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LOWE ELECTRONICS

OPEN DAY MATLOCK 10am SATURDAY SEPTEMBER 4TH

Stalls from Icom, Kenwood & Yaesu as well as the spacious Lowe showroom.

ICOM IC-7800 NEW £6400 C

HF + 50MHz 200W Transceiver
Latest 'top-of-the-range' transceiver from Icom. 200W output power, built-in ATU and power supply. Two completely independent receivers, four 32-bit floating point DSP units, flexible DSP filter capability. Massive 7in wide (800x400 pixel) colour TFT LCD. Multi-function spectrum scope.

IC-7800-PACK £6995
Includes Rig + 17" monitor, keyboard & SM-20 Mic

ICOM IC-756 PRO II £1899 C

Pride 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 £1299 C

HF/VHF 100W transceiver. Features large LCD with spectrum scope, auto ATU and same DSP system as IC-756PRO II.
Comes with *FREE* SP-21 Speaker & SM-20 Desk mic worth £219.

ICOM IC-706 IIG DSP £769 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-703 SPECIAL OFFER £589 C

START HERE!

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)

***FREE!* Icom 703 Logbook - while stocks last**

ICOM IC-718 £449 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.

BUDGET BARGAIN

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 £1099

KENWOOD TS-2000 £1599 C

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

TS-2000X + 23CMS £1899

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.

RELIABLE & EASY

YAESU FT-1000 MKV £2349 C

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

YAESU FT-1000 FIELD £1749 C

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

YAESU FT-897D NEW £899 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.

Now with TXCO fitted.

YAESU FT-857D NEW £729 C

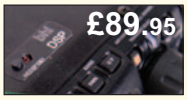
HF/50/144/430MHz Mobile Transceiver HF/6m 100W, 2m 50W, 70cm 20W. (13.8V DC) Developed on the FT-897 and FT-817 transceivers. Built-in features 32 colour display, spectrum scope, AM airband receive, built-in memory keyer, detachable front panel, DSP unit fitted.

YAESU FT-847 £1199 C

Covering 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 seperate antenna sockets.

YAESU FT-817ND £499 C

bhi DSP Module now available!



160m - 70cms. Up to 5W output all modes. ***Now with Ni-MH battery, charger & DC lead.*** **£589 with DSP ready fitted.**

NEW DSP Module
bhi have produced a lovely 4-stage DSP module that can be fitted inside the FT-817. The module costs £89 (plus a fitting charge of £25 for retro-fitting to existing models). This includes installing a mini switch and LED on top cover.

NEW FT-817 Clip on metal front support stand.
In stock now £14.95 +£1 P&P

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PRICE MATCH

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

How we saved Bill £148 on his FT-847 even at the discount price of £1199!

Bill wanted to purchase an FT-847 at the discount price of **£1199** from Waters & Stanton. He was going to pay on his credit card which would have cost him **1.583%** per month. **Doesn't sound much does it?** However, paying back at £100 per month would have taken him 14 months and cost him a massive **£148 in interest.** We signed him up for **Buy Now Pay Later.** He got his radio **but paid nothing for twelve months.** Instead he deposited £100 per month into a savings account, earnt some interest and used the accumulated savings to pay for the radio at the end of the twelve months. He saved himself **£148** and was even left with some cash over for a meal!

Similar terms available on all sales over £200 @ Waters & Stanton

Includes FREE Life Insurance Cover in 12 month period.

YAESU FT-7800 NEW £239 C

Yaesu's Powerful low cost answer!

* 2m/70cms Dual Band Mobile
* High power 50W 2m /40W 70cms
* Wide receive inc. civil & military airband
* CTCSS & DCS with direct keypad mic.
* Detachable front panel
* 1000 memories plus five one-touch

YAESU FT-8900R NEW £339 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 £159 C

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

ICOM IC-2200H NEW £199 B

The IC-2200H is the latest version of this popular high power 2m mobile rig. It has 207 memories inc 1 call channel & 6 scan edge memory channels.

*144 - 146MHz FM *65/25/10/5W RF o/p *CTCSS & DTCS *Green/amber display *Audio: 2.4W o/p *Tx 15A (65W) *Rx 1A (max audio) *Standby 0.8A *Power 13.8V DC *Size: 140x40x146mm

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.

OTHER MODELS...

ICOM			
IC-2725E	Dual Band FM Transceiver	**£269**	C
IC-2100H	2m 55W FM Mobile	**£229**	C
YAESU			
FT-8800E	2m/70cm Mobile	**£289**	C
KENWOOD			
TM-G707E	2m/70cm Mobile	**£289**	C
TM-V7E	2m/70cm Mobile	**£359**	C

YAESU VX-110 £119 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 case, large speaker and illuminated keypad.

ICOM IC-E90 £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 £249 B

WITH EXTRA WIDE RX COVERAGE

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

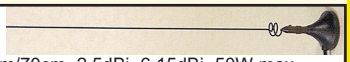
Up to 6W out with Li-ion battery and "scanner" style coverage from 100kHz to 1300MHz including SSB on receive! This is a great radio to have at all times when you are on your travels.

OTHER MODELS...

ICOM			
IC-E208	Dual Band FM Mobile	**£279**	B
YAESU			
VX-7R	6m/2m/70cm Handheld	**£299**	B
VX-2E	Dual Band FM Handheld	**£169**	B
KENWOOD			
TH-G71E	2m/70cm Handheld	**£199**	B

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-285	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/70cm 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	2m/70cm On glass 3.7m coax 50W	**£29.95**	B

MOBILE BASES

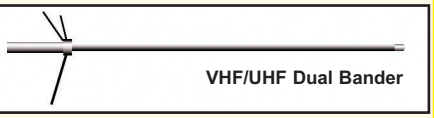
WATSON

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-50	2m/70cm colinear 6/8dB 2.5m	**£54.95**	C
X-50N	2m/70cm colinear 6.5/9dB 3.1m	**£59.95**	C
V-2000	6m/2m/70cm 2.15/6.2/8.4dB 2.5m	**£89.95**	C

CHECK OUR WEBSITE FOR FULL DIAMOND RANGE

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 W-25XM PSU NEW £99.95 B

A compact sized switch mode power supply that will run your base HF station with ease.

*Output Voltage 10 - 18V DC *Output Current 22A / 25A peak *Over current protected *Rubber Feet *Supply 230V / 115V AC 50/60Hz *Switchable dual voltage input *Size 220 x 180 x 73mm *Weight 1.8kg

WATSON W-25SM PSU £79.95 B

Very popular budget switch mode power supply. *Output voltage 13.8V DC *Output current of 22A (25A peak) *Front panel output terminals *Over current & voltage protection *Quiet operation

WATSON W-25AM PSU £89.95 C

DC power supply for the shack & esp. for use with 100W transceivers. Separate voltage and current meters. *Output voltage 0-15V DC *Output current of 25A (30A peak). *3 sets of output terminals *10A cigar socket. *Over current protection

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 Mobiles

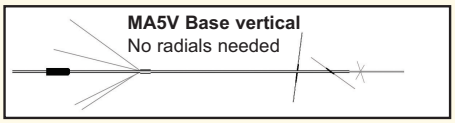
Get top performance when on the move. Purchase the **MO-3 base** (137cm) for **£24.95** or the **MO-4 base** (68cm) for **£22.95**. Then add the resonator of your choice. **RM-10, RM-12, RM-15**, all **£19.95** ea. **RM-17, RM-20 £24.95** ea. **RM-40 £26.95, RM-80 £29.95**

Resonator

Base section
MO-3 or MO-4

CUSHCRAFT BASE ANTENNAS

MA6V	20-17-15-12-10-6m 250W PEP	**£269.95**	C
MA5V	20-17-14-12-10m 250W PEP	**£239.95**	C



R8	40-30-20-17-15-12-10-6m 1.5kW	**£469.95**	C
R6000	20-17-15-12-10-6m 1.5kW PEP	**£329.95**	C

BUTTERNUT BASE ANTENNAS

HF9V-X	80-6m 7.9m 1kW PEP	**£349.95**	C
HF6V-X	80-40-30-20-15-10m 7.9m 2kW	**£299.95**	C
HF2V	80-40m 9.75m (160m opt) 1kW	**£229.95**	C

HY-GAIN BASE ANTENNAS

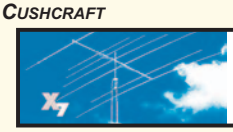
AV-640	40-6m 1.5kW, 300W 6m (PEP)	**£369.95**	C
AV-620	20-6m 1.5kW, 500W 6m (PEP)	**£279.95**	C
AV-14AVQ	40-20-15-10m 1.5kW PEP	**£169.95**	C
AV-12AVQ	20-15-10m 1.5kW PEP	**£139.95**	C
DX-88	80-10m 1.5kW, 250W 30m	**£369.95**	C

HARI High quality German traps. (Pairs)
200W 20m £44.95 40m £49.95 80m £53.95
1kW 20m £59.95 40m £64.95 80m £73.95

HARI High quality German Baluns SO-239
200W 1:1, 4:1 or 6:1 £25.95 ea.
1kw 1:1 £34.95 4:1 or 6:1 £41.95 ea

HORIZONTAL BEAMS & DIPOLES

CUSHCRAFT



Premier HF beam used around the world by serious DX'ers.

X-7	20/15/10m 7 el. Yagi 2kW	**£669.95**	D

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	**£369.95**	C
A4-S	10-15 & 20m 4 el. Yagi 2kW	**£569.95**	D
A3-WS	12 & 17m 3 el. Yagi 2kW	**£379.95**	D
D-3	10-15-20m dipole element 2kW	**£249.95**	C

Don't want a wire antenna but can't fit a Yagi, then consider a rotatable dipole.

D-3W	12-17-30m dipole element 2kW	**£249.95**	C
D-4	10-40m dipole element 2kW	**£349.95**	C
D-40	40m dipole element 2kW	**£319.95**	C
TEN-3	10m 3 el. Yagi 2kW	**£229.95**	C
ASL-2010	13.5-32MHz 8 el. log periodic	**£749.95**	C

RADIO WORKS

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

CW-160	160-10m 76.8m long	**£129.95**	C
CWS-160	160-10m 40.5m long	**£119.95**	C
CW-80	80-10m 40.5m long	**£89.95**	C
CWS-80	80-10m 20.1m long	**£109.95**	C
CW-40	40-10m 20.1m long	**£84.95**	C
CW-20	20-10m 10.36m long	**£89.95**	C
CW-620	20-6m 9.7m (32ft) long	**£89.95**	C
G5RV PLUS	80-10m with balun 31m (102ft) long	**£59.95**	B

YUPITERU MVT-3300 SCANNER £129 B

The MVT-3300EU covers most of the useful bands in the VHF and UHF spectrum. It has 200 memories as standard with a range of band and security channels as well. It has functions normally associated with more expensive sets such as pre-setting the receiving mode and frequency step, Duplex reception with "One Touch" function, Auto-Write and Search-Pass memory functions. There is also a Decipherment function to receive certain scrambled communications.

WATSON FC-130 Freq. 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.

WATSON BASE ANTENNAS

Unbeatable Value!

Model	Freq	L(m)	dB	Price
W-30	2/70	1.15	3/6	39.95 B
W-50	2/70	1.8	4.5/7.2	£49.95 C
W-300	2/70	3.1	6.5/9	£64.95 C
W-2000	6/2/70	2.5	2/6/8.4	£69.95 C

These antennas are solidly made of fibreglass, die-cast alloy and stainless steel. Guaranteed lowest prices in the UK.

Totally weatherproof
Pre-tuned & Unbeatable

MFJ-971 QRP Portable ATU £99.95 C

*1.8 - 30MHz *300W/30W/6W selectable *Cross needle meter *12V DC Ext. *SO-239 sockets *Tunes wire, coax, balanced line *Terminals & earth post *Size 160 x 150 x 60mm *Weight 870g

The MFJ-971 is the ideal QRP ATU to have on hand. It incorporates a cross needle SWR meter and displays forward or reflected power and SWR simultaneously.

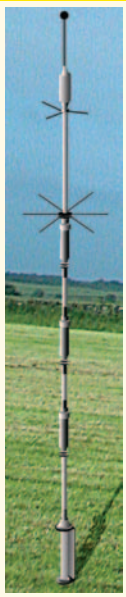
HUSTLER ZERO SPACE DX ANTENNAS

No Space Needed!

"Ground Level Wonder"

Run full legal power - 80m to 10m
No masts or guys.
Low VSWR 50 Ohm feed.

These HF verticals will take **1kW of power**, work at **ground level**, and are **self-supporting.** A single earth rod will get you going. Add buried radials for even better results. These are **rugged, well-built** antennas that American hams have been using for years. Now they are available in the UK from our three stores.



4BTV
40-20-15-10m. 6.52m high. **£149.95 C**

5BTV
80-40-20-15-10m. 7.64m high. **£179.95 C**

6BTV
80-40-30-20-15-10m. 7.3m. **£209.95 C**

NOTE: 80m coverage limited to 100kHz on 5BTV & 6BTV

YAESU VR-120D £119 B

The VR-120D handheld scanning receiver covers from 100kHz to 1300MHz. AM/FM/WFM modes (inc. preprogrammed broadcast freqs). The VR-120D's small size and tough polycarbonate case allows you to take it anywhere -hiking, skiing or while walking around town. Power is provided by 2 x AA batteries (not supplied). Ni-Cad batteries and charger are available as options.

RIGBLASTER-PLUS

The Adventure Begins!

~~Was £139.95!~~
£119.95
Order as RB/PL/C

New Low Price!! Explore all the new digital modes. All leads provided for computer and radio. Just connect between PC and transceiver. Plugs into 8-pin and RJ-45 radios. Internal jumpers to match your radio. Software on supplied disc for CW, RTTY, PSK-31, SSTV, Packet, AMTOR, DVkeyer, WSJT, Mic EQ, Rig CTL, EchoLink etc. Requires 12V DC

NOMIC Similar to above but no 8-pin front panel socket and no CW keyer function. Self-powered. **£59.95**
Code: RB/NO/CU for 8-pin rigs and for RJ-45 rigs

HEIL QUALITY MICROPHONES

Desk Microphones

HCL-5/4	Classic retro-look HC-5/4 desk mic	**£199.95**	B

Hand Microphones

GM-4/5	Goldline HC-4/HC-5 hand mic	**£109.95**	B

Headsets & Boom microphones

HST-YM	Traveler single side headset for FT-817	**£79.95**	B
HST-706	Traveler single side headset for IC-706	**£79.95**	B

Headphones & Boom Microphones

PRO-SET-PLUS	Large H/phones with HC-4 & HC-5	**£155.95**	B
PSQP-HC4/HC5	Large H/phones with Quiet Phone	**£189.95**	B
PSQP-IC	Large H/phones with Quiet Phone	**£199.95**	B

EVEN MORE DISCOUNT!

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V-1000 BATTERY CHARGER

*Charge 4 Ni-Cad in 60 mins
*Charge 4 Ni-MH in 2 hours

Uses 230V Mains or Car 12V

Includes AC lead & Cigar Lead

£10.95 A

HORA C-150 2M HANDHELD

£79.95 B

An amazing price for a 2m Handheld!
2W output on AA cells and 5W output on external 13.8V. 1750Hz tone, 20 memories, keypad control, 5 steps inc 12.5kHz, dial illumination receive 130 - 170MHz. You won't find a better deal! Includes flexi antenna, belt clip and instruction manual. (AA cells not included)

DMTR-21 TORCH/RADIO SPECIAL OFFER

BUY ONE GET ONE FREE!! ONLY £10
Carriage £2
HOCKLEY ONLY

Watson Wind-up/Solar Torch & AM/FM Receiver

*Torch/Flashlight/Siren
*AM 530 -1600kHz
*FM 88 - 108.1MHz
*Ferrite Bar Antenna AM
*Built-in FM Antenna
*Solar Power Panel
*Hand Crank Dynamo
*Spare bulb
*Fitted Ni-Cad Battery
* 3 xAA battery chamber

CHECK OUR 2004 PRODUCT GUIDE FOR MORE DETAILS OF THESE PRODUCTS

New RSGB Publications

RSGB Yearbook 2005

UK & Ireland Call Book
Edited by Steve White, G3ZVW

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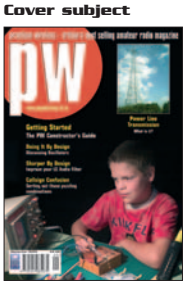

Jack Ward is a budding M3 licensee who is enjoying discovering the joys of radio and construction. It's for Jack and others like him (young and old) the *PW* Constructors Guide is aimed at in this issue. There's nothing like passing on hints and tips so, if you can help a future Amateur - don't hesitate.
Design: Steve Hunt
Main Photograph: Tex Swann G1TEX/M3NGS
Inset Photograph: Rob Mannion G3XFD

September features

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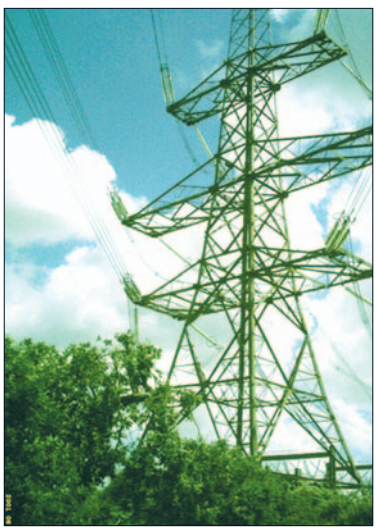

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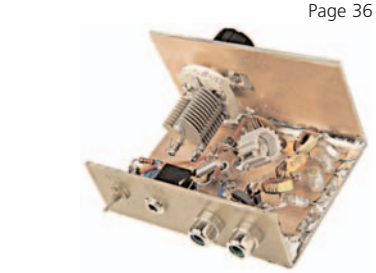

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September regulars

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

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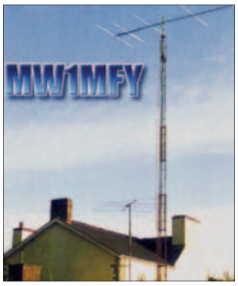

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ANOTHER PACKED ISSUE

rob mannion's keylines

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

Here in the United Kingdom we seem to have scant regard for the preservation of historic scientific technology. I say this because July 2004 saw the demolition of a number of the truly historic very low frequency (v.l.f.) masts at British Telecom International's (BTI) transmitter site at Rugby, right on the borders of Warwickshire and Northamptonshire.

The world famous landmark transmitting station, which still transmits and provides important services has the main A5 road running through part of the site and it's also highly visible from the M1 and M45 motorways. This, according to the information (and dis-information!) provided on a website was the main reason for the demolition being done at night. However, even though BTI and their contractors wanted to avoid attracting too many bystanders and 'rubber necking' motorway drivers - they weren't able to avoid some enthusiastic visitors.

Unfortunately, memories of the 'staggered', unsuccessful demolition of the former Criggion transmitter (towers refusing to fall when required!) came to mind when some of the carefully placed explosives at the Rugby site didn't detonate. It turned out later that the local rabbits had nibbled their way through the explosive detonator cord at several points!

Personally, I think that there might be a message for BTI's management in the recent difficulties at Rugby. The message may be - "Don't destroy all our historical technology sites". Of course, I'm not suggesting sabotage was used, employing remote (infra-red of course, as ordinary radio would not be that reliable) controlled 'cony-cutter' nibbling devices disguised as rabbits! Instead, I'm saying that by choosing the cover of night-time they actually attracted more attention to their activities, which also caused problems that might have been avoided in daylight.

Fig. 1: Preserved and admired - the historic No. 1 microwave tracking antenna at Goonhilly in Cornwall, featred in the painting by Philip Fooks, courtesy of G4JCP (see text).

Fortunately, commonsense has prevailed with the preservation of historic No. 1 microwave antenna, used for pioneering trans-Atlantic television links at BTI's Goonhilly, Cornish site **Fig. 1**. Despite this wise decision, the fact that the Rugby v.l.f. time signal transmitter service is to be eventually carried on from another site - the future of the remaining masts and buildings is in doubt.

Other people obviously have the same affection for sites of historic technical interest, and I was delighted to learn recently that the original, pioneering, RDF (later to be entitled RADAR) transmitter hall at Bawdsey in Suffolk are in line for possible preservation.

'Possible preservation' comes into play because the Bawdsey Manor radar site (situated on the east coast of England) has been entered into a competitive BBC2 television programme called *Restoration*. Here, in the series hosted by **Griff Rhys Jones**, viewers can choose their favourite project from those featured and 'vote' (by dialling a premium rate telephone number - with a proportion of the premium being donated to the eventual winner of the 'contest').

The BBC series was successful last year and I hope that the Bawdsey site stands some chance of winning. Against its success' is the fact that historic radar transmitters aren't to everybody's interest. But at least it's a start and I'm pleased indeed that some effort is being made to preserve such a valuable part of our scientific heritage in which many Radio Amateurs played a part.

However, other radio-related sites are in danger of extinction! Some years ago the pioneering BBC Daventry h.f. transmitter site, itself very close to the Rugby station, disappeared into oblivion. And now it seems as though the - now commercially owned (by VT Merlin) Wooferton transmitter's future may have a questionable future.

Our industrial heritage is often preserved by keen 'amateurs' like ourselves. Canals, windmills, even old coal mines - and yes, of course...I mustn't forget my own favourite - railways! All have their supporters. So, let's hope that the debt we owe sites such as Rugby, Woofferton, etc., won't be forgotten and that they're not forgotten and demolished. They deserve better in my opinion.

Buying Your *PW*

As follow-up to my Keylines last month where I highlighted the problems both regular and 'casual' readers will soon be encountering when fewer WH Smith shops will be stocking specialist titles - I'm pleased to say we've had much support. In fact, readers have been wholeheartedly supporting our drive to spotlight the problems specialised publications such as *PW* are now suffering from.

So, thank you to everyone who has written, E-mailed and telephoned to pledge their support. Keen types in Essex - led by members of the **Chelmsford Club** - have even been canvassing their local supermarkets! Of course, I'm determined *PW* readers won't lose out - but other special - interest magazines are also effected. Without them our lifestyle wouldn't be the same because I consider a 'good read' is essential...whatever the subject.

We'll be announcing ideas and special offers in the near future. But in the meantime, I can confirm I have written an 'Open Letter' to the large supermarket chains (copies available if required) in an attempt to convince them that they must surely be able to find room to stock specialist publications on their magazine stands. After all, who goes into a supermarket and leaves with only one purchase? I know I certainly don't!

Rob G3XFD

practical wireless services

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

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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. See page 72 for details.

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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

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

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

The Pulling Power of *PW*!

● **Dear Sir**

I'm writing to let you know about the effective 'pulling power' of *PW*. On page 13 of the June 2004 *PW* you published a cry for help from **Ranjit Fernando 4S6RZ** in Sri Lanka. He was seeking help to restore an old CR100 receiver.

During my 56 years in the hobby, I have owned two of these well known wartime Marconi receivers and I still have the second one. Many years ago I stripped it down to the bare chassis and rebuilt it with more modern B7G base valves in the r.f. stages, lots of new Cs and Rs, new wiring and other improvements. With its two r.f. amplifier stages and variable i.f. pass-band facility, I am still amazed by its good sensitivity and selectivity. Some farsighted assembly line worker saw fit to pencil the date on the chassis - 14 July 1944 - so it is now 60 years old!

Over the years I have assembled a whole lot of information about the CR100 so I was able to send Ranjit an A4 envelope of photocopied material. A few days later I was delighted to receive a 'phone call from him making his most effusive thanks for my help. This was closely followed by a wonderful picture postcard of Sri Lanka elephants and dancers in beautiful, colourful festive procession. Then later still, I received a long and informative letter in which Ranjit tells me more of his personal and Amateur Radio background.

The CR100 in question belonged to his father-in-law **VS7BE**, later **4S7BE**, but now a Silent Key who was attached to the Royal Navy during the Second World War. The CR100 was presented to him on his retirement and now it has found its way to Ranjit. He goes on to tell me that other *PW* readers sent him E-mails and one even sent him the whole service manual!

We 'War surplus wrinklies' of bygone years may perhaps sometimes deplore the way Amateur Radio has gone when we recall the innovative and experimental attitudes we showed in the past, but here in Ranjit we have something of the old spirit showing through. Not only that, the idea of help freely given is clearly illustrated by the response Ranjit has received to his plea. Furthermore, due credit must be given to *PW*, which, through the friendliness of its pages, continues to propagate the traditional Amateur Radio spirit of showing help to others. I end as I begin, by confirming the 'pulling power' of *PW* is still very healthy.

John Hoban G3EGC
Bolton
Lancashire

Editor's comments: The response to Ranjit's plea for help was excellent - I felt very proud of *PW* readers and how they reacted. Ranjit and I eventually exchanged many E-mails and I've got to know him very well. I'm particular interested in the Sri Lankan Railways, and his knowledge has helped me very much and it seems he now has many friends via *PW*. This result makes our work here in the office feel very satisfying and worthwhile. Thanks for your help readers...you added the 'special' ingredient.

Obituary - Sir Douglas Hall Bt.

● **Dear Sir**

I was unable to find any mention in recent editions of *PW* of the death of **Sir Douglas Hall Bt** (Baronet) who died on 8 April 2004. Did I miss what must have been a most interesting article?

Sir Douglas was an exceptional man for besides having a successful career in the Colonial Administrative Service from 1930 to 1951, he took the opportunity in his busy retirement from the Colonial Service to revive his interest in Amateur Radio. A website entitled 'The Ingenious Circuits' of Sir Douglas Hall is well worth a visit.

More than a hundred articles by him were published in *Radio Constructor* and *Radio Bygones* between 1964 and 1999 - were there any in *PW*? The world of Amateur Radio has lost a real enthusiast.

Leonard Davies G0RDV
Kettering
Northants

Editor's comment: Thank you for your letter Leonard. I too read the comprehensive (and truly fascinating) Obituary to Sir Douglas Hall which was published in the *Daily Telegraph*. I wrote a 'follow up' letter to the *DT* emphasising that Sir Douglas was often considered to be 'the expert' in getting the maximum out of a minimum number of components and stages in a receiver. As far as I'm aware Sir Douglas never published anything in *PW* (I've checked through the archives - but if you know better readers - please let us know) but he did write for our sister publication *Short Wave Magazine*. My own memories of this innovative gentleman (I was always fascinated by the titles and honours nomenclature attached to his articles in the *Radio Constructor*!) are due to the apparent simplicity of his projects. It was only when the constructor built them and tried to analyse what was going on within the circuit that you could appreciate that Sir Douglas had literally 'squeezed' the last drop of r.f. and a.f. gain possible from the design. Obviously, due to copyright conditions on the obituary in the *DT* and the fact he doesn't appear to have written for *PW* - I didn't think it was appropriate to re-publish the obituary in the magazine. However, we would certainly be interested in publishing an article on him and his work. One source has compared his ingenuity (but without the flair and desire for self-publicity) with that of the designer Scott-Taggart from the early days of *PW*. No callsign or mention of an Amateur Radio Licence was mentioned in any of the obituaries published, but if readers can help provide information we would be most interested in featuring the life of this remarkable designer. G3XFD.

Gobbledygook To This M3!

● **Dear Sir**

I am writing to you after reading what seems like a load of gobbledygook read in *PW* on a Sunday afternoon, relaxing after a session of obeying a well obeyed instinct from the hunter-gatherers' world of food. Let me explain...

The idea of 'Building it by design', or the notion of Do/Destroy It Yourself is fascinating, except I am an M3, who is only just grasping the idea of electrical theory, trying to read and understand the ethics of physics, such as those explained by **Tony Nailer**

G4CFY in July's edition of *PW* (this is only one example). What I am trying to point out here is that there are at least 3000 M3 licenses expected to be in season this year, granted happily by the RLC. (There are major opinions about this, but that's another story). And, with there being many young M3s with itchy fingers, so much of your magazine is alien, especially to people like myself when they haven't got a clue about 'C = 1(39.5 x f2 L). When I studied with the Yeovil Club of Somerset, I only knew the basics, such as V=IR.

Granted, you should read the magazine from 'Step 1', but the M3s and perhaps many others have only just been flung into the radio world and may have only heard of *PW*, let alone buy it. This can be a major problem for those willing to prod the world with a new skill, courtesy of many clubs formed by kind and the usually very old and wise, for this very purpose of education. (At this point, I wish to say a very big thank you very much on behalf of M3s everywhere, to those who have endeavoured at the radio clubs of Great Britain and beyond to brings us into the new world of radio communications).

In basic terms, please can *PW* find a new section in the magazine for quick experiments allowed by M3 Licence small print, and introductions to the higher mathematics and science? It would prevent the many urges of skipping major paragraphs that would be important when looking to build a new antenna or the like, which would then turn written essays and lectures into ideal, simple and easy to understand steps into this new found science.

I hope that this letter has brought the attention of such problems and perhaps answers for M3s everywhere. Thank you very much for taking the time for reading and perhaps publishing this letter.

Edward Summers M3GVZ
Reading
Berkshire

Editor's comment: Thank you for your letter and comments Edward. You've highlighted a problem of 'Editorial Balance' and content, which I've never been able to overcome and it's a problem has recently increased in severity. This is because, even though we aim to cater for as many levels of understanding as possible, nowadays there are readers who, although they're joining us literally fizzing with enthusiasm, sometimes come into the hobby with only the barest perception of the technology involved. The Radio Basics column was originally aimed at those with little 'practical' experience, as keen beginners or for those who had come through the (truly excellent) organised, stage-by-stage Novice training scheme. Unfortunately however, my column is now having to cater for a much different level of understanding. I must also strongly defend the recently introduced (and very much appreciated by readers I'm delighted to report) Doing It By Design series by Tony Nailer G4CFY, which is aimed at those who want more advanced reading, backed up by high standard practical projects. It shows much promise and I feel it fills a very important need in *PW*.

However, to fully answer the criticism levelled by Edward, I ask readers to please join me in this month's Topical Talk, on page 77, for further discussion on this topic. I hope to give him and others in the same situation - advice and encouragement.

Valves For Readers!

● **Dear Sir**
Following our discussions about future projects using the EF50 valves, and realising that some constructors may not have access to the valve or the special bases - I've been searching through my shack. Fortunately, I confirm that I have: 22 EF50 (CV1091) valves, bases and retainers and 12 B9G ceramic bases. These include:

EF50 valve and bases/retainers £3.50 each
EF50 valve only £2.50 each
B9G ceramic valve base £1.00 each P&P £1.20

At your suggestion, I include my telephone number only as a possible supplier **(01205) 351790**. Thank you for your offer to send me an April 2004 *PW* due to WH Smith taking them off the shelf here in Boston.

Alec Smith G0KQD
Boston
Lincolnshire

Editor's reply: Thank you Alec - I'm sure readers will find your offer helpful. Incidentally, even though he wanted to give them away - I thought it only fair that he should not be out of pocket disposing of these relatively rare (especially the bases) valves. I'm also hoping it will help Alec's experiments with battery-powered bicycles (He's promised us a photograph showing his /P operation using his bike!), which seem to be an interest of Amateurs in Boston. Another graphic example of how technically versatile Amateurs are. It's also appropriate to mention that as many WH Smith outlets will soon cease to sell specialist magazines - that single copies of *PW* can be ordered (post free) from the *PW* Book Store (see Keylines, page 9).

Lisney's Lisle Street Pleasures!

● **Dear Sir**
Oh those halcyon days of yore,
seeking the very early pleasures
by going down to Lisle Street and buying up its treasures.
For those of you that find my meaning less than clear,
I'm speaking of the wireless ....not the ladies who welcomed you with 'morning dear'!
I was only sixteen and had little experience in store,
and was never really sure why there were
ladies in every little street door!
In any case at that time my budget was very small,
running only to wireless and not
much else at all!

In fact I was more interested in components, because anything like a complete receiver was out of my budget. I did find a box of transformers, marked 'mod transformer' at 1/6d (7.5p) each, brand new STC and a very workman-like a job. I bought one for testing and the following week went back to buy all of the remaining stock of seven! Later, I found a box of transformers cut out from the American v.h.f. transmitter, very popular component, 6d each so I bought seven of them for stock. Of course, by the time I wanted one for my 'Top Band' transmitter, I had parted with them and had to scrounge a return of one.

The VCR97 c.r.t. featuring in *PW* recently was of course the basis of a number of home-brewed television sets, including the Premier Kit. At that time the VCR517 were more readily available and was a plug-in replacement. It gave a lemon coloured picture, rather than a green one. Our tubes came from an indicator unit and were a cheap source of components together with nuts and bolts. Any unit costing about 7/6d (35.5p) was usually a good source of components.

I used to do a tour to Leicester Square, Lisle Street

and then to Edgware Road to G W Smith and Henry's, from there I used to walk to Cricklewood and pop in to see my Gran and according to my mood, walk home to Burnt Oak. I even walked home from Kings Cross carrying a heavy Admiralty transformers when going home on leave from the Army!

I can remember, to their credit, the good practice of Smith and Henry's. At Smiths the members of staff who would often take time to advise customers in the selection of the right component for their job. Henry's frequently would offer fare money if a purchase proved faulty - what chance of that now?

Dennis Lisney G3MNO
Harrow, Middlesex

Editor's reply:
It seems a good idea this time,
to give my comments in rhyme.
This is because the Lisney words evoke,
the time I carried a heavy choke!
And we'll remember together all that surplus,
which inevitably travelled home with us!

Coils & Windmills

● **Dear Sir**
One or two comments in *PW* recently suggest that people have trouble making plug-in coils, so I'm writing this to remind constructors of an ingenious solution which I think originated with **G3WPO.** Something like 20 years ago I made the G3WPO dipper up, using a kit that appeared after an article in *RadCom*.

The plug-in coils were based on 3-pin DIN plugs. The base of the plug was removed and glued into narrow plastic tube available at d.i.y. outlets - I have also seen them in boxes of fireworks for launching rockets!

The lower frequency v.h.f. coil was airwound and soldered to the base without a former, other than a short collar to provide a suitable grip when changing coils. The higher frequency v.h.f. coil was made in a 'hairpin' style with a similar collar. My coils have lasted well and the unit is in use today - great for initial setting up of an antenna! I can't help with which issue of *RadCom* the design appeared in, though I believe there are archive CDs available now so it could be found. Anyway, it was an elegant and easy solution, which constructors could well adopt for their projects.

Incidentally, the photograph of the old mill at Gelligroes in the July *PW* article (Arthur Moore - The Forgotten Spark by **Leighton Smart GW0LBI**, pages 38 and 39) brought back lots of happy memories for me. In the 1950s I had relatives living just up the road and used to holiday with them every summer.

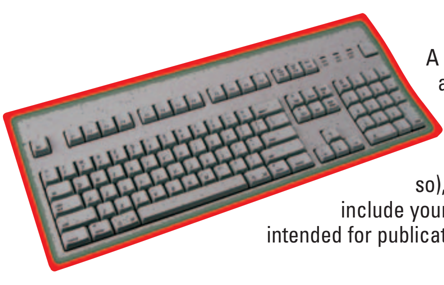
I first saw the mill some time around 1953, though as I remember it, it was not whitewashed at that time, but did run occasionally. The article solved one mystery for me. The first time I saw the mill a strange wire contraption stretched from the back of the mill over the field behind it, but it was gone the next year. I saw it with the uncomprehending eyes of a schoolboy, and my memories are clouded by the passage of time, but I would guess now that it was something like a Marconi antenna with a cage of several parallel elements.

It would be an appropriate tribute to a pioneer to have a working station at the mill, and a v.l.f. station with an antenna something like the one I remember would be even more appropriate! Good luck to the people working on this and I hope to go and see the mill again sometime. Best wishes to everyone.

Brian Carter G8ADD
Hall Green
Birmingham

● 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.

August 13
Cockenzie & Port Seton Amateur Radio Club's 11th Annual Radio Junk Night
Contact: Bob Glasgow GM4UYZ
Tel: (01875) 811723
E-mail: bob.glasgow@services.fujitsu.com
Takes place at the Cockenzie & Port Seton Community Centre, South Seton Park, Port Seton, East Lothian. Bring along your own 'junk' and sell it yourself! Tables will be provided on a first come, first served basis. A raffle will be held at approx 2100. Disabled access and refreshments available. Only £1 entrance fee. All money will be donated to the British Heart Foundation.

August 29
Torbay Amateur Radio Society's Communications Fair
Contact: Anna M3LMG
Tel: (01803) 812117
E-mail: rally@tars.org.uk
Held at Churston Ferrers Grammar School, Churston, Brixham, Devon. There will be a free car park and it's just £2 entrance fee.

August 30
Huntingdonshire Amateur Radio Rally
Contact: Peter Herbert M5ABN
Tel: (01480) 457347 (between 1800 and 2200)
E-mail: peterherbert@aol.com
To be held on the Annual Bank Holiday Monday at Ernulf Community School, St. Neots, Cambridgeshire (near Tesco superstore on A428). Doors open at 1000 and admission is £1.50. Hot and cold refreshments will be available. There will be a hall and car boot sale on hard standing and a Talk-in on S22.

September 12
The Vintage Valve Technology Fair
Tel: (01274) 824816
Website: www.myciunka.supanet.com/VVTF2003
To be held at the Haydock Park Racecourse, near Wigan, Merseyside WA12 0HQ, on the A49, five minutes from M6 junction 23 & A580. Why not clear your shed, shack, cellar or garage of those unwanted radios, gramophones, telephones, etc. Over 200 stalls available, everyone welcome! Public entry charge per person only £2! Car parking for up to 5000 cars free! See the above website for the latest information.

September 19
Lincoln Shortwave Club's Annual Hamfest
Contact: Baz Matthews
Tel: (01636) 612440
E-mail: m3dmv@btopenworld.com
Website: www.hamfest2004.secretbunker.org.uk
Takes place at the Showground, Newark, Nottinghamshire. Doors open 1000 and entrance is just £2 per person. There will be all the usual radio rally attractions, plus craft stalls, classic cars and a 'fly-in' from a Second World War Auster V reconnaissance plane. Lots to see and do for all the family.

September 26
Suffolk Data Group - SDG Radio & Computer Rally
Contact: Peter G8HUE
Tel: (01473) 631313
E-mail: Peter@sdgrally.org
To be held on the raceway centre green at the Foxhall Stadium, Foxhall Road, Ipswich, Suffolk. Traders and booters admission from 0800 where there will be plenty of boot pitches, pay on the day and only £5. Doors open 0930 and the entrance fee is just £1, accompanied under 14s go free. Large free car park adjoining the stadium. Hot refreshments available as is a Talk-in on S22. Everybody welcome.

September 26
South Wales Radio Group's Radio & Computer Rally
Contact: David Morris MW0DVM
Tel: (01443) 686281
To be held at the Bridgend Recreation Centre, Bridgend, South Wales. Doors open at 1000 and admission is £2. There will be a free car park, trade stands and a Bring & Buy, along with a licensed bar, catering and family attractions.

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.

Send all your news and club info to... Donna Vincent G7TZB at the PW editorial offices or e-mail donna@pwpublishing.ltd.uk

Diary Date

Mini Rally News

The rally season is in full swing but there's still plenty of forthcoming rallies for you to enjoy.

Worthing and District Amateur Radio Club are holding a mini rally at Newhaven Fort Museum, Newhaven, East Sussex, from 1030 to 1600 hours on Sunday 26 September. The main purpose of the rally is to raise funds for the Museum by selling excess equipment, which has been donated to the Club but is not suitable for display.

Tables, which will be under cover if the weather is inclement, are available at £10 for individuals or £15 for traders. The charge includes admission to the Fort with all its usual attractions including the display of vintage radio equipment and **GB2NFM**, which will be active on the h.f. bands for general contacts and on 145.550MHz for mobile talk-in. There will also be a Bring and Buy.

Admission to the Newhaven Fort Museum for those who are not taking a table is £5 but parking is free. The Museum provides a unique way to experience our defensive past for the whole family and is the best preserved and restored of Britain's coastal defences dating back to Napoleonic times. The military style canteen provides a wide range of modestly priced food and drink in an authentic atmosphere, so why not bring your family for a fun day out?

For more information or to book a table telephone **(01903) 753893**. If you want to find out more about the Worthing Club's activities and membership please contact:

Roy G4GPX
Tel: (01903) 753893
E-mail: roy.bannister@ntlworld.com
Website: www.wadarc.org.uk

Antenna Solutions

Phillystran Guying Cable

Nevada have just been appointed as UK distributors for Phlliystran guying cable.

Phillystran is an electrically transparent guy cable for towers and masts. It offers complete guy line isolation eliminating the need for insulators. It is constructed with a core of Kevlar fibres covered with a co-polymer jacket to provide excellent resistance to sun, weather and abrasion.

Since it was introduced in 1973 Phillystran has been installed on more than 1000 commercial broadcast towers in the USA. The manufacturers say it's very light but enormously strong and provides a maintenance free installation ideal for Amateur Radio towers or masts.

As the UK distributors Nevada will be able to supply a range of cable sizes with breaking strains of between 550 and 3000kg, as well as the fixing kits for the cable ends. For more information on the range visit the Nevada website at **www.nevada.co.uk**

Nevada
Unit 1
Fitzherbert Road
Farlington
Portsmouth
PO6 1TT
Tel: 0239 231 3090
Website: www.nevada.co.uk

Chelmsford Activities

Scouting for Radio

The Chelmsford Scout Amateur Radio Fellowship (Chelmsford-ScARF), have been teaching Amateur Radio courses to Scouts and Scout Leaders in the town with great success...

To-date some 45 Scouts have now gained their Foundation licences and another 18 have successfully completed their Intermediate. Not bad going in one town in just a few years! Chelmsford ScARF have also successfully run 'kit construction' sessions at Jamborees, which have introduced hundreds of young people to the joys of soldering.

By the time you read this ScARF will have taken part in the Essex International Jamboree, where hopefully up to 1500 youngsters will have constructed m.w. radios and you may well have worked the special event station GB2EJJ. So yet again it seems that the Chelmsford Radio Amateurs are promoting our hobby at every opportunity. That's not all - in 2007 the Scouting World Jamboree takes place in Chelmsford and its hoped that over 50000 young people from around the globe will attend giving ScARF yet another opportunity to get on the air!

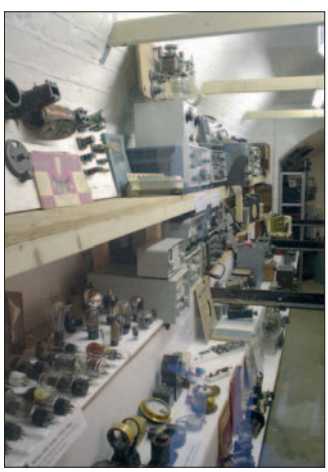
MAKE CONTACT

Call-in Your QSL Cards

Are you missing some QSL cards for contacts made in the G7AAA-ZZZ series? If so read on....

Marc Litchman G0TOC has recently been appointed as the new QSL Sub-Manager for the Radio Society of Great Britain (RSGB) for the G7AAA-ZZZ series of calls. Since taking on the post Marc has completed a comprehensive audit of all the QSL cards and s.s.a.e's, which are currently in his possession.

Marc would like to take this opportunity to invite enquiries by E-mail to **G7QSLMan@lefars.org.uk** to all current and ex-G7 callsign holders to check on how many, if any, QSL cards and/or s.s.a.e's, he's holding on their behalf. So, if you are missing some cards make sure you get in touch.



New Repeater

On Air Now! - GB3FK

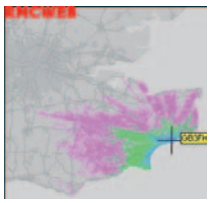
The new 144MHz band repeater for the Folkestone area is now on the air... so if you are in the area make sure you make use of it.

The grand switch on of **GB3FK** (operating on 145.750MHz) has taken place following good results from the initial testing. These were carried out using a 144MHz radio at the site, resulting in excellent reports across the Romney Marsh, down into Hythe, Seabrook and Sandgate where 144MHz contact is often difficult. Folkestone and Cheriton is now receiving 'blanket' hand-held coverage.

The antenna at the repeater site is omni-directional. During the testing period excellent coverage was achieved and it was found to be ideal for hand-helds in Folkestone/Cheriton. Using mobile GB3FK can be worked up to Ashford Junction 10 on the M20 and in the other direction down into Sandgate, Seabrook, Hythe and the Romney Marsh.

More reports will be available on **www.gb3fk.com** soon.

On the right at the back, Repeater Manager and Keeper, Matt M1CMN, Stan G6ZNW Vice Chairman of the Folkestone Repeater Group, Front left, Tony G4IMP Technical Manager and Anne G4RJZ. All at the repeater site, for the grand 'switch on'.



Coverage map of GB3FK showing extent of coverage for operating modes: Purple - 50% Mobile; Green - 50% Hand Portable - 90% Mobile; Blue - 90% Hand Portable

Vintage Fair

Calling All Valve Enthusiasts

If you have a passion for nostalgic radio, valves and all things with a warm glow, then make sure you visit the Vintage Valve Technology Fair.

Taking place at the Haydock Park Racecourse, near Wigan, Merseyside WA12 0HQ on the A49, five minutes from M6 junction 23 and A580 on Sunday 12 September from 0930 to 1430 hours. There will be plenty to see and no doubt bargains to be found as well.

On site there will be free parking for up to 5000 cars and entrance will be just £2 per person. If you are interested in exhibiting at the event stalls cost just £12, which includes a 6 x 2.5ft table. So why not clear out your shack, cellar or garage and pass on the joy of those old unwanted radios, valves, gramophones, telephones and hi-fi? More details can be found at **www.myciunka.supanet.com/VVTF2003**

Charlie Delta ARC

Foundation Success

The Foundation Licence is certainly proving a popular route for budding Radio Amteurs to take, here's another batch of successful candidates.

The latest Charlie Delta ARC Foundation Course was a success! All four candidates who took the course over the weekend of the 26 & 27th June achieved their 'tickets'. Mark, one of the two youngest candidates to have taken the course at the club so far, said afterwards "I enjoyed it all, except for the c.w."! The other's on the course were Hayley, Neil and John. Neil has now gone on to do take the Intermediate Course.

The new Licensees would like to thank **Dave M0DCM** for running the Course and **Geoff G7NZM** and **Dave G0MJY** for Invigilating the exam.

Another weekend Foundation course is being planned for the near future and anyone wishing to take part should get in touch with:
Dave M0DCM
Tel: (01902) 635244
Website: www.cqdx.co.uk

Don't Miss Out!

Practical Wireless Direct

Did you know that you can buy current issues of Britain's best selling Amateur Radio Magazine direct from the Publishers by post or telephone?

Some readers may be experiencing difficulties in finding copies of *PW* in their local WH Smith stores or independent newsagent and this could become a harder task later this year when WH Smith review the titles they stock. So, as we don't want you to miss out on your favourite radio read, we'd like to remind you that you can buy current issues at cover price direct from us.

Simply send a cheque (payable to PW Publishing Ltd.), Postal Order or telephone Credit Card details for the cover price (£2.95 inclusive of P&P) with your name and address to **Clive Hardy G4SLU** in the Book Store and your copy will be sent out to you (**cash not accepted**). This service is also available for copies of *Short Wave Magazine* and *Radio Active*.

Additonally, if you've missed an issue of any one of the three radio magazines you can order Back Issues in the same way (stocks permitting). Back Issue prices as follows: ***PW* - £4.70**; ***SWM* - £5** and ***RA* - £4.50** all inclusive of P&P.

Book Store
PW Publishing Ltd
Arrowsmith Court
Station Approach
Broadstone
Dorset BH18 8PW
Tel: 0870 224 7830 Fax: 0870 224 7850
E-mail: clive@pwpublshing.ltd.uk

Contesting

Team Work!

Helen Watt M0DEY took part in this year's PW 144MHz QRP Contest and thought she'd share the experience, read on to find out more...

Helen takes up the tale: The day of the QRP contest Sunday 13 June was a glorious day, perfect weather for shouting numbers at people! There was just enough breeze to prevent the operators from melting under the protection of the tent but it was hot enough for the Gs to fall asleep in

the sun! We were located somewhere near the trig point at Sharpenhurst and the view was spectacular.

The equipment was efficiently set-up and we started operating soon after 0900UTC. We used a Yaesu FT-290R running 2.5W. The Gs declined to operate so that was left to me (M0DEY), **James M3GQB, Ian M3FQR** for most of the day, but **Gerald M3GCR** chipped-in around lunchtime and **Liam M0EPX** joined us in the afternoon. We were delighted to be supported by several club members of the Horsham Amateur Radio Club who gave us extra points and multipliers by talking to us.

We managed 40 QSOs giving us a respectable score of 400. Even though we heard people with an extra hundred QSOs on top of our 40, it didn't demoralise us as we had a wonderful time anyway, and it was all good practice! By about 1600hours, we had contacted everyone within our reach and decided further calling would be pointless so, we packed up and went home with almost two full log sheets and valuable practice for s.s.b. field day 2004.

I found that James has a talent for logging; remembering every callsign worked and quickly finding the relevant entry in the log. Ian was brimming with confidence and persistence on the mic (apparently due to his hard work participating in the RSGB Club Championships) and Gerald gained valuable experience in operating. Everyone got into the swing of things and we rotated the mic when things got quiet helping each other out with prompts.

Next year, I hope to organise Horsham Amateur Radio Club's participation in the QRP contest again, perhaps with a few new faces at the mic and possibly a better position.

73 de M0DEY

Last Call

GB2LL Signing-Off

Members of the Bangor Amateur Radio Club in Northern Ireland will activate GB2LL for the last time in September, so listen out, make contact and help the station 'sign-off' in style.

The Special Event Station **GB2LL** based at the Control Tower of the Second World War airfield at Langford Lodge near Crumlin. County Antrim will be aired for the final time in September. The reason for this is that the Ulster Aviation Society museum's lease on the hangar and control tower runs out in October.

Richard Ferris GI0OUM together with members of the Bangor Amateur Radio Club will activate GB2LLL with the 28 days Notice of Variation on GI0OUM. Activity will be centered around the weekend of 11 & 12th September, which is the European Heritage weekend.

The pictured QSL Card will be sent to all stations who make contact during the event.

Summits On The Air

Mountain Goats Recognised

Two more 'Mountain Goats' (MG) have been awarded to Summits On the Air (SOTA) Radio Amateurs recently.

The second ever 'MG' was **John Earnshaw G4YSS** (usually using the Scarborough club callsign **GX0OOO/P)** who reached the landmark on England's highest peak, Scafell Pike G/LD-001 on 9 May 2004 after a breathtaking rate of summits qualified through the winter bonus period. He was followed by **Shirley Smith MW0YLS** who also sprinted to MG status with a surge of high-scoring activations in Scotland and the Lake District. However, it was on her local one-point summit, Hope Mountain (SOTA ref GW/NW-062) that Shirley became a Mountain Goat on the 13 June 2004. John and Shirley follow **Alan Poxon M1EYO**, who became SOTA's first MG on Pendle Hill G/SP-005 back in January.

The SOTA programme has grown in popularity since it was first launched in March 2002. For more details about SOTA, take a look at the articles in the June 2004 issue of *Short Wave Magazine* or the March 2004 issue of *Radio Active* or the SOTA website at **www.sota.org.uk**

amateur radio clubs

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

DORSET
Bournemouth Radio Society
Contact: Chris R. Ellis M5AGG
Tel: (01202) 893126
Website: www.brswebsite.freeserve.co.uk
Members meet on the 1st and 3rd Fridays of each month at 1930 for 2000 start at the Kinson Community Centre, Millhams Road, Kinson, Bournemouth **September 3:** G3TOI Industrial, RF, **17th:** Open discussion - my radio plans and dreams, **October 1:** Mystery objects - bring in radio items to be identified, **15th:** EGM & AGM.

EAST LOTHIAN
Cockenzie & Port Seton Amateur Radio Club
Contact: Bob Glasgow GM4UYZ
E-mail: gm4uyz@cpsarc.com
Website: www.cpsarc.com
The Cockenzie & Port Seton Amateur Radio Club was formed by **Bob Glasgow GM4UYZ** in 1984 to help local Amateurs get to know each other. Numbers have increased steadily over the years and now average about 20. Far from being just a local club, members come from the Borders, Dumfries, Strathclyde and Fife. The club meet on the first Friday of each month (second Friday in January) in the lounge of the Thorntree Inn on the old Cockenzie High Street from about 1900 till late. The club is run in a very informal way, there are no fees, no real committee structure, just a group of like-minded people doing something they enjoy!

GLAMORGAN
The Hoover (Merthyr) Amateur Radio Society
Contact: Howell Thomas MW0ATG
Tel: (01443) 400664
After the recent registration as an Exam Centre for the RSGB back in May, the clubhouse at Hoover held is first ever exam on the 29 June. Six Foundation Licensees sat the Intermediate Licence Examination after having attended the course with their instructor **James Sneddon MW0EQL**. All the following candidates were successful: **C.R. McCarthy MW3CPI**, **M. Townsend MW3END**, **S.J. Davies MW3AQH**, **R. Lacey MW3FEF**, **P. Martin MW3EGK**, **A. Budding MW3BOK**.

LONDON
Southgate Amateur Radio Club
Contact: Nick Earl G8DWF
Tel: 0208-886 8935
Website: www.southgatearc.org
Members meet twice monthly at the Winchmore Hill Cricket Club, The Paulin Ground, Firs Lane, Winchmore Hill, London, commencing at 1930. On the second Thursday of each month a guest speaker is usually invited along to give a talk on a subject of interest. Membership is open to all who are interested in the many facets of Amateur Radio and visitors and new members are always welcome.

SHROPSHIRE
Telford & District Amateur Radio Society
Contact: Mike Street G3JKX
Tel: (01952) 299677
E-mail: mjstreetg3jkx@aol.com
Meetings take place at the Community Centre, Bank Road, Dawley Bank, Telford, Shropshire. Meetings commence at 2000 every Wednesday. **August 18:** Rally preparations, **25th:** Antennas in the field G3UKV, **September 1:** Open evening/HF OTA/Committee meeting, **4th:** (Sat) Rally set-up - RAF Cosford Museum 1700, **5th:** (Sun) Telford radio @ RAF Cosford Museum - free entrance and parking, **8th:** Oscilloscopes with **M1RKH**.

Keep those details coming in!

Where will yours take you?

Yaesu UK Photo Competition

Win prizes worth in total over £1000!

Amateur Radio opens up a world of opportunities and interesting possibilities and here's your chance to share your experiences and be in with the chance of winning one of three great transceivers kindly donated by Yaesu UK.

All you have to do is send in a photo of you or your fellow Radio Amateur operating a Yaesu Radio in an unusual or impressive location (see the example on this page). Please also include a short description (200 words maximum) of the background to the photograph. Entries must be received by **Monday 13 September 2004** and thats it! Send your entry to **Yaesu/PW Photo Comp, PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW.**

All enties will be displayed on the Yaesu UK stand at the Leicester Amateur Radio Show at Donington on 1 & 2 October 2004.

So, what are you waiting for? Get snapping and send your entry today - Good Luck!

The Rules

- The photo must be a good quality print measuring at least 7 x 5in (digital images are allowed but must be printed on photo quality paper - no disks please)
- You must ensure you have the negative or original jpeg file available (at least 300dpi) in case you are lucky enough to have your print used in a Yaesu promotion
- Your name, address, Amateur Radio callsign and daytime 'phone number must accompany your photo
- Age is no barrier neither is Licence class - this competition is open to **all**!
- If you have taken the photo but its not you pictured you must have permission of the person to send it.

Terms & Conditions

The photo **must** be your copyright and by entering you will be relinquishing your copyright to PW Publishing Ltd. who reserve the right to pass the photo onto Yaesu UK for use with credit to the photographer.

Photos of an offensive, obsene or unsightly nature will not be considered.

Unfortunately photos cannot be returned so please make sure you keep a copy!

Your photo - even if you don't win a prize - could lead to an invitation to write an article for *PW,* which you could be paid for!

The Editor and Yaesu UK's decision on the winners is final and no correspondence can be entered into.

If you do not wish to be contacted in the future as a result of entering this competition please indicate on your entry.

1st FT-817ND £599

2nd VX-7R £359

3rd VX-2E £199

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).

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OUR PRICE **£139.95** delivery £10.00

New improved 'Wire Penetrator' 1.8-60MHz end-fed wire antenna (45ft long).....£159.95

CUSHCRAFT BARGAINS

Delivery £12.00

MA5B	Mini beam 10, 12, 15, 17, 20m	~~£380.00~~	£329.95
A3S	3 ele beam 10, 15, 20m	~~£499.95~~	£379.00
A4S	4 ele beam (10-20m)	~~£599.95~~	£449.99
R-6000	Vertical 6, 10, 12, 15, 17, 20m	~~£349.95~~	£315.95
R-8E	Vertical (40-10m) "special" ..... SPECIAL	~~£499.95~~	£399.99

Q-TEK COLINEARS (VHF/UHF)

P&P £10.00

X-30 GF 144/70, 3/6dB (1.1m) glassfibre.....£39.95
X-50 GF 144/70, 4.5/7.2dB (1.7m) glassfibre.....£54.95
X-300 GF 144/70,6.5/9dB (3m) glassfibre.....£69.95
X-500 GF 144/70, 8.5/11dB (5.4m) glassfibre.....£149.95
X-627 GF 50/144/70, 2.15/6.2/8.4dBi (2.4m).....£69.95

Q-TEK 6m end-fed half wave....£49.95

Q-TEK YAGIS

Delivery £10.00

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

DELUXE G5RV

P&P on either full/half size £6.50

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

Double size - 200ft (160-10m).....£84.95
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).....£25.00 P&P £4.00 (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
300m roll "club special buy".....£135.00 P&P £10.00

BALUNS & TRAPS

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

1kw Handling

REPLACEMENT POWER LEADS

DC-1 Standard 6-pin/20A fits most HF.....£20.00
DC-2 Standard 2-pin/15A fits most VHF/UHF.....£10.00

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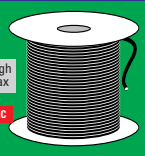

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All measurements approx

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NEW EASY FIT WALL PULLEY

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Del £10.00

	1½"	1¾"	2"
1m	£8.50	£10.50	£12.50
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Approx lengths

6 section telescopic masts. Starting at 2¼" 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.

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MH-4 4 pin fits older HF, etc. (4-pin round).....£15.00

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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 4.4mm/B/load 480kg.....£12.50 P&P £3
132m roll nylon guy (4.4mm).....£40.00 P&P £7.50
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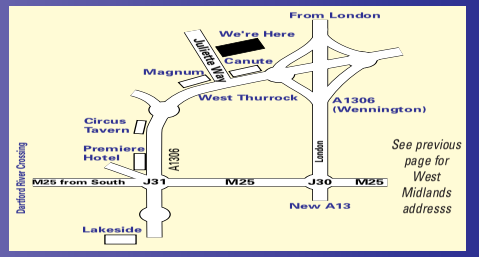

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In our opinion, the best HF transceiver below £1200. OUR PRICE £789.00

INCLUDES ATU

PS-53 matching power supply £229.00
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SP-23 matching speaker.....£68.95

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

TS-870 + PS-300 PSU £1379.00

£1275.00

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

TS-480SAT

New HF + 50MHz, 100W. Ideal for home or car use. Includes auto tuner.

OUR PRICE £899.99

TS-480HX - 200W version (no ATU) OUR PRICE £999.00

KENWOOD TS-2000

New all mode multibander: HF/50/144/430 optional 1200MHz.

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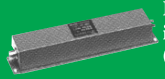
£1529.00

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

LF-30A



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YAESU HF

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

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FT-817 "ND" £489.00
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ATAS-120

Superb ready to use (with suitable Yaesu Tcvr) fully automatic antenna (40-70cm). No ATU needed - PL-259 fitting. Ideal mobile antenna (or base with counterpoise kit).

OUR PRICE £229.00

Counterpoise kit (for home use) £69.00
Universal boot mount.....£24.95
Pole mount with 5m cable.....£29.99

YAESU FT-857 DSP

LATEST UK VERSION

The ultimate HF excitement in a small package. HF + 6m + 2m + 70cm. Incl's digital signal processor unit.

Incl's optional DSP unit

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ICOM HF

ICOM IC-703

'706' technology in a QRP version designed by experts to be used by same HF + 6m (up to 10W O/P). ATU built-in DSP as standard. The only thing limited is the price. Ideal for M3.

£575.00

IC-703 + MS-1228 PSU ~~£640.00~~.....£625.00

ICOM IC-706II G

This classic all-band transceiver is still our No. 1 best seller. HF + 6m + 2m + 70cm.

IC-706 + MS-1228.....£799.00

£749.99

AT-130 commercial wire tuner 1.8-30MHz ...£299.99
AT-180 matching indoor auto ATU £339.00
Optional mobile head-set complete.....£39.95

NEW ICOM IC-7400

HF+6m+2m, All mode, 32bit DSP for outstanding signal enhancing.

£1149.99

D-7400 Duplexer for 7400 (6m + 2m).....£39.99
SP-21 matching external speaker.....£79.99
DC-2 spare DC lead.....£20.00
IC-7400 + SP-21 + SM-20.....£1289.00

hf accessories

MAC-200

New auto tuner 1.8-54MHz (200W) wire, vertical, dipole. You name it. (5 selectable outputs).

Connect a wire and away you go!

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SGC-230 (HF-200W) ATU £329.95
SGC-237 HF+6m Tuner.....£289.95
SGC-239 Mini Tower (1.8-30MHz) £179.95
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D-308B DELUXE DESK MIC

(with up/down). Many amateurs using this mic (over 4000) have expressed extreme pleasure with it's performance. Includes 8-pin round Yaesu mic lead.

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Yaesu	8 pin round to modular adapter (FT-100, etc.)	£19.99
A-08	8 pin "Alinco" round	£9.95
K-08	8 pin "Kenwood" round	£9.95
I-08	8 pin "Icom" round	£9.95
IM-08	Modular phone "Icom"	£9.95
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"TWO SPEAKERS IN ONE"! Not quite - this superb desk speaker has two inputs for two radios and a change over switch built-in. Ideal for any radio station requiring better sound reproduction.

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TRUE 'LINEAR' 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. 30 AMP/12 VOLT PSU

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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. RRP ~~£79.95~~

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'Smallest version to date' now with cigar socket.

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New 25A. PSU.

- Volts adjust (9-15vdc)
- Light in weight: 2.1kg
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Diamond quality power supplies/switch mode.

40 amp version £139.99

Model	Input voltage	Output voltage	Output current	Dimensions (W x H x D)mm	Weight	Price
GZV4000 (switching)	100V/230V	5-15VDC variable	40A continuous	210x110x300	3.5kg	£139.99
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hf antennas – & more!

MFJ-259B

HF digital SWR analyser + 1.8-170MHz counter/resistance meter.

ONLY £249.95

UK VERSION P&P £7.00

MFJ-993

NEW INTELLITUNER 300W, fully automatic. Will tune wires G5RVS, verticles, trapped dipoles, you name it.

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DIAMOND CP-6

A superb (diamond quality) 6 band trap verticle antenna with trap radials – unique trap system allows "flat wall" mounting. 80m/50m/20m/15m/10m/6m. 200W SSB, HT 4.6m

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Tx:- 2m/70cm.
Rx:- 0.5-999MHz. Includes battery (Li-/on) + charger.

OUR PRICE **£159.00**

Optional case.....£16.95
Cigar lighter lead.....£32.95
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ALINCO DJ-596

2m + 70cm Handie. Includes: (NIMH) Battery/Charger. High + narrow switchable. High power (4.5W) OP as standard. Alpha Numeric channeling. INCL'S FREE REMOTE MIC.

SUPERB VALUE

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KENWOOD TH-F7E

Transceiver & scanner 2m/70cm Tx (5W). Rx:- 0.1-1300MHz, all mode (incl SSB). Incls:- Lithium ion battery & charger.

INCL'S FREE REMOTE MIC.

£249.00

Optional case.....£19.99
Optional cigar lighter lead.....£19.99

YAESU VX-7R

Yaesu heavy duty tribander 50/144/430MHz. (Lithium ion battery) high power (5W) as standard. Includes charger.

OUR PRICE **£289.00**

Optional case.....£16.99

YAESU FT-7800

Rx:- 108-520/700-1000MHz

Yaesu's latest high spec, low cost mobile. 2m/70cm 50W-2m/40W-70cm.

£229.00

YAESU BARGAINS

FT-1000MP MkV.....£POA
FT-8900 Quad bander..£329.00
Quadra amp.....£3399.00
FT-8800 2m/70cm.....£289.00
VX-110 2m.....£109.00

ICOM IC-2725

OUR PRICE **£265.00**

Optional extended receive available which includes AM airband

ICOM BARGAINS

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IC-910X	2m/70/23	£1199.00
E-90	handie	£265.00

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SUPER-GAINER RH-9090

SMA 40cm flexible whip that is ideal as replacement.

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

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Frequency counter covers 10MHz-3GHz. Incl's nicad, charger, antenna.

ONLY **£59.95**
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A fully adjustable desk top stand for use with all hand-helds.

Fitted coaxial lead with BNC + SO239 connections.

£12.50 P&P £4.00

3 for **£30.00** P&P £7.50

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MS-107K

Superb speaker mic to fit Kenwood handies.

£19.95
P&P £2.50

NISSEI EP-320

Hanging type earphone with boom mic & in line PTT box. Available for Kenwood (EP-320K), also (EP-320). Will fit Alinco, most of Icom and Yaesu and ADi.

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TH-887 headset

Superb headset for most handies.
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887 (fits most twin socket-Alinco, Icom, Yaesu, etc. **£24.95** P&P £3

Optional adapter boxes available for Icom, Yaesu, Kenwood & Alinco VHF-UHF mobiles & HF Tcvrs (£18.95)

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500kg brake winch.

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350Kg brake.....£69.95
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T-127 ROTATOR KIT

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

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

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Heavy duty rotator for HF beams, etc. Supplied with circular display control box and 25m of rotator cable.

OUR PRICE **£325.00**

G-650C.....£359.00
G-1000DXC.....£499.95
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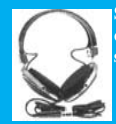
GC-065 thrust bearing £48.00
GC-038 lower mast clamps.....£25.00

KENWOOD HS-5



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Optional 240V Power Supply £16.95

Send SAE for data sheet

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

Send SAE for review

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OUR BEST SELLING LOW PRICED RECEIVER

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New comprehensive scanner (25-1300MHz) Alpha Tag, PC clonning control. Smart scanner + trunk track facility. Includes power supply.

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ICOM IC-R8500

Next generation wideband receiver for the true perfectionist. 0.1-2GHz. (All mode). Includes free power supply.

OUR PRICE **£1075.00** Del £10.00

SP-21 extention speaker.....£74.99
Voice synth board.....£34.95
IC-R8500 + SP-21 + voice synth £1189.95

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Yaesu VR-5000	£535.00
GRE PSR-225	£199.99

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Alinco DJ-X2000	£399.99
Alinco DJ-X10	£249.99
Alinco DJ-X3	£99.95
AOR AR-8200MkIII	£379.00
Yupiteru MVT-7100	£199.99
Icom R-5	£149.99

SECONDHAND SELECTION

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FT-920AF as new	£799.00
FT-736	£450.00
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IC-275 all mode 2m base	£299.00
AR-5000	£799.00
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Target HF-3S	£149.00
FRG-100	£299.00
Bearcat UBC-780XLT	£229.00

doing it by design

This month Tony Nailer G4CFY discusses quartz crystal oscillators and how they work. Tony also takes a detailed look at the Colpitts oscillator and provides you with a suitable project complete with a p.c.b., if you don't wish to make your own!

Welcome to Doing It By Design where this month I'm taking at look at quartz crystal oscillators, with a detailed look at the Colpitts type. And of course, there's a project for you to build...complete with a p.c.b. available if you need one.

Commonly used crystals in Amateur service are the HC18/U and HC25/U plug-in type HC49/U and HC50/U wire ended type. All versions have the same case size.

The quartz piezoelectric crystal has two principal operating modes; series or parallel. When a crystal is cut for series operation it's assumed there'll be no inductance or capacitance in series or parallel with it. However, when the crystal is cut for parallel mode it's done in conjunction with a specific load capacitance. (Normally this is 25pF or 30pF).

Frequencies available in the 'cuts' mentioned are from about 3 to 24MHz as parallel mode, and from about 20 to about 70MHz as a series resonant third overtone mode. Then from about 60 to 100MHz as fifth overtone, and from 70MHz to 140MHz as seventh overtone.

Crystal Harmonics

Crystals are also able to work on harmonics of the parallel mode. Because of this it's important that the circuit using the crystal must load it in a way which forces it to work in the desired mode. In some circuits where the crystal is supposed to work in series mode, a resistor is put across it which ensures it cannot operate in parallel.

A crystal operating in parallel mode acts like a very high *Q* parallel tuned circuit, and when used in conjunction with an amplifier with positive feedback it forms an oscillator at the crystal frequency. Series mode crystals are used either in the feedback path or as grounding elements in oscillators which have a tuned circuit to create the oscillation.

Parallel Mode Oscillator

The circuit, **Fig. 1**, shows the emitter follower Colpitts parallel mode oscillator. The transient voltage at switch on occurring at the junction of R1 and R2 causes the piezoelectric element of the crystal to flex. It then flexes back and forth at its natural frequency in decreasing amplitudes and would rapidly return to its rest state if not further electrically triggered.

During the flexing of the element an alternating voltage is generated at the natural frequency of the crystal. This voltage passes into the base of the transistor and is fed back around from the emitter to the base, in phase, where it adds to the base signal causing a build up of the wave.

In the configuration described the wave grows until during a negative swing on the base the voltage is lowered so much that the transistor ceases to conduct. This causes the wave to become flattened at the bottom of the cycle and prevents further increase of the wave amplitude.

If you examine the circuit again, it looks as if the crystal is series tuned with 47pF. Not true! The feedback capacitors of 100pF each form a series equivalent of 50pF, which in series with the 47pF give close to 24pF.

The calculation is;

Cp = (50 x 47) / (50 + 47)
= 2350 / 97 = 24.2pF.

So, the equivalent circuit is now re-drawn with respect to the crystal and capacitors as shown in **Fig. 2**.

In a practical circuit the crystal and C1 can be transposed and then C1 split into C1 + TC1. This is so that the precise value required to put the crystal onto frequency can be achieved, as in **Fig. 3**.

To calculate the values you should simply choose the parallel combination VC1 and C1 to be twice the required load capacitance of the crystal, then choose each of the feedback capacitors to be double again. For a 30pF load crystal, VC1 + C1 = 60pF, C2 and C3 are 120pF each.

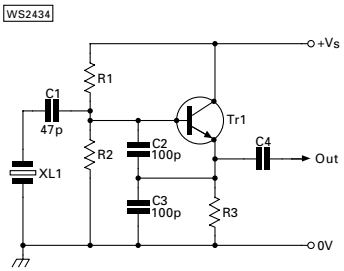


Fig 1: Circuit showing the emitter follower Colpitts parallel mode crystal oscillator (see text).

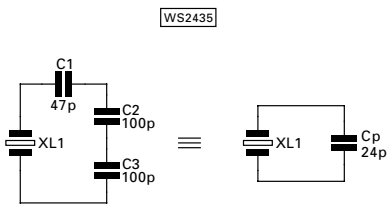


Fig. 2: Equivalent circuit re-drawn (see text for expanded discussion).

The DC Conditions

Now it's necessary to consider the direct current (d.c.) conditions, which allow the active device to function. Here, another 'rule of thumb' is to arrange the base voltage of an emitter follower or common collector oscillator be at two thirds the supply voltage.

With the 'two thirds' rules values of base bias resistors are then 2:1. They should be chosen so their parallel value is over 5kΩ so as not to heavily load a parallel mode crystal.

Useful resistor choices are 10 and 22kΩ, 8.2 and 15kΩ, and also 12 and 27kΩ. Some being

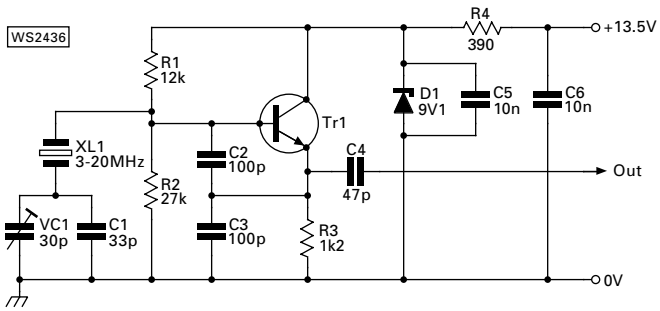


Fig. 3: In a practical circuit the crystal and C1 can be transposed and then C1 split into C1 + TC1. This is so that the precise value required to put the crystal onto frequency can be achieved (see text).

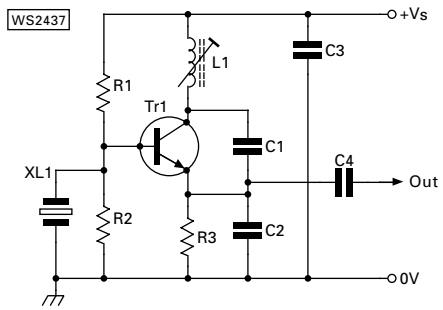


Fig. 4: A common base version of the Colpitts Oscillator. Here, L1, C1, and C2 provide the resonant circuit, and feedback is from collector to emitter (see text).

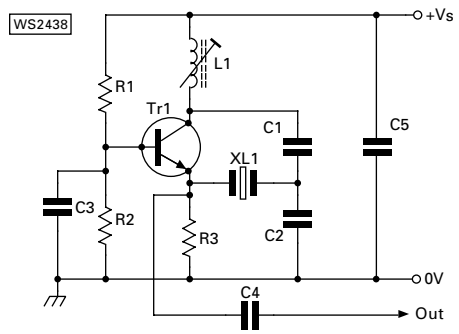


Fig. 5: An alternative version of the Fig. 4 circuit. This version uses a capacitor which is low reactance at the operating frequency. It effectively grounds the base of the transistor and then uses the crystal in the feedback path from collector back to emitter (see text)

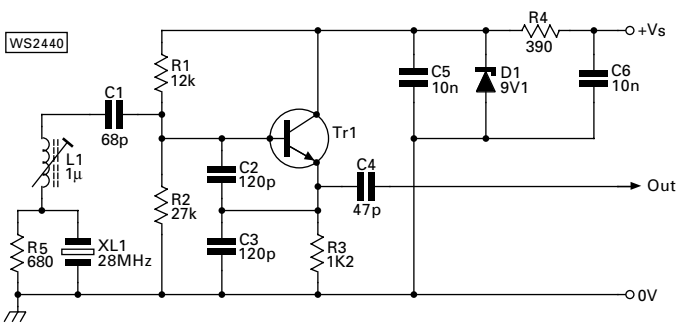
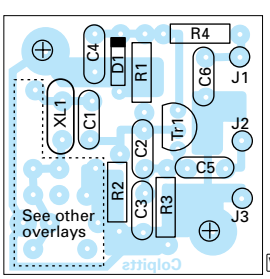


Fig. 6: Returning to the original common emitter configuration but use L1 in the base circuit together with C1, C2, and C3 forms a parallel mode oscillator (see text).



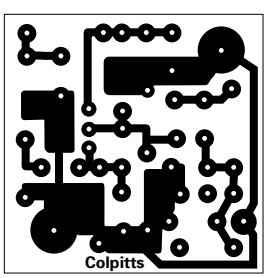


Fig. 7: A universal p.c.b that may be used for either mode crystal oscillators.

slightly higher than two thirds and some a little lower. (In practice it doesn't really matter as the final determining factor is the value of the emitter resistor).

The supply rail for a crystal oscillator should always be stabilised. This should be either from a stabilised rail used within the equipment or by its own zener supply. Values of Vs of 5.1, 6.8, or 9.1V are most commonly used.

Considering an oscillator running on a supply voltage, Vs, of 9.1V and using base bias resistor of 12kΩ for R1 and 27kΩ for R2. The base voltage will be;-

Vb = (R2 x Vs) / (R1 + R2)
= (27kΩ x 9.1V)/(12kΩ + 27kΩ)
= 6.3V.

The emitter voltage will be about 0.7V below Vb which means Ve = 5.6V. I suggest that you choose the emitter current to be 4 or 5mA and so determine the emitter resistor by Ohm's Law;-

Re = 5.6V/ 4mA = 1400Ω.

In this case, where Re is calculated as 1.4kΩ, you could readily use either 1.2 or 1.5kΩ.

Supply Rail

Finally, the supply rail has to be considered. Here, if the oscillator is running 4 or 5mA and a zener diode (D1) is used, a series resistor from the full supply needs to be determined.

The zener's operating voltage is usually quoted for a forward current of 5mA. When considered together, the current drain of transistor and zener is 9 or 10mA. Now, if the supply rail is 13.5V and the zener 9.1V, then by Ohm's Law;-

R4 = (13.5 - 9.1)/10mA
= 440Ω. (use 390 or 470Ω).

Finally, in order to prevent oscillator signals escaping along the supply rail (or noise from the supply rail getting to the oscillator) it's wise to decouple. This is done at each end of the zener supply resistor using a capacitor which is low reactance at the oscillator frequency. Typical values are 47nF at 6MHz, 22nF at 12MHz, 10nF at 28MHz, 4n7 at 50MHz, 3n3 at 70MHz, and 1nF at 144MHz.

The type of transistor suitable for this type of work are those intended for small signal intermediate frequency (i.f.) and radio frequency (r.f.) use. Suitable devices are transistor types such as BF194, BF195, BF196, BF199 or BF244.

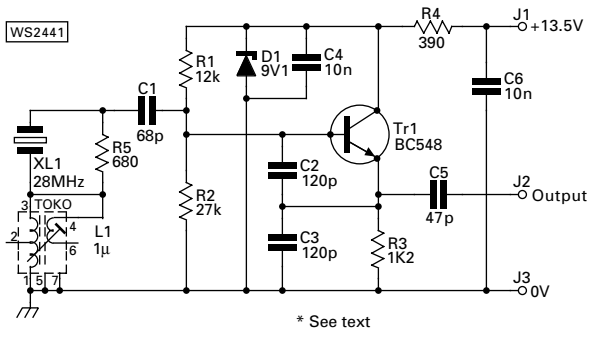
Series Mode Colpitts

A common base version of the Colpitts Oscillator is shown in **Fig. 4**. Here, L1, C1, and C2 provide the resonant circuit, and feedback is from collector to emitter. The device only acts as an amplifier with feedback if the base is decoupled to ground with a low impedance. The crystal performs this function by presenting a low resistance at its series resonant frequency and high reactance at other frequencies.

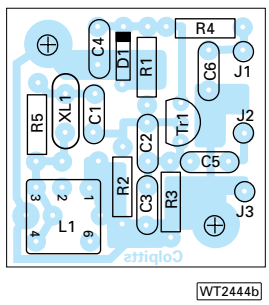
An alternative version of the Fig. 4 circuit uses

a capacitor which is low reactance at the operating frequency. It effectively grounds the base of the transistor and then uses the crystal in the feedback path from collector back to emitter, as in **Fig. 5**.

The grounded base Colpitts oscillators shown in Figs. 4 and 5 are easy to design if you choose the bottom capacitor in the feedback path to be three times the value of the top capacitor. The series value of the feedback capacitors has to resonate with the coil L1 at the same frequency as the series resonance of the crystal.



● Fig. 8: The circuit and p.c.b. used for a series overtone 28MHz oscillator.



Calculating Circuit Values

Choice of suitable inductor for this type of oscillator comes with practice but as a rule of thumb you should use around 6µH at 5MHz, 3µH at 10MHz, 1.5µH at 20MHz, 1µH at 30MHz, 0.4µH at 50 or 70MHz, and 0.2µH at 144MHz.

I choose a TOKO coil 3335R of 1µH for L1 and it's now necessary to calculate the total capacitance Ct to resonate with it at 28MHz. Then calculate C1 to be 1.33 x Ct, and finally calculate C2 to be 3 x C1.

After the initial calculations choose nearest practical values of capacitors for C1 and C2, then calculate the new Ct value, based on the values for C2, C3. As TOKO inductors are quoted with minimum inductance value so Ct can be slightly on the low side and be within tuning range.

$$Ct = \left(\frac{1}{39.5 \times f \times f \times L}\right) F$$

When f is in MHz and L is given in µH, then Ct becomes:

$$Ct = \left(\frac{1000\,000}{39.5 \times f \times f \times L}\right) pF = \left(\frac{1000\,000}{39.5 \times 28 \times 28 \times 1}\right) pF$$

$$= \left(\frac{1000\,000}{30\,968}\right) = 32.3pF$$

C1 = 1.33×Ct = 1.33×32.3 = 42.96pF.
C2 = 3×C1 = 3×42.96 = 128.8pF.

Let's try C1 as 39pF and C2 as 120pF: then:

$$Ct = \left(\frac{C1 \times C2}{C1 + C2}\right) = \left(\frac{39 \times 120}{39 + 120}\right) = \left(\frac{4680}{159}\right) = 29.4pF$$

The d.c. conditions for this type of oscillator require the base voltage to be about one third of the supply rail. The resistors are then in a 2-to-1 ratio as before, but with the larger value for R1.

If the stabilised supply is 9.1V, then Vb will be about 3V so the emitter will be 0.7V below this, at 2.4V. Again, let the emitter current be 4mA. Re = 2.4/4mA = 2.4/0.004 = 600Ω. (Use 560 or 680Ω).

The grounded base oscillators have no method of adjusting the reactance (as seen by the crystal) to zero, so it's possible for the oscillator to run up to 1kHz off frequency. Note: The crystal can also run in the wrong mode or even at a frequency somewhere between the series and parallel.

The solution is to return to the original common emitter configuration but use L1 in the base circuit together with C1, C2, and C3 forming a parallel mode oscillator. The crystal - placed in series with the inductor - now acts as a low resistance path and defines the frequency of the circulating current to its series resonant frequency (see **Fig. 6**).

By fine tuning the variable inductor the reactance can be adjusted to cancel at resonance or be slightly inductive or capacitive on one side of resonance or the other. True series resonant operation of the crystal can then occur.

To calculate the circuit values, These use the same techniques as applied to the common emitter and common base versions. If the 28MHz series overtone oscillator is again considered. The inductor will be 1µH as before. The total capacitance to resonate it at 28MHz is 32.3pF as before

Now choose the capacitor C1 to be double this at 64pF and the feedback capacitors double again at 120pF. Using standard values of 68pF and 120pF should be suitable but as inductors are usually quoted with their minimum values, it may be necessary to use a 56pF for C1.

Quiescent d.c.conditions are the same as the common emitter Colpitts with the base at 66% of the supply rail. The crystal is a series resonant third overtone type cut for infinite capacitance. It is forced to work in series mode by a resistor R5 of 560, or 680 ohms in parallel with it.

Using standard values of 68pF and 120pF should be suitable but as inductors are usually quoted with their minimum values, it may be necessary to use a 56pF for C1.

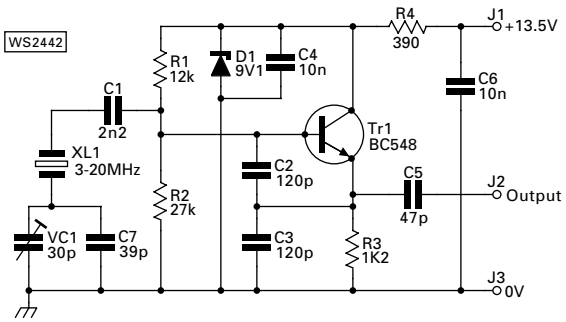
The d.c. conditions are the same as the common emitter Colpitts with the base at 2/3rd the supply rail. The crystal is a series resonant third overtone type cut for infinite capacitance. It is forced to work in series mode by a resistor of 560, or 680 ohms in parallel with it.

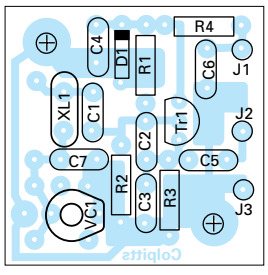
Most components of the parallel mode oscillator, Fig. 3 and the impedance inverting series mode oscillator, Fig. 6 are the same. By rearrangement of some of the component positions, a universal board was created, **Fig. 7**.

The circuit and overlay of **Fig. 8**, show the board in use for the series overtone 28MHz oscillator, while those of **Fig. 9** shows this board with parallel mode configuration.

That's all for this time and when you build the project...have fun Doing it by Design!

PW





● Fig. 9: The p.c.b. used for a parallel mode oscillator.

Parts availability

A p.c.b. and kit of parts for an Emitter Follower Colpitts oscillator (with the exception of the crystal) is available for £4.00 P&P 60p.

The same p.c.b. with components for an Impedance Inverting Colpitts oscillator (again without crystal) is available for £4.40 P&P 60p. (Please state frequency when ordering).

TOKO coils are available at 75p each;- 0.08µH type 100112, 0.21µH type 100076, 0.4µH type 4028, 1.2µH type 3335R, 1.7µH type 4612, 2.7µH type 6184 with capacitor removed, 9µH type K2027. Resistors 2p each. Ceramic capacitors 10p each. Trimcap 30pF 50p. Transistor BF199 25p. Postage on any quantity of parts 60p.

Postal address: **Spectrum Communications, 12 Weatherbury Way, Dorchester Dorset, DT1 2E**F. Cheque made payable to A.J. & J.R. Nailer. (Sorry no credit cards).

radio basics

Rob Mannion G3XFD has been both surprised and delighted by the response to the recent Radio Basics topics. Rob's recent mention of the 1CP1 miniature 'scope tube generated so much feed-back he's now working on a suitable project for you!

An interesting instrument? No, it's not a mock-up of a twin tube bino-oscilloscope! Instead, it's Tex G1TEX's way of demonstrating the possibilities with the 1CP1/DH3-91 miniature oscilloscope tube, shown photographed with a pair of 10 x 25mm binoculars.

Welcome to this month's Radio Basics (RB) where I'm delighted to report readers seem to have very much enjoyed the series of articles encouraging the use of an oscilloscope in the workshop. Feedback is always very pleasing and helpful, and as you'll see from the letters pages in this issue, it's often very difficult indeed for the editorial staff on a magazine such as *PW* to be able to judge what levels of complexity to adopt in the published articles, particularly RB itself

Not only have readers been seemingly enjoying the advice on 'scopes - several have told me that they've been encouraged to use instruments they already own. That - for me at this end - is extremely encouraging.

Another aspect of the correspondence has been with regard to the 1CP1, B8G based, miniature 'scope cathode ray tube (c.r.t.). This amazing - 1in (25.4mm) tube, **Fig. 1**, has brought memories flooding back for many keen constructors including myself. It seems that quite a few people had their first practical experience using a simple instrument incorporating the 1CP1.

My grateful thanks go to everyone who has sent me working circuit diagrams, manufacturer's specifications and application notes. One kind reader even offered me a tube, the necessary valve base and partly constructed 'scope from 1970! All the information has been very helpful and without the response - I would never have been able to gauge the interest in this topic.

The reaction from RB readers has been such that I was spurred on to make enquiries as to whether or not the 1CP1 c.r.t. was still available in large enough numbers to consider using it for a constructional project. I've got two in my store of components, but I had to make sure others were available and in short I'm really pleased to confirm that 'new' surplus 1CP1 tubes are available and at a reasonable price!

Langrex Supplies

Once the helpful information had started flowing in to the office I made enquires to see if any of our advertisers could get the 1CP1.Valve suppliers **Langrex Supplies** said they could help. Not only did they have the 1CP1 (as the Mullard DH3-91) in stock there's enough to keep us going for years! Langrex immediately sent me two 'new' surplus tubes, packed in their original Government surplus packages marked CV2302. (Please see the information panel at the end of the article).

As you can see from the photographs, the tubes are small - but they provide a full specification self-focus design. This means that in the tiny package you'll have a c.r.t., which doesn't require the complexity of a supply network to provide the focus. This is another factor that makes it ideal for the constructor in my opinion.

Higher Voltage?

Another, extremely important factor is that I've had to take into account is the higher voltage required for the c.r.t. And although the 1CP1 'scope tube requires around 300V officially, it will work successfully below this figure. Indeed, one or two of the projects I've built in the past, had the c.r.t. quite happily operating at around 275V.

Despite the lower h.t. voltage required - I've had to take into account the safety of intending constructors. This is because many relative newcomers to the radio hobby aren't experienced working with higher voltages. Even those who have been building equipment for many years often tell me they've previously avoided projects using anything higher than 250V.

Fortunately, even though Technical Projects Sub-editor **Tex Swann G1TEX/M3NGS** and I are fully aware of the possible dangers from the higher voltages...we both think that with extra care from constructors there should be no problems whatsoever. Readers can be sure that as we discuss and work on the project - we'll always have safety in mind, but at the same time the safety concerns will not discourage me from presenting this worthwhile project in *PW*.

You can be sure that when the project does appear in *PW* - hopefully in the early part of 2005, it will be useful, enjoyable to build and providing you follow our published guidelines when using the higher voltages - safe to build and work on.

Amusing Oddity?

Amongst the large number of letters, E-mails and telephone calls a number of readers suggested that although the 1CP1 was useful in its time - nowadays it's perhaps an amusing oddity. Comments like this came in from the most helpful readers, including several who had built miniature 'scope and indicator circuits using the c.r.t. and also had their projects published in the Amateur Radio press.

The most often voiced concern was that; "As modern 'scopes are so relatively cheap, and you can get a good sized screen

used 'scope for £50 or so - why bother"? And of course, I have to fully agree that to build a one inch 'scope, with all its associated complexity (even though it's a simple project) is certainly not something to be undertaken to save money. It's not a project which would please a 'bean counter'! (Accountant).

Personally, I think that the project I'm proposing for RB readers will be worth far more than any money. This is because it will provide every builder with invaluable practical experience and a working instrument, which although small, will prove very useful in the workshop.

So, as you'll realise....I intend to forge ahead. The advantages are too many in my opinion and it's my hope that keen RB readers will agree and enjoy the project when it arrives. In the meantime your opinions on the subject - either to me directly or to the letters pages - are welcomed.

Choosing The Circuit

Now I'm on the way, a suitable circuit for the 1CP1 has to be selected. Fortunately, there's an excellent choice as it was so popular 25 to 30 years ago and helpful readers have sent copies of published circuits. These include some from RSGB publications, several from the older RSGB *Radio Communication Handbook*, together with one from the much missed *Radio Constructor* magazine.

A number of circuits seem to have originated from either the *Radio Constructor* or from projects published in the **British Amateur Radio Teledata* Group** ('Bartag'). The 1CP1 circuit most often sent in by readers was for a RTTY tuning indicator.

***Note:** Originally Teleprinter, later changed to Teledata to encompass other keyboard modes.*

The most popular design was definitely from *Radio Constructor (RC).* It was published in the August 1969 issue as a 'Miniature Oscilloscope by **R. Starksfield**, who mentions in the article he was a member the **Shefford Amateur Radio Club** in Bedfordshire....a club which I'm very pleased to say is still active.

I built the *RC* design myself...using a 1CP1 given to me by one of my Radio Amateur friends working for the old Post Office Telephones. They got time expired c.r.ts which were sold off after working a set number of hours monitoring dialling tone waveforms, etc. The Post Office charged 50p for each tube and you got a sale certificate to prove you'd got the tube legitimately!

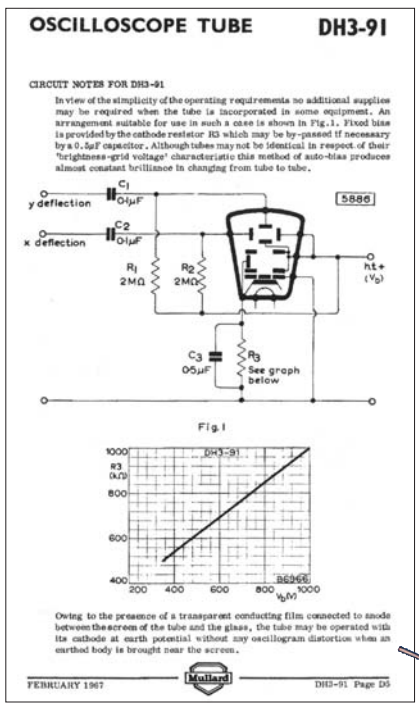
Successful Project

The *RC* project was very successful and simple to build, and gave good displays of audio frequencies and useful indications up to low intermediate frequencies (i.f.s). It employed a very simple timebase incorporating a neon indicator bulb working as a relaxation oscillator*! The only problem I found (also noted by the author in the article) was that I had to try several different neons until I found one which worked reliably.

***Note:** The term 'relaxation' refers to the effect that even though a neon will only 'strike' (start glowing) above a certain voltage it will carry on working well below that voltage once working. A useful property - ideal for simple saw-tooth timebases but I propose to use a different method for the RB project.*

That's all on 'scopes for the moment, but I suggest that if you're keen on joining me in the project that you buy your c.r.t. now. In the meantime I'll be developing the project with G1TEX ready for publication, but if you have any comments or suggestions...don't forget to write to either Tex or myself.

● Fig. 1: Small but useful! The 1CP1 (DH3-91) once inch oscilloscope tube is small - as indicated by the wander plugs and B8G base - but it's still a full functioning display device. The proposed Radio Basics 'scope project will use this c.r.t. (see text).



OSCILLOSCOPE TUBE DH3-91

CIRCUIT NOTES FOR DH3-91

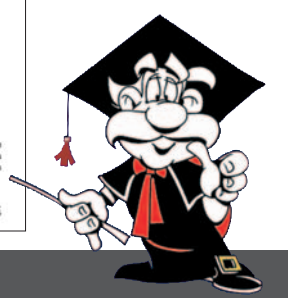
In view of the simplicity of the operating requirements no additional supplies may be required when the tube is incorporated in some equipment. An arrangement suitable for use in such a case is shown in Fig.1. Fixed bias is provided by the cathode resistor R3 which may be by-passed if necessary by a 0.5μF capacitor. Although tubes may not be identical in respect of their 'brightness-grid voltage' characteristic this method of auto-bias produces almost constant brilliance in changing from tube to tube.

Fig.1

Owing to the presence of a transparent conducting film connected to anode between the screen of the tube and the glass, the tube may be operated with its cathode at earth potential without any oscillogram distortion when an earthed body is brought near the screen.

FEBRUARY 1967 Mullard DH3-91 Page D5

● Fig. 2: The 1CP1 one inch screen c.r.t. was also made my Mullards (part of the Philips group) as the DH3-91. This illustration - reproduced with permission and courtesy of Philips) is part of the comprehensive application notes for this versatile little oscilloscope tube.



Information Panel

The 1CP1 1in c.r.t. is available, as the **DH3-91** (Military Code CV2302), from Langrex Supplies Ltd. The company tell me that they're offering a discount for *PW* readers buying the tube. Normal price for the c.r.t is £15, plus p&p, **but the offer price is £10 for the tube, with a reduced price of £3 P&P**. If a B8G valve base for the c.r.t. is required, these are also available and cost £2.50. Contact details are; **Langrex Supplies Ltd., 1 Mayo Road, Croydon, Surrey CR0 2QP. Tel: 0208 684 1166, FAX: 0208 684 3056. (Please quote Radio Basics, September 2004 when ordering)**.

Oscilloscope Data Sheet: The promised free (in exchange for a first class stamped, A5 sized envelope) oscilloscope data sheet mentioned in the August issue is now under preparation. We'll endeavour to achieve the promised deadline, but please be patient and don't forget - no first class stamped A5 sized envelope- no information sheet! **Rob G3XFD.**

Power Line Transmission & Amateur Radio

Angus Annan MM1CCR, Chairman of the RSGB EMC Committee (see information panel) writes on the prospects of PLT - using the national electrical power system to 'transport' data signals, particularly the Internet. What he has to say should concern everyone in hobby radio. Read on!

Information Panel
Contact details: **Angus Annan, C.Eng, MIEE, MM1CCR**, Chair of RSGB EMC Committee.
E-mail address: **A.Annan@iee.org.uk**

What is PLT you're probably wondering? The answer is that it's Power Line Telecommunications (PLT), and it is actually a broadband Internet service delivered by injecting Internet signals into the electricity supply lines. As part of the drive to 'Broadband Britain', PLT is now being piloted and promoted by electricity supply companies as an alternative to cable or ADSL access to the Internet.

Who needs PLT? In reply to that we could say 'Who indeed'! The idea is that PLT will be a great way to bring the Internet to remote or sparsely populated areas of the country.

The PLT system would also give the power companies a new line of business and could be competition for the cable and British Telecom (BT) networks. However, one group of people who certainly don't need PLT are Radio Amateurs and short wave listeners! This is because PLT works by injecting Internet signals of up to 10MHz into the electricity supply at the substation, **Fig. 1**, so that it carries through to all the local households on the supply.

A Good Idea?

The PLT technique may sound like a good idea to some people. Especially those who live in areas where BT are unlikely to upgrade the local exchange to provide the ADSL service. But just think about the electricity supply as an high frequency (h.f.) distribution system!

The PLT Internet signals will be launched on wiring that is unshielded and unbalanced. From an radio frequency (r.f.) point of view, the domestic electricity wiring is low grade with high absorption and it will need a good level of injected power to give a service that works. The distribution of electricity in rural areas is usually achieved on poles so the cables will be natural radiating antenna and the potential for interference to h.f. radio is obvious, **Fig. 2**.

Fig. 1: Power Line Transmission works by injecting Internet signals of up to 10MHz into the electricity supply at the substation, so that it carries through to all the local households on the supply. The problems associated with this technique are highlighted by the author in his article (see text).

As the bandwidth of PLT is shared by all users on the supply circuit, there'll be pressure to use higher frequencies and more power to get high data rates and an economic number of customers. Eventually PLT signals can be expected in the frequency range 1.6 to 30MHz.

On At All Times

The signals will be on the supply at all times and they will be in all households whether they are using the service or not. So, this looks likely to have a big effect on the

noise floor of the h.f. bands.

However, some supporters of PLT have suggested the ambient noise level on h.f. bands is so high the PLT effect will not be noticed, but from tests we know this is not true. In most residential locations, ambient noise is relatively low and interference comes in short bursts, unlike PLT noise, which will be continuous.

On the medium waves and h.f. bands the noise floor is measured in a 9kHz bandwidth - the bandwidth of a standard amplitude modulated (a.m.) broadcast signal. In fact though, it's often difficult to find a 9kHz slot free of signals, particularly at the lower end of the band and great care is needed to avoid including 'wanted' off air signals in the noise measurement, which would end up giving a spuriously high reading.

In practice it's much easier to measure in a narrow bandwidth such as 100Hz and calculate what it would be in 9kHz. Failure to observe this problem either accidentally or - dare we suggest it....deliberately - is a factor in the claims that PLT would not make the interference on h.f. any worse.

Scotland & Winchester

Working PLT trials are being held in some areas of Scotland and in Winchester, in Hampshire, but the real impact of widespread use of PLT on the h.f. spectrum is not known. There are also trials on other parts of Europe and the RSGB and other IARU organisations are working together to try to ensure our precious h.f. bands are protected by tight limits on r.f. emissions from cable networks.

In Japan, the national organisation for the Amateur Radio, the **Japanese Amateur Radio League** (JARL), reports that their Government has decided that PLT **will not be licensed to operate due to the potential for interference with safety of life radio services – such as Amateur Radio!**

If you wish to learn more regarding the implications, you can find out more about PLT and the implications for h.f. radio by checking the RSGB website at **www.rsgb.org.uk**

On the website you'll find notes of interference monitored by the RSGB on the recent trials. Incidentally....you can also listen to recordings of PLT interference!

Networks & Automation System

The PLT technique is also being developed for home networks and home automation systems. Here the reported signal bandwidths are from 13.5 to 30MHz, with signal rates as high as 14Mb/sec. The problem is that if this technology becomes popular, then the adapters may become commodity items with widespread use in ordinary households. (See **www.asokausa .com** for more information).

So, what we are doing about all this and what can you do? To start...the RSGB EMC Committee has been active in getting people to understand the realities of PLT.

The Honorary RSGB EMC consultants have been deeply involved in the work of the standards bodies at European level. They're trying to ensure that tight limits are set for r.f. emissions from cable networks. The consultants have also monitored the levels of interference from PLT trials and the results can be seen (and as I've mentioned - heard!) on the RSGB website.

You may now be wondering and asking the obvious question..."What can I do"? The answer is simple! Next time you hear somebody enthusing about the wonders of PLT and PLT trials, you can do your bit to counter the PR efforts of the power companies.

Start by explaining the facts about the likely interference problems for radio communications on the short wave bands. Make it clear that this is not only the concern of Radio Amateurs, but of the general h.f. user community. Next, explain how Japan (the supposed home of high technology) has decided at Government level that the system will not be used due to concerns about possible interference with safety of life radio systems.

Meanwhile, the RSGB will continue to exert all possible influence on the standards organisations and further updates will follow in *PW* and on the RSGB website. **PW**

Fig. 2: A good level of injected power to give a PLT service that works. The distribution of electricity in rural areas is usually achieved on poles and the familiar pylons. Because of this the cables will be natural radiating antenna and the potential for interference to h.f. radio is obvious. Editorial note: The 'Supergrid' system - pictured here in rural Dorset - already radiates r.f. signals (mostly originating from the National Grid's own 'housekeeping' telemetry and switching transmissions) which make themselves known to users of the long and medium wave broadcast bands, particular as you drive under or near them while listening on a car radio! Incidentally, eagle-eyed readers will note that the three phase 'Supergrid' route on the right of this photograph is 'earthed' for maintenance. This pylon - on the section between Mannington Heath Supergrid Substation and Wimborne had many miles of the route out of use and clearly indicated as such by the statutory notices under 'Permit to Work' system for heavy maintenance (each phase is earthed at the individual pylons). The reduction in radiated noise in the l.f., m.f. and h.f. parts of the spectrum were truly dramatic when the photograph was taken on 17 July by G3XFD.

Fig. 3: This pylon - at the Mannington Heath Grid Substation in Dorset, is much lower in height above ground level. Although this substation is not situated in a built-up area, many others are now surrounded by domestic housing, often built long after the Grid was in residence! Much of the Bournemouth area and its suburbs have 132kV grid routes (some with two three phase, and some with only one three phase route) passing through, or very close to domestic housing. As the author points out in the article- this situation which is not at all uncommon throughout the UK - increases the possibilities of 'pollution' of the h.f. Amateur Bands by data signal leakage. Note: The grid route, alongside the A35 between Hinton Admiral and Christchurch is of particular interest as the Energis fibre-optic data link (spirally around the tower-to-tower earth link cable) is particularly noticeable. It attracted my attention when it was being installed by the use of an amusing to watch machine which travelled along the earth wire, whilst winding the fibre optic cable as it travelled), and I'm left wondering (bearing in mind the number of lightweight strikes which occur each year on long, exposed overhead routes) how often the 'Energis' fibre optic system is damaged as it seems extremely vulnerable looping from one side - at the top most point - of each pylon and on to the next cable span. Readers might also confirm whether or not the 475kV routes also generally carry the Enrgis fibre optic system as I'm unable to confirm this fact. **Editor.**

A Short Wave Reflex

David Allen shows you how to make use of transistors twice, by passing a received signal through them more than once. This really is feedback without oscillation! And it's a technique with a long tradition.

I'm about to describe a simple set that uses a pair transistors to work on a received signal twice but, without any form of instability. The reflex circuit has been around for many years, in fact almost as long as valves and the later transistor have been around. This humble, though effective receiver would make an economical and interesting introduction to the world of short wave listening. The origin of the circuit I'm not sure of, perhaps someone in 'radio-land' could throw some light on this subject?

The circuit shown in **Fig. 1** is for a simple short wave receiver, which was adapted from a design that I recently found whilst rummaging through my mountain of archives. The original design was intended for the reception of long and medium wave transmissions and used the old (yet clever) technique known as reflexing.

How does it work? Well, to answer that question, the signal passes through once as the incoming modulated r.f., then a second time as a demodulated audio signal. Simple isn't it? The reflex technique allows a transistor to provide useful amounts of amplification at both radio and audio frequencies simultaneously. This is a technique that was popular during the era when valves originally and then semiconductors were not so cheap and plentiful as they are today.

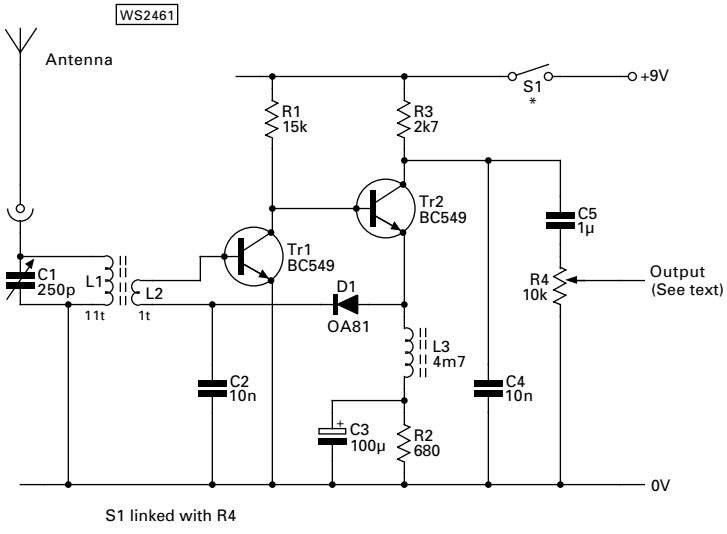


Fig. 1: The circuit is deceptively simple, but this has the equivalent of four transistors, not just the two you see.

Input Circuit

The input tuned circuit comprises a coil, L1 - 11 turns of 0.45mm (26s.w.g.) enamelled copper wire close-wound on a short 19mm diameter plastic former, which is tuned with a 125+125pF solid-dielectric variable capacitor (C1). Both sections of the capacitor are connected in parallel and the built-in trimmers set to minimum capacitance.

The variable capacitor is freely available from your local Maplin store or via their mail order service. This combination of coil and capacitor gives a tuning range of 6-18MHz that covers a good few of the more interesting short wave transmissions in the 49m to 16m bands.

The coverage of the radio can easily be modified by adjusting the number of turns on L1. More turns reduces the frequencies of the bands covered, while removing turns raises the band of frequencies tuned to. Whatever the number of turns you use for L1, you should retain the single turn coupling winding (L2).

For example, an alternative coil with a value of 31µH when tuned with the original capacitor will give a tuning range from approximately 1.8-6MHz. A suitable coil is easily constructed by close winding 58 turns of 0.45mm diameter enamelled copper wire on a 19mm diameter insulated former.

Signal Path

Now let's have a look at the path the signals take through the circuit. From a long wire (sometimes called a 'random' wire) antenna, signals are coupled to one end of the tuned circuit (L1, C1). (I've found that no 'earth' connection was necessary).

At resonance the input tuned circuit (L1, C1) is at high impedance, but unfortunately the input at the base of Tr1 presents a low impedance so if the tuned circuit were to be connected directly to the base of Tr1 it would be severely damped thus providing very poor overall results.

To overcome this problem a single turn of 'hook-up' wire (L2) is wound over, or near to, L1 to provide a suitable feed to the low input impedance of Tr1, which provides the first stage of r.f. gain. The capacitor C2 at this point effectively couples the 'low' side of L2 to 0V. Even so, as this is the only tuned circuit in the signal paths, tuning can be a little wide at times.

Output from the collector of Tr1 is then matched and coupled to

Receiver

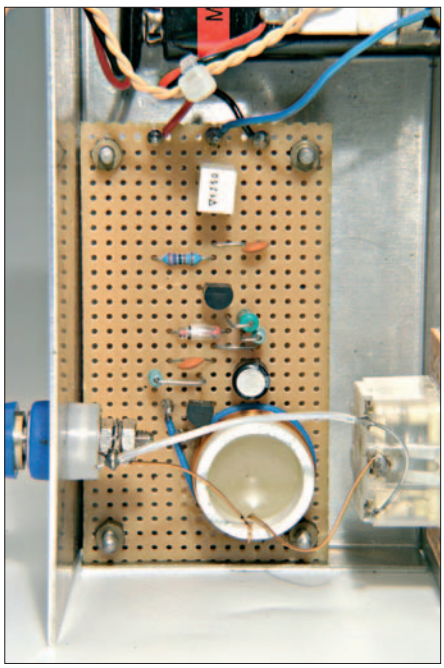


Fig. 2: Using stripboard to mount the components forming the radio, is relatively simple - just follow the circuit of Fig. 1.

the base of Tr2 which provides the second gain stage. This stage's r.f. output is at the emitter of Tr2, where you will notice a 4.7mH choke (L3) in the emitter circuit of Tr2. This choke presents a high impedance path for the r.f. signal present at the emitter of Tr2 and diverts the signal to the detector diode, D1.

The detector, D1, is fed (right-hand side) with an r.f. signal of many times that originally present at the base of Tr1 on its first pass through Tr1. So, D1 detects the modulated r.f. signal and turns it into an audio signal, when once again the 10nF-disc ceramic capacitor (C2) acts as a filter, removing the r.f. signal, leaving only the changing audio level to pass through L2 unaffected to the base of Tr1, which this time operates at audio frequencies.

The 15kΩ resistor, R1, this time functions, providing gain, at audio frequencies . The amplified a.f. signal across R1 is coupled to the base of Tr2, acting in common emitter mode to provide further audio gain with R3 as the output load.

To increase Tr2's gain at audio frequencies, the emitter of Tr2, resistor (R2) is bypassed, by an electrolytic capacitor (C3). The effect of the choke (L3) can be ignored at audio frequencies. Components R2 and C3 have been chosen to set the bias point for both transistors for best linearity and gain at the different frequencies.

Audio output is coupled from the collector of Tr2 through C5 to the volume control – R4 and in normal use the audio signal available at the wiper of R4 will drive a good crystal earphone at excellent volume. Should you wish to use the receiver with a low impedance pair of headphones an additional amplifier can be added.

There have been many instances of circuits of add-on amplifiers shown in the pages of *Practical Wireless*. In his regular column Carrying On The Practical Way, **George Dobbs G3RJV** has produced several designs based on the LM386 (December 2002) or the LM380 (April 2004). You may need to add another coupling capacitor into the circuit depending on which amplifier circuit you add.

Assembly Straightforward

Construction and assembly of the receiver is straightforward with all the resistors, capacitors, semiconductors and inductors mounted on a piece of stripboard, **Fig. 2**. When using stripboard, I use solder pins for off-board components (C1, R4, antenna input socket and the set's output connections) and solder the legs of the components together underneath the board. The receiver can be built-in to any suitable small plastic or metal enclosure. I've used a metal two-part box as you can see in the overall internal layout of **Fig. 3**.

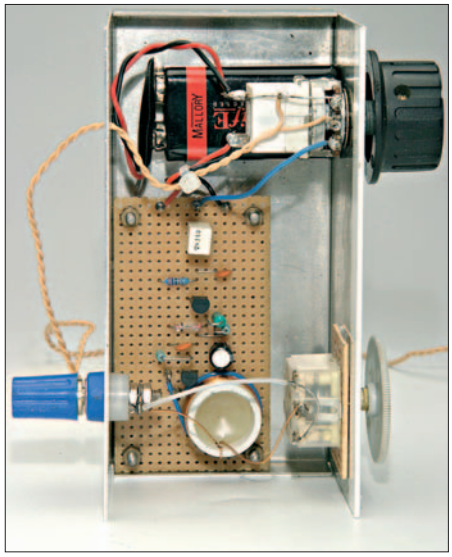


Fig. 3: Then fit the board into a case of your choice.

Operating The Receiver

In use, the operation of the completed receiver is not complicated. But in essence there are two steps:

a Connect a random/long wire antenna to the 'top' of L1/C1. If you has a mighty colossus of a long wire antenna it may be wise to connect a small value capacitor (say 47pF) in series with the antenna to prevent swamping of the receiver by super power transmissions.

b Switch on and rotate the volume control to about halfway, then rotate C1 slowly, until signals are heard and adjust volume control if desired.

Just before I sign off, I'll mention some of the things I've heard on my prototype receiver. With only two transistors in this modest design this receiver obviously cannot be placed in the communication receiver class! But you should be able to receive a good number of transmissions from around the globe, which will depend on your location, antenna system, time of day, time of year and vagaries of the ionosphere.

During operation of the receiver I noticed that during daylight signals at the higher frequencies were predominant. Then, as darkness fell the lower frequency transmissions started to arrive at good signal strength and the higher frequencies tended to diminish somewhat.

Well! That's it! A simple reflex radio, that gives a good account of itself, in spite of having only two transistors. **PW**

Shopping List

Resistors

Fixed 0.25W carbon film

680Ω	1	R2
2.7kΩ	1	R3
15kΩ	1	R1

Variable

10kΩ	1	R4 with on/off switch

Capacitors

10nF	2	C2, C4
1µF	1	C5

Electrolytic

100µF	1	C3

Variable

250pF	1	C1 or use a 125+125pF polyvaricon (Maplin, AB11).

Semiconductors

BC549	2	Tr1, Tr2 or any similar small-signal *npn* transistor
OA81	1	D1 or similar germanium detector diode

Inductors

L1 - 11 turns of 0.45mm enamelled copper wire close-wound on a short length of 19/20mm diameter plastic tubing (see text).
L2 - a single turn of hook-up wire wound over, or close to, L1
L3 - a small 4.7mH r.f. choke (Maplin)

Miscellaneous

A piece of stripboard, solder pins, hook-up wire, control knobs for R4 and C1, plastic tubing 19/20mm diameter,an antenna input socket some 0.45mm enamelled copper wire, enclosure of choice, nuts, bolts, etc.

The Vectis Run Part 9

By Rupert Templeman

It's January 1939 and travelling Wireless Technician-Salesman Alan Edwards is in a tight spot. His monthly trip to the Isle of Wight - The Vectis Run - has turned into an espionage nightmare. He's been abducted by the very people he had been trying to locate for the Secret Service!

As he slowly regained his senses Alan realised that the beating he'd received from the foreign agents was truly professional. They hadn't killed him! He was still 'available' for further 'physical persuasion' as the leader had called the treatment. They really weren't sure if he knew anything and Alan knew they'd be back to try again.

Although very battered and bruised, Alan didn't feel as though he'd been really hurt...until he moved. It was then he discovered he was restrained and that his body was protesting the pain from head to toes.

The memories of the insistent demands - half of which Alan hadn't understood - and the thuds as the soft cosh hit him, still reverberated through his mind. However, the most striking memory he had was not of the demanding questions from his captors - but the screams of the girl. She was obviously horrified at his treatment and had done her best to help stop the attacks. Her attempts were fruitless though, as she was eventually thrust into another room, although Alan could still hear her protests.

Alan was extremely uncomfortable and felt the salty slime from the wooden board he was lying on, seeping into his clothes. In fact, it felt very much as though the room he was in had been regularly flooded with water...and it was obviously sea water or tidal river water.

Looking around him in the dim light he judged it was early in the morning. Distant birds were raising their dawn chorus and he could see the daylight becoming brighter through the barred, glazed window which was too far above his head to allow him any view outside.

Listening intently he thought he could hear running water, and the swishing of wind through reeds. Was he near a river or tidal estuary perhaps? Unable to see his watch - and not even sure if he was still wearing it as his hands were secured behind his back - Alan struggled up into a sitting position.

As time went by he was certain he heard a distant train whistle. If only he could see his watch - that would give him a clue as to where he was. His extensive knowledge of the Isle of Wight railway system and timetable would see to that. Even in the present predicament he chuckled to himself, he did so because he'd get the last laugh - remembering his friends' running jokes about his eccentric interest in trains!

Suddenly the light in the room became brighter as the sun's rays penetrated inside via the barred window. The increased light enabled Alan to see his surroundings clearly. It appeared to be some form of cellar - and from the bricked up archway in the wall - it could have once had access to the river or sea. Perhaps it had been a boathouse?

High above his head he could see a landing, presumably the ladder/steps had been pulled up by his captors. Above that was a light coloured, heavily panelled, stoutly built door. The sunlight was now becoming brighter each moment and was illuminating the door.

Then, with a sudden, penetrating shock, Alan's mind leapt in full action - he could see a view from outside the window being projected onto the door! There it was, straight in front and high above him looking similar to a small cinema screen or one of the projection televisors he'd seen at Radio Olympia in London.

In wonderment Alan stared at the upside down scene - camera obscura fashion - visible on the door panel. If he wasn't so much in fear of his life - it would have been something to marvel at. The harder he stared - the more he thought he could see. At times Alan imagined he was looking down a river and towards distant hills. Before long however, without knowing it, he'd drifted off to sleep - despite being incredibly uncomfortable on the damp board laying on the flagstone floor.

It was a sharp and extremely painful bout of leg cramp that woke him up. Alan had no idea how long his exhausted sleep had been - but something made him look up at the door. As he did so - Alan was astounded to see the projected image of a ship glide by on the door. Despite the small image, the ship was so distinctive he recognised it immediately.

"It's either the *Isle of Guernsey* or the *Isle of Jersey*" he gasped aloud to himself. These sister ships were the almost new Southern Railway steam turbine packet vessels serving the Southampton-Channel Islands route. They were fast, truly beautiful ships and Alan had often watched them sail up the Solent cruising effortlessly at 25 knots. They were so regular you could almost set your clocks as they passed, as their timing was impeccable.

As the steamer slid silently off the door - as the vessel passed out of the narrow perspective of the window - Alan realised he could now probably identify where he was. It was certainly on the East Coast of the Island as the steamers operated via the Solent, passing between the New Forest coastline and the Island's eastern shore.

The ships always looked magnificent as they swept past the Yarmouth - Lymington Ferry service, making the smaller car ferry look like a bath toy. Importantly, Alan knew that the the daytime outward and inward bound steamers usually passed each other between Yarmouth and Gurnard - often in the vicinity of the Newtown Estuary and haven at around 1pm.

Newtown! That was it - he was probably being kept a prisoner somewhere in the Newtown area. It was an area where he'd never been, but the changing angle of the sunlight entering the window, and knowing the approximate time of the ships' passing place provided a strong clue.

Then, another thought struck him - if the steamers usually passed somewhere between Yarmouth and Gurnard - he might see the other vessel. That would clinch it - and he stared hard at the slowly fading picture on the door panel, literally willing the other ship to appear.

It must have only been a few minutes - although it seemed like hours - but Alan gasped a sigh of relief when the second ship appeared - travelling in the opposite direction to her sister. The clouds of black smoke from her two elegant funnels was so distinctive. He'd seen it so many times from the car ferry and knew he must be somewhere in the Newtown area. The river he could see was in fact Newton Bay, an inlet of the sea - providing one of the most peaceful small harbours on the Island.

But knowing where he was wouldn't help him much unless he could get free. Despite this, even though Alan was never a demonstrative young man - the surge of relief on finding where he was - urged him to struggle to his feet, using the damp wall as a support, until he was standing. It was then he discovered that his

feet where shackled with a sturdy chain and lock.

Alan tried wriggling his hands and slowly, he felt the cords loosen. He'd often been fascinated seeing the exploits of escapoligists in the cinema - and now he had an inkling of what they did - continually flexing and relaxing the muscles around their rope bonds. The difference was of course - they had much more practice...but undeterred he mentally pictured his hands and moved the wrists together - it was sore and unpleasant but slowly he felt, almost imperceptibly, that the cords were slipping down towards his knuckles.

Operation Vectis

Mike Coley had only just replaced the telephone receiver when the bell rang again. He snorted with stressful anger - he wanted to get back to monitoring. It was imperative to listen for Alan's beacon signal - but so many of the large team now involved in 'Operation Vectis' were ringing him to check progress. He even considered leaving the receiver 'off the hook' again - but remembered that the last time he tried this, the exchange had put the loud warning siren on. No escape that way!

Answering the demanding instrument Alan immediately recognised the clipped tones of an extremely worried 'Mr Jones'. "Any news"?, he asked Mike.

"No Sir", the latter replied - "I've just had Arthur Cotton from Freshwater on, and just before that Ivor Richards rang me from East Cowes, and about half an hour ago Carl Rheibach called. Nothing heard so far...it's really worrying"!

Jones, with a detectable air of despair in his voice replied quickly. "Well, we've instituted an air search for Mr Edwards, using the aircraft - the autogyro machine, which had already spotted him in Carisbrooke. The crew have finished their special mission and as they know what his van looks like - we've literally got them flying all round the Island". With that, the Secret Service officer abruptly ended the call.

Mike, nonplussed at the man's actions voiced his thoughts. "Hmm, the Island may appear small on the map...but it's a big place for one aircraft to search! He then returned to listening for the hoped-for beacon signal.

"something made him look up at the door. As he did so - Alan was astounded to see the projected image of a ship glide by on the door. Despite the small image, the ship was so distinctive he recognised it immediately".

Help From Above

Alan's wrists and lower arms were extremely sore now - and his watch strap had increased the friction. Relieved the watch was there - he hoped it was still working. Soon, almost imperceptibly, he felt the cords slacken enough to release his hands. It was then he discovered how stiff his arms were - as moving his arms round to his front seemed to take minutes.

He greeted his watch like an old friend. It was still working and was indicating just after 2pm. Obviously - from the sunlight - it was in the afternoon. Alan never tolerated anything other than a good timekeeper and knew that the watch would be accurate to within a minute or so.

His ears momentarily pricked. He'd heard another train whistle! Looking at his watch he saw it was now 2.10pm. And - know knowing where he was - he knew that it was the mid-afternoon train leaving, or approaching Ningwood station on the Freshwater to Newport journey. He felt as tough his railway friends were close by - but not near enough to help.

A sudden rattling and creaking noise made him look up. The door above his head was opening. Fearing the worst his body tensed - he was in for some more rough treatment - but at the same time was determined not to cower...preparing to defend himself to the end.

The door opened, and a slight figure appeared. It wasn't the pugilistic type - it was the girl! She peered into the dimly lit room and although obviously extremely frightened...she wasn't injured in any way.

"Hello" she said hesitantly - "I've escaped from the room and want to help you, but do not know where the ladder is. They have gone to complete their mission and I know we are both to be killed before they leave" she said, trembling, looking down at Alan.

Surprised at his croaky reply, Alan explained his feet were shackled and he couldn't climb up.

The girl looked desperate. "We have only a few hours and they have blocked the only way out of the house with their vehicle - we are trapped until they return". The fear in her voice was all too obvious.

To be continued.....

Stefan Niewiadomski set about improving the performance of an LC audio filter that he originally designed for the *PW* Colne receiver.

Sharper By Design

Way back in 1985 *Practical Wireless* published, in the *PW* Colne receiver, the first design for a passive audio band-pass filter using off-the-shelf inductors (Toko 10RB and 10RBH) along with standard value capacitors. At that time, *Spice* the electronic circuit simulator computer program, which I used to check the design before building it, was an expensive tool, 'borrowed' from my employer. But now there are versions of this program available for free!

Free software is easy to find, as I found out when I recently searched the Internet for suitable analogue circuit simulators. And the best I found was a program on the Linear Technology website.

The software on offer includes the facilities of schematic capture, a circuit simulator and a waveform 'viewer'. Although this package is intended for the simulation of Linear Technology's range of switching regulators it's really a general purpose tool and is eminently suitable for verifying lots of analogue circuits before building them.

Simulation Results

The circuit of **Fig. 1** shows a typical passive audio band-pass filter. Specifically it's a 3-pole high-pass filter (L1/C1 and C2) cascaded with a 5-stage elliptical low-pass filter (L2, 3 and C3 - C7). The resultant action of cascading two filters, is to create an overall band-pass response. This new composite filter is ideal for use in a superheterodyne (superhet) or direct conversion receiver. It could also be added into an existing receiver or transceiver.

The designed drive and load termination impedances of the filter shown in Fig. 1, are both 1kΩ. And when using these values, the lower and upper cut-off frequencies are nominally 400Hz and 2.5kHz respectively. In the past there have been a couple of aspects of passive audio filters using Toko inductors that have always concerned me. So, I decided to use more computer circuit simulations of a variety of the circuit parameters to explore if there were any alternative settings for the various values and parameters.

With the design drive and terminations loads, I found the pass-band response was always 'droopy', especially near the lower and upper cut-off frequencies. This effect is more noticeable when attenuating the higher pass-band frequencies. These frequencies, are important for intelligibility so, this droop is especially critical under marginal reception conditions.

Secondly, it seems that most filters are designed for equal drive and termination impedances, being typically 1kΩ. The equality of feed and termination impedances produces the potentiometric effect, of reducing the output voltage of the filter to half the input, even within the pass-band. The normally accepted effect of throwing away half the desired signal voltage, under marginal conditions, is not a good idea and is no aid to improving readability.

Circuit Variations

During my experiments, with the circuit values, I plotted the loss/frequency characteristics of several circuit variations. Firstly, I plotted the curve labelled '1' on **Fig. 2**, which shows the simulated response of this filter when driven from, and terminated by, 1kΩ resistances. As expected, the maximum output voltage is more than 6dB down (less than half) of the input applied voltage.

As well as the half-level output voltage, the frequency response shape of the curves near to the 'cut-off' frequencies are not particularly sharp. The extra attenuation of the filter, even within the pass-band, comes from the finite *Q* of the Toko inductors, which I modelled by including a series resistance in each of the computers within the computer model. For example, the 68mH inductor, due to its size, has a minimum series resistance of 66Ω.

Using the computer to simulate the circuit, I investigated the effect of different terminating resistances. However, conventional wisdom says this is not a good idea - filters should be driven from and terminated by their designed impedance. Should this rule not be adhered to, the sky will fall down - but of course it doesn't!

In Fig. 2, the other curves labelled 2-7 show the results of varying the terminating load resistance value. Clearly if the value of this resistance is reduced, the potentiometric effect increases, and less of the input voltage will get to the output. So, this is not really a good idea. The extra 'lossy' effect (in voltage terms anyhow) is shown in curve 2, which is the simulated response with a 470Ω terminating resistance. Please note that the response shape of curve 2 is even more 'droopy' close to the the cut-off frequency points.

So, having persuaded myself that values below 1kΩ were all in a no-go area, I set about trying other values. And so, all the other simulation values that I tried were greater than 1kΩ. But in the spirit of the original filter designs themselves, only standard E12 values were tried.

You can see from the other curves shown in Fig. 2, that as the termination resistance is increased, the output voltage (as a ratio of the input voltage) rises. This is due to there being less potentiometric effect. I also noted that the pass-band response becomes flatter up to a termination resistance of 2.2kΩ .

The curves plotted for 4.7, 10 and 22kΩ terminating resistance values show increasingly less pass-band attenuation (as expected), but they also show more pass-band ripple and sharper cut-off characteristics. Lighter loading of the filter also show up a greater output (only 1dB more though) at the higher turn-over points than at the lower one. For example, the rising output at 2.1kHz, compared to the the output compared to 500Hz level makes the output audio a little more 'punchy'.

The response of the filter up to 10kHz and terminated with a 4.7kΩ resistance, is shown plotted in **Fig. 3**. Here you can see that the mismatching of impedances does not adversely affect the stop-band response. The 40dB or so of stop-band attenuation makes this a very

respectable audio filter. In general setting the termination resistance at about 4-10 times the drive impedance seems to give the best results.

Real Applications

There are many ways that passive audio filters are included in real applications. **Fig. 4** shows a few ways that this can be done. If the collector of a transistor drives the filter (as in (a)), the collector resistor is the driving impedance 'seen' by the filter. Op-amps typically have a very low output resistance at audio frequencies and so a series resistor is added to match to the filter, as shown in **Fig. 5**.

At the output of the filter, a resistor to ground is typically used to terminate it. In circuit Fig. 5, which shows an op-amp driving the filter, and again the volume control providing the termination. Note that the driving resistance is shown as 1kΩ (this will depend on the exact filter implemented) and the terminating resistance is 10kΩ, giving the benefits described above, even though the filter is designed for equal, 1kΩ, input and output impedances.

My conclusions are that LC filters can provide an easily created audio filter and that a computer-based analogue simulator is a great way of experimenting with the circuit values. This is especially true where a large number of 'experiments' need to be done and the effects are subtle.

The effects are indeed so subtle that, in practice, you would need advanced test gear to measure changes if the experiments were carried out on a 'real' filter. The Linear Technology simulator includes a circuit simulator, waveform viewer and schematic capture and is an easy way of getting into circuit simulation for free.

The passive audio filter investigated benefits from being terminated with a higher-than-calculated termination resistance, which improves its pass-band response and lowers its insertion loss. Use of the simulator will allow the Amateur to experiment further with these effective, cheap and easy to build filters.

If you already have one of these filters being used in a receiver you can simply replace the 1kΩ termination resistor with say the 4.7 or 10kΩ value to get the benefits shown here. In general setting the termination at about four to five times the drive impedance seems to give the best results.

PW

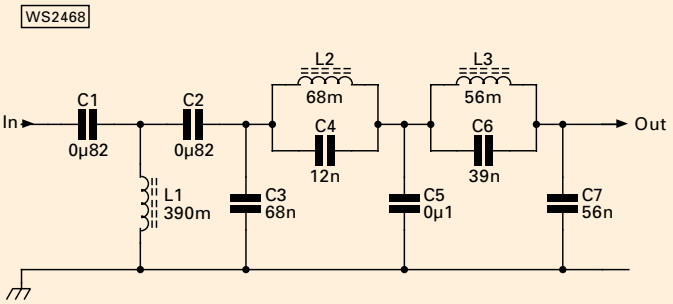


Fig. 1: The band-pass filter consists of a high-pass filter preceding an optimised low-pass one. See text for more detail.

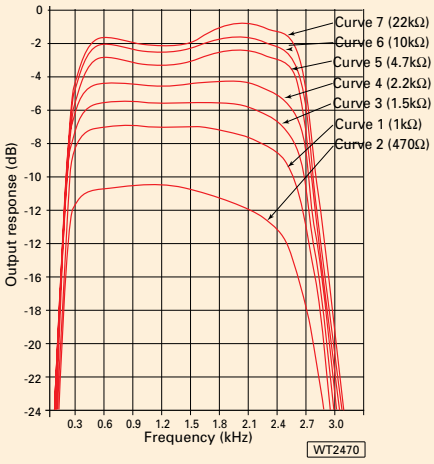


Fig. 2: A comparison of the response curves when using differing termination loads. See text for more detail.

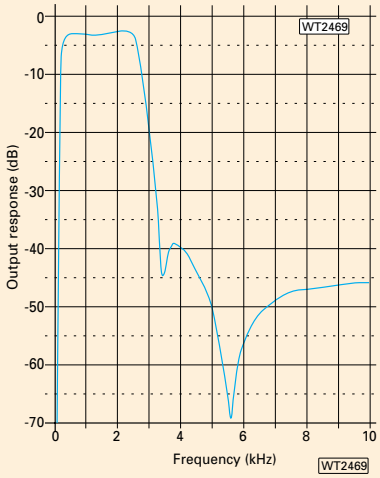


Fig. 3: A closer look at the in-band response of the filter feeding into a 4.7kΩ resistor load. See text for more detail.

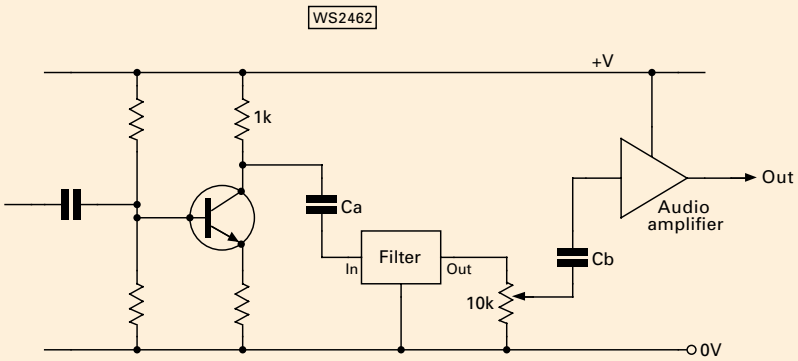


Fig. 4: When feeding the filter from a transistor amplifier, the collector load resistor is the input resistance too. Note: that capacitor Ca can be part of (C1) the filter. See text for more detail.

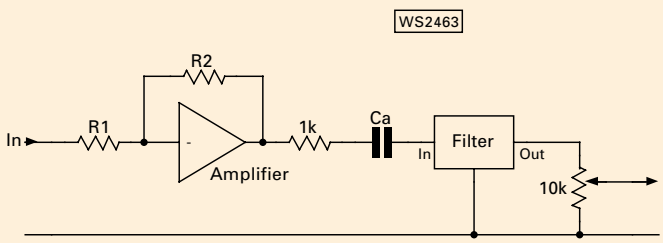


Fig. 5: Feeding the filter from an i.c. amplifier needs an actual input resistance Note: capacitor Ca can be part of (C1) the filter. See text for more detail.

Getting Hold of the Simulator

The schematic capture and *Spice* simulator package, *LTspice/SwitcherCAD III* , which runs on a PC under *Windows* used in these experiments was downloaded free of charge over the Internet. My thanks go to Linear Technology for making this package available from their site at **www.linear.com/software/**

Getting Hold of the Inductors

The Toko 10RB and 10RBH range of inductors are becoming rather more difficult to find, as they have been discontinued by Toko. But there still are some 'sloshing' around in the system. One pool of these inductors that I found was **Sycom** who, as we went to print, still have supplies of the components needed to make this filter. Contacted Sycom at: **PO Box 148 Leatherhead, Surrey KT22 9YW**. Tel: **(01372) 372587**, or via E-mail: **robin@sycomcomp.co.uk**

Walter Johnson G4CNK takes a look at the history of the radio callsign and the variety heard nowadays can be puzzling for new Amateurs. You'll soon get to know them as Walter helps you sort them out.

Sorting out Radio Calls

The Callsign 1900-2004

It's now well over 100 years since Marconi was in England working in co-operation with the Government carrying out definite wireless communication. Even from this early stage the Government must have realised the enormous advantage of such rapid communication.

In fact, there's no doubt that even before 1900, the Royal Navy were authorised to install equipment on board ships and carry out tests. They had in fact already installed Marconi equipment on some ships during the Boer War in 1899. It's hard to believe that this all happened before the Wright brothers flew their first aircraft!

Government interest was again shown, by the introduction of a Wireless Telegraphy Act. This was in 1904 and demanded that all transmitters and receivers in Britain be registered. If the word amateur is taken to mean a learner, everyone at first could only have been an amateur. The reason for this is that few textbooks had been written, never mind the rarity of arranged courses to train professional engineers.

The Great War

The original wireless experimenter licensees (now called Amateurs) were active long before the 'Great War' 1914-1918, latterly to become known as the First World War. To obtain a transmitting licence, a written application was made to the Post Office, with details of all experiments it was proposed to carry out.

A well written application and a 12words per minute (w.p.m.) Morse test would no doubt obtain a licence. There was no formal Radio Amateurs Examination requirement until 1946, but the 12w.p.m. Morse test was to survive until recently.

Callsigns before 1914 consisted of three letters, such as **MXA**. This was in fact the callsign of **Leslie McMichael** of the famous McMichael Radio Company. However, on the outbreak of war, for security reasons, all Amateur stations were dismantled and closed down for the duration.

Returned In 1920

It was 1920 before Licences were available again and even at the beginning of this period the 'G' prefix was not part of the callsign. The callsign consisted of one number, which was 2, 3, 4, 5, 6 or 8 followed by two letters.

There are still pre-1939 Radio Amateurs listed in the 'callbook', who now of course use the normal 'G' with one of the numbers and two letters. The secondary locator (if applicable) had also to be used. Occasionally, newcomers to Amateur Radio are confused when they hear a two letter callsign, because they're not so common nowadays.

Incidentally, it's interesting to note that even the 1922 BBC Broadcasting Station (2LO) had an Amateur type callsign! Another interesting fact is that the letter 'E' was not issued in a pre-war callsign, which was perhaps due to the fact that a single dot in Morse (in bad conditions) might cause difficulties.

Artificial Aerial Licences

Long before the start of the Second World War in 1939, 'artificial aerial' licences were issued. These commenced with the number 2, followed by three letters. This allowed the building of transmitters and testing them, but only into an artificial aerial.

The so-called Artificial Aerial consisted of a coil, capacitor and resistor, connected together in such a way, that electrically they had the same properties as a real aerial. This lot being 'a lump' in a small space meant it was a very poor radiator. In fact, it could be classed as a more elaborate dummy load than we would use for test purposes nowadays.

No radiation was allowed beyond the Licensee's own premises. But rules could be bent - even by the old timers - and perhaps their aerials were not made too artificial?

Wartime Work

Many of the pre-war Licensees served as technicians in all types of electrical work and others were radar and wireless operators, etc. in the services. Others, as civilians, were employed on important Government work to aid the war effort.

One of the very early Amateurs, **John Scott Taggart**, served in the 1914 war as a signals officer and was awarded an MC. He wrote radio books and was also a prominent author/designer writing for *PW*) and designed receivers that he sold as kits and owned wireless patents, etc. In 1923 he had the call 2LR.

Taggart also became a Wing Commander in the RAF during the last war and was awarded the Air Force Cross plus a Bar to it for his contributions and responsibility for Radar stations around Britain.

Forward Thinking Society

Due to the forward thinking and pressure by the Radio Society of Great Britain, Amateur Radio Licences became available again in 1946 soon after the War ended. The first Radio Amateur Examination (RAE) was soon available and consisted of a three hour written examination which remained at a constant theoretical level for about 30 years.

Some of the surviving pre-War Licensees had their licences re-issued, but it must not be forgotten that many others had perished during their War service.

Also at this time, the those who had held pre-War 'AA' Licences (The AA Licence system was not continued after the War) were allowed a normal Amateur radiating Licence,

after passing the 12w.p.m. Morse test. They were then issued with a 'G2' plus three letter callsign.

Many of the new Licence applicants were ex-servicemen and women with military qualifications in radio theory, telegraphy or both. Suitable qualifications allowed exemption from the RAE, c.w. test or even both tests. However, all exemptions ceased at sometime before 1955.

New callsigns issued at that time were in the G3 series. However, many pre-War callsigns using G2 plus two letters, G3 plus two letters, G4 plus two letters, G5 plus two letters and G6 plus two letters, and E8 plus two letters, can be heard on the bands.

Reciprocal G5 Callsigns

The once fairly common modern G5 plus three letter calls, were callsigns issued to Amateurs from abroad, and were introduced as a Reciprocal Licence about 1966. However, these were all revoked about 20 years ago. **Note:** Of course, it's is still possible for visitors to have reciprocal arrangements and this is made possible by the CEPT membership agreement, as explained in the Ofcom information and the RSGB booklet.

Visitors from the CEPT Agreement countries operate as follows: first they identify their station by sending the current 'M' (representing the UK) followed by (if applicable) the regional locator, then stroke(/), then their callsign as used in their own country, followed by a stroke /P or stroke /M, whichever is application. An example of this is a German visitor operating in Scotland who could be signing as MM/DL—-/P.

Amateur TV G6 Callsigns

The G6 allocation were new callsigns in use from about 1964 and they were for Amateur television transmission and reception Licensees only. However, this issue did not last many years as a class 'B' or 'A' Licensee ended up not needing a completely separate 'G6' Amateur Television (ATV) Licence. They were therefore all revoked, but were issued again as a new series of class B callsign in 1981, when the first class B callsigns were expended and more were required.

Class B Callsigns

Now we come to the G7 callsign. Interestingly, I've heard that during the 1939-1945 War some people were issued with special G7 callsigns to help the war effort. Whether or not this information is correct, is unknown. However, the G7 was eventually used as a new class B Licence in 1988.

The G8, G6, G1, G7, M1s are all Class 'B' three letter callsigns from 1964 to the current 'M1'. The 'G8' was the first 'no Morse code' licence and was first issued in 1964.

The G4 & G0 Series

The issuing of G3 series eventually came to an end of the 1960s and into the very early 1970s, to be replaced by the G4 series. The last of the callsigns using the 'G' prefix were to be the G0 series.

Specialist Callsigns

Let's now look at a specialist callsign - the G9s. These callsigns were issued to colleges, etc., for experimental work. Some manufacturing companies used a G9 licence for the same reason and to test manufactured equipment. For example, the famous Belling Lee Company financed, designed, built and operated a television transmitter at Croydon which used the callsign G9AED.

The A/B (M5) Licence

Passing the RAE and a 5w.p.m. Morse test qualified the applicant for the A/B Licence. Later, when the class A (M0) Morse test was reduced to 5w.p.m., the qualifications for both Licences became identical.

Due to the changes, the M5 class was not really necessary any longer. As a result all the original M5 licensees were granted the right to an M0 licence after application, but some didn't apply for this. (Except for these original issues, the M5 class was discontinued).

The Irish Republic

The callsigns used in the Irish Republic are quite simple. With one exception all prefixes are EI, and the numbers are 0-9 followed by one, two or three letters. The exception is the 'EJ' prefix for the off-shore islands.

Club Callsigns

Club callsigns have an interesting variation. Instead of the usual regional secondary locators, Amateur Radio clubs can use a special club regional locator. (This automatically denotes it as a club station and also the region). All these locators are listed in the Ofcom BR68 Booklet. As an example, the 'X' is the secondary locator for England, so a GX4—- is a Club station operating in England.

Licence Classes

Licence Classes: At present there are five classes obtainable, which include **2EI** intermediate (ex Novice), **2E0** intermediate (ex Novice), M1, M0 and the M3. **Note:** The Licence class M0 includes the 'Full Class A Licence which covers the older G2, G3 and G4 Callsigns.

Note: Callsigns can be re-issued, and it's possible to hear pre-War calls in use on the bands. Additionally long established clubs often retain the use of callsigns which were first issued as long ago as the 1920s, maintaining a proud tradition.

I haven't made any references to the numerous special callsign prefixes....that's perhaps a subject for another article to help newcomers to our hobby! Finally, my thanks to the late **Fred Webb G0CEK** for studying the original idea and giving his valued opinion and suggestions.

PW

valve & vintage

Judging by the brown dustcoat and the copy of the *Eagle* on the desk, it's obviously Phil Cadman G4JCP looking after the vintage 'wireless shop'. This month Phil rounds off his chats on audio topics...after he's read *Dan Dare*!

Hello, and a warm summer welcome to the V&V 'shop'. Glad you could drop by. This time, as a conclusion to my audio theme, I'm featuring an amplifier design that celebrates its 50th anniversary this year. I'll also be revealing what can happen when you mix a dedicated audiophile with a pair of large transmitting triodes!

It seems that most of you favour zero feedback with regard to valved audio amplifiers. I can say this because that's pretty much what I received from you about my last column. Do I take it that valved audio amplifiers are not popular with the V&V readership?

If so, it's strange, because valved audio amplifiers are easy enough to build and no licence is required to use them. Except, perhaps, when they, take-off, smack in the middle of the medium wave band, as once happened to me. Oops!

Actually, I did receive some feed back, in the form of one letter, from **John Gomer G8UNZ**. He very kindly loaned me a book from the **Bernards Radio Series** (No. 109) called ***High Fidelity Radio - Design And Construction***, by **N A Bonavia-Hunt** (wonderful name).

Inside the book was a design for a cathode-follower amplifier which used an EF37A driving two parallel-connected PX4s. It's a rather curious circuit. The output transformer is capacitively coupled to the cathodes, with a 3kΩ 50W resistor providing the d.c. path to h.t. - (and absorbing over half the audio output in the process). That's a good way to make an already inefficient amplifier even less efficient!

I also received an E-mail regarding c.r.t. transformers from **Morgan Jones** of ***Valve Amplifiers*** fame. I must admit, I was very surprised - and most flattered - to find that such a respected author reads the V&V column. Seems you never can tell....

Retro 7MHz Project

The 'retro' 7MHz transmitter-receiver re-published (from an original *PW* 'blueprint' design) in the July issue of the magazine caught my eye, not least because it used ECL86 triode-pentode valves. However, at the risk of sounding like a smart-alec, I was more than a little concerned to see a 47kΩ anode load resistor used in the receiver's audio output stage.

The value of resistance used in the circuit will cause the ECL86 anode voltage to fall to a very low value. I was concerned that it may well cause the screen grid - with its full 250V h.t. - to 'fry'.

So, I wonder how much current the screen grid will draw under these conditions? (Difficult to work out from the characteristic curves.) The data sheet says the maximum (continuous) screen dissipation is 1.8W; that's 7.2mA at 250V. Any more current and the screen runs the risk of overheating.

Phil Cadman G4JCP doesn't just write about valves - he enjoys using them! This photograph shows a pair of Leak TL/12 Plus amplifiers. They're Phil's pride and joy and are a variant of the Mullard 5-10 circuitry (see text).

Celebrating 50 Years

Fifty years ago, an article in the October 1954 issue of *PW* described the new **Mullard** 5-valve, 10W amplifier; subsequently known as the **Mullard 5-10**. This was the original 5-10 design, introduced in the Summer of 1954.

The engineers at the Mullard Applications Research Laboratory had purposely designed a compact amplifier so they could demonstrate the virtues of Mullard's new audio valves. The result was a high-performance amplifier that was both easy to construct and comparatively low in cost.

The 5-10 used an EF86 voltage amplifying stage, an ECC83 cathode-coupled phase splitter and two EL84 output pentodes. The h.t. was provided by a GZ30 (optionally an EZ80) with resistance-capacitance smoothing. The EL84s were pentode connected; later on, the 5-10 would also be specified to use the ultra-linear (Mullard called it distributed-loading) output connection.

With a quality output transformer (and 26dB of negative feedback) the amplifier delivered 10W at less than 0.4% distortion in the mid-band. The low power frequency response was excellent: only 0.5dB down at 10Hz and 20kHz. The power bandwidth was good too: just 2dB down at 30Hz and 30kHz relative to 10W.

The 5-10 design proved to be extremely popular, and many amplifier manufacturers took the basic Mullard circuit and marketed modified versions as their own. The **Leak TL/12 Plus** amplifiers I use in my own hi-fi system, (heading photograph), are very similar to the ultra-linear version of the 5-10. The only significant difference being the phase splitter; Leak used an ECC81 instead of an ECC83.

The ultra-linear output connection employed by Leak helped reduce the mid-band distortion to around 0.1% at 10W. The 0.1% distortion was something of a 'Holy Grail' figure in the 1950s, having originally been promoted by Leak in 1945 when they first advertised their **Point One** series of amplifiers.

I must admit to an affinity with the 5-10. Possibly because my Leak TL/12 Plus amplifiers were based on the design. Or maybe it's because both the 5-10 and I were introduced to an unsuspecting world in the same year!

Mystery Loudspeaker Design

While on the subject of 1950s Hi-Fi, I would be most grateful for a little help in identifying a loudspeaker

enclosure design. Featured in *Wireless World* some time in the 1950s, it's of interest to me because I'm sure it's the same loudspeaker enclosure that was used at my old school. (Yes, I did go to school although I hated it most of the time).

There were two loudspeakers, one on either side of the stage in the school hall (coincidentally, both were driven by a Leak TL/12 Plus), and there was a third in the music room. They were clearly not commercial enclosures and after I'd left school (hooray!), I wondered who had built them and remember they sounded remarkably good.

I can only offer a crude description: they were rectangular, approximately 36 inches high by 20 inches wide by 11 inches deep. No point in giving metric dimensions; anyone old enough to recognise this design will still think in feet and inches (okay Mr Editor?).

I'm sure they were a labyrinth design, standing slightly off the floor on two blocks of wood. But their most notable characteristic was that the top of the enclosure hinged back and was propped open at 45°.

The loudspeaker drive unit was immediately below the lid, facing upward and backwards in the direction of the open lid. All very reminiscent of those old TV sets which were viewed through a mirror mounted in the lid.

The mid and high frequency sound from the (eight inch?) drive unit reflected off the lid and into the room, while the bass frequencies emanated from underneath. The most annoying aspect to this is the fact that I once had a copy of relevant *Wireless World* in my possession, but for some reason, I gave it away.

Not Impressed?

Right, I think readers are clearly not impressed with a paltry 1.65W output from a triode-connected 6V6G/GT. So, perhaps 100W would be more acceptable to you vintage 'head bangers'? (Still produced by a single-ended triode output stage, of course). Well, if you're interested...I may have just the thing for you!

On the website of audiophile **Dr. Simon Busbridge** of **Brighton University** (http://audio.eng.bton.ac.uk/833_power_amp.htm) you'll find a description and pictures of just such an amplifier. To get 100W output from a single-ended triode stage (without resorting to paralleling valves), you'll need a big triode. Simon chose the **Penta Laboratories PL833D**, a modern version of the ancient and much venerated **RCA 833A** transmitting triode.

You'll see from the photograph, **Fig. 1**, that each mono amplifier is quite understated but immensely impressive. The design was sponsored by **Metropolis Music** who will actually sell you a pair, providing you have the space, the money and a strong enough floor!

Valves In Circuit

I don't know the details of the circuit but the input stage is a 6SL7, and that drives a 6SN7 cathode follower. The 833 operates in class A_2, which means that it draws grid current above a certain level of drive. Hence the need for a low impedance driver stage.

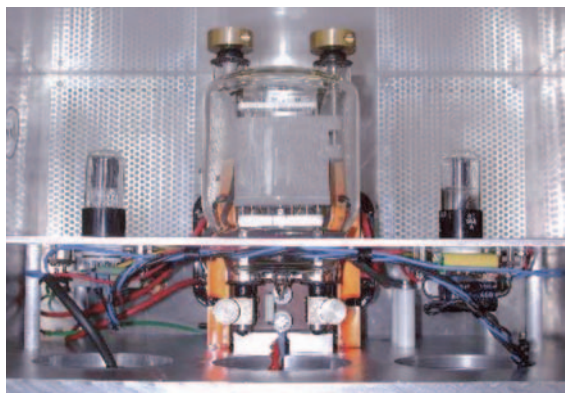
For those who are not familiar with the original RCA 833A, I'll quote the bare specification: The 833A is a directly-heated triode with a natural-cooled CCS (see below) anode dissipation of 300W. If you blow lots of air over the tube and use its ICAS rating then the permissible anode dissipation rises to 450W. It has a thoriated-tungsten filament which consumes 10A at 10V and glows like a light bulb.

In r.f. amplifier service, one valve will produce up to 1.6kW c.w. output. The maximum operating frequency at full ratings being 30MHz.

A pair in Class B modulator service are capable of producing a whopping 2.7kW of audio power. Old-timers are no doubt going misty eyed as they now remember what a wonderful Top Band p.a. this valve would make!

The amplifier pictured has a modest 100W output. But remember, the valve operates in class A, which is the least efficient class of operation. The h.t. supply of 2,400V is provided by a bridge of U19 rectifiers.

● Fig. 1: Each mono amplifier is quite understated but immensely impressive. The design was sponsored by Metropolis Music who will actually sell you a pair, providing you have the space, the money and a strong enough floor! No, it's not Phil in the photo - but he says it's "Quite spooky" that the gentleman looks very much like G4JCP!



● Fig. 2: Yes....the RCA 833A's anode should be glowing like that! (See text).

Power Hungry

Each amplifier consumes 900W from the mains supply, but I can think of no better use for 1.8kW of mains electricity. In these 'green' times, being energy efficient has its merits, but some things quite simply aren't meant to be energy efficient.

And yes, the anode, **Fig. 2**, is supposed to glow like that! The RCA data book says: "the plate (*anode*) shows an orange-red colour when the tube is operated at maximum CCS or ICAS ratings". With regard to 'CCS' and 'ICAS' ratings - which you'll often find mentioned in transmitting tube data - perhaps I should define what the letters of the acronyms mean.

The letters 'CCS' stand for Continuous Commercial Service. Valves used within their CCS ratings can be operated continuously, and should easily achieve their design life expectancy. If you need longevity and reliability, then it's essential to use a valve within its CCS ratings.

The letters 'ICAS' stand for Intermittent Commercial and Amateur Service. Oh, for the days when valve manufacturers not only acknowledged the existence of Radio Amateurs. Remember when valve data was even produced specifically for us?

Where was I? Oh yes, ICAS ratings. If a commercial user didn't mind a shorter operational life, then the higher, ICAS ratings could be used. One situation where a shorter life was considered acceptable was in mobile equipment, where small size and high efficiency were often the overriding considerations.

Amateur operation is necessarily intermittent in nature, and so radio amateurs could also use these higher ratings with the full blessing of the valve manufacturer. Go beyond the ICAS ratings and you were, naturally, on your own.

Ah well, I see its time for me to be on my own too. Do please send your comments and letters to me, either via E-mail to: **phil@g4jcp.freeserve.co.uk** or by mail to: **21 Scotts Green Close, Scotts Green, Dudley, West Midlands DY1 2DX**.

PW

call us six days a week, mon - sat 9.30 -

New Flagship Showroom Opening August 2004

We've been successfully selling radio equipment from Ealing since 1978, so why are we now moving to Chertsey in West London? **The quick answer is - parking and traffic.**

When Martin Lynch first started trading from Ealing, you could drive direct to the showrooms, park outside, spend as long as you wanted trying your new radio or accessory and then go home with little fuss. Then, around five years ago, traffic and parking got so difficult that instead of customers looking forward to their trip into London, they began to view it as a necessary evil to get to London's only Radio Store. We've listened to the complaints and now we're doing something about it by moving to Chertsey.

So how will customers benefit from our move to Chertsey?
The biggest single benefit is obviously parking. We have our own dedicated car park right in front of the showroom. That means you can drive the store, park outside and walk straight in. Bliss! This may not sound like much to those of you used to shopping outside London but to anyone living near a city, it's a real luxury.

Also, traffic is largely unheard of in Chertsey. It's a small town about half a mile from Thorpe Park (drop off the family?) with quiet roads and virtually no rush hour. It also has some excellent local shops including an Italian Deli called Carlo's - to die for and bang opposite the showroom too!

What can you expect when you visit the new Showroom?
Naturally, there's the usual bunch of smiling faces and helpful staff but now they're in an air conditioned showroom that's LARGER than ever before. It has three dedicated sections for Yaesu, Icom & Kenwood along with racks of MFJ, Maldol, Diamond, CT-Keys, Miracle Products, SGC, Linear Amp UK, Avair, MyDEL, BHi and a full range of antennas and associated accessories. There's also a huge selection of famous USED equipment too.

So when is the new super-store open and how do I get there?
We should be open for business on Monday the 23rd of August, assuming the builders, electricians, plumbers and assorted other tradesmen have vacated the premises by then - please call first. There's no need to update your phone book - the telephone and fax numbers are the same.

When we say "easy access", we really mean it.
The new address is Outline House, 73 Guildford Street, Chertsey, Surrey, KT16 9AS and it's located between junctions 11 & 13 of the M25. By car, it's just 1.2 miles from junction 11 or you can come off at junction 13 (Staines turn-off) and follow the signs to Thorpe Park. Follow the first sign past Thorpe Park to Chertsey Town Centre then, after a sharp right bend, Guildford Street is on the right. It's spilt into three sections and if you enter the street from the Windsor/London Street end, you turn right opposite the Royal Mail sorting office.

By rail, Chertsey Railway Station is literally only 800 yards away in the same street. **By plane**, Heathrow is just 6 miles away.

Our customers have allowed us to become one of the oldest Ham Radio outlets in the country and investing in larger premises in Chertsey shows our commitment to the hobby. Please come along and support your local emporium.

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73, Martin G4HKS and the gang

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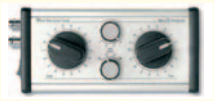

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The PW Constructor's

As a special 'extra' Rob G3XFD and Tex G1TEX/M3NGS 'pool' their knowledge, experience and enthusiasm to help you start off home-brewing. They're aiming to advise you just what basic tools to buy and where to find those difficult-to-get components.

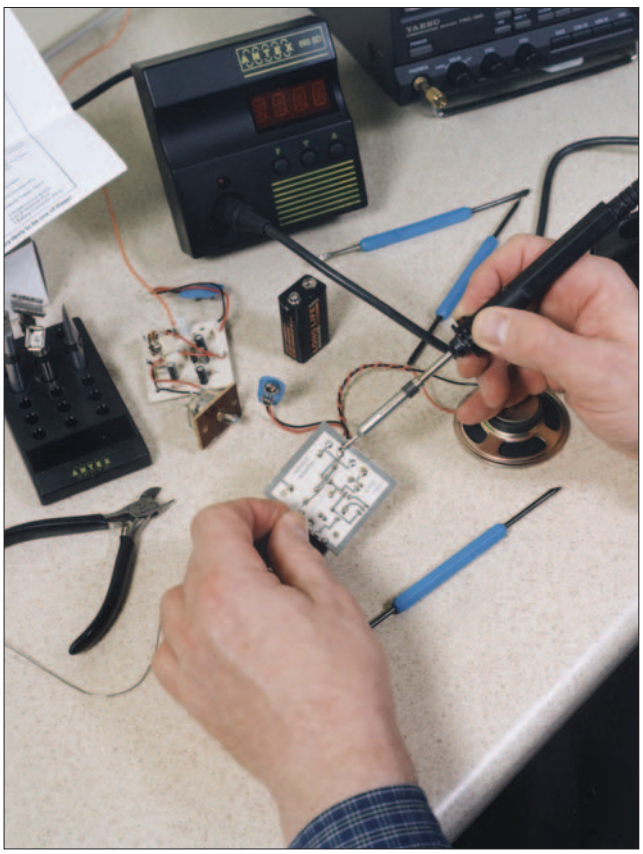


Fig. 1: Good quality hand-tools are worthwhile - they can last a lifetime. This photograph shows Clive Hardy G4SLU (*PW* Book Store Guru!) building a kit. The side-cutters next to his left hand provide a spring opening effect, are quality 'box jointed' fitted with insulated handles and are made from quality steel.

Discussing the ideas for this guide the Editorial staff considered the various problems likely to obstruct the relative newcomer to the long established home-brewing aspect of hobby radio. Firstly, **Tex G1TEX** and **Rob G3XFD** discussed their individual approaches to building equipment before settling on what you're reading here. Everyone working on *PW* hopes you'll find it useful and will be interested to learn of new sources of components from readers.

Tex, who works on *PW* is a mainstay of the **Poole Radio Society** and has much contact with fellow Amateurs. He's also an experienced kit builder, and has recently built and reviewed some interesting new products in *PW* and Rob is also a keen home-brewer and is planning to be very active again from his new workshop before the autumn.

So, with the combined experience of G1TEX and G3XFD let's now take a look at what they think you'll need in your workshop.

Wise Buyer!

For the absolute beginner in home construction the obvious first considerations must be a suitable selection of tools - and here, we have to firmly recommended - **be wise before you buy**.

Nowadays, there are a huge number of 'ready to use' tool kits, together with individual modestly priced tools. They're very tempting - but in all honesty can you really expect that a tool kit with over 100 separate items will be of reasonable quality when it costs less than £20?

Generally speaking - the 'bargain buy' tool kits often available from the major d.i.y. outlets are suitable (at best) for occasional use - but it can be frustrating when a spanner is used for the first time and the metal 'burrs' over on a nut and bolt. This will often be because the tools are made from lower quality softer steels (often they're made from poorer quality cast steel).

The best advice the *PW* Editorial staff can provide is that you should remember that usually "You get what you pay for". In other words, by purchasing a pair of quality, drop forged wire cutters or side cutters (for example) for perhaps as much as £15, will turn out to be an investment, **Fig. 1**. Whereas, the complete tool kit for £20 will be consigned to the dustbin very soon indeed.

It's usually a good idea to start off with a few tools - making sure they're of the best quality you can afford. If you have a traditional ironmonger/hardware shop near where you live - take a look at what they offer. You'll often find the 'bargain buy' hand tools for sale, but you may also see brands such as Draper and the names, which you may remember from Granddad's toolbox such as Spear & Jackson. They'll be immediately recognisable as they cost more - but the extra price is worth it.

Invest in a large screwdriver, smaller screwdrivers and also a 'jeweller's' screwdriver set. The latter cannot be expected to last that long because of the small size of their blades (and the torque you apply as you use them) but a good quality set may well cost around £10 and contain four to six different drivers.

Guide

Obviously, what hand tools you choose will depend whether or not you have any tools to begin with. But always be on the look out for really good older tools. Hint: Don't be frightened to consider buying them second-hand at rallies, car boot sales and those fascinating junk shops, which specialise in 'house clearance' sales. Here you'll often find tools which lasted the previous owner their lifetime - and with the proper care they'll last you just as long. Hand tools don't have to be new to be good!

Soldering Irons

One of the most important tools in the radio constructor's workshop must surely be the soldering iron. Many of us older Amateurs started off with simple mains powered 35W types. Rob G3XFD remembers that after persuading his parents he wouldn't damage the furniture - he got a new AEI 'Solon' iron literally every other Christmas for many years. Rob says that "They were a good soldering iron but suffered from the fact that the copper bit would eventually seize up in the alloy socket". Despite that...Rob's 'Solon' gave him many years of service.

Nowadays, one of the most reliable type of soldering irons you can invest is the temperature controlled unit. One of these, the **Antex 690 SD**, is shown in **Fig. 2**. This extremely reliable unit can be used with a set of special de-soldering tools - as shown in the photograph. As the time of writing Maplin have an extremely good deal on a temperature controlled iron for only £10.

Our Editor, G3XFD, has a selection of Antex irons and ranks them as his long-time favourites. Of the most interest to the home constructors are the mains operated lightweight range and the 12V, usually around 15W, portable types. Incidentally, the Editor says that his 12V portable Antex iron has proved invaluable and he even suggests that it can be run from your bench power supply, thus isolating it entirely from the mains. And when you're away from the workshop - a 12V battery supply takes over.

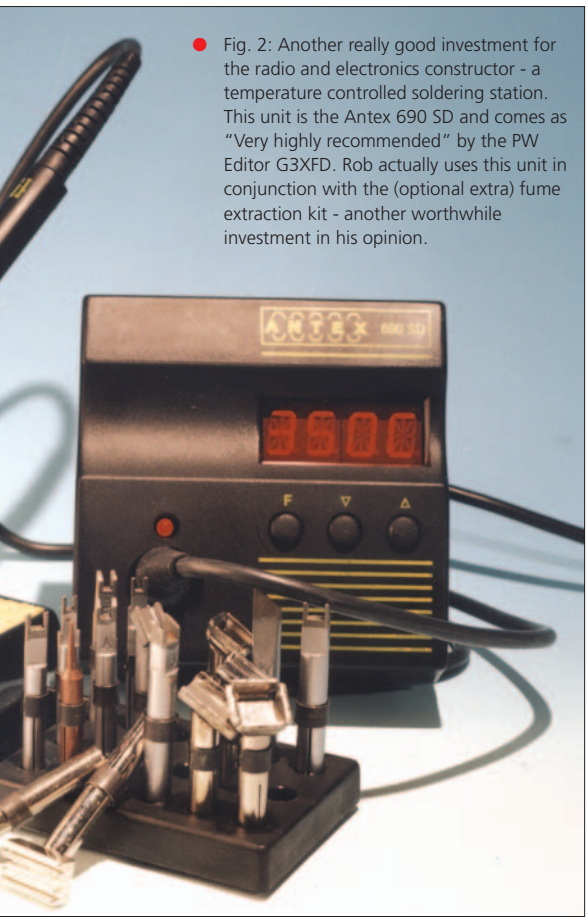


Fig. 2: Another really good investment for the radio and electronics constructor - a temperature controlled soldering station. This unit is the Antex 690 SD and comes as "Very highly recommended" by the PW Editor G3XFD. Rob actually uses this unit in conjunction with the (optional extra) fume extraction kit - another worthwhile investment in his opinion.

Workshop health note: For those people who aren't keen on the copious fumes from resin-based flux during soldering operations - the Antex 690 SD can be equipped with a fume extraction hose which (conveniently) attaches to the soldering iron barrel. The extraction hose (clear polythene tubing) terminates in a metal tube which is arranged to be very close to the iron's soldering bit. In practice (as Rob confirms) it works extremely well.

Fig. 3: Clive Hardy G4SLU busy on his workbench. Clive is shown using the Antex soldering station (see text).

The lightweight Antex soldering iron powered from the 690 SD unit is shown in used on G4SLU's work bench in **Fig. 3**.

For further information on Antex equipment, see their website at **www.antex.co.uk** and you can also E-mail them at **sales@antex.co.uk**. (technical enquiries to **technical@antex.co.uk**). Their address is **Antex (Electronics) Limited, 2 Westbridge Industrial Estate, Tavistock, Devon PL19 8DE. Tel: (01822) 613565, FAX: (01822) 617598**.

More Iron Advice

Before we leave the subject of soldering irons for the moment, there are two other types of irons you are advised to look out for. The first is the now commonly available butane gas powered portable type. These can often be adjusted from the equivalent of 15 to 100W and they're often very successful in outdoor conditions.

You'll soon learn that the slightest breeze cools even a 50W iron so much that it's often impossible to melt the solder! The extra heat available from the gas powered irons can help overcome this problem when soldering out-of-doors (on antenna wiring for example).

Finally, one of the most useful soldering irons you can have (although you won't use it that often) is the very large 'lump of copper' types which were traditionally found in a plumber's tool kit. Such an iron can often have a copper' bit' weighing in at as much as 1kg (approximately 2lb). These irons need to be heated to working temperature in a gas flame, or with a blow torch. They are absolutely ideal for antenna work as they take many minutes to cool, even in a relatively cool breeze. Our advice if you see one on sale is to buy it! And if you belong to a Radio Club...it could be loaned out to members use - perhaps even earning a little for club funds each time?

As the autumn approaches, the Radio Basics column will be offering further advice for the newcomer to home-brewing. Rob G3XFD hopes you'll join him on those pages too!

PW

Continued over...

Finding Those Essential Bits & Pieces!

One of the most difficult challenges facing anyone starting out in radio construction nowadays is 'Just where do I get the components from'? This is where this guide aims to help you!

The following *PW* advertisers and other companies offer a mail order service and attend rallies. Some specialise in manufacturer's surplus and you can often buy some extremely useful components, tools and other hardware. It's a good idea to get yourself on their mailing lists.

Greenweld Catalogues: this company, who occasionally provide catalogues via *PW* - are a very good source of components, tools, and specialised odds and ends. Of particularly help to readers who are keen constructors or who intend to be - is the Greenweld Technical/Hobby supplement illustrated here. Within its pages is everything you might need - from wire to paint and everything between (nuts, bolts, gears, pulleys, sheet metal, rod, bar and much else to keep you stocked with hardware. All you need to do is to telephone, FAX or E-mail your address to receive updates. Contact details: **Greenweld, Unit 14, Horndon Business Park, West Horndon, Brentwood CM13 3XD, Essex. Tel: (01277) 811042. FAX: (01277) 812419. E-mail: bargains@greenweld.co.uk Website: www.greenweld.co.uk**

WCN Supplies: Many readers will have already met this trader at rallies and shows. The catalogue, illustrated here, provides a good idea of what surplus material is available from them. Note: Although a good range of the stock is often available at rallies, it's best to contact WCN direct to check what you need will be on sale at a particular show. A good range of reasonably priced tools, components, switches, cases, knobs, etc., are always available. Of particular interest to readers building up a stock of basic components is the fact that WCN can supply standard value 250mW rating carbon film resistors (between 10Ω and 10MΩ) at 2p each or £1 for 100 of the same value. Please check for availability. **Callers are welcome at WCN Supplies Monday to Friday 0900-1700hrs, Saturday 0900 to 1300.** Contact details: **WCN Supplies, The Old Grain Store, (Rear of 62 Rumbridge Street), Totton, Southampton, Hampshire SO40 9DS. Tel/FAX: 0238 066 0700. E-mail: info@wcnsupplies.fsnet.co.uk Website: www.wcnsupplies.com**

John Birkett (Lincoln): There can't be many Radio Amateurs over the age of 40 who don't know of John and his Cessna aeroplane! He doesn't fly to many rallies nowadays but it's always worth checking what 'Aerojumbles' and special rallies he's attending. John and his crew also attend the National Vintage Communications Fair at the NEC in Birmingham twice a year. Their regular advert in *PW* doesn't do justice to the huge stocks of surplus held in store (John estimates he has 100 tonnes and the *PW* Editor estimates more like 300!). It's well worth calling to see if they can assist and keen valved-equipment builders will be pleased to hear Birketts have plenty of EF50s in stock, along with a limited number of B9G bases. **Contact details: J Birkett, 25 The Strait, Lincoln LN2 1JF. Tel: (01522) 520767. Note: The shop is closed all day on Wednesday.**

Bowood Electronics Ltd: Specialising in electronics components, this regular *PW* advertiser has a website where you can order what you need on-line. **Will Outram** the proprietor is a keen type and very helpful! A 60p stamp will get you their catalogue. Contact details: **Bowood Electronics Ltd., Unit 1, McGregor's Way, Turnoaks Business Park, Chesterfield S40 2WB. Tel: (01246) 200222. Website:www.bowood-electronics.co.uk and you can E-mail them on: sales@bowood-electronics.co.uk**

Electrovalue Ltd: This long-established company have specialised in component supply for many years. Their regular advert in *PW* says it all - listing everything from capacitors to service aids with everything between! If you have any projects using the Epcos (formerly) Siemens brands of i.c. and semiconductors EV are a franchised distributor. **Contact details: Electrovalue Ltd., Unit 5 Beta Way, Thorpe Industrial Park., Egham, Surrey TW20 8RE. Tel: (01784) 433604. FAX: (01784) 433605. E-mail: sales@electrovalue.co.uk and website is www.electrovalue.co.uk**

Sycom: **Robin Sykes G4NFV** (often accompanied by his wife **Rosemary**) attends many rallies and shows. Readers often report that, along with colleague **Geoff G4ECF** are always very helpful and will spend time to assist constructors. The Sycom advert in *PW* announces that 'Toroids' are our speciality'. However, their trade stand is a travelling treasure chest of components the constructor requires! Sycom offer a helpful mail order service and many readers report that they're 'Very helpful" on the telephone. If they don't have it in stock - they'll always try their best to help you out and our Editor Rob G3XFD, backs this up as he says he's "a very satisfied customer". Contact details: **Sycom, PO Box, 148, Leatherhead, Surrey KT22 9YW. Tel: (01372) 372587, FAX (01372) 361421. E-mail: robin@syscomcomp.co.uk and their website is at www.sycomcomp.co. uk**

Maplin Electronics: This company now have many shops throughout the UK, Northern Ireland and the Republic of Ireland. It's well worth buying their catalogue and although much of their stock is not Amateur Radio related they carry a large selection of leads, test equipment, batteries, etc. For further information see their website at **www.maplin.co.uk** or by telephone on **0870 429 6000** for details of the nearest shop. **E-mail: sales@maplin.co. uk**

Hobbies Annual 2004: The 2004 issue of the *Hobbies Annual* is on sale now (Rob G3XFD bought his copy at WH Smith). This annual catalogue is an excellent source of specialised tools, components, etc. It's especially useful for hand-tools and light engineering materials. **Thoroughly recommended.**

Editorial note

We fully realise that this list is not exhaustive and I intend to provide up-dates in Radio Basics, along with recommendations for specific tools, etc. So, if you know of a radio components/equipment supplier who can provide a mail order service for readers (especially if they are prepared to advertise in *PW*) we'd like to hear from you. The policy of *PW* is to support all our advertisers as much as possible - to the benefit of everyone. So, if you know someone who stocks those 'difficult to get bit and pieces' and we don't mention them - let us know!

Rob G3XFD, Editor *PW*.

practical way

"We take delight in things; we take delight in being loosed from things. Between these two delights, we must dance our lives."
Henry David Thoreau

This month the Rev. George Dobbs G3RJV looks back on a meeting with a reader and describes an "Easy build transmitter" and encourages you to have a go yourself. After you've read the appropriate quotation!

Last year a reader called by to meet me while he was travelling to the Lake District. We had a cup of coffee and a general talk about Amateur Radio and construction.

From the back of his car he produced a small cardboard box, which contained five projects he had built from this column. Three of the five were little QRP transmitters that I'd described over the years and he told me these were his favourite projects. He told me that there was nothing like making contacts on a little transmitter built in a few hours from a few parts. This was an echo of what I have heard from other readers.

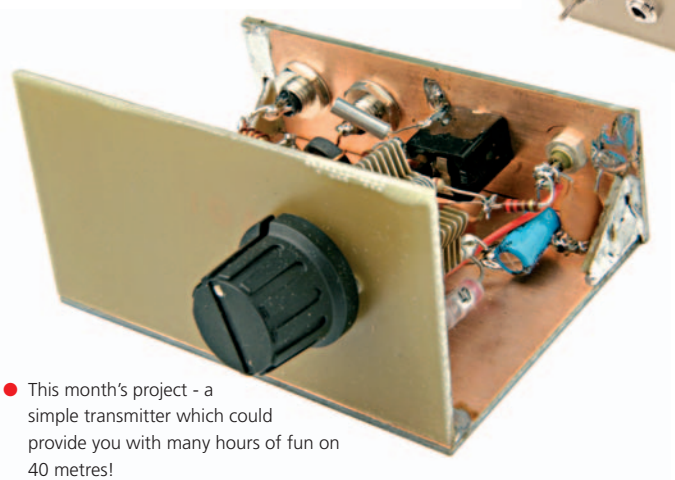
So, in the hope of pleasing the *PW* public, I offer another little QRP transmitter project. This time I am offering it as a blow by blow account of building a transmitter board. Very often these articles give the circuit idea and leave the reader to translate it into the finished item.

Here I'll use a common, simple, design and suggest how it may be built. Hopefully this will encourage those who have not built projects from this column before and perhaps even those who have never tried a QRP transmitter to share the enjoyment of others.

Tried & Tested

The first requirement here is to use a tried and tested design capable of easy to achieve results with easy to obtain parts. I opted for a version of the **W7ZOI Universal Transmitter**; a design that has proved to be a 'first time worker' for so many novice constructors.

The project uses common parts and accepts a variety of transistors and, like many others, I've never had a problem with this circuit and variants based on the project. The 'Easy Transmitter' circuit diagram is shown in **Fig. 1**.



This month's project - a simple transmitter which could provide you with many hours of fun on 40 metres!

Added to the transmitter circuit is a 7-element low-pass filter. This is to give the required level of spectral purity required necessary to produce an r.f. signal on the Amateur bands.

Circuit Operation

The circuit operation is simple and it begins with a crystal oscillator. I've chosen the 7MHz (40m) Amateur band as a good one for QRP working.

The oscillator transistor is a 2N2222A but many other devices could be used. I have good success using a BC107 but almost any generic *npn* device would serve the purpose.

The oscillator is keyed at the emitter and base biasing resistor. A series tuned circuit is used in the collector and the output is a link winding on the tuned circuit.

The power amplifier (p.a.) is marked as Tr2 and again several devices can be used here. I've had good results from both the 2N4427 and the 2N3866; both are currently available from UK mail order dealers.

Note: I have a few old 2SC799 transistors and this device works very well in the circuit and provides greater output than either the 2N4427 or 2N3866.

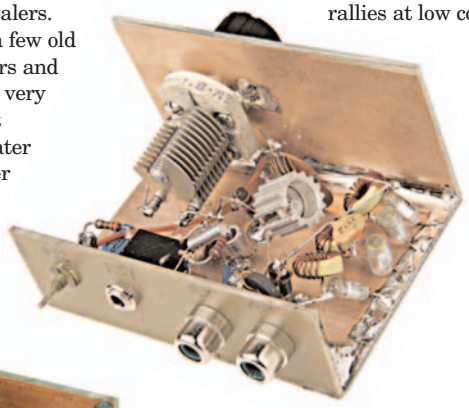
The p.a. load is a small radio frequency choke (r.f.c.) made by winding 10 to 12 turns of thin enamelled wire through a small ferrite bead. A 15µH moulded axial choke will also work well in this position. The output from the p.a. goes to the 7-element low-pass filter which follows the classic W3NQN design.

Construction Technique

The reader can choose any construction technique. However, let me tell you how I build mine, as a guide to those who may wish to follow my method.

For ease of materials and building I used 'ugly' construction techniques. This technique requires you to wire the parts point-to-point over a copper groundplane.

To use the 'ugly' technique the first job is to prepare the copper groundplane. This is made from blank (un-etched) printed circuit board (p.c.b.) material. It's possible to buy this from electronic component suppliers and is often available at Amateur Radio rallies at low cost.



Note:
Should you have a local p.c.b. manufacturer, they may have off-cuts that they would give away. It's always worth asking!

I used a piece of p.c.b. material measuring 80 by 550mm. A less experienced constructor may want to make it a little larger but there is adequate space on the p.c.b. size I used.

For my prototype I also decided to add a front and back panel of p.c.b. The front panel is 80 by 400mm and the back panel 80 by 250mm.

Both panels are soldered using the long edges of the base. The front panel is angled slightly backwards for viewing. Before they are mounted, both panels need drilling. The back panel requires four holes; these are for 12V in, 3.5mm key jack socket and two r.f. connectors (phono sockets are cheapest).

The 12V input is most easy fed to the board by using a feed-through capacitor. This is made

from stiff wire which feeds the supply through the panel with an insulated sleeve. This sleeve forms a capacitor between the feed-through wire and the p.c.b. material.

My prototype's front panel has a single hole because I used an conveniently available shaft controlled 60pF variable capacitor for the tuned circuit. In practice, a cheaper trimmer capacitor could be used, in which case the front panel need not be drilled.

The front and back panels can be made more secure by inserting a small triangle of p.c.b. material in the corner of the join between the panel and the base plate. A larger soldering iron, or a larger bit in a temperature controlled soldering iron, will be required to attach the panels to the base.

Assembling The Project

It's best to start by wiring the oscillator circuit. Mount the connectors on the back panel and the variable capacitor on the front panel and prepare the coil for the tuned circuit.

The tuned circuit coil is wound on a T37-2 core using 32 turns of 30s.w.g. enamelled wire. I then run a little bee's wax into the turn to hold them in place. (The wax may be melted with a soldering iron tip, but remember to ventilate the workshop).

The link winding, five turns of the same wire, is wound over the centre of the main winding. The oscillator circuit is 'hung' between fixed points; the key socket and the 12V supply.

Grounded components are soldered directly to the base plate, the free ends providing anchor points for other parts. The link winding may be connected either way round between output and ground.

Build the oscillator as far as the 47Ω resistor at the base of Tr2, without adding the p.a. transistor, the oscillator can then be tested. The output of the oscillator may be checked by using a diode probe connected to a voltmeter.

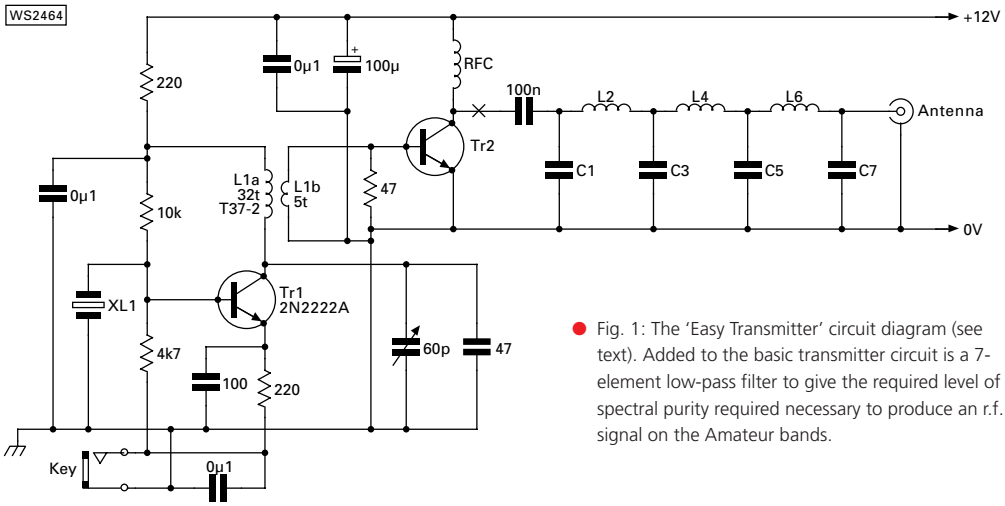
If you don't have a diode probe, they are easy to build. The circuit I regularly use is shown in **Fig. 2**. Screened leads are required between the probe and the meter (the ideal meter is an analogue multimeter).

Connecting the probe to the top of the 47Ω resistor and closing the key contacts should show about 1.5V d.c. The variable capacitor in the tuned circuit should be able to produce a peak reading.

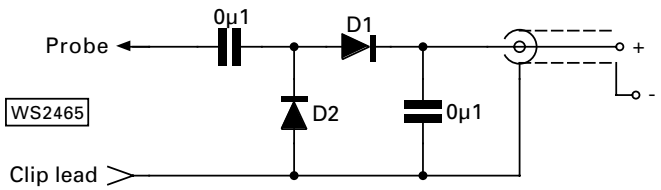
The p.a. and the low-pass filter can now be added using the same direct connection technique. The completed transmitter must be tested with a load on the output as the final stage requires a low impedance termination.

An r.f. output meter with a 50Ω load is ideal. If you don't have one available, insert a non-inductive 50Ω resistance between the output and ground. This should be capable of dissipating at least 2W.

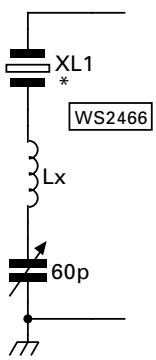
The diode probe should show about 20 to 25V at the output. This is a peak-to-peak voltage reading. Listen for the signal on a nearby receiver and adjust the tuning control to produce a pleasant keyed signal. The transmitter is now ready for use.



● Fig. 1: The 'Easy Transmitter' circuit diagram (see text). Added to the basic transmitter circuit is a 7-element low-pass filter to give the required level of spectral purity required necessary to produce an r.f. signal on the Amateur bands.

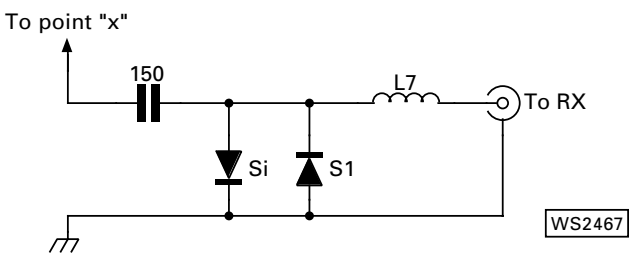


● Fig 2: Diode probes are easy to build. This is the circuit regularly used by G3RJV. Screened leads are required between the probe and the meter (see text).



● Fig. 3 (left): A variable frequency crystal oscillator (VXO) is useful. A suitable circuit is shown here. The variable capacitor tends to raise the frequency and the inductor tends to lower it. The oscillator will then work a few kilohertz ether side of the nominal frequency (see text).

● Fig. 4 (below): Another useful addition is an electronic transmit-receive change-over circuit. In this simple circuit the antenna is connected to both the receiver and transmitter at all times with the two reverse connected diodes prevent too much signal reaching the receiver input (see text).



Optional Extras

A useful extra is to convert the oscillator to a variable frequency crystal oscillator (VXO). A suitable circuit idea is shown in **Fig. 3.**

In principle the VXO is quite simple - the variable capacitor tends to raise the frequency and the inductor tends to lower it. The oscillator will then work a few kilohertz ether side of the nominal frequency. Incidentally, a good frequency is 7.030MHz; the QRP calling frequency.

The variable capacitor could be a good quality trimmer capacitor. **Note:** There is a limit to the amount of frequency shift available before the oscillator becomes unstable. Use a capacitor no more than about 60pF, the inductor Lx can be an axial inductor of 33µH or a little less.

Another useful addition is an electronic transmit-receive change-over circuit. A simple method is shown in **Fig. 4**. Here, the antenna is connected to both the receiver and transmitter at all times.

The two reverse connected diodes prevent too much signal reaching the receiver input. The 150pF capacitor feeds the signal to the receiver and an inductor (L7) reduces the losses to the receiver. For L7 wind 14 turns of 22s.w.g. enamelled wire on an FT37-61 core.

Once you've equipped it with the change-over circuit the transmitter can now be used directly with a receiver. There's no muting for the receiver, so the audio gain control will have to be turned down during transmissions.

So……there's an easy transmitter and a few tips on how to build it. Have a go and you'll really enjoy the pleasure of contacts with a transmitter you've built yourself!

PW

ZD7K - St. H

Keen DXpeditioner Glyn Jones GW0ANA and members of the Barry Amateur Radio Society put ZD7 St. Helena 'on the air' in the second stage of a double DXpedition that also took-in ZD8.

Sitting in a comfortable sun-lounger sipping a cold beer on the promenade deck of the RMS *St. Helena* and gently rocking to the motion of the ship as she headed south to St. Helena, I looked astern as the island of Ascension slowly faded away in the distance and reflected on the wonderful experiences the team consisting of **Richard GW4BVJ**, **Doug G0WMW**, **Sherri**, Richard's XYL, **Keith Orchard G3TTC** and I had had on the first part of our Double DXpedition. We were all very excited at the prospect of the second stage as we sailed.

Cruising

The sea cruise to St. Helena was enjoyable and the team would all like to thank **Captain Smith**, his officers and crew for making our trip south so pleasant. During the trip we took time to analyse our efforts on Ascension and plan how best to improve our activities on St. Helena.

After three days at sea the Captain announced that he could see the island of St. Helena just off the port bow around 32km (20 miles) away. We all went up on deck to look at the silhouette of ZD7 on the horizon and our faces beamed in smiles of joy as we each contemplated our forthcoming adventure on St. Helena.

Arrival on ZD7

It was a beautiful sunny day as the RMS *St. Helena* slipped into Jamestown Bay and dropped anchor. We all lined the ships rail, watching as a flotilla of small craft approached the ship to help off-load cargo and passengers. St. Helena is an amazing place of volcanic origin and as I looked towards Jamestown nestling in the fold of two large volcanic peaks I could see the famous Jacob's Ladder whose 699 steps rise to 602ft a.s.l. I couldn't wait to get ashore and see this beautiful island first hand, but first the normal embarkation formalities had to be attended to.

Very soon we were called to our disembarkation point and once onboard the small boat we chugged our way across the bay to the island through the clear azure blue water. Very soon we arrived at the quayside.

Once ashore we were greeted by **Bruce Salt ZD7VC** and his wife **Charmaine**, who had a great big bunch of flowers for Sheri. While the girls went off for a chat we made for the customs shed to collect our three large boxes of freight.

I must say the Custom officials were very helpful and we had a speedy clearance. I guess the Chief of Customs being a Radio Amateur helped, as she understood what the equipment and ancillary items were! Once clear of customs, all our gear was loaded onto a lorry, which Bruce had arranged along with a hire car and we all set off up the mountain to our QTH.

Splitting The Team

Due to the shortage of suitable accommodation for five people and an antenna farm we had to split our camp into two teams. This comprised of Sheri, Richard and I together at *Seaview Cottage*, while Keith and Doug stayed at *Sappers Way Cottage* just across the valley. This splitting of our forces would cause a little inconvenience what with the difficult road conditions in crossing the valley.

So, in order to maximise operating we also decided to split into two types of operations. Richard would operate c.w. and I would be on data modes from *Sea View cottage* with Doug and Keith operating on s.s.b. and 50MHz from *Sappers Way*. We would keep in touch with each other to let each other know what bands we were operating on. It was not the ideal situation but we made the best of it and soon got used to the arrangement.

Once we'd sorted out our accommodation it was down to Jamestown, the island's capital to collect our Amateur Radio Licence. The initial formalities had been arranged by Bruce ZD7V.

As we wanted a call that all members could use, I'd found a little further negotiation with the authorities was needed. But once our case had been explained **Mr Kurt D.A. de Freitas OBE** the Attorney General, who most graciously granted us the unique call **ZD7K**, signed the Licence for us. (This was the first single letter suffix ever given to a DXpedition group - we felt honoured). We left the Attorney General's office elated - ZD7K would soon be radiating around the globe.

Whilst in Jamestown we took the opportunity to buy food and refreshments. The island had a nice bakery so we stocked up on fresh bread and a few local

The small island of Ascension lies in the South Atlantic (7 56°S, 14 22°W) some 750 miles northwest of the Island of Saint Helena and covers an area of 35 square miles.

specialities in the fancy cake line.

By now the sun was high in the sky and the temperature in the high 80s so before we set off up the mountain again Bruce ZD7VC invited us to his home for a cool glass of lime, (it was delicious, thanks Bruce!).

The shack of ZD7VC is an Amateur's dream. He has a tower at around 15m looking at the clear blue southern Atlantic Ocean. He comes out of his house and there's the ocean around 300m below him - yes a 'real' dream location. So, after a pleasant interlude with Bruce we said our farewells and drove up the mountain to do some antenna farming.

Helena

Antenna Farming

As l.f. operating on c.w. was going to be the priority operating mode on ZD7 we decided to erect Doug's 'Dragon Special' antenna - a 22m vertical antenna at *Seaview Cottage*. The other antennas were a Butternut for 3.5 and 7MHz and a Cushcraft R7000 and after erecting these... we were getting short of real estate for the beam.

Then I had a brainwave - the adjoining property was empty as the owner was working on ZD8, I wondered if we could get permission to put the beam on his land. A couple of 'phone calls and an E-mail to Ascension Island later and permission was granted.

Once we had the okay we erected Richard's Force 12 tri-bander on the lawn above our bungalow. This location was brilliant, as it looked out to the south Atlantic and being above us caused us no interference.

When the 'antenna farming' was completed at *Seaview*, Doug and Keith went to *Sapper Way* to put up the Gap Titan vertical and the 3-element beam antenna for 50MHz. Bruce ZD7VC and **Barrie Williams ZD7BG** turned up to give us a hand, (thanks guys your help was very much appreciated!).

Once all the antennas were erected at both sites it was time to put the stations together. Bruce asked us if we could help out with the TVI and EMC he was suffering. Poor Bruce had tried everything and a lot of people were giving him a hard time, but most of all from his lovely XYL. She could not watch the 'Soaps' if Bruce was on the air so it was causing disharmony in the household!

Bruce had already raised the question in an E-mail so, we were forewarned and had brought a range of filters with us. It was agreed that a couple of us would run some tests and see what we could do.

The next day Doug and I went to Bruce's QTH, checked out his station and ran the tests. One of the problems is that the earth at his QTH is volcanic clinker, baked bone dry by the blazing sun and does not have good earthing properties.

We checked all his coaxial plugs and line, finding them to be sound, we then fitted a band-pass filter and braid-breaker filter to the TV and transmitted. The look on Bruce's face as the picture remained clear was a joy to behold!

Pile-ups

On my return to *Seaview* Richard was in full flow on c.w., the pile-up was intense and as Richard was still suffering with partial deafness from the ruptured eardream sustained on ZD7 he had my admiration. I listened to the rattle of the key and then slid into my position at the data station, loaded the software, checked the frequency and hit the key.... The return was instant and I began my stint on RTTY. It was not long before I was forced to operate 'split', as the cacophony of noise made it impossible to decode signals. But the twin v.f.o.s made it easy and the QSOs rolled along at a hectic pace.

I worked my way through the pile-ups and as band conditions changed so did I going from h.f. to l.f. and always checking for openings. It was a very interesting and fascinating experience as I learnt a lot from studying the propagation in real time and comparing it with our prediction charts.

Our other shack was being operated by Doug and Keith on

● Doug G0WMW 'enjoying' a 'pile-up'!

● Richard GW4BVJ in the middle of a c.w. 'pile-up'.

● Glyn GW0ANA with Jonathan, a huge tortoise who is reputed to be over 150 years old (see text).

ZD7K - St. Helena

s.s.b. They were active on l.f. to h.f. with openings on 50MHz. The lounge area had been turned into a h.f./l.f. shack, with a small bedroom housing the 50MHz station.

We had a link to each location by landline and a dedicated 144MHz frequency. The operators were in full swing when the 'phone rang, it was a neighbour who was getting 'TVI'. The lady who was an avid golf fan was about to watch the Pro Am golf tournament and TVI was spoiling her evening. She asked if the guys could shut down for a couple of hours. This they agreed to do and also to go to her house in the morning for tests and possible TVI cure.

The next morning armed with the filter kit Doug and Keith ran the tests. One braid-breaker and a couple of ferrite rings later the problem was cured.

The *Sapper Way* station was soon back on air. Later that evening a young lady knocked on their door with a platter piled high with fresh tuna spicy fishcakes (a speciality of ZD7) for our supper. This was a little thank you to Doug and Keith for fixing the TVI.

Top Band Static

Richard was busy trying the Dragon Special on Top Band and although he was hearing stations the static noise crashing in with them was causing him problems with marginal signals. So we decided to put out a 'Beverage receiving antenna'. This wire of around 200m was run out down the mountain only 3m above the ground and once installed it transformed the band for Richard.

The noise dropped, which helped Richard immensely as he was still suffering with the restricted hearing. But he stuck to his task, setting a target of 1,000 c.w. QSOs a day.

The sun set and Richard was still at the key tuning on 'Top Band', all was well. He had **OM2XW** in the log with **OK1FM, G3SNN, 4X4DK** soon to follow. Then just as Richard was trying to pull **W1NG** out - disaster struck! The band went dead; the s.w.r. went off the clock, with a loud crash on the bungalow's tin roof the Dragon Special crashed down breaking in two!

We went outside, there wind was howling, it was raining hard and there on the floor was our Dragon in three pieces. We looked at each other with our hearts in our mouths, it looked like 1.8MHz was now QRT. By now it was about 0200 hours so, we decided to leave it until daylight to assess the damage.

Doug came over bright and early the next day to examine the antenna. It appeared that an iron stake had pulled out of the soft earth in the storm bringing the antenna down. As it hit the iron roof the fibre pole holding the radiator broke.

There was only one thing we could do, which was to use my sea fishing pole as a splint. Doug pushed a section of fishing rod up inside the fibre pole, covered the pole in electrical tape and then put a rope whipping around the lot. It made a very strong repair and the Dragon was sent aloft again. Richard's only hope was that W1NG would be on again to finish the QSO!

Better Conditions

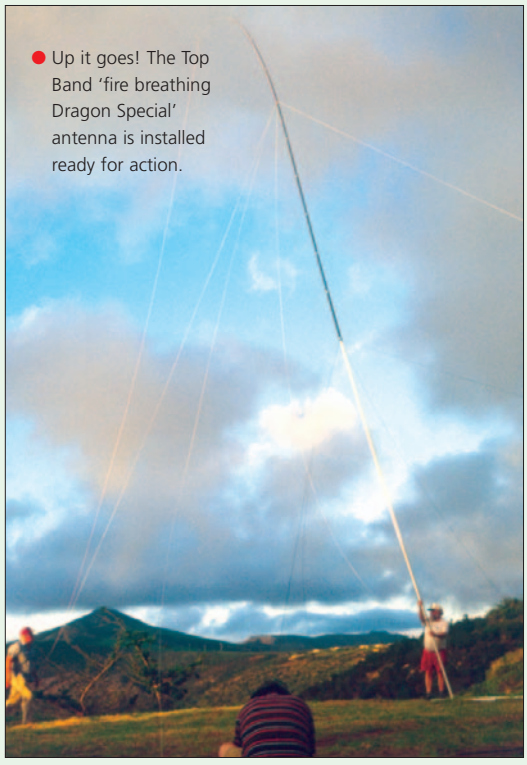
Conditions were better by now as the stations came in from Europe then Japan, led by **JA1JRK** followed by Stateside **N7JW** in UT. Then Richard beamed, "W1NG your 599 QSL roger your 5NN mny tnx fr the nw one 73 cugn". (W1NG had ZD7K on Top Band.)

So, it was back to the key as more stations came crashing over the tropical static, like **VE1ZZ** and **K5NA**. The Dragon Special was certainly 'breathing fire' despite a splint. Richard was very happy but he still had not made the West Coast on 1.8MHz, but he was still on course for his 10,000 c.w. QSOs from ZD7K. Then it happened around 0620 on 13 April, Richard fished **N6FF** from the ether 5nn into California, he had done it and he was still on target for 10,000 c.w. QSOs!

From RTTY To SSTV

Taking a break from the RTTY keyboard I fired up the SSTV computer. I tuned around on 28MHz to find a clear spot to call CQ SSTV and who should 'pop-up' but my dear friend **Danny ON4VT** and **ON7GB.** In no time I'd had a very nice QSO with them both and they confirmed that they received very fine pictures from me.

Soon I was in a SSTV pile-up as my SSTV frequency was spotted on the cluster. I had great QSOs with **JF8GVR, ZS2IV, SM5EEP, G0FMO** and **KD3RR** to name a few.



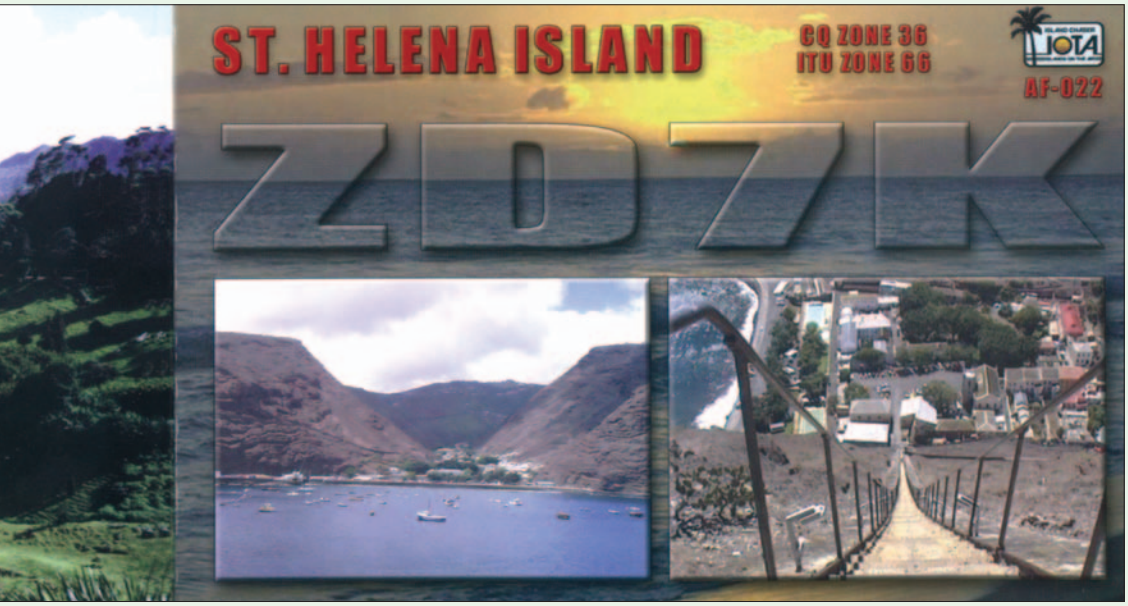
● Up it goes! The Top Band 'fire breathing Dragon Special' antenna is installed ready for action.

A Day Off

After slaving over the keys and mics the team was invited by Barrie Williams and his XYL **Valerie** to see a little of the island including include a visit to Napoleons House at Longwood. This fascinating villa once held the Emperor Napoleon, his officers, entourage and servants during his fours years exile on St. Helena.

We also visited the Governor's garden to see the giant land tortoise, Jonathan, who is reputed to be over 150 years old. He looks wonderful for his age, slowly munching his way through the Governor's lawn.

Sherri and Richard tried their hand at deep sea game fishing, what an adventure they had. First they saw dolphins, then an enormous Basking shark plus lots of flying fish just skimming the clear blue waters.



● The Harbour.

● Jacob's ladder!

Racking-Up the Numbers

Suitably refreshed the team returned to the pile-ups and the numbers racked-up steadily, with a few stations by now having worked us on nine or more bands. Keith was doing good business on 50MHz while I was doing stints on s.s.b. on the WARCs to help out. But still the flood of stations wanting ZD7K seemed un-ending.

Richard was feeling the strain of his 1,000 c.w. QSOs a day target, together with the demands made on him for Top Band coupled with the tropical heat, which was sapping his strength. But to his credit he stuck at it.

All the log activity had to be processed daily and sent by E-mail to our 'Chief Pilot' - **Ken GM0AXY** for him to publish on our webpage (**www.dxpedition.co.uk**). Ken was a pillar of support to the team, his backroom work was outstanding and the information relayed to us from him was of immense help, as it allowed us to appreciate the conditions on the other side of the pile-up.

Ken also sent requests for skeds and other requests, which the team did their best to oblige. This work entailed a lot of data transfer and number crunching, this tedious job was left to Doug, who would just light up a cigarette, pour out a cup of tea, turn his trusty laptop on and get stuck in.

Final Contacts

Saturday 14 April, was our final day and we had to start breaking down the station. As this was the Easter Holiday weekend the ship wanted our gear on the dock, crated-up ready for a 1000 sailing on Easter Monday. Richard still had a few more c.w. contacts to make for his 10,000 score, so we left him on the key and broke the station down around him.

In the meantime I had spoken with the port authorities who agreed to load us on the ship last, but we must have our crates on the dock by Easter Monday 0700 latest. This gave Richard a few more hours' 'brass pounding'.

Saturday was used to pack up and clean the accommodation. This meant all hands to the pumps as we wanted to have all the gear packed away so that we could all enjoy a farewell dinner in Jamestown with our ZD7 friends on Saturday night. A couple of tables were booked overlooking the ocean and so we made ready to have a dinner. What a fabulous meal it was, real organic steak from steers feed only on mountain fresh grass washed down with cold beer, liberally laced with the antidotes and stories from our expedition in the company of friends.

The gentle lapping of the Atlantic swell on the harbour wall, mixed with the gentle babble of restaurant customers and the smells from the chef's grill will linger long in our minds, but there was still work to be done back at camp as Richard needed another 100 or so contacts. So, with regret we said our farewells and it was back up the mountain to our shack and QRZ de ZD7K in A1A.

All the gear except for one rig and a beam had been boxed as I stood looking anxiously at Richard as the time for our 1500 deadline for going QRT had arrived. We needed another 20 QSOs and at 1332 Rich got **W7IUV** (9998), 1333 **W1GF** (9999) then at 1334 **UA6LGW** 10,000!

Richard had achieved his goal - he was a very happy man. Now it was time to pack away the final station and relax as we waited for the next day and the long journey home.

Barrie ZD7BG & his XYL Valerie invited us all to their home for a traditional St. Helenian dinner. It was more than a dinner, it was a sumptuous feast for which we were most appreciative. Sadly, the evening passed too quickly and we had to return home ready for the early start on Easter Monday.

Transport Trouble

Our transport arrived at daybreak and our gear was loaded on and then transported down to the docks ready for shipment. Then we heard on the local radio that there had been a major rock slide on the docks. As a result all movement in and around the dock area had been put on hold while the authorities assed the situation.

It appeared that hundreds of tons of rock had crashed down the mountain, smashing steel containers and vehicles on the dockside. But miraculously there were no fatalities. A few men were cut and bruised but escaped serious injury. The fire brigade, police and port authorities, together with the 'Rock Workers' on the face of the mountain worked very hard to make the area safe for all and to allow passengers and freight to be loaded onto the RMS *St. Helena.* Around 1700 local time, the port authorities gave the all clear and we were permitted to board the RMS *St. Helena*. It was with a tinge of sadness as we bid our farewells to our hospitable hosts and headed off with a little trepidation past the rock fall. We all passed safely and were soon on the launch heading for our ship.

Once on board we lined the ships rail and as the anchor was raised, the ship's whistle blew and we edged our way out of Jamestown Bay. Richard and Keith went up on the deck and held a 144MHz QSO with Barrie ZD7BG for a couple of hours as the ship headed into the vastness of the Southern Atlantic ocean illuminated by a canopy of stars.

Later that evening we all met up in the dinning room and enjoyed a wonderful dinner. The evening was full of stories, as each one of us recounted the amazing adventure we had all been part of. Before going to bed I went up on deck to reflect on our achievements.

Yes, I felt we had met all of our objectives, but we could not have done it alone. To this end we owe a debt of gratitude to the thousands of Amateurs that worked us and to the support of our sponsors as without all of their help and encouragement we would not have done it. Thank you one and all.

PW

The account of The Barry Amateur Radio Society's DXpedition to Ascension Islands ZD8 appeared in *PW* November 2003. Back issues are available for £4.70 inc. P&P by calling the Book Store on 0870 224 7830.

Antenna Workshop

Alan Wightman, a professional TV and Radio antenna engineer hops off his ladder briefly to explain how he's becoming more involved in specialised work. Alan tells us he's often asked if he can install interesting antennas for radio enthusiasts!

Some of the work that comes my way can be very different indeed and it can make a change from some of the run-of-the-mill jobs. Mind you, even the simplest antenna installation request can often turn awkward at the last moment!

Here in the south coast seaside resorts, working on the three and four storey Edwardian houses - similar to the type where the *PW* Editor lived until recently - the biggest hazard hasn't been the coastal weather. Instead, it's been the damage - caused by corrosion by the droppings - from the Herring Gulls which seem to have changed their life style.

Nowadays in Bournemouth and along the coast I've got to be prepared to wear a 'hard hat' **and gloves** when climbing up higher than 40 feet. This is because you can be sure that if there are large chimney systems...there'll be at least one Herring Gull in residence. From experience I can confirm that they're aggressive and need no protection from humans.

One job I was called to was in Milford-on-Sea, just up the coast from Bournemouth. Here, Rowridge (Transmitter 108.00, 500kW e.r.p.,) the main Band IV transmitter for the area is located immediately opposite the town on the Isle of Wight. It's only the two mile or so stretch of water formed by the famous Solent and four miles or so of rolling downland that separates the transmitter and its customers. The transmitter is actually located on the Downs above the B3401 Newport to Calbourne and Freshwater road. Well placed, it has a truly commanding view of a very large area of the south coast providing an excellent service.

The house I was called to had suddenly started to suffer from very bad delayed images ('Ghosting') on the u.h.f. TV reception. Set back from the sea front, the house was a large 1920s built three storey building with very large chimneys.

The original antennas had been fitted by another engineer from our company some 20 years before, and it was pleasing to see that the job had been done properly as the different height reference scratch marks on the aluminium tubing holding the man Band IV antennas could still be seen. This was where the engineer had carried out a 'Height versus Gain' test (normally referred to a 'Height Gain' test.)

As the house was screened from a direct view of the Solent, I knew that the indirect signal reflected from the water wouldn't have been as troublesome as it could have been for a sea front house. There, the reflected wave (which of course travels a longer distance than the direct signal) can cause truly dramatic variations in signal level with height and the tide. Some customers along the sea front have to resort to 'high tide and low tide' antennas!

Fig. 1: The Philips u.h.f. cordless headphones provide much pleasure for the *PW* staff as they're very efficient little units. But others have different ideas (see text).

Bird Bother

Once I'd got my ladders out and up to the side of the house, I soon found some bird bother. Herring Gulls are **BIG** and they're even bigger when you're 14 metres or so above the ground. I'd have believed it if I'd been told they had 4m wingspans and ate antenna engineers!

Climbing from the main roof to an extension flat roof I found the large and smelly nests amongst the chimney stacks. Their chicks had obviously 'flown the nest' but the birds were still using the roof as their 'Heathrow' making me feel very unwelcome..

On approaching the chimney stacks I could see the various cables making their way across the small flat roof - originally it had been for a small roof terrace garden. Most of the cables were covered in what can be politely called guano - extremely strong smelling and even I could tell that their diet consisted mainly of fish!

With closer inspection I found that several of the cables had their outer pvc sheaths damaged. One cable had been totally severed leaving - in effect - an open circuit stub on the antenna circuit. It turned out that the room to which it fed had not been equipped for TV viewing for some while.

Unterminated Reflections

I'd checked the received pictures from Rowridge before climbing. Viewed on the household TV sets the pictures had very clearly defined 'close in ghosts'. This had already set me thinking- and I'd checked around the house for open circuit cable feeds. However, the room to which the severed cable had served - was now a locked store room.

What had happened was that the severed cable had been long enough to provide a stub which was un-terminated. The extremely strong signals from Rowridge had then reflected back from the severed cable end and the 'delayed' signal joined the other incoming transmissions there was a very strong

'close in' ghost. It played havoc with their Teletext signals. Fortunately, it was very easy to correct the fault - all I did was to remove the offending stub and remake the cable joint...away from the avian monsters' runway!

Incidentally, although the original cable feed had been a quality Belling Lee type inductive 'splitter' which had been properly sealed - enough of the reflected energy had been able to impose itself on the main downlead feed. This type of problem is very common on new houses - especially where the job has been left to an electrician not familiar with radio wave theory and practice.

I'm not trained in the installation of household electrical circuits and appreciate the skills required. So I'm surprised when electricians get the chance - they often seem to treat u.h.f. cables feeds as if they're 250V 'mains' wiring!

One house I visited had four separate room TV outlets. One was in the kitchen, one in the lounge, another was in a study and the other in the main bedroom. All the outlets were fed from the same antenna.

The person responsible for the installation had just fed the main 75Ω cable down through the roof, 'splitting' it with 'choc bloc' type connectors (for the upstairs bedroom) before feeding it down to the main lounge. Separate 'spurs' went to the kitchen and study. The pictures were very noisy and with many imperfections include system-induced ghosting. The field strength variations between channels was particularly noticeable and the teletext service was unusable.

After evaluating the received picture in the lounge - I then spent several hours working my way around the house tracing the cable joints, replacing them with inductive splitters. All had been achieved by assigning electrical lighting type junction boxes!

Although it would have been far easier and cheaper to install new cable feeds complete with inductive splitter boxes the owner insisted otherwise. They'd only just moved in and after they received a bill for more than three hours' work from me. I heard later that the bill had been sent to the house builders. Whether or not it was paid, I don't know.

So, remember - it always pays to treat r.f. cabling as r.f. and not mains wiring. My other advice is always to use inductive 'splitters' and combiners as they have a lower 'through loss' and you're less likely to have problems with incorrectly terminated u.h.f. outlet sockets.

Finally, here's an extremely important point for Ham Radio operators to bear in mind; the TV set which is struggling to provide a picture from a less than adequate signal will be more prone to TVI because of the set's a.g.c. action which effectively increases the gain - making it more sensitive to 'out of band' signals.

Always ensure your coaxial cable downleads are in good condition and are waterproof. The smallest amount of water causes problems. If an aluminium coaxial plug looks grey and corroded - you've probably got water in the downlead and once it's in - that's it - replace the cable! (The copper braiding forms an effective 'wick' which will distribute the water throughout the cable given the chance).

Unusual Antennas

Increasingly, antenna field engineers like myself are being asked to erect unusual antennas and associated items. Recently I've had several complete home weather monitoring stations to install! The remote sensor masts are often placed on chimneys, using the same mounting brackets employed for heavier Band II v.h.f. antennas.

Another type of antenna which is becoming very popular are those for the Worldspace radio systems. One of the first I erected was on behalf of the *PW* Editor **Rob Mannion** for his own digital radio service from the Worldspace satellite. We were both very surprised to find that the antenna and built-in masthead amplifier were made in India.

However, it was a mention in the July issue of *PW* regarding u.h.f. 'cordless' headphones (see Keylines, page 9 'Cybermen Take Over') which reminded me of a very unlikely request to make and install an unusual antenna. It was all to do with the success - and great variety of - the neat u.h.f. cordless headphones

The cordless headphones, **Fig. 1**, are of course miniature u.h.f. f.m. stereo receivers operating on the 'licence free' - very low power allocation above the top end of Band V (863-865MHz). Maximum power is supposedly around 10mW - but some people have other ideas!

I had the first inkling of what's happening in 'Cybermen' land when Rob Mannion demonstrated an 'African Beat' music transmission clearly audible on cordless headphones on the eastern side of Bournemouth. Normally the headphone user can expect a range of around 100 metres or so and Rob reports that his Philips SBC HC9355 'phones provide reception over the three floors at the *PW* offices.

However, there always seem to be budding broadcasters around who are keen to 'boost' their audience! I'm not the first antenna engineer who has been asked to build and erect directional systems and amplifiers for the 'cordless headphone' band so it seems. My reaction has been to direct enquiries to the old Radiocommunications Agency (now Ofcom)...but would you believe - with a source of high quality dedicated receivers illegal broadcasters are latching onto the system!

The *PW* staff are using their cordless headphones legally and very much to their advantage, using the system to extend their fixed installation digital radio system's flexibility, especially for services such as BBC R7. So, let's hope that the would be illegal broadcasters stay on Band II where Ofcom can catch them. They're a real nuisance...and you've only got to visit London, Bristol, Birmingham or any large city to hear the havoc they cause to legitimate broadcasters.

The so-called 'Pirates' will have to look elsewhere for antennas and advice as far as I'm concerned!

PW

Fig. 2: Although the range of infra-red headphones is strictly limited you can avoid co-channel interference from other users! (These headphones are Philips HC 200 types, as preferred by G1TEX/M3NGS).

VHF DXER

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REPORTS & INFORMATION BY THE LAST SATURDAY OF EACH MONTH.

The 2004 Sporadic-E season got off to an excellent start with daily openings on the 50MHz band during the last two weeks of April and continued right through to the end of May. On 27 May the maximum usable frequency (m.u.f.) reached the 144MHz band and stations reported making Sp-E contacts into Albania, Bulgaria, Italy, Slovenia and Yugoslavia.

Operators in the UK were therefore waiting in anticipation to see what would occur during June, the month that traditionally heralds the peak of the summer Sp-E season. As expected, Sp-E propagation was most prevalent on the 50MHz band as it is situated at the lower end of the v.h.f. spectrum. Openings were reported on a daily basis, but for much of the month these were generally quite poor and lacked the intensity that is usually experienced at this time of the year.

Propagation on the 70MHz band was similarly lack-lustre with only four days of openings to European countries with access to the band. It was even worse for the 144MHz DXers who wasted much of the month listening to 'white noise'. Indeed, the only substantial Sp-E openings to reach this frequency band occurred right at the end of the month on 23, 24, 26 and 27 June. It was worth the wait though as there were 144MHz openings to such DXCC rarities as Algeria (7X), Ceuta (EA9) and Greece (SV).

THE 50MHz BAND

Although Sporadic-E openings were reported every day during June they definitely lacked the intensity and duration that DXers have come to expect. The majority of these openings were single-hop paths enabling contacts to be made all over Europe and into northern Africa.

There were also a handful of 'multi-hop' openings into the Middle-East area and North America. This propagation mode always manages to spring a few surprises and the number of countries that could be worked from the UK was quite considerable, probably in excess of 60.

Amongst the DX reported were the stations of CN8NK (Morocco), CT3FT (Madeira Islands), CU3EQ (Azores), EH8BPX (Canary Islands), EH9IB (Ceuta), HB0/DH3IAJ (Liechtenstein), HV0A (Vatican City), OD5NH (Lebanon), OHOJFP (Aland Islands), ST2DX (Sudan), SV3ASP/A (Mount Athos), TF3BM (Iceland), ZA/PE1LWT (Albania), ZB3B (Gibraltar), ZC4CW (UK Sovereign base on Cyprus), 3A2MD (Monaco), 4Z5LA (Israel), 5B8AV (Cyprus), 5T5SN (Mauritania) and 7X2RO (Algeria).

Multi-hop transatlantic openings to North America were reported on ten days, 9-10, 15, 19 and 24-29 June. The best of these openings occurred on 25 June between 1900-2200UTC to VE, VO (Canada), W1, W8, W9 (USA) and J79KV (Dominica) and on 27 June between 1115-1230UTC to W1 and later in the day between 2030-2200UTC to the W1, W2 and W3 call areas.

On the following day, 28 June, from 1730UTC the band was open to the stations of J79KV (an expedition by W6JKV running 700W to a 7-element Yagi) and HI3TEJ (Dominican Republic). Signals faded around 1830UTC returning at 2000UTC with the beacon station 9Y4AT (Trinidad and Tobago) being received in southern England. The 50MHz band remained open until 2130UTC with J79KV and stations in the W1 call area being worked by operators in England and Scotland.

John King G1XFE (Derbyshire) asks me to inform readers that they do **not** need high power and stacked Yagis to work European stations on the 50MHz band. John uses a Yaesu FT-690 transceiver running less than 2W into a 2-element beam suspended by fishing line from the rafters in his loft space. His recent s.s.b. contacts have included the stations of CT1ANO, DD6BKR, F1MOZ, HB9SJE, I0KNQ, OH3XR, OZ1BTE, SM7XJF, SQ9IAU and S57JVG.

THE 70MHz BAND

For much of June the Sp-E conditions were suppressed to such an extent that the m.u.f. rarely increased above 60MHz or so. On four occasions, 11, 15, 24 and 27 June it did intensify sufficiently to enable Sp-E contacts to be made on the 70MHz band with stations such as OZ2LD, OZ3ZW, OZ7IS (Denmark), S51CN, S51DI, S59MA (Slovenia), 9A2SB, 9A3AB and 9A6R (Croatia). There were also openings on other days to European countries that do not have authorisation to operate within the 70MHz band.

Contacts were established by working crossband, transmitting on 70MHz and receiving on the 50MHz band. A number of stations including I0JX, IH9/I2ADN (Italy), IS0GQX (Sardinia), YO4FYQ (Romania), YU1EU and YU7EF (Yugoslavia) now have 70MHz receive capabilities.

Don Dickson M0PJX reports that he made his first DX contacts on the band when he contacted the stations of OZ2M, OZ4EM and OZ4IDA in an opening around 1745UTC on 29 May. Don uses an Ascom f.m. transceiver running 25W into a Sandpiper 5λ8 wavelength vertical antenna.

Martin Andrew GM6VXB (Aberdeenshire) mentions that he is the only station in locator square IO97 active on the 70MHz band. He uses a Yaesu FT-847 transceiver and a BNOS LPM70 amplifier running 100W to a 6-element Sandpiper Yagi. He reports that the band was wide open on 29 May, but Polish f.m. broadcast stations (that also use the 70MHz spectrum) were extremely strong.

Martin did manage to work S51DI (Slovenia) but with some difficulty due to the interference. On 15 June he made another s.s.b. QSO with S51DI and also contacted the stations of S59MA and 9A3AB.

THIS MONTH DAVID G4ASR HAS REPORTS OF DX CONTACTS WITH STATIONS UP TO 3000KM AWAY ON THE 50, 144 & 430MHz BANDS

THE 144MHz BAND

Last year was truly excellent for 144MHz Sp-E propagation with ten days of openings being reported in the UK during June. The first event this year occurred on 27 May and expectations were therefore very high that another excellent season would occur.

However, it was not until 23 June that the next Sp-E opening was reported, it being followed by further events on 24, 26, 27 June. And that's a very long time to wait for a Sp-E opening during what is considered to be the peak month for this form of propagation.

The opening on 23 June only just made it into the UK and very few operators managed to catch it. **Jonathan M5FUN** (JO00) was one of them and he mentions that at his QTH the event lasted less than ten minutes. He was very happy though to work the s.s.b. stations

of 9H1ET, 9H1GC, 9H1PA and 9H1TX (Malta), all being approximately 2025km away.

An opening on the following day, 24 June, actually consisted of four separate events. The first phase between 0840-0910UTC was to the I7 and I8 call areas of Italy, this was followed two hours later between 1125-1150UTC with an excellent opening to Algeria (7X) and Ceuta (EA9) both located in north Africa. The third opening of the day between 1210-1330UTC was to Algeria, Spain (EA), Balearic Islands (EA6), Malta (9H), Sardinia (IS0) and Sicily (IT9).

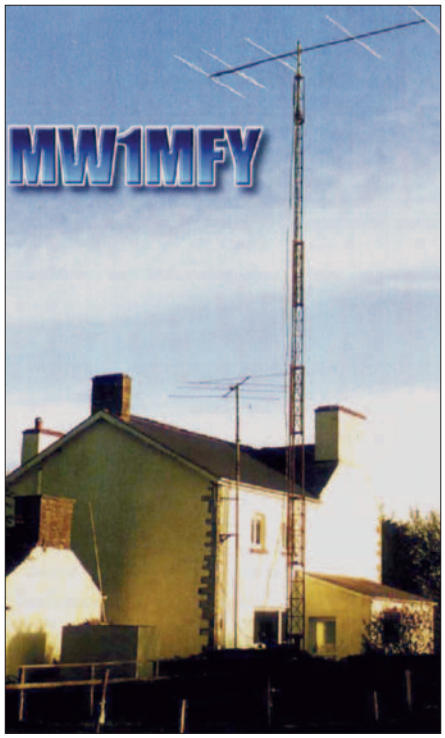
The station of EA6VQ (JM19) reports that he missed much of this opening but still found time to make s.s.b. contacts with the UK stations of G0RBD, G3LQR, G4DDK, G8GXP, G8JVM and G8TTI. The day rounded off with an hour long opening between 1600-1700UTC to stations in Bosnia-Hercegovina (T9), Croatia (9A), Hungary (HA) and Yugoslavia (YU).

Dave Edwards G7RAU (Isle of Wight IO90) mentions that it was a fantastic day. He made 16 s.s.b. contacts with stations in Algeria, Ceuta, Croatia, Hungary, Italy, Malta, Sardinia, Sicily, Spain and Yugoslavia. His best DX were contacts with 9H1PA at 2075km and 9H1ET at 2083km. He also heard the station of SV8DTD (Greece) at 2500km, but couldn't work him.

Geoff Grayer G3NAQ (Berkshire IO91) uses a transverter he built way back in 1976. It runs 90W into a 17-element Yagi and although more than a quarter of a century old, it still works the DX! Geoff reports that between 1132-1217UTC he contacted the stations of EA5AFP, EA5EZJ, EA5GPC, EA9IB and 7X0AD.

The 144MHz station of 7X0AD (JM16) operated by Jose EA7KW was probably the highlight for many European operators. During the opening, which lasted for over an hour at his QTH, Jose made more than 100 s.s.b. QSOs with stations in 14 countries. His UK contacts included the stations of G0NES, G0NNF, G3IRQ, G3KUM, G3LQR, G3LTF, G3NAQ, G3NVO, G3UTS, G4JZF, G4KWQ, G4LOH, G4RGK, G4RRA, G4TIF, G4VPD, G4WJS, G7RAU, G8GXP, G8IZY, G8JVM, M0IDU, M1MGD, GW3HWR, GW3LEW, GW4DGU and GW8ASD. It's amazing how many DXers weren't at work that Monday!

An opening on 26 June was reported between 0930-1030UTC to the Canary Islands (EA8). The main area of propagation from the EA8 perspective was to north-west France (IN78) although the path occasionally extended into south-west England. **Tim Fern G4LOH** (Cornwall IO70) reports working the stations of EA8BWD, EA8BWY, EA8TJ, EB8AHT and EA8/DL6FAW. All were situated in locator square IL18 approximately 2600km away.



● The 50MHz antenna at the QTH of Daniel Lee MW1MFY.

The Sp-E propagation on 27 June was actually another multi-phase event with openings in the UK between 1020-1030UTC, then briefly for a few minutes around 1115UTC and finally an hour long event between 1400-1500UTC. The first two phases were rather short as the UK was on the fringes of the opening.

A few stations in eastern England (JO01, JO02) reported contacts with I7UXH, IK7EZN, IK7XWJ and SV1BRL/8 but little else. The main opening in the afternoon was a much more widespread affair with stations in southern and central England and Wales making s.s.b. contacts into Croatia, Hungary, Italy, Poland, Romania, Sardinia, Ukraine and Yugoslavia.

Jonathan M5FUN running a Kenwood TR-751E transceiver, 100W and a 12-element Yagi made contacts with the stations of US5WU (KO20) at 1685km and UX5UL (KO50) for his best DX ever at 2108km. At the station of **Jamie Ashford GW7SMV** (Gwent IO81) s.s.b. contacts were made between 1415-1454UTC with 9A2SB, 9A5SG, YU7ON, US5WU (KO20) at 1907km and UT3BW (KN29) at 2048km. Geoff G3NAQ also worked the Ukrainian stations US5WU, UT3BW and completed s.s.b. QSOs with YZ7MON, 9A2SB and 9A8A.

TROPO DX CONTACTS

Under normal circumstances distances attained via an ionospheric propagation mode such as Sporadic-E will win hands down over tropospheric modes. This is especially true when considering contacts made on the 144MHz band. However, there are occasions when tropo contacts made on this band can equal if not better those made via ionospheric modes.

A number of stations in south-west England (Cornwall, Devon) and those bordering the Irish sea (Ireland, Scotland, Wales) are situated close to a coast with a clear sea path extending all the way to the Canary Islands (EA8), located off the west African coast. During the summer months, a marine duct occasionally forms over this 3000km path and super-DX contacts may be made with stations running quite low powers. Indeed this duct will often enable contacts to be made on the 430MHz band and higher frequency bands.

Between 2-8 June and 28-30 June a number of stations in western England, Wales and Ireland reported making tropo contacts with stations in northern Spain. On four occasions, 2, 3, 4 and 29 June, the path extended to the Canary Islands (and probably beyond!) with some excellent DX contacts being reported on the 144 and 430MHz bands.

Paulo Gomes CT1FOH (Portugal IN50) reports that tropo conditions were very good between 2-4 June. From his coastal QTH the 144 and 430MHz bands were open to England, Wales, Ireland and in a southerly direction, some 1500km away, to the Canary Islands. Paulo reports that the station of EA8BPX (IL18) worked EI5FK (IO51) over a 2678km path on both the 144 and 430MHz bands.

Tim Fern G4LOH mentions that the tropo opening on 2 June came as a big surprise as there had been no trace of the normally reliable EA1VHF beacon. It later transpired that it had lost power and was off the air! At 2228UTC he worked the station EA8BPX and then heard EA8BVU briefly, but didn't complete a contact.

On the following day at 1627UTC Tim put out a quick CQ call on 144.300MHz and was surprised to receive a call from EA8TJ at 59 both ways over the 2600km path. Tim then went on to work the stations of CT1ANO, CT1DYX, EA1TA, EB1EHO and EA8BPX. At 1654UTC he contacted RW1ZC/MM (IM23) on c.w. with 529 signals, these improving later in the evening to 57 signals on s.s.b.

The Russian maritime mobile station was over 2000km away in the Atlantic Ocean. Propagation was again found to be excellent during the evening of 29 June with s.s.b. contacts being made on the 144MHz band with the stations of CT1DYX, EA8BPX, EA8BVU, EA8TJ, EB8AHT and EB8BNS/P.

DEADLINES

That's it again for another month. Although the Sporadic-E season is now over there should be plenty of v.h.f. stations to work during the *Perseids* meteor shower in August. Good luck with your DX contacts and please let me know what you managed to work. Send your reports or news, preferably by E-mail, to reach me by the last weekend of the month.

73, David G4ASR

HF HIGHLIGHTS

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

The recent D-Day celebrations provided the chance to hear many special event callsigns being aired on the h.f. bands. Two of these included **GB60OL** and **GB4OL**, both were commemorating the 60th anniversary of Operation *Overlord* and the D-Day landings. Operators from all three service societies RNARS, RSARS and RAFARS were running the stations at 21st Signal Regiment based in Azimghur Barracks, Colerne, Wiltshire. These included **Graham Beesley M0GEB**, **John Densem G4KJV**, **Dennis Egan GW4XKE** and **Peter Fletcher G0RGB**.

The equipment used included a Kenwood TS-530S with matching AT-230 a.t.u. connected to a doublet antenna running approximately North/South. With the assistance of **Captain Dick Atterbury G4NQI** and a group of Territorial Army soldiers, three 15m (50ft) masts were erected for the group's use during the event. Dick was even given a break from his TA duties to help with the 'pile-up' style operating as there was a huge amount of interest in the callsigns. These high profile events can be very intensive for the operator when both operating and logging the received calls.

The assistance of a logger is a great help and an experienced s.w.l. is even better.

Former serviceman **David Vickers** was on hand and though disabled and on crutches, he was able to maintain the logbooks. A highlight of this occasion was a contact with **Alain TM8SOE**, Special Operations Executive (SOE) in France who was running a fully restored clandestine Suitcase Radio with just 4W output to a simple dipole antenna. (A similar set-up to those used by the SOE during the Second World War).

LOTS OF NEWS THIS MONTH ALONG WITH QSL ACTIVITY, TAKE IT AWAY CARL...

DX NEWS

On to some DX news now and you may just have a better chance of working Ethiopia on a digital mode now as **Michal ET3TK**, has been very active on RTTY lately and has also been using some p.s.k. The best times to work him are after 2000 on 10MHz, after 0130 and 1830 on 14MHz, after 1430 on 18MHz and after 1230UTC on the 21MHz band. QSL requests are via OK1CU via the bureau or direct to **Slavek Vanicek, Zahradni 447, Solnice 517 01, Czech Republic**.

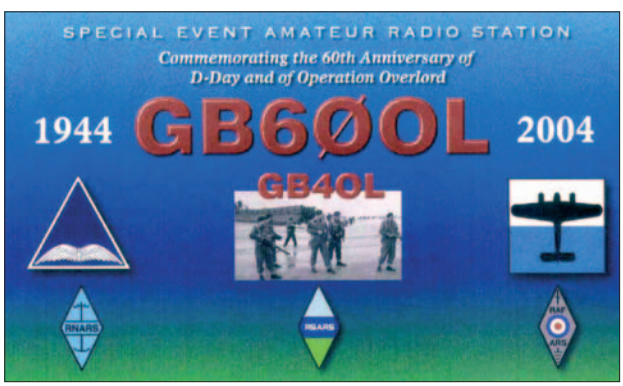
In Afghanistan **Daniel Schirmer DL5SE** will be active as **YA0Y** from Kabul until September. He will operate with 100W and a ground plane antenna and has already been quite active using c.w. on 10, 14, 18 and 21MHz at various times between 0630-0930 and 1400-1900UTC.

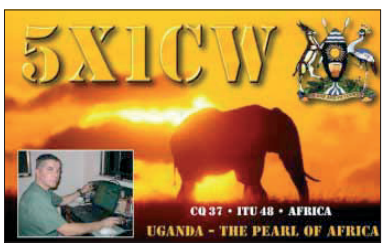
Closer to home in Sweden, **Martin Hedman SM0DTK** will be active as **SM0DTK/1** from Gotland Island EU-020 until the 22 August. If you need this island for IOTA, you can arrange a sked by sending an E-mail to **sm0dtk@passagen.se** and more information can be found at **http://hem.passagen.se/sm0dtk/**

ST. KILDA ACTIVITY

The archipelago of St. Kilda EU-059 is the remotest part of the British Isles and lies 66km (41 miles) west of Benbecula in Scotland's Outer Hebrides. The islands with their exceptional cliffs and sea stacks form one of the most important seabird breeding stations in the north-west of Europe. St. Kilda was inscribed by UNESCO as a World Heritage Site in 1986 in recognition of the island's Natural Heritage, for its exceptional natural beauty and for the significant natural habitats that it supports for wildlife.

Two UK operators **Nigel Wears 2M0NJW** and **David Warr GM4RQI** will be





● David G6OCD's compact shack - in Kirkheaton, W. Yorkshire.

● GB60OL operators

attempting to reach the rarest IOTA Island in Britain on a two man DXpedition on 22 August for four days. The callsigns to be used are **2M0NJW/P** and **GM4RQI/P** and operations are expected to be on 3.5-14MHz using both c.w. and s.s.b. Check out the National Trust for Scotland's very informative website at **www.kilda.org.uk/** for further details and a history of St. Kilda.

QSL INFORMATION

Some QSL information now beginning with French Amateur **Christian F6GQK,** who ended his operation from Kampala in Uganda as **5X1CW** on 12 June this year. His equipment there included a Yaesu FT-900AT and a Cushcraft R7 multiband vertical, which he says 'worked extremely well'. Christian has now returned home and begun the task of processing his logbooks which contain more than 14000 QSOs. If you worked him and require a card you can get one direct from **Christian Ramade, 23, Rue Du Perigord, 33510 Andernos Les Bains, France**.

Across the Atlantic another special event station **W5D** was activated by members of the **Jefferson Amateur Radio Club** (JARC) from a D-Day Museum marking the Allied invasion of Normandy. A certificate is available for those who managed to make a QSO and this can be obtained for $2.50 including postage. If you only require a QSL card, a s.a.s.e. will do and all requests go via **W5GAD, PO Box 73665, Metarie, LA 70033, USA**.

The JARC was originally founded in 1956 and now has well over 100 members. Its clubhouse is located inside Metairie Playground in Metairie, Louisiana just outside New Orleans. The club has both h.f. and v.h.f. stations and more than a half dozen antennas in its antenna farm, which includes one 46m (150ft) tower. Take a look at their interesting website at **http://www.gnofn.org/~jarc/**

YOUR REPORTS

A warm welcome to **David Ballantyne G6OCD** who lives in Kirkheaton, West Yorkshire and says "I am still getting over the shock of being able to use h.f. without having to pass the Morse test! You can see from the photograph that my shack is quite compact and geared up for v.h.f. operating. I do however listen to all the h.f. bands using my Yaesu FT-757, which I use with a long wire or G5RV antenna. I hope it will not be long before I grab the microphone and begin my h.f. DXing".

The logbook of **Ted Trowell G2HKU** on the Isle of Sheppy in Kent starts us off again this month. Despite "the rather high levels of static" Ted managed to work a fair bit of DX. The 7MHz band provided c.w. contacts with A61AR (United Arab Emirates) and N5TP/MM (USA) off the West Coast at 2000UTC using his Icom IC-746 and Butternut h.f. vertical antenna. A switch to 10MHz at 2100UTC using an Icom IC-751S and 4W QRP found SV8/GW3UOF/P (Greece), EA6/DL8YR/P (Balearic Islands) EU-004, W1MK (USA) in Boxford, Massachusetts and UR5FA/MM at sea near the Canary Islands.

THE 14 & 18MHz BANDS

The 14MHz mobile log of **Mark Taylor G0LGJ** in Dereham shows 100W s.s.b. contacts with YV5ANF (Venezuela) 0433, PJ4/YL2GM (Netherland Antilles) SA-006 0713, JW/OZ8KR (Svalbard) EU-026 1423 and 9K2YM (Kuwait) at 1647UTC using a Yaesu FT-100 and Pro-Am mobile whip.

In Chelmsford, Essex **Martin Medcalf M3VAM** used his Icom IC-746 and SGC237 auto tuner connected to 8.2m of wire and logged the following s.s.b. calls. T77EB (San Marino) 1333, SP9LSD (Poland) 1349, IR8RM (Italy) 1351, LY4A (Lithuania) 1355, ER3DW (Moldovia) 1554, EO59I (Ukraine), LZ04KM (Bulgaria) 1625 and T99A (Bosnia-Herzegovina) at 2229UTC.

In Nuneaton **Chris Colclough G1VDP** used a Yaesu FT-897 and Cushcraft MA5B beam logging WB8UHZ (USA) in Saginaw, Michigan and CU3GD (Azores) EU-003. On to the 18MHz band and Ted G2HKU who worked RK6CZ (European Russia) with 4W at 1500 followed later by CO8LY (Cuba) NA-015 and J48XH (Greece) at 2000UTC with 100W. The s.s.b. of Martyn M3VAM found GM6TW/P (Scotland) at 1609 and GU3UOQ (Guernsey) EU-114 at 1922UTC.

THE 21MHz BAND

On 21MHz c.w. **Alex Shillito G2FRY** in Nottingham worked several stations in the USA along with PX2A (Brazil), P40P (Aruba) SA-036, PJ2W (Netherland Antilles) SA-006, OC4WW (Peru) and WP2Z (Virgin Islands) NA-106 during one weekend. The equipment was a Yaesu FT-101E connected to his indoor home-brew 'rod' antenna.

In Fife, Scotland **David Cowie GM8KSJ** found the bands to be in 'poor shape' but was pleased to work on s.s.b. YC4IR (Indonesia) OC-143 at the early time of 0445 and RW3WW (European Russia) later at 1245UTC. The antenna was a small vertical matched with a tuner constructed from an article in February's *PW*.

Meanwhile, Mark G0LGJ also worked the 21MHz band finding VP5/W5AO (Turks & Caicos Islands) NA-002 at 1624UTC using s.s.b. once again.

Finally, Ted G2HKU put out a few CQ calls finding OY1CT (Faroe Islands) EU-018, ZF1A (Cayman Islands) NA-016, around 1600 followed by D44T (Cape Verde) AF-005, PZ1DG (Suriname) and P4/LY2TA (Aruba) SA-036 all around 2000UTC.

SIGNING OFF

Well, that's about it for another month. It is interesting to note that we had no reports from anyone for a band higher than 21MHz. Conditions have certainly not been at their best lately. With the recent increase in static noise I have monitored very little traffic on anything higher than 18MHz! It certainly looks like the lower bands are going to be our best DX hunting grounds for some time to come!

As usual my thanks go to all our reporters for their logs and to **Tedd Mirgliotta KB8NW** Editor of the **OPDX Bulletin** for all the DX information. Until next time have a good DX filled month.

73, Carl GW0VSW

DATA BURST

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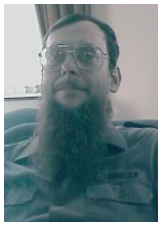
E-mail: rcooke@g3ldi.freeserve.co.uk Packet: G3LDI @ GB7LDI

ROGER G3LDI ROUNDS UP THE LATEST DATA NEWS, STARTING OFF WITH A TRIBUTE TO ALAN HOBBS G8GOJ

A Brief Biography of Alan Hobbs G8GOJ. Alan Hobbs G8GOJ died in April and this is a tribute to his outstanding work for British Amateur Radio Teledata Group (BARTG) and the teleprinting side of our hobby over a number of years. He was also Member Number 19 so was almost one of the founders of BARTG.



● Alan Hobbs G8GOJ, long standing member and keen supporter of BARTG who died in Aprl.

Alan developed his lifelong passion for electro-mechanical teleprinters at a very early age due to spending much of his school holidays in 'Telegraph House', the main factory of Creed & Co at East Croydon, from the early 1950s to the early 1960s. This was because his father was the Plant Engineer for Creed & Co and was responsible for the maintenance of the site facilities and the machine tools, which produced the teleprinters.

Alan's first teleprinter, a Creed model 47C/N4 tape printing teleprinter, was acquired in 1962, together with an ageing Creed model 6S/2 punched tape reader and a copious supply of scrap punched tape from the test benches in the main assembly shop. Many happy hours were spent printing out whatever tape could be obtained.

Within a few years, a National HRO communications receiver had been purchased from a friend at Technical College, a Government surplus GCRE FS/10 terminal unit had been purchased from a dealer in North London and a Creed model 7TR/B/2 re-perforator had been purchased from a dealer in Central London. With help from **Arthur Owen G2FUD**, of the British Amateur Teleprinter Group, the FS/10 was suitably converted and the 47C/N4 was connected to the HRO. This opened up the world of RTTY news agencies to Alan, leading to the bedroom floor being covered with 3/8in wide paper tape after an evening 'On the Air'.

In due course, the desire to talk back became overwhelming and the Amateur Radio callsign G8GOJ was obtained in August 1972. Alan eventually joined the committee of BARTG in the late 1970s.

He was a past Chairman of BARTG, with the 'T' of BARTG subsequently changed to 'Teledata and he was also BARTG President. Alan wrote many articles pertaining to machines, coding and RTTY in Britain, and was only active with machinery, including auto-start on 144MHz. In the 1960s, the only way to operate RTTY was with a teleprinter and terminal unit, and the RTTY shack was always a noisy and oily place, but very evocative of an era never to be seen again in most modern shacks.

CONTACTS

Phil Cooper GU0SUP is now the Awards Manager for BARTG. Phil writes a column for the *Datacom News* and is very active on RTTY, entering most of the major contests. He was born in 1953 in London, but has lived in Guernsey since 1974. He works for Guernsey Telecoms as an electronics engineer, repairing mobile 'phones.

● Phil Cooper GU0SUP is the Awards Manager for BARTG.

Phil is President of the Guernsey ARS and a Senior Instructor for the Foundation Licence. He can also be found in the RSGB Club Cumulative contests on 3.5MHz. Phil already has DXCC and WAZ on RTTY with WAS following.

Awards have long been part of our hobby and they have varying degrees of quality! The more attractive and appealing they are, the more likely they are to be hung on the wall.

The QCA award, offered by BARTG, which can be obtained in basic form in just one contest. All you need is 25 countries confirmed but you do need the QSL cards, so you might have to QSL to around 40 countries in order to get the 25 confirmed.

Some awards offer on the honour system whereby a witness checks your logbook and signs to that effect. To qualify for some awards there is a small fee to pay, while others require you to be a member of a data group. Take a look at the BARTG website (**www.bartg.demon.co.uk**) for more information.

Phil can be contacted by post to his QTH: **1 Clos au Pre, La Hougue du Pommier, Castel, Guernsey GY5 7FQ (Via UK)** or by 'phone on **(01481) 251747** or via E-mail to **pcooper@guernsey.net** The Membership Secretary and Treasurer for BARTG is **Andrew Thomas G8GNI/M5AEX**. Andrew can be contacted at his QTH: **Dame School House, 103 High Street, Stony Stratford, Buckinghamshire MK11 1AT** or via E-mail at: **members@bartg.demon.co.uk**

MAPS AND LISTS

Several years ago, we used to have updated lists of BBS/Nodes issued on the Network. These have been absent for a long while and perhaps it 's something to do with the work involved, the decline of the Network and migration to the Internet, or just nobody volunteering! However, looking around I found a list on the Internet together with a very nice Network Map. It just goes to show that there is still hope for the radio part of the network!

A lot of work has gone into producing both the map and the list, and this is due to the **Fourpack Packet Radio Group** and **G0SYR** in particular. It's very useful to have a Network Map when routing mail, or even trying to work across the Network by node hopping, not such a prevalent activity these days! However, quite a few Amateurs are becoming disenchanted with the Internet amd E-mail and are refreshing and renewing their packet mail again, great to see!

PACKET CONFERENCE

By the time you read this, the 2004 Packet Conference, organised by **Paula G8PZT,** will have taken place on 15 May. There were some interesting agenda items this time, such as the Amateur Aradio Messaging And Paging Sustem (ARMPAS), which I reported about in my last column, and the RF-LAN project, which has as yet to get off the ground.

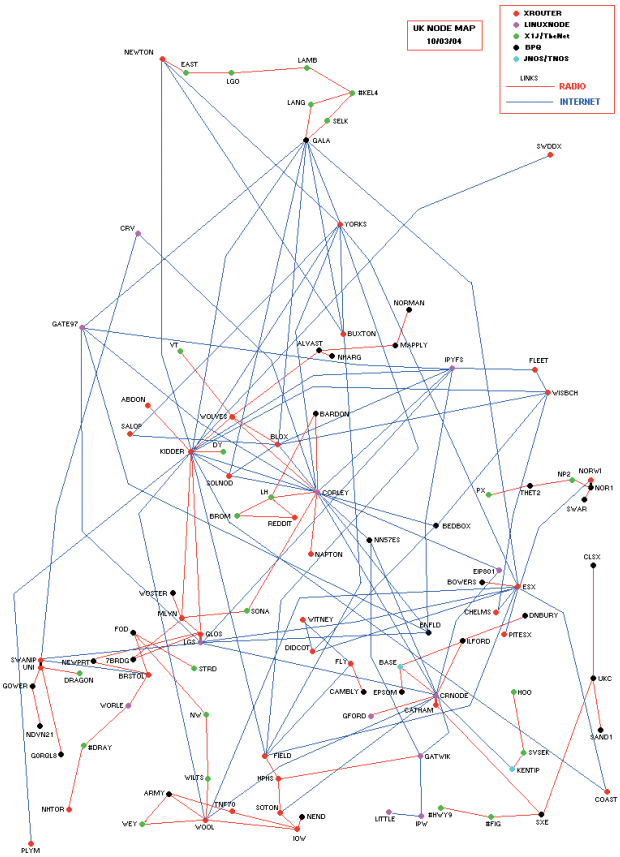
The ARMAPS, the system being proposed by **Phil Cadman G4JCP**, seems to be gaining interest and hopefully some of the software engineers will be sufficiently motivated by Phil's enthusiasm to become involved. Here are a few ideas from Phil regarding the state of play.

"The bane of packet life is collisions, or rather, how to avoid them. Problem is, you can't with AX25, at least when there are hidden transmitters. So, let's get one thing clear, the way to stop collisions becoming a problem is not to have them in the first place. Or at least try to make them very, very unlikely. I propose that the ARMAPS protocol should avoid collisions by two methods:

1 By not having a 'free for all'
2 Where a free for all is unavoidable, having very low channel occupancy, say less than 10%

In many cases, ARMAPS will be used in an application, which has some kind of central control. It makes sense, therefore, for one ARMAPS station to actively control the flow of packets on a channel. This is somewhat like a voice net where a net controller decides who can speak at any one time. Of course, there has to be some mechanism whereby new stations can join in, and stations already in the net can leave without the net controller being left wondering where they've gone".

This reminds me of the DAMA protocol. I tried to implement this years ago, when traffic was heavy, but it requires the co-operation of the user and I could not persuade the users to modify their TNCs.



It's very useful to have a Network Map when routing mail (see text).

For a lot more information, take a look at Phil's website: **www.armaps.org**

CABRILLO

I recently took part in the Volta RTTY Contest, only as a part-time entry and also a single-band as I did not have much time to spare. However, I did manage 284 contacts and after the contest I decided to send the log immediately. However, Cabrillo was 'grayed out', which means that the Volta module did not support the Cabrillo format.

Now most contests these days insist on Cabrillo format, but reading the rules again in *Datacom*, I found that a plain text file was acceptable as well as Cabrillo. I sent my file in as plain text, but got to wondering why they suggested Cabrillo if Writelog would not allow me to construct a Cabrillo file? Well, you know how these things 'gnaw' at you, so I sent a message to the Writelog reflector. Among several replies was this one from **Dave NC6P**:

"Hello Roger, I found this site: **www.sp7ps.pl/sp7dqr/eng/index_en.html** Click on 'converters' on the left side panel. The next page has several programs.

I use Writelog also. After a contest that has the Cabrillo grayed out, I have used the *WL2CABR* program to make a Cabrillo file. I am running Windows 98SE. In Writelog, choose file on the toolbar and then export ASCII not formatted by time. This will make a file that you will use to point the WL2CABR program to in order make your Cabrillo file. I played around until I found the right format from Writelog that would work with the converter program".

Thanks for that Dave, it works really well and I have now added that program to my Writelog directory for future use. That's all for this month, so until next time keep your data news coming!

Roger G3LDI

Click on www.sp7ps.pl/sp7dqr/eng/index_en.html for a program that will allow you to make a Cabrillo file to submit for contests (see text).

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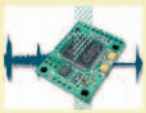

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Type 1/2, 2x5/8, 4x5/8
Length 2.5m
£69.95

W-30 2/70	£39.95
W-50 2/70	£49.95
W-300 2/70	£64.95
W-2000 6/2/70	£69.95
WBV-70 4m 1/2 Wave	£39.95

Bencher Antennas

Butternut HF-6V
Bands: 80/40/30/20/15/10
Height (Adj): 26 ft (7.9 m)
Weight: 12 lbs (5.4 kg)
Impedance: Nom 50 ohms
VSWR: 1.5:1 or less
£299.95

Butternut HF-2V 40/80	£229.95
Butternut HF-6V 80-10	£299.95
Butternut HF-9V 80-6	£349.95
Butternut HF-5B 20-10	£319.95
30-MRK 30m ad for HF2V	£89.95
A-17-12 17&12 ad for HF6V	£49.95
A-6 6m ad for HF6V-X	£14.95
TBR-160S 160m HF2/6/9V	£114.95

Hustler Antennas

Hustler 5-BTV
5 Bands - 80-10m
Height 7.64m - Weight 7.7kg
SWR 1.15:1 - Power 1kW
£209.95

Hustler 4-BTV 4 Band Vert	£169.95
Hustler 6-BTV 6 Band Vert	£239.95

West Mountain Radio

RIGblaster Pro	£229.95
RIGblaster Plus	£139.95
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RIGblaster M4	£109.95
RIGblaster RJ	£109.95
Nomic 8P	£59.95
Nomic 4P	£59.95
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Tonna Antennas

Tonna - 20655
23cms (1296 Mhz) 55 element 21.5 dbi gain "N" 4.64m long.

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Tonna 20809 2m 9el	£54.95
Tonna 20811 2m 11el	£79.95
Tonna 20817 2m 17el	£99.95
Tonna 20909 70cm 9el	£45.95
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Tonna 20921 70cm 21el	£74.95
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Tonna 20655 23cm 55el	£89.95
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HF15FX 15m Mobile	£39.95
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CP6 Base 6m-80m	£239.95
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X200 Base 2/70	£84.95
X300 Base 2/70	£99.95
X510 Base 2/70	£124.95
X700 Base 2/70	£249.95

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A3S - 20/15/10 3el	£499.95
A4S - 20/15/10	£569.95
A3WS - 12/17 3el	£379.95
ASL-2010 13-32MHz	£749.95
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D3 - 20/15/10 Dip	£249.95
D3W - 30/17/12	£249.95
D4 - 40m Rotary	£349.95

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M-285 5/8 2m Mobile	£13.95
NR-770H 2&70 Mobile	£23.95
SG-7900 2&70 Mobile	£31.95
CR-627 6&2&70 Mobile	£33.95
X-200 2&70 Base	£58.95
X-300 2&70 Base	£63.95
X-510 2&70 Base	£98.95
V-2000 6&2&70 Base	£68.95

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CWS-160 160-10m (133ft)	£114.95
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AT-1000

1KW Auto ATU - 1.8-54MHz - 1-8 secs Tune - Approx SWR Rating of 10:1

£499.95

LDG Z-100

100w Auto ATU - 1.8-54MHz - 0.5 - 6 secs

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LDG AT-11MP

100w Auto ATU - Covers 1.8-54MHz
1-5 secs Tune - Cross needle meters

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LDG RT-11

100w Waterproof Auto ATU - 1.8-54MHz
1-5 seconds Tune

£179.95

LDG RBA 1:1 & 4:1

1:1 or 4:1 Balun - Covers 1.8 - 30Mhz
Power rating 200w

£29.95

LDG AT-897

100w Auto ATU for FT-897 - 1.8-54MHz

£199.95

Accessories:

K-OTT Kenwood Interface	£49.95
Y-OTT Yaesu Interface	£54.95
Icom-IC1 Icom Interface	£29.95
Alinco-IC1 Alinco Interface	£29.95
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W2IHY 8 Band Audio EQ Noisegate

£229.95

Finally, professional audio processing technology is applied to the unique requirements of amateur radio operators! The W2IHY 8 Band Audio Equalizer and Noise Gate is an easy-to-use, sophisticated unit loaded with high-performance features. This thoughtfully-designed, quality- constructed station accessory performs three important functions, all in one good looking, low-profile package.
Don't forget you can use your exsisting desk mike/pro mike etc.
For arm chiar or DX audio tailored to *your* own specifications.

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W4RT Electronics

One-Plug-Power

One-Plug Power is the internal FT-817 battery solution you have been waiting for until now.

OPP-817 £54.95

NEW! 1800 mAh Large Capacity FT-817 Internal Battery Solution Still use Internal 817 Charger

OPP-897 £99.95

One Plug Power for the FT-897 4500 mAh; Fully Compatible with the FT-897 and Yaesu Charger.

NEW!

One-Plug Power is the internal FT-817 battery solution you have been waiting for until now. One-Plug Power comprises a 1800 mAh NiMH battery pack, both over-termperature and over-current protection, connection to the FT-817 Molex connector, and a modified Yaesu battery cover door featuring a power jack that allows connection of a battery charger such as the Maha MH-C777 or MH-C888.

One-Big Punch

One BIG Punch (OBP) is a custom add-on accessory for the Yaesu MH-31 microphone commonly used with many Yaesu amateur radios

OBP £49.95

Speech Compressor for the Yaesu MH-31 mic and FT817 FT857, FT897. Improve the TALK POWER.

Hand Mike £57.95

W4RT Electronics Microphone with One BIG Punch Speech Compressor included.

The One BIG Punch is an AF-based speech compressor specifically configured to provide remarkable increase in talk power while maintaining good audio quality. The OBP is NOT a clipper, but a compressor providing great voice compression, high-level limiting, and noise gating. The unit can be mounted inside the MH-31, requires no additional electrical power, and can be turned on or off by using the MH-31's TONE switch.

One-Board-Filter

The One-Board Filter (OBF) affords you the opportunity to have both the Collins CW and SSB mechanical filters available in your FT-817 together!

OBF £229.95

Replace two filters in the space of one. OBF includes the two optional filters and fitting.

Collins Mechanical Filters
for the Yaesu FT-817, 857 & 897.

500 Hz CW - £94.95 *2.3kHz SSB - £94.95*

This is the option that many, many FT-817 owners have requested. The OBF utilizes Collins Mechanical Filters that are the same as used in the optional Yaesu filters for the FT-817. The bandwidth of the 7-pole CW filter is 500 Hz and the 10-pole SSB filter is 2.3 kHz. The One-Board Filter is NOT available for installation by FT-817 owners. This is not a "do-it-yourself" option. The One-Board Filter must be installed by RADIOWORLD, or a competent engineer . If in doubt please call for details.

One-Touch-Tune

At the touch of a button, you have the carrier needed for tuning. One-Touch Tune (OTT) is totally transparent to the FT-817 and to any external equipment that you have attached to the rig.

OTT-817 £54.95

It requires no external power and works with both manual and automatic tuners.

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NEW* FT-817 Stand £19.95

Simply snaps into position. Adjust for desired height. Complete with non slip feet and allen wrench.

Professional-Grade FT-817 Stand

ATX Walkabout

ATX Walk--about PL-259

£47.95

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ATX Walkabout PL259	£47.95
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The Miracle Whip

RX - 0.6 to 460 Mhz
TX - 40,30,20,17,15,12, 10, 6, 2m & 70cm

Power Limits 25W PEP 10W Cont.

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** The Miracle Whip is optimized for for best receive rather than lowest swr on 80 and 160, as no short antenna will present good transmitting opportunities at these frequencies

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An extremely strong magnet base which actually consists of 3 x 5" chrome magnets that are interconnected with metal strips to form one very large mount. Suitable for very large mobile antennae such as ¼ wave tank whips.

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£269.95

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Mode: SSB/CW, FM/AM
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RF Output: 50W PEP (25W AM)
Power: 13.8V 10A max

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200Watts
(1.6-30 MHz)

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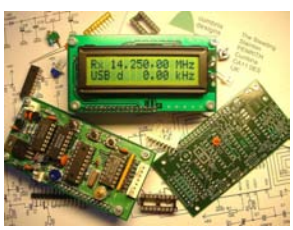

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bargain basement

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6m (50MHz) Tonna 5-element antenna, one year old, £35. 2m (144MHz) Tonna 9-element antenna, one year old, £25. Kenwood h.f. trans TS-570D a.t.u., d.s.p., can be seen working, clean radio, £525. Tel: (01903) 772563 or E-mail: dennis@ellis3147.fsnet.co.uk

6m (50MHz) v.h.f. u.h.f. multi-mode station, Trio TS700 mm, 70cm (430MHz), 10W and RN Electronics 6m (50MHz) 25W transverters, rotator, manuals, all in good condition, sensible offers, will split or swap, w.h.y.? G6HXX, QTHR. Tel: Lincs (01507) 534005.

Bendix RA1B receiver, good condition, working order with instruction book and circuit diagram, £65. Eddystone EC10 MkI, mint condition, instruction manual, £95. Roger, Leicester. Tel: 0116-276 7665.

Decca SMC Voyager marine s.s.b. radio telephone, 1.6-4.2MHz, TX/RX type 120. Power supply type 121, 12V or 24V, six channel crystals, handset, requires cable, handbook and circuits, £70 o.n.o. Peter GW4GCB, N. Wales. Tel: (01745) 720756.

DSP processor W9GR DSP3, professionally assembled, v.g.c., with data, £75. Datong audio filter FL1, working, £15. Tel: Ayrshire (01292) 479245.

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FT-101ZD, £200. TS-530S with c.w. filter, £225. Both in occasional use, buyer collects. Can deliver to Telford. GW3COI on (01758) 712675.

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Icom 505 6m (50MHz) transceiver, sought after model with f.m. board, good working order, some paperwork, £195. Tel: (07973) 836122 or (01428) 683189.

Icom 718, mint condition, three months old, fitted with d.s.p., instruction manual and boxed, £370. Outbacker Junior, 80-10m (3.5-28MHz) and 6-2m (50-144MHz), excellent condition, £150. Tel: (01740) 651938.

Icom 720A, g.w.o., £300. Labgear Top Band TX, £30. R1155, good condition, no valves, £30. Panda Cub TX, complete, £50. Marconiphone V2A domestic RX, offers. Tel: 0161-281 8584.

Icom IC-251 all-mode 2m (144MHz), BNOS 100W amp, £325 for both. John G4OVU, Harlow. Tel: (01279) 420513.

Icom IC-R7000 communications receiver, 25MHz to 2000GHz, v.g.c., recently serviced, all modes, £380. Roberts world-wide radio with s.s.b., £35. Tel: (01249) 653735.

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Optibeam OP9, five bands, new in box, never assembled, £500. John, Lincolnshire. Tel: (01522) 789959 or mobile (07973) 462268.

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Tennamast, extends to approx. 25 feet, galvanised finish, plus extra 10ft pole with rotor, complete with all fittings, stand off wall brackets, luffing wall tilt winch, to include two 5-ele dual band u.h.f./v.h.f. beams, all in good condition, plus feeder cable if required. Moving house, so absolute bargain at £210 the lot. Tel: (07973) 836122 or (01428) 683189.

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Yaesu FRG-7 RX, £80 plus P&P. John, Milton Keyes. Tel: 0207-536 0466.

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Racal receiver in working order and any Racal accessories wanted, eg: s.s.b. adaptor, pre-selector, panadaptor, etc., all considered. Will travel to collect. Tel: (01482) 887938.

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Practical Wireless BO

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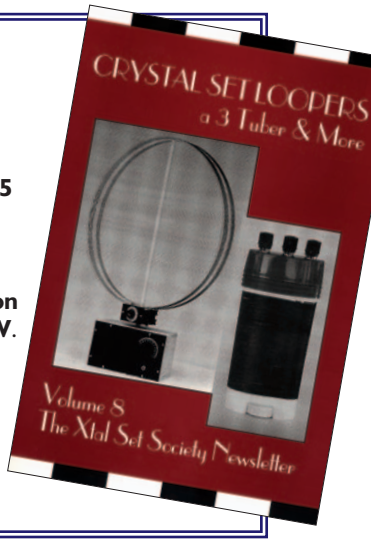

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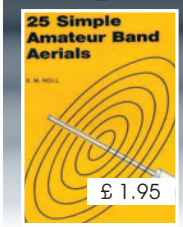

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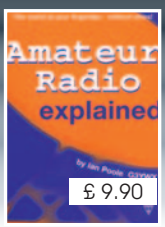

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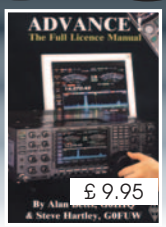

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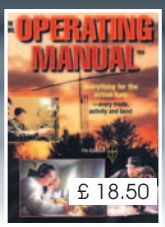

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topical talk

Encouraging Learning by Practice

Fig. 1: Robert Snary G4OBE is seen assisting an Air Training Corps Cadet undertaking Novice Course Projects during a demonstration at the former Picketts Lock show. Rob G3XFD explains how he tries to adopt G4OBE's dedicated style using the same 'over the shoulder' approach in Radio Basics.

In this month's Topical Talk Rob Mannion G3XFD responds to a letter from a newcomer to the hobby. In his reply Rob outlines his thoughts on how he tries to encourage learning 'by practice', and building up a technical library.

Generally, the feedback we get from our readers proves that the technical complexity of articles, together with the level of understanding we assume *PW* readers have, is acceptable to the majority. Our occasional surveys also provide valuable confirmation to enable us to maintain the vital standards.

Recently however, I've been made aware by a significant number of our readers that they would very much enjoy a series of articles catering for a higher level of understanding, coupled to a suitable project. In other words - first you can read about the technology, look at the approach by the designer, brush up on effectively applied mathematics and then use your new, or enhanced skills very much to your own advantage. That's the idea behind **Tony Nailer G4CFY's** new series Doing It By Design and I'm very pleased at the response from readers to Tony's excellent work.

However, I'm also aware that those joining our hobby nowadays often do so with little prior knowledge of the technology, science and physics in general. And although they can have seemed to miss out of science lessons at school (usually the education system's fault - not theirs!) they do join us with effervescent enthusiasm. This is why I fully sympathise with the sentiments clearly laid out by **Edward Summers M3GVZ**, in his letter in this month's Radio Waves, pages 10 to 12. I'll now try to explain how I try to overcome what seems to be a new difficulty.

Novice Scheme Training

Since the truly superb stage-by-stage learning system adopted by the Novice Scheme has been abandoned, we now have keen types who can (sometimes) end up with a transmitting Licence, while possessing the barest minimum of technical knowledge. Whereas, with the former Novice training - there was an extremely useful 'hands on' project element within the course, overseen by the extremely experienced Instructors.

Please don't think I'm criticising M3s and their training teams - I'm not! And of course many former Novice Trainers are now running the Foundation Licence courses, bringing all their experience with them, to the advantage of students.

Instead, I am in fact criticising the education system which today seemingly allows people to leave school without what I regards as the essential 'foundation' knowledge for life. Obviously, everyone has different priorities in life, but I think that a good working foundation of working English, basic mathematics, practical science and the ability to research for information is necessary (Strangely, researching is an art which is disappearing...despite the Internet/www effects).

Radio Basics

To help readers, within Radio Basics I try to adopt the same style of approach, **Fig. 1**, as my good friend **Robert Snary G4OBE**. I write the articles with the intention of conveying the feeling I'm actually working with the reader on their bench.

As much 'hands on' practice as possible is suggested, and importantly - I regularly remind readers to refer to the ARRL's *Understanding Basics Electronics* book (this superb publication is the recommended reference source). I also encourage RB readers to research as much as possible with the aim of assembling the best technical library possible.

We don't have room in *PW* for any more 'regular' columns this year, but you can be sure I'll do my utmost to assist readers in the same situation as Edward M3GVZ. And readers can help themselves by 'backing up' the essential 'hands on' experience with the necessary technical reading. In that way - by working together- we'll 'crack it' and further extend your enjoyment of our hobby.

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