Practical Wireless

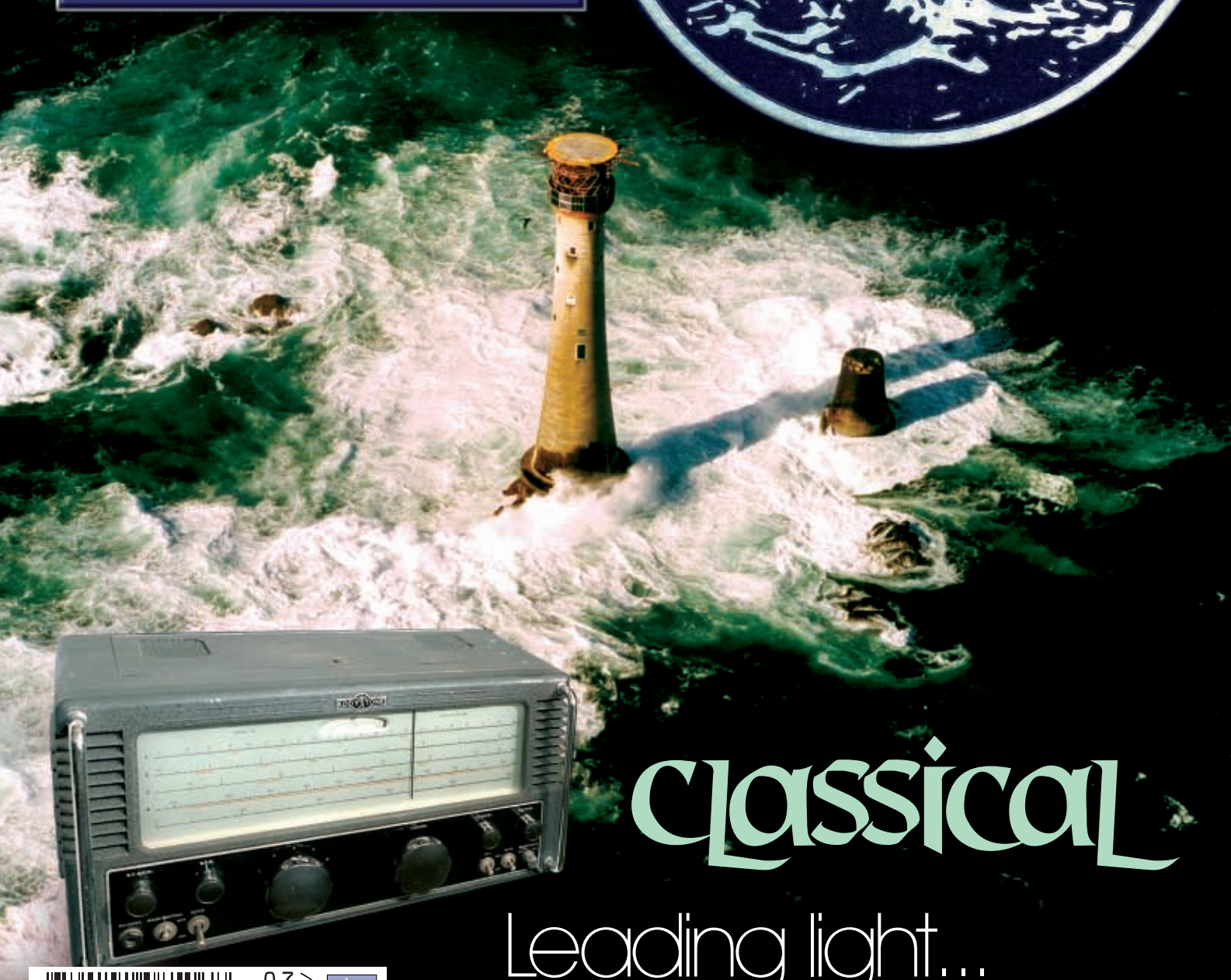
PW

amateur radio & more!

RADIO PRODUCTS

EDDYSTONE

TRADE MARK



Classical

Leading light... The Eddystone 750

9 770141 085068 07>

pwp

July 2003

£2.85

WATERS & STANTON

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WEB ORDERING
www.wsplc.com

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.
AVAILABLE SOON

NEW KENWOOD HF RIG 160-6m
Similar concept to the TSB-2000, but much smaller.
AVAILABLE AUTUMN

NEW YAESU VX-2R
World's smallest dual band HT with WB Rx up to 3W output!
COMING SOON

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 £2399 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 SPECIAL OFFER £1449 C

HF/VHF 100W transceiver. Features large LCD with spectrum scope, auto ATU and same DSP system as IC-756PRO II. Supplied with free SP-21 speaker & SM20 desk mic.
COMES WITH FREE SP-21 & SM-20

ICOM IC-706 IIG DSP £799 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 £549 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 £1695 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 £2499 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 £1999 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 £569 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

THE ONLY THING WE WON'T DISCOUNT CUSTOMER SERVICE

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 £279 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 £369 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!

YAESU VX-7R NEW £319 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-1R GREAT PRICE £119.95 B

2m/70cm

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

SAVE £100 WAS £219

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.

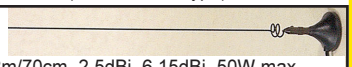
MOTOROLA T-5512 £69.99 B

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

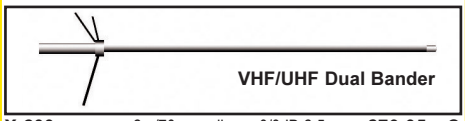
WATSON

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

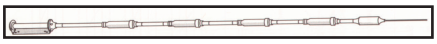
WATERS & STANTON

1973 WATERS & STANTON PLC 30th ANNIVERSARY 2003

PRICE MATCH

VERTICAL ANTENNAS

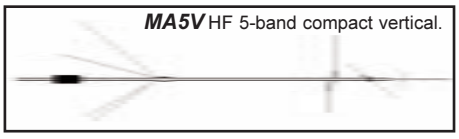
HUSTLER



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

LOWE SPS-8400 PSU £99.95 C

SPECIAL OFFER

A general purpose variable 3-15V DC, 25A (30A peak) power supply. Modern design, dual analogue meters, front power terminals. More than enough for 100W transceivers.

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*

LDG RT-11 Asm ATU £239.95 B

**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*

MFJ-969 ATU Deluxe Versa Tuner II £199.95 C

**1.8-54MHz*
**300W PEP*
**T-match network*
**Internal 4:1 balun*
**Built-in dummy load*
**X-needle meter*
**3-way ant switch*
One of the most popular 300W models.

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.

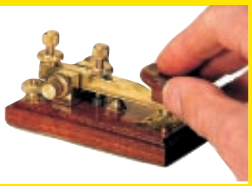
AVAIR AV-20 VSWR/Power Meter £39.95 B

Two cross-needle VSWR/PWR Meters ideal for any shack.
**AV-20 3.5-150MHz *AV-40 144-470MHz*
**FWD/RFLD VSWR + PWR *150W*
**Sockets SO-239 *50 Ohms *Size 85x87x95mm *Weight 280g*

AV-40 X-needle VSWR/PWR 140-525MHz **£39.95** B

WATSON W-GMP Morse Key £29.95 A

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



WATSON W-CRI Morse Key £46.95 B

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

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)

WEST MOUNTAIN RIGBLASTERS

RIGblaster pro	Data interface 8-pin/mod, Cd & cables	**£299.95**	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

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 NEW £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 NEW £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.

TRANSMITTING LOGBOOK NEW £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.

MOBILE/PORTABLE LOGBOOK NEW £4.99 A

The new Radio Amateurs Mobile/Portable Logbook. A5 size, spiral bound. Also contains relevant repeater information. Not a legal requirement for mobile, but great for recording QSO's.

CHECK OUR 2003 PRODUCT GUIDE FOR MORE DETAILS OF THESE PRODUCTS

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WE ARE THE ORGANISATION WHO WORK ON YOUR BEHALF WITH GOVERNMENT, PROTECTING YOUR RADIO INTERESTS. ANYONE INTERESTED IN RADIO IS WELCOME TO JOIN US (LICENCED OR NOT) AND PARTICIPATE IN OUR GREAT MEMBER BENEFITS.

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PW

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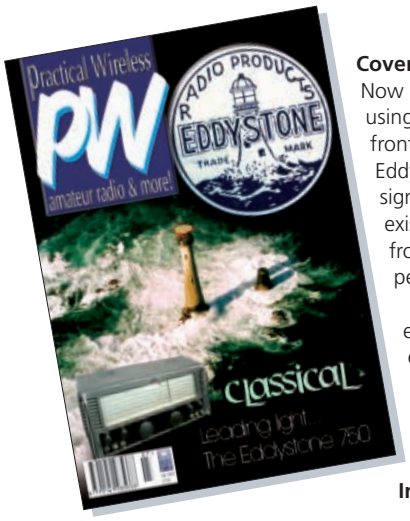

Cover Subject

Now for something completely different! We couldn't resist using a photograph of the famous Eddystone lighthouse on the front cover this month to accompany the feature on the Eddystone 750 receiver. In the article **Rob G3XFD** explains the significance of 'Smeaton's Stump' which stands alongside the existing leading light. Our thanks go to **Howard Cooper** from **The Corporation of Trinity House** for the supply and permission to use the photograph.

The team hope you enjoy this issue and continue to extend the hand of radio friendship to all those you 'meet' on the air!

Design: Bob Kemp
Main Photograph: Courtesy of The Corporation of Trinity House
Inset Photograph: Courtesy of Ben Nock G4BXD

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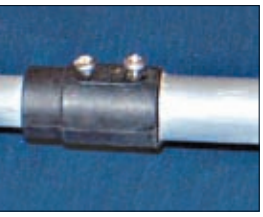

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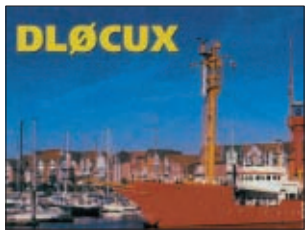

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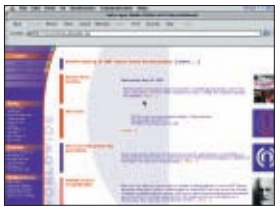

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ANOTHER PACKED ISSUE

rob mannion's keylines

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

On Wednesday 30 April I had the very great pleasure of having **Kevin Nice G7TZC,** Editor of *Short Wave Magazine* as a passenger during the 352 mile round trip to visit **Icom UK Ltd** in Herne Bay, Kent. At least...it would have been 352, rather than 372 if we'd not been so busily chatting that I missed the Herne Bay turn-off from the A299! We were so engrossed in chatting that it wasn't until the outskirts of Margate appeared that I realised my mistake!

It was to be a very long, but extremely enjoyable day. We were wondering what treats were in store for us at the famous Sea Street Headquarters of Icom (UK) Ltd. We weren't to be disappointed.

New Equipment

During the day the audience, including Icom's dealers and the Amateur Radio Press - including Elaine Richards G4LFM of *Radio Active* magazine and our colleagues on the Radio Society of Great Britain's (RSGB) *Radio Communications* magazine - were treated to a factual, (and sometimes amusing) run-down on Icom's soon-to-come products.

The entire Icom team seemed to turn out for us...including **Dave Stockley G4EPL**, and his son **Bob**. They were ably backed by their sales and marketing teams. The catering was exceptional too! There may even have been some Whitstable oysters judging by the quality of the food on offer. Thanks folks...it was a very enjoyable spread!

Of great interest of course were the recently announced IC-E208 v.h.f./u.h.f. dual-band f.m. mobile and the IC-703 h.f. and 50MHz QRP transceiver, which is actually on sale as I write this. We're obviously looking forward to the opportunity of reviewing both rigs...and will do so at the earliest opportunity!

Other aspects of the busy day was the introduction of the D-STAR system. Digital in operation, this system is a combination of data and voice communications and originates from the Japanese Amateur Radio League (JARL). The Japanese use it already, it's not encrypted, works on 1.2GHz and has a transfer rate of 128kps. Obviously, repeaters are necessary and Icom (UK) Ltd. had demonstrations with their own set up to whet our appetites (Whetted they certainly were!).

The potentials of D-STAR system are many...not the least being an Amateur Radio independent 'Internet' style system entirely using u.h.f./microwaves. There are some problems to be sorted out - some being political/regulational rather than purely technical - but we hope to bring you a full article on this topic soon.

And who better to write the article for us? Someone from Icom of course, and I shall be issuing an invitation for someone to expand the ideas on the fascinating concept.

Thank you for a truly intriguing and enjoyable day-out Icom UK. What a pity it's such a hike from Dorset to the Kent coast. A bit closer and I could attend more often...and watch the ideas develop!

A lighter moment - snapped in time - during Icom's Amateur Radio Conference on April 30 2003. Bob Stockley of Icom UK Ltd. seems to be asking an amused Martin Lynch G4HKS for something on a plate and whatever it was...Martin dug deep in his pockets for it! Meanwhile Bob's Dad....Dave Stockley G4ELP, also of Icom, enjoyed watching his son at work on another renowned salesman!

Welcome President Sean!

Relations between Radio Amateurs in the UK and our neighbourly Radio Experimenter (their official title in EI) friends in the Irish Republic are naturally very close. Because of this I have no doubt readers will join me in the congratulations I offer to **Sean Donelan EI4GK**, as he takes up office as the new **President of The Irish Radio Transmitters' Society** (**IRTS**). Sean was elected President at the IRTS Annual General Meeting, which took place on Sunday 27 April at the Green Isle Hotel, Dublin.

As is my practice with RSGB Presidents, I've cordially invited Sean to write a 'Guest' Keylines editorial if he wishes. And personally speaking, I would be honoured if Sean becomes the first IRTS President to accept the invitation...especially as I'm a member of the IRTS myself. To vacate the Keylines page would a very small tribute to a Society whose members have always welcomed and treated me with hospitality fit for someone of importance....let alone a humble journalist!

While On The Subject....

While on the subject of Ireland, I must mention the letters and E-mails which are arriving here in Broadstone from Ireland requesting more news and input to *PW* from their side of the water. In replying...I assure you that the editorial team would be delighted to receive even more news, articles and projects from both EI and GI.

So, how about it readers? If you've got something which you'd like to share with the wider Amateur Radio community in the group of Islands we share...let us know...we'll be delighted to hear from you

Rob G3XFD

practical wireless services

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

Subscriptions

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

Components For *PW* Projects

In general all components used in constructing *PW* projects are available from a variety of component suppliers. Where special, or difficult to obtain, components are specified, a supplier will be quoted in the article.

Photocopies & Back Issues

We have a selection of back issues, covering the past three years of *PW*. If you are looking for an article or review that you missed first time around, we can help. If we don't have the whole issue we can always supply a photocopy of the article. Back issues for *PW* are £2.85 each and photocopies are £2.85 per article.

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

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

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

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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*.

Anger & Dismay

● **Dear Sir**

It is with both anger and dismay that I read the letter from **Darren Kelly M3DKM** about him being 'ripped off' at the Bring & Buy sale at the Norbreck Rally. With 55 years experience in this great hobby of ours, I am not surprised!

Darren is not the first to be ripped off and won't be the last. (Even the Editor admits to having been duped!). Bring & Buy sales should have a 'financial health danger' warning at the door because they can be a danger area to the new and unwary amateurs such as the new M3s.

To the new and inexperienced Amateur I recommend a few cautious steps to take at a Bring & Buy. Firstly, ask to examine the item of your interest. If it is badly marked or dirty, tobacco stained or smells of burning, don't touch it. If you are still interested, ask the B&B organisers for details of vendor and then ask the public address operator to put out a call for that person to attend the B&B where you can meet them face-to-face.

Do not be afraid to ask a few pertinent questions; how old is the equipment; did they buy it new or used; how much use has it had; has it ever been repaired; why is it being sold; if you buy it will the seller give you their full name, address and phone number? An honest Amateur will readily answer your questions. If his answers appear reluctant or evasive - forget it! Also be very wary of the person who is 'selling it for somebody else'. They are least likely to know much about it.

The Editor has headed Darren's letter 'Buyer Beware' which we know is the translation from the Latin Caveat Emptor. It is a warning to be taken seriously when buying anything used. After all, would you buy a used car from a total stranger who you may never meet again without first test driving it? Buying blind at a Bring & Buy is just as daft!

All this **may seem** to create the impression that all Amateurs are dishonest and need to be regarded with suspicion. **This is not so**. **In my experience that vast majority are decent, ordinary people**. But unhappily, we live in a society which no longer has the good integrity of yesteryear, as we 'oldies' know.

There is always the dishonest minority in all walks of life. It is no wonder that this experience has left Darren with a 'bad taste in his mouth' and he is expressing despair about his future in the hobby. My message to him is 'stick with it'. You will get over the disappointment if you want to. It has been a hard lesson **but giving up is not the answer**.

This is a fine hobby. If it wasn't I wouldn't still be in it after 55 years. I see that Darren lives not far from me here in Lancashire. I can be found on 1.8, 3.5 and 7MHz from time-to-time and my wish is that one day I will have a QSO with M3DKM.

John Hoban G3EGC
Bolton
Lancashire

Editor's comments: I fully agree with John's comments. Despite the fact I have been caught out myself in the past...there's an enormous amount of integrity and generosity within the Amateur Radio community. The large number of maps which arrived here for my collection is surely a demonstration of that! Incidentally, an article, written by Ian Brothwell G4EAN, dealing with the various ways of buying and selling, is under preparation for *PW*.

Yagi Who?

● **Dear Sir**

Could we please have a few lines in *PW* on Yagi? Who was he and when was his type of antenna first used? I'm 86 and was a s.w.l. in 1931, and in all that time I have never seen any information.

In the early 1930s with 5m antennas were always Yagi types and the early RDF (Radar) used stacked Yagi. Thank you.

'Nobby' Clark G3BEC
Yeovil
Somerset

Editor's reply: It will be our pleasure Nobby! An article on the Yagi-Uda array (to give the full title as it was a joint effort) and the Japanese gentlemen behind this now standard antenna, is planned for *PW* soon.

Crystal Radio Kit

● **Dear Sir**

Last Christmas, my partner bought a crystal radio kit for her youngest son (8 years old). When I saw it...my heart sank a little because I know from experience that they can be difficult to get results from without using a huge aerial, a good earth and a strong radio signal.

To cut a long story short, the main problems seem to be the relative insensitivity of the detector diode which needs about 0.1V forward bias before it will conduct, and the poor impedance match offered by the crystal headphone - I understand that the earpiece should ideally be about 2kΩ dynamic.

For the first, I realise that this problem can be overcome by applying a d.c. bias so that the diode is almost conducting, but this negates the main (perhaps only) advantage of the basic crystal set, namely that it does not need any form of motive power. If you're going to include a battery then you may as well just use it to power a ZN414/MK484.

I'm wondering if there have been any recent innovations in diode technology and whether it's now possible to obtain small signal rectifiers with a very low forward voltage drop superior to that of germanium diodes, or to synthesise such components by using something else like a f.e.t. in an unorthodox configuration? With regard to the headphones, is it still possible to obtain the 'real thing' and if so where, and if not, what types of transducers have your readers had the best success with? Regards,

Graham Galbraith M0ADR
Newcastle upon Tyne

Basic Detectors

● **Dear Sir**

I've been reading through some of the Editor's Radio Basics columns from 1998 and wondered if you had any copies of your original Radio Basics Guides left over, maybe hidden away in the bottom of a drawer? But if you don't have one it doesn't matter.

I've done a little experimenting with crystal sets. I tried the Editor's idea of simulating a diode detector with a copper washer to make a metal oxide rectifier. I used an old green penny I found in the garden, and as pennies aren't legal tender here in Republic of Ireland any more (We've got Euro cents nowadays), I made a radio out of it...and it worked!

When I made my first crystal set I couldn't hear anything on the crystal earpiece I had. Instead while I was waiting for components to arrive by post to make an audio amplifier I plugged in the speakers from my PC. They of course, using the computer, provide a ready-made amplifier. The output was excellent...though only through one speaker as expected.

The point I'm trying to make is that you could recommend this to your readers as a short cut if they didn't want to go to the trouble of making an amplifier.

Liam O'Mahony
Kanturk
County Cork
Republic of Ireland

Editor's comments: Thanks for your letter Liam, and by the time your letter is published you should have received the original Radio Basics Guides. I'm pleased you had some success with the metal oxide detector. The trick for success is to use a sharply pointed steel wire (from a small spring, retaining most of the spring, with a few millimetres pulled out while its heated) as the contact ('Cat's Whisker') on the verdigris (the copper oxide).

Razor Blade Detector

● **Dear Sir**

Having for the first time read *Practical Wireless* and found it quite interesting, I would like to forward this request to you. During the Second World War I was a soldier in the Italian campaign and was at times with different sections of the Signals Regiment. One of the men in the Signals gave me instructions and a drawing of an 'Anzio receiver' made up from materials available...and capable of getting signals from the BBC in England.

This was a huge success and I would like to make up this set again, but I now have no details or instructions of how to build it, can you help? It may seem strange but the materials required are, a piece of wood, a razor blade to act as a crystal, a safety pin to act as a probe for station selection, a small coil of copper wire, a length of wire as an aerial and a pair of headphones and that's it! It may sound bizarre to say the least, but your help would be appreciated.

D. Kimberley
Haxby
York

Editor's Comment: There's much interest in this type of detector - even in this age of the integrated circuit. I sent Mr Kimberley the same pages from Radio Basics (*PW* January 1998) which Liam from County Cork had read for his project. Although the transmissions heard in Italy were almost certainly from the BBC's wartime short wave service (crystal sets work very well on h.f. for broadcast purposes)....sensitive, 2000Ω impedance headphones are required for the best results. (Photocopies of the article are available from the Book Service). Please see Topical Talk for further comment on this fascinating subject.

Eddystone Appreciation

● **Dear Sir**

Congratulations on another interesting edition of *PW* (May 2003). I was especially pleased to see the feature on the Classic Eddystone EA12 Amateur Bands Receiver by **Ben Nock G4BXD**, one of your regular Valve & Vintage team. Interestingly however, in spite of many trials and tribulations in recent years, the Eddystone name survives in no less than three areas.

Firstly, the famous Eddystone Diecast Boxes are manufactured by Hammond Electronics Limited (details at **www.hammondmfg.com**) Secondly, state-of-the-art l.f. and h.f. Eddystone receivers are manufactured in Cambridgeshire (details at **www.ringuk.com**)

And finally, SBS Eddystone Broadcasting is still producing f.m. radio transmitters at their Alchester factory near Birmingham (details at **www.sbsfm.com/html/edd.htm**)

Eddystone Radio has been manufacturing short wave receivers for over 75 years and interest in this famous marque continues to grow. The Eddystone User Group now has over 350 members world-wide. Members receive a bi-monthly *Lighthouse* magazine and also the latest copy of the Quick Reference Guide, a 60-age rapid reference to the receivers and brief history of Eddystone Radio in Birmingham from 1925 to the present day.

Perhaps you would be kind enough to mention that full details of membership may be obtained from me at the address below? Thank you.

Graeme Wormold G3GGL
Eddystone User Group
15 Sabrina Drive
Bewdley
Worcestershire
DY12 2RJ

Editor's comments: We're pleased to publicise the EUG's activities Graeme. The *PW* team also hope that you'll also enjoy our own tribute to Eddystone Radio on this month's cover, (with thanks to Trinity House for the photograph of the Eddystone lighthouse) and the article discussing the Eddystone 750 receiver on page 26.

The Daily Telegraph & Rugby

● **Dear Sir**

The Editor's letter to the *Daily Telegraph* published on 29 March 2003 has alerted me to the fact that a threat of closure hangs over the transmitter at Rugby. This is indeed dire news, and I do hope that somehow this can be averted.

The published letter brought back so many memories of my husband and I driving up the M1 and there was always the same thrill when those majestic masts appeared in the distance, gradually coming closer and closer, at which point I invariably visualised all the varied traffic and messages whizzing over my head.

Everything now whirls about the globe in seconds, but I am in my eighties and have vague memories of my father's crystal/cat's whisker radio set. The cutting edge of technology of its day!

Time was when ringtones and bleeps were still far over the horizon and you could guarantee a human voice would answer when you made a telephone call. **Yes indeed, please don't let us forget the time when communication was done the hard way, and preserve those memories if we can.**

Mrs K. M. Sykes
Carshalton
Surrey

Editor's comment: The letter Mrs Sykes mentions attracted a lot of interest let's hope that such places of scientific and technological importance won't be lost forever. If plaques can be placed where pop stars and footballers were born or lived...surely more can be done to remember our scientific heritage? Please make sure your own opinion is known by contacting your local newspaper, radio or television station.

Toroid Data

● **Dear Sir**

The enclosed data was drawn up for the benefit of my club members. And following the discussions in *PW*...it was suggested it might benefit your readers.

The chart covers the most called for cores, with space for additions. There are two frequency ranges for each core. Normal is the normal working range. The other frequency range is for maximum Q. I should have also added "select a wire gauge to allow winding to cover approx $^{3}/_{4}$ of the core".

James Hooper G3PGA
Ilford
Essex

Editor's reply: Thank you James! The A4 sheet he kindly provided will be photocopied and sent to readers who send a 1st class stamped (No stamped envelope - no photocopy!) self-addressed envelope to the Broadstone offices. Mark your envelope to us as 'Toroid Details July *PW*'.

Dip Meters

● **Dear Sir**

May I add to the excellent comments regarding Dip Meters/GDOs that were made by **Martyn Lindars** in *PW* June 2003. Most published designs seem to have two major failings. Firstly, they use a frequency range per coil of about three to one. Secondly, they use the minimum number of coils to cover the required frequency range.

It's better to limit the frequency swing, to say, two to one and ensure that the coils have a very generous overlap. For example, if the required coverage 2-32MHz, use the following coil ranges, 2-4, 3-6, 4-8, 6-12, 8-16, 12-24 and 16-32MHz. Being generous with the number of coils ensures that you can dip a circuit in the middle of the tuning range. This has two advantages, firstly the risk of erratic oscillation is minimised, secondly you don't 'fall between the cracks'.

Another consideration when choosing the coil ranges is to ensure that your favourite Amateur Bands are in the centre of the tuning range. Attention to these small details makes the instrument much easier to use and could be a way of improving a defective QSO.

Gerald Stancey G3MCK
Oakham
Rutland

Advertising & Selling Bugs

● **Dear Sir**

I have just read the news item from the Radiocommunications Agency (RA), printed in the June 2003 *PW*. It concerns a business said to have manufactured and sold electronic surveillance 'bugs' and that a man living in Leicester was convicted.

I wonder why this business was singled out for attention when there are others who advertise their goods in world-wide publications? Although I notice a certain decline in those advertising...they are probably still trading in these items, **from under the counter**. Perhaps if it had not been for the interference aspect...would this prosecution have taken place?

Another manufacturer, who I cannot find anymore, was **Suma Designs** of Baxterley, Warwickshire. They were the most famous I can think of. I don't know if it is just hard times of whether they have been asked/ordered to cease trading?

Perhaps the RA would like to clarify the issue by writing a short article for *PW?* In this way readers can be made aware of what is considered possible by way of research or home experimentation.

As a signal generator is capable or theoretically transmitting on any frequency in its range...does this offend under the Wireless Telegraphy act? If constructing a superhet receiver ...does the local oscillator offend? Where is the line drawn, or does it only matter if the item causes interference?

Are these things also covered under EMC regulations? Do the RA issue special licences to businesses who develop radio transmitters for legitimate users? Perhaps a book of pamphlet detailing the rules and regulations could be made available?

Well I hope this sparks somebody to reply so we can all sleep at night. Oh yes, just a thought but do those who work for MI5 also come under the same regulations? And do Police Officers have to pass an exam and carry a licence? Thanks for an interesting read.

Ian Johnson
Kidderminster
Worcestershire

Editor's comment: I think we may end up getting copies of the various, specialised RA booklets sent to us, to send on for you Ian! However, what's always puzzled me on the subject of illegal-to-operate equipment is that generally speaking it seems (from what is published) that the equipment can be advertised for sale...but the buyer cannot normally use it legitimately! Finally, if I disappear abruptly...you'll know I challenged an MI5 operative for their bugging licence!

Kit Radio Company Project

● **Dear Sir**

I write with reference to the Editor's review of the **Kit Radio Company's** KRC-A-3 Active Antenna Tuner project in the June issue of *PW*.

On the strength of **Rob G3XFD's** review I purchased one of these and in a couple of hours, Saturday shopping notwithstanding, had the unit up and running.

Beautifully easy to construct - I only had one minor query which was swiftly sorted by a telephone call to the helpful **Tony Westbrook** of KRC. It was a classic case of not reading the manual...**including the last page!** The manual was one of the best I've ever seen.

There was only one little problem...there was no mention of cutting off the lug on the **Sensitivity** switch...as it will not lie flat on the board if you don't! A minor point perhaps...but Tony took it on board!

The antenna coil comes ready-made up, as was the range switch board...making life much easier. Everything you need is included in the price.

The project works very well and it's simple to operate with the sensitivity control a boon...as the Editor said. The unit is also pleasing to look at and it doesn't need much room.

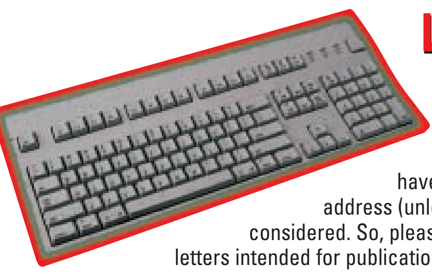
I carried out some modifications as follows: I put a PP9 battery connector on the rear removing the wing nuts to allow an plug-type power supply to be used. Two SO239 antenna connectors were mounted for the coaxial cable feeds. The wing nut holes are set at the tight spacing for this!

One other small matter...when I'd nearly finished it I wondered where the marker board and switch were (mentioned in the review). It turns out they're optional extras...but I didn't need them anyway. So, to sum up..."It does exactly as it says on the packet". A worthwhile addition to the shack. Best regards.

Jim Roberts
Pately Bridge
North Yorkshire

Editor's comment: Thanks for the report Jim. I'm delighted it "Does what it says" for you although I was unaware that the Marker board was an optional extra. My apologies on that point!

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



Letters Received Via E-mail

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

Editor

amateur radio rallies

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

June 15

The East Suffolk Wireless Revival
Contact: John Quarmby G3XDY/Steve Thomas M1ACB
Tel: (01473) 717830/(07720) 412648
Website: http://www.btinternet.com/~thomassg/eswr.htm
The East Suffolk Wireless Revival takes place at a **new venue** - the Suffolk Showground, Felixstowe Road, Ipswich. The gates open at 0930 hours The main attraction will be the radio car boot sale. In addition there will be a Bring & Buy sale, Bookstall, Foundation Morse tests, h.f. station and local club stalls. Food and refreshments will also be available. There will be ample car parking and well signposted access.

June 28

The Reddish Rally
Contact: John G4ILA
Tel: 0161-477 6702
E-mail: John@McKae.freeserve.co.uk
The Reddish Rally is being at held from 1100 at St. Mary's Parish Hall, St. Mary's Drive, South Reddish, Stockport. Admission is just £1, there will be refreshments, a Talk-in on S22 and much more.

July 6

York Radio Rally
Contact: Arthur G8IMZ
Tel: (01904) 787799 (business hours)
E-mail: APALG8@aol.com
The York Radio Rally takes place at York Race Course. Doors open at 1030 (1015 for disabled). There will be a talk-in on 144MHz and plenty of Amateur Radio, Electronic components and computer traders attending as well as a Bring & Buy, clubs and specialist interest groups.

July 12

Cornish Radio Amateur and Computer Rally
Contact: John/Ken
E-mail: g4ljy@qsl.net / ken@jtarry.freeserve.co.uk
The Cornish Radio Amateur and Computer Rally will be held at Penair School, Truro. Doors open at 1030. There will be trade stands, a Bring & Buy and refreshments, etc.

July 13

Northampton Radio, Electronics & Computer Fair
Contact: Andy M3AMF
Tel: (07970) 187529
To celebrate 90 years of Amateur Radio in Northampton, the Northampton Radio Club are holding a Radio, Electronics and Computer Fair at Northampton County Cricket Club in Northampton. Doors open 1030 till 1630. There will be lots happening throughout the day.

July 20
Lincoln SWC Hamfest
Contact: John G8VGF
Tel: (01522) 525760
E-mail: scoop-g8vgf@ntlworld.com
The Lincoln SWC Hamfest is being held at a **new venue** - the Lincoln University Sports Centre at Brayford Pool, Lincoln. Contact the organisers for more details.

July 27

Colchester Amateur Radio & Computer Rally
Contact: Gary/James
Tel: (01621) 818620
The Colchester Amateur Radio and Computer Rally will be held at St. Helena's School, Colchester. Further information can be obtained by 'phoning on or on **(01255) 242748)** or E-mail: **cra2003@garycavie.com** or **cra2003@mcginty.net**

July 27

Vintage Valve Technology Fair
Contact: Trevor M0TAN
Tel: (01274) 824816
Website: www.myciunka.supanet.com/vtf2003
The Vintage Valve Technology Fair takes place at Haydock Park Racecourse, Junction 23 M6. Doors open at 1000 and admission is £2.50. There will be plenty on offer with up to 120 stalls to browse.

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.

Icom News

Debut For Dual-Bander

Icom (UK) Ltd., have it seems, been very busy behind the scenes as they now announce another new radio to be added to their comprehensive range.

The latest transceiver to be launched from the Herne Bay stables of Icom (UK0 Ltd., is the **IC-E208**, a v.h.f./u.h.f. f.m dual-band mobile transceiver. Introduced into their range as a successor to the IC-207H, the IC-E208 boasts many of the features that made the IC-207H popular.

With its detachable controller head, increased power ouput and a selectable amber, green or yellow display, a large tuning dial and wide band receiver capacity, the IC-E208 is bound to appeal to new and experienced Radio Amateurs alike. Features of the IC-E208 include:

- 55W/50W output power
- 512 Memory channels
- 9600bps Data connector
- 104 x 2 DTCS, 50 CTCSS tone squelch operation
- Auto repeater function
- PC programmable
- Detachable front panel

Supplied with a HM-133 remote control microphone, OPC-889 front panel separator cable, OPC 346 d.c. power cable and a MB-84 controller bracket the IC-E208 will be available in June/July for **£365.72** (inc VAT) RRP. Look out for a review of the IC-E208 in the near future among the pages of *PW*!

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

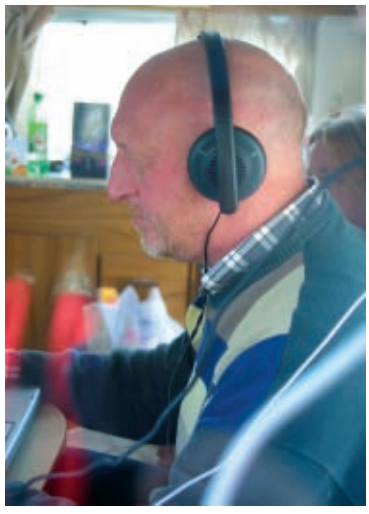
Amazing Success!

On Air with G3SWM

Wonderful weather, fantastic location!

The recent airing of G3SWM, the Short Wave Magazine club call, in connection with the SWM Listening Contest saw a frantic day's activity on Sunday 4 May 2003.

After a somewhat slow start, the log soon filled with pace as G3SWM took to the airwaves. The station confined itself to single band s.s.b. operation only with most contacts being made on 7.070MHz. An APRS node was also on-air to beacon the station's presence and pass information to those interested in the event. Located on the Dorset's southern most Isle of Portland in the rare WAB square SY77, G3SWM operated between 0500 and 1700 in support of the first *SWM* Listening Contest.



Clive Hardy G4SLU deep in concentration.

Short Wave Magazine Editor, **Kevin Nice G7TZC/M3SWM** commented that, "owing to an Italian contest also taking place on the band, the going got rather tough at times. I understand from many stations we worked that there was, at times, quite a pile-up of stations calling. I wish we'd had the opportunity to contact them all". The on-air day and listening contest was the first of what is planned to be an annual event.

Thanks must go to the **Dorset Police Amateur Radio Society** and others for their invaluable help in organising the day's station and providing the station accommodation. Great fun was had by all of those involved and next year's event is being eagerly anticipated.

Short Wave Magazine is currently in its 66th year of publication. For more information either call **(01202) 659910** or visit **www.pwpublishing.ltd.uk/swm/**

Radio Mountain

Three Peaks Challenge

The Three Peaks Challenge Team are attempting to climb Ben Nevis, Scafell Pike and Snowdon in aid of the East Anglian Air Ambulance and SCOPE, as well as taking to the air too!

The three peaks challenge takes place on the 21 & 22nd June 2003 and involves climbing in Scotland, England and Wales respectively within a 24 hour period, which includes the drive in between the Peaks. Three of the team are licensed Amateurs and will be operating throughout the challenge.

The Challenge team consists of eight people, four walking and four supporting. **Chris Backhouse G7VNN** will be walking, together with his Dad, **Ken Backhouse G4RHR** and Brother **Adrian Backhouse 2E0ACE** in support. They will be operating on 144MHz f.m. mainly, but there will be some activity on 430MHz. The team also plan to have an APRS station running so that their progress can be monitored by those back at home.

So, listen out for the Challenge team on the air and make contact with them if you hear them! More information on the Three Peaks Challenge can be found at **www.3peaks-online.co.uk**

Prestigious Military Radio

The Muckleburgh Collection at Weybourne, Norfolk is well known as a military museum but did you know there is also a prestigious collection of vintage military and other transmitters and receivers housed there? Read on to find out more.....

The Mulkleburgh Vintage Military collection dates back to the Second World War and features transmitters and receivers used by all three armed services, as well as a variety of radios used for intelligence gathering, surveillance, espionage, and counter-espionage. You can also see non-radio methods of communication including landline telegraphy, the heliograph, and the Aldis lamp. One particularly impressive exhibit amongst all this is the home-built Amateur station of the late Wing Commander **Ieuan E. Hill G6HL**, who was first licensed in 1927 as 6HL.

The equipment in the Vintage Military Collection is maintained and exhibited at the Mulkeburgh museum by the North Norfolk Amateur Radio Group (NNARG). They also look after an operational Amateur Station, **GB2MC**.

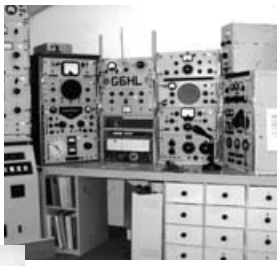
The NNARG is a friendly group of licensed Amateurs and radio enthusiasts who have the time and enthusiasm to help out voluntarily by looking after the exhibits and explaining the wonder of wireless to the general public. In preparation for the 2003 season the NNARG reorganised all the exhibits and comments from early visitors are very positive.

As you enter the foyer of the radio hut you are greeted by a computer generated simulation of Morse messages sent from and to the *Titanic* in 1912, which at the same time displays the messages in plain language on screen for the benefit of those unfamiliar with the code. Also in the foyer is a large 'Morse board' showing the origins and history of Morse, as well as a display of older type Morse keys.

Children are always made very welcome when they visit the radio hut, and after hearing a 'cats whisker' crystal set, a potato-powered radio and a 1920s horn-speaker radio in operation they are shown how to send their name in Morse code, for which they receive a certificate. Over 800 youngsters received these certificates in 2002. Visiting Radio Amateurs are encouraged to introduce themselves to members of the Group on duty in the hut, as are other radio enthusiasts, ex-service radio personnel, collectors, researchers and anyone else with an interest in vintage radio.

The vintage radio collection is continually expanding, donations are welcomed of appropriate early equipment. The NNARG are also interested in swapping surplus items, which become available from time-to-time, with other museums or collectors.

The museum is open daily from Easter to early November. During this period the radio hut can be visited on Wednesdays and Thursdays, Bank holidays and some weekends during August. Admission charges for 2003 are Adults - £5.50; Senior Citizens - £4.50; Children - £3; Family Ticket – £13.50. So, why not pay Muckleburgh a visit? It makes a great family day out.



Historic station of G6HL

A corner of the radio hut at Muckleburgh

Further information about the NNARG and its activities can be obtained by initially contacting the Group's PRO, **Tony Smith G4FAI**, QTHR, or E-mail: **g4fai@connectfree.co.uk**

The Mukleburgh Collection
Weybourne Military Camp, Weybourne, Holt, Norfolk NR25 7EG
Tel: 01263 588210. FAX: 01263 588425. Website: www.Muckleburgh.co.uk

Active From Arran

In celebration of the 50th Anniversary of the 135th Broadway Baptist Derby Scout Group, Geoff M5GAC is setting up 'camp' on the Isle of Arran.

The first main Scout camp of the 135th Broadway Baptist Derby Scout Group was held on the Isle of Arran off the west coast of Scotland, in the 1950s. **Geoff M5AGC** was one of the many Scouts who attended the camp and to commemorate the 50th Anniversary he will be on the island for a week from 20 July.

Geoff, who has a long association with the 135th Broadway Scout group, was not only on the first camp, but he was also the Scout leader of the troop in the early 1960s. Geoff will be operating daily on 7MHz IOTA EU-123 using the callsign **MM5GAC/P**. He will also be on 14 and 21MHz if conditions allow.

Geoff will be looking in particular for contacts with stations having a link to Scouting and all QSOs will be confirmed by a special QSL card. So, listen out for and make contact if you hear him!

Peter Pestered For Foundation!

Pete Asbury M0PCA's grandson Peter was among six youngsters who recently sat their M3 examinations at South Derbyshire.

You can't easily ignore a enthusiastic six year-old who constantly phones you with the line 'hello M0PCA this is M3PCA over'... can you? And it was this line of pestering that eventually convinced **Pete Ashby M0PCA** to help his grandson **Peter** gain his M3.

So, with the encouragement and help Peter along with six others sat their Foundation Licence exam at the South Derbyshire and Ashby Woulds Amateur Radio Group course held at the Moira Replan Centre. Peter was the youngest candidate at just six years old. The other successful candidates were **Hollie** 8, **Naomi** 9, her mum **Cathy**, **Matthew** and another **Peter** who was the oldest at 70!.

Shown here from left to right - front row: Peter M3PCA, Naomi, Hollie, and Lewis G4CRT (Club President). Back row: Berys G7EHU (Club Secretary), Cathy (Naomi's Mum), Matthew, and Peter.

So, there was a good mixture of young and older candidates, but they all worked together very well and one of the youngsters helped out a fellow candidate, who is dyslexic, with the Morse. All six passed, and were very pleased, as the photo shows.

The South Derbyshire and Ashby Woulds Amateur Radio Group meets at 1900hours on Wednesdays at the Moira Replan Centre Near Ashby de la Zouch, Leicestershire. The club runs courses and exams for the RAE, Intermediate and Foundation courses.

Another Chelmsford Achievement

Licensed for 70 Years!

The President of the Chelmsford Amateur Radio Society, Harry Heap G5HF celebrates 70 years as an Amateur Radio Licence holder this year!

Harry G5HF's first full transmitting licence was issued on 5 October 1933 a few months after his 16th birthday. Previous to this Harry held an Artificial Aerial licence with the call 2BZZ. During those early years Harry's main interest was in the 5 metre (56MHz) band.

To get the full licence Harry had to enlist the help of a local Amateur **John Curnow G6CW**. John assisted in writing the required letter to the Postmaster General detailing the experiments he wished to carry out and which could not be done with an Artificial Aerial. There were no exams in those days!

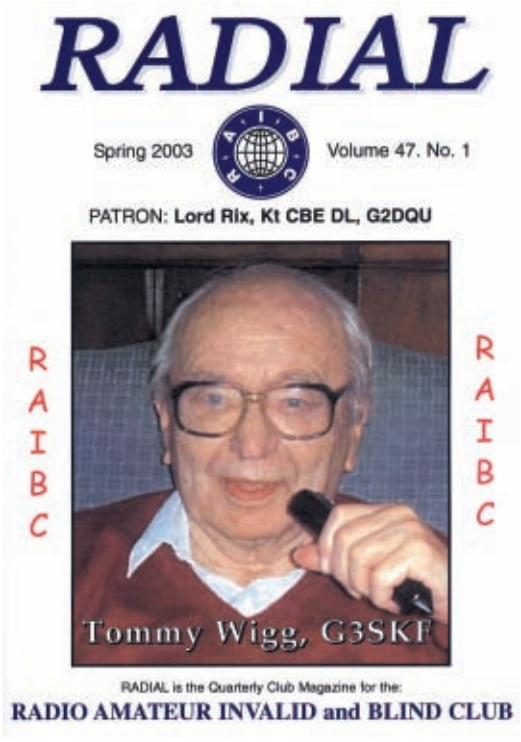
The Chelmsford ARS is privileged to have a total of nine members who have been licensed for 50 years or more. Between them they have over 500 years of experience in the hobby.

For more information on the Chelmsford Society contact the secretary **David Bradley M0BQC** on Tel: **(01245) 602838** or via E-mail: **info@g0mwt.org.uk**

RAIBC News

Readers Required!

The Radio Amateur Invalid and Blind Club (RAIBC) is looking for more people to read their club Journal RADIAL onto cassette tape for its visually impaired members. Can you help?



The *RADIAL* is published quarterly in A5 format and usually runs to between 50 and 60 pages of copy specifically of interest to blind radio operators. At present two readers share the work. One does most of the reading and the other acts as Editor, proof-reader and describer of circuits, cartoons and photographs.

The RAIBC now want to encourage extra readers from the wide field of people with an interest in Radio. The Club is seeking people who know how to make a decent voice recording on a machine with good pace, pauses and intonation for their listeners with hearing problems.

The hope is to get enough readers so that two or three can read and record each issue between them, giving the listeners' the benefit of a change of voice as the work progresses. An edited master tape is then made and is sent to an RAIBC member who makes multiple copies to be sent out to fellow members.

So, if you would like to join the team and make a hobby of reading to blind people with a similar interest, contact **Alan GM4FLX** on **(01505) 843524.** You can then arrange to send in a tape with sample of your reading and voice presentation.

Alan Lovegreen
16 Grahams Avenue, Lochwinnoch,
PA12 4EG
Tel: (01505) 843524

Sharing Radio

Young Contesters

Are you aged under 30, interested in Radio and would like to know where to find like minded enthusiasts? Then read on....

Did you know there is a group of Young Radio Amateurs all aged under 30 who are interested in Amateur Radio contesting? Well there is! The members have set-up a group called the **World Wide Young Contesters** where young people can 'meet up' and chat about radio (not just contesting) and share their experiences with each other.

The group are keen to encourage new members as they currently only have a handful of UK members and would like to invite many more to join especially M3 licence holders. The total membership world-wide currently stands at about 200.

Full details and further information about the World Wide Young Contesters activities can be found at **http://www.wwyc.net** Why not take a look?

Summer Schedules

Broadcasts In English

The Summer 2003 edition of Broadcasts in English is now available from the British DX Club.

Broadcasts in English was compiled by **Alan Pennington** and includes details of all currently known international broadcasts in English on short wave and medium wave for the Summer A03 schedule period. The schedules are given in time order and covers all target areas. and transmitter sites are listed where known.

A comprehensive guide to DX and Media Programmes is also included. There are also schedules for the WorldSpace and World Radio Network for Europe.

Copies of *Broadcasts in English* cost: UK £2; Europe 5 International Reply Coupons (IRC), 5 Euros or 4 US Dollars and Rest of World: 6 IRCs or 5 US Dollars. All prices include postage. Please make UK cheques/Postal Orders payable to British DX Club and payments in Dollars or Euros are only accepted in cash.

To order your copy of find out more contact:

British DX Club,
126 Bargery Road,
Catford,
London
SE6 2LR
E-mail: secretary@bdxc.org.uk
Website: www.bdxc.org.uk

BDXC
BRITISH DX CLUB

SALES 01908 281705 ★★ postage & packing mainland just £6.00 max per order ★★ E&OE

MOUNTING HARDWARE ALL GALVANISED

6" Stand Off Bracket *(complete with U Bolts)* £6.00
9" Stand off bracket *(complete with U Bolts)* £9.00
12" Stand off bracket *(complete with U Bolts)* £12.00
12" T & K Bracket *(complete with U Bolts)* £11.95
18" T & K Bracket *(complete with U Bolts)* £17.95
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36" T & K Bracket *(complete with U Bolts)* £29.95
Chimney lashing kit £12.95
Double chimney lashing kit £24.95
3-Way Pole Spider for Guy Rope/ wire £3.95
4-Way Pole Spider for Guy Rope/ wire £4.95
1 1/2" Mast Sleeve/Joiner £8.95
2" Mast Sleeve/Joiner £9.95
Solid copper earth rod 4' £9.95
Pole to pole clamp 2"-1.5" £4.95
Di-pole centre (for wire) £4.95
Di-pole centre (for aluminium rod) £4.95
Dog bone insulator £1.00
Dog bone insulator heavy duty £2.00

5ft POLES H/DUTY (SWAGED)

Heavy Duty Ali (1.2mm wall)
1 1/4" single 5' ali pole £7.00
1 1/4" set of four (20' total approx) £24.95
1 1/2" single 5' ali pole £10.00
1 1/2" set of four (20' total approx) £34.95
1 3/4" single 5' ali pole £12.00
1 3/4" single 5' ali pole (20' total approx) £39.95
2" single 5' ali pole £15.00
2" set of four (20' total approx) £49.95
(All swaged poles have a push fit to give a very strong mast set)

REINFORCED HARDENED FIBRE GLASS MASTS (GRP)

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

GUY ROPE 30 METRES

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

CABLE & COAX CABLE

RG58 best quality standard per mt 35p
RG58 best quality military spec per mt 60p
Mini 8 best quality military spec best quality per mt 70p
RG213 best quality military spec per mt 85p
H200 best quality military coax cable per mt £1.10
3-core rotator cable per mt 45p
7-core rotator cable per mt £1.00
PHONE FOR 100 METRE DISCOUNT PRICE.

CONNECTORS & ADAPTERS

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

YAGI COUPLERS

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

10/11 METRE VERTICALS

G.A.P.12 1/2 wave alumimum (length 18' approx) £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

Catalogue of Goodies

WCN Supplies

Looking for a supplier of components, batteries, bits & pieces and all those sundry items that are useful to have to hand in your workshop? Look no further...

Do you know about **WCN Supplies** who are based in Totton, Southampton? They offer a variety of components, electronic gadgets, accessories, meters, tools, etc for the radio constructor, hobbyist or anyone with an interest in electronics.

The latest WCN catalogue to land on the Newsdesk is Issue 17 and the *PW* team (who know WCN from Rallies) were amazed by the vast selection of goodies inside. We found everything from batteries to computer accessories, connectors, power supplies and soldering irons!

The stock at WCN is ever changing and to make sure you don't miss out on the bargains and special lines, as well as ensuring you have a catalogue to hand for everyday reference make sure you register your details today! Open Monday-Friday 9am-5pm and Saturday 9am-1pm WCN welcome callers to their premises.

WCN Supplies
The Old Grain Store
Rear of 62 Rumbridge Street, Totton, Southampton
SO40 9DS Tel/FAX: 0238-066 0700
E-mail: info@wcnsupplies.fsnet.co.uk
Website: www.wcnsupplies.com

Atlantic Challenge

Up, Up & Away!

Icom (UK) Ltd., support David Hempleman-Adams on his solo transatlantic balloon challenge.

Icom (UK) Ltd., will be offering their expertise and equipment to support a project called the Bank of Ireland Atlantic Challenge, in association with the Special Olympic World Games. Led by British explorer and balloonist David Hempleman-Adams, the challenge will attempt to cross the Atlantic from west to east in a traditional open basket Roziere balloon.

The Atlantic Challenge 2003 is scheduled to launch in June (so could be well under way as you are reading this) from Pittsburgh, USA and once airborne, David Hempleman-Adams will head for Newfoundland, keeping in constant communication with his trusted weatherman, Belgian meteorologist **Luc Trullemans**. The flight will be directed from the Control Centre in Bristol.

Once over the Atlantic, David's voyage is expected to take about a week. During this time he will have to cope with sleep deprivation, high altitude, temperatures well below freezing and some of the worst weather imaginable.

David will be taking a wide selection of Icom radio equipment with him. He will be using two h.f. IC-78 commercial transceivers (which will be used as the main operating transceivers between him and the control room). David will also take an IC-A200 v.h.f fixed airband transceiver as well as the IC-A3E and IC-A22E v.h..f. hand-held airband transceivers.

In case he has to ditch into the sea David will also have an IC-M1EuroV waterproof marine hand-held as a back-up. Icom (UK) Ltd are also providing antennas, power supplies and battery cases.

This will be the first British attempt at a solo crossing of the Atlantic in a traditional open wicker basket. So keep a listen out for David and if you are more more of an armchair adventurer you can track his progess at **www.boi.ie/specialolympics**

amateur radio clubs

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

CENTRAL REGION SCOTLAND

Falkirk ARS
Contact: Brian Waddell GM4XQJ
E-mail: gm4xqj@btinternet.com
Falkirk Amateur Radio Society will be running an RAE course starting 1 September 2003. Anyone wishing to enrol for this course please contact the Club Training Officer **Ken Elliot GM4NTX** on **(01324) 825914** or E-mail **gm4ntx@nfld.totalserve.co.uk**

DORSET

Bournemouth Radio Society
Contact: Chris Ellis M5AGG
Tel: (01202) 893129
Website: brswebsite.freeserve. co.uk
The Bournemouth Radio Society meets on the 1st & 3rd Fridays of every month at 1930 hours for meetings starting at 2000hours. Meetings are held at Kinson Community Centre, Millhams Road, Kinson, Bournemouth. Forthcoming meetings include: **July 4:** Members BBQ - see Website for more details; **18 July:** 'Understanding HF Antennas & Propagation' a talk by **Peter Clifford M0PTR**.

HEREFORDSHIRE

Hereford ARS
Contact: Keith Hales G0RQF
Tel: (01432) 870224
The Hereford Amateur Radio Society meet in the upstairs room at the Simpson Village Hall, Burghill, Hereford on the first and third Friday of the month. They're no longer meeting in the old Police Station Dungeons! The building has a stair lift and is adapted for the disabled. The club welcomes new visitors and members of all ages to join in. Keith, together with fellow Amateurs also run Foundation Courses and to date have successfully passed 23 new M3s!

KENT

Morse Radio Club of Swanley
Contact: Ken M3CZA
Tel: 0208-306 3544
Website: www.morseclub.co.uk
The Morse Radio Club meet every Thursday (except first Thursday in month) at The Five Wents Memorial Hall, on the Swanley/Hextable Road. North West Kent. Full details of the club activites can be found on the Website as well as a special offer for M3s. All visitors are welcome, so don't be shy go along and see for yourself.

SHROPSHIRE

Telford & District ARS
Contact: Mike Street G3JKX
Tel: (01952) 299677
E-mail: mstreet@g3jkx.freeserve.co.uk
Website: www.tdars.org.uk
The Telford & District Amateur Radio Society meet everyWednesday at 2000hours (unless otherwise stated).at the Community Centre, Bank Road, Dawley, Telford, Shropshire.
Meetings you may like to go along to include: **June 11**: 2nd DF Competition; 18th: BBQ & social at HQ and **25th:** VHF/NFD & Newport Show planning meeting.

Keep those details coming in!

HAYDON Communications

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See over for address

NEXT DAY DELIVERY TO MOST AREAS, £10.00.

MOBILE PENETRATOR

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

OUR PRICE **£139.95** delivery £10

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

Q-TEK PENETRATOR

"WE'VE SOLD 100s ALL OVER EUROPE"

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

ONLY **£179.95** delivery £10

SEND SAE FOR LEAFLET

Q-TEK ZL SPECIALS

Delivery £10.00

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

Q-TEK YAGIS

Delivery £10.00

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

NEW DOUBLE DELUXE G5RV

160-10M double length (200 foot). **£84.95** del £8.50

DELUXE G5RV

P&P on either full/half size £6.50

Multi-stranded heavy duty flexweave wire. All parts replaceable. Stainless steel and galvanised fittings.

Full size - 102ft (80-10m) £42.95

Half size 51ft. (40-10m) £36.95

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

STANDARD G5RV

Full size	102ft (now includes heavy duty 300Ω ribbon)	£28.95 P&P £6
Half size	51ft (now includes heavy duty 300Ω ribbon)	£24.95 P&P £6

Q-TEK INDUCTORS

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

DIPOLE CENTRE PIECES

Open wire £5.99

SO-239 .....£5.99

300Ω HEAVY DUTY FEEDER

5m length .....£5.00 P&P £3.00

10m length .....£10.00 P&P £3.00

BALUNS & TRAPS

1.1 Balun		£25.00 P&P £2
4.1 Balun		£25.00 P&P £2
6.1 Balun		£25.00 P&P £2
40 mtrs	Traps (1kw Handling)	(a pair) £25.00 P&P £4
80 mtrs	Traps (1kw Handling)	(a pair) £25.00 P&P £4
10 mtrs	Traps (1kw Handling)	(a pair) £25.00 P&P £4
15 mtrs	Traps (1kw Handling)	(a pair) £25.00 P&P £4
20 mtrs	Traps (1kw Handling)	(a pair) £25.00 P&P £4
5.35MHz	Traps	£25.00 (a pair)

CUSHCRAFT ANTENNA

MA5V	New vertical 10, 12, 15, 17, 20m	~~£229.95~~	£215.00
MA5B	Mini beam 10, 12, 15, 17, 20m	~~£349.00~~	£299.95
A3S	3 ele beam 10, 15, 20m	~~£499.95~~	£449.95
A4S	4 ele beam (10-20m)	~~£599.95~~	£529.95
R-6000	Vertical 6, 10, 12, 15, 17, 20m	~~£349.95~~	£315.95
R-8E	Vertical (40-10m)	~~£499.95~~	£449.95
X-7	7 ele 10, 15, 20m	~~£699.00~~	£599.95

Q-TEK COLINEARS

P&P £10.00

QT-100 GF 144/70, 3/6dB (1.1m) glassfibre	£39.95
QT-200 GF 144/70, 4.5/7.2dB (1.7m) glassfibre	£54.95
QT-300 GF 144/70,6.5/9dB (3m) glassfibre	£69.95
QT-500 GF 144/70, 8.5/11dB (5.4m) glassfibre	£149.95
QT-627 GF 50/144/70, 2.15/6.2/8.4dBi (2.4m) "	£69.95

MOBILE ANTENNAS

P&P £8.50

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

NEW: MOBILE HF WHIPS THAT REALLY WORK

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

COPPER ANTENNA WIRE ETC

Enamelled (50m roll)	£12.95 P&P £5
Hard drawn (50m roll)	£13.95 P&P £5
Multi-Stranded (Grey PVC) (50m roll)	£10.95 P&P £4
Flexweave (H/duty 50 mtrs)	£30.00 P&P £5
Flexweave H/duty (18 mtrs)	£15.95 P&P £5
Flexweave (PVC coated 18 mtrs)	£18.95 P&P £5
Flexweave (PVC coated 50 mtrs)	£40.00 P&P £6
Special 200mtr roll PVC coated flexweave	£99.00 P&P £10
Copper plated earth rod (4ft)	£13.00 P&P £6
Copper plated earth rod (4ft) + earth wire	£18.99 P&P £6
15m pack of earth wire	£10.00 P&P £6

NEW NOISE FILTER!

A superb TDK 'snap fix' ferrite clamp for use in Radio/TV/Mains/PC/Phone etc. *On thin cable simply wind cable round clamp 1-to-2 times. Simple yet effective!*

Simply close shut over cables and notice the difference! Will fit cables up to 13mm diameter. Ideal on power supply leads/mic leads/audio leads/phone leads.

OUR PRICE: **2 for £10** (p&p £2.50)

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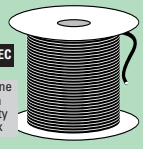

RG-213 Mil spec x 100m. MILITARY SPEC

ONLY **£69.95** P&P £10

RG-58 Mil spec x 100m.

ONLY **£35.00** P&P £10.00

Genuine high quality coax

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(P&P £4.50)

2 way CX-201 (0-1GHz) SO239	£18.95
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4 way CX-401 (0-500MHz) SO239	£69.95
4 way CX-401 'N' (0-500MHz) 'N'	£79.95

NISSEI PWR/SWR METERS

RS-502 1.8-525MHz (200W) .....£79.95 P&P £5

RS-102 1.8-150MHz (200W) .....£59.95 P&P £5

RS-402 125-525MHz (200W) .....£59.95 P&P £5

RS-3000 1.8-60MHz (3kW) Incls mod meter £79.95 P&P £5

RS-40 144/430MHz Pocket PWR/SWR .....£34.95 P&P £2

CAROLINA WINDOM

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

DOUBLE THICK FERRITE RINGS

A superb quaility ferrite ring with increadible properties. Ideal for "R.F.I". Width 12mm/OD35mm.

6 for £12.00 18 for £20.00

P&P £3.50

LOW LOSS PATCH LEADS

Connectors	Length	Price
PL-259 - PL-259	0.6m	£5.99
PL-259 - PL-259	4m	£9.99
BNC - BNC	1m	£6.99
BNC - BNC	1.5m	£8.99

+ £2.50 P&P

CAR BOOT MAST SET

Once they've gone, they've gone! 5 section (15') 4.5m 1¼" slot together mast set. Collapsed length 0.92m (3') makes this ideal for travelling out with.

£24.95 Del £10.00

2 for £44.95 del £10.00

3 for £64.95 del £10.00

20ft BARGAIN MAST SET

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

OUR PRICE **£44.95** Del £10

TWO FOR £79.95 THREE FOR £109.95

2 for £79.95 Del £12.50

3 for £109.95 Del £15.00

NEW 20' (approx) SLEEVED SLOT TOGETHER MAST SET

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

£49.99 Del £10.00.

TWO FOR £90.00

TELESCOPIC MASTS

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

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

Telescopic mast lengths are approx.

Tripod for telescopic masts £89.95

FIBRE GLASS POLES

Del £10.00

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

NEW EASY FIT WALL PULLEY

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

PULLEY **£8.99** + P&P £2.50

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

WALL BRACKET **£2.99** P&P £1.00

MAST HEAD PULLEY

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

£8.99 + P&P £2.50

METAL WORK & BITS

P&P available on request

2"	Mast base plate	£12.95 P&P £5
6"	Stand off	£6.95 P&P £5
9"	Stand off	£8.95 P&P £5
12"	T&K Brackets	£12.00 P&P £8
18"	T&K Brackets	£18.00 P&P £8
24"	T&K Brackets	£20.00 P&P £8

10mm fixing bolts (needs 8mm hole)	£1.40 each
U bolts (1¼" or 2")	£1.20 each
8 nut universal clamp (2" - 2")	£5.95
2" - 2" cross over plate	£10.95
3-way guy ring	£3.95
4-way guy ring	£4.95
2" mast sleeve	£9.95
1½" mast sleeve	£8.95
Standard guy kits (with wire)	£24.95 P&P £6
Heavy duty guy kits (with wire)	£29.95 P&P £6
Ground fixing spikes (3 set) powdered coated	£24.00 P&P £8
30m pack nylon guy 4.4m/B/load 480kg	£10.00 P&P £2
30m pack (3mm dia) winch wire	£16.00 P&P £4
Self amalgamating tape (roll)	£6.50
'Nylon' dog bone insulators	£1.00 each
Chimney lashing kit	£12.99

HAYDON Communications

For accessories see over

MasterCard VISA SWITCH

Mail order: 01708 862524

NEXT DAY DELIVERY TO MOST AREAS, £10.00.

All items sold subject to our terms & conditions - available on request

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power supplies

NISSEI PS-1020

- Volts adjust (9-15vdc)
- Light in weight: 2.1kg
- Automatic shutdown on load fault
- Ultra quiet cooling fan
- Over volts protection ~~£89.95~~

New 25A. PSU.

OUR PRICE **£89.95** Delivery £10.00

NEW NISSEI MS-1228

ULTRA QUIET FAN

28A at 13.8V yet under 2kgs. (H 57mm, W 174mm, D 200mm approx). Fully voltage protected. Cigar socket & extra sockets at front/rear. Ultra slim professional power supply.

'Smallest version to date' now with cigar socket.

Save £15.00

RRP ~~£79.95~~

OUR PRICE **£64.95**

Del £10.00

NISSEI PS-300

ULTRA QUIET FAN

30 AMP/12 VOLT PSU

Features: ★ Over voltage protection ★ Short circuit current limited ★ Twin illuminated meters ★ Variable voltage (3-15V) latches 13.8V ★ Additional "push clip" DC power sockets at rear

DIMENSIONS: 260mm (w), 134mm (h), 260mm (d)mm. Wt: 9kgs.

A SNIP AT **£119.95** Del £10

hf no problem

KENWOOD TS-2000

New all mode multibander: HF/50/144/430 optional 1200MHz. Optional UT-20 (1200MHz module) £299.00

OUR PRICE **£1549.00**

PS-53 matching PSU.....£229.00
SP-23 matching speaker.....£68.95
MC-80 desk mic.....£72.95
MC-60A desk moic.....£119.95

KENWOOD TS-870S

TRUE IF DSP TRANSCEIVER When only the best will do! Incl's ATU.

STILL OUR No1 SELLER!

OUR PRICE **£1279.00**

-52 matching power supply.....£229.00
MC-60A Desk mic.....£119.95
MC-80 Desk mic.....£72.95
SP-31 matching speaker.....£79.95

KENWOOD TS-570DGE

In our opinion, the best HF Tx below £1500.

INCLUDES ATU

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PS-53 matching power supply.....£229.00
MC-60A Desk mic.....£119.95
MC-80 Desk mic.....£72.95
SP-23 matching speaker.....£68.95

YAESU FT-897

New HF + VHF/UHF.

OUR PRICE **£999.00**

Optional battery.....£99.99
CD-24 adapter requires 12V supply.....£99.99
FC-30 matching auto ATU.....£219.95

YAESU FT-857 NEW

The ultimate HF excitement in a small package. HF + 6m + 2m + 70cm

LATEST UK VERSION

OUR PRICE **£779.00**

YAESU FT-817

100kHz-440MHz (with gaps). All mode transportable. Includes nicads/charger. O/P:- up to 5W. ~~£799.00~~.

LATEST UK VERSION

OUR PRICE **£549.99**

ALINCO DX-70TH

100W HF + 6m transceiver. RRP £699.99

LATEST UK VERSION

OUR PRICE **£595.00**

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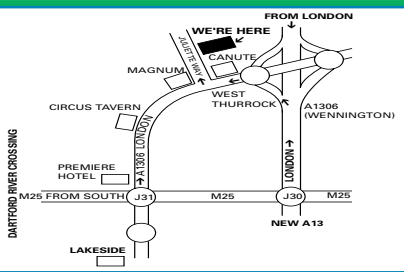

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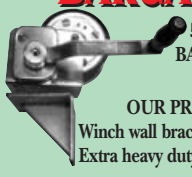

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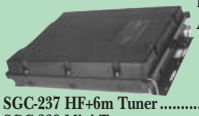

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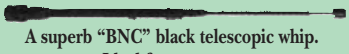

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Looking At...

OSCILLATORS AND FREQUENCY MULTIPLICATION

This time Gordon King G4VFV turns his attention to oscillators and frequency multiplication.

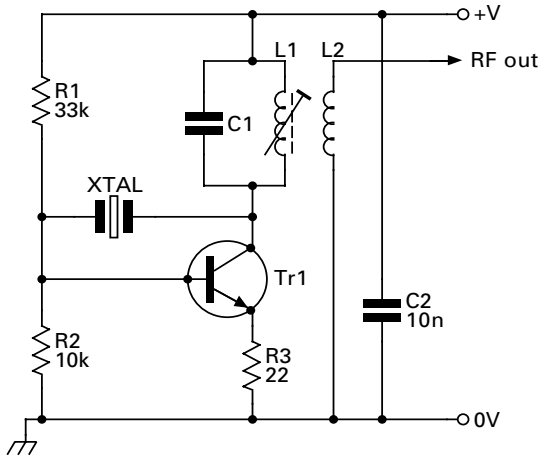
The previous instalment of Looking At... opened with the birth of a radio wave and concluded with a look at the series-tuned Colpitts Oscillator. This month I intend to focus on a couple more oscillators and conclude with a brief look at the frequency multiplier.

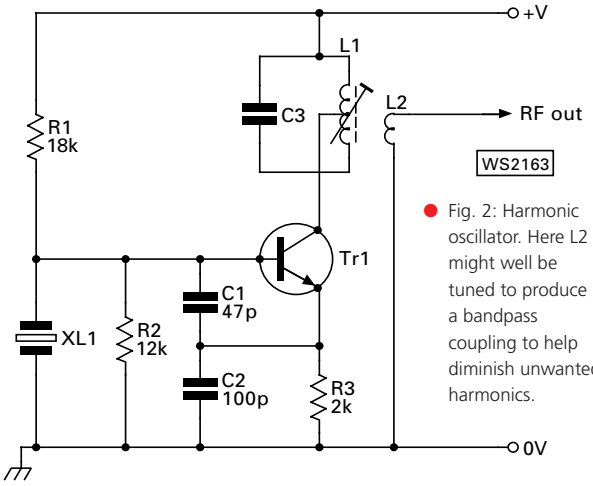
Both the short and long-term frequency stability of the radio-frequency (r.f.) signal generated by the Colpitts oscillator just mentioned, relies essentially on the excellence of both the mechanical and electrical stability of the tuned circuits. Outstanding frequency stability can certainly be achieved from a well-designed and engineered variable-frequency oscillator (v.f.o.) of this kind, as will be vouched by many an old hand in home construction.

However, before the advent of the more recent sophisticated equipment and techniques for frequency control and switching, nth-degree accuracy of frequency was commonly obtained by the use of the quartz crystal oscillator, particularly in designs, which snugly located the crystal in a temperature-controlled oven! Crystal-controlled oscillators, which are relatively simple devices, are still popular with home constructors and enthusiasts, particularly those constructors devoted to low power (QRP) operation.

WS2162

Fig. 1 Pierce Crystal oscillator. Harmonic suppression would normally be included in the output circuit from L2.





WS2163

Fig. 2: Harmonic oscillator. Here L2 might well be tuned to produce a bandpass coupling to help diminish unwanted harmonics.

Quartz Crystal

The Piezo-Electric quartz crystal used in an oscillator is often cut from natural crystal which, in full form, has a hexagonal cross section and pointed ends. I can recall picking 'raw' quartz of this nature out of the ground while in the 'out-backs' of Delhi, India during the Second World War!

The particular way in which the crystal is 'cut' and dimensioned from the quartz governs the frequency at which it vibrates. A couple of electrode plates accommodate the cut crystal, and when a voltage appears across them the crystal is put under mechanical stress. It's this effect, called the piezo-electric effect, which causes the crystal to vibrate and thus generate oscillatory energy, **the frequency of which is tightly controlled by the crystal parameters**.

Frequency of oscillation is essentially determined by the thickness of the cut, which makes it possible to grind a crystal for a specific frequency (oh! those happy days of grinding and frequency checking). Capacitance change will also alter the frequency of oscillation slightly, as will temperature change, which is why a low-wattage constant-temperature crystal oven is advantageous when absolute frequency stability is a primary requirement.

A quartz crystal is electrically representative of a series combination of inductance (L), capacitance (C) and resistance (R), with additional capacitance in parallel with the combination to correspond to the electrostatic capacitance (Cp) between the crystal plates when the crystal is not vibrating. The L, C and R are the respective equivalents of the crystal's vibrating mass, effective mechanical compliance and coefficient of friction, whose effective values endow the crystal with a remarkably high Q-factor - in the order of 30,000.

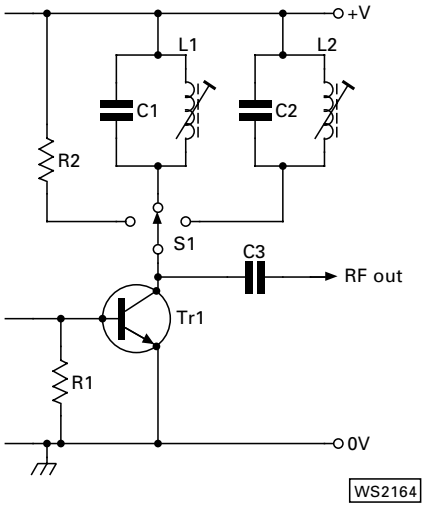
It's possible to change the oscillatory frequency slightly by the inclusion of a variable capacitor or inductor in the crystal circuit, the greatest frequency swings being possible with the higher frequency AT-cut crystals. Circuits of this kind are known as variable-frequency crystal oscillators (VXO5s).

Oscillators using the least positive feedback and hence of minimal r.f. output yield the best stability, the required amplitude of oscillation being achieved by subsequent r.f. amplification. It's noteworthy that many crystalline substances, like Rochelle salts, tourmaline, ceramics etc., exhibit the piezo-electric effect, but quartz has the advantage of mechanical ruggedness, low temperature coefficient and relatively low cost.

Pierce Crystal Oscillator

The two oscillator circuits looked at this month rely on quartz crystal to establish and control the frequency of oscillation. The circuit in **Fig. 1** is based on the Pierce oscillator, where the crystal itself lies in the feedback path between the collector and the base of the *npn* transistor Tr1. Oscillation commences when L1/C1 is tuned to resonate with the frequency of the crystal, the r.f. then being tightly locked to the chosen frequency of the crystal.

The onset of oscillation can be detected in several ways; a milliammeter connected in series with the supply at the 'cold' end of L1 will show a distinct reduction in collector current; an indicating wavemeter will show the presence of r.f.; a small torch bulb connected across the ends of a wire loop placed



● Fig. 3: The basic elements of a switched multiplier circuit.

over L1 will illuminate.

An experimenter will discover that oscillation continues, albeit at a decreasing amplitude, even when L1/C1 is detuned slightly either side of peak resonance. Indeed, it's generally undesirable to tune for maximum output, because then the reliability of oscillation to start immediately the circuit is switched on might be impaired.

The trick is to detune slightly within the oscillation range to obtain optimum restart reliability. This is essential when the oscillator is keyed for Morse operation.

The L1/C1 combination is adjusted to resonance by the dust-iron core in L1, while inductor L2 couples r.f. out of the circuit. Of course, the values of L1 and C1 are dictated by the required frequency, while the number of turns on L2 is determined by the input impedance requirements of the following stage, which might be a frequency multiplier or power amplifier.

Harmonic Oscillator

Frequency multiplication can also be arranged in the oscillator circuit itself. For instance, a harmonic of the crystal can be selected by the L/C circuit and the r.f. coupled to a subsequent stage and a circuit adopting this technique can be seen in **Fig. 2**. Here the oscillator is based on a Colpitts circuit using a crystal, the required harmonic of the crystal being tuned by L1/C3 in the collector circuit of the *npn* transistor.

In practice L1/C3 constitute a tank circuit across which the r.f. signal is developed, a reasonably high *Q*-factor being retained by the connection of Tr1 collector to suitable impedance tapping on L1. The circuit shows that the tank output is from the basic coupling inductor L2. However, in the interest of spectral purity, this would normally be followed by a harmonic filter, allowing the passage of the required harmonic while attenuating unwanted harmonics of the crystal frequency. Reduction in unwanted harmonic output can also be achieved by arranging L1 and L2 as a double-tuned collector tank, band-pass coupling.

The base of Tr1 in the frequency multiplier circuit shown in **Fig. 3** receives drive from the oscillator, and then passes this, or a selected harmonic of the oscillator appearing at the collector, through C3 to an intermediate 'buffer stage' or to the final power amplifier (p.a.). When the rotary switch S1 selects resistor R1, Tr1 passes on drive at the oscillator's fundamental frequency.

Output frequency corresponds to the second-harmonic of the oscillator when L1/C1 tuning corresponds to two times the oscillator frequency, and to the third-harmonic when L2/C2 corresponds to three times the frequency. Thus, with S1 in the first position Tr1 acts as a buffer amplifier, in the second position as a doubler and in the third position as a tripler.

Well, that ties things up for this session. Next time we'll continue on the transmitter theme, unfolding other aspects of interest. Until then have fun while keeping a strict control on those unwanted harmonics!

PW

Radio Basics

This month Rob Mannion G3XFD provides the full working circuit diagram of the Basic-4 superhet receiver. He also describes the final building and setting up of this simple but effective crystal-controlled front-end design.

Well....we're nearly there...and almost ready to roll with the final assembly stages of the Radio Basics (RB) crystal-controlled receiver project! It's been an interesting project for me too...especially as I've had to change the pace and direction slightly to suit the needs of readers as the idea progressed.

The changes were brought about because it became obvious from the correspondence coming into the office (and on the air!) that there were many first time constructors keen to have a go. And although I don't intend to dwell on the dip-meter suggestion any longer than necessary - as it's been mentioned at length already....it was the one aspect which was obviously going to make the construction difficult for the less-experienced home-brewer.

However, despite the fact it has taken longer to get to this month's stage...there have been many other benefits reaped because of the longer 'run up'. The most significant in my opinion is that the series of RB articles (when complete) will effectively have provided a very useful training exercise.

Readers will then be able to go on to other things...or do as I have already done with the prototype Basic-4 projects...and add on other refinements. Incidentally, I'm planning to discuss these briefly next month in the final article on the project.

Full Circuit

Hopefully, as we have discussed the project in stages...the final circuit, **Fig. 1**, won't look too daunting! In reality it's extremely simple indeed and if you break it down into bite-size chunks the complete receiver will seem (as it is) very simple indeed. **But behind that simplicity there's the ability to provide excellent results.**

So, let's now look at the completed design stage by stage (the bite-sized chunks) **which, for the purposes of the exercise is designed for 7MHz use**. Firstly, there's the r.f. amplifier stage which uses the cheap MPF102 f.e.t. which, incidentally, should cost you less than £1 each although, if you shop around at rallies you can find them for less than 50p each.

The incoming signals from the antenna are tuned by the toroid inductors L1a and L1b by C1. This capacitor can be either a small value variable type of around 100pF, or an adjustable trimmer type. When you have wound the inductor, using your dip meter, the L1 assembly is set to 7.050MHz- the middle of the 40 metre Amateur band.

Although C1 can be left 'set' once you've tuned it - the capacitor can be used to 'peak' the circuit for best results. However, although this technique will greatly assist in rejecting overloading transmissions - I advise you to set it up as a pre-set circuit first, get the project working and then adjust it accordingly. **Note:** There's nothing to stop you using a fully variable capacitor initially as a pre-set, rather than a trimmer type. When the project is finished you can then add a control knob to C1 if you wish, so that you then have a 'tweaking' control.

The resistor, marked as **Rx** in the r.f. stage is nominally 100Ω. However, this can be adjusted in value (see text under section entitled 'From Experience').

The amplified 7MHz signals are then passed (coupled) to the mixer stage via C4. The radio frequency choke (r.f.c.) should

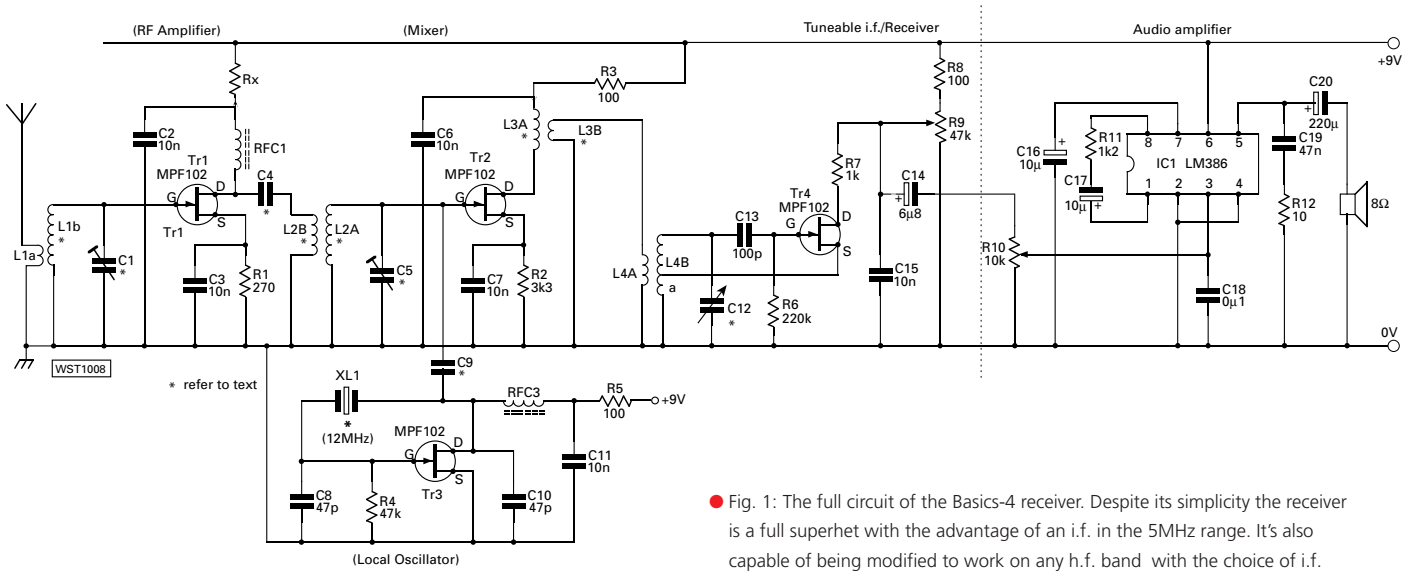


Fig. 1: The full circuit of the Basics-4 receiver. Despite its simplicity the receiver is a full superhet with the advantage of an i.f. in the 5MHz range. It's also capable of being modified to work on any h.f. band with the choice of i.f. being left to the constructor (see text).

be around 10mH, and its job is to offer a high impedance 'pathway' to r.f. signals - which then take the easier (lower impedance) pathway into the r.f. transformer primary provided by L2b.

Capacitor C4 is marked with an asterisk in Fig. 1 as you can try different values to provide optimum coupling between the two stages. Try 100pF first, and then increase the value, while noting the effects. (A maximum of 750pF suggested).

The input winding (L2b) is actually **placed over the top of the larger winding of L2a**, providing a transformer input. I've found that the best results are obtained with L2b occupying the first third of the main winding's core coverage.

Mixer Onwards

The f.e.t., Tr2, provides a little r.f. gain and with the local oscillator signal (generated by Tr3) injected via C9* also provides a 'difference' signal - as explained last month. Although there are other mixer products...we're interested in the main difference signal, as fully detailed in previous articles.

*This capacitor is of a type known as a 'Gimmick'. It's formed by twisting two separate pieces singled cored insulated wire together over approximately 20mm. This forms a low value capacitor. It's simple to adjust for results on air (altering the level of oscillator injection) but you can also experiment with fixed capacitors of values between 5 and 100pF.

The difference signal, the intermediate frequency (i.f.) is tuned by the toroidal inductor L3a. This means of course it has to be tuned to the frequency range of the i.f. In practice...as we're using a relatively narrow tuning range it can be effectively tuned to 4.750MHz for the 7MHz version using a 12MHz crystal.

The winding of L3b (wound over L3a) acts as a radio frequency transformer and couples the i.f. to L4a. I covered this in greater detail last month - please use that information for reference.

I also explained that for ease-of-use and stability, the tuning range of the L4b and C12 combination **must effectively only cover the wanted band**. There's no point whatsoever in making it tuneable outside the band range because by doing so it will be much more critical to adjust.

The trick, if there is one, is to make the tuning coverage as narrow as possible. By doing so, control of regeneration (feedback from the regenerative detector) will be easier to control and you'll obtain better results.

Tremendous increases in signal gain are possible with the regenerative amplification in the oscillator/detector stage of Tr4. Very careful adjustment of R9 will be necessary for the best results.

For a.m. use (not really required on 7MHz unless you are intending to use your receiver for the 41 metre band) the most sensitive setting of R9 will be the 'threshold' of oscillation. This is the point just before the circuit goes into oscillation. It takes practice...but you'll certainly quickly learn how to adjust it. to best advantage

As R9 is adjusted you'll be able to hear the level of received signals increasing...it's quite dramatic! For reception of c.w. (Morse) and s.s.b. (speech using single sideband suppressed carrier transmission) R9 should be adjusted so that the circuits has just entered into oscillation.

The reception of c.w. is very straightforward - I've managed to receive Canadian and West Coast USA stations during the early hours on both the prototypes I've built (both started as 7MHz versions, although the second receiver is now working on the 14MHz band with a 6MHz i.f.).

Reception of s.s.b. takes a little more care - although it's not difficult. In practice **I would strongly recommend** a slow motion tuning drive for both C12 and R9. You won't regret fitting them!

The resultant audio from the tuneable i.f. receiver/detector is fed to the audio amplifier i.c. via C14 and R10. Incidentally, although C14's value is marked ***(See note below)** as 6.8µF....you can try experimenting with different values up to around 50µF. **But take care to get the polarity correct** because this component is polarised and if its wrongly connected...your audio output will disappear!

***Note:** In fact, none of the components - other than the inductors and their tuning ranges are particularly critical. This receiver will work equally well with f.e.ts. other than the MPF102 (with appropriate component changes). It will also work well on any band between 1.8 and 28MHz. I have even played around with a version for 70MHz! It's an experimenter's dream...a real junk box project. It's also one which can be built successfully by those without access to a well-stocked junk box as only standard components are used.

From Experience

Having now built several of the Basics-4 receivers...it seems a good idea to pass on some of the things gained from the experience. And firstly...I would advise you to avoid choosing an i.f. near or on a busy broadcast band. Don't be tempted to use an i.f. - for example - between 500kHz and 1.6MHz!

Secondly, although the receiver will work well without a screened metal case (the toroidal inductors help here as they have more effective 'closed fields')..don't forget to allow room and facilities for it to be built into a suitable housing. However, remembering my own advise to readers...I actually built the original project on a piece of wooden floor boarding!

Those of you who've followed Radio Basics from the beginnings in 1998, will remember the drawing-pin board layouts. They provided an extremely effective prototyping system and I recommend that if you're relatively inexperienced...you actually build your first Basics-4 receiver using this method. The experience you then gain can be put to good use in the final version of your receiver.

The more experienced constructor may object to the fact there's no way, in the original circuit as shown, to adjust the signal level at the antenna input. However, in practice I've not found this to be a problem - the adjustment of R9 kept all the QRM from the 41 metres band away form the c.w. end of 7MHz.

If break-through is a problem though, the value of Rx can be changed from the nominal 100Ω I've already mentioned...but please don't be tempted to use less than the nominal. It can, however, be increased to as high as 500Ω to reduce the gain slightly.

Perhaps the most effective method of attenuation is to insert a variable capacitor (a 100pF will be adequate) in series with the antenna feed. You'll then be able to effectively increase or decrease the antenna coupling...reducing the strength of really strong background 'out of band' signals... but at the same time not entirely losing the signals you want! (It will take practice....and you must remember this is a simple receiver!).

Modifications & Extras

Next month I'm planing to discuss some modifications and extras which could add to the versatility of the Basics-4 receiver. These will include an extra i.f. amplifier stage and the possibilities of making the front end (the r.f. amplifier, mixer and oscillator stages) into 'plug in' units...making the receiver capable of working on more than one band.

So, until then I urge you - as usual - to have a go! I would also be very pleased to hear from you with news of the version you've built. Cheerio for now. *PW*

It's A Classic- The Eddystone

When the opportunity came to take a look at the Eddystone 750 general coverage receiver in this series Rob Mannion G3XFD couldn't resist the temptation! He's in no doubt....it's a real classic.

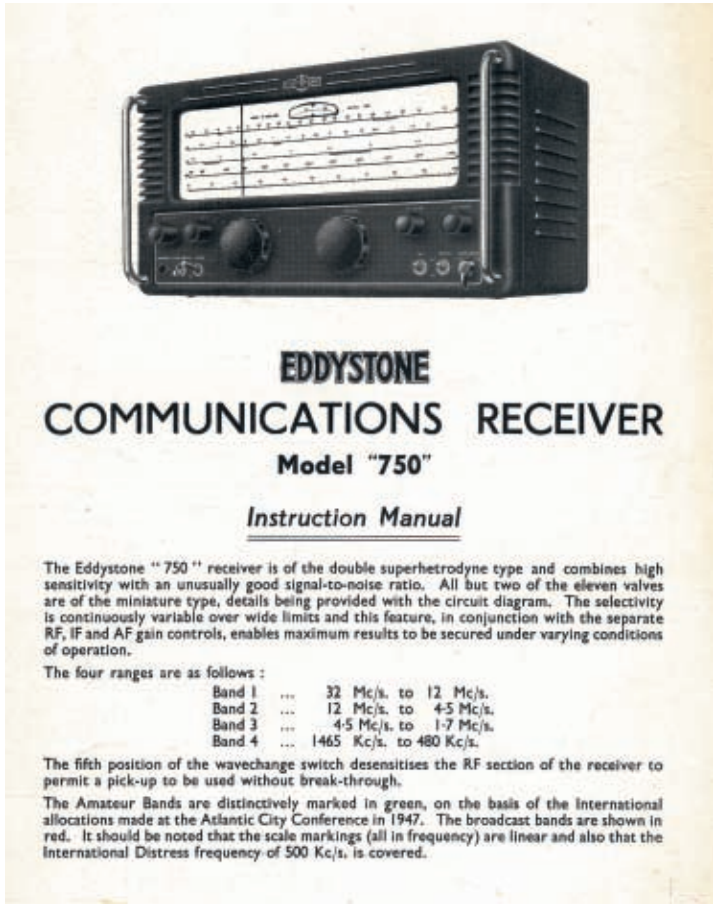
When the *PW* Editorial team decided to feature the Eddystone 750...I took the job on myself. I did so because I've got very fond memories of this truly classic receiver.

I actually purchased my first 750 from 'Bandit Bill' (Bill Lowe) in Matlock in Derbyshire in 1966...a purchase from a reliable dealer I never regretted. Bought 'blind' over the telephone, the set duly arrived a week or so later and was in continuous use until 1997 when the mains transformer failed.

The failure was because the main rectifier valve developed an internal short circuit. All would have been well except that the previous owner (I'd never checked the fuse...**silly me**) had placed a 3A fuse in the transformer protection circuit. This, when the fault developed caused the transformer to 'cook'.

Finally, before I get under way with this article, my thanks go to my good friend **Alan Ainslie**, from Farnham in Surrey who now owns the extensive Eddystone archives. He provided the valuable original Eddystone 750 archive material for me to use. It's in mint condition and was a privilege to use.

My thanks also go to another good friend...**Ben Nock G4BXD**. Ben's photography and general assistance in this project are much appreciated.



EDDYSTONE

COMMUNICATIONS RECEIVER

Model "750"

Instruction Manual

The Eddystone "750" receiver is of the double superhetrodyne type and combines high sensitivity with an unusually good signal-to-noise ratio. All but two of the eleven valves are of the miniature type, details being provided with the circuit diagram. The selectivity is continuously variable over wide limits and this feature, in conjunction with the separate RF, IF and AF gain controls, enables maximum results to be secured under varying conditions of operation.

The four ranges are as follows :

Band 1	...	32 Mc/s. to 12 Mc/s.
Band 2	...	12 Mc/s. to 4·5 Mc/s.
Band 3	...	4·5 Mc/s. to 1·7 Mc/s.
Band 4	...	1465 Kc/s. to 480 Kc/s.

The fifth position of the wavechange switch desensitises the RF section of the receiver to permit a pick-up to be used without break-through.

The Amateur Bands are distinctively marked in green, on the basis of the International allocations made at the Atlantic City Conference in 1947. The broadcast bands are shown in red. It should be noted that the scale markings (all in frequency) are linear and also that the International Distress frequency of 500 Kc/s. is covered.

● Stratton and Co., the original manufacturers of the Eddystone equipment were renowned for their attitude to existing customers, and possible buyers of their equipment. This copy of the Model 750 Instruction Manual (from the Eddystone archives) would have been sent in reply to any enquiries to their Birmingham headquarters. Rob G3XFD even had very helpful hand-written instructions arrive explaining - at some length - how he could fault-find an unusual a.g.c. problem. Such was the Eddystone service. Illustration courtesy of Alan Ainslie.

Introduced In 1949

The original manufacturers of the Eddystone marque - Stratton & Co. Ltd, based in Birmingham in the English West midlands, published the full specifications of the 750 receiver in September 1949. Interestingly, they announced at the same time that deliveries would commence in early 1950 stating "Order now from your local Eddystone Dealer for delivery in rotation as released".

The price - for anyone fortunate enough to be able to afford £45 in those days of austerity - purchased what was to prove to be an extremely reliable receiver. It was also one of the most 'state of the art' **receivers available to the radio enthusiast of the day**...and one which is still capable of working extremely well on our busy h.f. bands.

The Eddystone 750 is a double conversion superhet type and, for its time, provided unusually good signal-to-noise ratio and selectivity. Eleven valves were used and these, with the exception of two, were of the then very modern miniature all glass type. The N78 audio output valve (B7G base) is of particular interest (see later).

With a first i.f. of 1.620MHz and a second i.f. of 85kHz the Eddystone 750 provided general coverage reception from 480kHz to

32MHz in four bands. Using the large (left side, see heading photograph) mounted five* (See note) position range switch, the band selection was arranged as follows: **Band 1:** 12 to 32MHz, **Band 2:** 4.5 to 12MHz, **Band 3:** 1.7 to 4.5MHz, and **Band 4:** 480kHz to 1.465MHz.

The main controls are: tuning, band selector, separate r.f. and i.f. gain, b.f.o. switch and a.g.c. control (delayed a.g.c. is off when b.f.o. is on), noise limiter, stand-by (desensitising) switch, mains on/off and mechanically linked selectivity control.

The slide-rule type dial, with the well-placed logging scale on the 750, was of course superbly engineered. When first introduced it must have been a real eye-opener...and even today it's extremely attractive and easy to use. The broadcast bands are clearly marked in red, and the Amateur Bands are shown in green (excepting the modern 10, 18 and 24MHz WARC bands).

In operation the dial tuning with its heavy flywheel effect is superbly smooth...a real joy to operate. In my opinion (with the exception of the Eddystone EA12) it outclassed all the other models produced by Stratton & Co.).

The receiver is provided with variable selectivity achieved by a mechanically-adjusting i.f. core variable-tuning system. It's very effective and is still used today in modern equipment...the only difference being that the i.f. tuning is achieved electronically instead of mechanically. Eddystone were there first though!

Separate radio frequency (r.f.) and intermediate frequency (i.f.) gain controls are provided on the receiver. They enable the operator to 'balance' the front-end gain with i.f. gain to the best effect...and they are really useful! I say this because there have been many occasions when being able to reduce the front end gain, while increasing the i.f. gain...has enabled me to continue a QSO.

Note *The fifth position was provided to desensitise the receiver so that the rear panel provided audio pick-up could be used (The provision of a 'Gramophone Input' on receivers was commonplace at the time).

An original black and white publicity photograph from the Eddystone archives. Courtesy of Alan Ainslie.

Eleven Valves

The Eddystone 750 uses 11 valves, and it's an interesting line-up including: **V1** (r.f. amplifier), **V5** (85kHz i.f. amplifier) and **V9*** (providing the beat frequency oscillator) are 6BA6 pentodes (B7G base), **V2** (1st i.f. mixer/oscillator) and **V4**** (2nd i.f. mixer) are ECH42 triode-hexodes (B8A base), **V3** (separate 85kHz local oscillator) is an 8D3 pentode (B7G base), and **V6** is a DH77 double-diode triode, providing the 2nd detector, automatic gain control (a.g.c.) and a.f. amplification (B7G base).

Next is **V7**, a D77 double diode in which one diode provides noise limiting, and the other half forms part of the S-meter circuitry, when the external meter is used (B7G base). Next comes **V8**, the unusual (***see note below) audio output valve (B7G), **V10** is the full wave power rectifier (octal base). Finally, h.t. voltage stabilisation is provided by **V11**, a VR150/30 stabiliser.

Notes *The screen grid of V9 is 'strapped' - connected directly to the anode in this oscillator.

** The triode section of V2 has it's anode 'strapped' to the anode, and thus does not work as a triode. Local oscillator

The Famous Eddystone Lighthouse Logo

Although the story I'm about to tell may be apocryphal in nature...I think it's worth re-telling because I've heard it from several sources!

If you've ever had the privilege of sailing by (not too closely!) to the famous Eddystone Leading Light rock lighthouse, you'll realise that the Eddystone logo - even taken into account any artistic licence - does not look much like the existing magnificent structure. However, the clue to the origins of the logo - **Smeaton's Stump** - can be seen on our front cover this month thanks to **Trinity House in London**.

The Eddystone reefs have a long, and terribly dramatic - often tragic - history and I recommend you read up on the subject. However, although the original light built by the brave **Whinstanley** (he disappeared, along with his remarkable structure in a tremendous storm one night) didn't last long...it saved many lives and made it obvious another light had to be built.

The second lighthouse - built by Smeaton was so successful it lasted around a century, only having to be replaced when the rock it was built onto started to crack....endangering the lighthouse.

The Eddystone lighthouse we now see was then built onto a nearby rock...and the old lighthouse dismantled (except for the remaining 'Smeaton's stump') and was re-erected on Plymouth Hoe where you can see, and visit it for yourself.

The story continues! When Stratton & Company's artist visited the area (so the story goes anyway) to work on the logo which we now know so well...it was too stormy to visit the area near the Eddystone rocks. Undaunted he drew the squatter-shaped (but still very attractive) re-erected Smeaton tower on Plymouth Hoe. **Whatever the real story is...I enjoy this version and** I hope you did too!

Rob G3XFD.

Over 50 years since the Eddystone 750 was first produced many of them - such as this example - are safe in the hands of dedicated collectors. Some are even found to be using the original valves! Photograph courtesy of Ben Nock G4BXD.

injection is from V3, via the grid of the triode section of V2.

*** The N78 is a remarkably unusual, and extremely versatile B7G based a.f. output valve. It's capable of working **from audio frequencies up to 144MHz (and above!)**. Never a cheap valve, it featured as a power amplifier in several *1960s PW* v.h.f. projects.

Always On Duty

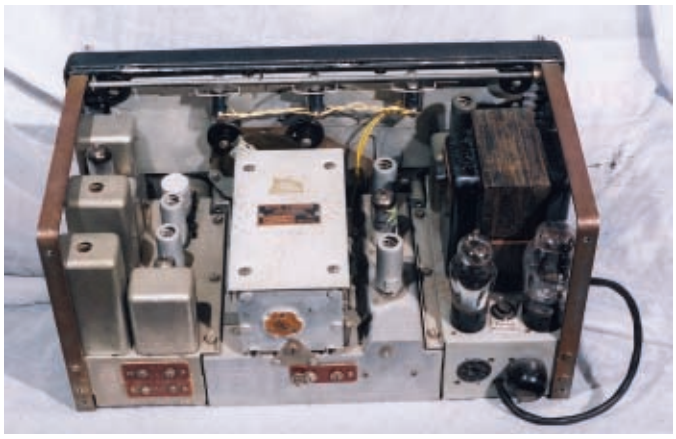
Usually, I would entitle this section of a review-type article as 'On the Air'...but in the case of the Eddystone 750 I think 'Always on duty' is more appropriate! I say this because the G3XFD 750 was always on - and was only ever switched off when my family and I moved house, etc. It was this continuous use (reducing power supply and switch-on surges) which made it so reliable...until the rectifier failed as already mentioned!

The 750 proved to be an excellent general coverage receiver, and along with my Amateur Radio use it was used extensively for broadcast reception. The 3W plus of audio from the large diameter 3Ω loudspeakers I used with the set delivered excellent audio. That was when I noticed how the set drifted as I would listen to Radio Netherlands from Hilversum for hours at a time.

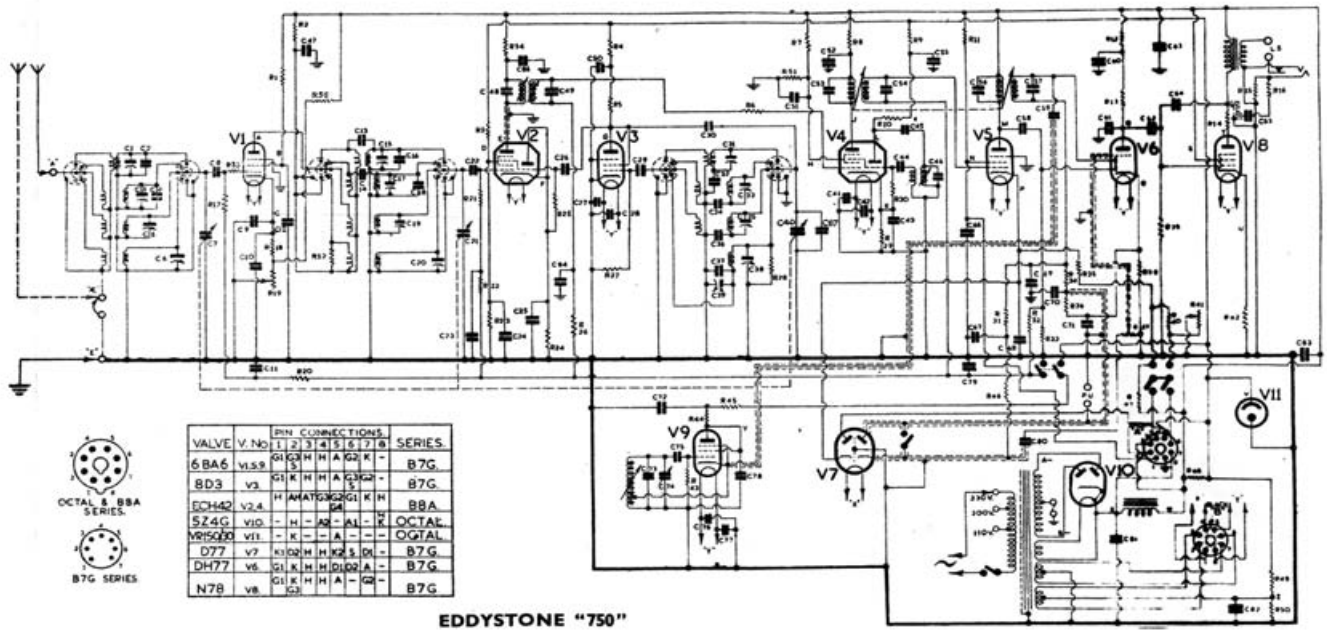
On the Amateur bands I found the 750's selectivity and sensitivity was perfectly acceptable for a.m. and c.w. working. I used it for thousands of a.m. QSOs on 1.8, 3.5 and 7MHz (particularly on 7MHz). Sensitivity was even good enough for 28MHz operation, whereas other receivers I had in those days lacked sensitivity up on 10 metres.

Although the beautiful dial with its 220 to 1 reduction drive was delightful to use...the cramped nature of the 7 and 14MHz tuning had to be tolerated along with the early difficulties in resolving single sideband (s.s.b.) transmissions. The latter was quickly overcome by adjusting the bandwidth control (reducing the bandwidth a little), and also reducing the r.f. gain, and carefully adjusting the b.f.o., with final tweaking of the i.f. gain control. It's a skill which is quickly learned!

To finish off this quick look at the 750 (I could write a book on this receiver alone!) I must say that my opinion is that it's still very much viable on the air. It's not just a semi-vintage receiver for collectors...instead it's a living and breathing tribute to the skill of Eddystone Radio...and a great companion! Long live the Eddystone 750! *PW*

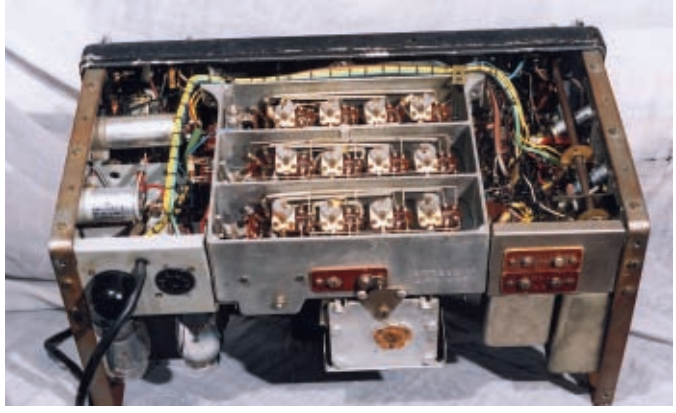


The Eddystone 750 removed from its 'wrap around' heavy steel casing. The main i.f. section is seen on the left, with the main r.f. front end assembly shown in the centre. The high quality tuning and dial cursor mechanism can be seen between the main tuning capacitor screening lid, and the scale illumination lamps. The main power supply and transformer are to the right. Photo courtesy of Ben Nock G4BXD.



VALVE	V. No	PIN CONNECTIONS 1	2	3	4	5	6	7	8	SERIES
6BA6	V1,5,9	G1	G3	H	H	A	G2	K	-	B7G
8D3	V3	G1	K	H	H	A	G3	G2	-	B7G
ECH42	V2,4	H	A	MAT	G3	G2	G1	K	H	B8A
5Z4G	V10	-	H	-	A2	-	A1	-	K	OCTAL
VR150/30	V11	-	K	-	-	A	-	-	-	OCTAL
D77	V7	K1	G2	H	H	K2	S	DL	-	B7G
DH77	V6	G1	K	H	H	DL	D2	A	-	B7G
N78	V8	G1	K	H	H	A	-	G2	-	B7G

The full circuit diagram of the Eddystone 750 double conversion superhet communications receiver. The only problem for owners was the use of the comparatively rare - and expensive to replace - B7G based a.f. output valve (see text). From (and reproduced with permission) of the Eddystone archive collection courtesy and permission of Alan Ainslie.



Underside view of the 750 receiver showing the man tuning assembly coils. The main if. circuitry is to the right. The mechanical linking control for i.f. 'selectivity' tuning (with its core operating links) can be seen on the far right). Also seen, on the rear panel, are the antenna input and earth connections, together with loudspeaker terminals and pickup input. The octal style socket provided connections for external h.t. and l.t.) via a separate battery and vibrator unit. Connections were also provided for a separate S-meter. Photo courtesy of Ben Nock G4BXD.

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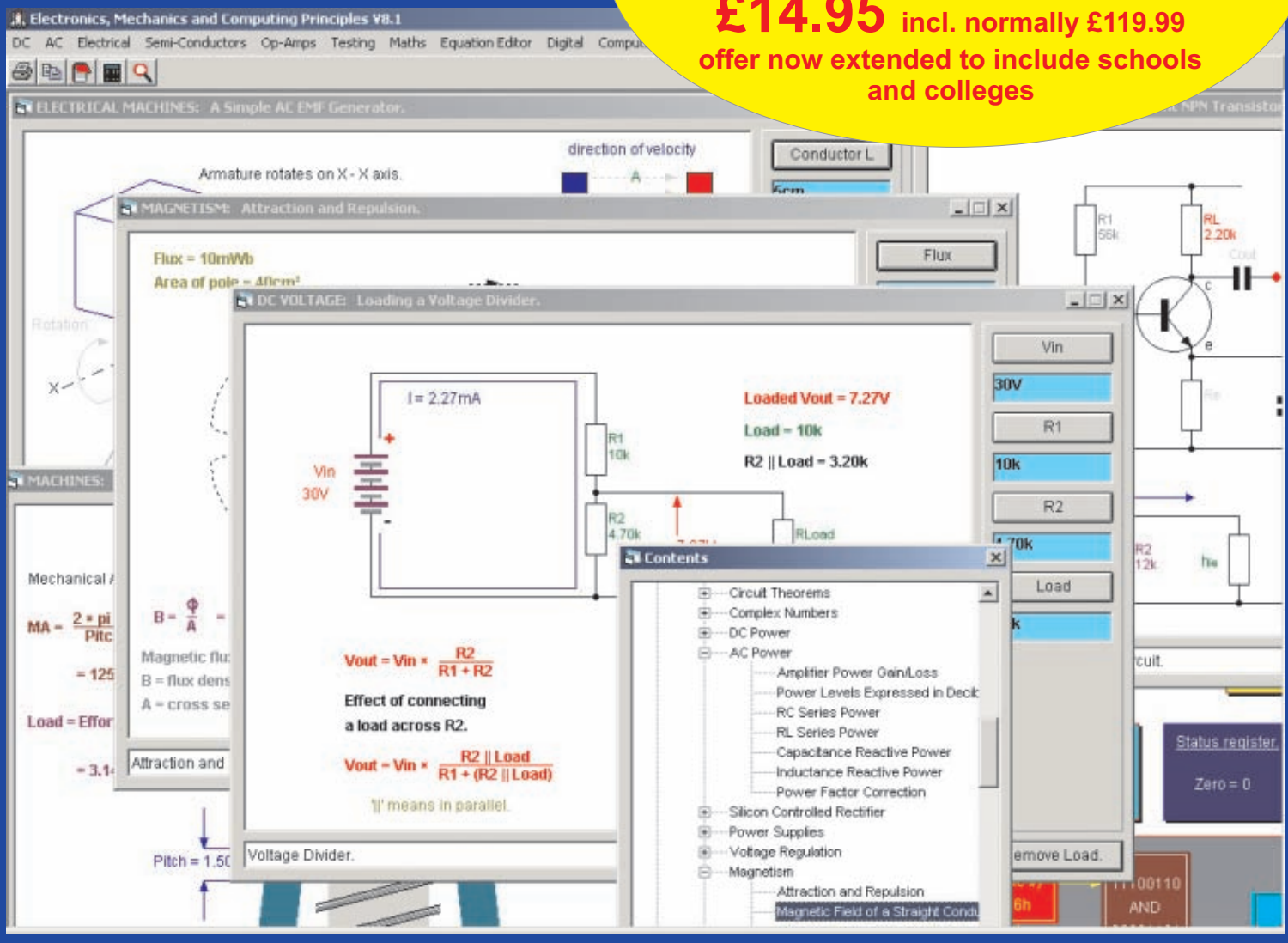

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Walford Electronics Antenna Matching Unit

Tex Swann G1TEX/M3NGS has been busy building a suitable h.f. matching unit from Walford Electronics. So, dragging his trusty soldering iron out of the corner in which it was languishing, this is what he discovered....

Being a recent 'convert' to h.f. operating, the equipment I have is more appropriate to v.h.f. work. And so I jumped at the chance to have a go at building the Antenna Matching Unit (AMU) from **Walford Electronics**. **Tim Walford G3PCJ**, produces kits that are not only innovative, but also work well. So, would this AMU kit be a worthy 'family' member?

The AMU comes in a medium sized plastic bag with printed circuit board pieces, wire, a variety of electronic parts, toroidal cores and a switch.

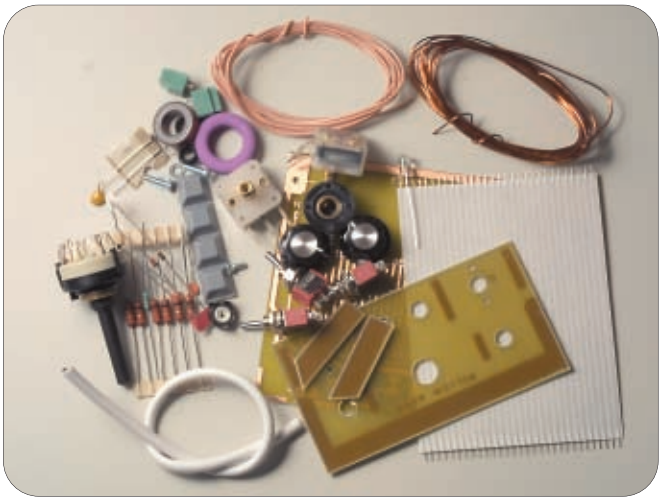

Fig. 1: The complete contents of the kit.

On the mechanical sides there are knobs, rubber feet and extensions for the Polyvaricon variable capacitors (**Fig. 1**).

Also in the kit were ten pages of description and instructions. To make reading the instruction easier I took out the staple holding the five double-sided sheets of paper. The parts list on page seven was used to check that all parts were present. Pages eight, nine and ten were drawings to accompany the text of the instructions.

Frequency (MHz)	Lowest SWR	CV1 effect	CV2 effect
1.90	1.2:1	Peaky	Flat
3.65	1.2:1	Peaky	Peaky
7.05	1.5:1	V. Peaky	V. Peaky
14.15	1.2:1	Peaky	Flat
21.20	1.3:1	Peaky	Deep
29.00	1:1	Deep	Peaky

Table 1.

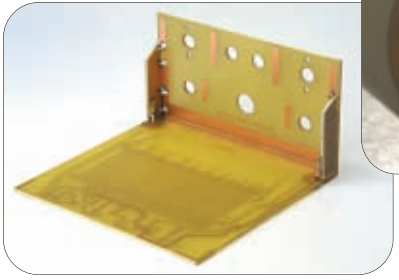

Fig. 2: The assembled chassis is made up from p.c.b. parts soldered together.

Fig. 3: I suggest you use an illuminated magnifier if you have one to hand. It makes checking soldered joints much easier.

Resistive Bridge

The kit consists of a resistive impedance bridge, a toroidal isolating balun and a T-form matching unit that feeds balance output lines. Variable capacitors make up the top 'arms' of the T, and a variable inductor the 'leg'.

Additional capacitance and inductances, increase the low frequency capability of the matcher. Bridge balance and output level is indicated with an l.e.d. on the front panel, but with an optional output to feed a small moving coil meter. The kit is designed for low power transmitters up to about 20W in operating, though only about 3-5W is needed to adjust the bridge.

After reading the description and technical details I settled down to build the kit following the instructions. Incidentally...**I can recommend following the instructions closely so as not to repeat the mistake I made early on**. But more of that later!

Putting the p.c.b. material 'chassis' together can be a little fiddly as getting the front panel to square up against the base plate can be tricky. Two side cheeks, of the same p.c.b. material give the front panel more rigidity. The cheeks are soldered to the front panel with wires passing through holes in the base onto the bottom of the unit.

The completed chassis is shown in **Fig. 2**, and it was at this point that I made the mistake that had ramifications throughout the rest of construction! The mistake was to fit the 30-way strap that forms the main switched tuning coil at this point **rather than later as I should have done**! I made the mistake because I had taken my attention off the point in the instructions when checking a drawing that shows (as a guide) the coil's position on the baseboard.

So, as a word of warning to remind you of the old adage RFTM - (Read The Flaming Manual!). In fact, with hindsight, I should have read it more than once, then perhaps I could have saved myself some effort.

Fitting the main coil is probably one of the most important jobs and I can recommend using an illuminated magnifier, **Fig. 3**. I used this to check all 60 soldered joints on the coil that should be perfect to allow the unit to work properly.

Quite Concentrated

The next couple of pages of the

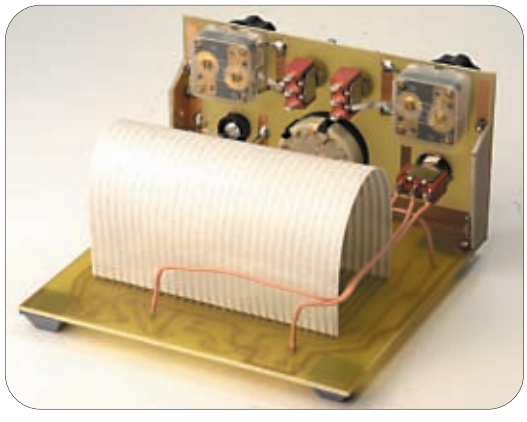

Fig. 4: The main coil, which was mistakenly fitted too early, made some assembly rather more difficult than it should have been. (See text for details.)

building instructions are quite concentrated. So, I suggest you use a highlighter pen to show how far you have worked through the instructions, marking through each section as they're complete.

With the benefit of hindsight, after building the chassis, I should have started with fitting all the front panel components, the switches and polyvaricons. This should have included the 12-way switch that selects the appropriate tapping of the main tuning coil.

The polyvaricons have small extensions shafts that have to be fitted 'back-to-front' to give a better grip to the small knobs fitted later. The 12-way switch has to be set up to work over all a full 12-ways, and doesn't need the locating body pin, which is snipped off. A rear view of the unit so far is shown in **Fig. 4**.

The switches and wiring that link various points on the main board are now wired in place, **Fig. 5**, and care should be taken with these wires to make them as short and direct as possible. Short wiring improves the high frequency capability of the AMU on the higher bands.

A small extra capacitance that extends the range of the unit is wired in one of two alternative places. Not knowing which was 'better', I settled for the suggested place. and as it turned out, it worked well.

At this point a frequency extending toroidal inductor has to be wound, and yes...I know that many seem to have difficulty with winding these devices. However, the instructions to wind the toroidal inductor, **Fig. 6**, were, if followed correctly, more than adequate to create the required coil.

Three Areas

This toroidal inductor is unusual in that it has three 'areas'. Two side-by-side sections at each end of the winding, and a 'bunched-up' section in the middle. The arrangement is to allow the required number of turns of enamelled copper wire to be wound on the specified toroidal core.With the actual matching section of the AMU assembled I turn to the resistive bridge part of the unit.

As mentioned previously, the unit uses a resistive bridge in which three arms of the bridge are formed by 50Ω (each formed from two 100Ω units in parallel). The remaining arm of the bridge is the reflected impedance at the input of the matching unit. The bridge sensor is shown in **Fig. 7**. As the whole bridge appears across the load when in use, the impedance presented to the transmitter is safe - irrespective of the antenna impedance.

The final item to be made and placed is the toroidal cored balun shown in **Fig. 8**. This item is a bifilliar wound (two interleaved identical windings), toroidal transformer. When completed this separates the coaxial side of the bridge from the twin-feeder output side, and may be left out if a balanced output is not desired. The final assembled unit is shown in **Fig. 9**.

So, how did the completed unit work? Well I started with a check using my MFJ Antenna Analyser in the middle of each of the main h.f. bands. The results may be found in **Table 1**. The test antenna was a simple dipole of 10.5m overall length fed with 300Ω flat twin feeder.

I've used the terms '**Peaky**' to mean just that - adjusting the control was quite sensitive and sharp.The term '**Deep**' means that the adjustment was less critical but still quite pronounced. And the term '**Flat**', means that almost any setting of this control had little effect on the matching.

Summing Up

In summing up, I think the unit is very effective, although the use of an l.e.d as an indicator takes some getting used to. My only negative comment of the kit's operating is that there is a degree of hand capacity effect when tuning. The documentation is rather 'dense' in layout, and could, I feel, be improved by being spread over a couple more pages.

There were a couple of anomalies, in that some references applied to both components and positions on the board. And finally, just a cosmetic point which I understand the reason for, I would prefer to see the front panel a few millimetres wider than the main board, making physical assembly easier.

Minor complaints aside, I'd certainly be pleased to own and use Tim Walford G3PCJ's Antenna Matching Unit in my h.f. station.

The AMU costs **£32 plus £1 P&P**. To order call **(01458) 241224.**

PW

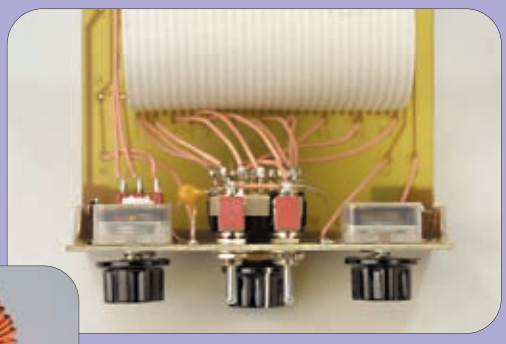

Fig. 5: The front panel assembled, with just one more item to make and fit.

Fig. 6: The range extending coil, illustrating its unusual method of fitting the required number of turns onto the core. (See text for details.)

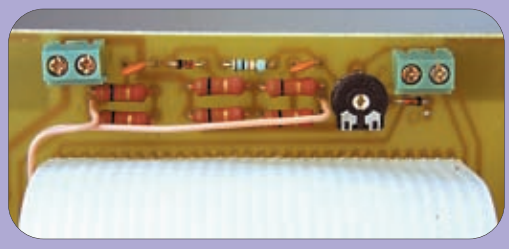

Fig. 7: The six resistors making up three arms of the resistive impedance bridge. (See text for details.)

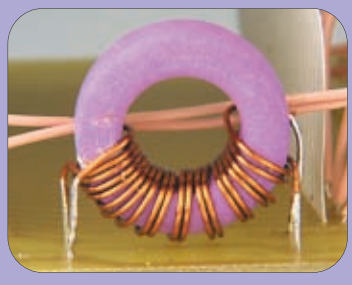

Fig. 8: The 10-turn bifilliar wound balun. (See text for details.)

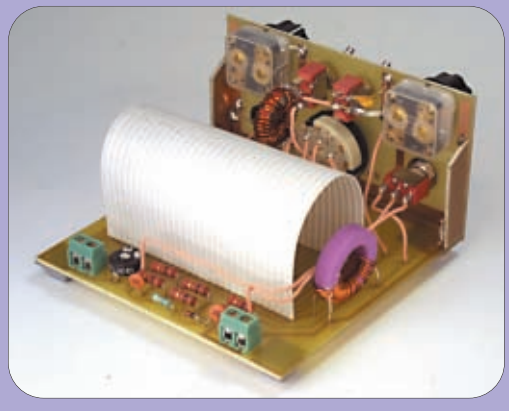

Fig. 9: Rather neat and small, the completed unit looks quite smart and operates well.

Tim G3PCJ's Reply

I am grateful to Tex for his helpful comments - after his 'error', he obviously concentrated much harder as he did find a small mistake in the instructions! I shall be incorporating his suggestions.

Many of his observations stem from the fact that, to keep costs down, I have to layout most kits to fit onto a standard 100 x 160 mm p.c.b. which is cut into the various sections after etching. This allows me to order much larger quantities and so lower the cost to constructors. In this case, it was not possible to increase the front panel size without going outside this restriction.

The same point is behind his comments on hand capacity effects; the base p.c.b. has to be single sided otherwise the matching inductance would have very high self capacitance, so the front panel has also to be single sided. My philosophy is to concentrate on the electronics and let builders enhance the mechanical aspects if they wish - which they can do often very well. It is very easy to install it into your own case (complete with a nice matching meter) if you wish, but that will add appreciably to the finished cost!

G3PCJ

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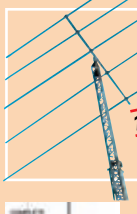

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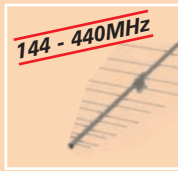

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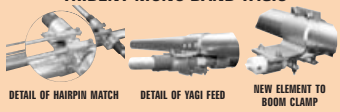
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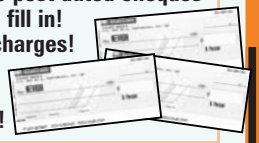

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Tackling EMC Problems

Part 4

This month Rob Mannion G3XFD, in the fourth and final part of this short informal series, tackles the touchy subject of EMC. Why touchy? Find out, by reading on!

If you're newly on the air, or perhaps only just beginning to discover the joys of h.f. operating…you may have already discovered some of the pitfalls that wait for the unwary. To help - this article, the last of the short series - starts off with looking at how you can avoid or reduce the chances of causing interference or inadvertently discovering Electromagnetic Compatibility (EMC) problems. I'll also be briefly looking at how we can often be on the receiving end!

Hopefully, you've already been on the air…and without problems? If the reply is "Yes"...good…that's the answer I would like to hear.

Unfortunately however, it's just as likely that despite being careful, and operating on h.f. with relatively low power…you may have already discovered problems. But not to worry, if you listen carefully to experienced Amateurs, follow the interesting articles from the EMC Sub Committee who report in the RSGB's *Radio Communications* magazine (known to everyone as *RadCom*...and read through this article…you'll be on the way to overcoming the difficulties.

With all the help available you'll be overcome any hurdles in your way to operating without that dreaded knock on the front door. And that angry family member asking you to stop "Playing with your radio"!

Getting Started

If you've already suffered from a case of Television Interference (TVI) or have already caused breakthrough on a broadcast radio receiver…there are some easy guidelines for you to remember and put into practice.

My first 'no real choice' advice (i.e. there's no viable alternative) is that you ensure that **wherever possible** all u.h.f. 'Off Air' TV sets are working from a properly installed antenna for the channel grouping of the transmitter you're using. So, I'll assume from now onwards you're not in your own home using 'indoor antennas'* (**see note**). Obviously you don't have any control on what your neighbours use!

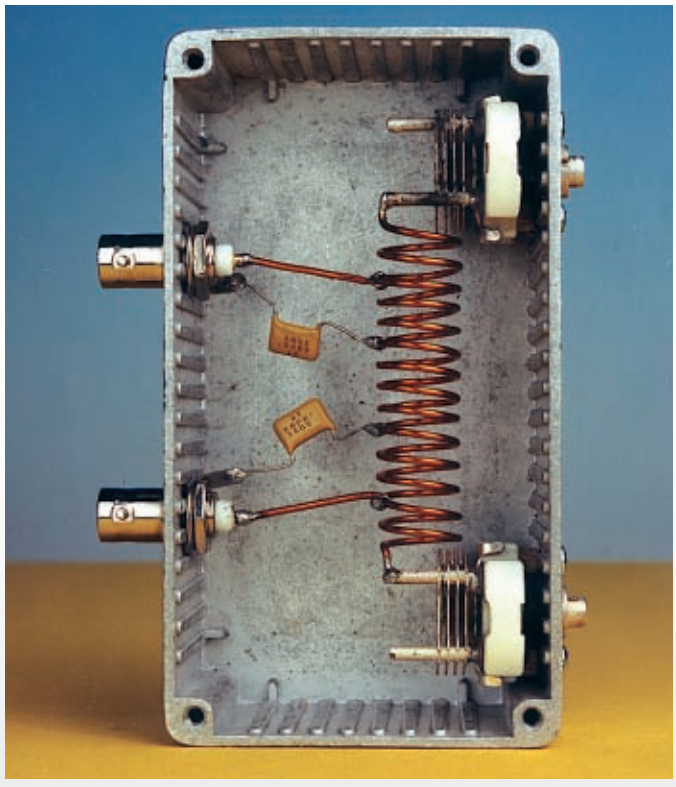
Note:** ***A TV receiver working from a 'set top' antenna can often be working with a less-than-adequate signal. You are far more likely to cause TVI to a TV operating in this way.

Low-Pass Filter

My second 'no choice' advice is that when operating on h.f., you **should always operate your transceiver** with a good quality low-pass filter (l.p.f.) between it and the antenna tuning unit (a.t.u.). If your transceiver comes with an automatic a.t.u. (a.a.t.u.), you'll have to place the filter between the transceiver and antenna.

I prefer to place the l.p.f. between the transceiver and a.t.u. because I've found the match between the rig and a.t.u. is more likely to be the 50Ω impedance the filter will be designed to operate with. There's then very little chance of the filter itself causing problems.

My next advice is that **even when using low power** – you only use tried and tested antenna designs. Dipole antennas, cut to the band you plan to operate on are excellent. By using them you'll not only be radiating a better signal...it will also reduce the possibility of mis-matched feeder cables radiating and causing interference on the way to the antenna.



Filters and matching units are essential for TVI proof instations (see text).

I emphasise the use of dipoles because here in the *PW* offices we've had long discussions with frustrated M3 operators who've telephoned for help. They've explained to us how they've got themselves into difficulties trying to use 75Ω balanced feeder, or the 300Ω ribbon cable to feed their new antennas.

The difficulties often arise because they're so keen to get the very best out of the antenna system they've chosen. Problems seem to occur when open wire feeders and 'balanced' antenna feeds such as 300Ω ribbon feeder are used...when they weren't really necessary. **Don't worry...I've been there and done that too!**

I can remember just how embarrassed I was, when I discovered an otherwise excellent antenna system I'd made up at my home QTH…was also radiating extremely well from the 75Ω 'twin' feeder I'd used. I had quite forgotten that the feeder would only be

'balanced' when the separate fields from the two sides of the 75Ω feeder wires were effectively cancelling each other's radiation out (provided the fields were equal and opposite...remember your theory?).

Because I'd forgotten my theory and common sense, allowing the feeder to touch objects on the way to the operating position in the shack, many strange things happened. These included very bad break-through on our telephone as the lead-in from the nearby distribution pole passed closely by the radiating feeder.

Coaxial Cable

I quickly re-arranged the feeder so that it didn't touch anything likely to un-balance it on the way to the shack. **However, the problems would have been avoided if I hadn't used balanced feeder in that situation**. So…I suggest you do the same and stick to using good quality coaxial cable until you've had more experience!

Although coaxial cable is less likely to bring you problems...using it is no guarantee that you'll not end up causing TVI or discovering other forms of (lack of) **E**lectro-**m**agnetic **C**ompatibility (EMC). Despite this, I thoroughly recommend you use good quality coaxial cable whenever you can until your station is established and proven to be working well...with no TVI problems.

The Long Wire

I think that the 'Long Wire' (LW) is one of the most popular and convenient antenna systems available to the transmitting Radio Amateur and keen listener. Having said that, the newcomer to h.f. could find using this form of antenna could bring problems unless a few guidelines are followed!

So, let's look at the difficulties the otherwise excellent LW can bring. But firstly, I should point out that the antenna is generally only considered to be a 'Long' **if it's more than a half a wavelength on the band you're using**.

Obviously, a 25 metre length of wire in use on 1.8MHz (160 metres or so) would not be a true LW antenna. However, if it were to be used on 7MHz (40 metres) it would be considered to be a LW antenna as it would be longer than the necessary half wavelength on the band.

The best piece of advice I can give you when using the LW type of antenna...is to keep it as far away from television and radio antennas as you can. Radio antennas include the large Band II v.h.f. Yagi arrays (commonly, but incorrectly referred to as 'f.m. antennas') which anyone who wishes to enjoy good quality radio reception should have! (the other systems…DTV radio and DAB radio aren't available nationwide yet).

You might be puzzled at my advice because Band II is up in the 100MHz range, and you're operating on h.f. Well, in answering the question I've got to say - **again from experience** - that hi-fi radio tuners operating on Band II have a horrible habit of suffering breakthrough from h.f. transmitters located nearby.

There are numerous reasons for the breakthrough...the first being that many people (Including me) tend to keep favourite hi-fi units and tuners for many years...much longer than TV sets. The result is that it's just as likely a radio tuner/music centre could be well over 20 years old and still giving good service…**until you start transmitting!**

Older Equipment

Older equipment is often much more prone to interference because of the transistors used, and the lack of good EMC precautions taken during manufacture (not as high a priority then). And strangely…this is then often made worse on the occasions when the radio/tuner is fed by good quality coaxial cable itself connected to a Band II antenna. Why? Because any r.f. currents (produced by your nearby h.f. transmitter) can appear on the coaxial cable and pass downwards into the receiver and even more likely...into the amplifier. I've even heard my own s.s.b. transmissions coming from the loudspeakers on an otherwise switched-off music centre!

Next on the possible problem list, if your LW is too close to the u.h.f. antenna, is the TV antenna mounting itself! And by now you're probably wondering just why I'm labouring the point so much?

Clip on ferrite filters can prove very useful – especially in dealing with interference FROM TV receivers and computers (see text).

Well, the answer is simple indeed...because the domestic TV antenna is very likely to be mounted at the highest point possible for best reception. So it's often used as a convenient point to anchor one end of the LW itself.

Although there's no real mechanical problem in using the excellent chimney lashings/mounting brackets used on such antennas to support your antenna...you place it there at your EMC peril!

In the past I've often used a TV antenna chimney lashing/bracket to support one end of a LW and also one end of a dipole ***(See note below)**. However, I've always made sure the actual antenna wire itself **is at least five metres or so away from the TV antenna** by using a nylon or polypropylene cord to hold the wire up...keeping the antenna wire away from the domestic down lead, etc. In this way, you can dramatically reduce the chance of broadcast radio breakthrough or TVI.

***Note:** Please be aware that the precautions I'm discussing also refer to placing the ends of dipoles - **or the placing of any transmitting antenna** - too close to broadcast receiving equipment.

Tackling Problems

When breakthrough on the TV or hi-fi does occur (whatever form it takes...you'll very soon realise it's your transmissions!) the first thing to do is to try and find out the cause of the problem. If the hi-fi alone is being affected (very likely, and particularly if the TV and Band I service share the same downlead via diplexers fitted at the antenna and the respective receivers...it's probably caused by r.f. currents flowing down the outer braiding of the coaxial cable.

Many of the component suppliers who advertise in *PW*, and those you meet a radio rallies, sell large ferrite rings, which can be used as simple filters. All you have to do is to thread the receiver end coaxial cable through the ring three or four turns - in a similar fashion to winding a toroid...and then re-connecting it to the hi-fi.

When you're on the air again hopefully the interference will have been cured...but don't be surprised if its not! You may have to re-site your Amateur Radio antenna or the v.h.f. broadcast radio….depending which is easier to do.

Of course...I'm assuming you're a member of a family and aren't a single person! If you are single the TVI and radio problems will only come your way if you effect a nieghbour's reception.

If only the TV is effected by interference - usually patterning, on the screen and possibly audio breakthrough you may be able to cure it very

● Add-on digital signal processing (DSP) filters can help overcome many noise sources…whether they originate from within the home or off the air (see text).

quickly indeed. This is because nowadays TVs are often connected to the incoming antenna via a video recorder (VCR). The VCR incorporates a built in pre-amplifier to provide a small amount of gain to overcome any losses due to splitting the signal for the video and TV.

Unfortunately for us, any form of wide-band pre-amplifier (for this is just what they are in effect) can be easily overloaded by transmissions a long way - in frequency terms - from their own working frequencies. Simply speaking, if you find that the TV set **is clear of interference when the incoming u.h.f. signal is fed straight into it** - rather than via the video recorder - you should operate the set in this way whilst you're on the air whenever possible.

Speaking from much practical experience...I must be honest and say that break through onto VCRs can be difficult to overcome. So, I strongly advise, where possible, that any VCR operating from an 'off air' source - be sited with its u.h.f. input feed - as far away from **any transmitting** antenna. Again, from experience...**I've learned just how vulnerable any form of tape recorder is to r.f. EMC problems!**

Mast Head Amplifiers

I'm always fascinated to check to see just how many mast head amplifiers there are near my home! I sometimes see a cheap 'contractor's antenna' connected to a much more expensive mast head amplifier!

Very often an amplifier seems to been fitted as a 'fit it and get out quick' solution to the rigger! If the job had been done correctly, the amplifier may not have been needed with extra expense for the viewer and possible EMC problems for the transmitting Radio Amateur avoided.

Generally speaking, nearby mast head amplifiers are bad news for anyone transmitting on v.h.f. and u.h.f. They can also cause many difficulties to h.f. operators too...especially if they're of the wide band type. These are often employed to save the antenna rigger/engineer having to stock 'Grouped Channel' amplifiers or those suitable for the requirements of Terrestrial Digital TV (TDTV). By using the wide band type only one amplifier need be stocked in their vehicles…saving them space, money and time.

The wide band nature means that very often the antenna input of the mast head amplifiers is 'wide open' to allow the necessary coverage from as low as 40MHz to upwards of 900MHz. This then provides coverage of Band II f.m. radio and Bands IV and V u.h.f. television (and of course the new Band III DAB radio services).

Again, generally speaking, all you can do if you find you are causing interference to a TV/and or a radio receiver (which is fed by an antenna using an amplifier) is to try and confirm whether or not it is wideband. If you can see only one cable coming down from the v.h.f./u.h.f. antenna, it's likely that the system is wide band. If so...you may well find it's best to get it replaced with a channel grouped amplifier suitable for the transmitter being received.

If you're in any doubt on this matter, the **Confederation of Aerial Industries** (CAI) will have an advert in the *Yellow Pages* for your area. All the companies who belong to this trade organisation operate under a code of conduct and you'll find them very willing to offer technical advice and information…especially if you then end up buying the replacement amplifier from them!

The DIY Amplifier

Another type of wide band amplifier you'll probably come across is the d.i.y. type. These are often on sale at the big warehouse style d.i.y. stores and they're specifically designed to be installed by the purchasers.

The problems, as far as we're concerned, are the possibility of the d.i.y. amplifier being interfered with. Even though new systems have to comply with EMC regulations to cope with out of band interference...some amplifiers might have been hidden away in a roof space and in service for a number of years. Up you pop with your new h.f. system (or v.h.f. for that matter) and suddenly a whole house full of d.i.y. cable fed sets can suffer from inadvertent TVI!

The interference is often caused by long cable runs within a house, with the central unit having a wide band coverage from 40MHz (or so) up to over 900MHz. On the other hand it may just cover Band II and Band IV and V...but either type tends to be prone to out of band interference when combined with long cable runs.

If it's your home...be prepared to replace the system with a channel grouped main amplifier (difficult to buy and not cheap) and/or to place filters in the various feeds. Fortunately here, even though the introduction of any filter causes a reduction in signal level (you never get anything for free in physics!) the amplifier usually provides a generous 'boost' to the outgoing signals.

If the interference is to a nieghbour's reception...be prepared to take advice on the matter. Speak to your local CAI engineer, and if you're a member of the RSGB you'll have access to the very experienced EMC Committee. Incidentally, the *RSGB Yearbook* – the new name for the *Callbook* – along with being indispensable in other areas…also has an excellent section on EMC and I thoroughly recommend you have this to hand. It provides all the EMC technical information you'll need at first, along with contact details. Don't be without one! (Available from the PW Book Store on **(01202) 659930**.

Finally on this subject...it's my earnest hope that all M3s who've been helped on to the air by local clubs...will also be assisted in setting up their h.f. stations by the same clubs. I urge all clubs, and newly licensed operators, to work together to sort out any problems. Many heads are better than one...and there'll often be someone in a club who has also suffered from, and cured similar TVI.

Receiving Interference!

Those people - not in the hobby - who occasionally suffer from inadvertent interference from transmitting Amateur Radio stations don't realise how much noise and general EMC difficulties we suffer from! However, even though much of it's out our control...you can lessen the problems by following a few guidelines.

Firstly, keeping your receiving antenna and equipment away from TV receivers will reduce pick up from these potent sources of r.f. and electrical signals! Secondly…use ferrite mains lead filters on the leads of each TV in the house to reduce the leakage of switch mode power supply and time base signals coming back into the mains from the TV/TVs.

The same goes for machine machines, dishwashers and tumble driers. Thermostats on tumble driers can be really annoying! Try to ensure they're all fitted with (suitably power rated) filter plugs or line filters.

Finally, in this short section, don't forget that the ubiquitous PC can be a dreadful source of interference. Check to see if yours causes problems - if it does it might be best to keep it off when you're on the air! If you can't manage without it...be prepared to spend a bit of money and some time sorting out suitable filters from your local computer shop!

I hope you found this informal series of assistance - I've certainly enjoyed preparing it!

PW

Tales of the Disapointed

John Worthington GW3COI explains why calling CQ in VK land can lead to disappointed operators!

Following a long stay in Tasmania (VK7) where the c.w QSOs are as rare as trousers in a Highland Regiment... I soon discovered that things were not much different to how they had been when I'd visited eight years previously. However, eight years before you could at least be sure of a QSO on a Sunday morning.

The regularity of the Sunday morning QSOs was due to the fact that a volunteer was calling CQ on 3.520MHz for the sole purpose of fixing up QSOs with callers and sending them off to another frequency (a bit like a head waiter in a restaurant!). The idea of the regular Sunday morning QSO is a good scheme, which makes the most of a weekly populated c.w. area. But alas on my latter visit to Tasmania it seemed to have vanished and in the daytime both 3.5 and 7MHz were barren and dead except for the odd s.s.b. QSO.

When Darkness Falls

I soon discovered that when darkness falls in the VK7 zone you can hear the occasional QSO on 7MHz c.w. but on 3.5MHz the only activity I ever heard (and I was listening every day and night for six weeks!) was a group of stations sending passages from books and newspapers to each other. They came up on s.s.b. between each sending period and would congratulate the sender on his skill before passing on to the next member. There were no conversations and I found it a totally new phenomenon that still mystifies me to this day!

Granted the method of simply sending passages gives practice in sending and receiving but wouldn't ordinary QSOs be much more interesting? I have to admit though that the group sending and receiving passages seemed happy with the arrangement and would spend at least three hours a night doing so, with no other c.w. contacts being made at all.

Humble QSOs

During my stay in Tasmania I eventually had two good QSOs but my transmitting equipment was the humble telephone and a thick wad of Australian dollars! **Gordon G3LGW** in the Midlands, United Kingdom is a keen DXer and so we set-up a sked whereby he would transmit on the 7MHz band and I would reply by telephone. Daft isn't it? But it was an interesting exercise as it demonstrated one or two things.

Firstly, my 'QSOs' with GF3LGW showed that what you can hear in the UK on 7MHz shall we say, is not how it sounds in Tasmania. So when you are sending CQ you should always move frequency slightly after each call to avoid sitting under the interference (QRM) that exists at 'the other end'.

The other vital point is that on nearly every morning and evening when it's dusk in VK or the UK, G stations on c.w using modest antennas and power are putting in ample signals to VK land. I must also add at this point that this was achieved using a humble Sony 7600D portable receiver using an external 'throw out' wire.

There have been countless times when I have put out fruitless CQs to the Antipodes from my home in North Wales, without making any contacts and I have always put it down to lack of antenna height or gain and modest TX output. However, I now realise that the lack of QSOs is either due to simple lack of VK c.w. stations or that my calls were being made under QRM that I can't hearin Wales.

Of course they can be other reasons for getting no replies to your calls such as the only VK listening has worked you twice already and so on but if they're the 'only woman on the desert island' facing the liberty boat from a visiting aircraft carrier, then they're going to be choosy. Let's put it this way, if you get a QSO after your CQ then you must count yourself a lucky, after all it is with a VK station!

So having experienced VK calling first hand I will continue to call CQ to VK land but will make my calls brief and in future I will 'move about a bit' on the bands. Try it yourself - you never know you may raise a VK station that you didn't expect to!

PW

..... fixing up QSOs with callers....

Long-time reader, Ralph Hague G3ZQV describes his path to a valved 1.8MHz communications receiver, built many years ago and is still in daily use!

home-brew receiver

My interest in radio began about 50 years ago when I was 20 years old. The radio 'seed' was planted as a result of reading of *Practical Wireless*. And although the seed was planted in the 1950s, it did not really germinate until many years later.

The first receiver I built was of the 'cat's whisker' crystal set type. Then came the small three-valved receiver with the miniature Acorn type valves. I wonder how many readers are familiar with this type of valve?

For interest and an insight of this type of valve, have a look in the September 2002 issue of *Practical Wireless* (*See separate panel* - **Editor**).

My next receiver was a little more ambitious but I hadn't got the hang of the proper layout of my home-wound coils that left a lot to be desired. However, all was not lost, I managed to receive Prestwick Airport and a few unidentified stations. I must point out at this stage that I have a large garden – 300ft long (90m) at about 500ft (150m) above sea-level, reception on all frequencies is extremely good.

Then one day I got to know a man in my own village, **Walter G3HTM**, now a Silent Key, who gave me a tremendous insight into this fascinating hobby, especially home-brew. He soon became acutely aware of my lack of knowledge in the field of radio and persuaded me to study for my 'ticket', which I did and passed.

Different Now!

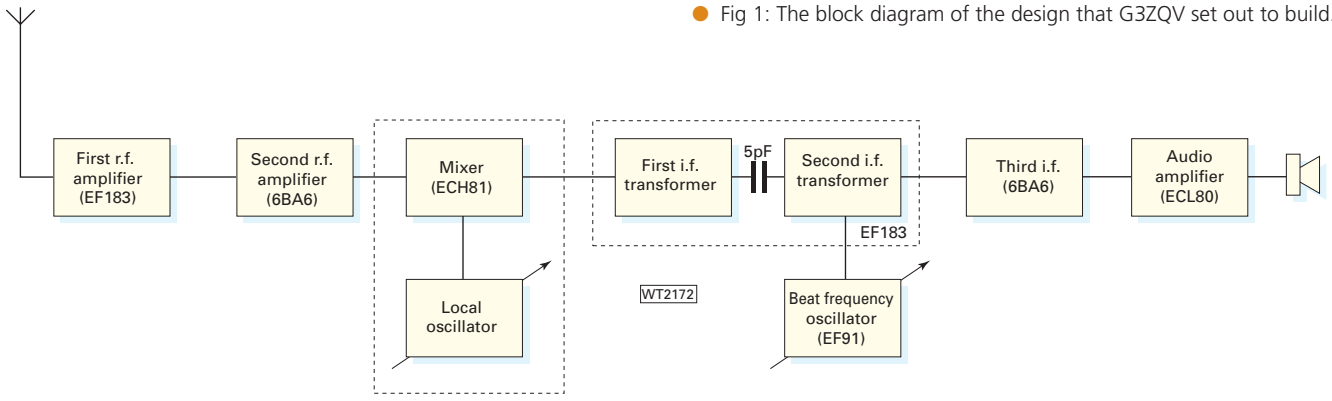
Things are very much different now! When you first got your 'ticket', often the first piece of equipment to be built was a 'Top Band' transmitter. (c.w. only of course). But I still possessed the urge to make my own receiver, and a good one this time. So, I set about my task. One important lesson I have learned about constructing any type of equipment is to make sure that all the bits and pieces are available before starting work on a project.

Personally, I have never thought that it was a good idea to include a power supply (p.s.u.) and a speaker on the same chassis. Items such as these can be 'remote', the speaker on the wall and the p.s.u. under the bench. It gives more elbow room with the layout and the overall size of the receiver would be much smaller.

At the time I started, I had a book that contained the circuit diagram of a 4-valve superhet receiver. Walter and I discussed at length the pros and cons of this receiver and concluded that it would be lacking in both sensitivity and selectivity. It was not to be taken too seriously as a main station receiver.

However, I suggested that, with a bit of thought, the circuit could be expanded and made to work like a 'professional' receiver. He chuckled and said "go ahead and let's see what you make of it". I did and the block diagram of my design is shown in **Fig. 1**.

The first section to be made



● Fig 1: The block diagram of the design that G3ZQV set out to build.

was the p.s.u. for which, many of the parts used had been collected over the years. A transformer that had gathered dust suddenly came in very handy although the rating was a little on the high side – 200mA at 350-0-350 volts.

As some of the valves I intended to use did not require the usual 250 volts some of the voltage had to be 'thrown' away. Most of the valves used were B9A TV types and I added a couple of high slope valves for higher gain. The receiver was designed for 1.8MHz - or Top Band as it was more usually known then!

Basic Broadcast

The original, four-valved, circuit had one r.f. stage, a mixer/oscillator, two i.f. stages, and a diode detector provided the demodulation. Of course that design was for a basic broadcast band receiver. To complete my radio design, I had to add a beat frequency oscillator (b.f.o.) to allow the reception of c.w. and s.s.b.

I also added an extra r.f. stage and two more i.f. stages, the first two i.f. stages, were coupled as two double-tuned circuits, coupled and separated by a small value (5pF) capacitor (see block diagram) to reduce the i.f. bandwidth and improve the filtering. Walter suspected that I might have feedback problems along that chain. But being young and confident, I just said, that he would have to wait and see.

The chassis I made was from aluminium and sized 10in x 8in (nowadays it would be 250 × 200mm). The chassis was bent and drilled and all the holes were drilled and cleaned up.

It's said that to err is human! It then became clear to me that I had made my first big mistake. You have probably worked out that the circuit I decided on would need a four-gang tuning condenser (capacitor). But I just couldn't get hold of one, or at least not one that suited my pocket!

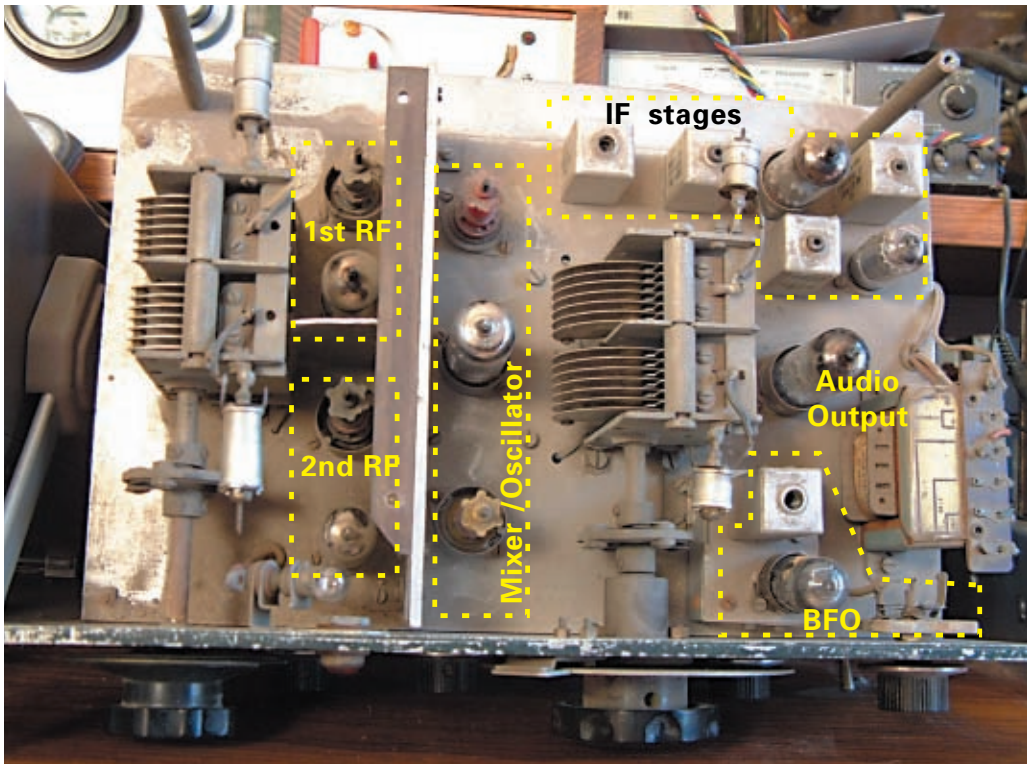
So, being unable to get hold of a four-gang tuning capacitor, I had to settle for two twin gang capacitors. One for the two r.f. stages and the other unit for the mixer/oscillator stage. As it turned out, this error was to become a blessing in disguise, as will be explained later.

Painstaking Work

After many months of painstaking work, I ended up with a gleaming, brand new receiver. The front panel is made from one eighth inch (3mm) thick aluminium plate, measuring 13.5 × 6in (343 × 152mm) that accommodates a vernier dial (marked 0-100) with 180° of travel for the tuning (mixer/oscillator).

Also on the front panel there's an r.f. tuning control and although this tuning dial is also marked 0-100, there's no vernier adjustment. This control is only used to peak up the signals as seen in the heading shot.

Next there are the r.f. gain, i.f. gain and audio gain controls plus b.f.o. and a.g.c. control and not forgetting the headphone jack socket. The S-meter, which I incorporated, uses a 0-500µA meter, which I had to hand.



● Fig 2: Although looking a little dusty after over 30 years of constant use, the Receiver G3ZQV built looks good enough to be a commercial receiver of its time.

continued on page 42

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zero DEPOSIT

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

CALL FOR LATEST PRICE

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The R.A.I.B.C. produces a Quarterly Journal called 'RADIAL', which goes out to all of our members and supporters in either printed or cassette form. The photograph shows our Editor, Peter Hunter, GOGSZ in his shack chatting on the much loved FT-8900 which - of course - was supplied by Martin Lynch & Sons.

If you are an invalided U.K. Licensed Radio Amateur (or know someone who is) who may benefit from the R.A.I.B.C., then why not drop them a line?

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The S-meter circuitry is complete with sensitivity and zeroing controls and is remote from the receiver. The audio output drives a ten-inch (250mm) diameter loudspeaker standing on top of a cupboard.

So, having built the thing, I now tentatively coupled up the antenna and switched on! Nothing! Not a squeak! Well , the indicator lamp was lit, as were the valves., but the rest of the thing seemed dead

Disappointment and lethargy took a hold and I began to wonder if I'd taken the right path in life. Should I have taken up mountain climbing or stamp collecting or… We've all travelled down that familiar path – or is it just me?

"It happens to everyone" I kept telling myself, but how could I avoid having to admit failure to Walter? I possessed a few items of dated test equipment, one of them being an old Heathkit RF/Audio signal generator along with a reliable Class D wave meter. I also had a grid dip oscillator (g.d.o.) to complete my 'test lab' to get myself out of trouble.

I began by disconnecting the antenna and coupling an audio signal from the generator to the audio output valve input with the gain controls to maximum. I could certainly hear the tone in the headphones so, I knew I was away.

Maximum Output

I started going back along the through i.f. chain and peaking each stage for maximum output when I was suddenly startled by a howl from the speaker (I had by this time discarded the headphones). But I quickly backed off the i.f. gain control, which fortunately, cured the problem.

The howl caused me to immediately think of Walter and his warning about self-oscillation in the i.f. chain. The self oscillation of the i.f. stages meant that I would always have to be wary of how far the gain control could be advanced.

I then turned my attention to the 'front-end' and completed the alignment – well almost! The signal generator dial was anything but accurate. However, I knew that I must be somewhere near the 1.8-2MHz (160m) band after 'dipping' the tuned circuits with the g.d.o.

What I needed now was a good strong a.m. signal from the local net, probably one from the lads who pumped out 59 plus signals every Sunday morning with their 10W of d.c. input!

Waiting until the weekend and sunday morning, I coupled up the end-fed antenna, turned the gains (except the i.f. one of course) up to maximum, then tuned around to what I thought was the 1.97MHz segment of the band (this was the usual Barnsley net frequency).

Steady Hiss

Nothing was heard. All I heard was a steady hiss from the speaker. I began to widen my search, tuning around until I was, as I thought, around 1.85MHz. Then, to my relief, I heard a voice, very faintly among the background hiss. I put on the headphones and recognised **Trevor G5IV**.

But what was Trevor doing near the bottom end of the band? He never went down there! Trevor lived about a mile from my QTH as the crow flies, so I should have expected a 59+ signal from him, but there was nothing showing on the S-meter.

I telephoned Trevor immediately and asked him what frequency he was on. "The usual one", he said, "1.97MHz". I now had the problem of moving the oscillator frequency into the correct part of the 200kHz wide band.

Although moving the oscillator and alignment was fiddly, I quickly sorted out and re-aligned the receiver. The band edges were verified and checked with the Class D wavemeter.

I now had around 6in (150mm) of travel on the dial to cover the full 200kHz on a 0–100 marked dial. This turned out to be 2kHz per division and with it being a vernier dial the accuracy was down to a notional 200Hz per dial mark!

Fig. 3: A variety of valves that were frequently used for home-brew equipment, from the larger 807 transmitter valve to the Acorn valves mentioned above.

Initial Warm-up

After the initial warming up period of around 20 minutes, I found that the oscillator was stable. So, I was more than pleased, as anyone can imagine, because it enabled me to use the receiver for amateur operation.

The amplification was overwhelming and I had to back off the r.f., i.f. and most of the audio gain controls. Selectivity and sensitivity are all excellent and the stability and reception of c.w. signals cannot be faulted.

My narrative now brings me to the point that I mentioned earlier about the separation of the two twin ganged capacitors that can be seen in the overhead shot, **Fig. 2**. When switching on the b.f.o., the automatic gain control (a.g.c.) is off. This led to the problem of overloading and distortion of c.w. and of s.s.b. signals.

Distortion was evident on signals from anyone within a radius of around 20 miles, depending upon conditions. The results were 'flattening' of the receiver and a signal readability that was practically non-existent.

I then considered putting in an attenuator but found that this would not be possible

Fig. 4: The small size of a typical (955) Acorn valve may be judged from the pound coin.

through lack of space. Then I thought of how I tuned in a signal tuning in a signal with the mixer/oscillator, before adjusting the signal for best readability with the r.f. stage tuning.

Going Deaf

I've only experienced one fault with the receiver and this didn't occur until many years later when I found that the receiver was slowly going

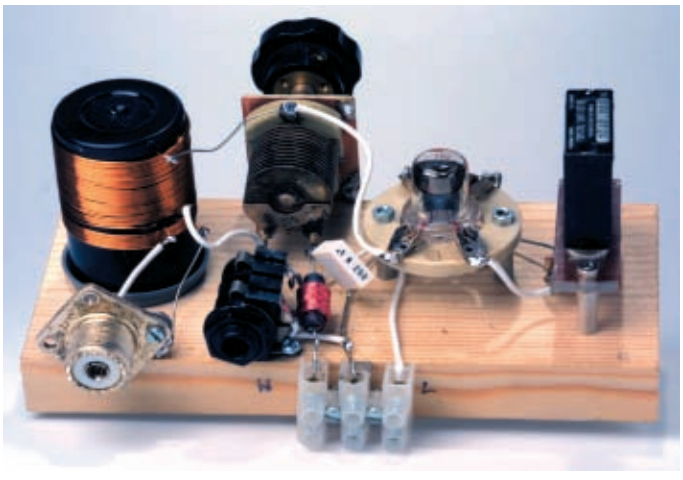


Fig. 5: The Acorn valved transmitter, featured in the September 2002 issue of *PW*.

When the r.f. stage is detuned it's gain is effectively 'backed off', allowing nearby signals reception to become perfectly readable. Also, in separating the r.f. stage tuning from the mixer/oscillator setting has alleviated any tracking problems.

With no tracking problems, the signal could then be peaked at both ends of the band. But this only became apparent on the wider bands bands of 14, 21 or 28MHz.

'deaf'. I only noticed this as I, over the weeks, had to slowly turn up the gain controls, even for nearby stations that had previously been distorted. Eventually I could hear nothing, only the usual valve noise.

Carrying out a visual check, I noticed that a resistor in the anode of the frequency changer was very hot and had an unhealthy brown look about it. On metering the voltages, I found that the anode voltage of this stage was down to 25V. By replacing the resistor (and increasing the wattage), I cured the fault.

The receiver was built around 1968 when, at that time, it cost me around £25, which was quite a large sum then. But it's still giving excellent results and should last many years yet as I also have a full set of spare valves, kicking around somewhere!

Why not have a go at creating your own receiver? It could be more rewarding than you think!

PW

The Thermionic Valve

The history of the thermionic valve is a fascinating one and is littered with successes and failures to improve the capabilities of the various types of valves. In the earlier half of their history, valves came in many sizes, almost all of them big! See the photograph of **Fig. 3**.

One a side-effect of their physical size, was of poor capabilities at frequencies higher than h.f. Their size also was a limiting factor in creating small or portable systems. With the conflict of the Second World War came a requirement to improve reliability as well.

The Acorn valve was one design attempt to try and improve both the higher frequency capability of valves and to reduce the space needed for sets. It was an 'all-glass' type of valve that was physically small, with electrode contacts taken out of the envelope near to the actual electrode placing. Reducing electrode connector lengths dramatically improved the useable frequency. Some rather unusual valve base connectors were needed for the various valves, as shown in the photograph of **Fig. 4**.

The article mentioned was one about Acorn valves and was by **the Rev.George Dobbs G3RJV**. The article, a small valved transmitter, was part of George's series, Carrying One The Practical Way, and was to celebrate *PW's* 70 years of publication **Fig. 5**.

We also have available, copies of three articles from the 1950s era about Acorn valves. If you would like copies of these, then send an A5 sized stamped s.a.e. to the editorial offices marking it 'Acorn Valve Articles'. Please include two one pound coins with your request to cover costs.

Valved Projects

There have been many many valved radio projects over the lifetime of *PW* but how do you get hold of the circuits to try them out? Well the answer to getting hold of the circuit diagrams of *PW's* previously published projects is actually quite easy. Though it sometimes can take some time to find an answer...unless you know exactly what you want!

Contact our Bookstore, with as much detail as you can about the project that you would like a reprint for. For fastest response the minimum information you need to provide, should include, the year and project name. We will advise you of cost and availability of reprints where available.

We'll do our best to find the project based on the information that you provide. Unfortunately we cannot offer a time consuming 'Archive Trawl' at present, preparing. *PW* for you takes priority.

Editor.

Antenna Workshop

FIVE YAGI ANTENNAS for the 50MHz band

Five On Fifty - David Butler G4ASR, a keen v.h.f. operator and our VHF DXer columnist, describes five antennas for the very popular 50MHz band.

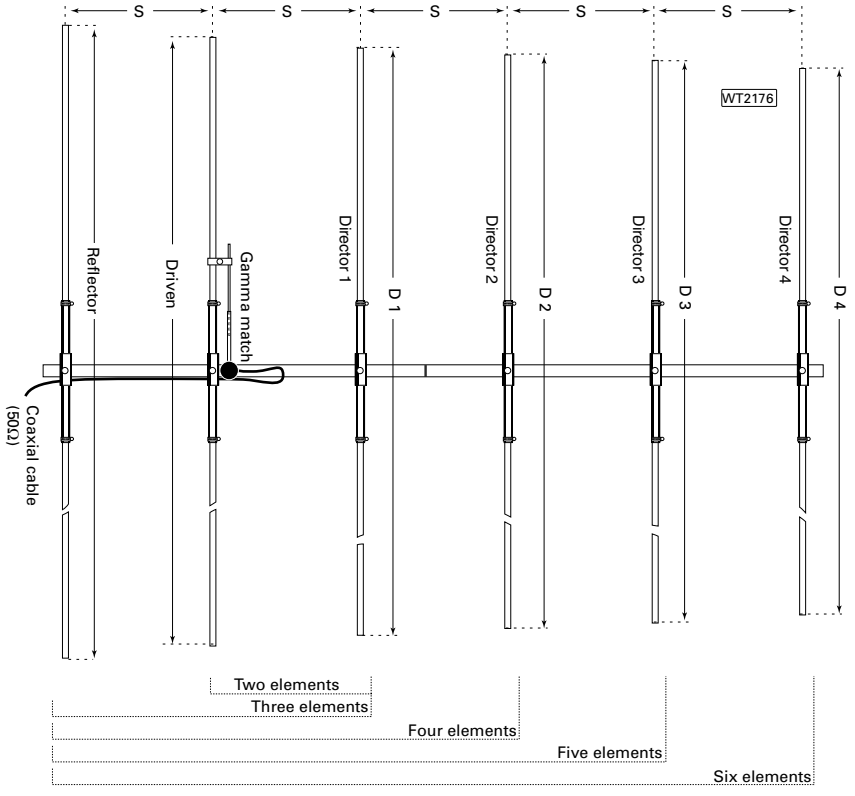


Fig. 1: Combined diagram of all the designs. Table 1 should be consulted for the actual dimensions for each design.

This time around I'm describing a set of five Yagi antennas for the 50MHz band varying in size from a small 2-element, to a larger 6-element whopper. If you have antenna size restrictions you might find that the 2-element beam on a 750mm boom will suit your needs as it looks very similar to an f.m. broadcast antenna.

Maybe you're a newcomer to the 50MHz band and don't know what antenna to start with. The 3-element Yagi with a 2.25m boom length is compact, yet provides good directivity and gain. Seasoned operators may wish to upgrade to a larger antenna with more gain and the performance of the 4-element or 5-element Yagis could be just what you're looking for.

If you really want to winkle out the DX stations, perhaps from a portable location, take a look at the the larger 6-element Yagi with a gain of 10dBd. The choice is yours. Whether you want to chat to local stations or are interested in DXing there will be a 50MHz antenna here to suit your requirements.

The design data for the five Yagi antennas shown here are very similar, the only difference between each model is the element length and element spacing. For each of these designs the element spacing remains constant and the elements reduce in length from back to front.

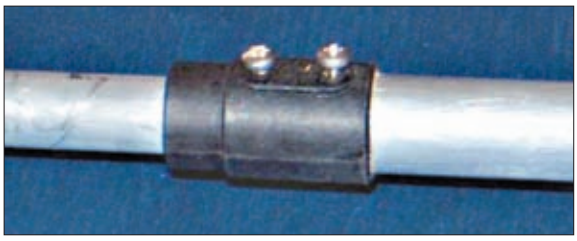
The diagram, **Fig. 1**, shows all the antenna designs combined into just one diagram. With the exception of the 2-element Yagi, all the antennas described here, consist of the conventional reflector, driven element, director arrangement. The smallest of these antennas doesn't use a reflector and consists only of a driven element and director. The table of dimensions, **Table 1**, should be read in conjunction with Fig. 1 which shows the general layout of the Yagi antennas.

Square Booms

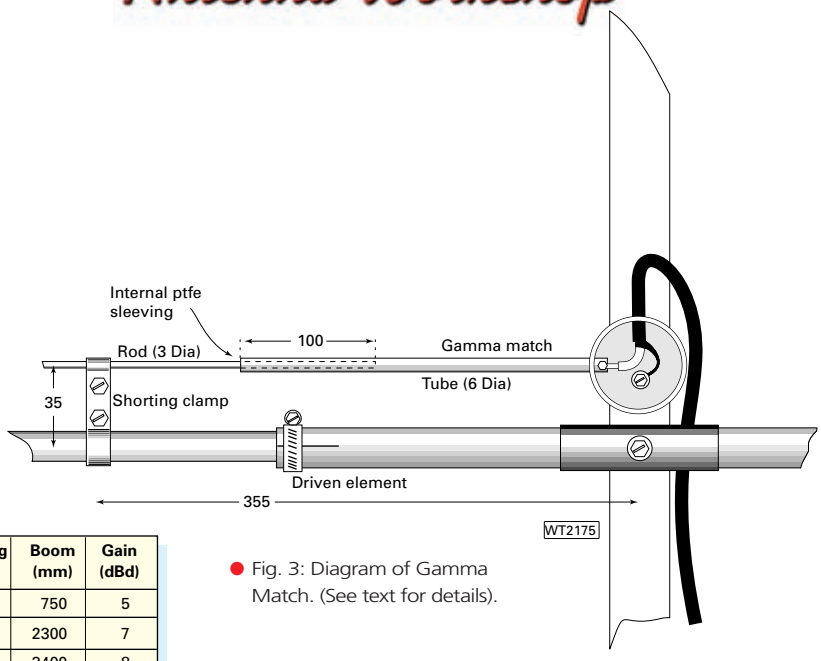
The antennas described here all use 25.4mm (1") square booms and 12.7mm (0.5in) diameter elements. These sizes form an excellent compromise, as I've found the materials are light enough for portable use, but they will also stand up to the rigours of winter in most of the UK.

Start construction with the boom which may need to be fabricated from one, two or even three pieces of square tube joined together. Cut to size a length of 25.4mm square aluminium tubing allowing a short overhang at each end of the boom. The 2- and 3-element Yagi designs use a single length of square boom. However, the designs for the four, five and six element versions will require two or three lengths of square tubing joined together with boom joints.

The joints consist of a 200mm length of 22mm (7/8in) square tubing inserted inside the 25mm boom and fixed with self-tapping screws. Measure, mark out and drill holes for the elements as shown



● Fig. 2: Photograph of moulded joining piece available from Sandpiper communications.



● Fig. 3: Diagram of Gamma Match. (See text for details).

Elements (No.)	Reflector (mm)	Driven (mm)	D1 (mm)	D2 (mm)	D3 (mm)	D4 (mm)	Spacing (mm)	Boom (mm)	Gain (dBd)
2		2819	2645				724	750	5
3	3073	2819	2654				1124	2300	7
4	3073	2819	2654	2616			1124	3400	8
5	3073	2819	2654	2641	2616		1130	4600	9
6	3061	2819	2629	2578	2527	2477	1092	5500	10

● Table 1: Table of dimension of the various designs covered in this article. Spacing (dimension S on Fig. 1) is fixed for each design.

in the tables. A tip here is to measure all spacing dimensions from the reflector position rather than marking out between each element. By referencing all dimensions to one starting position you greatly reduce inaccuracies along the length of the boom.

Now let's turn to making the various elements needed for the antenna. Each element is made from two lengths of 12.7mm (0.5in) outside diameter aluminium tubing telescoped into a 380mm (15in) centre section of 16mm (5/8in) tubing for strength. To set the element lengths I used moulded joining pieces with integral screws as shown in the photograph, **Fig. 2**.

Four Slits

Alternatively, cut four slits in the ends of the centre sections with a hacksaw and secure the joints with a small diameter hose clamp. Either method permits easy adjustment to frequency if required. Alternatively you can cut each element to length and fix through the centre section with self-tapping screws.

The dimensions given in Table 1 are for a design frequency of 50.5MHz. The 1.3:1 v.s.w.r. bandwidth curve is in excess of 1MHz so these measurements will fully cover the lower part of the band. If you only want to use the antenna above 51MHz reduce all the element sizes (not the spacing) by 50mm.

Shortening the elements by 50mm will optimise the antenna at around 51.5MHz. Clamps to join 12mm elements onto 25mm square booms are commercially available from a number of sources. I've found **Sandpiper Aerial Technology** one of the best suppliers for these specialised antenna components.

The driven element is matched to the 50Ω coaxial feeder cable by a gamma matching system shown in the diagram **Fig. 3**. In effect the arm is a variable capacitor (about 35pF) connected in series between the inner of the coaxial cable to a matching point on the driven element. To provide the necessary series capacitance a length of 3mm (1/8") diameter rod is partly telescoped inside a 6mm (1/4in) diameter tube about 200mm long. The tube is lined with p.t.f.e. sleeving which acts as a dielectric and provides a sliding fit.

The sleeving can be obtained from a model shop or commercially from Sandpiper. Alternatively you could carefully wrap plumbers p.t.f.e. tape around the rod until it is a snug fit inside the tube. Then insert 100mm of the gamma rod into the tube. The end of the gamma rod is clamped to the driven element 355mm from the centre line of the main boom. The spacing between the rod and the driven element is set at 35mm by the fixing clamp.

Coaxial cable is connected to the gamma rod in a waterproof junction box and the outer of the cable is securely connected to the centre line of the boom as close as possible to the driven element mounting. The position of the shorting clip is then adjusted for the lowest reflected power. If the match is not sufficiently low slightly adjust the length of rod inside the tube by a few millimetres and reposition the shorting clip.

Adjustment

The easiest way to carry out s.w.r. adjustment at ground level is with the antenna pointing straight up with the reflector element a metre or so above the ground. However for optimum performance you should always check the performance of the Yagi within your particular installation as it may also have other v.h.f. antennas within its capture area and these can cause detuning.

Using a gamma matching system can induce currents on the shield of the coaxial cable feed line (which can degrade the beam pattern) but if constructed with care there should be no noticeable distortion of the polar pattern. This matching method however can be prone to moisture incursion into the tubing so it is necessary to seal the open end of the arm with heat-shrink sleeving.

The smaller Yagi designs are self supporting and can be fixed to the mast with a suitable clamp located at the balance point. The four, five and six element Yagi antennas will require a support to prevent drooping of the main boom. An inexpensive yet effective method is to support the boom with nylon cord to a small clamp one metre or so above the main boom. To complete the job I suggest that rubberised caps are fitted to the ends of the boom and the antenna elements. *PW*

Now that you're ready to get going on the 'Magic Band' I suggest you take a look at the UK Six Metre Group web site at **http://www.uksmg.org**

Sandpiper Aerial Technology (**http://www.sandpiperaerials.co.uk**) of **Unit 5, Enterprise House, Cwmbach Industrial Estate, Aberdare, CF44 0AE. Tel: (01685) 870425** can supply element fixing clamps, aluminium tubing, gamma match assemblies and other antenna mechanical items. Please check with **Chris, Mark** or **Jane** for prices and availability of individual items for the antenna you'd like to make.

Valve & Vintage

Charles Miller continues his story of his life with wireless and continues from when he exchanged Royal Air Force Blue for a de-mob suit. He'd started a radio and TV repair business...albeit using a tent-frame and asbestos sheeting workshop!

Continued from the April issue: From a slow start, trade inside my makeshift tent-frame and asbestos clad workshop began steadily to build. And before long I had to take on part time assistance in the shape of one Alf Miller, who shared my surname but was no relation to me.

Alf could only work evenings, but this was fine as far as I was concerned because in those days of limited TV transmission hours many, if not most service calls had to be done after 8pm. Alf was an excellent engineer but inadvertently and indirectly he was the cause of the demise of the old Ford.

I used to ferry Alf from his home to the workshop and on one of these trips a taxi emerged from a side road at high speed and impinged on the front of the Ford. The result was spectacular, with the taxi overturning and sliding along on its side for several yards.

Fortunately the accident was long before seat belts had been invented and no one suffered any of those nasty injuries such as whiplash fractures of the neck which those devices are capable of inflicting. The taxi was soon manhandled back onto its wheels and was drivable again.

As for the Ford, the front bumper, the radiator shell and the front wings were well and truly mangled. And although it too could be driven away from the scene it had to be handed over to a local garage for repairs to be carried out.

The firm concerned turned out to be extremely dilatory and it would be several months before I saw the Ford again. Meanwhile, though, business had to carry on as usual.

As a temporary measure, a hire-car proprietor I knew allowed me to use one of his vehicles for collections and deliveries. As a result I like to think that I'm the only service engineer in history who has turned up at customers' houses in a Rolls-Royce. Whether this inspired confidence in my social standing or apprehension as regards the size of the bill is debatable!

Extraordinary Luck

Then, out of the blue, came an extraordinary stroke of luck. The RAF had discovered that I had been under-paid for most of my service and sent me a money order for just over £70. **This may not sound much today** but then **it was the equivalent of two months' wages for a lot of people** and it enabled me to solve my transport problem.

In response to an advertisement in the local newspaper I presented myself at the abode of one Heaton-Heap, who was desirous of parting with a 1937 Morris 5cwt ex-Post Office Telephones van. This was based on the contemporary Series II 'Eight' car, complete with chrome radiator and appeared to be in fairly good order.

After some haggling I handed over £44 (how we got to that sum I cannot imagine) and I set off, down hill, to drive the new acquisition home. I discovered one reason for its low price when I halted at a crossroads about a mile from the Heaton-Heap residence and endeavoured to start off into the main road up a slight incline...with little success!

The reason? There was so much clutch slip that it took several minutes for me to get away from the mark, after which I carried on, wondering what I had let myself in for. As it turned out, a new clutch plate cost 27 shilling and sixpence and a new carbon thrust bearing an extra ten shillings, so the total cost of repairs was under two quid!

Removing and replacing the engine to get at the clutch was achieved with a couple of ladders lashed together to make sheer legs and a device called a Haltrac, which consisted of a long length of rather disturbingly thin nylon cord and a large number of small pulleys, by means of which enormous mechanical advantage was obtained.

A year or two ago I found a Haltrac in a box of oddments in an auction sale and bought it for old time's sake. It's still difficult to see how that thin cord could take the weight of an engine.

Good Order

Apart from the clutch, the little Morris was in pretty good order. It bore a fairly close bodily resemblance to the Ford 5cwt (Five hundredweight) van of the period, whilst its engine was admitted to be a virtual copy of that used in the Ford.

The virtual copy ploy was forced on Morris when that firm was short of a design. It took the place of the old overhead camshaft engine (inherited from the take-over of Wolseley Motors) which itself had been based on an aero-engine of the 1920s.

The Morris version developed about 27 b.h.p., which in the light body of the van gave a pretty good power-to-weight ratio for the time. Lightness was of

"...I like to think that I am the only service engineer in history who has turned up at customers' houses in a Rolls-Royce. Whether this inspired confidence in my social standing or apprehension as regards the size of the bill is debatable"!

prime importance for vans in those days because they were taxed on their weight from a fixed minimum to so much per hundredweight.

The taxation weight, as it was called, was established by taking the vehicle to an approved weighbridge (in our case at the Council Slaughterhouse!) in a nominally drivable condition. In fact, it was standard practice to remove everything that wasn't absolutely essential, such as the spare wheel, the tool box and the passenger seat.

If the weight was still a little over one band into a dearer one ...the petrol tank and engine sump would be drained and the of oil and the vehicle towed to near the weighbridge site and then pushed onto it. By dint of these devious methods we got the taxation weight of the Morris down to 11 cwt 3 quarters, saving something like 50 shillings a year!

Before you laugh however, please remember that 50 shillings would then buy 30 gallons of petrol, and work out what that would cost you today (oh, all right...it's over £100). Talking of petrol, the Morris consistently did 45 miles to the gallon which few vans today could equal.

The van gave me reliable service for several years. I parted with it only because television sets had grown in size so much that it would accommodate only one 17-inch table set, and I needed something bigger. I sold it on for only £4 less than I had given for it. For the moment though, the Morris was perfectly adequate for the 9, 10 and 12-inch sets of the early 1950s, even console models.

Sprightly Acceleration

The van's getaway from rest was quite sprightly...and on one unforgettable occasion an ill-judged burst of acceleration brought trouble! A Pye 9-inch console burst its way out through the back doors and dropped on its top onto a gravelled road.

Fortunately the incident was at night and no one witnessed the ejection. Alf and I hastily gathered up the remains and beat it before anyone came. Astonishingly, apart from a severe case of gravel rash on the top of the cabinet the set was no worse for its adventure, and all we had to do was to apply the statutory quart of Colron wood dye followed by a generous coating of Dove furniture polish.

We eventually delivered the set at night and in the dim lighting favoured by TV viewers of the time, the owners of the set never noticed a thing wrong with it. Whether they did in the harsh light of day we never knew, but at least we received no complaint.

Another memorable night outing with the van took Alf and I to a council house - not far from where the Pye incident took place - to look at a failed radio set. The house was set back about ten yards from the road with a stepped footpath leading down to the front door.

Negotiating the steps with due care in the dim street lighting we reached the door safely and were ushered inside by a somewhat harassed looking gentleman. The set, which turned out to be a small table model in a Bakelite cabinet, was not repairable on the spot and Alf gathered it up in his arms to take it away.

Stepping out of the lighted house into near darkness made it even more difficult to see the steps in the footpath and Alf became a classic 'cropper' over one of them. He fell heavily to the ground and when he picked himself up we saw that the set, which had taken his full weight, had a shattered cabinet.

"Let's get away quick and try to stick it together in the workshop"! - he hissed.

But I was having none of that. No one could have put that cabinet back together in a way that would fool even the most short-sighted of owners and I opted for the direct approach. I knocked the door and when the owner answered it I told him without preamble that my colleague had fallen up the steps and had broken the set. To my relief, he did not go mad but instead evinced only apprehension.

"It doesn't matter about the set, but what about your friend? He's not hurt, is he"?... he asked anxiously. "My mother-in-law fell up those steps last week and broke her leg".

So, for once, honesty had been the best policy! I look forward to continuing the story next time I look after the V&V wireless shop. Cheerio for now.

PW

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IC-2725E

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TS-2000

TS-570DGE

IC-756PROII

IC-703

YAESU

FT-1000MP

FT-817

FT-920AF

FT-847

FT-857

MFJ

MFJ-259B

NES10-2

MFJ-949E

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

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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

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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

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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

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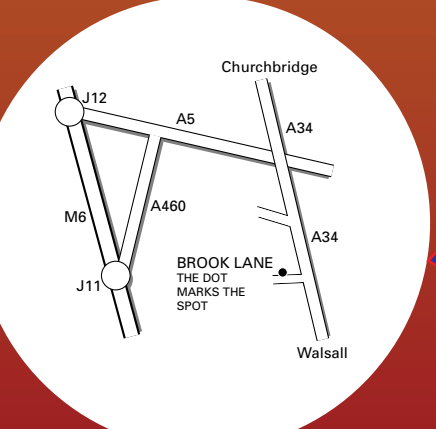
FT-847	£1,145.00
FT-920	£1,049.00
FT-897	£985.00
FT-857	£795.00
FT-817	£549.00
FT-840	£499.00
FT-8900R	£339.00
FT-7100M	£299.00
FT-2800M	£179.00
FT-1500M	£159.00
VX-7R	£299.00
VX-1R	£115.00
VX-150	£110.00
VR-5000	£549.00
FRG-100	£399.00
VR-500	£199.00
VR-120D	£159.00
VR-120	£139.00
MD-200A8X	£225.00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



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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
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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
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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
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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
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ERA	ERA	Microreader	£60.00
Euro	EA-150	CB Amplifier	£20.00
Fairhaven	RD-500VX	Wide Band Receiver	£525.00
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Heil	ProSet 4	Headset HC-4 Insert Fitted	£75.00
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Icom	IC-505	50 MHz Multimode Transceiver	£275.00
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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
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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
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Kenwood	TM-255E	2m Multimode Transceiver (Fair Condtion)	£299.00
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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
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Kenwood	YK-88CN1	270Hz CW Filter 8.83MHz	£40.00
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Kenwood	YK-88SN-1	1.8KHz SSB Narrow Filter 8.83MHz	£40.00
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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
Yaesu	FT-1000MP-MkV-Field	Top HF Radio - AC (2 Months Old)	£1,750.00
Yaesu	FT-101B	HF Base Transceiver	£99.00
Yaesu	FT-101ZD	HF Base Transceiver	£275.00
Yaesu	FT-1500M	2m 50W Mobile Transceiver with DTMF Microphone	£129.00
Yaesu	FT-2600M	Mobile VHF / FM Transceiver	£120.00
Yaesu	FT-290R-MkII	2m Multimode Mobile Transceiver with Amplifier	£250.00
Yaesu	FT-41R	Handheld Transceiver	£120.00
Yaesu	FT-50R	Dual Band Handheld	£150.00
Yaesu	FT-5100	Dual Band Transceiver	£199.00
Yaesu	FT-51R	2m / 70cms Handheld Transceiver	£199.00
Yaesu	FT-650AC	26-50MHz 100w Base Station Transceiver (MINT!!)	£525.00
Yaesu	FT-690R-MkI	6m Multimode Mobile Transceiver	£199.00
Yaesu	FT-707	HF 100W Transceiver	£275.00
Yaesu	FT-7100M	Dual band Mobile Transceiver	£225.00
Yaesu	FT-726R	6m / 2m / 70cms / HF Transceiver	£575.00
Yaesu	FT-726R	2m / 70cms / HF Transceiver	£475.00
Yaesu	FT-730R	70cms Mobile Transceiver	£120.00
Yaesu	FT-736R	2m / 70 cms Base Transceiver	£575.00
Yaesu	FT-736R	6m / 2m / 70cms Transceiver	£650.00
Yaesu	FT-747GX	HF Transceiver - General Coverage	£325.00
Yaesu	FT-757GX	HF Transceiver	£350.00
Yaesu	FT-76R	70 cms Handheld Transceiver	£99.00
Yaesu	FT-790R	70cms Multimode Transceiver	£175.00
Yaesu	FT-790R-MkII	70cms Multimode Transceiver	£250.00
Yaesu	FT-8100R	2m / 70 cms Dual Band Mobile Transceiver	£220.00
Yaesu	FT-840	HF Base / Mobile Transceiver	£399.00
Yaesu	FT-847	HF 6m / 2m / 70cms Transceiver	£850.00
Yaesu	FT-920AF	HF / 6M Base Transceiver	£999.00
Yaesu	FTV-1000	200 W Transverter	£475.00
Yaesu	FTV-430MHZ	Module for Transverter	£99.00
Yaesu	FTV-707	2m Multimode Transverter Including Module	£125.00
Yaesu	FTV-901	Transverter including 2m Module	£165.00
Yaesu	FTV-902DM	Transverter	£225.00
Yaesu	FV-102DM	Digital VFO	£150.00
Yaesu	FV-901	Digital VFO	£175.00
Yaesu	G-650	Rotator	£300.00
Yaesu	KP-100	FRG-100 Key Pad	£25.00
Yaesu	KR-400	Rotator	£120.00
Yaesu	KR-600	Rotator	£140.00
Yaesu	MH-35	Speaker Microphone	£10.00
Yaesu	MMB-16	Mounting Bracket	£20.00
Yaesu	MW-1	Remote Control Microphone & Infra-Red	£60.00
Yaesu	NC-29	Battery Charger	£30.00
Yaesu	NT-29	Charger	£30.00
Yaesu	SP-55	Mobile Speaker	£15.00
Yaesu	SP-767	Extention Speaker (BOXED)	£70.00
Yaesu	SP-980	Speaker with Built In Filters	£60.00
Yaesu	System 600	HF Commercial Radio	£600.00
Yaesu	VR-120	FM / WFM / AM Receiver	£99.00
Yaesu	VR-500	Yaesu Handheld Scanner	£149.00
Yaesu	VR-5000	Top Class Base Scanner	£450.00
Yaesu	VX-1R	Handheld Transceiver	£120.00
Yaesu	XF-114SN	2KHz SSB Filter	£60.00
Yaesu	YO-901	Scope	£250.00
Yupiteru	MVT-3300	Handheld Scanner	£99.00
Yupiteru	MVT-7100	Handheld Scanner	£129.00
Yupiteru	MVT-7300	Multiband Handheld Scanner	£199.00
Yupiteru	MVT-8000	Base / Mobile Scanner	£199.00

Please note, the equipment listed may have been sold or updated, please ring 01922-414796 to check availabilty

A Battery Operated Microphone Pre-Amplifier

If you've not tried building a desk microphone pre-amplifier...Bob Day G8FEG has just the project for you. It won't flatten the batteries either as it also incorporates auto turn-off circuitry.

The microphone amplifier was originally developed so that my daughter could sing through the main household stereo system via my digital guitar effects unit. She had been using my expensive (£100) microphone and I was rather worried that it would get damaged! I then found an old dynamic microphone in the junk box for my daughter to use. However, the old microphone did not provide enough output to drive the effects unit. So I started to design a simple low power battery operated amplifier.

The first amplifier I developed used three transistors and consumed 400µA. The circuit provided enough gain but with a single 9V battery and a 3mm light emitting diode (l.e.d.) in series with the supply (to save on current drain) there was only 7V available for the amplifier.

The 7V meant that the amplifier could only deliver a little over 1V r.m.s. before the onset of clipping. With normal level settings on the effects unit and the household stereo the microphone amplifier worked satisfactorily...but my daughter then expressed a wish to use it on the stereo in her bedroom.

The level needed from the microphone amplifier to drive the stereo system in her bedroom was much higher. Indeed...with normal volume control settings the microphone amplifier produced unacceptable levels of distortion, which was caused by clipping.

To increase the output level and simplify the design I then decided to double up on the batteries for the supply (providing 18V) and use a dual low noise operational amplifier integrated circuit (i.c.). This was achieved by using a TL072 amplifier which increased the supply current by a factor of 10....so I used a simple power saving circuit that would turn off the amplifier after a preset time interval.

The Circuit

The full circuit of the amplifier is shown in **Fig. 1**. The amplifier section and power supply section are shown separately for clarity. The two gain stages of the amplifier are simple non-inverting designs set to give a gain of 11 which gives a total gain of 121.

In operation, the gain of the first stage is set by R3 and R4 and the second stage by R7 and R8. By using field effect transistor (f.e.t.) input amplifiers (with very low input bias current) a high value bias resistors can be used which allows a small value (and small physical size) of input capacitors to be used without the loss of the low frequency response.

Almost any amplifier i.c. could be used in this circuit (an LF353 for example). **Note:** depending on the input bias current and input offset voltages...the polarity of C3 and C6 may have to be reversed.

To prevent radio frequency (r.f.) interference causing problems, R1 and C2 provide a low-pass filter on the input and a similar function is carried out by R9 on the output. However, the main function of R9 is to prevent high frequency instability by isolating the output of the second stage from any capacitive loads. Without R9 the capacitance of screened coaxial cable, to the effects unit or stereo, can easily cause instability.

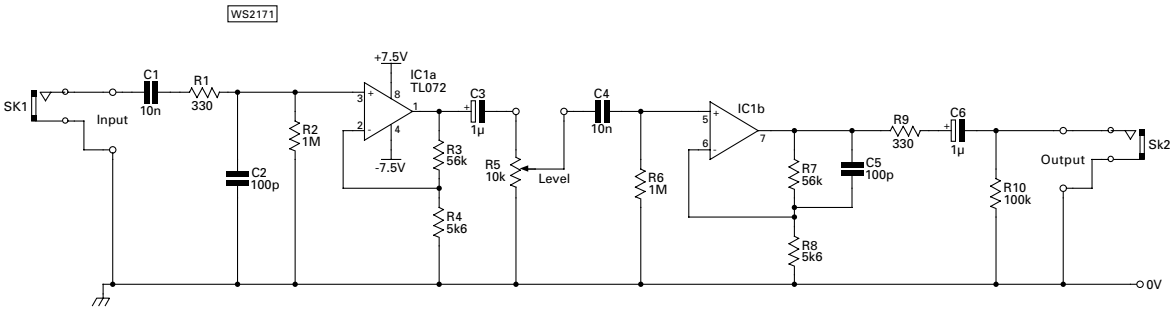


Fig. 1: The full circuit of the amplifier. The amplifier section and power supply section are shown separately for clarity. The two gain stages of are simple non-inverting designs (see text).

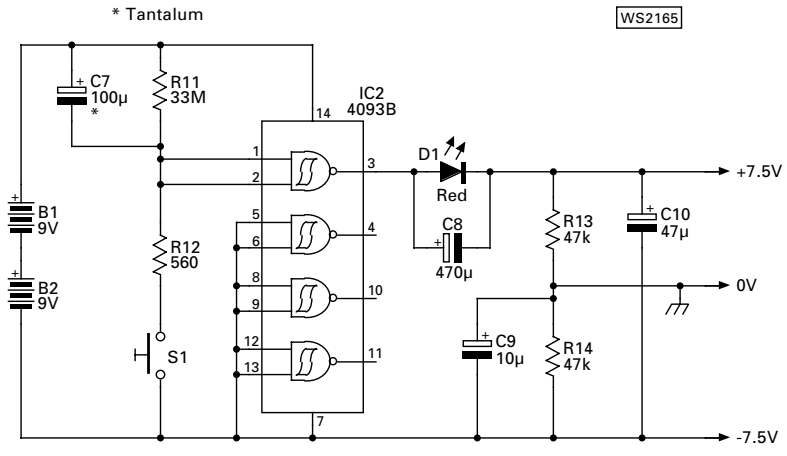
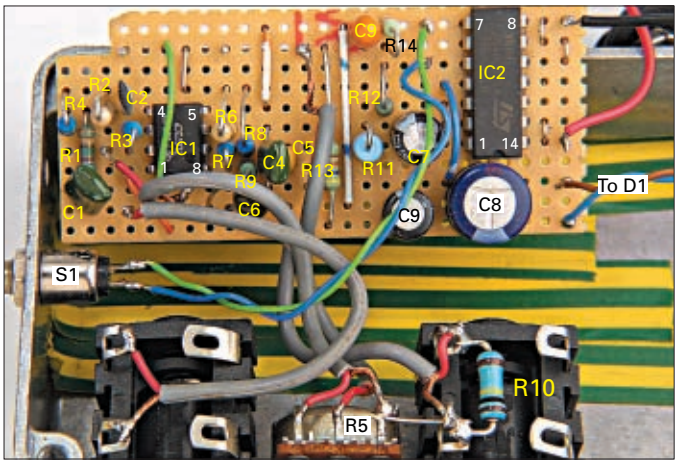
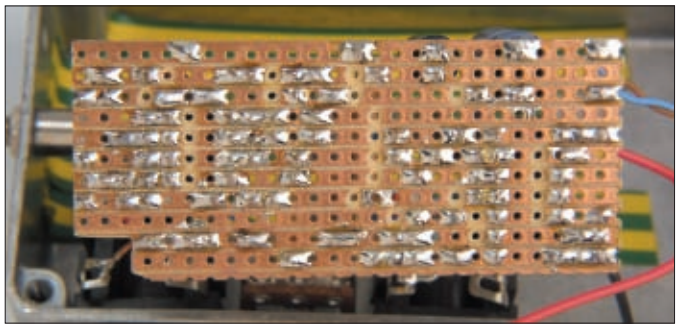


Fig. 2: The power saving (auto turn off) power supply uses a 4093B c.m.o.s. type i.c. This is a quad, dual-input NAND Schmitt trigger device (see text).





● Fig. 4: The Veroboard track breaks.

● Fig. 3: The final layout and construction techniques are not critical. The author used small piece of 0.1in pitch Veroboard measuring 28 x 67mm to construct the main part of the amplifier.

Power Supply

The power saving (auto turn off) power supply, **Fig. 2**, uses a 4093B c.m.o.s. type i.c. which is a quad, dual-input NAND Schmitt trigger device. The 20V rating, low static power consumption, very high input impedance and the Schmitt trigger action make this i.c. ideal for very simple and versatile low power timing circuits. Alternatively, a 40106B hex Schmitt trigger could also be used if you have one available.

When the batteries are first connected, the timing capacitor C7 doesn't have any charge on it. Consequently, pins 1 and 2 of IC2 are held at 18V (logic '1') by the timing resistor R11. This makes the output pin 3 of the gate go low voltage (logic '0') and only the static supply current for IC2 is taken from the batteries.

The data sheet for the 4093B shows the static current consumption to be 20µA maximum with a typical consumption of 0.04µA with a supply of 20V. With a pair of new alkaline PP3 batteries fitted and a 2µA current consumption the battery life in stand-by mode will be several years.

My measurements on the completed amplifier showed the stand-by current to much less than 0.1µA (my meter couldn't measure any lower). This means the normal shelf life of the batteries is to be expected in the standby mode.

Switched On

The power supply is switched on by momentarily closing S1. This connects R12 to the negative battery supply with C7 then starting to charge rapidly, and the voltage on pins 1 and 2 of the 4093B then begins to fall.

When the lower trigger threshold voltage for the gate is reached, the output at pin 3, changes state and powers the amplifier circuit. The time constant of C7 and R12 is such that S1 needs to be closed for about 0.2 seconds for C7 to be almost fully charged (to about 97% of the full supply voltage). The voltage at the input pins of the gate will be about 0.5V at this point.

When S1 is released, R11 starts to discharge C7 and the voltage on the input to the gate will start to rise. When the upper threshold trigger voltage of the gate is reached the output will change state switching the off the supply to the amplifier. The time constant of C7 and R11 sets the duration that the amplifier circuit is powered and with the values given the power was turned off after approximately an hour.

To save power the entire supply current to the amplifier stage is fed through D1. The data sheet for the TL072 gives the maximum current consumption of 5mA and a typical consumption of 2.8mA.

A quick check with my meter showed the current passing through the l.e.d. D1 was 4.35mA. This made the l.e.d. more than bright enough to give a satisfactory indication that the unit was powered. At this current level the voltage drop through IC2 from pin 14 (V_{DD}) to pin 3 (gate output) was 0.69V and the voltage dropped across D1 is 1.92V. The total voltage drop is about 2.61V which leaves more than 15V for the amplifier stage.

When the unit is switched on there'll be a current pulse caused by the initial charging of C10. The data sheet for the 4093B provides minimum, and typical output currents for the device **but does not mention** the maximum currents.

The typical current that can be supplied is in the region of 35mA and a current two or three times higher than this may be possible...depending on the exact characteristics of the output transistor. The very short duration current pulse will not damage the i.c., but it may be high enough to damage the l.e.d., D1.

So, to protect the l.e.d. a 470µF capacitor, C8, is fitted across D1. At switch-on C8 prevents any current flowing through D1 until C10 is almost fully charged and when the current will have fallen to 4.35mA.

The final part of the power supply is formed by R13 and R14. These effectively split the supply to provide the +7.5 , 0 and -7.5 V to the amplifier stages. **Note:** Supply de-coupling is provided by C9 and C10 and they should not be too far away from IC1.

Layout & Construction

The final layout and construction techniques aren't critical. I used small piece of 0.1in pitch Veroboard measuring 28 x 67mm to construct the main part of the amplifier, **Figs. 3** and **4**.

Incidentally, the components **D1** and **C8** weren't fitted until after both the amplifier and power supply sections had been constructed and tested. This enables the two parts to be tested in complete isolation from each other (see next section).

My junk box yielded an unused Eddystone Radio diecast box that was just the right size for the batteries, sockets, level control and circuit board (see photograph). The box had outside dimensions of 61 x 111 x 31mm and the snug fit and layout chosen meant that the circuit board did not need securing in any way.

Several strips of insulating tape were stuck into the box to stop any part of the soldered side of the circuit board coming into contact with the die-cast aluminium. A small piece of foam was then attached to the lid with Cyanocrylate adhesive to hold the batteries in place.

If you're not an experienced constructor, I suggest that you use a larger piece of Veroboard. However, the die-cast box was easily drilled to enable the fitting of the jack sockets, level control, switch and l.e.d. indicator.

Although I recommend a metal box, as it will provide screening to minimise hum and r.f. pick-up, it's not essential. If a metal box **is used however**, it should be connected to the 0V supply of the amplifier (**and not the negative side of the batteries**). This can be achieved either by soldering a wire to the outer case of the level control (as I did) or by drilling a small hole in the case and using a small nut, screw and solder tag.

Final wiring of the amplifier is achieved with four short lengths of small diameter screened cable, and several short pieces of thin wire to connect S1 and D1 to the circuit board. As D1 also came from the junk box and didn't have a mounting clip, it was mounted by fixing directly into a hole in the side of the box.

A hole slightly smaller than the diameter of the body of D1 was drilled and then carefully filed out until the l.e.d. could just be pushed into the hole. When the amplifier was fully assembled and tested, the l.e.d. was fixed in place with a spot of Cyanocrylate adhesive.

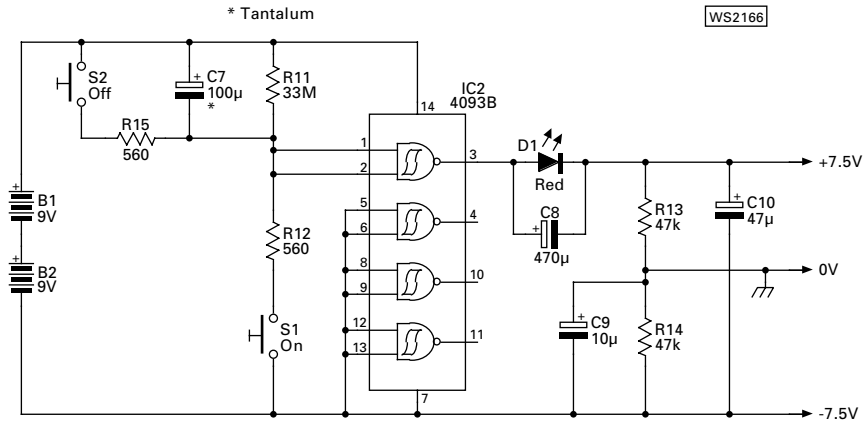


Fig. 5: The addition of a second push switch enables the power to be turned off before the automatic turn off time interval has elapsed (see text).

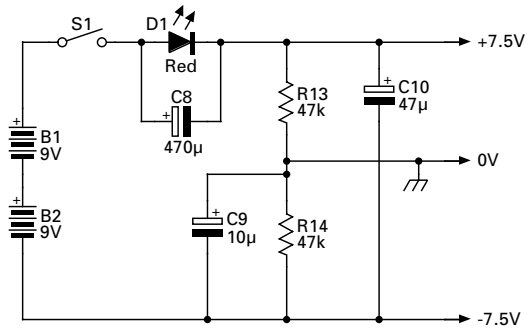


Fig. 6: If the automatic power saving function is not required, the circuit shown can be used with a single-pole switch.

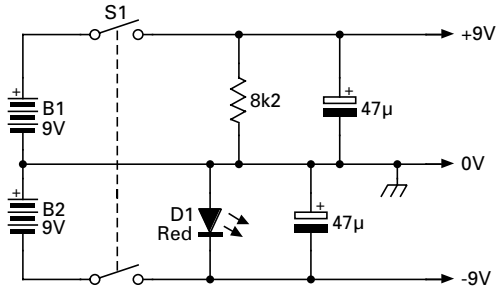


Fig. 7: This circuit is for use with a double-pole switch.

Finally, when you're satisfied that the timing circuit is operating correctly...disconnect the battery and fit C8 to the circuit board, and temporarily wire D1 to the board also, and check the function of the complete circuit.

If all is well, remove the temporary 180kΩ resistor and refit R11 **if it was removed**. Final assembly, wiring and testing can now be carried out.

Circuit Variations

As with almost any circuit...variations can be made to suit components available or to adapt it to the required function. For example, the gain of each stage can easily by changed by altering the values of R3 and R4 (for the input stage) and R7 and R8 for the output stage.

The level control is not critical and any value from 5kΩ to 100kΩ can be used. If **less gain is required** a single Op amp stage could be used (a TL071 for example) and the output of the amplifier could be taken direct from the slider of the level control R5.

If the modification suggested is done, a maximum value of 10kΩ for the level control is recommended to keep the output impedance of the amplifier reasonably low. This is because if the output impedance is too high...the capacitance of the connecting cable may filter off too much of the higher audio frequencies. **Note:** If adjustable gain is not required the level control can be omitted altogether.

The most obvious change to the power supply is to change the time interval of the power saving circuit. This is easily achieved by changing the value of C7, R11 or both. There will

Initial Testing

Initial testing of the amplifier - with nothing connected to the inputs or outputs of both stages - showed that there were odd voltages on pins 6 and 7 of IC1. A quick check with my oscilloscope showed that the output stage of the amplifier was oscillating at 38kHz!

With the level control not connected and the close proximity of R7, R9 and C6 to C4 there was enough stray feedback capacitance to make the stage oscillate. By connecting the level control to the board and so reducing the impedance at pin 5, the oscillations ceased.

However, to make doubly sure there would be no problems when the amplifier was fully assembled, I fitted an extra capacitor (C5) across R7 to limit the h.f. response of the amplifier. Without the level control connected, but with C5 fitted, the amplifier was stable and I proceeded with the construction and testing of the power supply.

Note: If the input stage shows similar oscillation during testing of your own version, another 100pF capacitor can be fitted across R3 to limit the h.f. response of the circuit. Then, when the amplifier is stable check the voltages on pins 1 and 2 with the 0V supply (**and not the battery negative connection**) as the reference. If it's slightly negative the polarity of C3 and C6 will have to be reversed.

Long Time!

Because of the very long time constant of the power supply auto-off facility, it's not easy to fully test without waiting an hour each time S1 is operated. However, by temporarily fitting a 180kΩ resistor either across or in place of R11, the time constant becomes a more reasonable 18 seconds which makes testing a lot easier.

Note: To ensure that the timing circuit is not unduly loaded a voltmeter with a high input impedance (10MΩ) is required for testing the power supply timing circuit.

Next, connect the batteries and check that supply is reaching pins 7 and 14 of IC2. With reference to the negative supply from the battery check that pins 1 and 2 are high voltage (at or near the full battery voltage) and pin 3 is at 0V.

The next stage is to momentarily operate S1 and check that the voltage on pin 1 and 2 falls to less than 0.2V. When S1 is released this voltage should then start to rise at approximately 1V per second (during this testing phase).

As the voltage gets higher the rate of increase will slow down and after about 18 seconds approximately 63% of the battery voltage (around 12V with new batteries) should be reached. After another 18 seconds approximately 86% of the battery voltage should be reached (around 16V).

Note: If all appears to be well measure the voltage on pin 3 and ensure that it rises to almost the battery voltage when S1 is operated and falls back to zero after about 18 seconds.

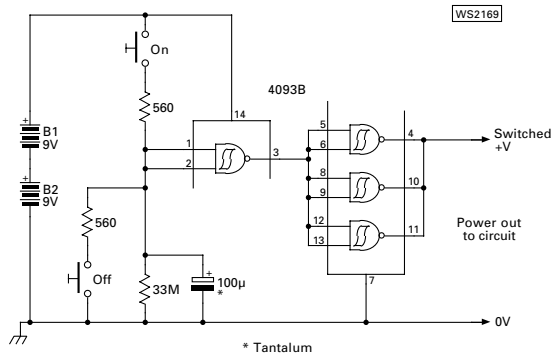


Fig. 8: By inverting the timing circuit and using the first gate to drive the other three, increased output current up to a maximum of about 30mA can be obtained (see text).

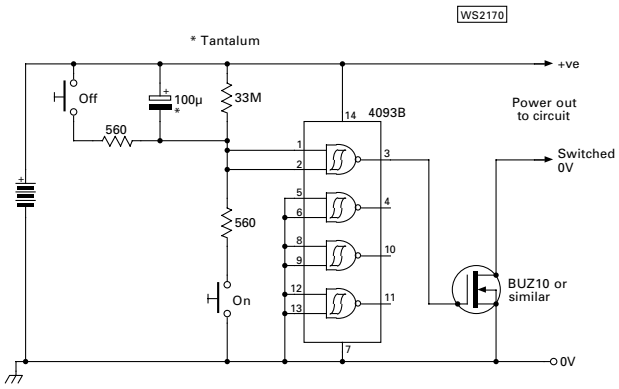


Fig. 9: If more current is required this circuit is suitable. A switching m.o.s.f.e.t. (BUZ10 or similar) can be used and currents up to several amps can be switched (see text).

be an upper limit for the time constant, and this is determined by the leakage current of C7.

Note: I've not carried out any experiments to determine what the upper time constant limit is...but I do recommend a larger value capacitor rather than a larger value of resistance if a longer time interval is required.

If a high value for R11 is not available from the junk box a higher value of C7 can be used and a lower value for R11 (470µF and 6.8MΩ will give about an hour time interval). However, as the capacitor values (and physical size) become bigger it may not be practical to fit onto the required circuit board.

Addition of a second push switch (see **Fig. 5**) enables the power to be turned off **before the automatic turn off time interval has elapsed**. This is achieved when S2 is operated C7 is rapidly discharged through R15 and when the upper threshold voltage of the gate is reached (in less than a tenth of a second) the power is turned off.

If the automatic power saving function is not required the circuit in **Fig. 6,** can be used with a single-pole switch. The circuit in **Fig. 7**, is for use with a double-pole switch.

It's not possible to get increased current by directly paralleling gates. This is because the threshold voltages for each gate are likely to be slightly different...with the result being all the output transistors would switch at different times!

If the first three gates switched off and the last gate could not supply enough current, the circuit being powered may behave in an unpredictable way. However, by inverting the timing circuit and using the first gate to drive the other three, increased output current up to a maximum of about 30mA can be obtained (see **Fig. 8**).

If more current is required, **Fig. 9** could assist. It shows how a switching m.o.s.f.e.t. (BUZ10 or similar) can be used and currents up to several amps can be switched (if the battery supply can deliver the current).

The type of m.o.s.f.e.ts mentioned require a relatively high gate voltage to fully turn on and if the battery voltage is too low a single bipolar transistor or Darlington pair would be more appropriate. Additionally, the data sheet for the m.o.s.f.e.t. used should be checked to ensure the maximum gate to source voltage is not exceeded.

Shopping List

Resistors

All 0.4W 5%

5.6Ω	R4, 8
330Ω	R1, 9
560Ω	R12
10kΩ	R5 (Variable log)
47kΩ	R13, 14
56kΩ	R3, 7
100kΩ	R10
1MΩ	R2, 6
33MΩ	R11(see text)

Capacitors

100pF	50V	C2, 5 ceramic
10nF	50V	C1, Mylar, polycarbonate, polyester layer
1µF	6.3V	Tantalum C3, 6
10µF	25V	Electrolytic C9
47µF	25V	Electrolytic C10
100µF	25V	Electrolytic C7(See text)
470µF	6.3V	Electrolytic C8

Semiconductors

IC1	TL072 (or LF353 see text)
IC2	4093B (or 40106B see text)
D1	3mm red l.e.d.

Miscellaneous

Push-to-make, release-to-break (S1), 2 x PP3 battery clips. Suitable plastic or metal box, a small piece of Veroboard (see text). 2 x input/output sockets to suit. Knob for level control. Some short lengths of insulation tape (see text).

Supplying Other Circuits

I've used the timing circuit in a number of applications and it works well from 5 to 20V. However, the maximum supply current is limited to about a maximum of 10mA at 18V and down to about 1mA at 5V.

And Finally!

My version of the completed amplifier is getting regular use and is robust enough to take the knocks of everyday use and abuse. There is just one problem....I wish my daughter could sing in tune!

PW

USING THE RIGHT STROKE!

Walter Johnson G4CNK says you'll get on 'swimmingly' in the Amateur Radio hobby if you use the correct 'stroke! And just to remind you...he notes how the / (Stroke) should be used after your callsign.

In the United Kingdom, there are four types of Amateur Radio operation affecting the use/addition of suffixes of your callsign and the first is at the address **as stated on the Licence.** When at this address or in the area within its boundaries, **no suffix is used**. This simply means that in the house, in a car in the drive, or in a deck chair in the garden, only the normal callsign is used.

The other three types are denoted by the suffixes **/MM**, **/M** and **/P** where the stroke separates these from the actual callsign.

All At Sea?

The addition of the **M**aritime **M**obile (MM) suffix is required in tidal waters, territorial sea of the UK, and international waters. The /MM is not required when sitting in a bathtub, sailing on a fishpond, lake, canal or the river Ouse in the centre of York City! (for example).

Operating Mobile?

Operating Mobile means on the move at no fixed location such as by car or walking, etc. So rowing on the river at York City would apply here!

Stroke Portable

If someone said over the air "I have a portable station"…most people would assume that the station could be easily moved by car or carried. This would be a natural assumption.

But if another operator said, "I'm working /P" we would know nothing at all about their equipment. They could be using a hand-held in their inside pocket, a heavy transceiver or equipment supplied by a 10kW ex-army generator in a field.

In all of the cases mentioned, the station in question could be working Stroke Portable. The vital point to note is that /P operation is nothing to do with batteries, mains or the equipment in any way. In fact, the word 'portable' is best forgotten as it confuses the whole issue…**the suffix simply denotes that the station is set up in a fixed temporary location**.

Temporary Location

Temporary location /P is a location away from home at a fixed position such as in a stationary vehicle, friend's house, tent, caravan or sitting in a field, etc. The location to within 5km - must be given when working /P every 30 minutes.

One method of complying is to find a well known place or building within 5km of the station. An example could be…"the tower, Blackpool". It is then just a simple matter of saying "location is /P near the tower, Blackpool".

Setting up the station for use at a vantage point on hills or at a picnic, etc., **is not /M operation**. After all, the journey has ended and operation could be for a considerable length of time.

It does not matter whether all of the equipment is fixed to the vehicle or not, **as the type of operation only depends on the location and not the equipment**. Many operators know what /P means, but use "/M" to avoid having to fill in a logbook even when sitting in an office, etc. for many hours!

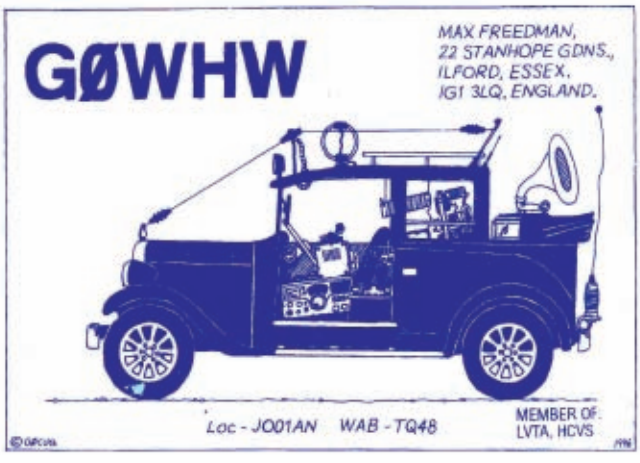
Visitors From CEPT

Over 50 countries are now signed up members of the **Conference of Postal & Telecommunications Administrations** (CEPT) agreement. This allows interchange of Amateur Radio operation between each other without first obtaining permission. Temporary visitors from these CEPT countries can use only /M and /P operation when visiting but the time limit could be as much as one year.

Other countries that are not CEPT members can still have a reciprocal agreement with the UK, which allows their Amateurs to operate here and vice versa. (It may take some time to obtain this permission and a fee may be required).

Visitor identification: Let's take an example, of a German (CEPT member country) Amateur operating in Scotland. Firstly, the current **M prefix** for the UK is sent, which is followed by **the M (regional locator for Scotland)** then a stroke sign. This is followed by the German callsign ending with /P giving (for instance) **MM/DL2—-/P**.

In the example, **two stroke signs** are necessary, and, of course, the location is required every 30 minutes, except when using /M. It may be possible for the operator to avoid sending /P and location details by previously notifying the authorities of the actual address of the station. Now you know why the callsign is so long!



If Max Freedman was operating from home...he would obviously use the callsign G0WHW. However, if he were to operate from his vintage taxi in the fashion shown on his QSL card...he would append his callsign as G0WHW/M (Stroke Mobile).

● Putting your car to a different use! Keen (and loyal he's been entering for many years, winning the runner-up prize last year!)...PW 144MHz QRP Contester Dave Hewitt G8ZRE, is shown operating as GW8ZRE/P in the 2002 contest. He's obviously not mobile, and as he's crossed the border into Wales...he correctly used the callsign GW8ZRE/P.

The Old Stroke 'A'

At one time the 'Stroke A' was used and this indicated operation from temporary premises **which were locations with an actual postal address**. When operating from here, the actual address had to be given over the air at intervals.

Incidentally, the 'Stoke Portable' suffix was in use at this time also. This was to indicate a temporary location without an actual postal address, such as in a field where also the location details were necessary at intervals of 15 minutes.

Before the Stroke A was used, some operators used to call this 'Alternative Operation', but it was not...**as it actually meant operation from any temporary premises**. I've actually mentioned the Stroke A specifically because I have actually heard it discussed on the air recently. And unfortunately...one G3 station appears to be still using /A after his callsign, even though it was scrapped at least ten years ago!

Alternative Premises

The 'Alternative Premises' was once in the regulations...to be used by someone (for example) who owned a second home. When operating at the alternative premises a previous notice could be sent to the local GPO Manager (This was in the days of the old Post Office Telephones, long before BT took over) for the area giving the actual address.

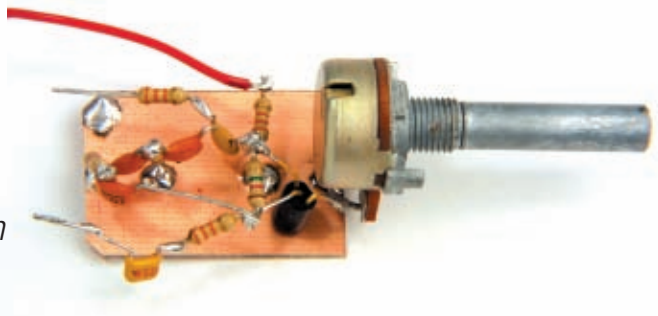
If pre-notification was done was done, only the normal main address callsign was necessary on the air. This was because the authorities knew the whereabouts of the station and another notice was sent when the station was closed down.

For a short stay, it may not have been worth sending notices, and in this case, the normal Stroke A could be used for the alternative premises **or any other premises**. There is no such thing now as alternative premises or "/A" and the above section is all now history.

The Final Stroke!

Finally…my interpretation of the RA's BR68 Booklet on this subject has resulted in many RAE passes over many years. I think it's best to extract from the BR68 the simplest meaning without the aid of a QC…otherwise we'll end up with very thick BR68 Booklets! I'm also very grateful to **Fred Webb G0CEK** for his valued assistance with this article. *PW*

Carrying On The Practical Way



One innovative reader, Carl G0NZI, found a method which enabled him to turn a Z-match project from Carrying On The Practical Way (March 2003 *PW*) into a 'One Knob' unit! Read on to discover how.

This month the Rev. George Dobbs G3RJV has some interesting feedback from his readers. Thanks to the letters he looks at an extremely simple audio filter and a one knob Z-match!

" Do you realise if it weren't for Edison we'd be watching TV by candlelight"?

Al Boliska

Sitting down month by month to write the Carrying On The Practical Way (COTPW) column, I sometimes muse on who is the typical reader. But experience has taught me that's a fruitless pursuit!

I get feedback from readers, usually very positive and helpful, but the variety of readers is quite amazing. Some even remember my earlier writings in *PW*, which go back more than 20 years, and some are new to the delights of building up little circuits and enjoying the Amateur Radio home-brewing tradition.

My favourite letters are from readers who take my little offerings and improve on them because that's what the hobby's all about isn't it? So, this month I want to quote a couple of them and share their advice.

The first offering comes from **Peter Horner** who wrote some time ago after I had given details of yet another simple direct conversion (d.c.) receiver. Peter suggests some basic audio filtering to improve such receivers.

In fact the advice is not directly from Peter...instead it's from an idea by **Derek Money G3HKD**, which appeared in the **G QRP Club** journal, *Sprat*, as long ago as 1987. It was an idea I had forgotten about, so I looked up the circuit and tried it for myself.

WS2173

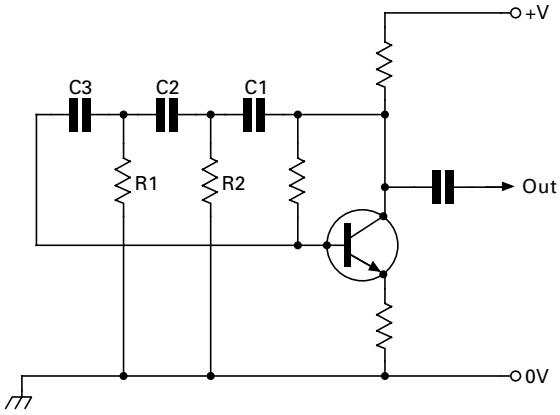


Fig. 1: The basic circuit of a phase shift oscillator. In the text G3RJV discusses how this oscillator can be used to great advantage when incorporated into a simple direct conversion receiver, operating as a 'regenerative a.f. amplifier/filter.

Selectivity & Input Tuning

Because the selectivity in a typical d.c. receiver comes from the input tuning, good front-end tuned filters are required to sort out stations on the crowded Amateur bands. But in the simpler designs...the input filter is often very basic.

A way to improve d.c. receiver selectivity is to add an audio filter. The audio filter is designed to select and amplify the audio signals of the desired audio frequency (or pitch) and attenuate other audio signals.

Typically the filter would be set at about 800Hz and enhance the signals at around this frequency at the expense of signals at other audio frequencies. Very often, op-amp chips are used with a bandpass frequency around 800Hz.

The G3HKD circuit is just one transistor stage. The diagram, **Fig. 1**, shows a basic circuit for a phase shift oscillator. Oscillation is maintained in the circuit by feeding back the signal from the collector of the transistor to the base.

WS2174

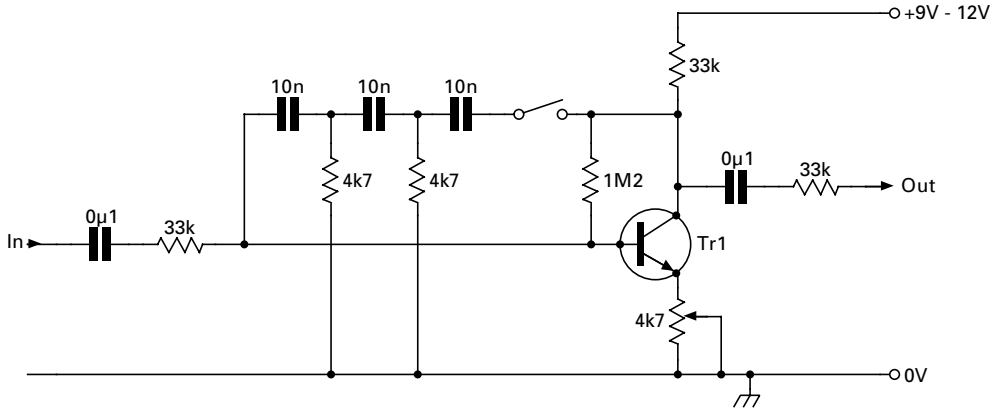


Fig. 2: A practical use of the technique originally suggested by G3HKD in the G QRP Club journal *Sprat*. It shows the principle being used to make a regenerative audio filter (see text).

The resistor/capacitor (RC) network (C1, 2, 3 and R1, 2) sets the frequency of the oscillation and provide regenerative feedback between the output and input. The transistor is in the common-emitter configuration, which means that the phase of the signal is reversed by 180° between the input and output. The RC network also provides a 180° phase shift to give positive feedback at the base and maintain oscillation.

A practical use of the technique is illustrated in **Fig. 2**. This shows the principle being used to make a regenerative audio filter.

Assuming that S1 is closed, Tr1 is acting as a phase shift oscillator. However, at the same time it is operating as an audio amplifier stage with the signal being fed in at the base and out at the collector. Indeed....it's an oscillating audio amplifier!

A wide range of *npn* transistors could be used in the circuit shown. (I used a 2N2222A because I have lots of them). Any reasonably high gain device suitable for an audio amplification stage could be used. So....is this an oscillator or an audio amplifier? In fact, it's a regenerative audio filter as it uses both properties.

Potentiometer Control

A potentiometer, acting as a variable resistance control, has been placed in the emitter of the transistor. When this variable resistance is at its lowest value (literally providing a short circuit) the transistor will oscillate at an audio frequency dependent on the value in the feedback network.

When the same resistance is at its highest value, 4.7kΩ, the transistor will not oscillate. However, between the two, there will be a point at which the transistor is just moving into oscillation. It's at this point it becomes a high gain amplifier at the oscillation frequency. In other words - a very 'frequency selective' amplifier.

The circuit in Fig. 1 is best placed in the receiver audio stages, ideally after the volume control. But remember....**like most regenerative circuits it takes a little practice and skill to use**.

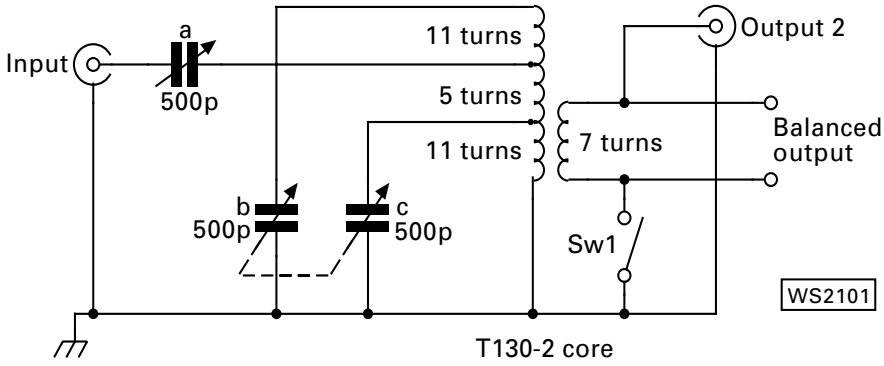
The procedure is to begin with the **maximum resistance** in the emitter...although even at this setting some narrowing of the audio pass-band is evident. As the resistance is reduced the sharpness of the audio response will be noted right up to the point where oscillation occurs.

When it's oscillating, there'll be considerable audio amplification at the chosen frequency. The volume control may then have to be set back to avoid over-loading the audio output stages.

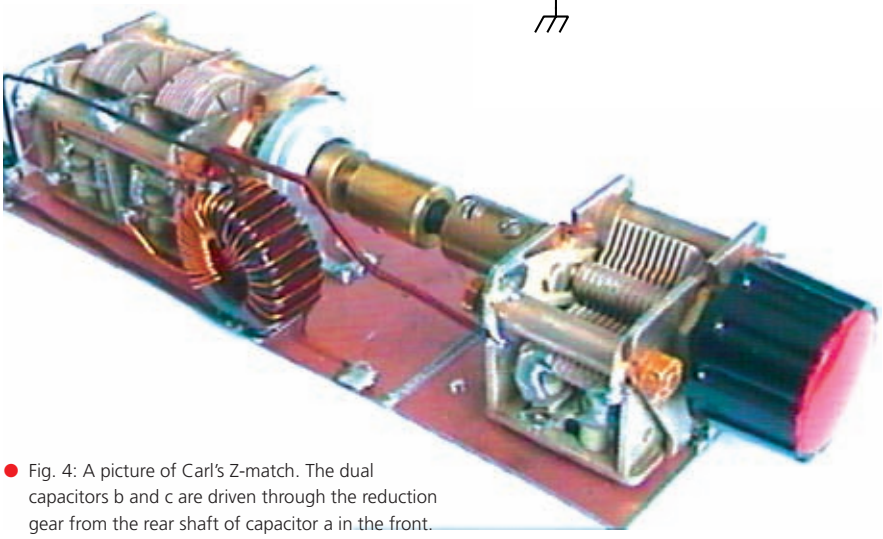
A combination of the filter control and the volume control should be able to produce a significant improvement in selectivity. It may take a little practice to achieve the best results. The switch (S1) has been added so that the feedback network can be removed when the filter action is not required.

The centre frequency of the filter can be easily changed by experimenting with the value of the two 4.7kΩ resistors in the feedback network. It would even be possible to replace these with a suitable double-ganged potentiometer.

Checking the frequency is also very simple: just set the circuit to oscillate and listen to the note, or look at it on an oscilloscope. It's a very simple idea but I was surprised at how effective it can be when used in a basic d.c. receiver.



● Fig. 3: The circuit of G3RJV's mini Z-match which originally featured in the March 2002 issue of *PW*. The project proved to be very popular and an interesting one-knob control modifications has arrived on George's desk. (see text).



● Fig. 4: A picture of Carl's Z-match. The dual capacitors b and c are driven through the reduction gear from the rear shaft of capacitor a in the front.

Carl's Z-Match

The other reader's suggestion comes from **Carl Peake, G0NZI**. Carl wrote to tell me that he built the single inductor Z-Match Antenna Tuner from the COTPW column in March 2003...and ended up building a one-knob Z-Match! (A reminder of the circuit is given in **Fig. 3**).

Carl noted that although the double ganged capacitor (b and c) was quite critical to set, the single gang capacitor (a) was much less critical. He then wondered if he could drive them on the same shaft using only one knob.

In Carl's own words..."As I found that capacitor Ca was not as sharp tuning as capacitors b and c, I thought it would be interesting to try the single and double gangs on the same rotational shaft...Ca isolated but still driving Cb and c via an in-line reduction drive. This has the effect of doing the job with one control, albeit requiring several rotations".

Carl chose a capacitor for 'a' which had both front and back driving shafts, **Fig. 4**. This was directly driven by the control knob with the rear shaft connected to capacitor 'b' and 'c' via an epicyclic slow-motion drive.

Capacitor 'a' **must be isolated from the ground** although capacitors 'b' and 'c' are both grounded. So, it really is possible using this arrangement to have a one-knob Z-Match tuner.

A neat little idea Carl, although I have yet to try it! This will done when I find a suitable capacitor. So, until next month I'll say cheerio and leave you to your building while I hunt for a suitable capacitor! *PW*

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16-17 August 2003

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Special lectures on both days: John Pether will speak on "The History of the Y Service from WWI" and David White, curator of the Diplomatic Wireless Hut, will talk about the "Secret Intelligence Service and their communications".
A German Field radio station will be set up on Faulkner Green by Bletchley Park's German re enactment group.

The Diplomatic Wireless Service Museum in Hut 1 will open for viewing. You can see original wireless and landline communications equipment as used at Bletchley Park during World War II. The wireless stations received and transmitted secret Bletchey Park ULTRA and DIPLOMATIC messages to our overseas outposts and bases.

The GB4FUN from the Radio Society of Great Britain will be on site that day. With the aid of the specially equipped Mobile Radio Shack called GB4FUN, Milton Keynes Amateur Radio Society will be able to put on a practical demonstration of the hobby of Amateur Radio whatever the weather.

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REPORTS & INFORMATION BY THE LAST SATURDAY OF EACH MONTH.

THIS MONTH DAVID G4ASR TAKES A LOOK AT YOUR VHF REPORTS AND GIVES DETAILS OF HOW TO CATCH A SPORADIC-E OPENING ON THE 144MHZ BAND

During April the ionospheric conditions observed on the 50MHz band were a varied mix of auroral back-scatter (Au), trans-equatorial (t.e.p.) and Sporadic-E (Sp-E) propagation modes. The auroral openings, which were reported on April 1, 5, 8, 10, 11, 14 and 16 were all very weak with only a small number of inter-UK contacts being made on c.w. and s.s.b.

Trans-Equatorial propagation was much more exciting with contacts being made throughout the month on the traditional southerly path deep into the African continent. Some very good but short-lived Sp-E openings were also reported during the month with the best occurring in the period April 14-23.

The first t.e.p. opening of the month occurred on April 6 between 1245-1415UTC with the s.s.b. stations of ZR6DXB, ZS6AXT and ZS6WB (South Africa) being worked by operators in southern England and Wales. **Neil Carr G0JHC** (Lancashire IO83) also found the station of ZS6WB operating on 50.245MHz with the digital JT44 weak-signal mode.

Around 1830UTC on April 8 a few stations in south-east England (JO01) reported hearing signals on 50.195MHz from 5T5SN (Mauritania) but no contacts appeared to have been made with this station. A brief opening was reported to the station of 5N6NDP/9 (Nigeria) between 1630-1700UTC on April 14. His s.s.b. signals were peaking to S9 and extended as far north as stations located in the Yorkshire (IO93) area.

The station of FR1GZ (Reunion Island) was copied for a short time at 1320UTC on April 16 but few operators contacted him as signals only just made it into southern England. On the following day FR1GZ had a slightly longer opening between 1325-1350UTC but yet again signals only made it as far as the south coast of England and south Wales. Later in the afternoon around 1510UTC on April 17 the station of G8GXP (IO93) heard ZS6WB on 50.115MHz but the s.s.b. signals were quite weak. Conditions were much better in southern Europe around this time.

Jose CT1EEB reports that at 1548UTC he was monitoring the intercontinental calling frequency 50.110MHz when he heard the station of EM1U with a large pile-up of South American stations. Jose managed to contact EM1U who confirmed that he was located on Vernardsky Base in the Antarctic. This was subsequently confirmed as being the first ever QSO made on the 50MHz band between Europe and the Antarctic continent.

Propagation into southern England (IO90, IO91, JO01) was very good on April 19 with an opening between 1500-1730UTC to Ascension Island (ZD8), Malawi (7Q), Zambia (9J) and Zimbabwe (Z2). Among the stations heard or worked were Z22JE, 9J2BO, 9J2KC and the beacon stations ZD8VHF (50.031MHz) and 7Q7SIX (50.002MHz).

Stations in southern England and Wales heard the Nigerian station 5N6NDP/9 again on April 20 at 1535UTC. Incidentally the '/9' indicates that the station 5N6NDP was operating from another call area within Nigeria. Many countries allocate different administrative or geographical areas (cantons, counties, provinces, regions etc) with an individual call area number. Knowledge of these is very useful when DXing on the v.h.f. bands. You can find extensive details of world-wide call areas in both the ARRL and RSGB Amateur Radio operating manuals.

A good t.e.p. opening to South America occurred on April 23 from 1515UTC. At my QTH (IO81) the event only lasted for 15 minutes but at other UK locations the opening continued for much longer. I made s.s.b. contacts with the stations of CX3AN and CX4CR (Uruguay) with signals peaking to S9 at times over a path of some 11000km. Catching this short opening was really easy.

I was sitting in the shack literally writing this column with the receiver tuned to 50.110MHz, the intercontinental calling frequency. After hours of listening to white noise, up popped the station of CX4CR (Montevideo GF15) who made it immediately into my log book. Such contacts are very much easier if accomplished **before** the pile-up starts! During this opening other UK stations reported making c.w. and s.s.b. contacts with LU1JOG, LU7WW and LW3EX (Argentina).

Although not totally unexpected there were a few early season 50MHz Sporadic-E openings during April. The first Sp-E opening of the summer occurred on April 14 and was a little unusual. At 1315UTC the station of **Peter van der Woude PA1SIX** (Netherlands) issued a warning on the DX Cluster and Internet site: **http://sam-europe.de/** of impending auroral activity in the following hours.

No auroral activity was heard in the UK although the station of LA6QBA (Norway) did report at 1430UTC hearing the GB3LER beacon (Lerwick IP90) on 50.064MHz with auroral signals. I can't say whether this input of ionised coronal material triggered a Sp-E opening but at 1515UTC an intense double-hop event started which lasted for over three hours.

The 50MHz band was wide open to the Middle-East area with contacts being made from England and Wales with stations in Cyprus (5B) and Israel (4X). Amongst the DX contacted on s.s.b. were 4X1IF, 4Z4DX, 4Z4KX, 4Z4UR, 4Z5AO and 5B4AGY. Single-hop contacts were also being made at the same time with stations located in Bulgaria (LZ), Greece (SV), Italy (I), Sicily (IT9) and other Mediterranean countries. **Rady LZ2ZY** (Bulgaria KN13) reports that from his QTH he made contacts with EH8JF (Canary Islands), F4DXX, F5SRH (France), 4X4KX (Israel), 5B4AGY (Cyprus), 9H1EI and 9H5YZ (Malta).

Another lengthy Sp-E opening between 1115-1430UTC was reported on April 16 with QSOs being made with stations to the south-east of the UK. Contacts on c.w. and s.s.b. were made with many stations including IW0BSQ (Italy), S05X (a multi-national dxpedition to Western Sahara), T99C (Bosnia-Hercegovina), LZ1XL (Bulgaria), YT1ET (Yugoslavia), Z36W (Macedonia) and 9A2DS (Croatia).

Plamen LZ2CM (Bulgaria KN13) mentions that despite only running 10W output into a vertical ground-plane antenna he made a total of 20 s.s.b. contacts. His QSOs included the stations of G0PQO, G3ZVW and others in Belgium, Denmark, France, Germany, Italy, Poland and Sweden. On the following day, April 17, between 0915-1300UTC another good Sp-E opening from the UK to southern Europe was reported.

Contacts were made into Bosnia, Croatia, France, Greece, Italy and Yugoslavia. Other stations worked on the 50MHz band included EH6XQ (Balearic Islands), OE6BMG (Austria), YO7VS (Romania) and 4U1ITU (United

Nations, Geneva). Most signals were very loud, often S9+ for long periods. Between 1100-1200UTC the maximum usable frequency (m.u.f.) peaked to 100MHz with UK operators reporting reception of Italian f.m. stations in the 88-108MHz broadcast band.

The ten-watt station of LZ2CM made a total of 42 s.s.b. contacts throughout Europe and finished off the day by making two t.e.p. contacts with stations located in Brazil (PY). A two-hour opening from the UK occurred between 0930-1130UTC on April 19. No significant DX other than SV1DH and SV2DCD (Greece) was reported. Most contacts were with stations around the Mediterranean area, this being one of the most favourable directions for Sp-E propagation from the UK.

THE 144MHz BAND

Apart from two very weak auroral back-scatter openings and some reasonable meteor showers the prevailing propagation on the 144MHz band during April was dependent on tropospheric conditions. Aurora and meteor scatter occurs in the ionospheric E-layer at a height of around 90km.

Tropo lifts are weather driven and occur in the troposphere, from ground level up to 3km, although the upper limit of the troposphere extends to a height of around 10km. No periods of extended tropo propagation were noted during April although occasional contacts up to 800km or so was reported between well equipped 144MHz stations.

If you live in a QTH with a reasonable take-off, run high-power into a good long Yagi this sort of distance is achievable **all** the time provided someone at the other end is operating under similar conditions. Signals will generally be quite weak and will require the use of c.w. or s.s.b. modulation.

The following flat-band contacts made during April are typical of those that can be achieved at 144MHz with a system optimised for DX working; G4RGK (IO91) to DK7FC (JN49) peaking 529 on c.w. over a 741km path, G4RRA (IO80) to EA2KP (IN83) 55 on s.s.b. over 807km, G7RAU (IO90) to DL6NAA (JO50) peaking 429 on c.w over an 870km path and G4LOH (IO94) to F4AZF (JN38) 53 on s.s.b. at a distance of 859km.

Philip Van Steenbergen ON1VS (Belgium JO21) has sent in a report of stations worked during March on the 144MHz band. On several evenings he had good tropo openings to Scotland, northern England and Denmark (OZ). Between March 17-19 he made s.s.b. QSOs with the stations of GM0HTT (Orkney Isles IO89) at 1020km, GM0OYT (IO87) at 850km, GM3WKZ (IO88) at 930km and MM5AJN (IO87) at 850km. Other contacts included G0BLB (IO81) G0TKJ (IO93), G3WRD/M (JO02), G6TTL (JO03BB) and OZ1KEF/P (JO56).

Because of the much higher scattering medium, 90km as opposed to 3km, contacts made via E-layer propagation modes will normally be over much greater path lengths. This year for example some c.w. contacts made on the 144MHz band via auroral back-scatter have included the station of G7RAU (IO90) to LY2IC (KO14) at 1750km, G4ASR (IO81) to YL3AG (KO26) at 1820km and G4LOH (IO94) to OH5LK (KP30) at 1863km.

Meteor scatter communication also provides excellent long distance possibilities. In November 2002 my longest distances worked on 144MHz s.s.b. during the Leonids meteor shower were to IK7UXY (JN90) at 2092km, OH7HDU (KP32) at 2133km and RX1AS (KO59) at 2234km. There is one propagation mode however that can produce even more spectacular results and the bonus is that you don't necessarily need to run high power or have a very large antenna system to be able to work the DX.

Fig. 1: 144MHz Sporadic-E openings in 2002

Date	Time UTC	DXCC Country
June 1	0720-1745	HA, LZ, YO, YU
June 2	1325-1435	I, 9A
June 2	1710-1830	HA, I, S5, 9A
June 3	0740-0915	I, 9A
June 3	1315-1500	EA, CT
June 3	1715-1745	I
June 4	0830-0915	ES, LY, OH
June 8	0945-1120	CN, EA, EA8, YO
June 10	1145-1200	CN, CT
June 10	1845-1850	I, YO
June 19	1350-1400	I
June 20	1325-1345*	I, 9H
June 20	1710-1740	HA, S5, YU
July 3	1250-1350*	I, IT9, SV9, 9H
July 28	0850-0920	EA, CT

SPORADIC-E

It's that time of year again when stations located in northern temperate latitudes experience the joy of sporadic ionisation of the E-layer during daylight hours. Yes - **Sporadic-E is back!**

During the months of June and July discrete patches of the E-layer can become ionised strongly enough to enable propagation of radio waves in excess of 200MHz. Ionisation at this frequency is very rare, maybe on one day during the two month period. At 144MHz there should be at least ten days during the period when an opening occurs whereas at 50MHz the chances are very high, maybe two out of every three days with a lengthy opening.

Catching events on the 144MHz band is quite difficult and needs a fair bit of dedication. To help you find those elusive openings study the details in the chart, **Fig. 1**. It shows all the 144MHz Sp-E openings from the UK last year. Although 2002 was not a particularly good year the results match the historic data built up over the last 25-years.

At 144MHz the expectations are that most Sp-E openings will occur during June and July, with a bias for the month of June. Openings peak between 0800-0900, 1200-1400 and 1600-2000UTC. If an opening occurs around midday there's a reasonable chance of another opening later in the day. Most events are to countries located south or south-east of the UK in the range 1700-2200km. Just keep your receiver tuned to 144.300MHz and then move to a more convenient frequency when the band opens up. Good luck!

CONTESTS

Now I'll turn to news of some RSGB contests (**www.blacksheep.org/vhfcc**) coming up soon. During the weekend of June 21-22 between 1400-1400UTC it's the 50MHz Trophy contest. This contest is now aligned with the larger IARU Region 1 event. A separate event (Backpackers) for low-power 50MHz stations is being held between 1100-1500UTC on Sunday June 22.

The v.h.f. National Field Day contest, an all -and event, is taking place over the weekend July 5-6 between 1400-1400UTC. Don't miss it as there will be a terrific amount of activity on all the v.h.f., u.h.f. and microwave bands. On Sunday July 6 between 1100-1500UTC there's also a separate 144MHz Backpackers event.

Later in the month on Sunday July 13 another 50MHz Backpacker contest is being run between 1100-1500UTC. Also don't forget the UK activity contests on a Tuesday evening between 2000-2230 hours.

On June 17 it's the 1.3GHz to 24GHz event and a week later on June 24 it's the 50MHz contest. On July 1 activity is on the 144MHz band followed by the 430MHz event on July 8.

DEADLINES

That's it again for another month. Forward any news, views, comments or photographs to the address and by the date given at the top of the column.

Thanks for your letters and good luck with the Sporadic-E DX. See you again next month.

73 David G4ASR

HF HIGHLIGHTS

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REPORTS, INFORMATION AND PHOTOGRAPHS TO ME PLEASE BY THE 15TH OF EACH MONTH.

This year's International Lighthouse and Lightship Weekend will take place in August from 0001UTC on the 16th until 2359UTC on 17th. This is a highly popular annual event which attracts hundreds of Radio Amateurs each year who are looking to contact the large number of individual operations and special event stations taking part.

A variety of lighthouses and lightships from locations around the globe will be activated and last year, during the 48 hour period, over 300 stations were active in 45 countries. The Amateur Radio Lighthouse Society offers several awards and certificates in various categories for contacts made during this weekend. If you decide to take part in this year's event please register on-line at **www.vk2ce.com/** or send the details of your operation to **illw@vk2ce.com**

A list of all announced operations will be available shortly on the VK2CE website. Another site that may also be of interest can be found at **http://www.worldlighthouses.org/**

The World Lighthouse Society (WLS) is a non-profit organisation which was formed in September last year. The society wishes to encourage communication and co-operation amongst all lighthouse organisations and enthusiasts around the world.

The WLS aim is to act as a focal point for all activities and anyone who would like information, help, or to would like to make contact is invited to submit their letters, articles or items of news to these pages. If you have a problem locating equipment, need technical advice or have any other kind of difficulty let the WLS know because they have a wealth of expertise at their disposal.

LATEST DX NEWS

It seems that this time of the year is the period for Islands On The Air operations judging by the amount of DX information I have just received. The first of these is from a DXpedition team that has been put together to operate from St Paul Island (NA-094) between July 24 and August 2nd.

The team members include **Andrea K5AAH, Robert N0RN, Vance N5VL, Igor W0IZ, Joe KO4RR, Alan K5AB** and **Dale VE7SV** and they will have a selection of antennas with them including a 'Battle Creek Special'. The team hope to operate on the low bands during all openings and a callsign will be given at the beginning of the operation. QSLs should go via N5VL and you can visit the website **www.hometown.aol.com/vlepierre/myhomepage/index.html** for updates.

On now to another island operation which will take place from Miquelon (NA-032). **Peg KB9LIE** and **Paul K9OT** are planning their third annual low-power DX vacation as FP/K9OT and FP/KB9LIE from July 27 to August 5th. This will include an entry by Paul in the CW North American QSO Party. They will operate using both c.w. and s.s.b. concentrating on 1.8, 3.5, 7, 10, 18, 24 and 28MHz which are the bands in greatest demand.

Special attention will be given to QRP or mobile stations and QSLs should go via the operator's homecall. A web page has been set up for further information which can be found at **www.mhtc.net/~k9ot**

The Siberian Radio Amateurs correspondence club Radio-Prim was created on 15 May 1993 and since then the club has put on a variety of special event stations. This month you can look out for the callsigns **UE9OWQ** and **UE9ORQ** which will be active between June 28 and 30th. They commemorate the 110th anniversary of Novosibirsk, which is the capital city of Siberia. A special diploma will be available and for more details on how you can receive it you should visit **www.nsk.su/~rpc/eh.htm**

Finally, operators from the Polish Radio Club SP4KSY will be active until the 31 July as **HF650O** to celebrate the 650th anniversary of the town of Olsztyn. The QSL cards go to SQ4NR either via the bureau or direct to **Grzegorz Gawel, ul. Herdera 16/14, 10-691 Olsztyn, Poland**.

AWARDS

Some award news now! Firstly.... North Jersey DX Association (NJDXA) members **Ann W2AZK** and **Brian KF2HC** will sign homecall/KP2 from St.Croix (NA-106) in the US Virgin Islands between June 12 and the 19th. Activity will be on all h.f. bands 1.8 to 28MHz using both c.w. and s.s.b. All QSLs should go to the callsign worked via the bureau or direct and all confirmed QSOs count towards the **NJDXA Award**.

All you have to do to qualify is work 15 NJDXA members on any band and using any mode within a period of one year. Submit your log entries to **Bill Hudzik, W2UDT c/o NJDXA, PO Box 599, Morris Plains, NJ 07950, USA** for verification. You can then earn a full colour certificate that would look good on any shack wall.

The NJDXA was formed in 1957 for the purpose of bringing together Amateur Radio operators who, because of their mutual interest in DX, would benefit from such affiliation. One of the goals of the founding members and carried forward to the present day was to foster and encourage Amateur Radio operation and communications of all types and to contribute to the establishment of standards and ethics within the hobby. Further details can be found at **www.njdxa.org**

CARL MASON GW0VSW HAS LOTS OF HF NEWS FOR YOU THIS MONTH, STARTING OFF WITH DETAILS OF THE LIGHTHOUSE WEEKEND.

QSL INFORMATION

On to this month' QSL information now which, incidentally, I hope you are all finding useful? I start with 4S7DXG via UR9IDX, **PO Box 85, Mariupol 87531, Ukraine**., 9V1YC via Joe Morris N5ID, **813 Highway 13, Wiggins, MS 39577, USA**, 8P9R via YC9BU, AP2ARS via K2PF, C53KL via YL2KL, CS7AL via CT1BXE, D88S via DS4CNB, EO58JS via KD5RBU, J79T (1989), VK9EW and VK9WB (1990) and V63BW (1992) direct only via **Ray Husher W5EW, 202 Washington Ave, Thibodaux, LA 70301, USA**, VI5WCP via VK3ZZ, XQ6ET via W8UVZ and finally YC8RRK via YC9BU.

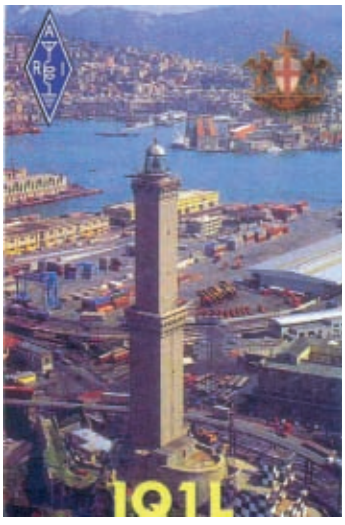
YOUR REPORTS

Time for your reports now and the first one comes from all c.w. man **Ted Trowell G2HKU** on the Isle of Sheppy, Kent who used a Ten-Tec Omni V and Butternut vertical antenna or G5RV to work on 1.8MHz OY8PA (Faroe Islands) at 2000UTC.

On to **Paul Bridle MW3ARD** in Ruddlan, Denbighshire whos 3.5MHz s.s.b. log includes 10W contacts with PA3FAT (Netherlands) 1835, LX0LT (Luxembourg) 1931, ON5JI (Belgium) 2010, EW1MM (Belarus) 2200, EI2FN (Ireland) 2213, II2ARI (Italy) 2255 and HA5IQ (Hungary at 2300UTC using an Yaesu FT-847, FC-20 auto tuner and home-made dipole.

Ted G2HKU had 7MHz contacts with 5T5HC (Mauritania), A45XR (Oman) and

● The International Lighthouse and Lightship Weekend takes place on August 16 & 17th. (see text).



JW0HU (Svalbard) around 2000UTC. As 10MHz was in "reasonable condition" several countries were worked including CO8LY (Cuba) at 1000 followed later by JA7ARM (Japan) 2100, TF3HP (Iceland) 2205 and OD5/OK1MU (Lebanon) 2225 and PP5XZ (Brazil) at 2200UTC.

The next report is from the portable log of **Roy Walker G0TAK** who operated from a bedroom at his daughter's house in Portsmouth, Hampshire. The rig was an Index QRP Plus with battery power and an the antenna was an MFJ-1621 indoor vertical. The following contacts were also made on 10MHz. PA3FOZ (Netherlands) 0951, DL8RE (Germany) 1003, GM3MXN (Scotland) 1042, F5PLC (France) 1152, LA6DG (Norway) 1206, EI8FH (Ireland) 1354 and GW0TAU (Wales) at 1621UTC. Roy said "There was not a great deal of stunning DX but the logbook shows just what can be done with such a simple set-up".

THE 14MHz BAND

There were a few new countries on 14MHz for **Owen Williams G0PHY** in Biggleswade this month. Using a Yaesu FT-747, 100W and a dipole antenna Owen worked 9M2RPN (West Malaysia) at 1639 followed later by V47KP (St Kitts & Nevis) 1936, TO4T (Guadeloupe) 2017 and A71EM (Qatar) at 2020UTC.

In Bishopston, near Swansea, **Robin Trebilcock GW3ZCF** once again favoured PSK31 and used his Icom IC-775DSP, horizontal loop antenna and 50W to work ZL1BAD (New Zealand) 0837, UA9CA (Asiatic Russia) 1053, JI4POR (Japan) 2008, LU1LS (Argentina) 2309 and HK3AHM/P (Colombia) at 2309UTC. **Mike Baker G3SUK** in Stowmarket, Suffolk used his IC-746, Carolina Windom and 80W s.s.b. to log contacts with ED5TEF (Spain) 0856, VK4SJ (Australia) in Caloundra, Queensland at 0818, ZA/Z35M (Albania) 1629 and 9K2HS at 2016UTC.

● Peter MI5JY worked 3V8BB (see text)

Using an MFJ-9420 single band QRP transceiver was **Peter Lowrie MI5JYK** in Newtonabbey, Northern Ireland. Peter say's "As the weather was excellent over the weekend of CQ WPX I fancied a spot of portable working to give away a few points and to see how my vertical performed after some "tweaking" to its dimensions. The antenna was the ground mounted 1/4 wave for 14MHz which is now resonant at 14.250MHz with an s.w.r. of 1.1 according to a borrowed MFJ analyser, so an a.t.u. wasn't needed.

Peter continues "The 14MHz band seemed lively enough with very low noise levels and weak signals were easily heard. Japanese stations were being copied at about S2 and fully readable audio wise so things were looking good. I made well over 150 QSOs and worked four continents which was not bad for 5W QRP in 'Kilowatt Alley' during a popular contest". The log includes DF3CB (Germany) 1150, LY7A (Lithuania) 1159, S52W (Slovenia) 1211, NB1B (USA) in Wayland, Massachusetts at 1220, EA8ZS (Canary Islands) 1248, UA9AYA (Asiatic Russia) 1450, P3A (Cyprus) 1525, 4L6AM (Georgia) 1750 and 3V8BB (Tunisia) at 1845UTC.

THE 18 & 21MHz BANDS

In Tongue, Sutherland, **Gary Macleod MM3SCO** found huge pile-ups trying to work the DXpedition call ST0RY (Sudan) on 18MHz. Using a TS-50, MFJ-948 tuner and converted CB antenna Gary said "I was very pleased to finally work them late one afternoon at 1643UTC after trying hard for several days"! A switch to the 21MHz band found TK5NJ (Corsica), 1421, OY7QA (Faroe Islands) 1636 and T94CV (Bosnia-Herzegovina) at 1652UTC.

Operating mobile s.s.b. again was **Mark Taylor G0LGJ** in Dereham who also had several s.s.b. QSOs on 21MHz. These included OD5/OK1MU (Lebanon) 1140, A71AW (Qatar) 1201, YB0AZ (Indonesia) 1438, 9K2ZZ (Kuwait) 1514, E20KIR (Thailand) 1521 and EA9URM (Ceuta & Melilla) 1743UTC. All contacts were made using an Yaesu FT-100 and 100W to a Pro-Am whip antenna.

Also on 21MHz was **Martyn Medcalf M3VAM** in Chelmsford, Essex who uses an IC-746 connected to a SGC-237 tuner and 8.2 metres of wire as the antenna. His s.s.b. contacts include IZ8DBJ (Italy) 1241, LY1DT (Lithuania) 1246, RA9FLW (Asiatic Russia) 1244, OH3OJ (Finland) 1307, UT7QF (Ukraine) 1515, LZ2PB (Bulgaria) 1527 and UA6AF (European Russia) 1640UTC.

THE 24MHz BAND

Using a Carolina Windom 80 Special once again was **Rob Hastings M3AHH**, Chelmsford, Essex. Stations worked this month using s.s.b. include TA2MW (Turkey) 1320, RZ6AEY (European Russia) 1344, LZ2KV 1405 and Z37HWX (Macedonia) at 1430UTC. All contacts were made with a Kenwood TS-50 and 10W output.

THE 28MHz BAND

There were not so many reports on the 28MHz band this month. Robin GW3ZCF had PSK31 contacts with HP1KZ (Panama) 1559, LU7YZ (Argentina) 1608, CX6DAP (Uruguay) 1927 and PY4PW (Brazil) at 1945UTC and there was just one s.s.b. contact for Mike G3SUK who logged D88S (South Korea) at 1944UTC.

SIGNING OFF

Well, it's time to sign off once again. My thanks to all our reporters for all your logs and the vast amount of information received. I hope that I have managed to include you all.

Thanks also to **Tedd Mirgliotta, KB8NW** editor of the *OPDX Bulletin* for the DX information and of course to everyone for their e-mails, letters and phone calls. Have a good DX filled month.

73, Carl GW0VSW

DATA BURST

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ROBIN GW3ZCF'S BURST OF DATA THIS TIME LOOKS AT THE HELLSCHREIBER SYSTEM AND A NEW PROGRAM FOR YOU TO TRY

This month I'm going to talk about Hellschreiber, one of the less commonly heard soundcard modes, but one which still has some life left in it. The technique was patented in 1929 by its inventor, **Dr. Rudolph Hell**, who devised a method of sending text over a telephone line by breaking characters up into dots, which were then printed onto a moving paper tape at the receive end of the circuit.

The system quickly developed into a portable military Field Text Writer (Feldfernschreiber) in 1932 – hence the name Feld-Hell. It was a 4 valve 12V system with a worm and hammer device which printed onto moving tape at 2.5 characters per second.

Particular characteristics of the early machines, which still persist to this day, included specially devised text fonts which ensured good character recognition using very few dots per character (hence reducing transmitted bandwidth) and double row printing, whereby two rows of identical text appear one above the other. The reason for this apparently bizarre feature was that the machines at either end of the circuit were driven by electric motors, and if they were not running at exactly the same speed the text would not be horizontal, but would move up or down from the horizontal line. By printing two identical rows, the top row came into view before the lower one had vanished off the bottom of the tape, so 100% readability was maintained.

Under wartime conditions, Feld-Hell machines were considerably simpler, and therefore more reliable and easier to maintain, than RTTY machines. It was used by the Germans in the Spanish Civil War and throughout the Second World War. Landline versions of the equipment continued to be used for press transmissions well into the 1980s.

GAVE WAY TO OTHER DATA

Gradually Hellschreiber gave way to other modes of data transmission, and that might have been the end of the story, with Hellschreiber sinking slowly into obscurity. But a group of Radio Amateurs pioneered the use of signal processing with home computers and recognised that the electro-mechanical operations of the Feld-Hell machines could easily be mimicked by computers equipped with soundcards.

By using d.s.p. techniques, coupled with gray-scale (rather than black on white) display, Hellschreiber became a very sensitive mode, which worked extremely effectively under weak signal conditions. In true digital modes, characters are either received correctly or not, leading to garbage text being displayed on the screen when conditions are very poor. In Hellschreiber (which is more correctly termed a 'fuzzy mode') poor conditions result in the text appearing increasingly blurred or smudged, but the eye and brain are very adept at interpreting poor print and skilled operators are often able to make sense of severely degraded signals.

Much of the original Hellschreiber software was DOS based, but a great breakthrough was achieved by **Nino IZ8BLY**, who produced a program with a waterfall display, provision for macros, a range of user-selectable fonts and lots more. Nino's program will run on almost any computer, including old 386 machines. The latest version, 2.9, is still available free of charge on Nino's website. However, the site has been rather difficult to access in recent months, but you can join the Yahoo Hellschreiber group (also free) and download the software from the Files section of the reflector.

The other commonly available software for Hellschreiber is *MixW2* (a multimode shareware program which can be downloaded free for evaluation, but costs $50 to register for permanent use). *MixW2* requires about 166MHz c.p.u. speed, with 32Mb RAM.

Incidentally, sites for downloading software are sometimes unavailable for weeks at a time, but there are two collections of software which are almost always functional, and from which most of the programs I describe can be obtained. They are maintained by **Dave G3VFP** and **Ko NL9222**, and you'll find the URLs at the end of this article.

A CQ call in Hellschreiber can been seen in **Fig. 1**, in this case received using *MixW2*. The text appears on what looks like a paper tape emerging from the bottom left corner of the screen, and you can see that the original paper tape protocol of printing two rows of characters is still used. It's probably not necessary for soundcard derived Hell, because frequency generators in modern PCs are so precise that it is most unusual these days to see text going up or down hill! However, it's fun to be reminded of the origins of the mode.

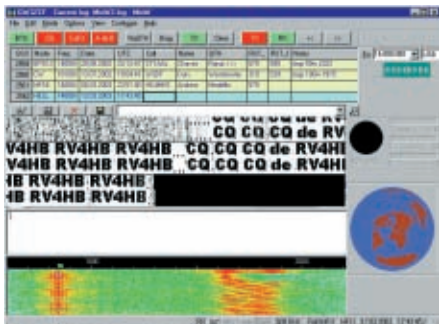


Fig. 1.

FINDING HELLSCHREIBER

So, where are Hellschreiber signals to be found? When I started using the mode, 14MHz was the best place to look, centred around 14063kHz.

Nowadays, it's more usual to see Hellschreiber around 14080kHz. Similarly, look on 21MHz around 21063 or 21080kHz. The 3.5MHz band is also a good place to 'look' at night time, typically around 3580kHz.

You will notice that Feld-Hell is far more resistant to multipath distortion, which can sometimes make 3.5MHz night-time QSOs almost impossible on PSK31 or RTTY. Because of the rather leisurely sending rate of 2.5 characters per second (or less, if larger fonts are used for greater DX clarity) Feld-Hell lends itself to 'rag chewing' QSOs. Take a listen, you might be agreeably surprised!

LOGGER32

I had hoped that, by the time I came to write this edition of Data Burst, the new *Logger32* by **Bob Furzer K4CY**, would have been released. However, Bob is currently in Kuwait with other things on his mind, so the final tweaks to the software still remain to be completed.

I have played a small part in the development team for nearly two years and I am using a beta version daily – I can tell you that the finished product will be well worth the wait. Bob has agreed that I can show you a preview of the program, in the hope that it will be released by the time that this appears in print. But if it's not, don't shout at Bob!

Many of you will be familiar with *Logger*, Bob's original logging program, and *Zakanaka*,

which I think is the best PSK and RTTY software currently available. Many logging operations can be performed directly from the received text on screen by clicking the mouse pointer over the relevant section.

However, these were 16-bit programs and they did not work together when run under *Windows XP*. So, Bob undertook the colossal task of producing a brand new 32-bit logging program with associated soundcard generator for PSK and RTTY. He took the opportunity to introduce a lot of new features which users had asked for over the years. I'll only have room to give you a small taste of the capabilities of the program this month, but I will return to it in the future.

The heart of the software is the logbook and **Fig. 2** shows a page of my logbook, which displays those of the available windows which I have selected. These can be sized and positioned as required, and they will come back in the same position next time the program is opened.

The main logbook page can accommodate up to 48 user-definable ADIF fields. You can choose which columns to show, together with heading and width, and the order in which the columns appear.

The windows you want to display are chosen from the row of icons just above the logbook page. A number of these windows come into their own if you are connected to the Internet.

You can display incoming DX spots via Telnet or the cluster, and these can be shown on a map of the world which also has the grayline visible, and can track satellites using simply loaded Keplerian data. Other icons allow you to obtain QTH information from QRZ.com and QSL manager from GoList, just by clicking a button.

The QSO information is entered via the Logbook Entry window. It can be typed in or, when you are using the Soundcard Data window, taken directly from the received text screen.

As soon as the callsign is entered, previous QSOs with the station are listed, as are QSOs with that country. The example in the screenshot is for a PSK QSO with XU7ABN. As soon as the callsign was entered, a window appeared showing that I had previously worked Claude on 14MHz RTTY – the red background indicating that I had received Claude's QSL for that contact. (QSLs sent but not received are shown green)

There is a powerful tool for calculating statistics for awards. You can get an instant readout of your status for WPX, IOTA, WAZ, WAS, DXCC, WAC, US Counties and Grid Squares, broken down by band and mode if required. ADIF import and export are fully supported, and selected QSOs can be exported for QSL printing, eQSL or (when it eventually comes into being) Logbook of the World.

Along the bottom of the screen details are displayed of the country being worked, sunrise and sunset times and local time at that country, beam heading and distance. Oh, I forgot to mention, the software can point your beam in the right direction and enter data from your radio directly into the log!

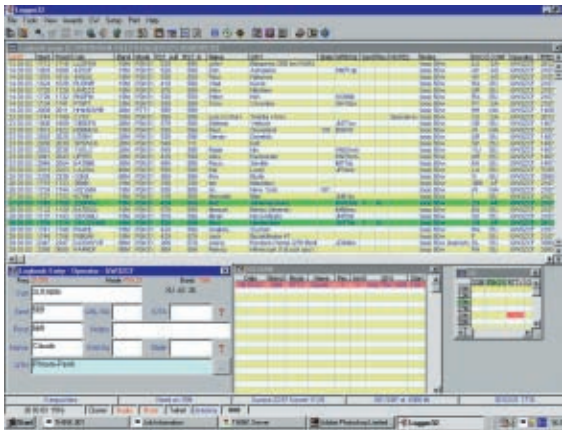


Fig. 2.

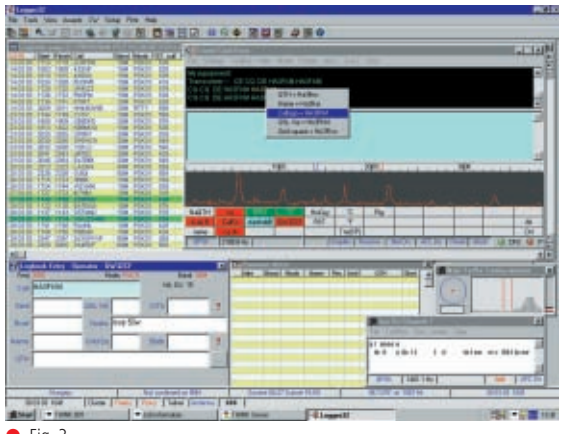


Fig. 3.

SOUNDCARD DATA

The Soundcard Data window of *Logger32* is shown in **Fig. 3** superimposed on part of the logbook. Users of *Zakanaka* will immediately recognise it, and, apart from one or two of the macro commands, it's virtually identical.

The incoming text shows a CQ call from HA3FKM. Using the mouse I placed the pointer over his callsign on the screen, which changed colour to ensure I had 'grabbed' the right bit of text. I then right clicked the mouse and selected Callsign from the drop down menu which appeared and HA5FKM appeared in the Logbook Entry window – magic! Other items which can be captured from the screen using a right click include Name, QTH, QSL manager, RST, Grid Square, US State and IOTA number.

The sharp-eyed among you will see that the soundcard window is configured to show a spectrum display of the incoming signals. This is my preferred way of using the software, but some of you will be more comfortable with the waterfall, as shown in the screen shot in Data Burst April 2003. Quite a few of you contacted me to ask what software was depicted in my last column, so, .now you know!

I have only scratched the surface of the many features of *Logger32*, but I hope it won't be too long before you are able to try it out for yourself. A word of caution though, this is a very powerful program which needs a powerful computer to drive it. In power saver mode, you should just get away with 166MHz c.p.u. speed and 32Mb RAM, but some functions will work rather slowly. Probably 250MHz is the lowest speed I would recommend.

When it becomes available, it's planned to use KC4ELO's website, which is currently offering the latest versions of the original 16-bit *Logger* and Zakanaka. Experience in the past showed that when new versions of *Zakanaka* were released, so many stations tried to download it that the bandwidth of the ISP was not sufficient to cope and download speeds dropped to unacceptable levels. *Logger32* is a much bigger program, so the problem may be even worse. Just be patient, after the first two or three weeks the immediate heavy load on the site will subside, and the software will still be there!

Well, that's all I have room for this time. Please let me have your comments or views, and any requests for future items you would like to see in Data Burst. Happy keyboarding!

Robin GW3ZCF

USEFUL URLS

Website	**Program**
http://iz8bly.sysonline.it/hell/	IZ8BLY Hellschreiber
http://tav.kiev.ua/~nick/mixw/mixw.htm	MixW2 or join the Yahoo Hellschreiber group at
http://groups.yahoo.com/group/Hellschreiber	
http://www.qsl.net/kc4elo	KC4ELO. Download site for Logger, Zakanaka and, hopefully, Logger32
Software collections can be found at: http://www.g3vfp.org/download.html http://home.wanadoo.nl/nl9222/digisoft.htm	G3VFP Dave NL9222 Ko

TUNE-IN

TOM WALTERS
P.O. BOX 4440
WALTON
ESSEX
CO14 8BX
E-mail: tom.walters@aib.org.uk

TOM HAS PLENTY OF INTERESTING BROADCAST BAND NEWS THIS MONTH - SO TUNE THAT DIAL & LISTEN UP!

At the time of writing no sign of hope had emerged for **Radio Austria International** so, international transmissions in French and German were to be discontinued from 1 July, leaving a main transmission as a rebroadcast of a domestic service in German. There may be some English, but nothing has emerged yet. It's a great pity, and very short-sighted. Check out the website at: **http://roi.orf.at**

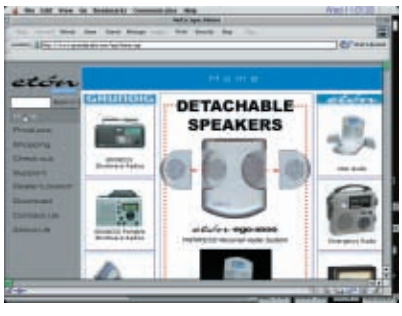
However, just a border away, in Germany they've been getting up a good head of steam over the official launch of **DRM**. The project has been going for five years, and now has 70 broadcasters, manufacturers, network operators, research institutions, broadcasting unions and regulatory bodies from 25 countries on the strength. The DRM project is headed up by the engineering boss of **Deutsche Welle**, **Peter Senger**. So, it's little surprise that the inaugural broadcasts will include transmissions by DW and also by **Radio Netherlands**, who have always had a strong interest.

The initial DRM broadcasts will take place during the ITU's World Radio Conference in Geneva, and in DRM's words "The landscape of the broadcasting industry will change forever". And indeed it probably will, **eventually**.

Trials across the world have been very successful, and the technical brains are among the best in the world. The sticking point will be who's going to make and buy the receivers? For more details take a look at **www.drm.org**

GRUNDIG BANKRUPT!

There's been shock news from Germany this this month with the news that the once-great electronics manufacturer **Grundig** had gone bankrupt and the group had been posting huge losses. Grundig was founded in 1945 and was once the biggest radio manufacturer in Europe, it its heyday employing 38,000 people.



Despite the news Grundig's short wave radios, made in China and marketed by the Eton Corporation of California, will still be available. **Esmail Hozour**, President of Eton, says that Grundig's financial plight could open up a new market for Eton. Until now, Eton has not had the rights to sell radios in Europe under the Grundig name, but this might change. Eton sales have been booming recently, especially before the war in Iraq.

In the autumn, Eton may introduce the **Satellite 900 receiver**, which will be able to pick up XM Satellite Radio, as well as short wave, medium wave and f.m.. Keep an eye on **www.grundigradio.com** for updates.

VATICAN POLLUTION?

Remaining in Europe, it seemed that **Vatican Radio**, once accused of making people ill in the vicinity of its Italian transmitter site at Santa Maria de Galeria, had seen the last of the threatened legal action. But the Pope's radio is back in the dock. Now it seems that a trial of Vatican Radio officials about electromagnetic pollution from transmission antenna will take place after all.

The case was dismissed in February 2002, but it has been argued by the Italian supreme court that Italy does have jurisdiction over Vatican Radio officials. Vatican Radio says it has always borne in mind the international recommendations for protecting people from electromagnetic waves. And it says that it has dealt with the issued "constructively". The Vatican hopes that a new trial will finally dispel "unjustified and unfounded allegations" against it.

Vatican Radio frequencies are still extensive though, listen at: 0140-0200 on 7.335, 9.865; 0250-0315 on 7.305, 9.605; 0300-0330 on 9.660; 0500-0530 9.660, 11.625, 15.570; 0600-0620 on 1530m.w., 4.005, 5890, 7250, 9645, 11740, 15595; 1000-1100 on 585mw, 5.890; 1530-1600 9.865, 13.765, 15.235; 1715-1730 on 585mw, 1530mw, 4.005, 5.890, 7.250, 9.645, 11.740, 15.595; 1730-1800 on 9.865, 13.765, 15.570; 2000-2030 on 7.365, 9.660, 11.625; 2050-2310 on 585mw, 1530mw, 4.005, 5.890 and 7.250MHz.

Religious broadcaster **HCJB World Radio** is no longer broadcasting from Ecuador in English to Europe and North America. English transmissions from Ecuador ceased on 31 May 2003. This "reflects a change in strategy" for HCJB. The organisation has become regionalised, and with the opening of the new transmission facility in Kunnunurra, Australia and some English transmissions have already been moved away from Ecuador.

The mission in Quito now plans to focus on the Latin American region itself. Money plays a part, and HCJB says that surveys have shown a decline in shortwave listening in Europe and North America over the past decade.

If you are listening on short wave in Europe or North America, it could be worth trying: 0200-0400 on 12.040; 0300-00600 on 9.745; 0700-1100 on 11755mw 21.455 and at 1100-1430 on 15.115MHz. Broadcasts from HCJB in Japanese to Japan have also ceased.

INTERNATIONAL BROADCASTING

International broadcasting had a very 'good' **Iraq war**. All the technical stops were pulled out. On **BBC World Service** in English, you could hear a blow-by-blow account, 24 hours a day, seven days a week. Riveting listening it was too!

Most international radio stations beefed up their transmissions, especially those directed to the Middle East. Technically, everything is now possible. Correspondents in the thick of the fighting, in the region or far away on other continents can be brought together live in the smoothest way, in top quality.

Now attention has to turn from this routine miracle to what is actually said. A big row blew up, with stations like the BBC claiming impartiality, while accusing some American stations of undue patriotism. And as for the safety of journalists – should they be better protected, or should they bear their own risks?

One long-running saga was resolved by the war. For many months, it was said that the headquarters of **Radio Free Europe/Radio Liberty** (RFE/RL) in Prague was unsafe, under some unspecified threat.

The Czech Republic then expelled five Iraqi diplomats amid allegations that Iraq was planning an attack on the RFE/RL headquarters. The director of the Czech Secret Service said that Iraq had ordered it's agents to halt Radio Free Europe's Arabic broadcasts to Iraq. All of a sudden RFE/RL has been told it is safe, and can stay where it is. Now we know!

Bye for now, Tom

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You should state clearly in your advert whether equipment is professionally built, home-brewed or modified. The Publishers of *Practical Wireless* also wish to point out that it is the responsibility of the buyer to ascertain the suitability of goods offered for purchase.

FOR SALE

Alinco v.h.f. t/ceiver DR-112, output H/L 45W/5W, boxed little used, mobile bracket, £75. Copies of *PW/SWM* from October 1984 mostly in binders offers, also various power supplies. Bob Hamilton G4IAV/G0DYB, Greater Manchester area, Tel: (01942) 870954 anytime.

Altron 3-section lattice tower approx 40ft plus rotator cage £offers. HF 3-element Mosley tri-bander, £offers. Jaybeam 2meter (144MHz) 8-element crossed beam £offers. Tel: Herne Bay, Kent (01227) 742061.

Argonaut Ten-Tec V mint boxed etc., £495. Trio TS-120V, v.g.c. Both h.f./QRP, £175. Icom IC-701 h.f. trans 100W. Icom p.s.u., v.g.c., £200. Alinco 2m /f.m. trans v.g.c., £100 o.n.o. Tel: (01305) 777691 after 630pm please or E-mail: g40wy@aol.com

AVO Mod7, £30. LCR meter **??**, £30 freq meter M300 20-1300MHz/40Hz-40MHz s.w.r./power meter W52 range 1.8-200MHz. Tel: 0141-944 3865.

Complete tuning drive mechanism and IFT L42 for AR88D RX, new boxed in waxed paper. Wooden lattice boom 25'-4" for w/saved 3-ele 20m (14MHz) beam, unused, any offers? Tel: (01246) 566040.

Cushcraft MA5V vertical antenna new and unused, £160. JRC NRD-515 receiver, NVA515 speaker, NDH-518 memory unit, NCM-515 keypad. All in excellent condition c/w manuals, £600. Arthur, Paignton. Tel: (01803) 529788 after 1800hours please.

Eddystone collection for sale due to illness includes rare and prototype sets. Send A5 s.a.e. or e-mail for full list. Simon M5POO, PO Box 66, Corbridge, Northumberland NE45 5YR. E-mail: simon@nomis.co.uk

Hand-held, scanner 1000 memory, Yupiteru MVT-7100 multi-band for sale. Icom IC-R2 hand-held as above with airband, both v.g.c, boxed, £150 no offers. Tel: Wiltshire (01225) 793354.

HF TRCVR FT-250 with p.s.u. mic, working, £65. Trio TR-2300 2m (144MHz) synth transceiver, £40. FT-102 transceiver needs attention RX, r.f. hence, £130. Power meter, dummy load, 200W, £25. Ben G4BXD. Tel: (01562) 743253 or E-mail: g4bxd@compuserve.com

HRO Coils fully checked overhauled, aligned and very nice condition. HRO 6V original shape power unit, £65. HRO new four gang tuner/gearbox, 375. Codar AT5 12V power unit, antenna c/o unit and lead, £40 (all 3). Tel: (01872) 862291/241005.

HRO MX 3 bandspread coils 160, 80, 40m (1.8, 3.5, 7MHz) good specimen, £80. Eric G3LPS, near Blackburn, Lancs, Tel: (01254) 812797.

Icom 207H 2m (144MHz) + 70cms (430MHz) with remote cable, £150, Kenwood TH-G71E 2m/70cms, £135. Alinco 70cms Lin-amp 3 in 30 out, £25. Racal RA1217, h.f. receiver, £125. Manson 25-30Amp ps, £60. Nissei SJCD308 desk microphone, £40. Alan G4YYD, Bury, Lancs. Tel: 0161-797 7893.

Icom IC-2725 f.m./v.h.f. transceiver, £225. Kenwood TS-50 h.f. transceiver, £400. Both units in fine, as new condition. Tel: London 0208-785 7314.

Icom IC-45E 70cm (430MHz) mobile f.m. radio 10W 430-440MHz boxed with manual, good condition only ever used as base station on Packet, £55 prefer collect but will post. Alan, Manchester. Tel: (01942) 602796 or E-mail: g4gfd@tiscali.co.uk

Icom IC-706 MkI, £350. Manual MFJ Tuner £40. Tony G0CZV, East Yorks. Tel: (01430) 422657 or (07929) 963756.

Kenwood R2000 communication receiver fitted, v.h.f. converter in mint condition, boxed, manual, £275. Radio Spares analogue clamp meter to measure a.c. current model RS300A new, £35 each plus carriage. Len G0ING. Tel: (01752) 343074.

Kenwood TM-G707E. Admiralty pattern Morse Key. Multistrand half-size G5RV & Balun. Morse tutor MFJ-418. All v.g.c. M5WMF, QTHR. Tel: (01609) 776609 8pm onwards. E-mail: William.Fry@btinternet.com

Kenwood TR-75IE 2m (144MHz) multi-mode £300. Microwave Modules 100W 2m (144MHz) Amp, £100. 9-element crossed Tonna, £50. MFJ Morse Tutor with tutor tapes, £50. Buyer collects or pays P&P. M5JON, Bristol. Tel: (01454) 326869.

Kenwood TS-570DGE as new, boxed, complete, £625. Microwave Modules 28/144 h.f./v.h.f transverter, £90. Kenwood MC60A base mic, £65. Yaesu FT-290R with Mutek front-end v.g.c., £120. 2m (144MHz) 20W Amp, £35. Tel: Toby, Sidcup, Kent. Tel: (07930) 387120 or E-mail: toby_walsh@hotmail.com

Kenwood-Trio R1000 communications receiver with manual, book u.s.b., l.s.b., c.w., a.m. wide, narrow all short waves, Amateur etc., only, £135 includes carriage. Tel: (01608) 663745.

MFJ-259 good condition, upgrading, £180. Hands NCMI, built never used, £55. Becker Grand Prix car radio non-working, looks nice LMSK, £15. Tel: 0141-562 4571.

Palstar WM150 cross needle p.w.r./s.w.r. meter. 1.8-150MHz, 0-300W, 0-3kW, average or peak readings, illuminated scale. Brand new, unwanted gift, Cost £70 (see Nevada ad.) Sell for £55 including post. John G3EGC, Bolton, QTHR. Tel: (01204) 301502.

Rare opportunity to obtain the classic JRC-NRD505, only reason for departure require cash to obtain Kenwood TS-50S transceiver. Interested? then you need to match the TS-50S second-hand asking price, find that out before phoning, Buyer inspects and collects, v.g.w.o. Tel: Bungay, Suffolk (01986) 896658 anytime.

RCA AR88D, g.w.o. clean original condition, unmodified, unrestored RCA speaker, manual, £120 PX BC348, buyer collects due to health problems or PX 2m (144MHz) rig about 20W. Barry Fielding G7CMP, Axminster, Devon. Tel: (01297) 32381.

Realistic DX-394 h.f. RX mint, with manual 150kHz-30MHz, £120. Datong D70 Morse Tutor

with leaflet, mint, £45. Will deliver London/Suburbs. E-mail: esquire@fsmail.net

Rockwell 7553 manual, new, 2 Nylon tuning gear, mains plug, new, £15 all. MX294 32ch 2m (144MHz) power unit/speaker, mic, better r.f. trans, £55. Tel: 0141-562 4571.

SG-230 Smartuner not used outside, as new, boxed, with all instructions, £255 incuding P&P. A bargain aluminium pole 16', £12, buyer to collect. Tel: Derbyshire (01332) 672245.

Ten-Tec QRP 20m (14MHz) c.w. transceiver, £70 including postage. Tel: (01763) 853608.

TX/RX input/output tester. Marconi Model TF-1065A. Ranges 10V-1000V ??? 3W - 300µW r.f. deviation, £20. Tel: 0141-944 3865.

Vintage new-in original box Exide GFG4, 2V radio accumulator dry uncharged. Antenna Telex Hy-gain TH3JR-S 10, 15, 20m (28, 21, 14MHz) meters and manual. 19 Brimar 13D3.CV No CV4068, B9A double triodes 25/- in1959. A number of tubes numerical indicator. Tel: Cornwall (01840) 770048.

Wooden Lattice type boom unused for wide spaced 20m (25ft) beam, complete tuning mechinism (new) and if trans L42 for AR88D RX, any offers? Tel: (01246) 566040.

Yaesu 107M base station a.t.u. v.f.o. speaker, £400. Icom 251 b/station, £295. Alinco 605 dual-band, £200, Bends 100W Amp 2m (144MHz), £125. Kenwood TH-FTE, portable, £200. Tel: Harlow (01279) 420513 any morning.

Yaesu 107M base station with a.t.u. v.f.o. speaker, £400. Alinco 605, £180. Kenwood TH-F7E, £200, Both 6mths old. Icom 251 base station, v.h.f., £250. Fidelity CB, base station, £40. Tel: Harlow: (01279) 420513.

Yaesu FT-290RII with matching FL-2025 amplifier, also with NiCad battery case and carry case. All in excellent condition, £275. Gareth, Newbury. Tel: (01635) 281841.

Yaesu FT-8100 v.h.f./u.h.f. dual-band f.m. transceiver, £210 o.n.o. Buyer to collect or pay postage .Tel: (01788) 860550 ask for Bryn.

Yaesu FT-847 with FC-20 a.t.u. included also mic, £800 . M0LAB, West Yorks. Tel: (01924) 264866.

Yaesu VX-7R hand-held tri-band TX/RX as new plus rapid charger and submersible speaker-mic, £200 plus postage. Jon Kempster M5AEO. Tel: (01908) 504140.

WANTED

AVO valve tester wanted, prefer CT160 but any other model considered. Tel: Yorks (01482) 887938.

Circuit diagram for Labgear TV pattern generator No. E5180A. John GM4AQO, QTHR. Tel: (01592) 874719.

Codar, Collins, Drake and KW please let me know if you have any items from these manufacturers for sale. Also looking for an HAC single valve receiver. Paul G4CCZ, Woodham, Surrey. Tel: (01932) 342927 or E-mail: g4ccz@6metres.com

Coils for Globe King s.w. receiver, any parts and info for restoration project. Dennis G41AD. Tel: (01942) 817556.

German 510K Transmitter. Tel: Richard on: (01895) 270772.

KW Vespa TX (MkI or II). KW202 RX, KW777 RX minor faults acceptable. 4m (70MHz) transverter (28MHz i.f.). B. Tibbert, 66 Horsley Road, Kilburn, Derbyshire. DE56)NE. Tel: (01332) 883035.

Manual and circuit diagram for Racal 9903. Pascal GI0SFt. Tel: 0287-135 2804.

Old half-inch ferrite rods. must be half-inch in diameter and six inches long or more. willing to pay good money for them. Tel: Peter on Mobile (07931) 63823 9am to 10pm.

Racal receiver wanted, RA17L, RA17W, RA117 or an RA1784/MA1072 also any accessories for these receivers and a genuine Racal cabinet. Tel: Yorks (01482) 887938.

Relay type 4/SCO/435. Wiring/schematic diagram for Sinclair Z12 module. Tel: Carlisle (01228) 526436 or Email: mickbarber@zetnet.co.uk

Spy/Clandestine radio sets from Second World War and since wanted by collector. Have some items for swaps. Manuals for same also required. send full details to: W. J. Macdonald, 40 Latchett Road, London E18 1DJ.

SSB adapter for ex-naval B40 receiver. Tel: (01591) 620747.

Transit case for receiver R1355 good condition in/out. Some old valved radios. Valves 19 Brimar D13 double triodes, new in multi-segment box. Hitachi loudspeaker system SS-W51, new, boxed not unwrapped, large. Keith M1CCE, Cornwall. Tel: (01840) 770048.

Yaesu YC601 frequency counter for my FT-101E line-up, offering, £45, can anyone help? This is the final item to complete my line-up. Martin Williams GW00UV, Trelewis, South Wales. Tel: (01443) 412695 or E-mail: martwil.martwil@virgin.net

PHOTOS

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Practical Wireless BOOKS

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Shortwave Receivers Past & Present

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Shortwave Receivers Past & Present Communications Receivers 1942-1997 to give it its full title is your guide to over 770 shortwave receivers that have been manufactured in the last 55 years or so. Whether you are a Radio Amateur, collector or shortwave listener you'll find this book (American in origin) to be a very useful reference source for all types of receiver from classic tabletop types, to general coverage and speciality receivers. If you enjoyed reading **G3XFD**'s article on the Eddystone 750 on pages 26, 27 & 28 of this issue then then you'll find this book fascinating as it contains listings of numerous Eddystone models, as well as many other discerning manufacturer's products.

Shortwave Receivers Past & Present usually costs **£25.95 plus £1.50 P&P UK**, but this month you can buy yours for just **£23.35 inc.** postage (UK only, overseas oreders add £2.75). To order call **(01202) 659930** or post your order using the order form on **page 73** to: **Book Store, PW Publishing Ltd, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW**. Remember to include your payment (in Sterling, cash not accepted), name, address and telephone number with your order.

Offer open until 9 July 2003 - Order your copy today!

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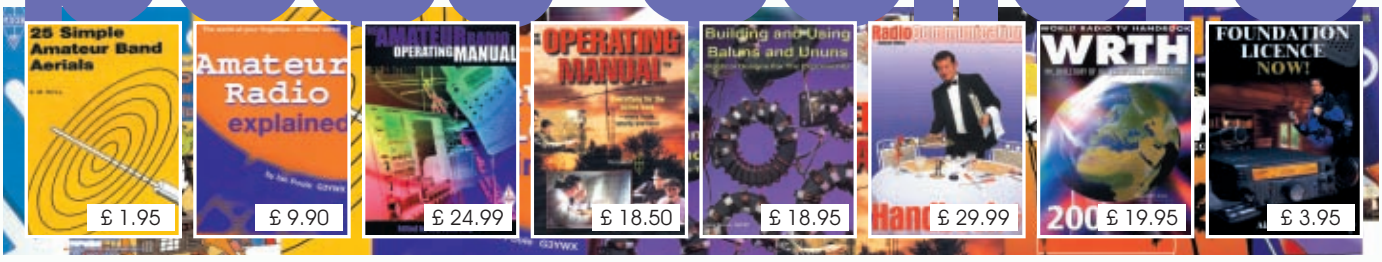

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topical talk — Simple Detector Receivers

The interest shown in simple detector receivers, particularly using home-brewed metal oxide rectifiers, certainly stirred up some memories for our Editor!

The readers' letters this month on the subject of simple detector receivers certainly got our Editor's memories flowing! He was particularly reminded of a very funny incident a few years ago when BBC Radio programmes seemed to be emanating from a large stack of drainpipes (No reflection on the BBC's programme quality though).

A newspaper report told the story of a building site not far from the BBC's Brookman's Park transmitter site north of London. A mobile crane was in use and had been left - during the lunch hour - with its hook swinging gently in the wind. Every now and again the hook touched the end of the stack of metal pipes...with the effect that the whole building site was entertained to the sound of the Conservative politician Anne Widdecombe being interviewed on the World At one!

What was happening of course - so Rob reminded everyone - was that the crane's steel cable was acting as the antenna (the crane was mounted on a large lorry with rubber tyres) and the hook when it touched the pipes became a crude point contact rectifier, basically forming a similar circuit to that shown in **Figs. 1** & **2** (from Radio Basics January 1998). Depending on the state of the hook and the pipes it could have been a metal oxide rectifier, aided by any rust which was present.

The newspaper reported that the only complaint from the builders on site was that they couldn't tune the crane and pipes to BBC Radio 1. And knowing just how loud building site workers prefer their radio volume to be...perhaps it was fortunate they couldn't get Radio 1!

Many Stories

The Editor continued his stories and it became obvious to the *PW* team that if there's any possiblity of a radio signal being rectified and made audible...it's taken place! Reports of electric cookers providing BBC Radio 4 in and around Droitwich in Worcestershire (very close to where the famous Wychbold Farm 198kHz transmitter, next to the M5, is situated) are legion.

However, coming down the scale in size of receivers, there are of course many true stories associated with Prisoners of War in Germany listening to news from home using simple receivers. Occasionally the receivers used smuggled valves and were very sensitive...but there are documented reports of metal oxide rectifier 'Crystal sets' receiving the BBC - and other Allied broadcasts - on short waves.

A great deal of fun can be had reproducing simple rectifier receivers - using everything from rusty razor blades, coal, coke, lead sulphide (Galena) and other semi-conductive material. But of course...the biggest difficulty was always getting hold of suitable sensitive headphones. With modern i.c. amplifiers you can manage without them....but many constructors would like to have a go at making the 'real thing'.

So, the *PW* team are left wondering...have any readers successfully 'scratch built' sensitive high impedance headphones themselves? If you have...how about sharing the idea? *PW*

Fig. 1.

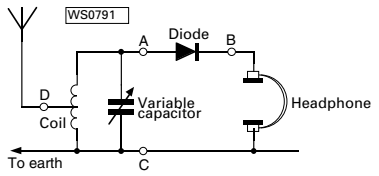
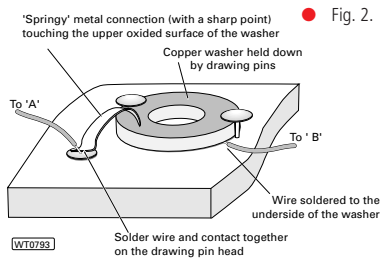


Fig. 2.



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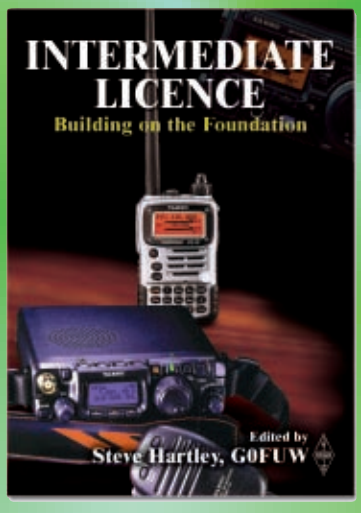

INTERMEDIATE LICENCE

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With the introduction of the new Intermediate Licence Syllabus the RSGB is pleased to present our new companion book for those working to pass the exam. *Intermediate Licence - Building on the Foundation* draws heavily on the decade of success enjoyed by the Novice Licence scheme and in particular the *Novice Student's Notebook* by John Case, GW4HWR. However, this is more than a new edition with it adopting the easy to read and understand style of the hugely popular *Foundation Licence - Now,* that many readers will be familiar with. The book is broken down into manageable half-hour worksheets and contains practical exercises along with plenty of helpful advice and safety tips. This is the course workbook for the Intermediate Licence, and as such contains all the information covered during the 20 hours recommended for the course. This is the ideal book for every Intermediate Licence student.

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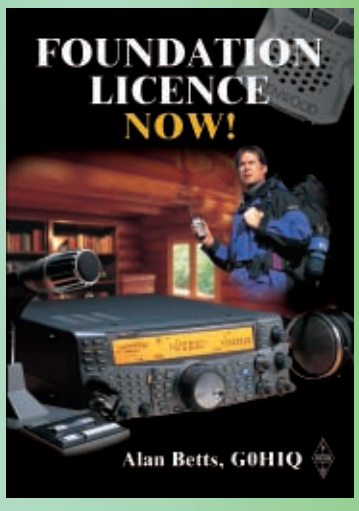

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For those wanting to know more about the new Foundation Licence the RSGB has produced *'Foundation Licence - Now!'*. The book contains all that is required to obtain this first step into Amateur Radio. Not only covering the basic course the book also provides a useful insight into the technical basics, receivers, transmitters and antennas. Attention is also paid to good operating, licence conditions, safety and EMC. Written in an easy to use and understand style this is the ideal book for young and old alike.

In addition to the book the RSGB are also providing, free of charge, an information and materials pack including the New Foundation Licence application form and many other items such as current Band Plans etc., making this a very useful addition for every Radio Amateur beginner.

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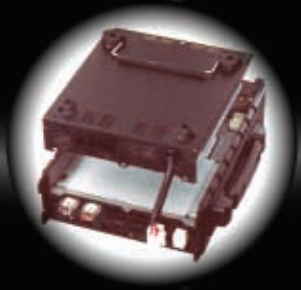

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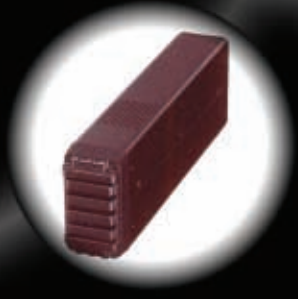

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