early days of broadcasting. The BBC's 'Senders' were then numbered from one onwards.

Sender 92, **Fig. 8**, was actually 'on the air' as Kevin photographed it...and we could see the high power valves under load - with the anodes and screens of the triodes and tetrodes glowing. The 'evaporative' water cooling system was entrancing to watch...but we were kept well clear of the e.h.t by safety glass panels.

What's truly remarkable about Sender 92, a Marconi BD 272 250kW (Senders 91 to 96 are all of this type) is that they were installed in 1964. And nearly 40 years later thanks to Marconi (and not least the dedicated station staff who seem to have to be plumbers as well as radio engineers!) these magnificent units are still running...very well indeed. Inside they're a mixture of very simple transmitter technology (very reminiscent of pre-war Amateur Radio) re-engineered for very high power and reliability.

As you might expect...TVI precautions had to be taken! However, it's interesting to read in *BBCEng* that even in the old Band I and III 405 v.h.f. TV days...the filters fitted by the BBC staff were very effective. And this was despite the station being located in an area suffering from low field strength TV reception from the Sutton Coldfield (near Birmingham) television transmitter.

Tradition Ends

A great tradition came to an end when the BBC sold off their transmitter sites. The sell-off in March 1997 was part of the move to provide funding for the introduction of digital broadcasting services.

Club Visits To Wooferton

Pre-arranged visits (**Please see note in the text referring to heart pace-makers and the high field strengths which can be encountered on the site**) by organised groups to Wooferton are possible...provided enough notice is given and the number of people in each party is limited. In the first instance Club Secretaries and others involved in organising such visits are asked to apply in writing to the **Engineering Manager Barry Alding, Merlin Communications, Wooferton, Shropshire SY8 4AW**. And from what I've heard about the club visits...you'll have a whale of a time!

G3XFD

The short wave broadcasting sites were actually sold to **Merlin Communications International Ltd** during the first week in April 1997, in a Management/Staff buy-out deal. The long and medium wave transmitters, along with v.h.f. and u.h.f. sites were sold to another company, **Castle Transmissions Service** (Now **Crown Castle**). However, both companies still transmit BBC programmes on behalf of the corporation.

In October/November 2002 Merlin was sold to **Vosper Thornycroft** (**VT**), and are they're now known as **VT Merlin Communications Ltd**. Of course, VT are well known for their long history in defence equipment and shipbuilding for the navies of the world. I didn't let this go un-noticed in *PW*...commissioning **John Worthington GW3COI** to produce a cartoon showing an old Royal Navy frigate being used as a floating BBC World Service transmitter!

Following our visit to Wooferton I'm now planning to present the original cartoon - suitably framed - to the station's staff as a 'Thank you' for the wonderful day out! I've always taken an interest in the site...but whenever I drive past Wooferton in future...I'll remember my visit with Kevin, and the wonderful chance to understand the work of a dedicated group of people. *PW*

● Fig. 6: The photograph shows part of the antenna beam slewing system and although it may not be obvious...the pole and wires in the immediate foreground form a Pawsey stub familiar to Radio Amateurs! (See text).

● Fig. 7: The main transmitter hall at Wooferton. Unusually, because of the high water table...the transmitters do not extend below floor level (see text). Photo by Kevin Nice G7TZC.

● Fig. 8: Installed in 1964...and still going strongly! Sender 92, installed in 1964 is a Marconi BD 272 model, capable of 250kW (see text). Photo Kevin Nice G7TZC.

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N TYPE for RG213 ..... £2.50 each
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10/11 METRE VERTICALS

G.A.P.12 1/2 wave alumimum (length 18' approx) £24.95
G.A.P.58 5/8 wave aluminium (length 21' approx) £29.95

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

TRI/DUPLEXER & ANTENNA SWITCHES

MD-24 HF or VHF/UHF internal duplexer (1.3-225MHz) (350-540MHz) SO239/PL259 fittings £22.95
MD-24N same spec as MD-24 but "N-type" fittings £24.95
MD-25 HF or VHF/UHF internal/external duplexer (1.3-225MHz) (350-540MHz) SO239 fittings £24.95
MX2000 HF/VHF/UHF internal Tri-plexer (1.6-60MHz) (110-170MHz) (300-950MHz) £49.95
CS201 Two-way di-cast antenna switch. Freq: 0-1000MHz max 2,500 watts SO239 fittings £18.95
CS201-N Same spec as CS201 but with N-type fittings £28.95
CS401 Same spec as CS201 but4-way £49.95

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

MOBILE 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

ANTENNA WIRE & RIBBON

Enamelled copper wire 16 gauge(50mtrs) £9.95
Hard Drawn copper wire16 gauge (50mtrs) £12.95
Equipment wire Multi Stranded (50mtrs) £9.95
Flexweave high quality (50mtrs) £27.95
PVC Coated Flexweave high quality (50mtrs) £37.95
300Ω Ladder Ribbon heavy duty USA imported (20mtrs) £15.00
450Ω Ladder Ribbon heavy duty USA imported (20mtrs) £15.00
(Other lengths available, please phone for details)

HF BALCONY ANTENNA

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

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 errect, 6ft collapsed £199.95
TMA2 2 1/4" to 1 1/4" heavy duty telescopic mast set, approx 40ft when errect, 9ft collapsed £149.95
TMA1 2" to 1 1/4" heavy duty aluminium telescopic mast set, approx 20ft when errect, 6ft collapsed £99.95
TMAF-1 2" to 1 1/4" heavy duty fibreglass telescopic mast set, approx 20ft when errect, 6ft collapsed £99.95
TMAF-2 2 1/4" to 1 1/4" heavy duty telescopic fibreglass mast set, approx 40ft when errect, 9ft collapsed £189.95

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 £89.95
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 £79.95
(MTD-5 is a crossed di-pole with 4 legs)

PATCH LEADS

STANDARD LEADS
1mtr RG58 PL259 to PL259 lead £3.95
10mtr RG58 PL259 to PL259 lead £7.95
30mtr RG58 PL259 to PL259 lead £14.95

MILITARY SPECIFICATION LEADS
1mtr RG58 Mil spec PL259 to PL259 lead £4.95
10mtr RG58 Mil spec PL259 to PL259 lead £10.95
30mtr RG58 Mil spec PL259 to PL259 lead £24.95
1mtr RG213 Mil spec PL259 to PL259 lead £4.95
10mtr RG213 Mil spec PL259 to PL259 lead £14.95
30mtr RG213 Mil spec PL259 to PL259 lead £29.95
(All other leads and lengths available, ie. BNC to N-type, etc. Please phone for details)

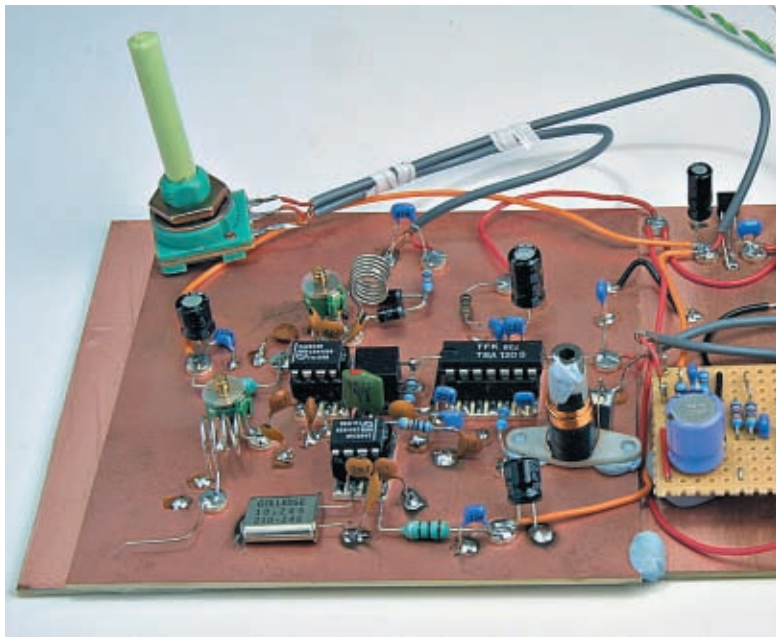
CS401 4-WAY ANTENNA SWITCH

★ 2.5kW power ★ 0-1000MHz
★ Lightning surge protection
★ Unused connections grounded
OUR PRICE just **£49.95**
plus £6.00 P&P

Radio Basics SPECIAL

Radio Basics Goes VHF: For a long time I've been working on ideas and projects to encourage Radio Basics (RB) readers to try v.h.f. construction. The 70MHz band seems a good allocation to start with as the techniques aren't too difficult for the less experienced constructor. So, I'm hoping you'll join Phil Cadman G4JCP and I as we venture up to 'Four'. Phil has done all the hard work (Thank you Phil for researching and building the projects) while I've done the easy bit...supplying the ideas and preparing the column! We start off with a really basic receiver before building the transmitter. We hope you enjoy the 'different' approach and would value your feedback.

Rob Mannion G3XFD



● Using simple techniques you can build a really basic - but workable - 70MHz f.m. receiver (see text).

Rob Mannion G3XFD says "Now for something c
Why? - It's because - with the help of Phil Cadma
aims to encourage you on to 70MHz with simple p

As Rob has mentioned...I've escaped from the *PW* Valve & Vintage 'wireless shop to join him in bringing you some simple v.h.f. projects to Radio Basics (RB) starting with a 70MHz f.m. receiver. So, let's get on with it!

I've broken the design down into separate parts to be constructed and tested one at a time. The 70MHz receiver follows this philosophy as far as possible.

I suggest you build each part and test it thoroughly before moving on...so when it's completed, you should have a working receiver. If, at any point in the construction, things don't work, you'll know the problem must be in the bit you've just finished!

Capacitor & Resistors

Firstly, a note about capacitors; I've used ceramic plate capacitors for all capacitors below 220pF in value. Above 220pF, I've used resin-dipped ceramic capacitors (little blue ones, the kind sold by Maplin).

The only exceptions are the 10nF decoupling capacitors, where I use ceramic discs. Please note that all the electrolytics are rated at 16V or higher. The trimmers are miniature film dielectric types.

The resistors I used are metal film type, and of 250mW rating. Naturally, higher-rated resistors can be used, but physically small types are to be preferred.

The Circuit

A block diagram of the receiver is shown in **Fig. 1**, which, as you can see, is nothing unusual! Looking at the 'back end' first the audio power amplifier stage is shown, **Fig. 2**, employing the popular LM380N integrated circuit (i.c.).

The audio i.c. needs few additional components and can give over 1W output into an 8Ω load from a 12V supply. Around 60mV at the input will drive the amplifier to full output. It's best built onto copper-clad board as pins 3, 4, 5 and 10, 11 and 12 of the LM380N are used for heat sinking.

Soldering the pins directly to the copper, provides more than adequate heat sinking, even at full output. It also helps provide a low impedance path for the supply current.

In the circuit R2 and C7 form a Zobel network which (to a large degree) cancels the inductive reactance of the loudspeaker at high audio frequencies. Without this network, out of phase currents flowing through the loudspeaker could potentially damage the output stage of the LM380.

The capacitor C3 is the main supply decoupling capacitor and must be located as close as possible to IC1 (C5 is for internal decoupling...not essential but it's worth including).

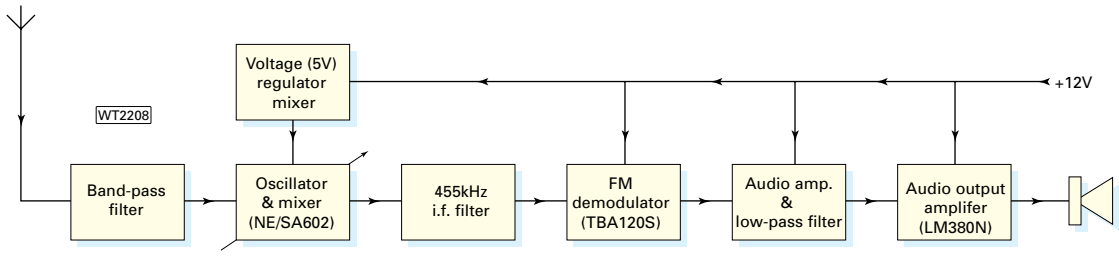
In practice, the amplifier is provided with differential inputs on pin 2 (non-inverting) and pin 6 (inverting). For this application I've a.c. coupled the audio input to pin 2 and decoupled pin 6.

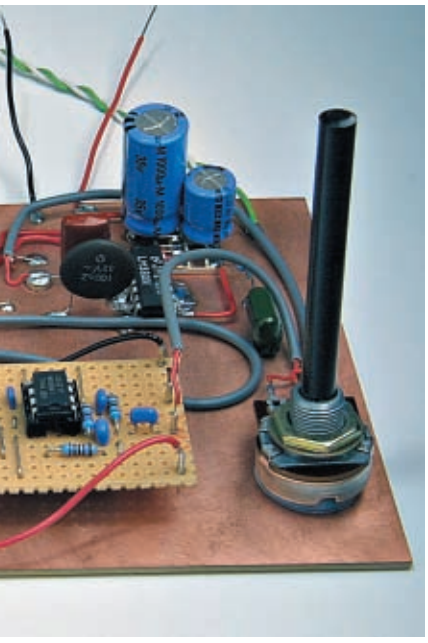
Quite often you'll see pin 2 connected directly to the slider of the volume control (R1). I don't particularly like doing this as it disturbs the internal bias on the differential inputs. Although no harm will come to the chip, having different (d.c.) resistances connected to pins 2 and 6 will affect the d.c. voltage on pin 8.

Normally, the voltage on pin 8 should be close to half supply. Any movement of this voltage, either positive or negative, will cause the amplifier to 'clip' the audio signal prematurely in one direction, thus reducing the maximum undistorted output power.

I suggest that IC2, a 78L05 regulator, be mounted near to IC1. There's no electrical reason for doing

● Fig. 1: Block diagram of the Radio Basics 70MHz f.m. receiver.





ompletely different"!
n G4JCP....the series now
rojects.

this; it's simply convenient to have all the power sources and their associated decoupling in the same physical area. This device provides a regulated supply for the receiver's mixer/oscillators.

Amplifier Testing

Once you've completed the audio stage you can test the amplifier by feeding it with the output of a radio or a personal CD player. The LM380 can draw a hefty current if things go wrong, so it's best to use a current-limited 12V supply during testing. There'll be quite a switch-on surge as C3 and C8 charge, after that, the current should drop to around 20mA with no output.

For communications purposes a frequency response of 300Hz to 3.5kHz is considered ideal for most communications channels. In the design used in the 70MHz receiver, the lowest a.f. frequency is much lower than 300Hz. Not a problem...as usually there's not much low frequency energy in the transmitted signal. That's certainly not true of the upper frequencies though!

High Frequency Noise

An f.m. discriminator produces considerable high frequency noise in the absence of a signal. It reduces when a signal is tuned-in, but even so, on weak signals the remaining noise can be both distracting and tiring. A good low-pass filter is therefore desirable.

The circuit, **Fig. 3**, shows a simple two-stage, active low-pass filter built around an LM358N dual op-amp. This part of the receiver is most easily built on a small piece of Veroboard.

The circuit can be laid out (tracks running horizontally) much as it's drawn in the diagram. With the components given, the filter has an overall gain of one (within the pass band) and a cut-off frequency of 3.5kHz.

I've made no attempt to (unduly) limit the low-frequency response of either the low-pass filter, or the audio amplifier. If you prefer a low-frequency roll-off, capacitors C10 and C16 can be reduced in value. Try 47nF initially, and then adjust as necessary.

The design shown in Fig. 3 is based on one described in the *ARRL Handbook*. If you have both a recent *ARRL Handbook* and access to the Internet, you can download an active filter design program from the ARRL website. (Instructions on how to do so are given in the *Handbook*).

Single Rail Supply

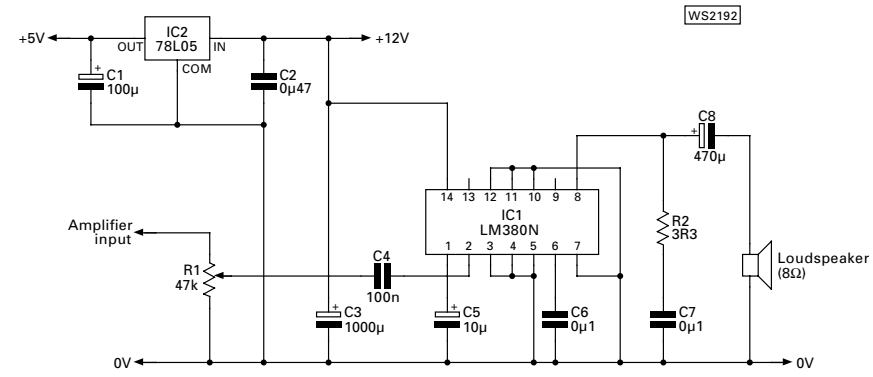
The LM358 is designed to work from a single rail supply, but we still need to provide the operational amplifiers with a d.c. reference at about half-supply voltage. This is the purpose of R3, R4 and C9.

In the circuit R5 feeds the voltage to the input of the first op-amp. Its value - 1MΩ - is sufficiently high enough for its effect on the a.c. part of the circuit to be ignored. The second stage op-amp is d.c. coupled to the output of the first op-amp and so needs no separate d.c. reference.

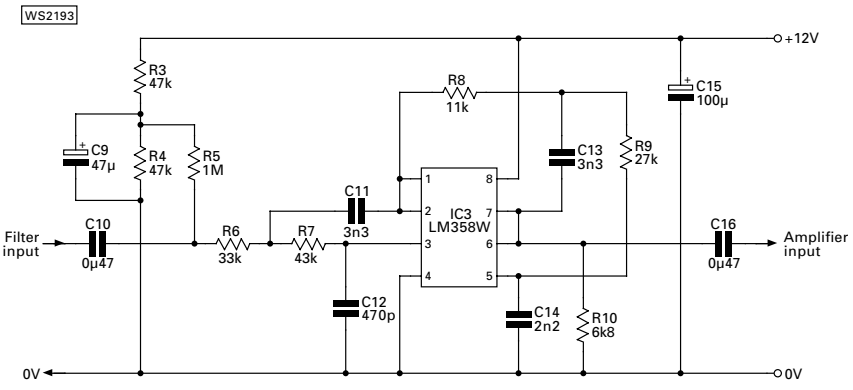
Radio Frequency Section

If the LM380 and the low-pass filter stages are working properly, you can begin work on the radio frequency (r.f.) section of the receiver circuitry, **Fig. 4**. However, if you haven't got either an r.f. signal generator or a grid dip (or gate dip) oscillator, then I suggest you at least get hold of one! Don't forget, a g.d.o. can be used as a signal generator as well as for checking resonance.

For many years, the American

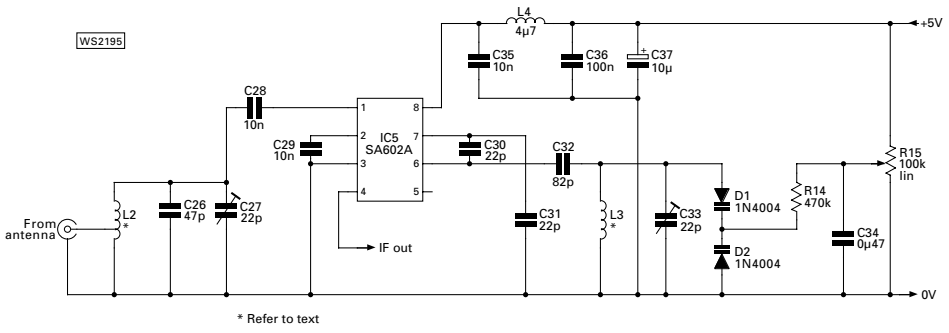


● Fig. 2: The audio and voltage regualtor stages of the 70MHz f.m. receiver (see text).



● Fig. 3: The circuit of a simple two-stage, active low-pass filter built around an LM358N dual op-amp. This part of the 70MHz f.m. receiver is most easily built on a small piece of Veroboard (see text).

Radio Basics SPECIAL



● Fig. 5: The 70MHz f.m. receiver front-end is based on the Philips SA602A double-balanced mixer and oscillator (see text).

Motorola company produced a series of communications i.c.s. making the design and construction of f.m. receivers very easy. Indeed, later types made it possible to build single-chip, v.h.f. f.m. receivers which performed very well. Only a audio power amplifier was required to drive a loudspeaker.

As far as I know the Motorola devices have been discontinued. There are a few alternatives made by other manufacturers, but these have also either been discontinued, or are difficult to get hold of.

However, Philips still make some communications i.c.s suitable for our purpose...but they've ceased producing them in dual-in-line packages...concentrating on surface mount (SMD) devices...rather a non-starter for most constructors!

So, rather than use either a discontinued or surface mount device, I've chosen the venerable **TBA120S** to form the heart of our receiver. **Note:** be aware that there are several variants of this device which are not compatible with the one we're using.

There's only one alternative to the TBA120S, and that's the TBA120AS. So please, make sure you get either a TBA120S or a TBA120AS, and not one of the other versions.

Television Sound

The original TBA120 was designed as a sound i.f. amplifier and demodulator for use in television receivers. Inside there's a limiting i.f. amplifier, a frequency discriminator and an audio gain stage.

The 'S' version added a 12V Zener diode and an uncommitted *npn* transistor, although we're not using them in our receiver. The audio stage also acquired variable gain, set by a resistor connected between pin 5 and ground (5.6kΩ recommended for fixed-gain applications).

The TBA120S is almost an antique by today's standards, but its widespread use in television receivers has ensured the chip's survival. However, it may be wise to stock up now, as it will no doubt be discontinued at some point.

As you can see from Fig. 4, there's not much to the circuit. The output of XL1, a 455kHz ceramic filter, is connected to the i.f. input (pin 14) of the TBA120S.

In the prototype I used a muRata CFU455E2 ceramic filter which has a bandwidth of 15kHz and an impedance of 1.5kΩ. You need to choose R11 to match the impedance of the filter. Capacitors C17 and C18 are for neutralisation, while supply decoupling is taken care of by R13, C19 and C20.

The frequency discriminator would normally work at the television sound i.f. of 5.5MHz. In such circumstances, the tuned circuit connected across pins 7 and 9 would be resonant at 5.5MHz. Internal 50pF quadrature capacitors - connected between pins 6 and 7, and between pins 9 and 10 - drive the tuned circuit.

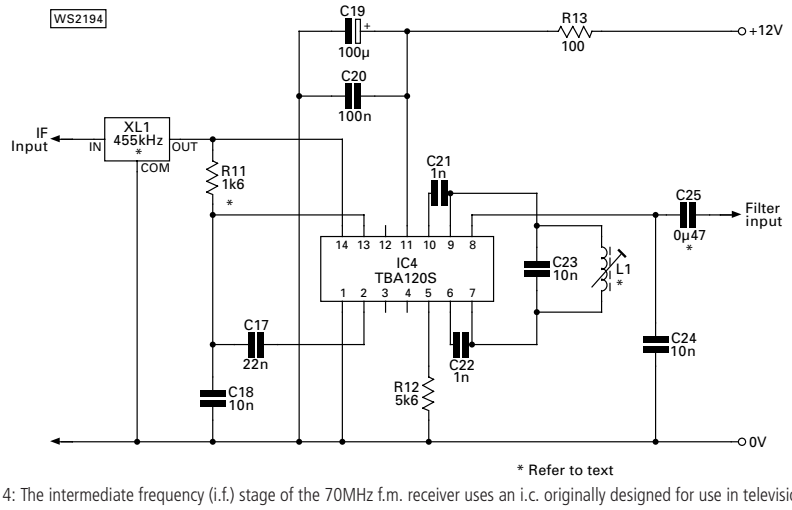
Radio Amateurs found that the discriminator would work quite happily at the much lower frequency of 455kHz. All that's needed are two additional 1nF capacitors - C21 and C22 - connected across the internal quadrature capacitors, plus a tuned circuit resonant at 455kHz. A 10nF capacitor (C23) and a 12µH adjustable coil (L1) gives good results.

Ideally, the capacitor for C23 should be a polystyrene or polypropylene type (polyester layer capacitors can be used). Vague details (no wire sizes) suggested 50 turns on a 3/16in diameter former with a dust core will yield the required inductance.

I ended up using 30s.w.g. (0.315mm) enamelled copper wire which worked well, so any wire around that size should be suitable. Ideally, the coil should be screened, although I admit mine wasn't.

A salvaged i.f. transformer (i.f.t.) from an old transistor radio, will work too. Just remember to wire across the extreme ends of the coil; ignore any taps and other windings.

If the '*Q*' of the circuit (*Q* is the term for the 'Quality') is too high then the demodulated audio will be distorted on peaks. This problem can be fixed by wiring a resistor across the tuned circuit - try 2.2kΩ in this position for starters.



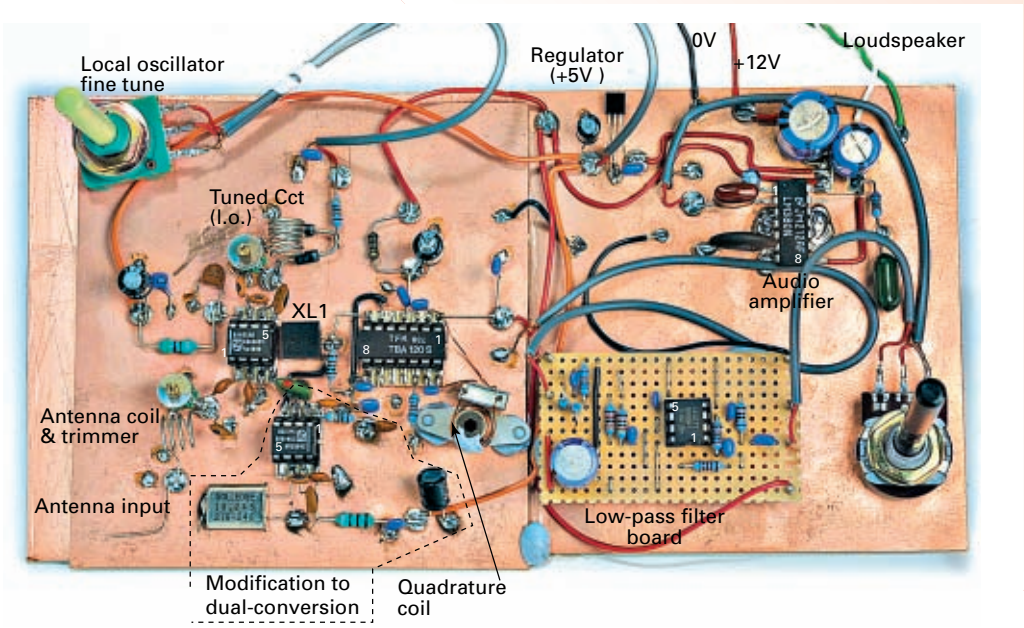
● Fig. 4: The intermediate frequency (i.f.) stage of the 70MHz f.m. receiver uses an i.c. originally designed for use in television receivers (see text).

Demodulated Audio

The demodulated audio is taken from pin 8 and fed to the low pass filter shown in Fig. 3. The capacitor, C24, is there to provide de-emphasis in TV applications, not required here...but useful in removing any r.f. that might get through the demodulator.

Note: C25 isn't needed if the following stage has its own input capacitor, as in Fig. 3. But do keep C25 in circuit if you're not sure, as there's approximately 7V d.c. on pin 8.

If you have access to test gear, apply a frequency modulated



● Fig. 6: Annotated photograph of G4JCP's prototype 70MHz receiver, indicating major components and stages (see text for details on the various stages).

455kHz signal to the input of XL1. You then have to adjust the core of L1 to give the best-looking demodulated waveform as viewed on an oscilloscope.

If you can't get an oscilloscope, you'll have to listen to the demodulated signal and tune L1 for the cleanest-sounding tone. Without any test gear, you're better waiting until you've completed the front-end, which I'm going to describe now.

Single Conversion

Our 70MHz receiver has one big disadvantage - apart from being relatively insensitive - in that it's only a single conversion superhet. The low i.f. of 455kHz means that the image frequency is a mere 910kHz away from the wanted frequency.

Additionally, at 70MHz, a single tuned circuit provides little attenuation at such frequency spacings. But at least the band will sound twice as active as it really is!

Our receiver's front-end, **Fig. 5**, is based on the Philips SA602A double-balanced mixer and oscillator. Alternatives are the SA612A and the Signetics NE612A.

The mixer is a Gilbert cell multiplier configuration which typically provides 18dB of gain at 45MHz. The oscillator is a Colpitts type which can operate up to 200MHz.

Antenna Tuning

Signals from the antenna are tuned by the combination of L2, C26 and trimmer C27. The inductor L2 is made from four turns of 22s.w.g. (0.71mm) tinned copper wire, 6mm inside diameter, stretched to a length of 7mm. The antenna tap is one turn up from ground.

Actually, the exact construction of L2 isn't critical, but what you will need is a 'Dip Meter' (g.d.o.) to find where L2/C26/C27 is resonant. At these frequencies, it's easy to find the tuned circuit is 10MHz or more removed from where it ought to be!

I don't think L4 - which helps with supply decoupling - is critical; 4.7µH is what's used in the circuits given in the application notes. A few dozen turns of enamelled copper wire wrapped around a 1MΩ 0.5W resistor should work just as well.

The Oscillator

The oscillator section of the SA602A is wired as a conventional Colpitts circuit; the internal transistor has its base connected to pin 6 and its emitter connected to pin 7. All biasing on the i.c. is internal.

The inductor, L3 is made up from six turns of 22s.w.g. (0.71mm) tinned copper wire. It has an 6mm inside diameter, stretched to a length of 9mm.

As the SA602A has balanced outputs, the i.f. signal can be picked off from either pin 4 or pin 5. I prefer to use pin 4 simply because it's on the opposite side of the chip to the local oscillator.

No matching network is necessary as the output impedance of the device is 1.5kΩ. This is the same as the impedance of the 455kHz ceramic filter.

The oscillator operates 455kHz below the wanted (receive) frequency. I chose the low side as the frequencies immediately above 70.5MHz are quite busy. Running the l.o. on the low side puts the image frequencies just below 70MHz where things are quieter.

Electronic Tuning

Electronic tuning is much easier to arrange than using a low-value variable capacitor. After all, the l.o. is running at 70MHz so lead lengths must be kept as short as possible.

Varicap diodes also have the added advantage of letting us mount the tuning control almost anywhere. **Note:** It's best to use screened cable from the slider of R15 to the junction with R14.

Genuine varicap diodes used for D1 and D2, provided a far greater change in capacitance than was needed. However, a pair of ordinary 1N4004 diodes worked a treat.

Once the IN4004s are reversed biased by more than a volt or two, the change in capacitance is very small...ideal for the restricted tuning required. And they're much cheaper than real varicap diodes!

You'll need your g.d.o. to set the combination of D1/D2/L3/C30/C31/C32/C33 close to 70MHz. After that, the precise tuning range can be set by listening to the l.o. on a scanner, (if you have one) and adjusting both C33 and the length of L3. Remember that the l.o. runs 455kHz lower than the receive frequency.

The change of capacitance of D1 and D2 increases dramatically as the voltage across them drops to a volt or less. This then makes tuning more critical and taking the received frequency well out of the 70MHz band.

Incidentally, one useful addition would be the inclusion of a 27kΩ resistor between the 0V rail and the bottom end of R15. That then keeps at least 1V across D1 and D2, even with R15 set at minimum.

The final adjustment is C27 on the input tuning, which should be adjusted to give maximum quieting on a weak signal. If you weren't able to inject a 455kHz f.m. signal into the TBA120S, then you should adjust L1 for best sounding audio.

Receiver Modifications

Later on in the project I'll be discussing some receiver modifications including adding a second i.f., turning the receiver into a double conversion design. Secondly, I'll also describe modifications for the 28 or 50MHz bands.

However, having built the receiver for 70MHz and got it working, the only thing left to do is to put everything into a suitable screened enclosure. And, hopefully, enjoy listening to it! (Or maybe not!). Observant readers will have noticed the lack of any squelch. This is a problem, as the noise from the receiver (when no signal is present) can be very annoying.

So, one possible, and extremely desirable addition, would be a squelch function. We're working on it! See you next time. PW

The World's smallest h.f. to u.h.f. Amateur

Yaesu FT-857 Tra

● The Yaesu FT-857...the standard-sized pen demonstrates how small the transceiver is!

Carl Mason GW0VSW takes a look at the FT-857 h.f., v.h.f. and u.h.f. transceiver.

Why is it, that when I was given the opportunity to review one of the latest transceivers for *Practical Wireless* the band conditions become the worst they have been for sometime? This was the case when the postman arrived with a small package containing the FT-857!

It was certainly going to be interesting putting the new Yaesu transceiver thorough its paces and see just how well it could cope with the poor h.f. conditions. So, it was on with the review!

World's Smallest?

The Yaesu FT-857 is claimed by the manufacturers to be the world's smallest h.f. and v.h.f./u.h.f. multi-mode mobile/portable transceiver. It measures just 155 x 52 x 233mm and weighs 2.1kg.

The FT-857 is capable of 100W maximum output on h.f. and 50MHz, 50W on 144MHz and 20W output on 430MHz. And I've no doubt that QRP enthusiasts will be pleased to know that the power level can be dropped to as low as 5W on all bands.

Don't let the transceiver's size deceive you though...it's packed full of features, many of which can only be found on more expensive base station models. These include a high performance receiver with wide frequency coverage, dual v.f.o.s, Digital Signal Processing (Bandpass Filtering, Noise Reduction, Auto-Notch and Microphone Equalisation), i.f. Shift, a built-in keyer and CTCSS to name but a few.

Die-cast Chassis

The diecast chassis is certainly built to take the knocks! The front panel is removable and can be unclipped to mount away from the main body using the YSK-857 separation kit which is available as an optional extra. (this kit includes a holder for the front panel, extension cables for the controller and speaker,

Radio Rig? nsceiver

double-sided tape and all the mounting screws, nuts and washers).

The knobs and buttons have a very positive feel, and all the controls can be easily reached with one hand. This is particularly convenient for the operator who is using the FT-857 when mobile in a vehicle.

Underneath the body, folded back against the bottom of the transceiver, are two 'feet'. These can be tilted down for better viewing of the display when the rig is mounted on a flat surface.

Neat & Compact

The front panel is very neat and compact and is home for all the transceiver's important main controls. These include the combined a.f. **Volume** control (for either the internal or external speaker) and **Squelch/RF** knob which can be programmed by the user to adjust either the **Squelch** or the gain of the receiver's r.f. and i.f. stages.

A 'dented' rotary switch is used for v.f.o. tuning, memory selection and function selection for the A, B or C keys of the FT-857 in a similar fashion to those found on the smaller FT-817. A **Home** key allows the operator to retrieve a favourite frequency from memory and below this is a further key that activates the Receiver Clarifier.

When in use, the **Select** knob can be set to offset the frequency in use by upto ±9.99kHz without the transmission frequency being affected. This knob also allows channelised tuning in minimum steps of 1kHz on c.w. and s.s.b. and 5kHz on f.m.

Additionally, if the key is pressed and held for one second, the **IF Shift** feature is activated. This allows you to adjust the centre frequency of the i.f. filter's pass-band.

Pressing the **Function** key momentarily lets you select the three-multi function keys **A**, **B** and **C** and the various operating functions they can perform. By rotating the **Select** knob you can scroll the display through 17 rows of functions which include various items such as **VFO A** or **B** or split frequency, speech processor, **VOX**, **Keyer**, narrow filter, etc.

Mode Keys

Pressing the **Mode keys** enables the operator to scroll either up or down the menu and choose from either **LSB**, **USB**, **CW**, **CW Reverse**, **AM**, **FM**, **Digital** or **Packet**. Alongside these keys is the **DSP** button that allows instant access to the d.s.p. system. (This had already been installed on the review model).

If you hold the d.s.p. button down for one second, you activate a memory item. This permits adjustment of the d.s.p. microphone equaliser and is a feature that I will cover a little later.

Main Tuning

The transceiver has an excellent main tuning knob, similar in size to those on my base station rigs. It allows a secure non-slip grip and has a nice soft feel to it and over the review period I found it to be very smooth in operation and pleasant to use.

Above the main tuning knob are two buttons for band selection marked **UP** and **DWN** and to the right of this are two more buttons marked **V/M** and **LOCK**. Pushing the V/M button switches frequency control between the v.f.o. and memory systems. If you press and hold this key you can store a frequency in the transceiver's **Quick Memory Bank** while the lock button prevents the accidental changing of frequency

Rear Panel

Let's now take a look at the transceiver's rear panel, and I'll start with the d.c. power supply connection which can be found. The supplied cable can be used to connect the FT-857 to either a car battery or a d.c. power supply which must be capable of supplying at least 22A at 13.8V.

The jack can also provide a **Transmit Power Control Terminal** (TPCT) if you connect pin-3 (the battery sensor) of the terminal to the 'ground'. The FT-857 will then automatically switch to 20W (10W on 430MHz) output.

Seven other sockets are provided. The first is an 8-pin mini DIN jack used to connect an optional external automatic antenna tuner (a.a.t.u.) such as the FC-30, personal computer (PC), tape recorder or linear amplifier such as the Yaesu VL-1000.

There's also a data socket which will accept AFSK input from a TNC via a 6-pin mini jack plug. It also provides fixed level receiver audio output, push-to-talk (p.t.t.), squelch and ground lines.

Product

Yaesu FT-857

Company

Yaesu UK Ltd,

Contact

Tel: (01962) 866667

Supplied Accessories

Operating Manual
DC Power Cable
MH-31 Hand Microphone
MMB-82 Mounting Bracket

Pros and Cons

Pros *The FT-857 is very easy to set up once you have read the manual and has a superb specification for the price. The FT-857 would be ideal for the beginner or experienced Amateur who is looking for a versatile mobile/portable transceiver or those who require a compact base station radio.*

Cons *It pays to spend a few hours reading the instruction manual to fully understand what functions there are...and how you can best set them up to suit your operating style*

Price

£849 inc. VAT

Supplier

Yaesu UK Ltd,
Unit 12,
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Winnal Close,
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Continued on page 36

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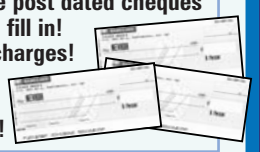

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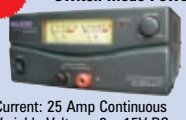

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Also provided are three 3.5mm jacks that allow you to connect a key, external speaker or accessories such as a TNC. Finally, there are two antenna sockets.

The first socket is an SO-239 for h.f. and 50MHz. The second is the more v.h.f./u.h.f. efficient 'N' type for 144/430MHz. Both are designed for use with any antenna system providing a 50Ω impedance, though it will cope with minor deviations. (If there's a mis-match of more than 50%, the power amplifier's protection circuitry will begin to reduce the power output).

Main Display

The main liquid crystal display (l.c.d.) is very clear and has good contrast. There are four options for illuminating it, starting with **Off** which disables all background lighting. **Auto 1** illuminates the l.c.d. for three seconds when any button is pressed or if you rotate the **Select** knob. **Auto 2** illuminates the panel continuously when the FT-857 is operating on an external power supply. Finally there's **On** which provides back lighting continuously.

The contrast can also be adjusted, as can the display brightness. (These are selected when the Menu Mode is activated).

One interesting feature is the ability to choose the display colour. In fact, there are 32 options are available and they can be set in a variety of combinations for a wide number of operating conditions.

For example, you could have different colours for each band used, or each mode, the type of meter selected or for the v.f.o. in use. I first thought the feature to be a bit of a gimmick...but found it quiet useful when I was able to choose a colour more suited to operating in the bright sunlight coming through the shack window!

Digital Signal Processing

As I mentioned earlier, the DSP-2 d.s.p. was installed in the FT-857 and is fitted as standard on all UK models. This appeared to work extremely well...especially when I was using s.s.b.

The processing feature is selected by pushing the **DSP** key which then activates the **A**, **B**, and **C** keys as **DNR** (Noise Reduction Level), **DNF** (Auto Notch Filter) and **DBF** (Receiver Band-pass Filter). Next, by holding in each key for one second you can recall the **Menu Mode** and use the **Select** knob to adjust each level as required.

● Inside view of the main p.c.b. panel.

● Close up view of the main tuning control. This control also carries out many other functions (see text).

The receiver's selectivity can be enhanced via the d.s.p. **Band-pass Filter** to suit your operating needs. Both low-cut (**High-Pass Filter**) and high-cut (**Low-Pass Filter**) levels can also be adjusted.

When operating in the a.m., s.s.b. and f.m. modes you can push the DSP button for one second to activate yet another menu mode for d.s.p. **Microphone Equalisation**. By rotating the main tuning dial you can then select several equalisation options.

The setting **OFF** is selected when no equalisation is required, **LPF** is for high-cut where lower frequencies are emphasised, **HPF** is for low-cut where the higher frequencies are emphasised and **BOTH** selects high and low-cut where the mid range frequencies are accentuated.

During the review, it took me a while to set Microphone Equalisation up for best results. I think it would be much easier to do if you have the help of another station...one that's preferably a good distance away.

The Morse Mode

The FT-857 has an array of features for the c.w. operator. For example when operating on the Morse mode there's the option of using either a straight key, a paddle using the built-in electronic keyer which also includes weight control or computer keyboard.

The **CW Pitch** control allows the transmitted signal to be offset by 400/500/600/700 or 800Hz from zero beat with the receive frequency. When this pitch control is adjusted, it also varies the centre frequency of the receiver's pass band together with the **CW Sidetone** pitch. This means you can use the sidetone as a reference during tuning.

There's also three-message memory which can be used to programme exchanges such as those found in contests. A 'Beacon' mode is also provided and this can send a repetitive message continuously for up to four hours. (This would be extremely useful for those with an interest in DXpeditions...particularly on the 50MHz band.

Finally, the FT-857 has a built-in c.w. trainer! This helpful feature will send random groups of five letters and/or numbers which can be heard through the speaker. (Should help to keep up your c.w. reading skills!).

Incidentally, an optional YF-122C 500Hz Collins filter is available for the FT-857, and it had been installed in the review model. Personally speaking, I would consider this an essential extra if you were a keen c.w. operator....especially when operating on crowded bands such as 7MHz or when working in contests.

Stacked VFO System

One menu item I did use a good deal was the 'Stacked' v.f.o. system. This controlled the v.f.o.s and was found by simply pressing the **FUNC** key momentarily and rotating the select knob to the menu **A/B**, **A=B** and **SPL**.

The **A/B** function button then allows you to toggle between the two v.f.o.s (**A** or **B**) for each band. For example, you could have v.f.o. **A** set for the c.w. section of a band and v.f.o. **B** set for the s.s.b. section. (This is how I set up the transceiver as both mode and frequency information are remembered until they're changed).

When you do change bands using either the **A** or **B** v.f.o., the two v.f.o.s don't change bands together. This would prove useful to those of you who operate split bands when working - for instance - **Low Earth Orbit** (LEO) f.m. satellites. This procedure is well covered by the appendix in the supplied instruction manual. I must admit that I have never tried this myself but have every intention to do so in the near future.

The A=B function allows you to have both v.f.o.s on the same frequency. Here, **SPL** selects the 'split' function...which was very useful when trying to work some of the pile-ups on several DXpeditions heard during the review period.

Advanced VHF/UHF Features

The v.h.f./u.h.f. operator using the FT-857 has not been forgotten either! The transceiver has a host of useful features that will be useful on v.h.f. and u.h.f.

For repeater use both a 50-tone CTCSS system and 104 code **Digital Code Squelch** (DCS) encoders and decoders are already built in. The ability to encode either CTCSS or DSC if required and a 'Split Tone' feature has been included.

When you use the 144 or 430MHz bands, the transceiver will automatically activate your personally programmed repeater shift for the band in use. And...you're travelling and visit a new location a **Smart Search** system can scan in f.m./a.m. modes for any activity

and load those frequencies into a special memory bank.

You can also use a **Spectrum Scope** feature that will create a bar graph display of active channels above and below your chosen frequency. Another interesting feature is the **Auto Range Transponder System** that lets you know if a low power station has gone out of range. This could be useful for groups like RAYNET who provide safety cover at various events throughout the country.

Earth Connection

One item that I was surprised to find missing was an earth connection of some sort. However, the manual states: *"Although satisfactory grounding in most installations will be achieved via the d.c. cable's negative lead and the antenna systems coaxial shield, it is often recommended that you provide a direct ground connection to the vehicle chassis at the mounting location of the transceiver"*.

The FT-857 does actually come supplied with the MMB-82 Mounting Bracket...and providing this is installed and connected to a vehicle's chassis you should be okay. If you do decide to install the transceiver in a vehicle, I would certainly recommend you double-check the installation position carefully, just to be sure you are actually making an earth!

While using the transceiver in my shack, I used a screw and washers from the mounting kit supplied, connecting my earth wire to one of the bracket mounting holes. With this set-up I experienced no problems such as r.f. feedback or noise pick-up during the review period.

Sensitive Receiver

I found the receiver to be very sensitive and the audio quality from the small speaker to be excellent. Away from the Amateur bands I listened into several broadcast stations on both Band II v.h.f. f.m. and also on a.m. on medium wave, and h.f.

There's always plenty of activity around the South Wales coastline...so I also monitored several marine channels. The FT-857 coped with everything it heard and the receiver showed no signs of being overloaded at anytime.

On occasion I did need to use the attenuator, which reduces the received audio signal and noise by about 10dB. It might be worth mentioning at this point, that this function doesn't operate on the 144 or 430MHz bands.

On The Air

As I stated earlier, band conditions were very poor for the duration of this review and my on the air tests! I only had an inverted full size G5RV at my disposal, which was fixed in a north/south direction.

To tune the antenna I used my MFJ-971 portable tuner as this would allow me to work on most bands. On the first day of the review I could only hear stations on 7MHz and most of those were based in the UK. Static noise was terrible and signals would appear very strong at S9+ one moment and then fade down into the noise.

However, all was not lost and several stations did respond to my "CQ" calls, which were made with the supplied MH-31 hand microphone. I should mention at this point that Yaesu offer the MH-59 Remote Microphone as an optional extra and this provides control of all the major functions of the transceiver from the microphones keypad as well as rotary controls to adjust the frequency or audio levels.

The first call came from **John G4XBL** in Aspatria near Carlisle in Cumberland who was able to comment on the "clear audio" just before his signal faded away. Next, **Vic G4KEE** in Exeter then called in...but it was very difficult to hold a conversation with him. He also commented on the audio quality which had improved slightly when I switched in the d.s.p.!

These difficult QSOs were then followed by a call from **Tony G3RKL** in Sheffield, South Yorkshire, who ran a Yaesu FT-817 with a Yaesu FL-110 linear at about 60W. We were able to hold a long QSO and experiment with gain levels on both our microphones, sometimes with Tony running just 5W.

Incidentally, both **Jack EI7HX** in Dublin and **David G4YER** in Barnsley, South Yorkshire monitored these tests. They gave excellent signal and audio reports to both of us! I was very grateful for their assistance.

Pick of the DX for me was **Bruce ZD7VC** on 21MHz who was enjoying a large pile-up at his home in Jamestown, on the Island of St. Helena. It took a while to work him, but he finally heard my callsign and responded with a 5/6 report.

Bruce was interested to know a little more about the Yaesu and we enjoyed a short chat before he returned to the pile-up. Incidentally, this was a new country for me, so I was more than pleased to work him. I followed this a few days later with a c.w. contact with **Koji JY9NX** in Jordan...and his 599 report gave me another new country on the 21MHz band.

I concentrated my operating mainly on h.f. bands but did try the 50, 144 and 430MHz bands. This was limited to f.m. contacts only and included contacts with **Denzil GW3CDP** and **Brian GW0KZK** who had both been monitoring me during the review period, and they reported the audio as being "Good".

● The detached FT-857 front panel, shown in this fashion to demonstrate the relative proportions of what is a very small h.f. to u.h.f. transceiver (see text).

Superb Specifications

In summing up, I think the design engineers at Yaesu have worked very hard to produce a transceiver that would end up with superb specifications and meet the needs of today's modern amateur. I'm sure that they have succeeded in this and have even been able to include a few bells and whistles along the way!

I think the FT-857 is very compact, ruggedly built and designed to easily withstand the abuse that it's sure to receive when used for either mobile or portable work. However, the menus do take some time to get used to and occasionally I had problems when I wanted to operate split frequency quickly or adjust the d.s.p. settings. Despite this...it has to be said that regular use would make the operator more familiar with these controls and their operation would in time become second nature!

The FT-857 performed exceptionally well in the poor h.f. band conditions when using both c.w. and s.s.b. I would seriously consider this as a replacement for my ageing IC-706 Mark 1 as in my opinion it is the best value transceiver available at this time.

As with any new model like this, it does pay to spend a few hours reading the instruction manual to fully understand what functions there are...and how you can best set them up to suit your operating style. The FT-857 would be ideal for the beginner or experienced Amateur who is looking for a versatile mobile/portable transceiver or those who require a compact base station radio *PW*

The Wrexham ARS/GB2W

Putting North Wales On The Map!

Mark Harper MW1MDH says..." I think it's fair to say that a lot of time and work goes into a Special Event Station. I've seen a few in action, but until GB2WHO, I've not been part of one". Read on to find out more!

What follows is a write up of the events of one station and one radio club, and an almost impossible battle against the elements and the landscape! More than that, it should be considered a lesson to all fledgling radio clubs, or those that have never operated a special event station before (or as a humorous/cynical view of said events), that when operating a special event station - go in with an open mind - nothing is **ever** what it seems!

The **Wrexham Amateur Radio Society** decided to get involved with the National Museums Weekend, the meeting after our AGM, where the club's Leadership changed hands. This was when I was installed as the Vice-Chairman (and consequently the Web master).

Ian Wright GW1MVL/GW0VML (our new Chairman) asked for support for the event, and if possible, a location. The trouble was, there aren't any museums within Wrexham, and we'd already figured that the Chester Club may be operating from the Grosvenor Museum in the centre of Chester.

● Wrexham ARS achieved this award for activating GB2WHO.

It was suggested that we look at the 'Dr Who Museum', in neighbouring Llangollen, so Ian set about making contact with the museum. We decided to operate on 7MHz and run UI-View and Packet, although the reality of the 144MHz decision was somewhat different.

In the weeks that followed, many E-mails passed between myself, **Glyn Rogers MW0BNB** and Ian. Plans were hatched, ideas drawn up, designs for QSL cards and so on. Ian and **John GW3RBM** both went and did some site surveying. I know someone is thinking, "hang on - you're all Radio Amateurs - why not discuss stuff on the air". Well, in reply to that, there are hills all around me and my antennas are inside - so perhaps you see the problem?

Much discussion followed in the following weeks, and it all went so fast, (in my opinion anyway!). Before I knew it, it was the Sunday before the event, and the weather wasn't looking too good.

The plans were finalised, we would operate on 7MHz, although we weren't sure about the antenna configuration. In the end, we decided on an inverted-V dipole with a balun, built by John, literally using anything except the kitchen sink. We weren't too sure about the roof on the museum either, so decided to play it safe.

We would also use a donated set - a pristine condition vintage FT-101ZD, with the outboard speaker. My cohorts inform me that this piece of classic Yaesu engineering is capable of at least 150W without so much as breaking a sweat! In short, including my FT-100, we had 20+ years of technology in one room!

Myself, and my other 'Novice-in-Crime' **Stephen 2W1STE** would operate the UI-View Station, using my KAM, FT-100 and if I could get it working again, my 486 laptop. If that failed, we could unhook it all and play on 144MHz. Our plan was simple...use Stephen's 144MHz portable beam, with his mast.

Saturday Arrives

Saturday arrives - Hmmmmm….what could be said? Not a lot! For starters, I hadn't got up that early in years - what was worse, it was overcast.

I had spent the night before packing up my shack - my FT-100 (other FT-100 owners take note - it fits into an (Official) Iomega Zip Drive case). You need to remove the panel, but the main box fits quite nicely into the case, but with the exception of the p.s.u., I managed to pack everything into a fairly sturdy box.

Stephen arrived and I loaded my kit into his car. We then picked up some sand for the mast on the way. When we got to the site, Ian - along with John, **Geoff Blore GW0EMB** and **Geoff Davies GW6SBD** - were already there setting-up. Ian had rigged both his daughters in to decorate the room we would be using with the mass of information the RSGB had kindly sent us.

A small downpour did nothing to dampen our spirits, this was the first special event station myself and Stephen had a hand in, and nothing was going to give us grief! I helped carry the antenna and sand to the tiny hatch onto the roof, and while Stephen set about putting the antenna together, I put all the kit together.

Around me the military-style operation of installing the aerials swung into action, flyleads were dropped from the roof and through the windows. I had never taken part in a Special Event station, granted I had seen a few, but never been part of one. Suffice to say - we were in safe hands!

Teething Trouble

The 144MHz station got on the air first and h.f. followed not long after. However, 'two' was dogged by an N-Plug problem, but we got it sorted quite quickly. I started up UI-View and started sending.

Unfortunately, nothing came back, we couldn't hear a thing, it was like there was nothing to hear! I had put it down to the fact that we had god set up and running - by now it was

HO Special Event Station

● The Dr Who Museum, in Llangollen, Wales.

0800GMT. So, I left things 20 minutes or so and tried again. Still nothing!

Fearing the N-connector of doom again, I borrowed another patch cable, this also didn't help. The thing was, we were not alone, the h.f. side of the operation wasn't doing much.

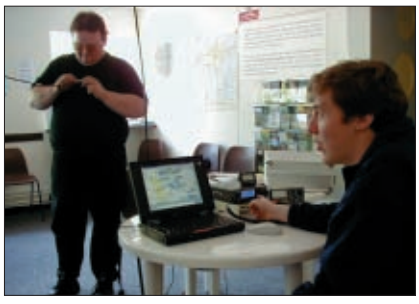
We thought about things for a few moments, and then went about checking leads, s.w.r., analysers came out of boxes, 259s were re-soldered. We also discovered we had some noise on the bands, some of us toyed with the antennas - some of us went off to try and fathom out the noise.

I knew that my laptop was a possible source - so I shut down the entire v.h.f. side of the operation. The noise was still there! We even switched all the lights off as well! We later discovered that it was caused by some ventilation equipment.

The lesson to be learnt at this point is do a full r.f. check of your location, locate (and if possible isolate) any r.f. problems so that you know what you're up against when you set-up. As I wasn't involved in the initial site surveying and the such, I can't comment. I think we had thought that if anything, the machinery in the workshops would be more of an issue.

Although no one was actually panicking, we were concerned. I was convinced something was drastically wrong with my FT-100, perhaps I had knocked it during transit, maybe causing something to work loose?

Ian and the 'team' were checking the FT-101 out as well, both units were functioning perfectly. Looking back at the log, by this point we had managed to get two contacts in before all of this.



● Problems, the laptop would have to be shut down!

We decided to make a quantum leap in terms of technology. We set the FT-100 up on h.f. and within minutes of doing so, we were talking to **GB2OWM**, in the Orkneys. At least we knew we were getting somewhere!

The first day of GB2WHO was a somewhat slow one. With the help of Glyn, myself and Stephen decided to tackle the 144MHz problem to ensure the next day was better.

● Some of the gang - ready to set-up.

Metal Towers & Hills

For those who don't know, Llangollen is actually in a deep, steep sided valley, and when stood on the roof of the exhibition centre, we discovered a very narrow channel in which to fire a 144MHz signal.

While on the roof, myself and Glyn checked over the antenna - all seemed to be in full working order, so we went back downstairs. This should have been a good time to take a 'handie' with us, but no one had one at the time.

Stephen, it could be said, is well known for the fact he likes to sit on top of some of the hills in our area and 'play radio' from there, and he gets some impressive results. Consequently, he'd brought his Icom IC-706MkIIG along as a spare set, so we headed off into the car park to look at the situation.

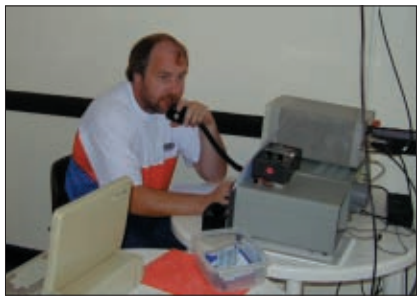
We did all manner of tests and found out we could open a repeater in Stoke-on-Trent, using the full output of the IC-706. Glyn had theorised we could attempt to bounce the signal off the two metal towers on the hill above us - we tried this, but to no avail.

By now it was almost midday and sadly we decided to admit defeat. But we weren't defeated, in a nutshell, we ran for two years from the Dr Who Museum before transferring to the Chirk Vintage Aircraft Museum using the callsign GB0CVA. There was quite a team up at Chirk...but that's another story!

pw

● Time for a quick lunch break.

● Geoff GW0EMB ready to operate.



● Ian GW0VML about to make contact.

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Thank you to George G3NOH who actually tested Mario on his arrival.

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Carrying On The Practical Way

This month the Rev. George Dobbs G3RJV has set himself a task! Building a multi-band transmitter with less than 20 parts! But we wonder...does that count include the quotation?

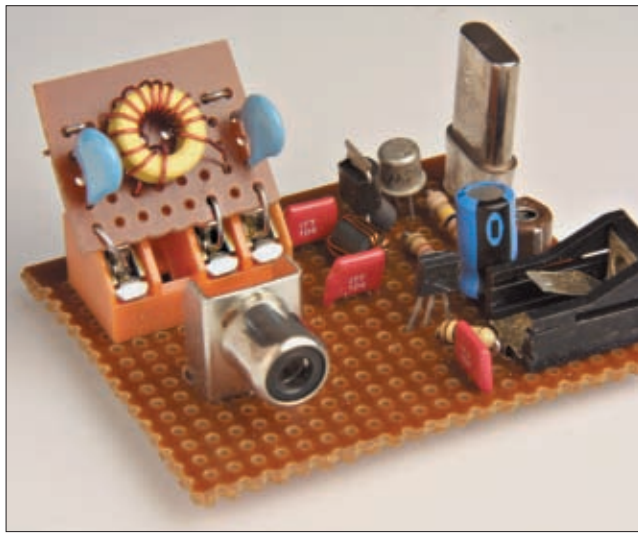
"Use what talents you possess; the woods would be very silent if no birds sang there except those who sang best".
William Blake

In the last issue I set myself the task of building a worthwhile receiver with 20 parts. There's something very satisfying about a little project that can be built in an hour or so!

It can be a nice way to end a day; going to bed with something completed…and hopefully working. I recall that in the past *PW* ran a series called (I think) 'Take-20'.

Each article described an electronic project which could be built with 20 parts or less. I built quite a few of them for the sheer fun of it.

My memories then set me thinking that following the 20 part receiver, I ought to produce a 20 part transmitter! Fortunately, there are a lot of simple transmitter designs around, some of which use far less than 20 parts.



Twenty parts for 20m QRP operation. George G3RJV demonstrates just what can be achieved...using a circuit based on the famous 'ONER' design.

version using surface mount (SMD) components. It's crystal controlled, but a variable frequency oscillator (v.f.o.) controlled transmitter with only 20 parts is a tall order. However, provision could be made for it to operate as a variable crystal oscillator (VXO) transmitter.

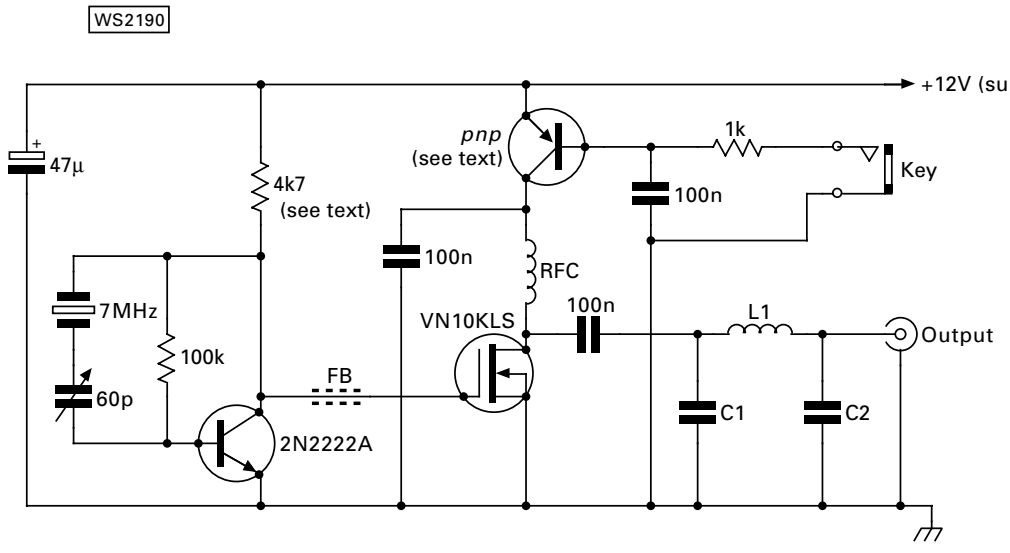


Fig. 1: George G3RJV say that this month's project uses.... "The classic circuit of the 'ONER' transmitter". A bi-polar transistor crystal oscillator stage uses a crystal and a series variable capacitor to form a feedback path between the collector and base (see text).

Ideal Design

The ideal design would be one that could be used on several bands and is capable of a viable radio frequency output. I immediately thought of the famous 'ONER' transmitter, that classic design from the workbench of **George Burt GM3OXX**.

I've built the 'ONER' many times over, included a

To be true to the 20 parts criteria, the project ought also to include a low-pass filter so that it can be used 'as is' on the Amateur bands. The low-pass filter would have to be changed according to the band in use, so some method of changing the filter is required.

The finished transmitter could be on one small board. This would allow a crystal and a low pass filter to be added ready for use on a particular band.

The Result

The result of my project is shown in the circuit, **Fig. 1**. This is the classic circuit of the 'ONER' transmitter. A bi-polar transistor crystal oscillator stage that uses a crystal and a series variable capacitor to form a feedback path between the collector and base.

In this application, the crystal must be at the fundamental frequency of the required signal and the series variable capacitor allows a little shift of this nominal frequency. The amount of frequency shift depends upon the frequency and individual examples of the crystal. (I used the common

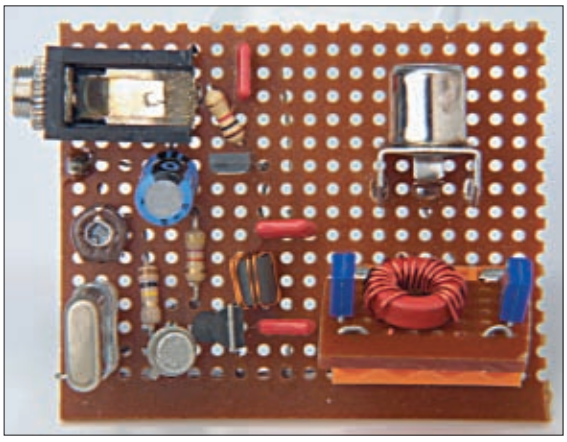


Fig. 2: The prototype transmitter, built by G3RJV on to a small piece of Perfboard (see text).

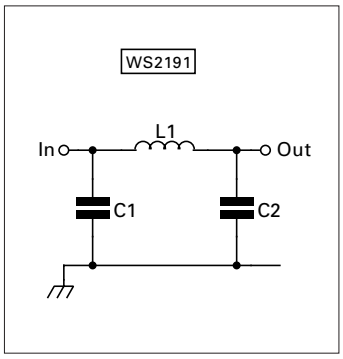


Fig. 3: Circuit for the simple low-pass filter unit (see text).

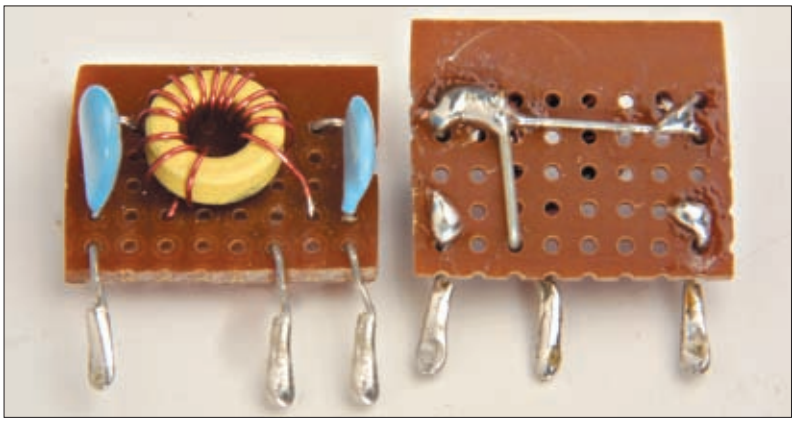


Fig. 4: The completed 'plug in' low-pass filter. Both sides of the board are shown for clarity (see text).

2N2222A, device but a whole range of similar transistors would do the job).

The oscillator directly feeds a VN10KLS m.o.s.f.e.t. power amplifier. This is capable of an r.f. output of between 1 and 3W, depending upon the band and the amount of drive from the oscillator.

The collector resistor of the oscillator can be adjusted to give the appropriate drive and the 4.7kΩ resistor shown in the circuit diagram is a useful compromise value. (Although a VN10KLS will be hard pressed to produce more than about 1W at 14MHz or above).

A radio frequency choke (r.f.c.) provides the load for the drain of the m.o.s.f.e.t. This is made by threading 10 or 12 turns of small gauge wire (32 or 34s.w.g.) through the hole of a small ferrite bead.

Making the ferrite bead choke is not as difficult as it might appear! But try to avoid scratching the enamel off the wire as it passes through the bead.

The ferrite bead added to the gate lead of the VN10KLS is an optional extra. It can help prevent spurious oscillation, but I have never experienced the problem with this circuit. It's just the "belt and braces" approach!

Transistor Switch

A *pnp* transistor switch is used to key the power amplifier. However, a simpler version could be made by inserting a key between the top of r.f.c. and the 12V power line. (The series transistor keying is a better option because it keys the transmitter to the circuit ground).

The *pnp* transistor may be any switching transistor capable of handling the current demanded by the power amplifier. I used a ZTX751, the component used in the original 'ONER', but the more common 2N3906, or similar devices, would serve the purpose.

Three Element Filter

To remain within the 20 parts I had to use a 3-element low-pass filter...and I suspect this only takes the transmitter to the edge of harmonic emission acceptability. (The values for the low pass filter are shown in **Table 1**).

The more circumspect constructor would probably use the **W3NQN** designed 7-element low pass filters*, which I have described from time to time in this column. Remember...just because a QRP transmitter only emits a small amount of radio frequency power...there's no excuse for a 'dirty' signal!

Band (MHz)	C1 (pF)	C2 (pF)	Turns	Wire Dia (mm)	Core (type)
1.8	820	820	33	0.32	T37-2
3.5	470	470	23	0.32	T37-2
7.0	220	220	17	0.45	T37-2
10.1	150	150	16	0.45	T37-6
14.0	100	100	14	0.45	T37-6
18.068	82	82	12	0.45	T37-6
RFC	12 turns of 0.25mm Dia copper wire on a ferrite bead				

WT2197

Table 1: The values required for the low-pass filter on different bands (see text).

* One of the most effective series of filters was described by Ed Wetherhold W3NQN in Filters - Cutting The Edge in *PW* July 1998. **Editor**

The Prototype

The prototype transmitter is shown in the photograph, **Fig. 2**. I built it on a small piece of Perfboard. A p.c.b. mounted connector block is used to hold the low pass filter, **Fig. 3** and **4**. (It's a four terminal block with one of the two centre screw terminals removed).

In my project, the spacing between the outer terminals is just enough to fit a small low-pass filter. The filters are screwed into place according to the band being used.

The board also includes a p.c.b. mounting jack socket for a 3.5mm for the key and a phono socket for the output. I used a trimmer capacitor for the VXO control, but others may prefer to use a variable capacitor with a shaft that can take a knob. (If this option is used, remember that the variable capacitor will have to be isolated from the circuit 'ground').

So, there it is...we have a small transmitter, with less than 20 parts capable of putting a viable signal on to a range of Amateur bands. Try it out and see for yourself.

The 'ONER' is known for good results. I well remember meeting a member of the G-QRP Club some years ago who had worked over 30 countries using a 'ONER' transmitter on 14MHz with only a simple wire antenna.

So, why not set yourself the task of seeing how many countries you can work with less than 20 parts? Or perhaps try to contact 20 countries with 20 parts?

PW

Noise Eliminating Add-Ons from bhi

Rob Mannion G3XFD takes a look at two interesting add-on units aimed at providing in-line noise elimination. Both are from the bhi stables...a company aiming to provide reasonably priced d.s.p. facilities!

In the recent past, digital signal processing (d.s.p.) was affordable for only the rich or extremely dedicated radio enthusiast. The choice was simple...either buy a very expensive d.s.p.-equipped radio or an almost equally expensive 'add on' unit.

From the very outset in their marketing to the hobby radio enthusiasts, East Sussex-based bhi have been trying to overcome the often quoted phrase "d.s.p. is expensive...I can't afford it" problem...and are doing well in their attempts. Time will tell...but I suggest you 'watch this space' because it's my personal opinion that bhi won't be long in bringing a budget-priced fully featured d.s.p. unit onto the UK market.

Latest Products

The latest products from bhi are 'variations on a theme' of their existing products...but are nonetheless useful, especially as they're now presented in such a versatile way. The first unit - the NEIM1031, **Fig. 1**, is particularly neat and surprisingly stylish-looking considering it's just the proverbial 'Black Box' with white lettering. It also works well!

● Fig. 1: The bhi NEIM1031 in-line noise elimination module. The unit is operated from an external 12 to 24V d.c. input, and can be conveniently operated from the shack 13.8V supply. Power is applied (top right) via the ubiquitous female coaxial plug-in sockets we're so familiar with nowadays. The centre connection is the positive connection.

In the information booklet supplied with the NEIM1031, bhi state that "the in-line noise elimination module incorporates digital signal processing technology to remove unwanted background noise and interference from speech". So, let's take a deeper look at the unit.

In use, the NEIM1031 provides eight switchable levels of noise cancellation, see Fig. 1. This allows the user to optimise the unit for their level of noise and interference.

Noise attenuation up to -35dB is possible, with eight separate switched levels. The line input can accept inputs from 300mV to 2V r.m.s. with an input impedance of 10kΩ. The line output impedance is 100Ω.

The module is provided with connections for low and high level audio signals. It's designed to be easily connected into the path of noisy signals where the intelligibility and clarity of speech needs to be improved. **Note:** the NEIM1031 is **not designed** to be used with music (it's electronically 'tailored' for speech frequencies).

A motor vehicle style in-line fused lead - as used in car radios - (not shown in photograph), is provided with the NEIM1031 power lead which is shown plugged into the unit in Fig. 1. Also provided is a 1.2m length of coaxial audio cable, terminated at either end with mono 3.5mm jack plugs.

● Fig. 2: The mono audio input (switchable to either the phono or jack sockets) is provided with both an RCA phono and a 3.5mm jack socket. The audio line output (right) on the NEIM1031 is similarly equipped with a RCA phono socket and 3.5mm jack socket but does not incorporate switching (see text). Note: This end of the unit is referred to as the 'rear' within the bhi information booklet.

● Fig. 3: The 3.5mm headphone socket on the NEIM1031 is recessed, at the opposite end to the input/output connections (see text).

Sockets & Connections

Let's now look at the sockets and right connections! The phono sockets, in **Fig 2**, are used for low level audio signal input, while the 3.5mm mono jack socket alongside is for

speaker-level audio input.

Power for the unit is applied via a standard coaxial female-to-male (with the male mounted inside the unit and on the main p.c.b.). The instruction booklet provided by bhi clearly states the unit can be powered using voltages ranging from 12 to 24V. I ran the unit from my shack 13.8V p.s.u. but the 24V capability should prove useful for use in marine and heavy goods vehicle (HGV) applications.

● Fig. 4: Front panel view of the bhi 1042 audio switch box. This simple but effective unit allows a combination of audio sources and loads to be used with the NEIM1031 (see text).

● Fig. 5: Rear panel view of the bhi 1042 audio switch box. All the inputs and the one output are provided with 3.5mm jack plug sockets.

Effective & Easy

As with previous bhi products providing the same basic facilities...the NEIM1031 proved effective and easy to use. To be frank...I think this presentation of the bhi approach to noise reduction is the best so far...with only one problem to solve.

On the Amateur bands - particular 7MHz - the noise reduction was very helpful indeed. And although bhi don't claim the unit as being effective for 'static crashes'...it certainly reduced this annoying effect during the thunderstorms experienced in the south in mid July! It was also very effective on the h.f. broadcasts bands...and even through the circuitry is optimised for communications rather than broadcast reception, it proved very effective.

Setting up is simplicity itself and I kept the unit so it would be next to my left hand... it could be adjusted quickly. Input level setting is aided by a **OK** green l.e.d. and an **Overload** red l.e.d. The filtering level is set by a pre-set type (p.c.b. mounting) rotary switch which has a very narrow grip (with adjusting slot) protruding out of the front panel marked with **0 = Min**, **Max = 7** .

Tex Swann G1TEX and I found the little **Filter Level** p.c.b. mounting style rotary switch (with minuscule scale markings) very small and fiddly to use. Even **Donna G7TZB**, found it to be fiddly. However, in practice...all you have to do is to occasionally rotate it for the best results. Perhaps a larger knob* - with the relevant figures silk-screened on the front panel would be better?

Note:* *Graham Somerville, the bhi Marketing Director informed me that due to customer feedback, this control is being changed for new production runs. It's larger and the marking is screen-printed onto the case. Existing owners of the NEIM1031 can purchase pre-prepared level scale labels direct from bhi (see contacts panel).* ***Editor*.

In summing up I can only say that this product is as effective as previous bhi products. However, this presentation is certainly the most versatile so far and when used in conjunction with the 1042 switch box...it could prove even more useful.

The next logical step is more facilities...and I think that won't be long in coming. My thanks go to bhi for the loan of the units for review and I look forward to their next idea with relish as reasonably priced d.s.p. is very welcome.

pw

Product

bhi NEIM1031 noise eliminating module and 1042 switch box

Company

bhi Ltd.

Contact

(0870) 2407258
E-mail:
Sales info@bhinstrumentation.co.uk

Pros and Cons

Pros: *Versatile and simple and effective to set up and use.*

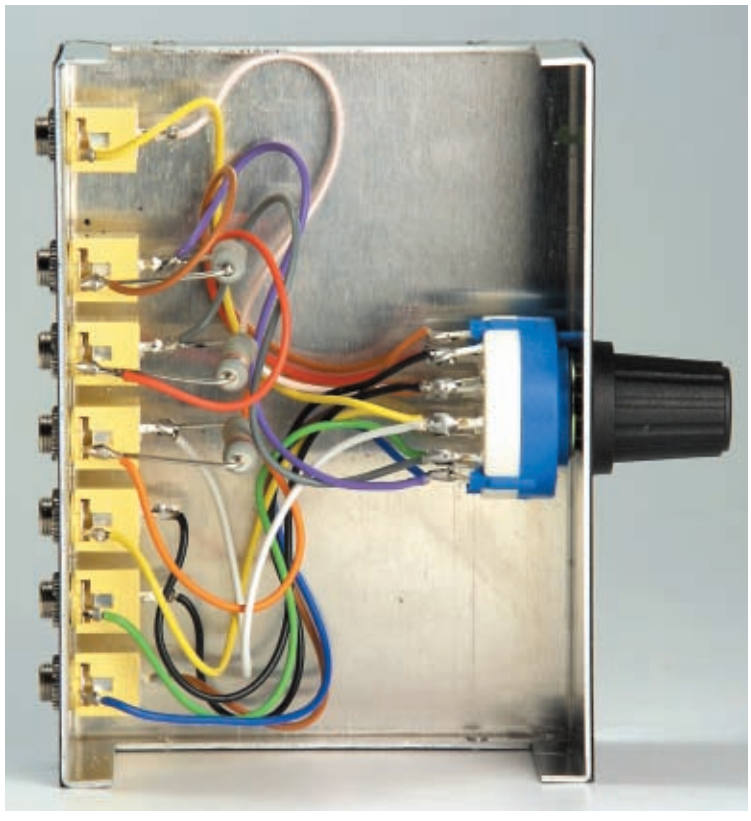
Cons: *Filter level control 'fiddly' to use (see text for bhi update).*

Price

The NEIM1031 costs £129.95 plus £6.95 P&P (if required, a power supply, the 1030-UKPA is an optional extra). The 1042 Switch box costs £29.95 plus £2.75 P&P.

Supplier

bhi Ltd.
22 Woolven Close
Burgess Hill
West Sussex
RH15 9RR



● Fig. 6: Inside view of the 1042 switch box. Despite its simplicity the switch box allows the user to select a useful number of audio sources to be fed onto the in-line noise eliminating NEIM1031 module.

Just How Accurate?

Walter Farrar G3ESP, takes a look at the need for accuracy in calculations, and asks if it's really necessary!

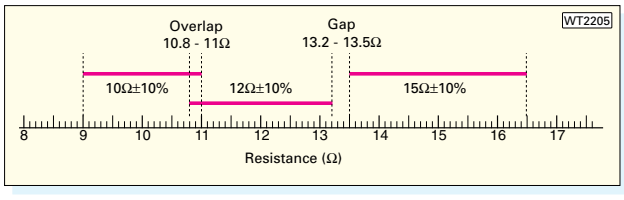
"Why the question mark in the title"? I hear you ask. Well, before examining accuracy, you need to know what the word means. My *Chambers Dictionary* gives its definition as: "correctness, exactness". A good description, but **how** correct, exact or accurate can one be?

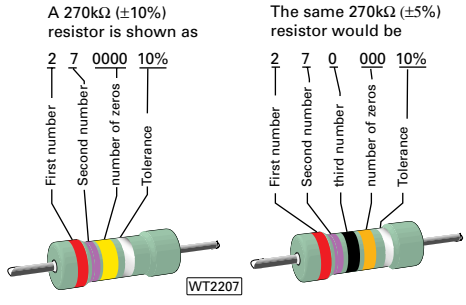
No measurement is absolute! Every measurement almost invariably depends on at least one or more other measurements. The speed of radio waves (and light) is given as 300 million metres per second in free space, meaning two measurements are involved.

The speed of light figure depends on the accuracy of a defined length (metre) and time (second). Both of these values, have in turn, had to be measured! Extremely sophisticated experiments have determined the value of a metre and of a second to a high degree of accuracy - a degree of accuracy that we ordinary mortals cannot hope to achieve.

Consider the common mathematical value 'π ' (the Greek letter 'pi'), used in mathematics and electronics calculations. At school, I first learned that the value of π was 'three and one seventh' or 22/7. Though this figure turns out to be non too accurate, improvements in accuracy were made as I went through school, from 3.142, though 3.14159 and beyond.

It seems that the number of decimal places for this simple factor π can go on and on. Ages ago, long before the computer was invented, the value of π was determined to over a thousand decimal places!





● Fig. 1: The range of the first three values in the E12 series showing both overlap and a gap in possible values for these components.

Component Accuracy

Now let me turn to the the accuracy of components used in electronic circuits. You need resistors and capacitors and possibly inductors (coils) of various values to build an electronic project. But just how accurate are these components nominal values?

As a lad in the 1930s I took all component values at their face value and the (simple) circuits worked. It never occurred to me then that, for example, a simple 250Ω resistor could be anywhere between 225 and 275Ω , being 250±10%. In fact, in those far off days, it wasn't unusual to have components that could vary by as much as 20% (one-fifth) of their nominal value!

A system of 'preferred values' was introduced, for ±20% components the E6 series was created. Followed by the E12 series for ±10% component values. The E12 series gave nominal component values of: 10, 12, 15, 18, 22, 27, 33, 39, 47, 56, 68, 82, 100, 120, 150, 180...etc. and are shown in **Table 1**.

Consider as an example the first three values in the E12 series, the values 10, 12 and 15 for resistors as shown in **Fig. 1**. The first nominal value is 10Ω , though its actual value may be between 9-11Ω . The 12Ω resistor may have a value between 10.8-13.2Ω. While the 15Ω ±10% resistor can be between 13.5 and 16.5Ω .

The first three nominal values in the ±10% tolerance range can cover a variety between 9 and 16.5Ω . Note that it's possible that a 12(±10%)Ω resistor could actually be lower in value than a 10(±10%)Ω resistor. Note also that there's a 'gap' between the minimum value of a 15Ω ±10% resistor and the maximum value of a 12Ω ±10% one.

As manufacturing techniques improved, closer tolerance values of ±5% (E24 series), ±2.5% (E96 series) down to ±0.1% were produced. This higher degree of accuracy of course requires a greater number of nominal values. Due to the manufacturing tolerances, capacitors too, are manufactured in the same series of values.

If a 'matched pair' of resistors is needed (i.e. two of identical value) then ±1% tolerance resistors should suffice. Though to be pernickety, you need a digital meter to select from a number of similar resistors.

Electronic Calculators

In the days when I was teaching Physics, students used their electronic calculators to produce apparently accurate results such as 9.9137465. Because the calculator had an eight figure read-out, it was therefore felt to be very accurate. Not so!

Consider a simple resistor network: 27Ω in parallel with 27Ω . Mental arithmetic easily gives a correct result: 13.5Ω

$$\frac{1}{R} = \frac{1}{27} + \frac{1}{27}$$

Using the above formula, my eight figure calculator produces the answer as 13.500013, which is slightly wrong! It is a fact that the answer to a calculation cannot be more accurate than any of its component parts. Stated more simply, the answer cannot have any more significant figures than any one component part (the first significant figure is, when reading the number from the left, the first non-zero).

Let's now apply this argument to a more complex case! A tuned circuit is required to resonate at a frequency (F) of 3.560MHz, using a tuning capacitance of 200pF (0.000200μF). The question is: What's the required value of inductance for resonance in the above case?

$$L = \frac{1}{(2\pi F)^2 C}$$ Where C = 0.0002μF and F = 3.560MHz

$$= \frac{1}{(2\times\pi\times 3.56)^2\times C}$$

$$= \frac{1}{(2\times 3.14159\times 3.56)^2\times 0.0002}$$

The answer, 9.9933544(μH) shown on my calculator was derived when using 3.14159 as

the value for π . When using a value of three and one seventh (22/7 - beloved of maths teachers), my calculator gave an answer of 9.9853016µH.

Either of the two figures just mentioned is, for all practical purposes, still 10µH. So, who needs to use a value of π given to thousands of decimal places? Or in fact, do you even need a value of π to four or five decimal places?

In either the calculations, the frequency was quoted to four significant figures and the capacitance was given to three significant figures (200pF). The resultant answer should therefore not have more than three significant figures, ie. 9.99µH (when rounded out) in each case. Or in practice and reality, a figure of 10µH for the inductance may be taken.

A popular way to make the inductor (coil) is to wind a suitable coil on a toroidal core. Let me assume that that's what we are to do, using a T50-6 toroidal core. (*Winding coils using toroidal cores has been explained in articles, published in other issues of PW. Editor*)

So, after looking up the winding details for the T50-6 toroidal core, we find the formula:

$$L = \frac{5N^2}{1000}$$ L is the inductance, N is the number of turns

$$N^2 = \frac{10 \times 1000}{5} = 2000$$

$$N = \sqrt{2000} = 44.7 \text{ turns}$$

Since, on a toroidal core, it's only possible to have a whole number of turns, the value of N in the above equation, turns out to be 45. The problem is that when using the figure of 45 for N in the above formula, the inductance value (L) works out at 10.1µH.

The discrepancy of inductance value can be accommodated by having part of the 200pF as a small trimmer. Since you cannot guarantee the precise values of the fixed, variable and trimmer capacitors which make up the quoted 200pF there's no need for great practical precision elsewhere. A coil with a tuning slug or a trimmer capacitor can always put you right on the required frequency without the need for too great accuracy.

E6 (±20%)			E12 (±10%)			E24 (±5%)		
Low	Nom.	High	Low	Nom.	High	Low	Nom.	High
0.83	**1.00**	1.20	0.91	**1.00**	1.10	0.95	**1.00**	1.05
						1.05	**1.10**	1.16
			1.09	**1.20**	1.32	1.14	**1.20**	1.26
1.25	**1.50**	1.80				1.24	**1.30**	1.37
			1.36	**1.50**	1.65	1.43	**1.50**	1.58
						1.52	**1.60**	1.68
			1.64	**1.80**	1.98	1.71	**1.80**	1.89
1.83	**2.20**	2.64				1.90	**2.00**	2.10
			2.20	2.42	2.10	2.10	**2.20**	2.31
						2.29	**2.40**	2.52
			2.45	**2.70**	2.97	2.57	**2.70**	2.84
2.75	**3.30**	3.96				2.86	**3.00**	3.15
			3.00	**3.30**	3.63	3.14	**3.30**	3.47
						3.43	**3.60**	3.78
			3.55	**3.90**	4.29	3.71	**3.90**	4.10
						4.10	**4.30**	4.52
3.92	**4.70**	5.64	4.27	**4.70**	5.17	4.48	**4.70**	4.94
						4.86	**5.10**	5.36
			5.09	**5.60**	6.16	5.33	**5.60**	5.88
						5.90	**6.20**	6.51
5.67	**6.80**	8.16	6.18	**6.80**	7.48	6.48	**6.80**	7.14
						7.14	**7.50**	7.88
			7.45	**8.20**	9.02	7.81	**8.20**	8.61
						8.67	**9.10**	9.56
8.33	10.00	1.20	9.09	10.00	11.00	9.52	10.00	10.50

WT2206

● Table 1: The E6, E12 and E24 series of component values compared, showing both upper and lower figures as well as the nominal values.

Final Point

One final point! Colour codes are also getting complicated, with some resistors having as many as six coloured bands.

Moreover, it is sometimes difficult (I find) to decide whether a band is orange or red. It's best to check them with an ohmmeter...just to be accurate! *pw*

RADIOW

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ICOM

IC-2725E

KENWOOD

TS-2000

YAESU

FT-1000MP

MFJ

MFJ-259B

NES10-2

IC-756PROII

TS-570DGE

FT-817

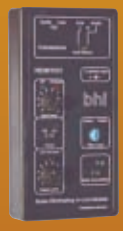
MFJ-949E

FT-920AF

IC-703

FT-847

FT-857



NEIM-1031

ALINCO

MODEL	PRICE
DX-701	£629.00
DX-70TH	£599.00
DX-77	£499.00
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-M06	£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
EDX-2	£299.00
DJ-X2	£165.00
DR-140	£219.00
DJ-596	£199.00
DJ-C1	£99.00
DJ-C4	£99.00
DR-M03	£239.00
DM-330MVZ	£129.00

ICOM

MODEL	PRICE
IC-756ProII	PHONE
IC-7400	£1,299.00
IC-910H	£1,100.00
IC-706MkIIG	£789.00
IC-703	£575.00
IC-718	£449.00
IC-2725E	£299.00
IC-207H	£275.00
IC-2100H	£225.00
IC-E90	£269.00
IC-T3H	£129.00
IC-R8500	£1,199.00
IC-R75	£599.00
IC-PCR1000	£329.00
IC-PCR100	£229.00
IC-R3	£369.00
IC-R10	£275.00
IC-R5	£169.00
SM-20	£125.00
SP-21	£69.00
AT-180	£329.00
FL-100	£59.95
FL-103	£59.95
FL-223	£59.95
FL-232	£59.95

KENWOOD

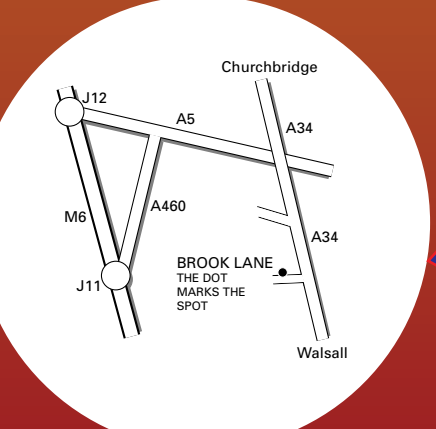
MODEL	PRICE
TS-2000X	£1,800.00
TS-2000	£1,550.00
TSB-2000	£1,499.00
TS-870S	£1,299.00
TS-570DGE	£829.00
TS-50S	£599.00
TM-D700E	£429.00
TM-V7E	£375.00
TM-G707E	£279.00
TH-D7E	£299.00
TH-F7E	£249.00
TH-G71E	£210.00
RC-2000	£199.00
PS-52	£229.00
PS-53	£229.00
PS-33	£199.00
MC-60A	£110.00
MC-80	£69.95
SP-31	£82.00
SP-23	£68.95
SP-50	£27.95
YK-88C-1	£61.95
YK-88S-1	£61.95
YK-88SN-1	£61.95
YK-88CN-1	£61.95

MFJ

MODEL	PRICE
MJF-16010	£56.95
MFJ-989C	£379.95
MFJ-986	£349.95
MFJ-934	£189.95
MFJ-924	£74.95
MFJ-921	£74.95
MFJ-969	£199.95
MFJ-914	£64.95
MFJ-962D	£279.95
MFJ-949E	£159.95
MFJ-910	£24.95
MFJ-906	£89.95
MFJ-948	£139.95
MFJ-903	£54.95
MFJ-945E	£119.95
MFJ-941E	£129.95
MFJ-901B	£85.95
MFJ-212	£79.95

YAESU

MODEL	PRICE
FT-1000MkV	£2,400.00
FT-1000MkV-FIELD	£1,899.00
FT-847	£1,145.00
FT-920	£1,049.00
FT-897	£985.00
FT-857	£795.00
FT-817	£549.00
FT-840	£499.00
FT-8900R	£339.00
FT-7100M	£299.00
FT-2800M	£179.00
FT-1500M	£159.00
VX-7R	£299.00
VX-1R	£115.00
VX-150	£110.00
VR-5000	£549.00
FRG-100	£399.00
VR-500	£199.00
VR-120D	£159.00
VR-120	£139.00
MD-200A8X	£225.00
MD-100A8X	£99.00
FC-10	£299.00
FC-20	£225.00
FC-30	£229.00



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E&OE

USED EQUIPMENT

Accom	2000A	ATU HF Amp	£2,995.00
ADI	AT-600D	Dual band Handheld Transceiver	£129.00
Adonis	AM-805G	Desk Microphone, with Built In Compressor, and VU Meter	£70.00
AEA	MM-3	Morse Machine	£30.00
AEA	PK-232MBX	TNC	£125.00
AEA	PK-900	TNC	£200.00
AEA	PK-96	TNC	£90.00
AKD	6001	6m FM Transceiver	£135.00
ALAN	HQ-2000	2kW 26 - 30Mhz SWR / Watt Meter	£25.00
Alinco	DJ-G5EY	Dual Band Handheld	£199.00
Alinco	DJ-X10	Wide Band Receiver	£200.00
Alinco	DJ-X3	Handheld Scanner	£99.00
Alinco	DR-150	2m Transceiver with Air-and Receive	£150.00
Ameritron	QSK-5	Amplifier Switch / Pre Heat	£200.00
AOR	AR-7030	Top Receiver	£550.00
AOR	AR-7030+	HF Receiver	£625.00
AOR	AR-8600	Base Scanner / Receiver	£425.00
AOR	AR-8600-MkII	Base Scanner / Receiver	£525.00
AOR	ARD-2	Decoder	£200.00
Bencher	YA-1	Low Pass Filter (1.8 - 30MHz)	£25.00
BNOS	12/40A	Top Quality 40 Amp Power Supply	£175.00
BNOS	LMP144-25-180	180 Watt 2m Amplifier	£200.00
Comet	CD-20		£40.00
Comet	CD-270D	SWR Power Meter	£49.00
Commtel	COM-510	Wide Band Scanner	£80.00
Cybernet	BETA-3000	Original 40 Channel CB	£40.00
Daiwa	CL-22		£20.00
Daiwa	CN-1001	Auto ATU	£99.00
Daiwa	CN-103L	2m / 70cms Cross Needle SWR Meter	£40.00
Daiwa	CN-540		£20.00
Daiwa	DK-210	Electronic Keyer	£60.00
Daiwa	LA-20		£99.00
Datong	ASP	Automatic Speech Processor for FT-817, FT-77 etc.	£70.00
Datong	FL-2	Filter	£60.00
Datong	RFA	Broad Band Amplifier	£20.00
Diamond	SX-100	SWR & Power Meter - 1.6 - 60MHz	£65.00
Drake	R-7A	HF Receiver	£500.00
Drake	SW-8	World Band HF Receiver	£375.00
ERA	ERA	Microreader	£60.00
Euro	EA-150	CB Amplifier	£20.00
Fairhaven	RD-500VX	Wide Band Receiver	£525.00
Fujion	F-2000A	Direction Finder (AM, FM, MAR, LW, VHF)	£99.00
Global	AT-2000	Manual Short Wave Tuner	£60.00
Grundig	SAT-100	Satellite Receiver	£400.00
Heil	ProSet 4	Headset HC-4 Insert Fitted	£75.00
Heil	ProSet 5	Headset HC-5 Insert Fitted	£75.00
Howes	CTU-9	Receive Antenna Tuner	£10.00
Icom	AT-150	Automatic ATU for IC-735 etc.	£175.00
Icom	AT-160	Automatic ATU	£175.00
Icom	AT-500	Automatic ATU	£275.00
Icom	BC-30	Battery Charger	£25.00
Icom	CM-35	Mains Battery Charger	£20.00
Icom	CT-16	Satellite Unit	£80.00
Icom	IC-2100H	2m FM Mobile Transceiver	£150.00
Icom	IC-229A	2m Mobile Transceiver	£100.00
Icom	IC-2500E	70 / 23 cms Dual Band Mobile (RARE!!!)	£295.00
Icom	IC-2710H	Dual Band Mobile	£225.00
Icom	IC-271E	2m Multimode Transceiver - 25W	£299.00
Icom	IC-275E	2m Mobile / Base Transceiver	£245.00
Icom	IC-2GE	2m Multimode Transceiver	£60.00
Icom	IC-32E	2m / 70cms Handheld Transceiver	£99.00
Icom	IC-451E	70 cms Base AC	£299.00
Icom	IC-471E	70cms Multimode Transceiver	£299.00
Icom	IC-490E	70cms Mobile Transceiver	£250.00
Icom	IC-505	50 MHz Multimode Transceiver	£275.00
Icom	IC-575A	50 MHz Multimode Transceiver	£450.00
Icom	IC-707	HF All Mode, General Coverage Transceiver	£375.00
Icom	IC-7100	25 - 2000 RECEIVER	£575.00
Icom	IC-71E	Receiver	£325.00
Icom	IC-718	HF Transceiver	£399.00
Icom	IC-720A	HF & FM Transceiver	£400.00
Icom	IC-728	HF Transceiver	£400.00
Icom	IC-735	Base Or Mobile Transceiver	£399.00
Icom	IC-738	HF Base Transceiver Built in PSU & ATU	£599.00
Icom	IC-740	HF Base Transceiver	£350.00
Icom	IC-746	HF / 6m / 2m Built In ATU	£650.00
Icom	IC-751	HF Base Station With Built In PSU, General Coverage	£425.00
Icom	IC-756	HF / 6M All Band Transceiver	£950.00
Icom	IC-756pro	High Class Transceiver	£1,400.00
Icom	IC-781	Icom Top Class Transceiver	£1,600.00
Icom	IC-821H	Dual Band Base - All Mode	£599.00
Icom	IC-910	2m / 70cms Base Transceiver	£999.00
Icom	IC-R100	100kHz - 1.85GHz Receiver	£199.00
Icom	IC-R2	Handheld Scanner	£99.00
Icom	IC-R7000	MINT CONDITION!!! Receiver	£550.00
Icom	IC-R71E	Receiver	£325.00
Icom	IC-R72	Receiver	£350.00
Icom	IC-T21E	2m Handheld Transceiver	£60.00
Icom	IC-T8E	Quad Band Handheld Transceiver	£175.00
Icom	IC-W2E	2m / 70cms Handheld Transceiver	£140.00
Icom	PS-55	Power Supply Matching IC-735	£100.00
Icom	RC-7000	Remote Control	£40.00
Icom	SM-5	Desktop Microphone	£25.00
Icom	SM-6	Desktop Microphone	£30.00
Icom	SM-8	Desktop Microphone	£75.00
Icom	SP-12	Speaker	£30.00
Icom	SP-20	External Speaker	£99.00
Icom	SP-3	Speaker	£20.00
Icom	SP-3	MINT CONDITION!!! Speaker	£50.00
Icom	SP-7	Speaker	£20.00
Icom	UT-84	Tone Squelch Unit	£25.00
Icom	WR-2000	SWR & Power Meter with 3 Modules	£99.00
JPS	NIR-10	Noise / Interference Reduction Unit	£99.00
JRC	JST-245	HF 50MHz 1500w AC Base Transceiver	£1,295.00
JRC	NRD-345N	HF Receiver	£275.00
JRC	NRD-525	HF Receiver	£375.00
JRC	NRD-545DSP	HF DSP Receiver	£975.00
JRC	NRD-L2000	1kW Linear Amplifier Solid State (VERY RARE!!!)	£1,600.00
Kamtronics	KAM	Multimode TNC	£140.00
Kent	RA	Morse Paddle Key	£40.00
Kenwood	BC-15	Rapid Charger	£35.00
Kenwood	DM-81	Dip Meter Including Coils	£55.00
Kenwood	HS-5	Headphones	£25.00
Kenwood	LF-30A	Low Pass Filter	£30.00
Kenwood	MC-60A	Desktop Microphone	£70.00
Kenwood	MC-80	Desk Microphone	£40.00
Kenwood	MC-85	Desk Microphone	£85.00
Kenwood	PS-10	Power Supply for TR-9130 etc.	£40.00
Kenwood	PS-31	Power Supply (TS-870, TS-850, etc)	£135.00
Kenwood	PS-430	Power Supply	£100.00
Kenwood	PS-50	Power Supply	£145.00
Kenwood	R-5000	Receiver	£499.00
Kenwood	R-5000	Receiver With VHF Converter	£600.00
Kenwood	R-600	Receiver	£175.00
Kenwood	RZ-1	Wide Band Receiver - Car Radio Size	£130.00
Kenwood	SP-230	Speaker	£40.00
Kenwood	SP-430	Speaker	£45.00
Kenwood	SW-100E	SWR Meter	£25.00
Kenwood	SW-200A	SWR Meter	£60.00
Kenwood	TH-215E	2m Handheld Transceiver	£99.00
Kenwood	TH-235	2m Handheld Transceiver	£85.00
Kenwood	TH-47E	70cms Handheld Transceiver	£80.00
Kenwood	TH-79E	2m / 70cms Handheld Transceiver	£175.00
Kenwood	TH-F7E	Dual Band Handheld	£199.00
Kenwood	TH-G71E	Dual band Handheld Transceiver	£170.00
Kenwood	TL-120	Low Drive Linear Amplifier 100W HF	£150.00
Kenwood	TL-922	1 kW Amplifier	£899.00
Kenwood	TM-241E	2M Mobile Transceiver	£120.00
Kenwood	TM-251E	Mobile Transceiver	£140.00
Kenwood	TM-255E	2m Multimode Transceiver (Fair Condtion)	£299.00
Kenwood	TM-255E	2m Multimode Transceiver (MINT)	£395.00
Kenwood	TM-431E	70cms Mobile Transceiver	£110.00
Kenwood	TM-451E	70cms Mobile Transceiver - Data Ready	£175.00
Kenwood	TM-455E	70cms Multimode Mobile Transceiver	£450.00
Kenwood	TM-D700E	Dual Band Built In TNC	£299.00
Kenwood	TR-2400	2m Handheld Transceiver	£50.00
Kenwood	TR-751E	2m Multimode Transceiver	£250.00
Kenwood	TS-450SAT	HF Base / Mobile With Built In ATU	£550.00
Kenwood	TS-50S	HF Mobile / Base Variable Power	£425.00
Kenwood	TS-520	HF Base Transceiver	£99.00
Kenwood	TS-570DGE	Mobile / Base HF Transceiver	£675.00
Kenwood	TS-60S	6m 100W Mobile Transceiver	£450.00
Kenwood	TS-850SAT	HF Base Station with Built In ATU	£699.00
Kenwood	TS-940SAT	Mains HF Base Transceiver with Built In ATU	£599.00
Kenwood	TS-950SD	HF 150W DSP Base Station	£1,200.00
Kenwood	TS-950SDX	Kenwood's Flag Ship	£1,650.00
Kenwood	VC-10	VHF Converter	£99.00
Kenwood	YG-455CN-1	270Hz CW Crystal Filer	£100.00
Kenwood	YK-88C-1	500Hz CW Narrow Filter	£40.00
Kenwood	YK-88CN1	270Hz CW Filter 8.83MHz	£40.00
Kenwood	YK-88S-1	2.4KHz SSB Narrow Filer 8.83MHz	£40.00
Kenwood	YK-88SN	1.8K SSB Filter	£40.00
Kenwood	YK-88SN-1	1.8KHz SSB Narrow Filter 8.83MHz	£40.00
Linear Amp	6 METRE	6m Linear Amplifier	£550.00
Lowe	HF-225	HF Receiver	£150.00
Lowe	HF-350	HF Receiver	£295.00
MFJ	MFJ-1272B	TNC / Mic Switch	£20.00
MFJ	MFJ-1278	TNC All Mode	£175.00
MFJ	MFJ-207	HF SWR Analyser	£50.00
MFJ	MFJ-259B	HF / VHF Analyser	£175.00
MFJ	MFJ-722	CW / SSB Filter with 5 Watts Amp	£59.00
MFJ	MFJ-784DSP	DSP Tunable Filter	£140.00
MFJ	MFJ-921	VHF 200 Watt ATU	£50.00
MFJ	MFJ-962D	1.8 - 30MHz, 1kW Antenna Tuning Unit	£199.00
MFJ	MFJ-971	Small HF Cross Needle ATU	£75.00
Microset	SR-100	Power Amplifier with Pre-Amp (100W Output)	£99.00
Microwave	28/144	28 / 144 MHz Transverter	£125.00
Microwave	MOD-144/30	30 Watt Amplifier	£79.00
Microwave	MML-144/100-S	100W 2m Amplifier	£99.00
Microwave	MML-432/50	50 Watt 70 cms Amp, with Built-In-PreAmp	£85.00
Microwave	Pre-Amp	Low Noise RF Switched Pre-Amp	£25.00
Midland	PowerPack	CB Power Pack (BOXED)	£50.00
Navico	AMR-1000	2m, FM Mobile Transceiver	£89.00
Nissei	TM-3000	1.6 - 60MHz, 10W / 3kW, SWR Meter	£49.00
OptoElectronics	MiniScout	Frequency Counter	£129.00
PacCom	TINY II	TNC	£99.00
PacCom	TNC-320	TNC	£90.00
PalStar	KH-6	6m Handheld Transceiver	£99.00
Pres. Lincoln	10 METRE	10 Metre Multimode	£175.00
Quantek	FC-2000	1MHz - 2.4GHz Frequency Counter	£30.00
RadioShack	Pro-60	200 Channel Handheld Scanner (30MHz - 999MHz, WITH GAPS)	£99.00
RevCo	RS-2000	60 - 519 MHz Home Base Scanner	£79.00
Revex	V-540	SWR Meter	£25.00
Sabtronics	8610B	Frequency Counter	£30.00
Sangean	ATS-909	World Band Receiver	£130.00
SEM	MultiFilter	MultiFilter	£20.00
SEM	SEM	QRM Eliminator	£20.00
SGC	SG-2020	HF Transceiver	£450.00
SGC	SG-231	Automatic Smart Tuner - HF / 6m	£275.00
SGC	SG-3030	All band Antenna	£200.00
Shure	444D	Desktop Microphone	£35.00
Signal	R-532	Airband Receiver	£99.00
Sommerkamp	FT-290R	2m Multimode Transceiver	£150.00
Sony	7600-D	Worldband Radio	£80.00
Sony	ICF-Pro80	Air Band Receiver	£40.00
Sony	SW-100E	FM/SW/MW/LW Portable Receiver	£90.00
Spectrum	RP-6S		£20.00
SSB Electronis	LT-23S	23cms Transverter	£450.00
Standard	C-156E	2m Handheld Transceiver	£125.00
Standard	C-500	Dual Band Handheld	£99.00
Standard	C-510	2m / 70cms Handheld Transceiver	£125.00
Standard	C-510E	Dual Band Handheld	£99.00
Standard	C-5900A	Tri-Band Mobile Transceiver	£299.00
Swedish	Key	Straight Morse Key	£25.00
Timewave	DSP-599ZX	DSP Filter	£225.00
Tokyo	HL-30V	2m - 25W Amplifier	£75.00
Tokyo	HL-35V	2m Power Amplifier with Pre-Amp	£89.00
Tokyo	HL-37V	Linear Amplifier	£60.00
Tono	MR-150	150 Watt 70 cms Amplifier	£175.00
Tono	T-777	Communications Terminal	£120.00
Tono	4M-70G	60 Watt UHF Transciever, Including Pre-Amp	£119.00
Transverter	QM-70	28/144 Transverter	£100.00
Trident	TRX-200	Latest Scanner	£175.00
Trio	TM-201A	2m Mobile Transceiver (Complete with Detachable Front &	£99.00
Trio	TR-9000	2m Multimode	£199.00
Trio	TR-9130	2m All Mode Transceiver	£250.00
Uniden	UBC-860XLT	Base Scanner / Receiver	£99.00
Watson	Hunter	Frequency Counter	£40.00
Watson	W-DB30	Dualband Amplifier	£89.00
Welz	AC-38M	200W Mobile Matching Network	£50.00
Welz	CH-20A	Antenna Switch	£15.00
Welz	CH-20N	Antenna Switch	£15.00
Welz	CT-150	Dummy Load	£50.00
Welz	CT-300	300W / 1kW Peak Dummy Load	£65.00
Welz	SP-15M	SWR Meter	£35.00
Welz	SP-380	SWR & Power Meter 1.8 - 500MHz	£30.00
WinRadio	WR-1550E	Trunking Software	£450.00
Yaesu	ATAS-100	Yaesu Active Tuning Antenna System	£175.00
Yaesu	FC-30	Automatic ATU - FT-897, FT-857	£189.00
Yaesu	FC-700	Tuner - AS BRAND NEW (BOXED)	£129.00
Yaesu	FEX-767-2m	2m Module for FT-767	£175.00
Yaesu	FEX-767-6m	6m Module for FT-767	£175.00
Yaesu	FL-2025	Amplifier	£90.00
Yaesu	FP-30	Power Supply - FT-897, FT-857	£189.00
Yaesu	FP-501DX	Low Pass Filter	£20.00
Yaesu	FP-700	Power Supply	£100.00
Yaesu	FP-707	Power Supply Unit	£80.00
Yaesu	FP-757GX	Power Unit for FT-757	£300.00
Yaesu	FR-101	HF, 2m, 6m Base Transceiver	£399.00
Yaesu	FRG-8800	Receiver Including Converter	£399.00
Yaesu	FRT-7700	Antenna Tuner for FRG-7700	£60.00
Yaesu	FRV-7700	Converter for FRG-7700	£60.00
Yaesu	FT-100	HF / 6m / 2m / 70cms Mobile Transceiver	£499.00
Yaesu	FT-100D	HF / 6m / 2m / 70cms Mobile Transceiver	£539.00
Yaesu	FT-1000MP-MkV	200W DSP HF Transceiver	£1,800.00
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DXPediti to Menorca

Can you combine a holiday with radio? Yes, of course you can says Carl Mason GW0VSW, who enjoyed a bargain break in Menorca. Read on...

My family and I were lucky enough to find a last minute bargain holiday to the Island of Menorca for one week during the school holidays. We flew from Cardiff airport for the two and a half-hour flight to Mao airport, arriving at around 2000.

Our destination was the resort of Playa del Fornells on the north coast, about 30 minutes drive from the airport. The brochure had some good photographs of the apartments we had booked and I thought there would be no problem in finding a suitable location for my antenna. How wrong I was!

The lovely Ciutadella Harbour, in the west of the city Menorca.

Islands Galore

The Island of Menorca is the second largest of the Balearic Islands, a group that includes Mallorca, Ibiza and Formentera. Lying 225km south east of Barcelona, the Island measures 53km from east to west and 23km at its widest point north to south. It has over 220km of coastline with more beaches than all the other Balearic Islands put together. The highest point is the mountain Monte Toro at 358m, which has spectacular views all over the Island.

There are cities at either end of Menorca. Mao, in the east, is the capital and there has been a city here since Roman times. There's a busy port that is protected by a large harbour.

The waterfront has many bars and restaurants around it whilst the surrounding area has an assortment of white washed buildings, both old and new. Here you can see the many cruise ships, ferries, luxury yachts and fishing boats that use the port.

In the west is the city of Ciutadella with its cathedral. Narrow streets fan out from the cathedral with many historic buildings rich in architecture. These date back to the 17th century when the Islands richest families settled here. Between these two cities lies a rural landscape of meadows and cattle, dry stone walls and market towns where Romans and Byzantines, British and Spanish colonists have all left their marks.

The fort at Ciutadella.

Time To Operate

As we were only on the Island for a week, we had decided to relax as much as possible. My operating times were to be early in the mornings whilst my family slept, and later in the afternoons if time allowed.

On previous holidays to the Islands of Zakynthos EU-052 and Tenerife AF-004 I had used a QRP plus, MFJ-971 tuner, half-size G5RV and battery power. This time I was going to use an IC-706 together with a new SEC-1223 switch mode power supply.

The IC-706 would give me the option of working QRP if conditions were good, or turn up the power a little if they were not - something I had not been able to do on previous holidays! This was going to be an 'all c.w.' week so my small ex-Admiralty Mk8 Morse key completed the station.

The apartment we had been given was on the ground floor at the end of a small block. There appeared to be nowhere to secure the G5RV, but help was not far away, as the couple occupying the room above us offered to let me tie the centre above their balcony at about 6m. One end dropped down at an angle of 45° to the windowledge of our bedroom whilst the other crossed over a small path to a convenient post on the adjacent block. With a power supply near the entrance to our apartment, I was ready to go!

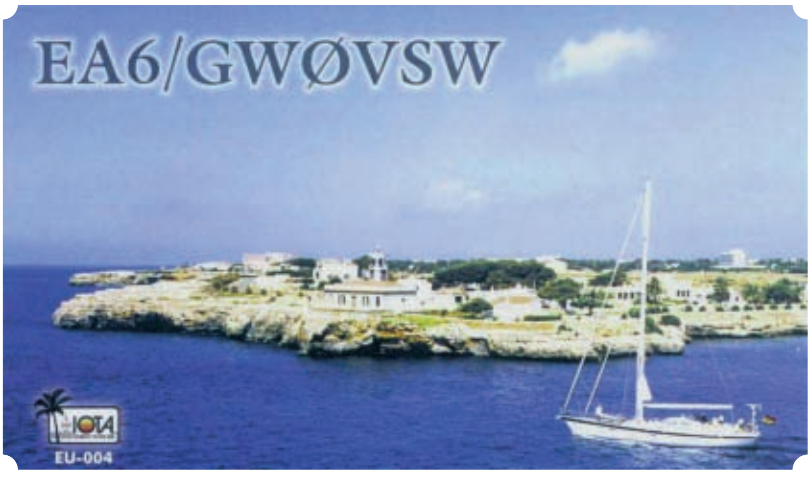
My First CQ

Band conditions on 14MHz were very good so that was where I made my first CQ call, which went out at 70W operating as EA6/GW0VSW at 1534UTC. Straight away, **Ian VE2DOH** in Beaconsfield near Montreal answered my call with a superb 599 signal. I was especially pleased because I have met Ian several times. He comes over to the UK to operate GB2RN, the Royal Navy Amateur Radio Station onboard HMS *Belfast* in London for our Easter activity week. My report was also 599, so the antenna was working well.

Then there followed a small 'pile-up' with stations from Germany (DL), Bulgaria (LZ), Czech Republic (OK), Belgium (ON), European Russia (UA) and Asiatic Russia (UA9) making it into my log. All had very good signals. I closed down at 1730UTC to get ready for our evening meal and by this time I was already looking forward to the next mornings operation.

The following day my alarm went off and after a quick coffee I was up and ready to go. The 14MHz band was again in good shape and at 0513UTC I called CQ. This time there followed a large pile-up with some very strong signals - especially from the USA. Calls that made the log this time included **Matt N2FOC** (USA) near Folsom, New York at 559, **Alf SM7ENF** (Sweden) at his home in Bor at 589 and **Ken VK3BXN** (Australia) in Melbourne who was also 559.

With conditions so good I dropped to 5W QRP and moved up to 14.060MHz and called for



● Carl GW0VSW's QSL card.

ion EU-004

● The equipment, consisting of my Icom IC-706 together with a new SEC-1223 switch mode power supply.

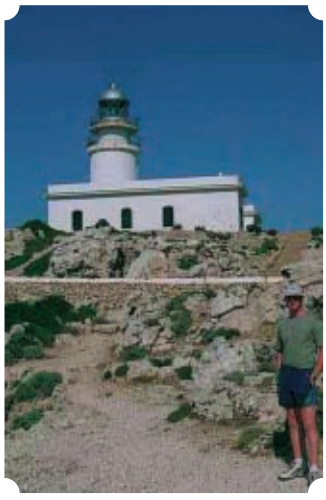
QRP stations. My first reply was from **Vitas LY2FE** in Klaipeda, a fellow GQRP club member who was using his new K2 transceiver and 2W into a long wire. Reports of 579 passed both ways.

Next came ARCI member **Jack W7CNL** (USA) in Boise, **Idaho** who was pleased to work EA6 for a new 2xQRP country. Despite some QSB and strong QRM, reports of 439 passed both ways before he faded into the background noise.

Good Performance

The IC-706 performed much better than I had expected and the 500Hz c.w. filter installed was a great help during the weeks' operation. The G5RV was also doing very well, considering its odd shape! I say 'odd shape' because after our first day on the beach, we returned to find a note from the complex manager asking us to remove the length of wire crossing over the path.

I removed the wire as I did not want to upset anyone. However, I was now at a loss as to where this end of the antenna was going to go. Once again the couple in the room above came to the rescue, allowing me to pin the wire under the gutter around the roof of their balcony.



In its new position the G5RV could hardly be seen, as one side of the antenna was now inverted and the other horizontal and folded. I had no other problems during the rest of our stay. It always amazes me just how well a wire antenna can work, even if it is not erected in an ideal position!

My morning operations continued, despite having to fight off the effects of the garden water sprinklers, which came on just before I got up. Most of my efforts concentrated on 14MHz, but other bands were also tried. The best DX on 24MHz was with **Ossi OH9JQF** (Finland) at 579 at 0739 with **Dick GI3OQR** (Northern Island) in Dungannon making it on 18MHz with another 599+ signal.

Staying on 10MHz was good between 0430 and 0830UTC. The best DX on this band was **John ZL1ALA** (New Zealand) in Ngatea, North Island, at 579 using 100W and a long wire antenna and **George ZL4SEA** in Hampden, South Island, at 549. Both of these contacts were made around 0515UTC.

Unfortunately, 7MHz was not good and very few stations replied to my CQ calls. The two replies I did receive were from **Bob F9OQ** (France) in Marseille at 0514 and **Stanley EA6ZY** on the nearby island of Ibiza at 1731UTC. Both stations had excellent signals peaking over 599.

Time To Explore

We spent most days on the nearby beach enjoying the sun or using hired canoes to explore the coastline. On one occasion we wanted to explore further afield and hired a car.

We toured around, visiting many of Menorca's smaller villages including Ferreries, the highest town at 150m and several prehistoric sites that include burial chambers, most of which are on private land but have free open access for visitors. The lighthouse at Cap De Cavalleria was well worth a visit, despite having to drive over several miles of rough dirt track to get there!

With excellent weather, food and of course wine, we were sorry to see our holiday come to an end. The stay had been one of the most relaxing weeks we have enjoyed for a long time, and I would say that Menorca is definitely an Island we shall be visiting again.

● Time for some radio!

● Well worth a visit - the lighthouse at Cap De Cavalleria.

In just one week, I had made 118 QSOs on five bands working 28 DX countries, using both high and low powers. It is always a good feeling to give someone a new country or IOTA. When I returned home to Wales the first of several direct QSLs had already arrived! Who knows where our next holiday will be? One thing is for sure though, I will be taking my radio equipment with me that's for sure! PW

Valve&Vintage

The brown dust-coated figure, enjoying the *Eagle* comic....indicates that Phil Cadman G4JCP is looking after the post war 'wireless' shop this month. And there's not much room with that G2DAF receiver on the counter!

Whew! A very warm welcome to the Valve & Vintage 'shop' this time. Crikey, the shop is so hot, I'm temporarily relocating to the Village Green to enjoy a cool drink and the sound of leather on willow. Hopefully you're enjoying the weather...but not letting summer activities distract you from thinking about new valve projects. I'll be mentioning some interesting valves later on in the column which you may like to try sometime. But first....let's look at receivers.

Last December I told you about **Ted Edwards G8HLJ** from the **Wirral**, planning to build all three versions of **G. R. B. Thornley's G2DAF** receiver. Ted finished the first design late last year and there's an impressive photograph, **Fig. 1**, to prove it. Well done Ted!

Ted used many of the original components as recommended by G2DAF; such as surplus crystals, AR88 switch wafers and an Eddystone 898 dial. The receiver is complete with *Q*-multiplier and noise limiter.

● Fig. 1: Ted Edwards G8HLJ's completed G2DAF receiver. He finished the first design late in 2002 (see text).

Accurate Measurements

In my June column, I asked if anyone knew an accurate method of measuring the frequency to which a (non-oscillating) t.r.f. receiver was tuned. The measurement could not rely on any previous calibration and I received two replies; one from **Gerald Stancey G3MCK** and the other from **Dave Bolton GM8UQC**. (Thank you gentlemen).

One suggested method would be to shock excite the tuned circuit and then measure the frequency of the resulting decaying oscillation (with the audio output would, of course, need to be muted). Unfortunately, there's doubt as to whether the decaying oscillation could be measured reliably.

Another method involves the use of an automatic grid-dip oscillator (g.d.o.) with the coil positioned near the tuned circuit and the instrument automatically swept over the receiver's tuning range. Once a dip is found, the g.d.o. frequency can be measured. The potential difficulty is finding the dip accurately enough.

Either way, the electronics needed to make the measurement would be very much more complex than any t.r.f. receiver. Looks like drawing lines on bits of card is here to stay, for the time being at least.

Cadman's Hi-Fi System

My hi-fi system uses a pair of refurbished Leak TL/12 plus amplifiers. They sound wonderful....but they do have a rather hungry appetite for EL84 output valves. Leak did tend to over-run them a little...no great problem in itself as inexpensive Russian-made EL84s are readily available.

However, I do like to use new old-stock (n.o.s.) valves wherever I can. That's out of the question with EL84s as they're rather expensive - so I use 6BQ5s, the American direct equivalent to the EL84. They used to be cheap and plentiful but unfortunately, that's no longer the case.

With my stock of 6BQ5s running low, I've been looking for another n.o.s. alternative. So far I haven't found anything, but while looking, I came across a curious valve made by the American company **General Electric (GE)**. It's the **6DZ7** and is electrically equivalent to two 6BQ5s in one envelope.

I think 6DZ7 was introduced in late 1959, as it was described as 'new' in the January/February 1960 issue of G.E.'s *Ham News*. Do you remember when valve manufacturers used to advertise in Amateur Radio magazines?

In the UK, Mullard and Brimar - amongst others - advertised regularly. Valve manufacturers even produced publications specifically for radio and audio enthusiasts. They positively encouraged hobbyists to use of their valves.

Today, I think there's only Arizona Microchip - the PIC microcontroller people - who even acknowledge the very existence of electronics enthusiasts. How times change!

Octal Base

The photograph, **Fig. 2**, shows an 6DZ7. You'll notice it has an octal base; and this of course severely limits the number of electrode connections that can be brought out.

● Fig. 2 (right): The 6DZ7 in its octal base showing both 'valves'...severely limiting the number of electrode connections that can be brought out (see text).

With two pentodes sharing six pins (heater excluded), the cathodes and suppressor grids all had to be tied together. The screen grids also had to be tied together, and that prevents the valve being wired for ultra-linear operation, (which is a shame).

While the valve is not useful for replacement purposes, it can be used instead of two 6BQ5/EL84s if you're building an amplifier yourself. At the

moment, a single 6DZ7 is somewhat cheaper than a pair of 6BQ5s. There's even a **6DY7**, which is equivalent to a pair of beefed-up 6V6s in one envelope.

The moral of this story is: look around! Although some valves are still being made in Russia and the Far East, many n.o.s. valves are becoming expensive.

Fortunately, there are plenty of other n.o.s. valves available quite cheaply. Helpfully...some are very similar, if not identical to well-known types and this applies particularly to ex-military valves; the ones with **Common Valve (CV)** numbers.

Almost all CV-numbered valves have commercial equivalents. However, being made for the military, they often have better internal screening and a higher mechanical specification.

Even if they are the same as their commercial counterparts, the CV parameters will be more tightly controlled. My advice is...if you haven't got a CV-equivalents list, then do get hold of one.

I've found it useful to go through distributors' lists with both a data book and a list of valve equivalents to hand. Indeed, my copy of **Bernard Babani's** valve equivalents book is never far away when I browse through any valve list (or visit a radio rally).

Valves For TV

Valves designed for television receivers are also worth investigating. There are still a lot around and few people, it seems, want them. Consequently, they're often sold quite cheaply.

Although some TV valves are too specialised to be of much use, the only real problem with most of them was their 300mA series heaters. Some do have 6.3V heaters, but most have very strange heater voltages.

Because h.t. transformers usually had only 6.3V heater windings (with maybe a 5V rectifier winding), this prevented them being widely used outside television receivers. However, 300mA heaters are no longer a problem; nowadays h.t. and heater transformers are often separate. A suitable l.t. transformer plus a resistor or two, is all you need to get them glowing nicely.

There are another couple of advantages in using TV valves. Firstly, they are often good performers. The introduction of a 625-line, u.h.f. - and later colour - television service, demanded high-performance valves.

For example, there are the high-gain r.f. triodes and pentodes, and power tetrodes. Take a look at the PC86, PCC806, EF183 and EF184, PL508 and the PL509 to see what I'm on about!.

Secondly, TV valves often had to operate with a rather low h.t., so most were specified to work from a supply of 170V or less. This kind of voltage can be obtained from a low-voltage (say, 20-0-20V) transformer driving a voltage quadrupler.

Additionally, by keeping the h.t. rail below 200V you'll avoid any problem of resistor breakdown. Suitable capacitors are also readily available and inexpensive.

Just one last point; valves intended for series-heater chains are specified by heater **current** and not voltage. Always adjust the heater supply to provide each valve with **300mA**, and let the heater voltage look after itself.

● Fig. 3: Two of G4JCP's 6DZ7 valves even have the same production code Notice the pattern of dots under the '6DZ7' identifier (see text).

From The USA

My 6DZ7s came from the USA via **Stuart Scott** of **Portway Associates** (**01903 815118**). He also has lots of **CV4014** valves available quite cheaply. CV4014? - that's a military **EF91**. A very useful valve. One other valve Stuart has in quantity is the **CV4062**; a military version of the **Marconi A2134**.

I'd never heard of the A2134 (shame on me), yet it turned out to be a delightful little output pentode (Pa = 9W) with a B7G base. It also has - quote from one enthusiast who was extolling its virtues on the Internet - 'beautiful triode curves'. And I agree!

The A2134 is of interest to us because it's rated for full output with an anode voltage of just 165V. And it's becoming popular with valve hi-fi enthusiasts as a driver for big audio triodes.

Throughout much of the valve era, valve manufacturers often re-branded other manufacturers' valves as their own. This fact was graphically illustrated by the 6DZ7s I bought.

I have 6DZ7 versions by RCA, Zenith and GE. Each manufacturer has branded the valve as their own, yet they are clearly all from the same manufacturer. The give-away is the original labelling...it's the same on all the valves.

Two of the valves even have the same production code - see **Fig. 3**. Notice the pattern of dots under the '6DZ7' identifier. Both my RCA 6DZ7 and my Zenith 6DZ7 have the same pattern of dots. The pattern on my GE example is similar, but differs in the exact placement of the dots. Clearly a means of identification, does anyone know exactly what the dots signify?

● Fig. 4: A Mullard-manufactured (but labelled CEI) EL34/6CA7 (see text).

● Fig. 5: Mullard EL34s were always true pentodes, but the American valve shown here is labelled Sylvania - is a beam tetrode (See text).

Design Liberties!

Manufacturers even took liberties with the actual design of some types! For example, **Fig. 4** shows a Mullard-manufactured (but labelled CEI) EL34/6CA7. The Americans call an EL34, a 6CA7; they're supposed to be the same valve.

Mullard EL34s were always true pentodes, but the American valve shown in **Fig. 5** - labelled Sylvania - is a beam tetrode. And yet it's marked 6CA7/EL34. As you can see, it's physically quite different. Confusing eh?

Data on all the valves I've mentioned is available on the Internet. Your first stop should be **Steve Bench's Tube Search** page at **http://tdsl.duncanamps.com/tubesearch.php**. There you'll find an index of much of the valve data that's available on the Internet. Steve also has some other valve-related information at **http://members.aol.com/sbench101/**

One site that frequently pops up is **Frank Philipse's Tube Data** pages. They're at **www.tubedata.org** Frank, who lives in **Waaire** in the **Netherlands**, now has over 6,500 data sheets on-line, and has brief data on a further 2,000 types. This site is an invaluable resource and Frank really ought to get a medal!

Finally, there's a very interesting description of how valves work at: **http://www.john-a-harper.com/tubes201/**

Ah, the players are leaving the field, and I'd better get back to the 'shop'. Until next time, please send your comments and letters to me, either via the ***PW* offices**, via E-mail to **phil@valveandvintage.co.uk** or direct to: **21 Scotts Green Close, Scotts Green, Dudley, West Midlands DY1 2DX**. *PW*

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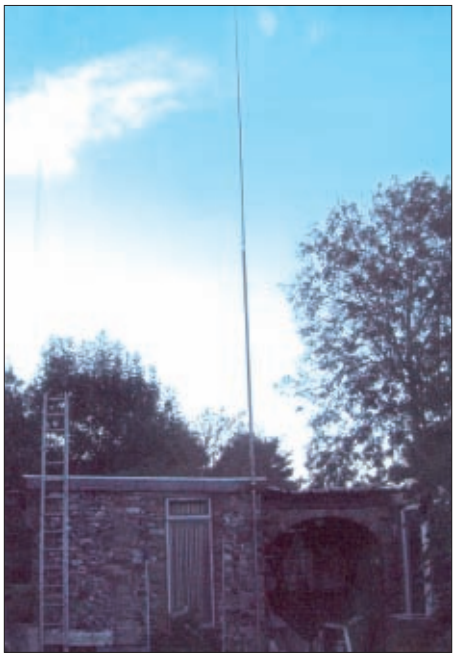


Ian Keyser G3ROO pulls the threads of his vertical antenna for the 1.8MHz band together, and explains how it has enriched the tapestry of his 'Top Band' logbook!

For several years on the lowest frequency Amateur band, known affectionately as 'Top Band' (though no longer, as we've now got 137kHz!), I've been using a Marconi T antenna with an 18.5m vertical section. This, combined with a good earth system, has proved to be a winner.

Unfortunately, there are very few of us that have the space to accommodate such a system so excluding many from the excitement of working DX on this great band. What is needed is a practical system that many more could erect in the more commonly sized garden.

Fig. 1: The top three metres of the roach pole are wound with a turns pitch of 12-13mm, and the lower two metres are close-wound with wire. This is the change over point. Note the use of masking tape to hold the wire temporarily in place.

In practice large number of guy wires make any tall, potentially unobtrusive systems, very ugly. What I felt was needed, was an extremely strong self-supporting 'needle'. The antenna is designed for 1.8MHz, but by altering the number of turns, it can be made to function on any other of the lower frequency bands.

Important Aspect

Probably the most important single aspect of any vertical antenna system is the antenna ground. Here it cannot be stressed strongly enough that any work done on the earthing system will pay off in the long term. And it will also make apparent an improvement in the performance of the overall system.

With this antenna, **or indeed any antenna system**, it's important to take into account the 'windage', or sideways pressure, it will have to tolerate due to winds. In practice, the forces experienced on this 'needle' antenna are a lot weaker than you may imagine.

If you have a long scaffold pole you can carry out an experiment. When there's a windy day in your area, stand the pole on the ground supporting it at shoulder height and as upright as possible. You'll find that you can hold it with relatively little effort.

In fact, it's harder to keep yourself upright without the pole! The antenna described here takes advantage of this effect and is supported at a point 2.5m high on the facia of an outbuilding. The remaining nine metres are fully exposed to the south-westerly winds that are predominant here in Kent where I live.

I live some five kilometres from the White Cliffs of Dover, and about125m above sea level and we experience severe winds, sufficient to cause damage to our house roof every year. Though causing building damage, these winds deflect the top of the vertical antenna little more than two metres or so. During last year, the antenna suffered no damage whatsoever.

Relatively Simple

Construction is relatively simple. For the top section, you'll need a five metre roach pole and remove and retain the base screwcap and its plug, but leave the sections inside. It's essential to leave these inside as the large sections **cannot be inserted later** through the finished assembly.

Next take a 300mm length of 25mm diameter Dural tube (salvaged, say, from an old beam antenna) and apply layers of pvc tape to increase its diameter to make it a snug fit into the base of the roach pole.

Then, add another ring of tape, around the middle of the tube so that when it is inserted into the base of the glassfibre fishing pole there is no free movement of the pole on the alloy tube. Anyone who has used a good quality pvc tape in antenna systems will know how well it sticks. After a year or so, it's necessary to carve it off, not unwind it!

You'll then have to mix up a quantity of epoxy-based car body filler before withdrawing the dural tube so that the end padding pvc ring is only just inserted in the glassfibre pole.

While slowly inserting the dural tube back into the glassfibre pole, pack the intervening space with the body filler. When the second ring of pvc tape is securely within the glassfibre pole, finish off neatly with more filler and clean up.

The screw-on end cap that you retained earlier has a rubber insert that may be removed. Carefully increase the diameter of the hole, left in the base of the cap to allow it to pass over the dural tube. Then feeding the screwcap back onto the roach pole base, screw the it back onto the bottom of the fishing rod, thus making a very neat final assembly.

You can then pull out the inner sections of the roach pole, pulling each of the overlaps to make them secure. Using more pvc tape to wind around each of the joins of the roach pole. Lay the first couple of layers on the smaller tube, hard up against the 'shoulder' of the larger tube. This ring you've just created would be the first line of defence against the pole telescoping back into itself.

Keeping the tape under some tension, you should then make several more turns over the joint area to ensure waterproofing and increasing the strength of the joint, five or six layers of tape should be adequate. Finally, cover the taped area with a layer of masking tape, as the whole assembly will be painted after tuning.

Top Section

Winding the top section of the antenna can be exceedingly tiring, especially on the fingers. I suggest that you find a comfortable place to sit with plenty of room to accommodate the five metre pole.

I'd also suggest, that you have a roll of masking tape to hand, preferably in a tape dispenser, to make temporary fastenings to hold the wiring in place while you take a rest. The only other requirement is the wire for the coil. I used a 100m roll of pvc covered wire 24/0.2mm (RS 356-684).

The wire you use is not really important, but I favour pvc covered wire as enamelled insulation can easily get damaged. To reduce resistive losses, it is advisable to use a reasonably heavy wire ... and 24/0.2mm is a reasonable compromise.

Feed the end of the wire through the small eye at the top of the roach pole and make secure with pvc tape. Then twisting the pole with the left hand and gripping the wire and the pole with the right hand feed the wire on with a spacing of about half an inch. At intervals, it's advisable to fasten the windings with a layer of masking tape in case the pole is dropped!

When there's about two metres of pole remaining, securely tape with masking tape and commence close winding until the end of the pole is reached, securing it with masking tape again. The photograph, **Fig. 1**, shows the point at which the wide spacing becomes tightly wound turns.

Finally, when you come to the base of the roach pole stop winding the wire just above the point where the metal tube is inside the pole. Secure this point in the winding with temporary layers of pvc tape leaving a good length of wire free. Note: adjustments to the number of turns may be needed later, when the wire is clamped to the scaffold pole.

Fig. 2: The alloy joining tube fitted into the top of the scaffold pole, using four clamping bolts. The alloy tube has been strengthened with wire mesh and car body filler.

Bottom Section

For the bottom section of the antenna I've used a 6.5m dural scaffold pole, although the most commonly available ones are a little under 6m this will make little difference. I purchase my poles when required from the local scaffolding firm and pay about £3 per metre (£1 per foot).

Four holes are drilled at the top end of the scaffold pole, to form a clamp for the dural tube. Start by drilling a pair of holes some 15-25mm from the top of the pole, and spaced about 45° apart around the circumference. At a point 100mm lower down the scaffold tube, and directly in line with the first pair of holes, make a second pair of holes.

The four holes that you've drilled need opening out and suitably tapping for 8mm diameter bolts. These bolts are used to clamp the one inch dural tube to the inside of the top of the scaffold pole. (This point is shown in the photograph, **Fig. 2**.).

As this scaffold pole forms the bottom part of the antenna, a further 3mm hole is drilled and tapped between the top and bottom pairs of fixing holes. This will be used to provide an electrical connection to the top section.

Support Points

Now let me turn to the support points for the antenna. You will see from the photograph of **Fig. 3,** that the clamping to the facia board is made using a 'saddle' of 1.5-2mm thick steel plate and a section of plastic tube taped to the pole as an insulator.

The base support is formed from a 900mm length of 12-15mm diameter (0.5 inch) bolt or spike set into a slab of concrete. If you have a suitable block of concrete, then you can drill a suitable hole to embed the spike in. Otherwise set the spike in a new section of concrete. Either way leave it so that around 200mm is still showing above ground.

As the system is a vertical antenna **it must be insulated from ground at all times** so, a conical chunk of plastic is drilled and fitted over and around the steel rod. This plastic 'lump' acts as the base insulator, **Fig. 4**. The impedance at this mounting point and ground is low, so insulator requirements can be lax and almost any non-moisture absorbing insulator may be used.

The roach pole and alloy tube can now be mounted in the top of the scaffold pole, clamp off securely with the 8mm bolts. **Note:** do not over tighten these bolts, as they are just to hold the alloy tube securely, but needn't form an electrical join.

Make a temporary connection between the end of the coil and the 4mm connection to the scaffold pole and check continuity between the ends. Now make a four turn coil of hook up wire and connect this to the base of the scaffold pole and the ground system.

The pole is then lifted to the vertical and mounted in position. Next using a g.d.o. check for resonance (mine came out at 1.7MHz at first attempt). Then adjust the number of turns on the top section so that the point of resonance is in the section of the band that is of primary interest. Of course, if you are using an antenna analyser, it's likely that you can couple directly to the antenna without the coil.

Earthing Systems

The various methods of antenna earthing systems is a subject so wide that a book could be written just about it! Arguments for buried or elevated radial systems, buried copper tanks or multiple rods abound.

However, I think buried radials are a pain to layout and insert, elevated radials

Fig. 3: The support 'saddle' around the lower section of the scaffold pole, has a short section of plastic water pipe fitted around the pole to act as an insulator with pvc tape holding it in place.

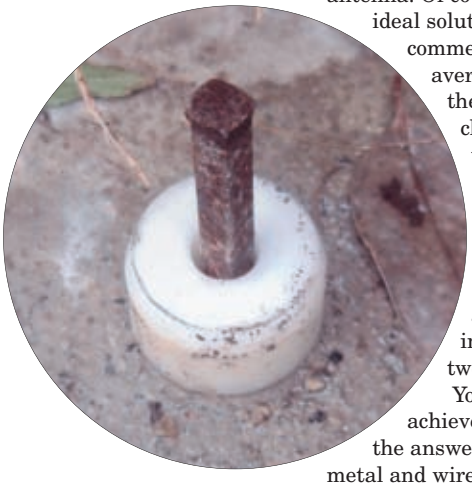


Fig. 4: The base mounting insulator around a metal spike set into a block of concrete. See text for more details.

get in the way of almost everything and everybody. My own technique and the one I'm in favour of, employs a system of multiple earth rods. Not only earth rods close to the antenna, but also some, which are connected together ... but placed as far away as possible from the base of the antenna.

For lowest angle of radiation, the 'earth' must be a good many wavelengths long from the base of the antenna. Of course, a huge earth-mat would be the ideal solution and is one that many commercial transmitter sites use. But the average Radio Amateur cannot excavate the vast area of ground and lay a chicken wire earth mat and replace the soil.

However, I've found a way that is a very good compromise. With the co-operation of my neighbours, I have a 1.5km of earth radial to the south, 600m of radials to the west and 200m to the north and installing the whole lot only took me two days!

You may ask how did I manage to achieve this effective earth system? Well, the answer is that I used my neighbour's metal and wire fences!

During a visit to the local scrapyard I found a huge amount of 22mm copper tube in 900mm lengths and a coil 7/22 bare copper wire. I came away with a trailer full for £20. Onto the top of each tube I wound a 450-500mm length, leaving some of the copper wire free, around the top of the pipe and soldered it in place using plumber's flux and a blowlamp.

Prepared Tubes

Armed with the prepared tubes, blowlamp, solder, flux and a club hammer, I set about modifying my neighbours' fences. And to start with, the bottom run of wire along each of the fences, was cleaned every 10m or so.

At the cleaned-up points, one of the prepared tubes was driven into the ground with the club hammer. The free length of copper wire was then used to join the bottom wire of the fence to the driven in post.

Note: as you progress along the fences, check all wire joints between the separate sections of the fence. Solder a copper strap across them if you are at all unsure of their connections. It really is quick, especially if the galvanising of the wire is good. In one case, the complete section of fence was so bad I replaced the bottom strand with new wire.

The antenna has really proved its worth, giving world-wide QSOs on the 1.8MHz band. But as I've mentioned before, the ground is really important and this shows up at this location during dry weather. We have a light loam soil on top of 200m depth of chalk rock. This drains very quickly so, that in dry weather DX is just not workable!

Other Bands

To modify the antenna for other bands, you must reduce the number of turns on the close wound coil for resonance and set-up using test equipment such as a grid (gate) dip oscillator (g.d.o.). (*I can recommend an antenna impedance meter such as the MFJ-259 as possibly better still.* **Editor**)

To create an antenna suitable for the 7MHz band, a single wire will suffice. Another alternative is to use the helically wound 160m vertical and an automatic matching unit (a.m.u.) at the base to enable it to work on all bands.

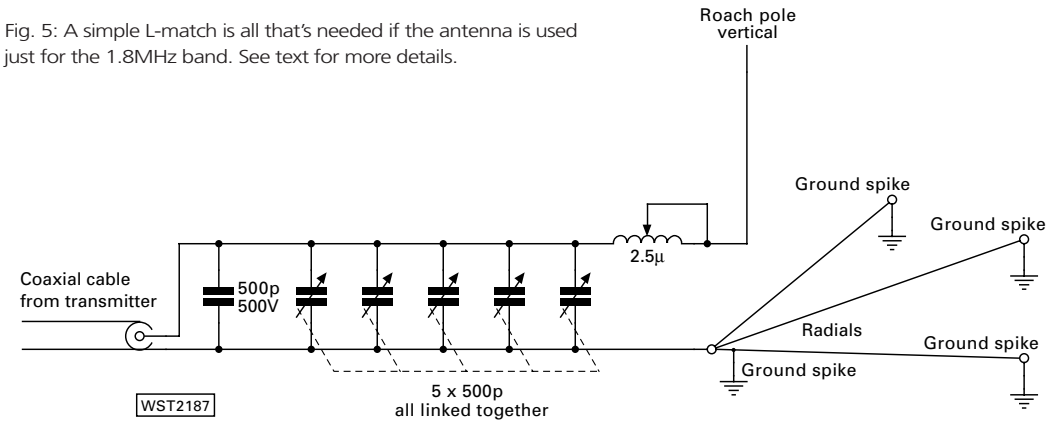
For mono-band operation, a simple L-match network at the base will enable the antenna to be matched across the band. The feed impedance of the basic antenna will be very low, in the order of 10Ω or so requiring this type of feed matching.

For the 1.8MHz band and with a good earth, I've found that a 1.5µH coil in series with the antenna and a 3000pF variable capacitor to ground will be ideal. Although to cover a variety of antenna lengths and feed-point impedances, I've shown the inductor in **Fig. 5** as a variable 2.5µH component.

In practice due to earth losses, an antenna analyser may perhaps show a near perfect match to 50Ω without the matching network. In this case, the antenna will still work, but will be indicative that the earthing system could do with yet more work!

See you on 'Top Band'! PW

Fig. 5: A simple L-match is all that's needed if the antenna is used just for the 1.8MHz band. See text for more details.



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EF91	2.00	UF89	5.00	6GK6	4.00	5763	6.00
EF183/4	2.00	UL41	12.00	6J5G	6.00	5814A	5.00
EL33	15.00	UL84	4.00	6J5M	4.00	5842	12.00
EL34	6.00	UY41	5.00	6J7	5.00	6072A	10.00
EL36	5.00	UY85	2.00	6JE6C	27.50	6080	6.00
EL41	3.50	VR105/30	4.00	6JS6C	27.50	6146B	15.00
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EN91	7.50	5R4GY	7.50	6SC7	5.00	7027A	25.00
EZ80	5.00	5U4G	15.00	6SG7	5.00	7360	25.00
EZ81	10.00	5U4GB	15.00	6SJ7	5.00	7581A	20.00
GZ32	8.50	5V4G	6.00	6SK7	5.00	7586	15.00
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REPORTS & INFORMATION BY THE LAST SATURDAY OF EACH MONTH.

THIS MONTH DAVID G4ASR HAS REPORTS OF SPORADIC-E OPENINGS TO FIVE CONTINENTS ON THE 50MHz BAND AND TO AFRICA ON 144MHz

The summer Sporadic-E season, although slow to start, really kicked into gear during June with openings on the 50MHz band every day throughout the month from somewhere in the United Kingdom. Propagation was really good with extensive contacts being made throughout Europe and into Asia, Africa, South America and North America. Although other propagation modes such as aurora, trans-equatorial and tropo were reported these were of little significance compared to the intensity and duration of the Sp-E openings.

The DX activity was tremendous with numerous contacts, some with very low power, being made on the 50, 70 and 144MHz bands. The highlights of the month include an amazing **15** multi-hop transatlantic Sp-E openings on the 50MHz band to South America, North America and the Caribbean Islands and **ten** Sporadic-E openings that reached as high as the 144MHz band. It was so good that during some of the 144MHz openings UK stations reported making contacts with four countries in North Africa!

THE 50MHz BAND

Now I'll take a look at the Sporadic-E events in more detail starting first with contacts made on the 50MHz band. The most prevalent form of Sp-E is a single-hop path which provides a communication distance of between 1400-1900km (1650km ± 250km). From the central UK this encompasses all of Europe, from Iceland in the north to the Mediterranean countries in the south and often just into northern Africa.

As the 50MHz band was open every day during June there were a considerable number Sp-E propagation is that signals are often intensely strong and contacts may easily be made with low power and a simple antenna.

Adrian Ball G8PSF (London IO91) recently obtained a Yaesu FT-817 transceiver and was eager to try it out on 50MHz. Running 5W output into a simple half-wave dipole he was staggered at how easy it was to make s.s.b. contacts all around Europe.

Within a few days Adrian had worked stations in Austria (OE), Czech Republic (OK), Finland (OH), France (F), Germany (DL), Iceland (TF/G4ODA), Italy (I), Norway (LA), Poland (SP), Scotland (MM5DWN Orkney Islands), Sweden (SM), Switzerland (HB9) and Yugoslavia (YU). He says he's very pleased to have started operating on the 'magic band' at the right time of the year, this is certainly very true as the summer Sp-E season is always spectacular with enormously strong signals. Unfortunately, this situation only lasts for two months or so during June and July so, by the time you read this the Sp-E season will have unfortunately petered out.

MULTI-HOP PATHS

In addition to the more common single-hop path you may also encounter paths consisting of many reflections. These multi-hop Sp-E paths are likely to be formed from hops of the most common distance, i.e. 1650km ± 250km and by dividing the great-circle path into segments of this length you can easily deduce the most probable number of hops.

Double-hop paths can often be found whereas triple or four-hop modes are much more rare. A double-hop Sp-E path of around 2800-3800km will give contacts into the Middle East area and further into North Africa. During June a number of double-hops were formed enabling c.w. and s.s.b. contacts to be made with stations such as JY9NX (Jordan), OD5/OK1MU (Lebanon), 4Z4DX (Israel), 5B4FL (Cyprus) and 5T6M (Mauritania).

Triple-reflection paths of around 4200-5700km are slightly rarer, but not unusual. These allow contacts to be made deeper into Asia and across the Atlantic Ocean to Canada (VE, VO) and the eastern seaboard (W1-3 call areas) of the United States of America.

On June 9 at 1455UTC the station of A61AJ (United Arab Emirates) was heard in the UK during a triple-hop opening, but I've no reports of any contacts being made. However, **Nick G4KUX** operating in Afghanistan as YA4F experienced a good 50MHz opening between 1830-1900UTC on June 16 and managed to work a few stations in northern England.

The three-hop transatlantic path to Canada and North America was reported on six occasions during June. These occurred on June 6 around 2115UTC to Newfoundland (VO) and between 1000-1300UTC on June 7 to Newfoundland, Canada (VE1), St.Pierre & Miquelon (FP5BU) and USA (W1). Transitory reports of hearing the VO1ZA beacon (50.039MHz) continued through to 2000UTC on the same day.

Other three-hop openings occurred on June 17 around 1130UTC to VO, June 20 between 1430-1630UTC to VO and W1 and on June 25 between 1300-1500UTC to VO, W1, W3. The best of these three-reflection Sp-E openings occurred on June 26 between 1600-2130UTC. This was an extensive opening to VO1, VE1-3 and the W1-3 call areas. It was so good that Adrian G8PSF using his small dipole antenna heard the stations of W1LP and VE3RM.

Surprisingly, four-hop paths of between 5600-7600km were even more prevalent than the three-hop variety with a total of nine being reported on June 5, 10, 11, 12, 14, 15, 16, 23 and 29. This multi-reflection path can give contacts into the Caribbean islands, countries in the northern part of South America and the W4 call area of the USA. Some of the DX stations known to have worked into the UK during this period included FG5FR (Guadeloupe), FJ5DX (St.Barthelemy), FM5WD (Martinique), FY1FL (French Guiana), HI8ROX and HI8RP (Dominican Republic), KP2A and KP2/KF2HC (Virgin Islands), KP4EIT, KP4NIX, WP4LNY and WP4NEG (Puerto Rico), PJ2/K2GSJ (Netherlands Antilles), PY2BT, PY5CC and PP8KWA (Brazil), VP9/N0JK (Bermuda), V25XX (Antigua), W6JKV/C6A (Bahamas), YV1DIG and YV4DDK (Venezuela) and 9Z4BM (Trinidad). All of these openings took place in the evening between the hours of 1600-2300UTC.

On June 23 between 1130-1500UTC a very extensive opening was reported into the W4 and W8 call areas of the USA. Many c.w. and s.s.b. contacts were made with stations in the 6000-7000km range.

A five-hop path of between 7000-9500km is a very rare occurrence indeed and from the UK it enables Sp-E contacts to be made into central and South America. Signals over this multi-reflection path will invariably be quite weak often lasting for only a few minutes. During the opening on June 23 the station of GM4PLM (IO75) reported hearing TG9NX (Guatemala) peaking 51 on s.s.b. over an 8400km path.

During openings it's always worthwhile

listening for the weaker station. Indeed this principal should always be adopted no matter which band or propagation mode you are listening to. Simply put, if all the DX you work is S9, then you're definitely **not** working the 'real' DX stations!

THE 144MHz BAND

With daily Sp-E openings on the 50MHz band including 15 days of multi-hop transatlantic propagation, it was not surprising that some of these ionospheric E-layer events reached as high as the 144MHz band. A total of ten openings were reported on June 2, 4, 5, 6, 16, 17, 18, 20, 22 and 29 to countries lying between the east and south of the UK.

The openings in the first week of the month were relatively brief with comparatively few DX stations active. The 144MHz band was open to Bulgaria (LZ) at 1730UTC on June 2, to Spain (EA5) on and off between 1930-2130UTC on June 4, to Portugal (CT) and Spain (EA1) from Scotland between 1645-1700UTC on June 5 and to the Canary Islands (EA8) at 1345UTC on June 6. During this opening the station of EA8BPX (IL18 - Africa) was worked by a few s.s.b. stations in south-west England over a rare two-hop reflection path of some 2700km.

The 144MHz Sp-E openings later in the month were much more intensive with many DX stations active. As with all events that reach this frequency, this one started many hours earlier at the low end of the v.h.f. range before reaching the 144MHz band.

John Buckley M0CYW reports that he experienced intense Sp-E during the afternoon of June 16. He was driving back home to Worcester on the M50 when he became aware of Italian and French stations on the Band-2 car radio.

John was also monitoring the f.m. calling frequency 70.450MHz when at 1535UTC he heard S51DI (Slovenia) calling CQ, almost strong enough to be a few yards away! A quick mobile contact was then made with 59 reports. Not bad with 25W to a quarter-wave vertical antenna on the back of the car at 65m.p.h. on the M50! An opening on the 144MHz band began at the same time lasting for well over one hour.

At my QTH (Herefordshire IO81) s.s.b. contacts were made with 23 stations in Corsica (TK), France (F), Italy (I) and the Balearic Islands (EA6). My best DX made in the period between 1523-1637UTC included the stations of TK/F1YJ (JN42), EA6DD (JM19), EB6AG (JM18) and I8MPO (JN70) at 1829km. **Geoff GW3LEW** (IO71) fared even better making a total of 35 QSOs with stations in Corsica, France, Germany, Italy, Sardinia (IS0) and Sicily (IT9) with his best DX being at a distance of 2168km.

Another hour long 144MHz event was reported between 1600-1700UTC on June 17 favouring stations located in central and eastern UK. This opening was to stations located in Poland (SP) approximately 1700km away. Towards the end of the opening the path extended to over 2300km allowing s.s.b. contacts to be made with the stations of EW6FS (Belarus), UA1WAM (KO56) and RA3LBK (KO65) in European Russia.

● The station of EA3LL, always a strong signal via 144MHz Sporadic-E.

Jonathan M5FUN (Sussex JO00) caught the tail-end of the opening, hearing the stations of LY2SA, LY3AX (Lithuania), RA2BK (c.w.) and RA3LBK. He managed to work EW6FS (KN35) at 2018km before the Sp-E ionisation disappeared.

The next 144MHz Sp-E opening occurred between 1750-1810UTC on June 18. The band was briefly open to Romania with contacts up to 2200km being made from southern England to YO3IZI, YO4BZC and YO4SLL. During this opening, the station of SV3CYM (Greece) reported hearing G0NFA (IO91) but unfortunately the QSO was not completed.

An excellent mid-morning opening occurred between 0945-1100UTC on June 20 to stations located in Germany (DL), Switzerland (HB9), Hungary (HA), Italy (I), Austria (OE), Czech Republic (OK), Slovakia (OM), Slovenia (S5), Bosnia-Hercegovina (T9), Yugoslavia (YU) and Croatia (9A). At my QTH (IO81) a total of 38 s.s.b. contacts were made with stations in seven countries. The contacts included 11 in southern Germany, six in Slovenia, five in Yugoslavia and four each in Austria, Bosnia-Hercegovina, Croatia and Hungary. I noticed two reflection points with contacts being made with German stations less than 1000km away simultaneously with DX stations up to 2000km away.

Daniel Lee MW1MFY (IO81) was active between 0950-1025UTC working 34 s.s.b. stations in seven countries. The tally included nine each in DL and HA, five each in OE and S5 and two each in OM, YU and 9A. His best DX was with the stations of YU7AR and YU7EW (KN05) at 1920km.

There were two 144MHz openings on June 22. The first being reported between 0945-1200UTC and the second occurring in the early evening between 1600-1700UTC. Both phases were particularly good as there was DX activity from Africa.

Stations known to have worked into the UK included CN8IG and CN8LI (Morocco), EA9HA and EA9IB (Ceuta and Melilla) and 7X0AD (Algeria). Unlike stations in the Canary Islands (EA8) which are about 3000km away from the centre of the UK those in CN, EA9 and 7X are within 2000km, a very much easier distance for Sp-E contacts on the 144MHz band.

Ian Goodier G0UWK (IO83) was active in both events working EA1AK/7, EA7AJ, EA7CV, EA7ERP, EA7HG and EA9IB (IM85) for best DX of the morning at 1983km. In the afternoon opening he made s.s.b. contacts with the stations of EA3ACK, EA3AXV, EA3CSV, EA6DD, EA6FB, EA6VQ, EB6/DG3GAG, EB6AOK and 7X0AD (JM16) at 1861km.

During the morning phase I contacted the stations of EB4AFK, EB5EEO, EA1AK/7, EA7AJ, EA7BIH, EA7ERP, EA7NK and EA9IB at 1857km. The afternoon session found three more EH3 stations along with EA3CBH/6, EA6/DF9UX, EA6SA, EA6VQ and EB6AOK on the Balearic Islands.

Another excellent 144MHz Sp-E opening occurred between 1630-1815UTC on June 29. UK stations reported making s.s.b. contacts into the Czech Republic (OK), Hungary (HA), Lithuania (LY2BAW), Poland (SP), Romania (YO), Slovakia (OM), Ukraine (UT0YH and UT5YM) and Yugoslavia (YU).

DEADLINES

That's it again for another month and what a fantastic month it was with as much, if not more DX than gets reported in the HF Highlights column! And it was all on v.h.f.!

Thank you for your reports. Please keep sending them in by the date given at the top of the column. Good luck with the DX and see you again next month.

73 David G4ASR

HF HIGHLIGHTS

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REPORTS, INFORMATION AND PHOTOGRAPHS TO ME PLEASE BY THE 15TH OF EACH MONTH.

I'll begin the column this month with news of a slightly unusual project for *PW* reader **Colin Topping MM3ACL** in Gauldry, Fife, who has been taking time off from his h.f. activities to renovate his latest acquisition, a 1943 Wolseley Stationary Engine. The Wolseley Sheep Shearing Company was founded in 1887 at 'Witton Works' Birmingam and was a well-established manufacturer of sheep shearing and associated equipment.

Wolseley produced their first engine in 1911, which was rated at three horse power and was able to power six sheep shearing handsets. Colin has got the engine running and is now looking to find a suitable alternator.

Colin could then generate enough power to run his old 1155 RAF Second World War valve receiver from the unit. I'm sure you'll all be interested to hear how Colin gets on, as this would certainly make an interesting power source for a special event station if it were operated at a county show for instance!

Vintage Note: Readers of our sister publication *Short Wave Magazine* may well remember seeing the photograph-story featuring the club who regularly entered a steam-powered National Field Day station in the 1960s and 1970s. The engine consumed a very small amount of coal and kept them warm! **Editor**.

DX NEWS

On to some DX now and news of two special memorial operations taking place in Poland to commemorate the work of the Polish scientist **Ignacy Lukasiewicz**. He was a pharmacist by profession and the first person to drill for and distill crude oil in the country.

Lukasiewicz also founded two large oil distilleries in the cities of Gorlice and Jaslo. In 1853 he literally illuminated a dark world by inventing the kerosene lamp, which was used for the first time in the operating theatre of a hospital in Lyczakowska Street, Lviv on 31 July that year.

So, the callsigns to look out for this month are **HF150IL** (QSL via SP8PJG) until 15 August and **HF8IL** (QSL via SP8PJG) between 20 August and 15 September. The Podkarpacie Branch of PZK is supporting the anniversary celebrations together with the Lviv Radio Amateur Club.

In Australia, another special event began on the 1 July when the most senior elected member of the Northern Territory Government, the Honourable Chief Minister **Clare Martin** became the first person to transmit on-air using the special Amateur Radio callsign **VI8NT**. This celebrates 25 years of self-government for the Northern Territory and will operate until 31 December, so you still have plenty of time to work the call. The QSL cards can be obtained via **Neil Penfold VK6NE, 2 Moss Court, Kingsley, WA 6026, Australia**.

French operator **Paul-Joel F2YT**, will be touring the Italian Province of Grossetto (I5) from 8 to 31st August. He will be using the callsign **I/F2YT** and activating a lot of Italian castles, which will count for the Italian Castles Award. A short trip to Elba Island (IOTA EU-028, IIA LI-001) is also planned between 15 & 31st August, where Paul will sign **IA5/F2YT**.

Activity is planned to be on 7.052 and 14.252MHz s.s.b. and by request, Paul can make a c.w. QSO on the same frequency if needed. Please QSL via F2YT, either direct to **9 Rue de l'Alouette, Estree Cauchy, F-62690 Aubigny en Artois, France** or via the bureau.

Industry Canada has authorised the use of special event prefixes once again and this time they are to celebrate the 100th Anniversary of Military Communications in Canada. The prefixes will be **XM** for all VEs, **XL** for all VAs, **XN** for all VOs and **XO** for all VYs and will be heard up until the end of August.

Don't forget that the International Lighthouse and Lightship Weekend takes place this month, over the weekend of the 16/17th August. Conditions permitting, there should be a great deal of activity from around the world on all the h.f. bands.

ACTIVITY AWARD 2003

The Swedish National Radio Society has an award, which is open to all Radio Amateurs and short wave listeners to promote operating activity on our Amateur Radio bands. To claim the award you need to have worked or heard 365 radio callsigns during the period 1 January to 31st December 2003.

Activity can be on all bands, using all modes and the same station may be worked more than once. To claim the award you just apply with a simple statement saying "I have made at least 365 radio contacts during the year 2003" and enclose the award fee which is 5Euro or $5 to **SSA Awards Manager, Bengt Hogkvist SM6DEC, Ostbygatan 24 C, SE-53137 Lidkoping Sweden**.

ZP AWARDS PROGRAMME

The Radio Club Paraguayo is issuing several awards for the Radio Amateurs or s.w.l.s, so here are details on three of them. The first of these is **The Tropics of Cancer and Capricorn Award** (TCCA) and is issued for contacts with countries that are touched by the Tropics of Cancer A4, A6, BV, BY, C6, HZ, KH6, SU, SO, S2, TZ, VU, XE, XZ, 5A, 5T, 5U and 7X and the Tropic of Capricorn A2, CE, C9, LU, PY, VK, V5, ZP, ZS and 5R. There are three classes of the

CARL GW0VSW HAS LOTS OF HF NEWS TO REPORT... AND BY THE LOOK OF YOUR LOGS THE BANDS ARE BUZZING!

● Colin Topping MM3ACL's renovated 1943 Wolseley Stationary Engine (see text).

● Ian O'Donell M3IOD's shack.

● The station of CX2AQ was worked by Steve Bainbridge.

awards, Class A for all 28 Countries, Class B 20 Countries and Class C 12 countries.

The second is **The Diploma Paraguay** (DP) and is issued to Amateurs living outside Paraguay for confirmed contacts with five different 'ZP' stations and finally there is **The All Mediterranean Countries Award** issued for contacts with inland countries as follows, A2, A5, C31, CP, EK, ER, ET, EU, EX, EY, EZ, HA, HB, HV, JT, LX, OE, OK, OM, T7, TL, TT, TZ, UJ, UN, XT, XW, YA, Z2, Z3, ZP, 3DAO, 4J, 4U1ITU, 5U, 5X, 7P, 7Q, 9J, 9N, 9U and 9X. Once again there are three classes, Class A all 41 countries, Class B 30 countries and Class C for 20 countries.

Certificates for all the Radio Club Paraguayo awards issued on a mixed band/mode basis except for those contacts made with digital modes like RTTY or PSK31 and require a Group Certified List (GCR) and 5 IRCs or $5 for each award to **Radio Club Paraguayo, Awards Manager, PO Box 512, Asuncion 1209, Paraguay.**

QSL INFORMATION

If you have managed to log **Christian 5X1CW** in Uganda - it's worth mentioning that he only sends out QSL cards when he is at home in France, which is once every six months! He does not use the QSL bureau, but will be pleased to accept cards direct to his homecall **F6GQK, Sp 91300, 00201 Armees, France**.

Amateur Radio operations have come to an end for **Ralph 5H3RK** in Tanzania as he has just finished his work assignment and should be back home in Australia by the time you read this. Therefore, if you have worked him and still need a QSL card you should send 'direct only' to **Ralph Karhammar, 6 Sevenoaks Street, Maroochydore, QLD 4068, Australia** as he is not a member of the bureau of the Wireless Institute of Australia.

Other QSL information that I hope will be useful includes: 5Z4KE via DF8AN, CW1OO via EA5KB, EO10N via UX5UO, OY8PA via PA5ET, P40Y via AE6Y, VP2ERD via N0AT, ZD9IR via ZS6EZ and ZF2AH via W6VNR.

YOUR REPORTS

On to your reports now and the bands have certainly not been at their best. All our reporters complain of poor h.f. propagation with only the occasional openings during the day and early evening and we have not even reached the bottom of cycle 23!

Unusually, there were no contacts made by anyone above the 21MHz band! This has still not stopped them from digging out some good DX as the first log from **Steve Bainbridge M3SWB** in Liverpool shows. Using an IC-706 and 10W to a long wire on 7MHz Steve worked TR1CKS (Gabon) 2029 and EM1U (Antarctica) 2106UTC using his favourite mode PSK31.

Meanwhile, **Roy Walker G0TAK** in Kendal, Cumbria has been busy 'shepherding' some new M3s and still managed to find the time to work UA4SU (European Russia) 1833, HB9JND (Switzerland) 1847, YO4PX (Romania) 1901, *PW* author **Henryk Kotowski** operating as **SV8/SM0JHF** (Greece) on Lesvos Island EU-049 at 1905, PA3DHR (Netherlands) 1906 and SM5BOK (Sweden) at 1917UTC 'on the key' using a TS-570DG and 3.5MHz long wire loop.

Roy has also purchased a lead to run a link between his PC logging programme *LogEQF*, rig control programme and his Kenwood transceiver. This has made operating a little easier, especially when at the microphone of special event station **GB2WSM**, Windermere Steam Museum. Roy says "I find the new computer set-up interesting but I find it easier to use the control knobs on the rig!".

THE 14MHz BAND

On 14MHz new reporter **Ian O'Donnell M3IOD** in Sunderland, Tyne & Wear has been spending a good deal of time on the h.f. bands since getting his licence in March this year. Ian has been a s.w.l. for 25 years and is now active on the h.f. bands using a FT-100D and wire dipole at 10 metres above ground.

Contacts using this set-up include LZ2LP (Bulgaria) 0530, EA8AOC (Canary Islands) 1540, HG50MT (Hungary) 1553, AY9H (Argentina) 1620, SV8CRI (Greece) 2017, CX4BT (Uruguay) 2130, EX8AA (Kyrgyzstan) 2050 and ZB2FX (Gibraltar) at 2226UTC.

Also on this band was **Martyn Medcalf M3VAM** in Chelmsford, Essex who logged ER1MF (Moldovia) 0907, SP5ZCC (Poland) 0909, LY5W (Lithuania) 0955, EW6AF (Belarus) 1002, RP3FWM (European Russia) 1004, Z34A (Macedonia) 1038, TA2ZF (Turkey) 1043, S53EO (Slovenia) 1259, ZA/UT7DW (Albania) 1412 and 9K2OD (Kuwait) at 2220UTC using an IC-746 connected to a SGC237 tuner and 8.2 metres of wire as the antenna.

Steve Bainbridge M3SWB worked CN8NMR (Morocco) 2026, PT2PC (Brazil) 2125 and CX2AQ (Uruguay) at 2130UTC with PSK31 and a switch to PSK63 found UR5TW (Ukraine) 1810 and PB5SAM (Brazil) at 2110UTC.

THE 18 & 21MHz BANDS

On to the 18MHz band and welcome to the second of our new reporters, **John Yarnall M3JKY** who lives in Wombourne, Staffordshire. John has been enjoying some time on the h.f. bands using an FT-100 and half-size G5RV antenna tuned with an MFJ Versa Tuner MkII and worked WP4U (Puerto Rico) on s.s.b. at 2139UTC using just 10W.

Also on this band was **Mark Taylor G0LGJ**, Dereham who made just three contacts of note this month operating mobile s.s.b. They were with JR6LMJ (Japan) 1515, 9V1WW (Singapore) 1651 and 9M2TO (West Malaysia) at 1700 using his Yaesu FT-100 with 100W to a Pro-Am whip antenna.

A brief spell here for Martyn M3VAM found CU2AAL (Azores) 1849 and CT3FT (Madeira Island) at 1855 followed by 21MHz contacts with RK9AWC (Asiatic Russia) 1347 and HB0/ON5YR (Liechtenstein) at 1746UTC.

The PSK31 of Steve M3SWB worked LU8EKC (Argentina) at 2027UTC while Ian M3IOD had one s.s.b. call to ZA1B (Albania) at 1620UTC but this time used a IC-735 and 84 foot long wire fed via a Kenwood AT-230 a.t.u.

SIGNING OFF

Well that's it for another month and despite the 'dip' in conditions, there has at least been a few openings on the lower h.f. bands. It really pays to listen carefully on your chosen band to 'sniff out' that elusive DX station. My thanks to **Tedd Mirgliotta KB8NW** editor of the *OPDX Bulletin* for the DX information and to everyone for their reports and input to the column which is always appreciated.

73 Carl GW0VSW

DATA BURST

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E-MAIL: rcooke@g3ldi.freeserve.co.uk PACKET: G3LDI @ GB7LDI

Recently **Godfrey Manning G4GLM**, wrote to me to ask if there are any other Flexowriter owners out there. Godfrey still has a limited amount of spares and some technical information for the MkI machine and would be willing to help anybody that needed it. Incidentally, the Flexowriter is based on an IBM typebar electric typewriter with the addition of a paper tape punch and reader, plus connectors to allow a data link to a computer. Godfrey can be reached at **63 The Drive, Edgware, Middlesex HA8 8PS. Tel: 0208-958 5113.**

DOWNWARD SPIRAL

We are now on the downward spiral of the sunspot cycle and this will have an effect on our h.f. operating habits. Not least of these will be the bands used for RTTY contests.

Time spent on 21 & 28MHz will gradually decrease and the majority of points claimed will now be on 14MHz. More use will be made of the l.f. bands and to that end, 3.5 & 7MHz will be very congested.

Please be careful not to spread too far over those bands, especially 7MHz, where activity on other modes takes place. This does happen on 14MHz and it causes a lot of hassle.

I have heard RTTY stations as low as 14.050MHz and as high as 14.120MHz. Whilst this 'spreading out' is a tempting thing to do, we should be aware that other operators of the bands, who legitimately try to use their recognised frequencies, do not take kindly to a wall of RTTY operating for a whole weekend, thwarting their efforts at making a contact.

I am talking in particular about the QRP c.w. operators, some of the allocated Packet and Pactor frequencies, plus the new 'suggested' channel for PSK31, 14.070MHz. Then there is the beacon frequency of 14.100MHz, and above 14.115MHz it is s.s.b. territory. The l.f. bands are worse, with a restricted bandwidth due to the eroding of our Amateur bands over the years. Top band is a joke!

One very good reason why the spread happens is that a majority of RTTY operation comes from Stateside. So let's compare what they have available in the United States with what the UK operators have to cope with.

Firstly, let's look at the United Kingdom allocations designated for data communications.

THE 1.8MHz BAND

1.838 - 1.842MHz Wow! In this vast space, we have digimode, RTTY and c.w. in the actual digimode section of this sub-band, which is **1.838 - 1.840.** The other 2kHz has s.s.b. as well. Huh? How many s.s.b. stations can occupy 2kHz?

If you did have an s.s.b. station, say, on 1.841, which would be fine according to the 'bandplan', then the rest of that segment would be wiped anyway! No wonder there are not many RTTY stations on top band! It's about time this was changed!

ROGER G3LDI CONCENTRATES ON BANDPLAN DIFFERENCES BETWEEN THE UK & USA

THE 3.5MHz BAND

The UK amateurs have a digimode section from **3.580 – 3.620.** Admittedly it is mixed with c.w. and Packet in the section from **3.580 – 3.600.** Oh yes, and from **3.600 – 3.620MHz** it is mixed with digimode, c.w. and 'phone! This is called 'mixed modes', which is obviously a euphemism for free-for-all! Operate RTTY in that segment and you will learn some new Russian swear-words!

THE 7MHz BAND

The 7MHz band used to be **7.100** to **7.300** but this has been eroded by two thirds. This is a superb DX band, and a limitation of 100kHz is tantamount to war sometimes, when trying to squeeze all the various modes into such a small space, especially when encouraging even more amateurs to join in! Having said this, even on this small band, the digimode section is from **7.035** to **7.045MHz**

Don't get too excited though! In the bottom 5kHz, **7.035** to **7.040** not only do we have digimode, but SSTV, FAX and c.w. In the top 5kHz, **7.040 to 7.045** we have those modes AND phone as well! What a crazy situation, just think how many Packet, Pactor, RTTY, SSTV, FAX and c.w. stations can all operate simultaneously in 5kHz!

THE 10MHz BAND

Things improve on the 10MHz band as we have **10.140** to **10.150** and in that 10kHz, all we have is digimode and c.w. That's more like it, not enough mind you, but better!

THE 14MHz BAND

The 14MHz band is not too bad either, well, it is the main DX band after all! We have **14.070** to **14.089** in which we have digimode and c.w. Then we have **14.089** to **14.099**, in which we have digimode, Packet and c.w. We have to avoid 14.099 to 14.101, as this is the International Beacon Project Frequency. My goodness, a 'clear' frequency to be filled! and filled it is! Take a look in any contest, indeed on most days. I do wonder sometimes if Amateurs ever study their bandplans.

The third segment is **14.101** to **14.112**, in which we have digimode, (packet), phone and c.w. Now to the Amateurs' credit, you very rarely have c.w. in this segment. Since I have been licensed, it has been accepted that all c.w. stays below 14.100MHz. A mode that appears in brackets is the preferred mode of operation. Try telling that to the French s.s.b. stations in that section and you will learn some swear-words in French!

THE 18 & 21MHz BANDS

Thi 18MHz band has **18.101** to **18.109** designated to digimode and c.w., use which is acceptable. The 21MHz band is another superb band during the peak of the cycle. Here we have **21.080** to **21.100** for digimode and c.w. and **21.100** to **21.120MHz** for digimode (packet) and c.w. This is not a bad arrangement, and although we have occasional QRM from the USA Novice c.w. stations, who are quite entitled to use the top data segment, it has worked for a number of years for me on Packet.

THE 24 & 28MHz BANDS

In 24MHz we have a 9kHz segment **24.920** to **24.929** in which we have digimode and c.w., a similar segment to the 18MHz band. Whereas 28MHz is another superb band when it's open. Here we have **28.050** to **28.120**, in which we have digimode and c.w. and then **28.120** to **28.150** in which we have digimode (packet) and c.w.

Of course using 28MHz is becoming a major problem when it's open, as nobody has bothered to tell the CB intruders of the bandplan, not that they would pay any attention anyway! So, here I would suggest that during the contest weekends, we use RTTY over the whole band, checking first to make sure that no Amateur station is using the frequency.

Now let's take a look at what the USA stations have available. I will quote the Extra, Advance and General just as an illustration.

THE 1.8MHz BAND

In the USA they have virtually the same total band as us, namely **1.8** to **2MHz**. Ours starts at 1.810, so we have 10kHz less. In that total segment they are allowed c.w., RTTY, Data, phone and Image (FAX). So, for RTTY, read Data and therefore they have the possibility of an extra 186kHz over us.

THE 3.5 & 7MHz BANDS

On 3.5MHz, the Americans have **3.500 to 3.750** for c.w., RTTY and Data, which according to my calculations makes an extra 210kHz. Nice work! On 7MHz though they only have **7.000 to 7.150,** in which to operate c.w. RTTY and Data! This makes an extra 140kHz for them to squeeze into.

THE 10MHz BAND

On 10MHz, in the USA they can use **10.100 to 10.150kHz** for c.w., RTTY and Data, just an extra 40kHz, but better than 10kHz! Still, they are limited to 200W on this band.

THE 14 & 18MHz BANDS

On this band, they can use **14.000 to 14.150** for c.w., RTTY and Data. This gives them an extra 110kHz. It's interesting to note that their bandplan makes no note of avoiding the beacon frequency. On 18MHz they can use c.w., RTTY and Data in the segment **18.068 to 18.110.** This gives them an extra 34kHz.

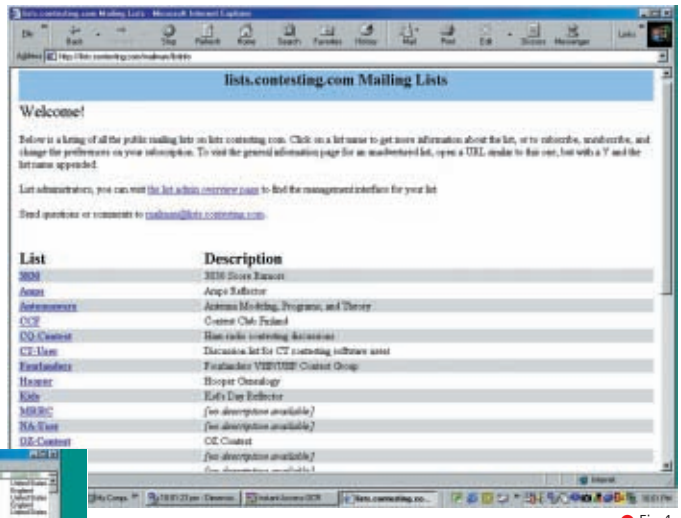
THE 21, 24 & 28MHz BANDS

The 21MHz band allows a huge segment, **21.000 to 21.200** for c.w., RTTY and Data giving them a whopping 160kHz extra to play with. On 24MHz they have **24.890 to 24.930** for c.w., RTTY and Data, again giving them 31kHz more than us. Finally on 28MHz they can use c.w., RTTY and Data in the segment **28.000 to 28.300MHz** which means they have 200kHz more than us.

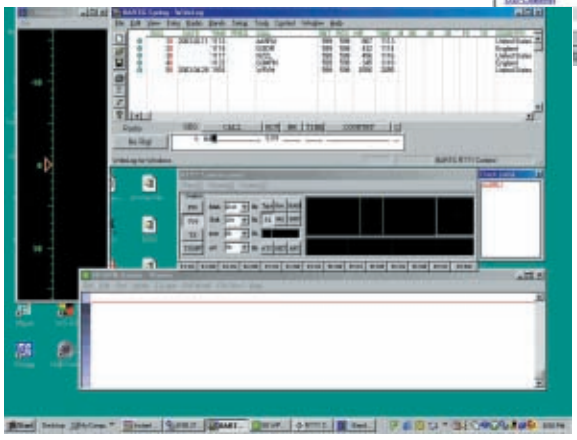
So, looking at the total 'space' in which the USA stations can operate RTTY, it means that theoretically they have 1111kHz more spectrum than us. There is little wonder therefore that a spread happens during a contest.

Data covers a number of modes. I have mentioned but a few in the notes above. There are those that are experimenting with newer modes, such as Pactor, Clover, MFSK, PSK63, Hellschreiber, and several other modes like AMTOR, not used much now, but it still needs to be considered. These all need space, and to lump them all together in a small segment is bad enough, but then to add insult to injury by allowing phone as well to mix in is a recipe for disaster.

At least the USA stations can spread out. You might say that they need the extra space, as there are more of them than there are of us, but that argument does not hold in practice. There can be several USA stations operating fairly close to one frequency, and on certain bands they won't hear each other. It does, however, encourage them to increase power in order to be 'first' in the list.



● Fig.1.



● Fig.2.

● Fig.3.

Extra bandwidth is urgently needed on h.f. in order to maintain a status quo; unless the RA is hoping that the G3 population is a dying one! Encouraging M3s onto h.f. is great, but listening to some of the hassle that goes on will not do much for the hobby in my opinion. The newly licensed will form a jaundiced opinion of what we are about, and go back to the pub!

REFLECTOR

Why not join the RTTY reflector? If you have a problem that is bugging you, sending a message to the reflector will bring a response and you might be able to help somebody else too. Look at **http://lists.contesting.com/mailman/listinfo** (**Fig. 1**).

WRITELOG

Now let's have a look at *Writelog*, which is, used in conjunction with *MMTTY*, and it's probably the most common duo to be found in the RTTY world. Of course, there are plenty of other programs eminently suitable, and I hope to be covering these in the future, so if you have a particular favourite, let me know why, and how you use it.

If you decide to try *Writelog*, you will need to register and pay. You can then download the program and you will be issued a registration code to enable the program to run. You will also need *MMTTY* and MMTTYPluginforWritelog.exe You can find *MMTTY* at **www.qsl.net/mmhamsoft/mmtty/index.html** and the Plugin is at **www.writelog.com/ThirdPartyDownloads.htm**

The latest version of *Writelog* is 10.40j; and once you have registered your program you'll have one year of free updates. The program will run RTTY, c.w., and s.s.b. and a typical screen display is shown in **Fig. 2.**

It's possible to set up a number of different windows showing differing information and I'll be discussing these in a future column. Meanwhile. take a look at: **www.writelog.com/Downloads/sbrdchk.zip** Put both extracted files in the same directory and click on the .exe file. This will tell you what your soundcard can do.

I also recommend that you look at **http://www.k9jy.com** (**Fig. 3**) for lots of information on *Writelog*. One word of advice however, use the program off-air to become familiar with it. I tried to operate the AFS c.w. test earlier this year and only used the program for ten minutes prior to the contest, **not** a good idea!

That's all for this time, see you in the December issue.

Roger Cooke G3LDI

TUNE-IN

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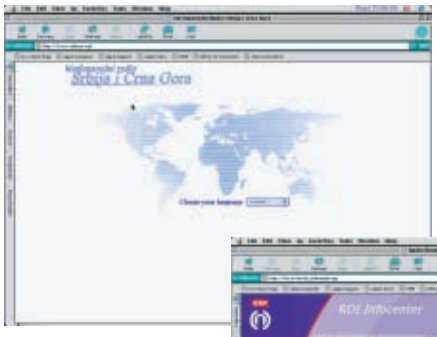
TOM WALTERS HAS REPORTS OF TROUBLE BREWING AMONG INTERNATIONAL BROADCASTERS

After the positive news I reported last time, unfortunately there now seems to be some troubles brewing. **Radio Austria International (ROI)** has finally, after years of rumour, been forced to bite the bullet, and go ahead with the much smaller output that has been long predicted. The following announcement appeared on the ROI website **http://roi.orf.at/english/welcome.html**

"From July 1st 2003 Radio Austria International will have a different program structure with significantly less programming in English. This follows a decision by the Austrian government to cease funding ROI and transfer it to the ORF, the Austrian Broadcasting Corporation. The ORF has subsequently decided, on budgetary grounds, to dramatically reduce the foreign language output.

The new structure will not include programs in French or Spanish but will include a 15 minute program in English - Report from Austria. This program will continue to cover the major political, social, cultural and economic developments in Austria for an international audience. As well, the weekly Insight Central Europe will be broadcast on Saturdays with a repeat on Sundays.

With the exception of the daily English language program, the future international programming on ROI will be a relay of the ORF's German language domestic radio station Österreich 1. The programme mixture, consisting of information, cultural features, music, literature, education, science and religion, has found wide acceptance among Austrian listeners and will thus be available to Austrian expatriates and a global listening audience interested in Austria".



You can hear the shadow of ROIs former self in English: Report from Austria at: 0115, 0145 America (East) 9.810; 1215, 1245 Australasia (Mon-Fri) 21.780MHz; 1245 Europe 6/155 13.730; 1510, 1540 America (West) 15.515 (Sackville); 2315, 2345 Latin America (Tue-Sat) 9.870, 13.730MHz. Insight Central Europe: 0105, 0135 America (East); 0505, 0535 Middle East (Sun) 17.870; 1202, 1235 Europe, Asia, Australasia (Sat-Sun) 6.155, 13.730; 1505, 1535 America (West) (Sat-Sun) 15.515; 2305, 2335 Latin America (Sun-Mon) 9.870, 13.730MHz.

As for **Kol Israel**, what a see-saw! Last time I reported that at one point it seemed as if the whole of Israel's international radio service was to be abolished because of domestic cuts (very similar to the situation of Radio Austria). Then there was a big re-think, and the cuts were halved, reprieving the foreign service.

Now regrettably, the director-general of the Israel Broadcasting Authority (IBA) has presented a 'restructuring' plan. Under the plan, the Foreign Service of Israel Radio will close after all. Money of course is at the root of it.

The government has planned a budget cut for the IBA of some 52 million dollars over three years, with 20 million dollars coming off this year alone. As a result, 200 employees will take early retirement. Other networks will be merged or closed.

Fearful rumours of closure put the management and staff at **Radio Netherlands** into a frantic spin, as they are already undertaking big cuts. A report on public broadcasting said that RNW's work could just as well be done by Embassies and the Internet! The whole station was up in arms. It was only a report, but you can't be too careful - these reports have a habit of suddenly turning into reality.

WHAT'S IN A NAME?

If your country is generally known to the world as Yugoslavia, then **Radio Yugoslavia** seems a nice and simple name for the radio station. Then (only slightly confusingly) you can have the snappy **RJ** (Radio Jugoslavia, they themselves spell their country with a 'J') as back-up.

Then political inspiration strikes: Yugoslavia is actually made up of Serbia and Montenegro, so why not call the station by the Yugoslav name for these two regions and you get **Radio Srbija i Crna Gora**. What a wonderful snappy improvement! And of course, to replace RJ you then have **RSCG** – trips off the tongue doesn't it!

The other problem with name changes was what to do with the old web site address: **www.radioyu.org** The answer is... we don't want to confuse people, so we'd better leave it the same.

The Radio Yugoslavia website is actually quite attractive and useful, and gives the following English schedule, listen at 0000-0030 on 9.580; 0430-0500 on 9.580; 1830-1900 on 6.100; 2100-2130 on 6.100 and at 2200-2230 on 7.230MHz**.** The station is very busy, with news in text, in real audio and on short wave. There are 12 languages – Albanian, Bulgarian, Chinese, English, French, Greek, Hungarian, Italian, Serbian, Spanish and Russian.

The Voice of Nigeria (VON), which already broadcasts in English, French, Arabic, Swahili and Fulfude, has added two native languages to its international output – Ibo and Yoruba. A VON official said: "The aim is to reach as many Nigerians outside the country as possible while not forgetting to export our culture". English from VON can be heard on 7.255, 11.770 and 15.120MHz at 0500-0800, 0900-1200, 1800-2000 and 1900-2300.

CURIOUS NEWS FROM RUSSIA

To finish off this month, I've news of a very curious report that was put out by Russian news agency ITAR-TASS. It noted that the **Voice of Russia**, which has been closely involved in the development and testing of **DRM,** was taking part in the inaugural broadcasts in DRM format. Thus, trumpeted the agency, VOR "has become the first digital radio station in the country, broadcasting to Europe four hours a day in digital format".

The Voice of Russia, noted ITAR-TASS is using only one transmitter for digital broadcasts at present, but "all others are expected to go digital in the very near future to cover all continents by the end of the year". So, with no DRM radios out there, if all transmitters are converted to DRM, will anyone actually be listening?

Perhaps patriotism triumphed over accuracy with regard to VOR. It was reassuring to learn though from the VOR report that complete transition to digital should be completed by 2015.

That's all for this month, so until next time, keep your dial tuning the boadcast bands and don't forget to let me know of any interesting finds.

Bye for now
Tom

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FOR SALE

9k6 packet board for Tiny 2 and clones, complete with manual, £20. Roger, Cornwall. Tel: (01637) 889198 or E-mail: roger@g4oco.freeserve.co.uk

486 computer, Internet, monitor, keyboard, speakers, £30. DX-304 h.f. RX, 150kHz to 30MHz, s.s.b., c.w., a.m., a.c. mains, 12V a.c., £110. Working, will deliver, London suburbs. E-mail: esquire@fsmail.net

Albrecht AE485S 10m a.m./f.m./s.s.b. mobile TX/RX, mint condition, £90. Tel: Suffolk (01359) 242161.

Assorted receivers for sale: Hallicrafters, RCA, Collins, military BC348, 19 Set, 1155, etc. Please ring for details. Tel: (01274) 824816.

Classic receivers, including Ten-Tec RX-340, £2250. Plessey PR-2250, £500. PRS-2280, £600. Racal 6775 with software and many others. Tel: (01526) 342173.

Drake R4C, MS4 speaker, £275. Drake 2B RX, speaker, £225. National HRO, C1935, 10 coils, p.u., £75. Rare 1935 Philips 575A all-wave, 6 valve, PX4 output, £75. Pye 39JH, 8 valve, 11 waveband, £75. Jim, Bournemouth. Tel: (01202) 510400.

Eddystone 940 receiver, 540kHz to 30MHz, 15 valves, superb condition and performance, with manual and spare valves, etc., £150 or swap for Trio R-1000 or similar. Wanted: manual for R-1000. Pete G4IXY, St. Albans. Tel: (01727) 839908.

External modem v.90-56k, with u.s.b. connect, disk perfect, working, £30. Tel: Rotherham (01909) 850519.

FT-707, FC-707, FV-707DM, FP-707, YM-35 mic., all as new condition, complete with original boxes and manuals, plus vehicle mounting bracket, £450. Oscilloscope SMIII dual beam, £35 and MK8-4, £20. Tel: (01945) 585857 or E-mail: whbarnes20@hotmail.com

HF-150 Comms receiver, good condition, plus manuals, NiCad, charger, aerial cable and balun, £150. Tel: Essex (01702) 544670.

Howes kits, semi professional, built one 14MHz c.w., 20W, other 21/28MHz c.w./audio, 80W, both cased, one mains p.s.u., 12V/5A s.w.r. meter, suit novice improver, offers around, £100 for all. Keith G0RSL on (01539) 740815.

Icom IC-706 MkII with d.s.p., h.f. 6m (50MHz) and 2m (144MHz), original box and manual, £375 - can be seen working. Tel: W. Sussex (01903) 772563, E-mail: denniswellis3147.fsnet.co.uk

Kenwood TS-850S with built-in a.t.u., excellent condition, with manual, boxed, compete with matching MC-60A desk microphone, also boxed, £625. Ken G3RRN, Lincoln. Tel: (01522) 751557 or E-mail: g3rrn@btinternet.com

Marconi TF2950 mobile radio test set, complete with manuals, worth £700, will take, £500. 70cm (430MHz) beam, £15. Rotator with control unit, £25. Steve 2E1GFS, Taunton. Tel: (01823) 279930 or (07743) 939922.

Microwave Modules 432MHz transverter, 28MHz in and 432MHz out, £43. 19 Set, original with B Set, Russian writing, complete, £350. Modified 19 Set, internal mains unit, £160. KW77 and PCR receivers (2), £95 each plus carriage, £10 each. Tel: Truro (01872) 241005.

***Radio Constructor* (22)** mid 60s-70s, pure nostalgia, £4 - postage extra (unknown). Upright Tandberg tape recorder (heavy), loads of tape, make me an offer, you will not be sorry, collect or carriage extra. Two sets p.m.r. hand-helds, see Greenweld catalogue, £25. Optimus stereo infrared headphones plus p.s.u., £20. AKG professional (dead rat) microphone, as seen on TV, offers? Let's chat. Tel: Suffolk (01986) 896658.

Reception set R209 MkII, handbook, battery, charger, head set, complete, £60 or offers. Tel: Bournemouth (01202) 397698.

Vari capacitors, 500pF and 2-gang x 3-gang ex valve rigs, any offers plus post please. 'Phone for details. G4XSM, Suffolk. Tel: (01284) 768084.

Yaesu FRG-7700 communications receiver GC plus FRT-7700 and FRV-7700, £140 all three. MFJ-949D antenna tuner, Versa Tuner, £40. Grundig Yacht Boy 1100, working, £15. Sony ICF-5900 multiband radio, xtal calibrator b.f.o., £25. Tel: Norfolk (07815) 717124.

Yaesu FT-707, complete h.f. TX/RX with FV-707DM v.f.o., FC-707 a.t.u., FP-707 p.s.u., cables, two mics, handbooks, £200. Yaesu FT-480K v.h.f. TX/RX with

FT-80A p.s.u., s.w.r. speaker, cables, mic., £80. Ron G0FGN, Glos. Tel: (01285) 655061.

Yaesu FT-920AF h.f. plus 6m (50MHz), auto tuner, d.s.p., 12 months old, excellent, mic./manual, boxed, buyer collects, £750 cash sale. 25A p.s.u., three months old, £50. New radio forces sale. Wanted: Yaesu YC-601 freq. counter to match FT-101, £35-45 offered. Anyone got one? Tel: (01443) 412695.

Yaesu FTV-901R transverter, 144 + 50 modules fitted, boxed, £175. Yaesu FC-902 a.t.u., £95. BNOS LPM 50-10-100 6m (50MHz) linear amp, £95. Microwave Modules 28-432S 70cm (430MHz) transverter, £25. Tel: Worthing (01903) 763226.

Yupiteru MVT-7100 hand-held scanner with s.s.b., mint condition, complete with accessories, £100. Kenwood R-2000 communications receiver, fitted v.h.f. converter in mint condition, boxed, manual, £275 - share carriage. Len G0INU, Devon. Tel: (01752) 343074.

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EC10 MkII RX, any condition, also Atlas TX/RX, working or not. Cash waiting. Tel: (01939) 250679 or E-mail: peterparker2@lineone.net

Kansas City Tracker for satellite and moon tracking. Tel: (01795) 430608 after 1800 please.

Linear 2 Trio T-7010, Mizuho SB2M or similar 2m (144MHz) s.s.b. rig, must be in good working order please. Pete G1SFS on (01858) 461243.

Lowe SRX30 servicing data needed. Lowe kindly sent diagram, but there is no manual, it works, but needs aligning and modifying. Jonathan, London. Tel: 0207-243 6656.

Manual for Grundig 2035 RX or any info. Ron G4MNB, Wiltshire. Tel: (01793) 331585, E-mail: the.sharps@ntlworld.com

Q Tek Tritan 6m (50MHz), 2m (144MHz) and 70cm (430MHz) beam, Watson W-2000 vertical, WB 234A amplifier, re: 144MHz. Any cheap, broken, but reliable h.f. (Amateur bands) mobile antennas, w.h.y.? Handbook to FT-757GX or copy. Enquiries on behalf of G6LSW - Alan M3BZY. Write c/o: 85 Hillside Road, West Bungay, Suffolk NR35 1RH, Tel: (01986) 896658 (can collect within 50-70 mile radius). Payment by cash on delivery either way.

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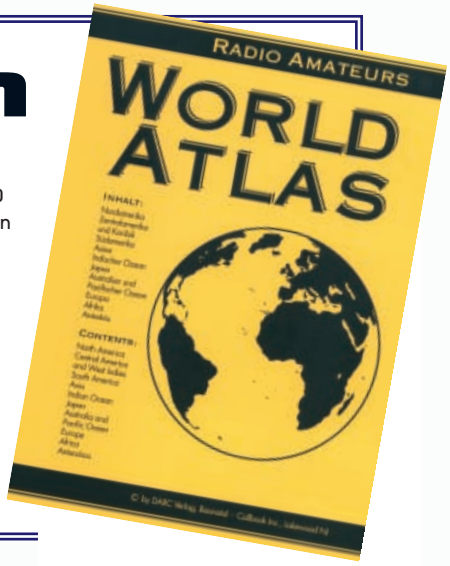

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topical talk — Activity Afternoon

This month Rob Mannion G3XFD chats about the proposed 70MHz activity afternoon - now scheduled for late August. It sounds as though it could be fun!

Many readers will realise - from what I've written in the past - just how keen I am on the much under-used 70MHz band. The current Radio Basics 70MHz project reflects this...as it is aimed at offering encouragement. But along with many others, I've got to admit that in recent years, I too have neglected four metres.

The subject of 70MHz as also been raised by several EI and GI friends I worked on 144MHz during my recent holiday in Ireland...as they too want to see more four metre activity. The seed was sown!

The actual idea for the 'Activity Afternoon' on 70MHz came during the wonderfully sunny, clear Sunday afternoon of the 2003 *PW* 144MHz QRP Contest. Incidentally, the photograph, **Fig. 1**, is an indicator of just how enjoyable the day was...as I was joined for several hours by **Kevin Nice G7TZC/M3SWM** the Editor of *Short Wave Magazine*...who had seemingly hot-footed it from Australia (judging by his hat!) to share the pleasure of a cup of tea on site. (Tea always seems to taste better in such situations doesn't it?).

● Fig 1: 'Cobber' Kevin Nice VK/G7TZC visiting the G3XFD/P site during the QRP Contest. Nothing better than a cuppa from a (Ned) Kelly's Kettle!

Kevin added that 'extra' ingredient to the day - and we thoroughly enjoyed each other's company. Remembering *SWM's* own recent extremely successful 7MHz listening contest activity - we started chatting about the possibility of a 4 metre afternoon.

Following some discussion amongst friends - and also checking to ensure we wouldn't interfere with any other planned 70MHz activity - I've settled on the last Saturday of August...which happens to be the **30th**.

Antenna On Air

The antenna I'll be using on air is to be very kindly supplied by **Sandpiper Communications**. The 3-element Yagi will then be featured in a review. To further encourage readers to come on the band anytime between 1200 and 1600UTC I'm planning to use the same location I worked from during the 144MHz contest. However, the final site depends on the day-to-day needs of the very helpful farm staff who allow me onto private land. My usual Tenna-Tourer mast base and 10 metre pole system will also be used.

Although I'm hoping c.w., a.m., f.m. and s.s.b. will be heard on the day - I'll be on f.m. using my 25W AKD 4000 transceiver using horizontal polarisation. Channels available to me on the AKD rig are: 70.250, 70.2625, 70.2750, 70.2875, 70.300, 70.3125, 70.3250, 70.3375, 70.3500, 70.3625, 70.3750, 70.3875, 70.4000, 70.4125, 70.4250, 70.4375, 70.4500, 70.4625, 70.4750 and 70.4875MHz. Bearing in mind the AKD isn't on the 'traditional' 70.260MHz channel...I'll listen on 70.2620, and also monitor the other channels.

Join Us!

Finally, I ask if you can...why not join us (please). Several EI stations have stated their intentions to be active, and **Martin Andrew GM6VXB**, whose QTH is three miles from Fraserburgh in Aberdeenshire is very keen to work down south, using various modes.

Martin works off-shore but promises to be available on the day selected...and I've made sure he knows the date chosen is Saturday 30 August. I hope to chat to as many *PW* readers as possible...but remember it's not a contest...it's an activity afternoon!

An E-mail list of stations who hope to be on-air, will be sent to anyone mailing me at **rob@pwpublishing.ltd.uk** and I hope your callsign will appear on the list!

pw

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