THE UK'S BEST SELLING MAGAZINE FOR AMATEUR RADIO ENTHUSIASTS

practical Wireless

JANUARY 1996 £2.20

FREE THE PRACTICAL WIRELESS HANDY DATA REFERENCE CHART

CRYSTAL CLEAR FUTURE

Ian Poole G3YWX says..." The future's crystal clear for quartz in radio"

REVIEWED

The Watson 2090H 'Handy' Amplifier

BUILD

A Junk Box PSU & A Six-Whip Antenna

pwp 9 770141 085037 01>

COMPUTER PROGRAMMABLE

Dual Band Mobile FT-8500

"Each of the mics function the same, and the radio is PC programmable with ADMS-2!"

"Look, the digital voltage display monitors my car battery voltage, too!"

"I like the Spectra-Analyzer. It keeps track of my favorite repeaters, and checks UHF and VHF channel activity."

"Yaesu did it again!"

Features

- **Frequency Coverage:**
  2m RX: 110-174 MHz
  TX: 144-146 MHz
  70 cm RX: 410-500 MHz
  TX: 430-440 MHz
- Spectra-Analyzer™ w/adjustable signal width, spacing & span markers
- 6-Character Alphanumeric Display
- 110 Memories (in 5 memory banks)
- Omni-Glow™ Display
- Digital voltage display
- Selectable 1200/9600 baud
- 3-Level Auto-Mute w/Mute Timer
- V+V, U+U, V+U Dual Receive
- 3 Power Output Levels
  2 m 50/10/5 Watt
  70 cm 35/10/5 Watt
- Built-in Auto Power Off (APO) and Time-out Timer (TOT)
- MIL-STD 810
- 9 Memory DTMF Autodialer
- PC Programmable w/ADMS-2
- 3 Scanning Modes w/ Clear Scan
- Adjustable LCD Contrast/ Brightness Control
- **Accessories:**
  Consult your local Yaesu dealer.

The only alphanumeric dual band mobile now comes with a choice of two unique microphones.

FS-10 Smart Controller™ Microphone
Use unique Joystick-type lever to command functions.

NEW

MH-39 DTMF Microphone
All functions conveniently at your fingertips including two user-programmable buttons.

Rear-panel data jack for packet with 6-pin connections for Data Input, PTT, 9600 bps and 1200 bps Receive Data, Squelch Status, Ground.

ACTUAL SIZE
5.6 x 1.6 x 6.4 in. (140 x 40 x 160 mm)

Rotary Dial Selector Knob
Select memories and other settings according to the current mode functions.

VHF&VHF, UHF&UHF, VHF&UHF Select three dual band configurations. Shown with custom 6-character alphanumeric code.

SPECTRA-ANALYZER™ Display station activity above and below current operating channel. Exhibit programmed channel signal strength in Memory Recall.

DIGITAL VOLTAGE DISPLAY Monitor automobile battery voltage. Choose 1200 or 9600 bps from Menu Selectable Packet Baud Rate.

For the first time ever, the only dual band mobile with alphanumeric capability is available with two microphones. Customize your mobile radio use by choosing the high-tech FS-10 Smart Controller™ Microphone with its unique Joystick-type lever, or the new MH-39 DTMF Microphone which includes convenient handheld programmability. The FT-8500 has a built-in function menu, so you can program the radio from the microphone, or use the exclusive, optional new ADMS-2 Windows™ Software Kit. An unbeatable combination—user-friendly Yaesu engineering, and state-of-the-art performance.

The FT-8500 offers more than a choice of microphones. Watch the exclusive Spectra-Analyzer™ exhibit station activity above and below your current operating channel. See the digital voltage readout monitor your car battery voltage big and bold in the Omni-Glow™ display. View frequencies and custom alphanumeric messages at the same time in V+V, U+U or V+U. What's more, the FT-8500 features handy cloning, selectable 1200/9600 baud, and a rear-panel data jack for packet!

The company who defined dual band for amateur radio has now made it better. The FT-8500, with two microphones to choose from, and a host of terrific features for exciting operation, and extraordinary performance. We give you a choice, the FT-8500/FS-10 or the FT-8500/MH-39. Make it today!

YAESU

Performance without compromise.℠

Specifications subject to change without notice. Specifications guaranteed only within amateur bands. Some accessories and/or options are standard in certain areas. Check with your local Yaesu dealer for specific details.

YAESU UK LTD. Unit 2, Maple Grove Business Centre, Lawrence Rd., Hounslow, Middlesex, TW4 6DR, U.K.

Practical Wireless

JANUARY 1996 (ON SALE DECEMBER 14)
VOL. 72 NO 1 ISSUE 1066
NEXT ISSUE (FEBRUARY)
ON SALE JANUARY 11

EDITORIAL & ADVERTISEMENT OFFICES
Practical Wireless
Arrowsmith Court
Station Approach
Broadstone
Dorset BH18 8PW
☎ (01202) 659910
(Out-of-hours service by answering machine)
FAX (01202) 659950

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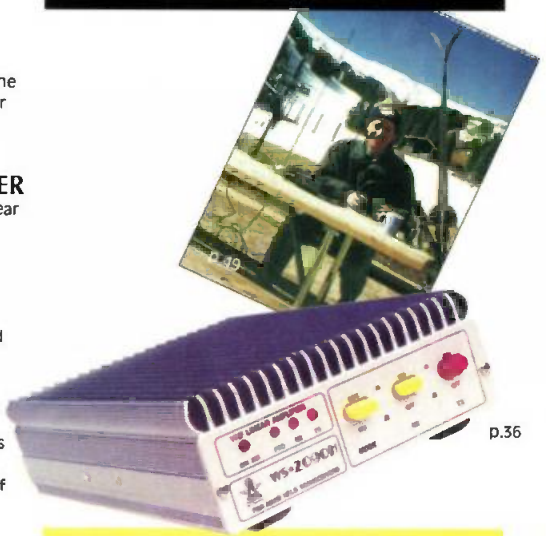
(Out-of-hours service by answering machine)
FAX (01202) 659950

Front Cover Photograph:
Craig Dyball

Published on the second Thursday of each month by PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW. Tel: (01202) 659910. Printed in England by Southernprint (Web Offset) Ltd. Distributed by Seymour, Windsor House, 1270 London Road, Norbury, London SW16 4DH. Tel: 0181-679 1899. Fax: 0181-679 8907. Telex: 8812945. Sole Agents for Australia and New Zealand - Gordon and Gotch (Asia) Ltd.; South Africa - Central News Agency. Subscriptions INLAND £22, EUROPE £25, OVERSEAS (by ASP) £27, payable to PRACTICAL WIRELESS, Subscription Department, PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW. Tel: (01202) 659930. PRACTICAL WIRELESS is sold subject to the following conditions, namely that it shall not, without written consent of the publishers first having been given, be lent, re-sold, hired out or otherwise disposed of by way of trade at more than the recommended selling price shown on the cover, and that it shall not be lent, re-sold, hired out or otherwise disposed of in a mutilated condition or in any unauthorised cover by way of trade, or affixed to or as part of any publication or advertising, literary or pictorial matter whatsoever. *Practical Wireless* is Published monthly for $45 per year by PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW. Royal Mail International, c/o Yellowstone International, 87 Burlews Court, Hackensack, NJ 07601, UK Second Class Postage paid at South Hackensack. Send USA address changes to Royal Mail International, c/oYellowstone International, 2375 Pratt Boulevard, Elk Grove Village, IL 60007-5937. The USPS (United States Postal Service) number for Practical Wireless is 007075.



Front Cover Acknowledgement: Thanks to: **Mike & Annette Brooke of Gemini, 3 Grand Parade, High Street, Poole. Tel: (01202) 668383** for the loan of the rock quartz crystals and to **Piezo Products Ltd., Crow Arch Lane Industrial Estate, Ringwood, Hampshire BH24 1NZ. Tel: (01425) 479337** for the loan of the quartz crystal units.

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* 1 watt output at 7.2v
* 2 channel S20 & S22
* External mic/speaker socket
* Cell case with DC socket
* Hi/low power switch
* Helical & telescopic antennas

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TS-850SAT	list £1959	our price £1699
TS-450S	list £1499	our price £1299
TS-450SAT	list £1649	our price £1439
TS-50S	list £1059	our price £929

YAESU

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FT-1000MP	list £2849	our price £2549
FT-990	list £2399	our price £2039
FT-990/DC	list £2099	our price £1779
FT-900	list £1399	our price £1189
FT-900AT	list £1599	our price £1359
FT-840	list £959	our price £819

ICOM

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IC-736	list £1969	our price £1719
IC-738	list £1649	our price £1439
IC-729	list £1325	our price £1175
IC-707	list £889	our price £775
IC-706	list £1195	our price £1075

VHF TRANSCEIVERS

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IC-275H	list £1495	our price £1395
IC-281H	list £449	our price £399
IC-2000H	list £369	our price £329
IC-2340H	list £689	our price £599

KENWOOD

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TM-455E	list £1059	our price £925
TM-733E	list £739	our price £645
TM-251E	list £419	our price £359
TM-702E	list £579	our price £519

YAESU

FT-736R	list £1999	our price £1699
FT-8500	list £749	our price £659
FT-5200	list £729	our price £619
FT-5100	list £679	our price £579
FT-2500M	list £399	our price £339
FT-2200	list £419	our price £355

VHF/UHF HANDI's & PORTABLES

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FT-41R	list £369	our price £315
FT-51R	list £529	our price £449
FT-416G	list £369	our price £249
FT-290R2	list £599	our price £509
FT-690R2	list £649	our price £549
FT-790R2	list £749	our price £625

ICOM

IC-Z1E	list £529	our price £459
IC-2GXE	list £255	our price £225
IC-2GXET	list £279	our price £229
IC-T22E	list £259	our price £229
IC-T42E	list £269	our price £269
IC-W31E	list £469	our price £419

KENWOOD

TH-79E	list £479	our price £419
TH-22E	list £254	our price £219
TH-42E	list £289	our price £249
TH-28E	list £319	our price £279
TH-48E	list £369	our price £319

STANDARD

C188	sale offer price	£169

On some items supplies are limited at our offer prices

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At rock bottom prices, OK for 70cm Packet conversion

SMC 545LIN/B

Single channel *Only* **£79**

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2 channel *Only* **£89**

MICS AVAILABLE £10 EXTRA

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307L1 lowband handie **£49**

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FTC-740A lowband 40w 12ch.....**£79**

FTC-1625 VHF 25w 7ch **£89**

All sets intended for convertion for packet radio use mic's extra.

Carr A = £2.50 B = £5 (handies) C = £9.50 (mobiles) D = £13.50 (base stations) E = £16.50

HOKUSHIN ANTENNAS

HS-702S	2M/70CM Whip BNC	£12.50
HS430	5⅛ Wave Whip BNC	£8.50
88F	2M 8/8 Wave Mobile Whip	£16.50
VM-727RS	2M/70CM Mobile Whip	£32.00
HS-727SS	2M/70CM Mini Mobile Whip	£17.00
EX104B	2M/70CM Mini Mobile Whip	£22.50
SMC12SE	12M Mobile Whip	£16.50
SMC15SE	15M Mobile Whip	£16.50
SMC17SE	17M Mobile Whip	£16.50
HF3	12/17/30 Base Vertical	£59.00
28HS2HB	10M 2EL ZL Beam	£65.00
HS-GP62	2 X ⅝ Base Colinear	£65.00
GP23	3 X ⅝ Base Colinear	£39.00
SQ44	2M SWISS QUAD	£45.00
WX1	2M/70CM Base Colinear	£75.00
WX2N	2M/70CM Base Colinear	£99.00
WX4N	2M/70CM Base Collnear	£129.00
WX6S	2M/70CM Base Collnear	£189.00

HOKUSHIN MOBILE ANTENNA MOUNTS

GCCA	Gutter Clip & Cable	£19.50
SOCA	4M Cable Assembly	£11.50
SOCAL	6M Cable Assembly	£12.50
HS-TMK	HD Boot Mount & Cable	£19.50
EM-B7	Mini Hatch Mount & Cable	£29.00
BM3	Mini Mount	£14.00
BSD	Bumper Strip Mount	£12.00
FB4N	Cable Assembly Low Loss 'N'	£14.50
SFA-4N	Cable Assembly Very Low Loss 'N'	£25.00
GCD	Gutter Mount	£9.00

ANTENNA ROTATORS

G-400	Medium duty rotator	£179.00	D
G-400RC	R/C version of G-400	£219.00	D
G-600RC	H/D version of G-400RC	£339.00	D
G-450XL	New medium duty model	£269.00	D
G-650XL	New H/D version of G-450XL	£369.00	D
G-800SDX	450° deluxe model	£429.00	D
G-1000SDX	H/D version of G-800SDX	£499.00	D
G-2700OSDX	H/D rotator 450°	£959.00	D
G-500A	Elevation rotator	£289.00	D
G-5400B	AZ/EL rotator	£529.00	D
G-5600B	AZ/EL rotator H/D	£629.00	D
RC5-1	Medium duty create	£329.00	D
RC5-3	Medium duty + preset	£439.00	D
RC5A-3	H/D v/speed + preset	£659.00	D
RC5B-3	V H/D v/speed + preset	£989.00	D
GC038b	Lowes clamp G-400, 800, 1000	£25.00	B
GC038G	Lowes clamp G-600	£25.00	B
MC½	Lowes clamp create	£49.95	C
GS-050	Rotary bearing up to 1¾ mast	£29.00	B
GS-065	Rotary bearing 2" mast	£45.00	B
CK46	Create rotary bearing 2" mast	£57.00	B
CD-45	Telex meter controller	£315	D
HAM IV	Medium duty meter controller	£449	D
HAM V	HAM IV with digital controller	£749	D
T2X	H/D with meter controller	£525	D
T2XD	T2X with digital controller	£795	D

cushcraft CORPORATION

Cushcraft Antennas are one of the best range currently available. They offer superb performance, innovative design, excellent build quality and outstanding value for money.

HF Antennas

R5	10/12/15/17/20 vertical	£295.00
R7	10 thru to 40m vertical	£389.00
AV-3	14-21-28MHz vertical 4.3m long	£89.00
AV-5	3-5-7-14-21-28MHz vertical 7.4m long	£159.00
AP8A	8 Band Vertical	£199.00
APR18A	Radial Kit	£49.00
40-2CD	2-ele 40m Yagi	£469.00
A3S	14-21-28MHz Yagi	£349.00
A3WS	12/17m 3-ele Yagi	£275.00
A103	30m Extension A3WS	£115.00
204CD	4 ele 20m Yagi	£469.00
154CD	4 ele 15m Yagi	£279.00
D4	Dipole 10/15/20/40m	£249.00
D3W	Dipole 12/17/30m	£189.00
A4S	3-4 ele Yagi 10/15/20m	£439.00

VHF Antennas

AR-270	2/70 Dual Band Vertical 1.13m long	£65.00
AR-270b	2/70 Dual Band Vertical 2.3m long	£89.00
AR2	2m Vertical 1.2m long	£35.00
AR6	6m Vertical 3.1m long	£59.00
A148-10S	2m 10-ele Yagi 13.2 dBd	£65.00
A144-20T	2m 10-ele Cross Yagi 12.2 dBd	£99.00
13B2	13-ele 2m Yagi	£99.95
17B2	17-ele 2m Yagi	£189.00
A50-3S	3-ele 6m Yagi	£75.95
A50-5S	5-ele 6m Yagi	£149.00
A50-6S	6-ele 6m Yagi	£229.95
424B	24-ele 70cms Yagi	£115.00
22XB	2m 22-ele Yagi c/w polarization switching	£229.00
738XB	70cms 38-ele Yagi c/w polarization switching	£199.00

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NEW

DSP232 – Multimode data terminal plus DSP unit.
PRICE £PHONE Carr C

PK12 – A new VHF TNC that offers superb performance and simplicity of operation.
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PK12/100K – 100k Mail Drop Memory Upgrade **£49.95** Carr A

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PK900 – Deluxe multimode data terminal
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PAK WIN – Windows based packet software programme
ONLY £79.00 INC Carr A

DAIWA

Proven Reliability for Today's Amateur!

			Carr
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PS140MIIA	PSU 13.8V 12/14A	£72.00	D
PS304IIA	PSU 1-15V 24/30A	£129.00	D

RS40XII	PSU 1-15V 32/40A	£169.00	D
CN101L	1.8-150MHZ 15/150/1500W	£59.50	B
CN103LN	150-525MHZ 20/200W 'N'	£68.00	B
CS201	2 Way Switch SO239 1KW	£17.50	B
CS201GII	2 Way Switch 'N' 1KW PEP	£23.50	B
LA2080H	2M L/AMP 1.5-5W IN 30-80W OUT	£136.00	B
DLA80H	2M/70CM Dual Band Amp 0.5-25W IN 80-60W Out Pre Amps	£345.00	C
DX10N	2m/70cm Duplexer UHF/N	£22.50	B
CP10Y6	Cigar plug lead for FT530,etc.	£6.50	A

LINEAR AMPLIFIERS

TOKYO HY-POWER

			Carr
HL 100B/10	21-28MHz 100w out	£210	C
HL 100B/20	14MHz 100w out	£210	C
HL 100B/80	7MHz 100w out	£210	C
HL 66V	50MHz 10w in 60w out	£169	C
HL 166V	50MHz 3/10 in 160w out	£299	C
HL 37VSX	2m 5w in 35w out	£119	B
HL 62VSX	2m 5-25w in 50w out	£235	C
HL 180V	2m 5-25w in 170w out	£389	C
HL 36U	70cm 5-10w in 30w out	£155	B
HL 63U	70cm 10-25w in 50w out	£259	C
HL 130U	70cm 3-25w in 120w out	£485	C
HL 2K	HF 2Kw PEP, 2x3-500Z	£1750	E
HL1K/6	6m 10w in 500w out	£995	D

MIRAGE

B108 G	2m 10w in 80w out	£199	C
B1016 G	2m 10w in 160w out	£299	C
B2516 G	2m 25w in 160w out	£269	C
B5016 G	50w in 160w out	£269	C
D1010N	70cm 10w in100w out	£349	C
D3010N	70cm 25w in 100w out	£329	C

DAIWA

LA2080H	2m 5w in 80w out	£139	B
DLA80H	2m/70cm 5-25w in 80/60w out	£345	C

All discounts are based on recommended retail prices.

CARRIAGE: BASE ANTENNAS £9.50 MOBILE ANTENNAS £5.00 STATION ACCESSORIES £5.00

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If you've never tried a digital HF transceiver before, you won't believe just how well the TS-870S can find a signal that's almost buried in noise. And because it's made by Kenwood, reliability can be taken for granted, too.

Features? High frequency DSP for post-IF signal processing, high-speed PC control, automatic antenna tuner, a built-in K1 LogiKey for a full range of CW operations features, 100 memory channels...and that's just a taste. Your nearest dealer has the full specification.

Best of all, the TS-870S gives you all this at a price that's amazing value. So you can talk to the world without getting any interference. Even from your bank manager.

KENWOOD

For more information on the TS-870S phone 01923 212044.

THE BANDIT

PHONE US FOR PRICES ON ALL KE

If you look through the adverts in this magazine these days, you will no doubt notice the claims made by various dealers to provide support and service. Modern amateur radio equipment is very complex, and to properly service it requires a very large investment in test equipment and the personnel capable of using it. Here at Lowe Electronics, we have test equipment worth around £100,000 plus 4 full time engineers with many man years of accumulated experience on the whole spectrum of equipment going back 20 years. We consider this to be a minimum requirement if we are to offer credible service. Next time you are phoning round for prices on equipment, just ask what level of service that dealer can offer. Then consider whether the answer is true. Any customer is more than welcome to visit our service department. Everybody deals with the sharks . . . once!

Vårgårda Radio AB

Call us on (01629) 580800 and we will send you full details of the top quality v.h.f. antennas from Vargarda of Sweden.

VHF SWR METER

125-525MHz. 5/20/200W

£69.95

Average and PEP reading

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only **£189**

THE NEW KENWOOD TS870S

is now in stock

- Fully DSP at IF stage • Built in RS232 control
- Auto ATU as standard • Built in K1 LogiKeyer
- Successor to the famous TS850

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Fax: 0191-410 5558

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ENWOOD AND YAESU TRANSCEIVERS

GPS EQUIPMENT
MAGELLAN GPS 2000 GARMIN GPS 45

- Smaller then a a 2m hand-held
- Tracks up to 12 satellites
- 15 metre accuracy
- 17 hour battery life
- Lat Long or Nat Grid

only **£199**

Ask for our GPS info pack that explains it all!!

- Stores 250 way points
- Zoom-in map of your track
- Up/download route from PC
- Remote mountable antenna
- Ideal for in-car use
- Use with your packet TNC

only **£289**

VIRTUAL CYBERSPACE CLEARANCE SALE

Look at our WWW site (address below) for our super clearance list of bits and pieces

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WE STOCK A LARGE RANGE:-
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Ask for our HF antenna pack

USED EQUIPMENT

As we have 8 shops across the country, we have a constant flow of trade-ins coming in. Every used item we sell is backed by our 3 month warranty. Here is a small sample of rigs currently available.

Kenwood TS-140S	£750
Kenwood TS-820S	£425
Kenwood TS-950SDX	£2500
JRC JST-135	£1075
Alinco DJ-580E	£369
Kenwood TH-75E	£250
Yaesu FT-23R	£199

Call us for our complete list

Got a 2M hand-held? Want more power? Using it mobile? You need our new linear amp with pre-amp.

WS-1090H

- Up to 5W in • 80W out
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EDITOR'S Keylines

Rob Mannion's viewpoint on the World of Amateur Radio

So Slow Licensing?

During the last year or so I've had several invitations to visit Subscription Services Ltd. (SSL) at their headquarters located (quite literally!) in the centre of Bristol. Various problems meant that I couldn't pay a visit to SSL until mid-October 1995.

And in fact, due to bad weather on the day I was delayed in arriving. But I need not have worried though because my hosts at SSL and the (large) delegation from the RSGB knew I was on my way and waited for me. I appreciated them waiting for me, and it was good to see so many other people intent on looking after the interests of our hobby!

Presentation & Briefing

The presentation and briefing the senior SSL staff provided was illuminating and interesting. I was also able to meet all the senior staff, and chat to **Karen Scott** from the Radiocommunications Agency (who had come from London for the occasion).

It soon became obvious that the Amateur Radio side of the SSL operation is very small, when compared to their TV Licence operations. And it was also apparent that this subsidiary of the Post Office is very busy indeed.

However, although their Amateur Radio operation is only a small part of their work, SSL are bound by the contract to take an apparent disproportionate amount of care on our behalf. I was impressed at the service (which is continually monitored by their own especially appointed staff and the RA) offered.

After the briefing, the RSGB party and I went on a tour of the relevant parts of the building. That was when I met two ladies who carry out a rather special service for Radio Amateurs - by opening the mail!

Mandy Lane and Lisa Wooton.

Special Mail

What's so special about opening the mail you may ask? Well, the answer is that it's because Amateur Radio Licence applications contain RAE Certificates and sensitive (personal) information.

The incoming mail is carefully opened by hand by **Mandy Lane** (left in the photograph) **Lisa Wooton** (right) and colleagues. And, having seen the highly automated incoming postal opening and handling arrangement for TV licence work, I know that the 'hand opening' is a service unique to our licence applications. Needless to say, I was again impressed!

Another aspect of the SSL service is the very busy 'Telephone Helpline' at the Radio Licensing Centre (RLC). I've used this myself on various occasions and even though I'm fully aware they know it's a journalist they're dealing with, it's an excellent service.

Jason Pearce, has helped me on several occasions when I've telephoned, so it was a pleasure to meet him face-to-face. Jason (and up to five other people) are often kept very busy on the RLC's Helpline number **0117-925 8333**.

I chatted to Jason and told him of problems from my point of view and that of readers, and it also seemed only fair to ask how we could help him to help us. In reply, Jason reminded me that he and his colleagues could answer enquiries quicker if the **customer reference number** or **callsign** is given. The payment **reference number** is of no use in this respect.

Additionally, there has been a lot of confusion regarding problems regarding banking. Jason told me that SSL bank with **Midland Bank PLC** and **not** The Bank Of England. Coupled with this has been the confusion over **Standing Orders** and **Direct Debits**. The difference is **(and this is important)** that a Standing Order is the **responsibility of the customer and their bank** (hands up the reader who hasn't had problem with their bank in this area!). On the other hand, once a Direct Debit is set up, it's up to the recipient (SSL and its bankers) to collect the money. And to this end, SSL inform me that they've recently streamlined their 'collecting' days with Direct Debits.

Jason Pearce busy on the RLC 'Helpline'.

Feeling Satisfied

I came away from SSL feeling much more satisfied as to what this particularly subsidiary of the Post Office is doing on our behalf. Yes, there will always be individual problems, but I feel that nowadays, they really are trying their best to help provide the best service possible.

While I was at SSL I spoke to Karen Scott from the RA to try and resolve problems for several readers. These were promptly dealt with by Karen on her return to London as they were policy and regulation matters, outwith the remit for SSL.

So, my advice is if you have a problem, call SSL on the Radio Licensing Centre's Helpline number. If they can't help you, try the RA. (This is because very often SSL - as the 'contractor' - is only following the rules laid down by the RA).

If neither approach seems to be able to help, I'm always available to advise or intervene. Although I must stress that I think the old SSL problems have really turned from a flow to a trickle, judging by the reduced number of complaints received in the *PW* office.

In the past I have been very critical of their service and of course I'll continue to monitor their activities. But now I think SSL deserve a new nickname....Steady, Sure Licensing because Jason and his team of 'Argonauts' really are trying their best!

Rob Mannion G3XFD

What's your view?
Write to 'Receiving You', you may win a prize!

RECEIVING You

PW's Postbag. If your letter is published you'll win a prize.

Comparative Reviews

Dear Sir

Ref. 'Keylines', November *PW* on reviews. I think a comparative review would be useful, but it occurs to me that such a review might show that most of the current radios are of similar performance. Alternatively, a weak point in one might be a strong point in another and vice versa and there would accordingly not be an obvious choice for an 'all round' radio, the choice would rather be based on what the user wished to do with the radio.

If my assumption is reasonably correct (and I can't off-hand think of a radio which is accepted as being 'the best' by everyone) then the main variance between radios would be the major features and the way in which the radio offers those features to the user. In other words, how well designed is the user interface, both in terms of the logic and control panel, and how easy/acceptable is it in actual use?

I expect that you have realised that I am heading towards the comment that a user review might be of more use than a technical evaluation. Would this be feasible to put into practice? Could a panel of users be handled a choice of comparable radios and each member of the panel be allowed to compare those radios for ease of use, etc.?

I have a niggling feeling that such a subjective review might actually be harder to produce than a somewhat more objective technical review but it would make for (very) interesting reading!

Ian Brothwell G4EAN
Dorset

Morse & The Radiocommunications Agency

Dear Sir,

As you will be aware, the President of the Radio Society of Great Britain (RSGB) wrote to the Agency in August expressing concern about the UK's proposed stance to support the proposal to delete Radio Regulation 2735. That letter and my subsequent reply were circulated with last month's *RadCom* promoting a flood of correspondence and telephone calls. I would like to take this opportunity to put the issue into context.

Background: There has long been debate on whether there should be two separate licence classes and whether the Morse test should be the means of differentiation. We asked the amateur community in 1992 to submit their views on code-free licensing both to various publications, including *RadCom* and to the Agency Direct.

The general result was that class 'A's were in favour of retaining the requirement, whilst class 'B's wished to see the test dropped. The main reason given by respondents for retaining the test was to maintain the high standards of operation on h.f.

Class 'A's felt that they have struggled to obtain their position and that opening up the bands to class 'B's would be a retrograde step. The arguments given for abolishing the test were that Morse was no longer widely used and that the modern technology had removed the need for a knowledge of Morse. Many class 'B's felt that the Morse test is a real barrier to the development of amateur radio.

The Current Position: It is the role of the Agency to manage the radio spectrum on behalf of all users. The RSGB have stated that the h.f. bands are already overcrowded and that opening the bands up to all licence holders would result in them being unusable.

If this is the case, and it is necessary to restrict access, the Agency needs to consider whether the Morse test is the appropriate means

Manufacturer's Viewpiont

Dear Sir

I was very interested in your Editor's 'Keylines' in the November *PW* setting out your position regarding reviews of new equipment. You might like to know how we manufacturers view your efforts!

I think it is fair to say that a magazine review is often the first opportunity that anyone outside of the manufacturer has to put a new radio through its paces and to try out, in the real world, all the facilities that the engineers back in Japan have laboured over (often for many years). We normally receive a sample radio a month or so in advance of the first production shipment, this will be passed to the major UK magazine reviewers and I would say personally that I value the range of experience that you all bring to your work.

A review seems to be one of those rare things in life where everyone wins! The manufacturer obtains publicity for their new product, the magazine has a popular feature to promote and the customer has an interesting article to read (and no, these weren't listed in order of importance!).

For those of your readers who may harbour any thoughts that there is cosy connection between us, the reviewers and our advertising agents, I can tell you 'forget it'. In our case, at Kenwood, we will receive advance information about a new model. We will meet with the account executive from our Advertising Agency (who handles amateur and p.m.r. advertising) and discuss the likely selling points. They then go back to their office, produce a number of possible drafts, we meet again, weed out the non-starters and polish the possible ones and continue this process until the final advertisement is created and accepted. The Agency books the insertions to tie in with the likely launch date of the new radio.

Whilst all this is going on, I will be liasing with the magazine about the practicalities of the review. The point is that the two processes are separate!

Most radios these days are, in reality, pretty good. I doubt that any reviewer will often find themselves in the position of having to reveal some horrendous problem on a new product.

What we look for is a fair and honest assessment of our radio by someone who has a wide range of experience built up over the many years, can assess this new radio's place in the market and who can express themselves to their readers in a clear and readable manner.

As far as comparative reviews are concerned, I would agree with Rob Mannion's comments that these may not be so helpful if the reader doesn't know all the radios concerned. A normal 'one-off' review compares the new radio against the 'standard' transceiver (real or theoretical) and so always starts from the same baseline.

Another point to bear in mind is that each manufacturer may well have different design philosophy behind their radios. For example, the relatively large numbers of cars on the market today are aimed at a very limited number of markets: the Mondeo, Vectra, Laguna and Xantia can be compared with each other precisely because their target customer is the same.

Anyway, back to radio. Very occasionally, a reviewer will take issue with a particular aspect of a product, but in general they are writing a review, rather than a criticism. The fact that the former rarely turns into the later is not a matter for suspicion. It is simply a reflection of the standard of radios today.

Finally, I can tell you whilst we appreciate the opportunity to comment on reviews, the idea that we can (or would) influence the final outcome is a total non-starter. If we managed, by hook or by crook, to tone down the occasional negative comment, then what value would there be in all the positive ones? No, we see all the reviewers as being truly independent and I wouldn't want it any other way!

David Wilkins G5HY
Sales & Marketing - Communications Division
Trio-Kenwood UK Ltd.
Herts

of doing this. A possible alternative opinion put forward by respondents to our survey was a further technical examination, perhaps one that related specifically to the use of h.f.

A further possibility is, in line with the Government's policy of deregulation, to abolish the distinction between 'A' and 'B' licences altogether. By it's very nature, radio is international and the UK will need to keep a close eye on events within Europe and world-wide.

We already have a number of reciprocal agreements with other countries and participate in CEPT Recommendation T/R 61-01. We fully support these initiatives and would want to allow UK amateurs to continue to take part. Again, one option we would consider is an optional Morse test for those who want to travel abroad and operate.

The World Radio Conference (WRC) 1995: This issue has arisen because a proposal for the deletion of Radio Regulation 2735 may be discussed at the forthcoming WRC. There is a view that this regulation is outdated and therefore should be deleted.

The CEPT administrations have briefly discussed this topic but we have been unable to reach an agreed view. While we are still considering our own national position, we see merit in the argument that the Morse test should cease to be an international obligation.

Removing it would allow administrations a degree of flexibility and, should we decide to remove the Morse test in the future, would simplify procedures. It is still unclear as to whether this issue will come up for debate at the WRC.

The Future: Whatever happens at WRC, it is clear that the issue of the future of the Morse test needs to be firmly resolved. There is still much to be considered and we would propose to pursue this issue with the RSGB as the national representative body for radio amateurs.

I have personally received a number of letters following publication of my letter and while some have expressed concern about the proposal to drop the Morse test, others have fully supported its abolition. Whilst I cannot give a definite statement now of where we go from here, I can give an assurance that we will continue to act in the best interests of the whole of the amateur radio community.

Roger Louth
Director - Mobile Services
Radiocommunications Agency
South Quay Three
189 Marsh Wall
London EC14 9SX

Editor's comment: Roger Louth's letter (addressed to me) arrived just too late for publication in the December issue of *PW*. As it's an important statement of fact, I have published it in full so as to keep readers fully informed. Readers who have not seen the letter published in *RadCom*, and wishing to comment now have the opportunity to write to Roger direct.

High Flyer

Dear Sir

With reference to the article by Victor Goom in your November issue of *PW* it would be informative to read his comments on the following consideration of the 'High Flyer'. Given that the antenna is 75% shortened, this will result in a feedpoint resistance of between 6 and 20Ω.

The lesser figure assumes negligible resistive losses. The reflection coefficient arising from such a mismatch will give rise to high transmission line losses when connected to coaxial as stated. One wonders whether the reported s.w.r. of 2:1 was achieved in spite of tuning!

The capacitive effect of the 'Indocap' is difficult to understand as it has no point of reference, ie. it is unable to 'see' its opposite number.

The observation by Clive Hardy that connecting the ends made no difference is understandable and his further remark that connecting one end resulted in a shortening effect is entirely in keeping with the behaviour of inductance and capacitance in series.

Finally, I must applaud the efforts of Victor who is obviously a thinking man for providing an article of such interest. Consideration of the way in which one antenna is 'aware' of the existence of another is just a progression of the same line of thought.

Maurice Murphy G0CDQ
Kent

Still 'Amateur' Radio?

Dear Sir

Although I have not been too active on the air for some years now, I have listened and bought an occasional magazine and wondered what the latest equipment is with its many letters and numbers. So, I looked at the advertisements and was amazed to see h.f. rigs (are they still called rigs?) going for two and three thousand pounds.

I wonder if this is still amateur radio? Do people repair their own equipment at these prices? Is it beyond the average amateur's knowledge?

Some years ago I sold my FT-101E to go to home-brew or use modified equipment with the idea 'if I can't build it, I can't have it'. One exception is my RA17L (but I can and have repaired it).

How can Scouts at a Jamboree show interest when they are told 'this rig costs £2000, linear £500, antenna £300, s.w.r. meter £100, portable mast £150, microphone £50' (And it's called 'amateur radio').

I'm glad to see the kits advertised in your magazine and I think that this is the kind of gear that the Scouts should see to show that equipment can be made and used without costing a fortune as well as being a 'doing' hobby. Perhaps in the future, the RAE will become a 'radio operators exam', in other words, glorified CB radio.

Bill Kitchen G4GHB
Lancashire

THIS MONTH'S STAR LETTER

Reader's letters intended for publication in 'Receiving You' must be original and not be duplicated. Letters are accepted on the understanding that they have only been submitted to *Practical Wireless*. Please ensure that your letter is clearly marked 'for publication in Receiving You' and that it has not been submitted to other magazines. We reserve the right to edit or shorten any letter. The views expressed in letters are not necessarily those of *Practical Wireless*.

The Star Letter will receive a voucher worth £10 to spend on items from our Book or other services offered by *Practical Wireless*. All other letters will receive a £5 voucher.

Authorised Or Pirate?

Dear Sir

I was interested to read Walter Farrar's letter in Receiving You (*PW*, November 1995). Although I share his views up to a point when he mentions the Wireless Telegraphy Act, how on earth is anyone to know what an 'authorised broadcasting stations' is?

There are many pirate broadcasting stations around the world, and supposing for example that I am tuning my receiver around the broadcast bands (as I very often do) and come across one of these stations. If I listen to this station for say ten seconds or two hours, I have committed a sin, since the Act makes no mention about time.

No Mr Farrar, it's not the listener who is at fault but the Act itself. Because with the best will in the world, nobody can abide by it, probably because it has been drawn up by people with no knowledge of radio. How can anyone sitting at a receiver possibly know whether the next station that comes through his headphones is 'authorised' or a pirate?

The ruling of scanners is just as silly. My transceiver which I use for my amateur band transmissions has a scan mode which is just about the same as any other transceiver. Is this classified a scanner even though I have never used this facility?

Is tuning my scanner by hand breaking the law? Whilst so many questions remain unanswered, and the Act remains so vague, there will always be problems.

Harold McIntyre G3FLJ
Hampshire

Editor's comment: Harold has a good point. As a keen 7MHz operator I know that there are so called 'authorised' broadcasting stations operating illegally within the amateur allocation (Europe). Does that make them 'pirates'?

Send your letters to the *PW* Offices, marking it clearly for 'Receiving You'

NOVICE Natter

For Radio Beginners Of All Ages

Elaine Richards G4LFM reports on Jamboree on the Air activities, a booklet designed for newly licensed Novices and covers signal reporting in 'First Steps'.

Jamboree On The Air

How many of you heard stations on the air over the weekend of 21/22nd October celebrating Jamboree on the Air (JOTA)? This is an event held internationally, with the aim of linking up Scout Groups across the world.

The club station at Madley Communications Centre went on the air with **GX0SAT**. Cubs and Scouts throughout Hereford attended, in fact about 10 groups turned up - 70 children all wanting to get on the air!

Two stations were run simultaneously and fortunately they didn't suffer any interference problems. There was a 3.5MHz station and a 14MHz station running 100 and 400W respectively.

Somewhere between 80 - 100 contacts were worked around the world. Well done **David G4ASR** and **Andy G4XRS** whose hard work put the station on the air. Keep an ear out for them in February too, for Thinking Day on the Air - this is an equivalent event with Brownies and Guides.

Now, if you are on the air, or even just listening and you hear a Special Event Station that involves youngsters like the Scouts or Guides, please, please, please take the time to answer and talk to these children or just log and report their conversation. Many of them are working towards badges and this is probably the first time they've ever been on the air.

I know that sometimes the conversations can be rather strained, but they could be as young as seven. So, how about a New Year's Resolution that you'll try and work a Thinking Day on the Air station in February next year. Oh yes, don't forget to let me know how you get on.

The JOTA special event station GX0SAT was put on the air by several Cub and scout groups throughout Hereford.

Newly Licensed Novices

So you've studied hard, persevered with the practical and have passed your Novice exams. Brilliant! You've even got a squeaky new callsign to go on the air with, but who answers all those questions you've still got?

Where do you get more information about the bands? You could try reading the **Poole Radio Society** *Novice Booklet*.

The *Novice Booklet* is full of practical advice for the newly licensed Class B Novice. Mind you, having started to read through it, I think many amateurs will find it useful, especially if you are considering enlarging your horizons and starting on a new band.

In 62 pages (and at a cost of £5) the Poole RS haven't tried to include all the information possible. If it is more sense to refer the reader to other sources - especially in fast changing fields - then they've done that. At least you won't be reading very out-of-date information.

The booklet covers things as diverse as advice for those attending rallies, information on clubs and societies, microwave bands, amateur television and everything inbetween. I read through the chapter 'Which HF Band' and found it interesting. I'd set out just to have a quick read through, but ended up by reading all of it instead!

The pros and cons of the bands are discussed, whether it be warnings about the size of the antenna or warnings about the effects of the sunspot cycle. And the information sources you are pointed towards are excellent reference books.

Poole RS have also gone to the trouble of telling you a bit about the book and how relevant it is to you. If you are interested in this booklet, then you should contact **Colin Redwood G6MXL**, at **45A Lulworth Avenue, Hamworthy, Poole, Dorset BH15 4DH**. The £5 charge covers postage and packing in the UK and if you are sending a cheque or postal order, please make it payable to Poole Radio Society.

Season Of Goodwill

You should be reading this as we approach the festive season. So, let me take the opportunity to thank all those who have written over the year and I hope to hear from lots more of you in 1996. As it's supposed to be the season of goodwill, this seems a good time to mention a plea for help.

The **Radio Amateur Invalid and Blind Club** (RAIBC) in Northern Ireland are on the lookout for sample questions and answers on the Radio Amateur's Exam (RAE) either on a database, ASCII file or computer print out. They'll happily take 5.25 or 3.5in disks for the PC.

The reason they want these questions is so that they can put together home tuition courses for the blind and disabled people who cannot attend a school or college. The courses are either printed (large type if necessary), Braille or cassette form and are loaned, free of charge, to those who need them.

If you can't help with

supplying questions, perhaps you would like to key-in some questions they already have? Either way, you should contact **Dave GI0HOW (QTHR)** or on **(01232) 471370.**

Getting Started

I know I've been through 'Getting Started' before, but there are always new readers taking up the magazine for the first time, so it doesn't hurt to repeat things now and again. If you

are interested in becoming a radio amateur, whether by the Novice route or not, the first thing you need to do is contact the Radio Society of Great Britain (RSGB).

The Radio Society of Great Britain will be able to give you details of the nearest Novice course or the nearest college for the RAE course. Once you know where to go, if you enrol on one of the courses the instructors will be able to guide you further.

Next, I really think that contacting your local radio club is important. If you want to take up a hobby, then local people can often supply you with the best support.

If you are slogging your way through a course and are finding it hard going then it's great to have friends locally who will encourage you to carry on and help you out when you get stuck. Studying on your own is about the hardest way of doing it.

Other than *Practical Wireless*, of course, another good publication is *DIY Radio*, available from the RSGB. This is written specifically for the Novice and contains hints and tips on the course, projects you can have a go at and lots of news and information. I'm not sure of the current subscription rate, but a quick call to the RSGB will solve that one.

If you are serious about wanting to get involved in amateur radio, do get in touch with the RSGB. I've called them twice recently and have been impressed with their efficiency and the information they've supplied. You can contact the RSGB at **Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JE. Tel: (01707) 659015.**

First Steps

Signal Reporting

You've all heard it 'your report is 599 and can you just repeat your callsign once again'. Chances are the signal wasn't 599, that's why a repeat was asked for.

So, why give a false report? Either the operator was being lazy or doesn't understand the internationally recognised RST reporting code. During contests, especially c.w. contests, often the use of 599 as a report is just for convenience.

The exchange between the two stations must contain certain items depending on the rules of the contest. I don't know of one that doesn't require the exchange of signal report.

If you bother to make proper use of the reporting system, gradually it will become second nature and you won't have to think before you make your report. An honest report is much more use to the other station than one that's made up at the time.

If a station continually gets bad reports about their signal strength or readability when they are working the same part of the world, hopefully they'll be able to do something about the problem. It's even more important when reporting on the tone of a c.w. signal.

If no-one tells the station that he's putting out a really rough c.w. tone, then he'll carry on sending like that, much to the annoyance of those listening. Of course, it's only a personal observation.

If you and I were reporting on the same signal, unless it was particularly good, you could find that we report differently. That's OK.

If you gave a report of 457, that means Readable with practically no difficulty - Fairly good signals - near pure tone, trace of ripple modulation. I may give 347 for example.

If I found the signal readable but with considerable difficulty in my opinion then that explains why we report differently. Don't worry about this.

If you speak to someone on a regular basis, then they'll be able to compare the reports from you over a period of time to see how well their signal is improving (or not). The most important thing is to get used to using the RST System and don't cut corners.

You'll find the Table shown here useful if you keep it by the radio whilst you're working. It's like all things, practice makes perfect.

Readability

1 Unreadable
2 Barely readable, occasional words distinguishable
3 Readable with considerable difficulty
4 Readable with practically no difficulty
5 Perfectly readable

Signal Strength

1 Faint signals, barely perceptible
2 Very weak signals
3 Weak signals
4 Fair signals
5 Fairly good signals
6 Good signals
7 Moderately strong signals
8 Strong signals
9 Extremely strong signals

Tone

1 Sixty-cycle a.c. or less, very rough and broad
2 Very rough a.c., very harsh and broad
3 Rough a.c. tone, rectified but not filtered
4 Rough note, some trace of filtering
5 Filtered rectified a.c. but strongly ripple-modulated
6 Filtered tone, definite trace of ripple modulation
7 Near pure tone, trace of ripple modulation
8 Near perfect tone, slight trace of modulation
9 Perfect tone, no trace of ripple or modulation of any kind

That's all I have for you for this month so, Merry Christmas and I look forward to hearing from you in the New Year. Send your 'natterings' to me at the address below.

Send your letters to Elaine Richards G4LFM, PO Box 1863, Ringwood, Hants BH24 3XD.

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TS-50S	RRP ~~£1059.95~~	£PHONE
TS-790E	RRP ~~£1959.95~~	£PHONE
TM-255E	RRP ~~£949.95~~	£PHONE
TM-455E	RRP ~~£1059.95~~	£PHONE
TM-251E	RRP ~~£419.95~~	£PHONE
TM-451E	RRP ~~£459.95~~	£PHONE
TM-702E	RRP ~~£579.95~~	£PHONE
TM-733E	RRP ~~£729.95~~	£PHONE
TH-79E	RRP ~~£479.95~~	£PHONE
TH-22E	RRP ~~£254.95~~	£PHONE
TH-42E	RRP ~~£289.95~~	£PHONE
TH-28E	RRP ~~£319.95~~	£PHONE

YAESU

FT-100MP (AC)	RRP ~~£2899~~	£PHONE
FT-1000MP (DC)	RRP ~~£2599~~	£PHONE
FT-990DC	RRP ~~£2099.95~~	£PHONE
FT-840	RRP ~~£949.95~~	£PHONE
FT-290RII	RRP ~~£699.95~~	£PHONE
FT-790RII	RRP ~~£749.95~~	£PHONE
FT-690RII	RRP ~~£649.95~~	£PHONE
FT-2500	RRP ~~£399.95~~	£PHONE
FT-8500	RRP ~~£749.95~~	£PHONE
FT-11R	RRP ~~£324.95~~	£PHONE
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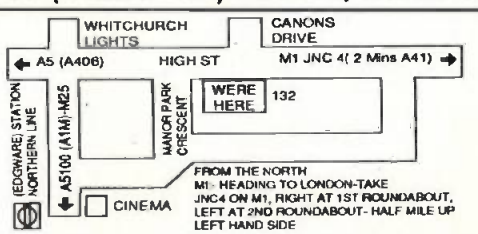

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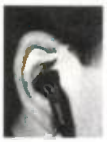

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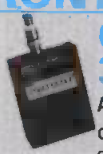

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CLUB Spotlight

Compiled by Zoë Shortland

Stockport Radio Society's 75th Anniversary Exhibition.

Anniversary For Stockport

Throughout October, the **Stockport Radio Society** were engaged in organising a 75th anniversary exhibition/display of its long history and present day activities in the town's Central Library. Five showcases, filled with artefacts and memorabilia, told the Society's story from 1920 to the present day.

Items displayed included a home-brew 30 line TV made by a member in the 30s, a fine commercially made crystal set, various Heathkit Projects, a collection of 'Keys to the whole world' (two of them straight and one of them a paddle!) and various contest trophies. There were also many interesting photographs and documents including the first amateur licence ever issued in the town.

The objective was to bring the town's long involvement with amateur radio to the attention of people. This, it appears, been achieved judging from comments received!

Manchester's Meetings

The **Manchester & District Amateur Radio Society** meet every Tuesday evening at 7pm at the Simpson Memorial Civic Centre, Moston Lane, Moston, Manchester 10. Visitors to the club will be given a warm welcome where RAE, NRAE and Morse courses will be running all year round. These courses are free to all who are interested.

Club nights are 'natter nights' and 'radio nights', with projects and construction, etc. included, whilst the third Tuesday of each month is usually given over to a talk on radio related topics. A talk has been lined up on QRP by the **Rev. George Dobbs G3RJV** which is being held on January 30 1996. All who are interested are most welcome to attend, whether club members or not.

Further talks planned for 1996 include Packet Radio, SSTV and Antenna Designs and the club also have a number of special event stations to operate throughout the year.

More information can be obtained from **Barrie G3IOA** on **0161-681 5406** or **Harold G0VJZ** on **0161-338 4412**.

Newcomers Welcome

The **Newbury & District Amateur Radio Society** has been established for over 50 years and provides a great way of finding out, learning and taking part in what can only be described as a truly amazing and varied hobby.

The Newbury Radio Club meet on the fourth Wednesday of every month (from 1930 to 2200hrs) at the Memorial Hall, Upper Bucklebury, Near Newbury. Newcomers are always welcome to come along to see what the hobby and the club is all about. During most club meetings, there is an interesting talk or demonstration.

The society's secretary is **Norman Jaques G0HFU** and he can be reached on **(01635) 863310**.

Poldhu's Visit To Sasso Marconi

Carolyn G1ZPC, Hon. Sec. of the **Poldhu Amateur Radio Club** tells of their recent trip to Sasso Marconi in Italy.

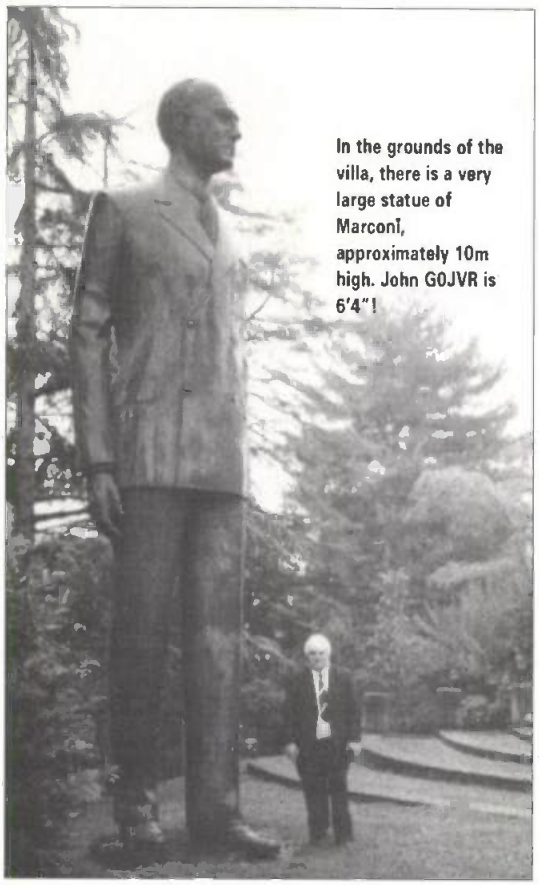
Back in October, over the period of the 1-8th, a civic delegation went out to Sasso Marconi from its twin town in Helston (approx 16km from Mullion). Because of Poldhu's importance, the club were asked to nominate a representative to take part in the delegation. So, Chairman **Davey Davey-Thomas G3AGA** and his wife **Sheila** duly represented the Poldhu club. **John G0JVR** and I also took part in the delegation, as I am the chairman of Mullion Council at the moment, and Poldhu is in Mullion Parish.

Everyone had a wonderful time in Sasso, visiting several special exhibitions put on to commemorate the centenary. On the first day, we were welcomed by the Mayor of Sasso and he showed us around the exhibitions of stamps, old photos and old equipment from the time of the great man himself.

Particularly pleasing were the displays in the shop windows in Sasso town square. One of which showed the Marconi monument at Poldhu with three of our members in period costume for the recent stamp launch from our site! (It seems that Poldhu members get everywhere!).

We were also delighted to spend two days with Princess Elettra and her son Prince William. It was lovely to think they recognised us, I suppose it's a case of once seen, never forgotten! Princess Elettra had kindly brought several photos with her to the club, which she signed, so anyone visiting us in the future will of course be able to see them.

The British party were honoured to be part of the festivities on the actual day of October 5, when we visited the Villa Griffone (Marconi's family home, where he conducted his first



In the grounds of the villa, there is a very large statue of Marconi, approximately 10m high. John G0JVR is 6'4"!

radio experiments), and saw a film showing Marconi himself. We also saw an exhibition there showing the desk, tools and equipment he used in his experiments.

There was a mass held in the mausoleum attended by Princess Elettra and Prince William. We all attended, though of course we didn't understand the language, but we found it very moving anyway. John and the Mayor of Helston carried in the large wreath to be laid at Marconi's magnificent red marble tomb.

All in all we had a wonderful trip. The Italian people were very friendly and it was made even more special by the fact that we met Princess Elettra again after her visit to Poldhu back in January 1995 at the start of her world tour.

In the speech that I had to give on the final evening, I thanked them all and invited them back to Poldhu for our celebrations, whatever form they take for the centenary of our location on December 12 2001.

It was a civic delegation, but this time it was very much radio oriented and the amateur radio world was well represented. Davey G3AGA and Sheila were there, John G0JVR and I G1ZPC from the local council and also two other members of the Poldhu Amateur Radio Club, who were there as members of the twinning committee, **Ray G3UQE** and **Eileen White**.

John G0JVR and Danny carrying in the wreath during the mass held in tribute to Marconi.

■ After a period of inactivity, the **Southampton Amateur Radio Club** is now up and running. Meetings are held every Monday evening and new members are always welcome.

Full details can be obtained from **Harold McIntyre, 42 Dunvegan Drive, Lordswood, Southampton SO16 8DD** or by telephone on **(01703) 737715**.

■ The **Amateur Radio Club of Nottingham** meet every Thursday evening at the Sherwood Community Centre, Mansfield Road, Nottingham at 7.30pm. Visitors who are short wave listeners, transmitting radio amateurs or are just interested in finding out more about amateur radio are welcome to attend the meetings.

Further details can be had from **Simon G0IEG** on **0115-950 1733**.

■ Members of the **Three Counties Amateur Radio Club** meet at the Railway Hotel, Liphook, Hampshire, on alternate Wednesdays, starting at 8pm. Visitors are always welcome to the meetings, particularly the non-technical subjects. The club are very active and have members with a wide variety of communication interests.

More details available from **Tom Milne G4CMG** on **(01428) 606298**.

■ The **Wincanton Amateur Radio Club** meet at King Arthur's School in Wincanton every 1st and 3rd Mondays at 7.30pm sharp, except for Bank Holidays, when it is the 2nd and 4th. On January 8th there is a talk by Dave G3ZXX on 'Aerials 2 - The Sequel'.

Further information can be obtained from **Jim Hatch G3OOL** on **(01963) 370352**.

■ **Harpenden Amateur Radio Club** meet on the first Thursday of each month from September to May at Aldwickbury School, Harpenden. Further details can be obtained from **Peter 2E1BDB** on **(01727) 860631** or **John G4JOV** on **(01582) 765821**.

■ The **Horndean & District Amateur Radio Club** meet on the 1st and 4th Tuesday of each month at Lovedean Village Hall, Lovedean Lane, Lovedean, Hants, starting at 7.30pm. January 2nd is a Natter Night.
Find out more by contacting the club secretary **Stuart Swain G0FYX** on **(01705) 472846**.

■ Meetings are held on Wednesday evenings for the **Aylesbury Vale Radio Society** at the Hardwick Village Hall, commencing at 8pm. Hardwick is situated off the A413 between Aylesbury and Buckingham.

For further details, contact the club's secretary **Ivan Eamus G3KLT** on **(01296) 437720**.

■ The **Conwy Valley Amateur Radio Club** meet at The Studio, Penrhos Road, Colwyn Bay, Clwyd on the 1st Wednesday of the month. At the recent AGM, **R. W. Evans GW6PMC** was elected as secretary (for his sins, so he says!).

So, to find out more, contact him on **(01745) 855068**.

■ The **Blackmore Vale Amateur Radio Society** meet on the 2nd and 4th Tuesday of the month at the Shaftesbury School in Dorset at 8pm. A club net is held every Sunday on 145.550MHz at 7pm local time.

The club secretary is **Stuart G7JIF** and he can be contacted on **(01935) 814055.**

Send your club information to Zoë Shortland at the PW Offices.

All Aboard - Dayton HamVention '96

Calling At New York & Dayton

The *PW* Dayton HamVention holidays have established themselves on the amateur radio travel calendar. In 1996 you can join us on a two-centre trip and have the option to extend the holiday and 'Flexi-Fly' wherever you wish in the USA.

Following many years of Ohio's late April variable weather, the organisers have moved the Dayton HamVention date to mid-May when it should be warmer and drier! Unfortunately, the change brings the return airline flights into the summer season, with the inevitable increase in cost. To get over the increased flight and accommodation costs our professional tour organisers - Gullivers Groups & Incentives Ltd. - have come up with an interesting two-centre package based on New York and Dayton.

Come & Fly With Us On The *Practical Wireless* HamVention Holiday May 13-21 1996

London To New York

The 1996 *PW* HamVention Holiday departs from London on **May 13**, when we'll fly direct to New York with Continental Airlines. On arrival, the party will be transferred by bus to the Edison Hotel in Manhattan for a three night stay.

After enjoying the sights of New York the party will fly to Dayton on Thursday where we'll be staying in the Englewood Holiday Inn for four nights. The HamVention opens Friday lunchtime ('Flea' market open from 6am) and runs until Sunday afternoon. The party then departs from Dayton on the Monday lunchtime **May 20**, arriving in London on Tuesday morning **May 21**.

You can join the 1996 HamVention Holiday for **£785*** per person. The £785* cost is based on two people sharing a twin-bedded room but single rooms are available for a supplement.

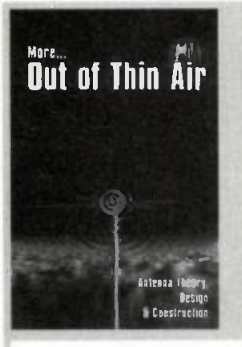
The price includes: economy class flights London to New York, New York to Dayton and return to UK. Also included are three nights accommodation in New York, four nights in Dayton, return airport/Hotel transfers, entrance fees to HamVention, UK and US Airport taxes, US State and City Taxes and VAT.

Extend Your Holiday

You also have the option to extend your stay in the USA after the HamVention by either 'going it alone' or by taking advantage of a special Air Pass available from Gullivers, which allows you to Flexi-Fly anywhere within the USA. For example, a £160 Air Pass would provide you with three additional flights to **anywhere** in the USA. Further details on this and other options are available on request.

To receive your information pack and obtain other details, telephone Donna Vincent G7TZB at the *Practical Wireless* Editorial offices on (01202) 659910. Alternatively, write to Donna, marking your letter: 'Dayton HamVention '96' providing your name, address (and if possible) a daytime telephone number. We're looking forward to seeing you on our Dayton HamVention Holiday '96!

★ Prices correct at time of going to press and may be sybject to change due to currency fluctuations.



Book Review - *More Out of Thin Air*

Rob Mannion G3XFD has been reading the latest book from PW Publishing, and he seems surprised!

I can just imagine readers saying "What's this, the Editor of *PW* reviewing a book just introduced and printed by his own publishers. It looks like nepotism to me"!

Well, anyone reading this book review can rest assured that it's not an example of the worst type of nepotism. It's an honest review! I can say that because I was the only member of the *PW* team who wasn't involved in producing the *More Out of Thin Air book*.

Everyone on the *PW* team except me was involved in the preparation of the long-awaited new book. So, my reaction when the first copy arrived in my office was an honest one. It was also very appreciative!

Superb Value

For many years the famous *PW* 'reprints' provided superb value for money booklets. These, including the famous *Passport To Amateur Radio* must have been the cheapest technical textbooks available in the UK.

Now that the 'new era' has arrived, I feel that my colleagues employed within PW Publishing have provided a superb new book. It's well printed, provides a good read, many interesting projects and ideas and is excellent value-for-money.

General editing on the new book was carried out by Elaine Richards G4LFM. Elaine chose to balance the new publication with a well chosen selection of well-proven and popular projects and new work.

Chapter 1 is headed Antenna Theory and covers antenna data, 1.8MHz antennas, loops, a 50MHz dipole, ideas for the Novice, etc. Chapter 2 concentrates on h.f. antenna constructional techniques and includes an interesting project from Doug DeMaw W1FB describing a portable vertical antenna.

Chapter 3 deals with v.h.f./u.h.f. antenna constructional techniques and includes well-established antennas and related projects from Fred Judd G2BCX along with new ideas from Colin Redwood G6MXL (70MHz antenna conversion), Tony Martin G4XBY (lightweight 144MHz beam) and Adrian Knott G6KSN (50 and 70MHz pre-amplifier).

Chapter 4 concentrates on the antenna workshop with test equipment, reviews and ideas. Chapter 5 includes a look at lightning protection and a simple r.f. bridge project from G4RAW. And a comprehensive 'further reading' list is provided by Chapter 6.

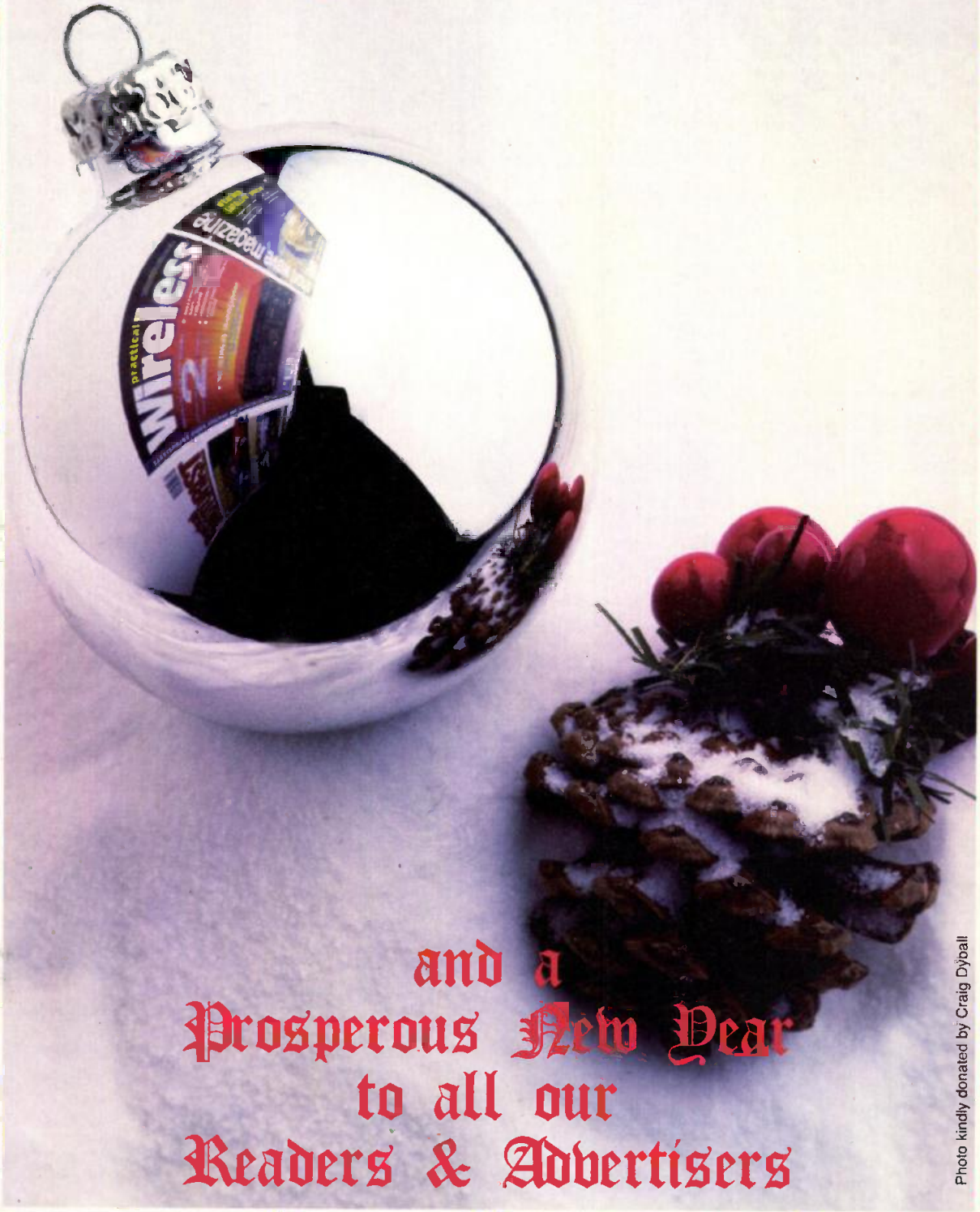
Altogether I have no hesitation in saying that I was most surprised at the new book. My first impression (that it looked to be good value) was reinforced when I read it through. If you like playing around with antennas, you'll enjoy *More Out of Thin Air* as much as I did.

And although it's very hard work for everyone, I hope PW Publishing will continue to bring out new editions of our old favourites. I honestly think they're bound to be good reading and good value-for-money.

G3XFD

More Out of Thin Air is available for **£6.95 plus £1 P&P (UK), £1.75 P&P (overseas)** from the PW Book Service. To order please use the form on page **62** of this issue or call the **Credit Card Hotline** on **(01202) 659930**.

Merry Christmas



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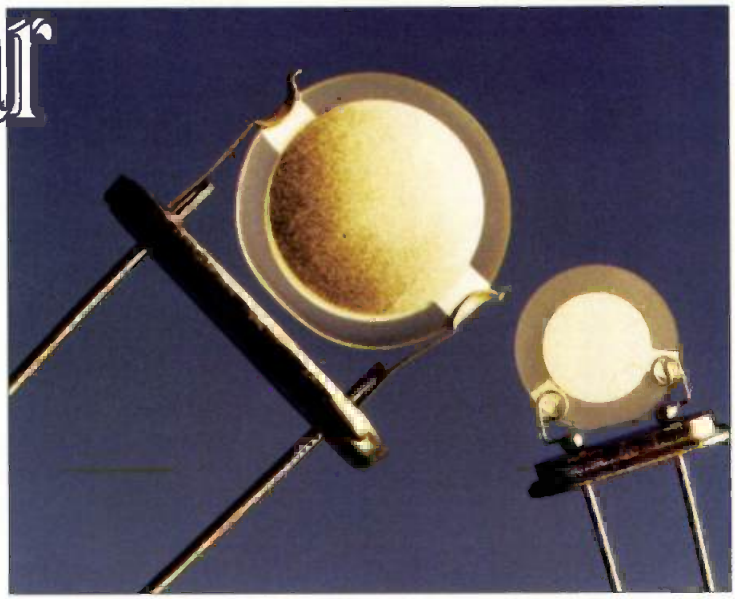


By Ian Poole G3YWX

Ian Poole G3YWX directs his experienced eye to look at quartz crystals. He suggests they're often overlooked but are at the very foundation of 'crystal clear' radio transmission and reception and have a clearly defined future.

Quartz crystals are used across the whole spectrum of electronics from radio to computers. In all aspects of the industry, vast quantities are used as highly accurate tuned circuits costing very little money.

The technology may not seem to be as advanced as the latest microprocessors. But crystals offer an incredibly high performance for remarkably little money.

Quartz crystals rely on the remarkable properties of the quartz itself for their operation. And surprisingly perhaps, it's only a form of silicon dioxide, the most common material on the earth's surface.

Often, seams of quartz will be seen running through various cut rocks or exposed hillsides. However, it's only rarely found in a size which can be used commercially.

Initially most quartz came from Brazil. But once it could be manufactured synthetically this source was very little used.

Quartz is very hard. It's one of the hardest substances known to man, only exceeded by materials such as diamond, silicon carbide and aluminium oxide.

A typical man-made crystal can be 45mm long and up to about 50mm in diameter. Commonly it has a hexagonal cross section with a hexagonal pyramid at either end.

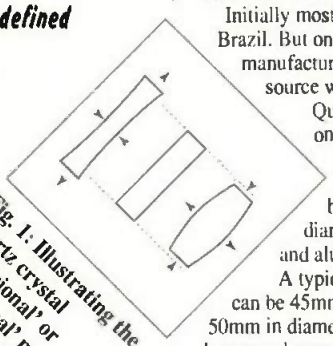


Fig. 1: Illustrating the quartz crystal 'extensional' or 'longitudinal' mode of oscillation (see text).

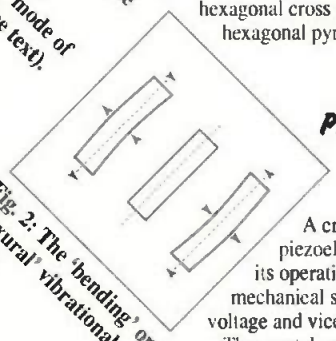


Fig. 2: The 'bending' or 'flexural' vibrational mode.

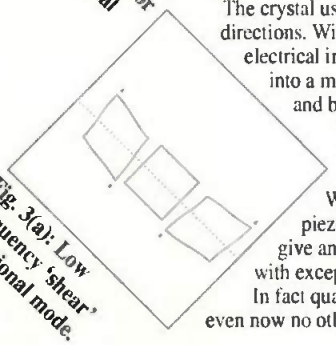


Fig. 3(a): Low frequency 'shear' vibrational mode.

Piezoelectric Effect

A crystal depends on the piezoelectric effect (p.e.) for its operation. The p.e. converts a mechanical stress in a crystal to a voltage and vice versa.

The crystal uses the p.e. in both directions. With this process an electrical impulse is converted into a mechanical movement and back again.

The mechanical resonances of the crystal are also used. When coupled with the piezoelectric effect they give an electrical resonator with exceptional values of Q. In fact quartz is so good, that even now no other form of resonator can perform as well. Particularly when cost is considered.

Quartz resonators can exhibit Q factors of several thousand. Whereas tuned circuits made from conventional inductors and capacitors give values only in the hundreds at the very best.

Incidentally, it's not a well known fact that a crystal has a number of resonances, depending upon the way in which it vibrates. It may oscillate in what is called an extensional mode as shown in **Fig. 1**.

Alternatively the crystal may have a flexural type of oscillation like that in **Fig. 2**. It may even vibrate with a shearing type of oscillation, as in **Figs. 3a** and **b.**

Different Ways

As there are so many different ways in which a crystal can vibrate, it's possible for an oscillator to excite several of them at any one time. Fortunately many of the modes only have a very limited piezoelectric effect connected with them.

But, if the crystal is poorly cut the unwanted modes can cause problems. They may lead to small spurious responses and oscillations when one mode excites another.

Sometimes the problems can mean that the crystal may even oscillate on completely the wrong frequency. This is particularly likely to happen if the oscillator circuit has no tuned circuits as in a digital clock oscillator circuit.

Characteristics of a crystal are determined to a very large degree by the angle at which it is cut from the main crystal. For example, in one plane there is no piezoelectric effect, while in another it can be maximised.

Angle Of Cut

Many other features including the way in which the crystal vibrates are also determined by the angle of cut. Because of this it's therefore very important to choose the correct cut for a given application

For most radio frequency application including amateur radio, the 'AT' cut is used. For this, the major surfaces are angled at 35° to the lengthwise or longitudinal axis of the crystal.

The 'AT' cut is very popular because it combines a high level of activity with low spurious responses. In addition to this, the dimensions of the crystals required are such that crystals can be made for operation from below 500kHz up to 30MHz and more. Beyond this they can be operated in an overtone mode.

Incidentally, when using crystals in an overtone mode you should remember there's a slight difference in frequency. The overtone frequency is nearly but not exactly equal to the third harmonic of the fundamental.

Modern Methods

Modern crystal manufacturing methods have come a long way since types like the FT243 were manufactured during the 1940s and 1950s. Nowadays very high standards of cleanliness are required, together with many advanced processes so that very high precision components can be manufactured reliably.

The first stage in the manufacturing process is to obtain large crystals of quartz. These are now manufactured artificially. From these round blanks are cut using diamond wheels.

Once the blank has been cut, it's 'lapped' to give the correct thickness for the frequency required. This process is performed using a either silicon carbide or aluminium oxide paste in view of the extreme hardness of the material. The paste is also very fine so that an extremely fine finish is obtained.

Even so, after lapping the surface still contains some discontinuities. These adversely affect properties like the crystal activity and its ageing (a process where the frequency changes slowly with time). To overcome this problem the blank is chemically etched

to give a near perfect finish.

Mounting the crystal is the next stage in the process. To do this silver or gold electrodes are deposited onto the blank to act as contacts.

The deposited electrodes also serve to finally trim the crystal to its final frequency. This is achieved by slightly altering the amount of metal which is deposited.

Having added the contacts the crystal then needs to be mechanically mounted. This is done in a way that reduces any mechanical losses, thereby not unduly degrading the Q.

Then the crystal is placed in its 'can' (the familiar metal container) which is then evacuated or filled with an inert gas before it is sealed. This helps reduce the effects or ageing caused by chemical action from any gasses penetrating the surface of the crystal lattice and combining with the quartz.

Major Uses

One of the major uses of crystals is within oscillators. So, let's take a quick 'refresher' on the crystal oscillators work.

Simply stated, when reduced to its basic elements an oscillator consists of an amplifier and a feedback loop. However, to enable a circuit to oscillate there are two main requirements which must be fulfilled.

The first is that the amplifier should have sufficient gain to overcome any losses in the feedback network. The second requirement is that there should be a 360° phase shift in the circuit.

With the phase shift any signal appearing at the output will pass round the loop and appear amplified at the output. As a result of this, any signal which is fed back from the output will be 'reinforced' as it passes around the loop.

To obtain the best performance the amount of feedback should be sufficient to reliably start and maintain oscillation. It's important that it should not be set too high.

If feedback is set too high then unwanted modes of oscillation may be excited and spurious signals generated. Another problem of excessive levels of feedback is that stability is not as good.

In any crystal oscillator circuit it is advisable to include a conventional LC tuned circuit tuned to the required frequency. By doing this it ensures that the crystal is excited in the correct mode and the required frequency is obtained.

When using untuned oscillators, as often happens when crystals are used in digital circuits it's possible for the crystal to start in the wrong mode. A totally erroneous frequency is then generated.

Main Advantages

One of the main advantages of crystal oscillators is their inherent stability and in many instances highly accurate oscillators are needed. Frequency counters, signal generators and many other instruments as well as some radio receivers need very accurate internal reference oscillators.

An ordinary crystal oscillator could give an accuracy of a few parts in 10^6 if it was designed and set up very carefully. (**Note:** 1 part in 10^6 would give an error of 1Hz on a 1MHz crystal). Even this order of accuracy is not sufficient for some applications.

To achieve better accuracy crystal ovens are used. These are very carefully designed crystal oscillators which are contained within a temperature controlled 'package'.

The oven contains heaters which are thermostatically controlled to bring the oscillator up to a certain temperature and hold it there. In this way any drift caused by changes in temperature is removed.

In addition to the temperature control, the oscillator circuit is very carefully designed for optimum stability. Additionally the circuit will be run from a very stable regulated supply in the oven.

High stability ovens can give accurate results of 1 part in 10^7 over a period of a year due to ageing of the crystal. (Drift due to temperature and voltage changes are well below this).

Excellent Filters

Apart from their use as oscillators, crystals also act as excellent filters. Most of the high performance filters used in today's receivers and transceivers use crystals to achieve their performance.

There are a number of different ways in which crystals can be used in filters. A simple circuit is shown in **Fig. 4**. This gives a high degree of selectivity, but has the drawback that the response curve is not symmetrical.

The circuit in **Fig. 4**, was the type of filter used in the legendary National HRO receiver. On the HRO's front panel there was a 'phasing' control (this was C1 in the circuit and it had to be adjusted to give the correct response).

In order to produce a symmetrical response, designs using two or more crystals are used. The basic circuit, called a 'half lattice' filter is shown in **Fig. 5**.

For optimum performance the two crystals should have slightly different frequencies. When this is done it's found that the 3dB bandwidth of the filter (ie the bandwidth where the output has fallen by 3dB) is about 1.5 times the frequency difference between the crystal frequencies.

By using the approach I've described, the response has a 'peak' at either side and has a slight 'dip' in the middle. The amount of 'ripple' (on the response) is dependent on a number of factors.

The factors include the matching of parameters of the crystals used, and the matching of the filter to its load and source impedances. And often an additional resistor is placed on the input or output of the filter to ensure good matching is achieved.

A two-pole crystal filter (i.e. one containing two crystals) like the one shown in **Fig. 5**, will give very good results when compared to an ordinary LC or single crystal filter. However, even with two crystals the performance is not as good as today's band conditions require.

Better Performance

To obtain better performance it's possible to place several filter sections in series. By doing this the filter can be made to have a much steeper rise to its response and a much greater ultimate rejection.

Typically, a two-pole filter will give only 20dB or so. However, a filter with four poles will give about 50dB and an eight pole version, 90dB or more.

To round off, in one sense of the phrase crystals may seem to be 'as old as the hills' (the basic material is just that of course!). But in the other sense of the term (being 'old fashioned and outmoded') nothing could be further from the truth!

By using the latest in technology for their manufacture, quartz crystals have demonstrated their worth. They're used in many areas of electronics from their traditional uses in radio communications to a host of other fields including computer technology.

In view of their established value, crystals in all forms are set to remain as a crucial component for use in the electronics industry for very many years to come. Indeed, their future is as clear as crystal!

PW

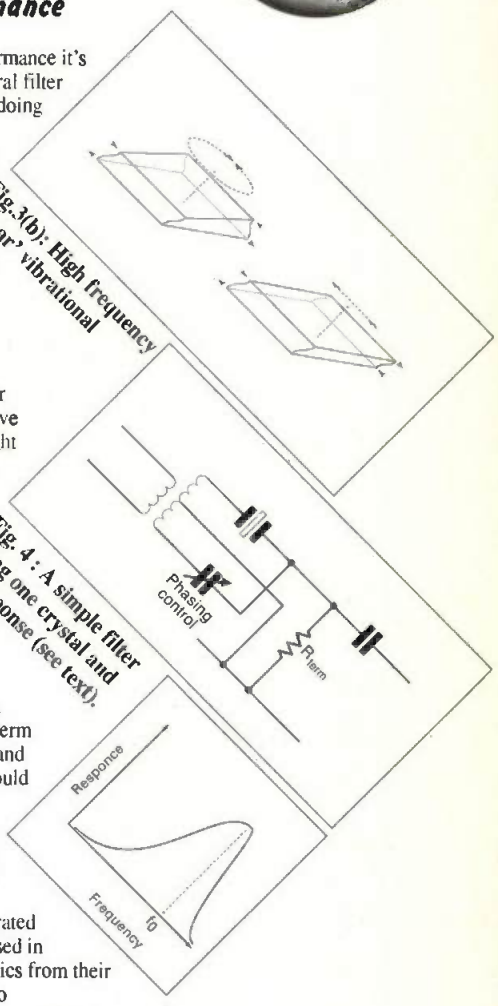


Fig. 3(b): High frequency 'shear' vibrational mode.

Fig. 4: A simple filter using one crystal and its response (see text).

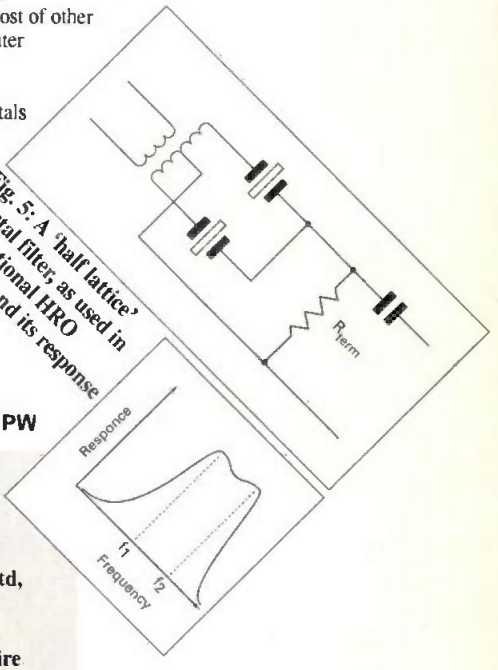


Fig. 5: A 'half lattice' crystal filter, as used in the National HRO receiver and its response (see text).

The crystals shown in the heading photo were kindly supplied by **Piezo Products Ltd, Crow Arch Lane Industrial Estate, Ringwood, Hampshire BN24 1NZ. Tel: (01425) 479337.**

Budget Battery Power

By Ben Nock G4BXD

Ben Nock G4BXD, is always on the look-out for a bargain. This time he's come up with a budget-priced power unit using an interesting combination to help you overcome two problems - no volts and a low purse!

The heading photograph shows the inside view of the PW prototype power supply built and tested by Clive Hardy G4SLU. Clive encountered no problems with the project. (The 12V gel type lead-acid accumulator is mounted separately in the PW prototype).

As I needed a low voltage power supply recently, I started looking for the usual 12 to 14V variety, capable of providing about 20A or so on peaks. My search led me to scour the magazines and rallies to see what could be found.

Unfortunately, I found that mains power supplies of the rating I needed, with a couple of fancy meters on them, could easily cost about £80 to £100. This was a little high, well...for my empty wallet at least!

Thinking it over, I thought there must be a cheaper way of providing a power supply to suit my needs. So, I looked in car accessory shops, and the price of car, motor-bike batteries and the like were examined as possible power sources.

Nowadays, there's also a large choice of different forms of lead acid batteries. Amongst these are the sealed type using a leak proof gel, which I thought might lend themselves to a solution to my power problem.

Sealed Accumulators

So, I acquired a couple of the sealed lead acid accumulators type. They were rated at 12V at 24Ah (**Ampere hour**). In other words, you could draw 24A for one hour, or 1A for 24 hours (in an ideal world!).

I needed the new supply for an h.f. transceiver which draws just over 20A on speech peaks. It seemed that one of the batteries should do the job, considering the duty cycle involved and the one I had in mind only measured 152 x 152 x 127mm.

Duty Cycle

The duty cycle refers to the proportion of time you transmit to the length of time you listen. Obviously, the longer you transmit, the heavier the current flow, with a correspondingly shorter interval before recharging is needed.

But, with s.s.b. transmissions, your transmitter will only draw a substantial current as you speak. In between speaking the current consumption drops to a very low level. This occurs during receive as well and the current consumption is also very small by comparison to that on transmission.

Having decided to buy, I then had a battery that could now supply the peak currents needed. The next task was to keep the battery charged up, during 'on air' periods and when the equipment was switched off.

The basic circuit of the charger unit design I ended up with is shown in **Fig. 1**. However, you should remember that unlike the **constant current** chargers needed for NiCad batteries, the charger for a lead acid battery (as used in this project) is a **constant voltage** type.

The LM317T is used as the voltage regulator with a TIP2955 acting as a 'pass' transistor. The transistor increases the total current that can be passed by the regulated power supply.

The transformer can be any suitable type, supplying around 9-0-9 at about 3 to 4A. The 18V a.c. is taken to a bridge diode block which rectifies it to provide 'raw' d.c. and is smoothed by the 6800µF capacitor.

The two low value resistors split the current flowing through the LM317, with the larger portion going through the 'pass' transistor (the TIP2955). The low value resistor*, 0.1Ω, was made from a small ferrite ring with some 18s.w.g. wire wrapped around it (about 20 turns or so).

**See Editorial comment in shopping list*

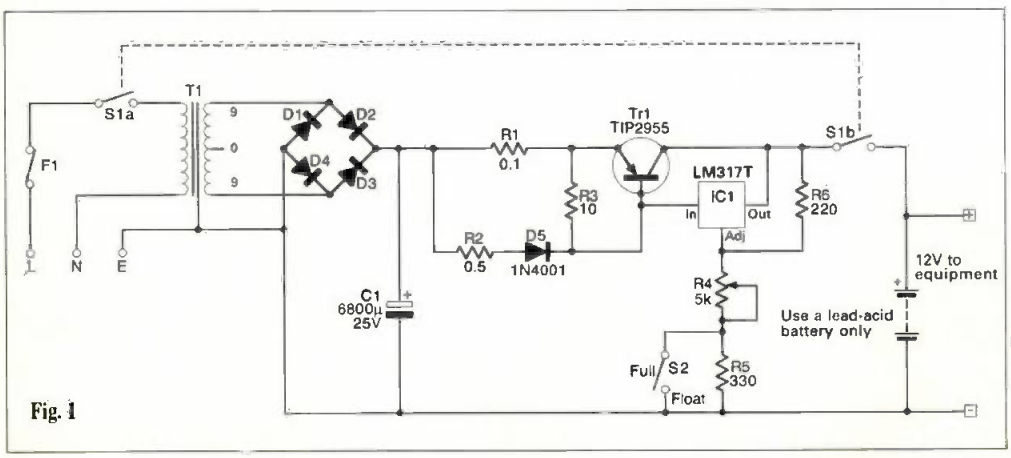


Fig. 1

Regulator Adjustable

The LM317T regulator is a fixed 1.2V type but may be used to provide adjustable supplies. As a 'stand alone' regulator it will pass 1.5A itself.

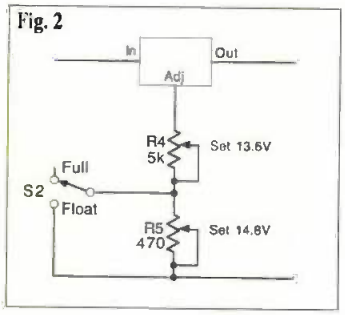
And although the power supply is not designed to pump large amounts into the battery, I felt that a little more than 1.5A would be needed, hence the 'pass' transistor. The TIP2955 is capable of passing around 15A according to the book, but I think about 6A is a better limit.

The switch in the 'adjust' leg of the LM317T is used to select between **Full** charge and **Float** charge. The battery I acquired had charging

information written upon it, between 14.6 and 15V for full charge and 13.6 to 13.8V for a 'trickle' or float charge.

With the LM317T switch open, the voltage is set to 14.8V using the potentiometer. When closed the voltage drops to approximately 13.8V.

If preferred, a further potentiometer of around 470Ω could be used and adjusted exactly, see **Fig. 2**. If you use the two potentiometer, the switch is first closed and the 5kΩ



potentiometer adjusted to give 13.8V, the switch is then opened and the 470Ω potentiometer adjusted to give the 14.8V setting.

The mains **On/Off** switch is also used to disconnect the battery from the charger when not in use. However, it's quite probable though that you can leave the charger in the **Float** position all the time, switching to **Full** during, and for a period after a sustained current drainage from the battery.

Assembly Techniques

The assembly I adopted uses standard techniques, and the TIP2955 and the LM317T devices need to be bolted to a heatsink. And bear in mind that if you use if the case as the heatsink, you'll need to have small mica insulating washers between the device tab and case.

The rest of the components are not critical. In fact, they can be mounted on tag strips, strip board or in a fashion to suit what you've got to hand in the junk box.

The main **On/Off** switch, the **Full/Float** switch and the terminals need securing to a suitable chassis. The voltage 'set' potentiometer is mounted inside the case to save any alterations being made to the charge voltage accidentally.

In Use

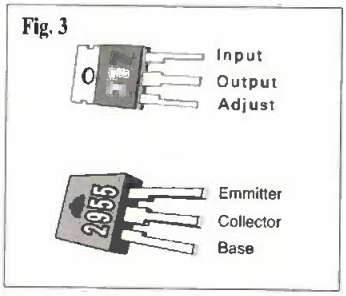
In use, the charger is connected to the battery and the supply to the rig is taken directly from the battery terminals by stout wire. The connections between the battery and the rig need to be **very** substantial.

Remember Ohms law! If there is a resistance in the wires carrying the supply from the battery to the rig of only 0.1Ω, then when 20A is drawn by the equipment, a voltage drop of 2V occurs between battery and rig (ie 12V at the battery but only 10V at the equipment.

Any larger resistance in the wire and the volt drop increases proportionally. So, the wire from the battery (and the connection to the battery itself) need to be of a very low resistance. A sturdy nut and bolt, with a couple of good clean washers, are needed at each terminal.

Unless you have a very large soldering iron with which to solder a thick wire to a suitable socket, it's better to rely upon compression joints. You should also use large nuts and bolts with appropriately sized clean washers.

Where the supply is to be used to power smaller items of equipment



(such as a 144MHz 10W transceiver) suitable connectors can be used. This is because the current drawn is considerably reduced, with a 10W rig perhaps only drawing about 2 to 3A, allowing for the inefficiency of the p.a. stage.

Fuse Protection

With regard to fuse protection of the power unit, the leads supplied with both my 430s had 'in line' fuses. But, don't forget that the batteries I've suggested will supply a **very high** short circuit current.

If there are no fuses fitted in the leads supplied with your equipment...**they must be fitted**. You should also bear in mind that poorly fitting fuses in flimsy holders are going to have a resistance. This could be appreciable at 20A or so.

You should search for fuse holders that screw in firmly. And when you're fitting them, ensuring that the fuse and holder are clean and free from rust or dirt, etc., and that a good firm contact is made between both ends of the fuse holder and fuse itself.

Final Appearance

The boxing up and final appearance of the power unit is not critical and is left to the user's choice (or what's in the junk box!). For my purposes, I wanted the whole assembly together in one box, along with a couple of 4mm sockets into which could be plugged the odd rig or unit.

In my prototype the main 20A terminals were the screw type. The power leads from the h.f. rig used compression types fitted to large sturdy lugs which were then screwed under the equally large terminals.

Alternatively, the charger could be housed in a smaller box which simply sits on top of the battery, with the h.f. rig leads being bolted to the battery directly. But, whichever way you choose, ensure that there's a good connection between battery and rig and between charger and battery.

Even if all the parts, battery and charger bits, are bought new, the cost of the project is a lot less that of a commercial unit. And while your pricing this project up, enquire as to the cost of a new 25A transformer (while sitting down of course!) Happy building!

PW

Fig. 2: Circuit of voltage setting arrangements and switching details (see text).

Fig. 3: Pin-out diagrams of the transistor (TIP2955) and the regulator i.c. (LM317) used in the project.

Shopping List

Resistors
Type as stated individually

0.1Ω	R1	**3W wirewound preferable for safe 5A charge. (G1TEX)*
0.5Ω	R2	*1W wirewound*
10Ω	R3	*0.5W metal film*
220Ω	R6	*0.5W metal film*
330Ω	R5	*0.5W metal film*

Potentiometer

5kΩ	R4 (see text) standard type or multi-turn (preferred for setting accuracy)

Capacitors
Electrolytic 25V d.c. working
(Computer grade if available)

6800μF	C1

Semiconductors

Bridge Rectifier	D1, 2, 3, 4 Bridge J005 (Maplin Code BH45Y)
1N4001	D5
LM317T	IC1
TIP2955	Tr1

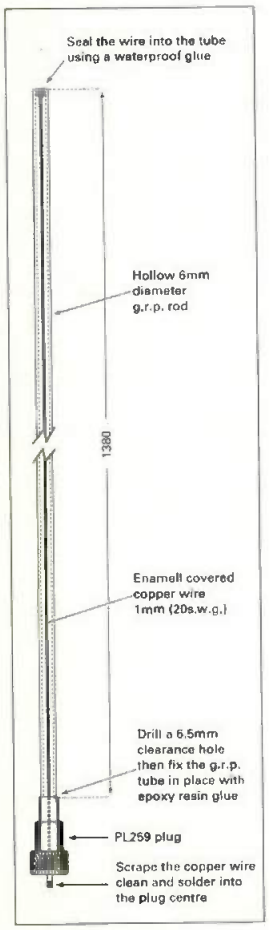
Miscellaneous
Mains transformer centre-tapped (9-0-9V) 4A type (see text), switches, heat-sinking (and appropriate mica insulation kit), connectors, suitable plugs and sockets (see text for suggestions), Sealed lead-acid 'gel' type battery 20 to 25AH capacity (see text). Case and other accessories to suit your needs.
Note: This circuit is NOT suitable for NiCad battery use.

The Six-Whip

By Kevin James G6VNT

Kevin James G6VNT has been busy again! This time he describes an effective quarter-wave whip for 50MHz

The 'Six-Whip' 50MHz mobile antenna built and described by Kevin James G6VNT. The antenna uses a length of hollow glass fibre rod to form the external support for the element. (See text for sources of the rod and safety advice on cutting and preparing the



The project I'm about to describe produces a very effective antenna that costs just £2 or so to make. The project came about because 50MHz dictates antennas of a fair size compared with higher frequency v.h.f. work, and I wanted an antenna which was easy to handle and transport.

I thought about trying a quarter-wave whip and decided to construct one. I finally arrived with a prototype and put it to the test.

In the end I was quite pleasantly surprised by its performance and non existent v.s.w.r. During recent lift conditions on 'Six' I quite successfully worked Italy with 20W and got a 5-9 report.

I was 180m a.s.l. at the time, near a local DX spot in my car. The fact that the antenna is vertically polarised, did not seem to make much difference over the distance worked, as the polarisation seems to change anyway.

Robust Antenna

What was wanted was a reasonably robust antenna. But it also had to be light, and not too big.

My brother (who is a keen kite flyer) suggested using some hollow fibreglass rod. He obtained a white 2.5m long 6mm diameter length for me to try (it cost me £2.50 from the local kite shop).

Warning: The fibreglass material was rigid and extremely light, being easy to cut. I used a pad saw, but I encountered a possible nasty hazard. If you are not **extremely careful**, almost invisible splinters can get into your skin. These are near impossible to locate, and very painful. One took me nearly a week to locate and remove!

When cutting the rod to the required length, gently sand the sharp edges of the rod ends away from you, using fine emery on a sanding block. Blow the dust away from you as you sand.

Avoid handling the cut ends! Providing this technique is used you should not experience any difficulties with this excellent material for making kites or antennas.

***Editorial note:** Kevin is quite correct to point out the hazards of handling glass fibre material. Please take adequate precautions when handling it. Gardening or good quality rubber gloves should be used when sawing and finishing the glass fibre rod. Finally, do not attempt to use a power grinder to cut or smooth the material (because of the minute glass 'dust' particles).*

Construction Straightforward

Construction is straightforward, and to start I took a PL259 plug and drilled the RG58 cable entry hole out to 6.5mm diameter. However, this stage is not quite as easy as it sounds, as the drill tends to snatch into the brass and stall!

So, make sure you grip the body of the plug tightly in a vice before attempting to drill the plug. Better still, use a power drill with a 'slow speed' control, or if you've got the energy...a hand-drill.

Next, take a 1.5m length of 0.75mm (22s.w.g.) enamelled copper wire and scrape the enamel off one end. Then push the wire down the hole in a 1.5m length of fibreglass rod, and down the hole you have just drilled in the PL259.

The wire should now be just showing out of the PL259 plug pin. Solder it into the pin, and then using some fast curing epoxy resin adhesive, cement the rod into the hole just drilled in the PL259 plug.

As the rod will be a loose fit, make sure the it's pushed right into the plug and square to the rod. You've got to do this before the resin 'cures'.

Mounting The Antenna

Mounting the antenna shouldn't be a problem. I used an old CB type magnetic antenna mounting base that I found in my garage. It was a first rate 228mm diameter mounting from my earlier days in radio. (I removed the centre 3/8in thread mounting, and substituted it with a SO239 socket to take the new antenna).

You'll then be nearly ready to 'tune up'. But it's a good idea to wait half a day until the epoxy adhesive has 'cured' before attempting this stage.

When the resin has 'cured' to your satisfaction you can start. Cut the rod to 1425mm from the point where the it enters the plug to the tip of the antenna (this is for tuning purposes).

Next, place the 'mag' mount in the centre of the roof of your car, with the PL259 of the new antenna screwed into it. Then connect up an s.w.r. meter and the transceiver, select low power, and set it to f.m. mode.

Set Frequency

Set the frequency to around the 50.210MHz mark. Next, you should 'key up' and note the v.s.w.r. I found with my prototype antenna, that the optimum length from the 'shoulder' where the rod entered the plug, to the tip of the antenna was 1380mm.

I achieved this by sawing off 10mm from the end of the rod at a time, until the lowest v.s.w.r. was achieved. Finally, I then sealed the end with a blob of the rapid-setting epoxy resin.

Performance Excellent

In use I found the performance and the v.s.w.r. on the 'Six-Whip' to be excellent. The needle doesn't even twitch on my meter!

I've made numerous successful contacts down south, in the Mediterranean area with 5-9 reports using a mere 20W. As I've already briefly mentioned, my location (a favourite DX spot) is approximately 180m a.s.l. and I have enjoyed working the DX. So, good luck and I hope you enjoy the 'Discount DX' too!

PW

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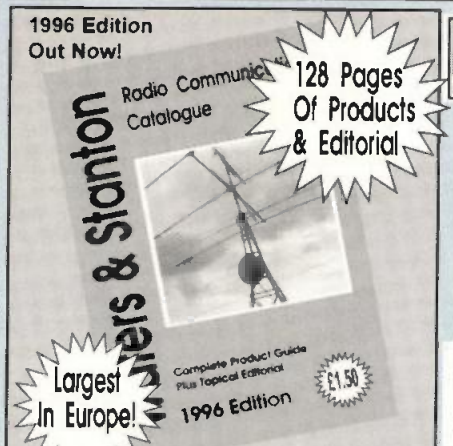

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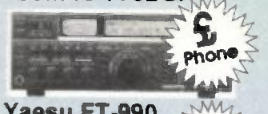

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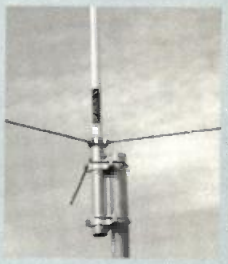

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NEWS 1996

Compiled by Donna Vincent G7TZB

'MicroHenry' In Stock At Martin Lynch

A very new 'item of stock' was on show for the first time at The Amateur Radio Exchange Centre in Ealing on Saturday 18 November. The new 'stock item' was young Henry Lynch, the five-week old son of Martin and Jennifer Lynch.

The latest addition to the 'Lynch Mob' was immediately nicknamed 'MicroHenry' by a visitor, from all over the UK to enjoy the constant supply of food, raffle prizes, good company and the chance to meet friends old and new. However, one visitor was still a little 'Jet Lagged' as he had only just arrived from New Zealand!

It seems as though everyone enjoyed the open day, and news of the event will be spread round the world, via the BBC World Service *Waveguide* programme. The producer and a reporter attended and interviewed some of the visitors, recording for the programme which is transmitted at 3.50am on Sunday mornings.

Martin and Jennifer Lynch proudly present young Henry Lynch, their five-week old son, who was quickly and aptly named 'MicroHenry' by a visitor to the annual Open Day at their Ealing emporium.

who must remain anonymous! The proud parents were able to show off the latest addition to the family, loan him out to temporary surrogate parents and refuse many cash offers for the latest 'model' from the Lynch emporium.

Henry slept through most of the event and so missed the opportunity to take his official Morse Test, the first time the facility had been available at the Ealing shop's open day. He also missed a truly beautiful day and the opportunity to see and try the latest Icom IC-706 fitted into an Icom demonstrator car parked on the forecourt.

Representatives from the Amateur Radio trade joined with hundreds of visitors

Next year it's rumoured that 'MicroHenry' will be fitted with his very own miniature familiar 'Martin Lynch' blue sweat-shirt...just in time for the 1996 Picketts Lock Show! Martin says that at the next open day Henry will take his Morse Test, after passing the RAE of course!

Everyone on the *PW* Editorial team sends their best wishes to the Lynch family and their latest arrival. **Editor.**

Radio Amateur Examination Courses

The Lee Valley Leisure Centre in conjunction with the Southgate ARC will be running a 15-week RAE course in preparation for the May 1996 examination starting in January 1996. More details are available from the instructor **Steve White G3ZVW** on **0181-882 5125.**

Alan Lake G4DVW will be running a 14-week RAE course from January 11 at the **Arnold & Carlton College, Digby Avenue, Mapperley, Nottingham** in preparation for the May 1996 examination. The course is aimed at students who have a background knowledge of the subject. However, keen beginners are welcome but need to appreciate that the treatment of the 'basics' will be strictly limited!

More information and advice can be obtained from Alan Lake G4DVW on **0115-938 2509.**

High Street - Low Power

Chris Rees G3TUX is pleased to announce the opening of new high street retail premises for his **QRP Component Company.** The shop is located at **7 Kings Road, Haslemere, Surrey** and will house all the usual kits, keys and QRP equipment.

Chris G3TUX says that shiny new black boxes will not be crowding the shelves but the essentials such as coaxial, slotted feeder and various types of connectors will all be on offer. The opening hours are expected to be Mon/Tues/Thurs/Friday: 1000 - 1200 and 1400 - 1600; Wednesday: Closed and Saturday: 1000 - 1300. Times outside these hours can be arranged.

Before visiting the QRP Component Company you are advised to telephone Chris on **(01428) 641771** or FAX him on **(01428) 661794** to confirm opening times, especially if you are travelling from afar.

Realistic Scanner

Realistic have just launched a new scanner in the shape of the PRO25. The PRO25 hand-held has 100 channels and covers the 66-88, 108-174, 406-520 and 806-956MHz bands.

When used in memory mode the PRO25 can scan at 50 channels per second and at 100 steps per second when used in search mode. It can be powered by dry cells, NiCads or from a 9V power supply.

The PRO25 costs **£189.99** and comes complete with an antenna, belt clip and manual. More information is available from **Link Electronics, 26 Lincoln Road, Peterborough PE1 2NE. Tel: (01733) 345731** or **FAX: (01733) 346770.**

AOR - Under One Roof

To coincide with the launch of the AR7030 short wave receiver and the AR5000 all-mode wide band base receiver **AOR (UK) Ltd.** have set-up a new manufacturing division under the name 'AOR Manufacturing Ltd'. This division will be responsible for producing AOR's new AR7030.

The AOR team have also relocated to Belper in Derbyshire. This now means that AOR (UK) Ltd., AOR Manufacturing Ltd. and the retail division the World Radio Centre are now all under one roof at **4E East Mill, Bridgefoot, Belper, Derbyshire DE56 2UA.** The new telephone number is **(01773) 880788** and the **FAX** number is **(01773) 880780.**

Why not pay AOR a visit and see for yourself the AR7030 and the AR5000 together with the rest of the range?

Bucking The Trend

In an age when prices (and facilities) seem only to go skywards, it's nice to see a hand-held rig that is bucking the trend. Many users have little need of the facilities most modern rigs provide. So, with that in mind **South Midlands Communications** have found the ideal solution. And kept the price down to the absolute minimum in the process.

The GEE-890 is fitted with only two crystal controlled channels (S20 and 21). And it's ideal for simple point-to-point contact. This 1W two-channel 144MHz hand-held is an easy-to-use unit supplied with two antennas and a battery case which takes six 'penlight' cells.

The GEE-890 costs £65 and is available from **SMC, SM House, School Close, Chandlers Ford Industrial Estate, Eastleigh, Hampshire SO53 4BY. Tel: (01703) 255111.**

Datong Improves Performance

The Leeds based company **Datong Electronics Ltd.**, have for many years offered a range of units which are designed to improve the performance of any transmitter or receiver. They are perhaps best known within the amateur radio world for their 'famous' D70 Morse Tutor however, their audio filters and speech processor could prove to be useful aids for improving your station.

Datong's FL2 and FL3 audio filters allow the removal of unwanted signals to enable you to hear the one you want. Both the filters take the audio from the external speaker of your radio and using digital switching techniques offer the optimum performance. The FL3 also has an auto notch filter which allows carrier signals to be filtered out automatically. The FL2 and FL3 are priced at £99.95 and £149.95 respectively.

The Auto Speech Processor (ASP) is designed to 'even up the odds' when competing with a station using more power than you. The ASP takes the input from your microphone and 'clips' the speech by up to 30dB's. This means that a higher than average power output is given compared to normal speech and the transmitter is used more efficently. The result is a much 'punchier' received signal. The ASP is available for £94.95.

To obtain details on the full Datong Electronics range which includes converters, broadband amplifiers and direction finders you should contact them direct at **Datong Electronics Ltd., Clayton Wood Close, West Park, Leeds LS16 6QE. Tel: 0113-274 4822 or FAX: 0113-274 2872.**

Repeater News

The **South Oxfordshire Repeater Group** (SORG) are pleased to announce that **GB3DI** is now on air on RB6 (433.150MHz). The GB3DI repeater serves the southern parts of Oxfordshire, including Abingdon, Wantage, Wallingford and Dideot.

The GB3DI repeater is currently running at 5W although this may be increased. The SORG have applied to reactivate GB3OX on RB12 (433.300MHz) to serve the city of Oxford and the area to the north. It is hoped that the application will be approved sometime in 1996.

Both GB3DI and GB3OX will use CUL logic incorporating the latest in CTCSS and DTMF for its control. Reports and further information from **G8CUL, QTHR.**

Club Call Operations

The International Short Wave League (ISWL) will be on the air throughout 1996 using a variety of modes and bands with the callsign **GX4BJC.** The callsign will be activated by a different ISWL member each month (see table).

Month	Operator	Name
January	G4EHU	Bill
February	G0RRW	Nigel
March	G4VBP	Brian
April	G4TLQ	Harry
May	G0DBX	David
June	G0VGX	Dave
July	G2BRR	Dick
August	G0UTP	Tony
September	G0OZI	Evelyn
October	G4FMI	Fred
November	G4DMS	Phillip
December	GM4AIE	Bill

Each operator will sign GX4BJC/P during their allocated month. However, **Dick G2BRR** and **Bill GM4AIE** will sign G4BJC and GS4BJC/P respectively. Anyone who hears or works GX4BJC is eligible to receive a ISWL QSL card by sending a QSL or reception report either via the bureau or direct to the ISWL Club Callsign Manager, **David Beale G0DBX/G-10618 at 'Kenwood', London Road, Louth, Lincolnshire LN11 8QH.** If you wish to receive a QSL direct please enclose an s.a.e.

National Novice Contest Results

The first National Novice Contest which was organised by **Poole Radio Society** took place on Sunday September 17 1995. This was the first time a contest had been run exclusively for Novices and the standard of logging was generally very high.

As you can see from the result tables most of the QSOs took place on the 430MHz band. Only one QSO separated the overall winner **Joy Fowler 2E1DXA/P** who was operating from Derbyshire from **Gregory Smith 2E1AES/P** who was on the Purbeck Hills in Dorset.

There was less activity on 50MHz but **James Mortimer 2E1CXE** from Leicester managed five QSOs on the band in addition to seven QSOs on 430MHz. Both Joy and James receive cups for winning as does **B. Cannon 2E1DZQ** for sending in the neatest hand written log. All entrants who enclosed an s.a.e. will receive a certificate.

All in all the contest was a success and plans will be made early in 1996 to run another contest. Congratulations go to all winners, participants and everyone who helped to make the contest a success.

50MHz Band

Pos	Callsign	QSOs	Points	QTH
1	2E1CXE (*)	5	15	Leicester
2	2E1DWX	3	9	Leicester
3	2E1AXO	2	6	Leicester

430MHz Band

Pos	Callsign	QSOs	Points	QTH
1	2E1DXA/P	18	54	Derbyshire
2	2E1AES/P	17	51	Dorset
3	2E0AES/P	13	39	Somerset
4	2E0AKB	8	24	London
5	2E1DWK	7	21	Leicester
	2E1CKY	7	21	Sheffield
	2E1AQS	7	21	London
	2E1CXE (*)	7	21	Leicester
9	2E1DXB	4	12	Essex
	2E1DZT	4	12	London
11	2E1DWZ	3	9	Nottingham
12	2E1DWQ	2	6	W. Sussex
13	2E1DTD	1	3	W. Sussex

Cushcraft Catalogue

The **Cushcraft Antenna Corporation** of New Hampshire, USA have recently published their new full colour amateur radio catalogue which contains several new products.

During October the Cushcraft company's International Sales Manager **Ed Hamilton** visited the UK distributors Waters & Stanton Electronics at their Head Office in Essex to discuss the new products and to deliver the first of the new catalogues. Anyone who would like a copy of the Cushcraft catalogue and price information should send their name and address to **Waters & Stanton Electronics at 22 Main Road, Hockley, Essex SS5 4QS** quoting 'Cushcraft Catalogue'.

New Citizens Band Specifications

The Newsdesk has received notification from the Radio Communications Agency of a new Europe wide specification for Citizens Band (CB) radio equipment, which will allow UK retailers access to a wider range of suppliers and enhance competition which came into force on October 27 1995.

There are two CB radio services which operate on the 27MHz band. One is intended for use in the UK and the other throughout many European countries. Each service has its own specification.

At present CB sets intended for the UK service

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NEWS 1996

Continued from page 27

Compiled by Donna Vincent G7TZB

only require self certification by the manufacturer that they comply with the relevant specification. However, as from January 1 1996 The Wireless Telegraphy (Citizens' Band and Amateur Apparatus) (Various Provisions) (Amendment) Order 1995 will require sets to be type approved by a recognised testing laboratory. This will benefit retailers and users who will now be confident that they are selling and using legal equipment.

The Order also introduces a new specification for the Europe wide service following the withdrawal of the old national specification. This new Europe wide specification will allow UK retailers access to a wider range of suppliers and thus enhance the competition.

The specification changes only apply to newly manufactured apparatus. The users of CB equipment will be able to continue to use apparatus manufactured to previous specifications. The changes allow CB apparatus to brought to the market which conforms to the Electromagnetic Compatibility Regulations, which become mandatory after December 31 1995.

Further information on the CB specifications can be obtained from the **Radiocommunications Agency at South Quay Three, 189 Marsh Wall, London E14 9SX. Tel: 0171-211 0211.**

Send your news information to Donna Vincent G7TZB at the PW Offices.

New Titles

The *PW* Book Service has recently introduced some new titles. The first of these is the newly published *More Out of Thin Air*, which is a compendium of antenna information and designs published by PW Publishing Ltd.

More Out of Thin Air is revised, rewritten and updated from *Out of Thin Air* and whilst containing some material from the original there are plenty of new articles for the antenna enthusiast to enjoy. Articles included are: Slim Jim Vertical Antenna for 144MHz, A five-element Beam Antenna for 70MHz, Antenna Ideas for the Novice and G2BCX 16-element Beam Antenna to name a few.

At only **£6.95** the 112 pages which go to make up the A4 sized *More Out of Thin Air* are packed with information and this is surely a book which any amateur would love to own.

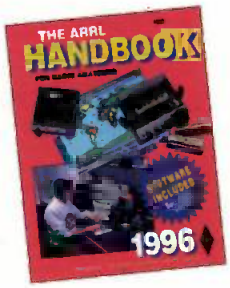
Secondly the 1996 edition of the *RSGB Amateur Radio Call Book and Information Directory* is available **now** for just **£11.23** from the Book Service. This year's Call Book covers callsigns up to G0WJF, G7VOT and 2E0AMO and 2E1EIZ.

Following the introduction in the 1995 Call Book of a surname and town index the RSGB have continued to widen its appeal by introducing a WAB square listing and IARU locator for most entries. As well as this you can expect to find all the usual information on Band plans, Contests, Licensing, Morse, Propagation, RAYNET and much more. The *RSGB Amateur Radio Call Book and Information Directory* would make an invaluable addition to any shack bookshelf.

And thirdly the 1996 edition of the *ARRL Handbook For Radio Amateurs* has just arrived in the Book Service Department. Now in its 73rd Edition this 1200 page book is packed with information on everything from What Is Amateur Radio? through Practical Design to Construction Techniques and Operating Practices.

For the first time the *ARRL Handbook* includes a disk of software which should prove useful and practical to all amateurs. The disk contains a Windows database, TISFIND which is a list of parts suppliers and addresses to be used as an extension of the references given in the Handbook. Also included on the disk are software applications for Pi Network Design, SSTV, active filter design and a shortened dipole design, etc.

The only omission from this year's edition is the 'etching patterns', these are no longer included but are available on request direct from the ARRL. *The ARRL Handbook for Radio Amateurs* is at **£25** a worthwhile consideration for your bookshelf.



All of the books mentioned here are in stock and **Michael Hurst** is eagerly awaiting your order on **(01202) 659930**. If you order immediately you should get your books in time for Christmas so, why not treat yourself, order a book in preparation for the festive holidays. Please remember to add P&P to your order: £1 for one book, £2 for two or more (UK), £1.75 for one, £3.50 for two or more (overseas).

Short Wave Shop 'Launched'

Wednesday November 1 1995 saw *PW* Editor **Rob Mannion G3XFD** doing something really unusual. He (successfully) 'launched' **The Shortwave Shop** at **18 Fairmile Road** in **Christchurch, Dorset!**

Southern Scanning & Shortwave, run by **Colin Riggs G3XAS** and **Bob Burrows G6DUN** have been trading for over a year now catering for all aspects of the radio hobby. And at long last they have found a shop which is convenient for bus, train and car users. Located a very short distance from Christchurch station it has good transport connections from a wide area. It's open Tuesdays to Saturdays from 10.30 to 6pm (8pm late closing Wednesdays). **Tel: (01202) 490099.**

Rob 'launched' the shop at 2pm in front of guests from the trade and amateur radio world saying: "Just how do you 'launch' a shop?...apart from saying good luck and God Bless all who 'sell' in her"! He then re-assured everyone that the shop could not 'stick' on the slipway (like the last boat he launched did!) or sink!

Rob Mannion G3XFD reassuring Colin G3XAS (left) and Bob G6DUN that you don't have to be large to 'sell' in the good 'ship' The Shortwave Shop, before launching them into business and declaring the establishment open on November 1 1995.

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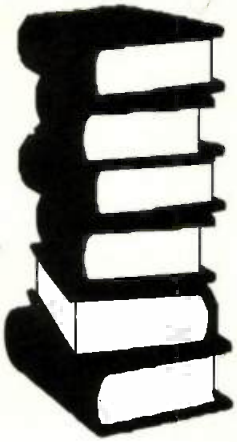

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Potters Bar, Herts EN6 3JE

A Junk Box PSU

By Ken Lee-Rand G3UXA

Ken Lee-Rand G3UXA digs around in his junk box and finds the bits to produce a variable power supply unit and explains how you can do the same!

Almost by accident I had collected a couple of commercial unregulated mains adapters, of the type assembled inside a 13A mains plug. The only use I could find for these items were to power a home-made NiCad battery charger, as the excessive voltage and residual mains ripple (r.m.r.) was so large as to preclude their use for anything else.

Having built a number of small test equipment items for that required regulated voltages, I reasoned that if I built a regulator, I could put the new power supply units (p.s.u.s) to work. My self imposed constraint would be that all the components should come from the junk box, hence the name!

Circuit Details

A quick glance at the circuit details, **Fig. 1**, shows a series regulator with a minimum of components. None of the components are critical, providing they are within the voltage and current rating for your design. I've opted for an f.e.t. (Tr1) in constant current mode, instead of a resistor, for two reasons. 1) This method gives better output current limiting. 2) It also provides better regulation because it increases the comparator amplifier (Tr4) gain.

Most published designs state the obvious voltages, but few provide the critical voltages you want to know. Take a look at **Table 1** and you will see I've provided some other useful voltages.

You could also use **Table 1** as a good starting point to calculate the resistors required to construct a fixed or switched voltage regulator. However, I should point out that you will have to fine tune the resistors in the end to get it right, because of component value tolerances.

You should also note that when the slider of R4 is at the earthy end, the output voltage is at its highest. You will also notice that the voltage to the input of the correction amplifier stays fairly constant (6%) for a 400% change in output voltage.

If you use a linear potentiometer for R4, the low voltages will be spread out, but the higher voltages will be cramped. Greater setting accuracy is preferred at the low voltage end where a small change in voltage can cause equipment malfunctions.

More Linear

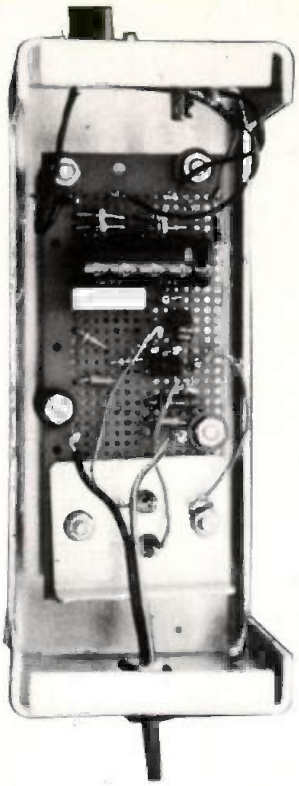
If you want the scale to be more linear, then a logarithmic (log) ratio variable resistor is called for. A normal log variable would have to be wired 'the other way round', so that the output voltage decreased when turned clockwise.

A reverse log ratio control (usually marked with a C, E or RD after the value) would reverse this situation. But these are pretty rare items.

The diode D1 protects the unit from reverse connection when using a d.c. supply. The diode bridge D2-5 is for a.c. input. This was added in the first place because I have an HP21 calculator that had ceased to function, the mains adapter is a transformer with an output of 10V a.c. at 80mA.

Using the HP21 p.s.u. through to the regulator, I get a useful 3V to run a mini cassette recorder and 6V to run other equipment. I've found that adding an a.c. input capability also increases to the regulator's versatility.

Incidentally as I hate throwing kit away perhaps you could help! If anyone can tell me how to use the HP21 keypad as a key pad for my HF-225 I would be most grateful.



Results

Let's look at the results. Bearing in mind the measurements given in the tables are made with hobbyist equipment.

The input voltage must be at least 4V greater than the output voltage for satisfactory operation. And you should also allow for a loss of 15mA for the regulator itself.

Have a look at **Table 2**. I think it shows the danger of connecting unregulated units to sensitive equipment.

The voltages shown in **Table 3**, were taken on a commercial 'regulated' p.s.u. Tests with another regulated supply, showed that the cheap commercial p.s.u.s can be prone to over voltage.

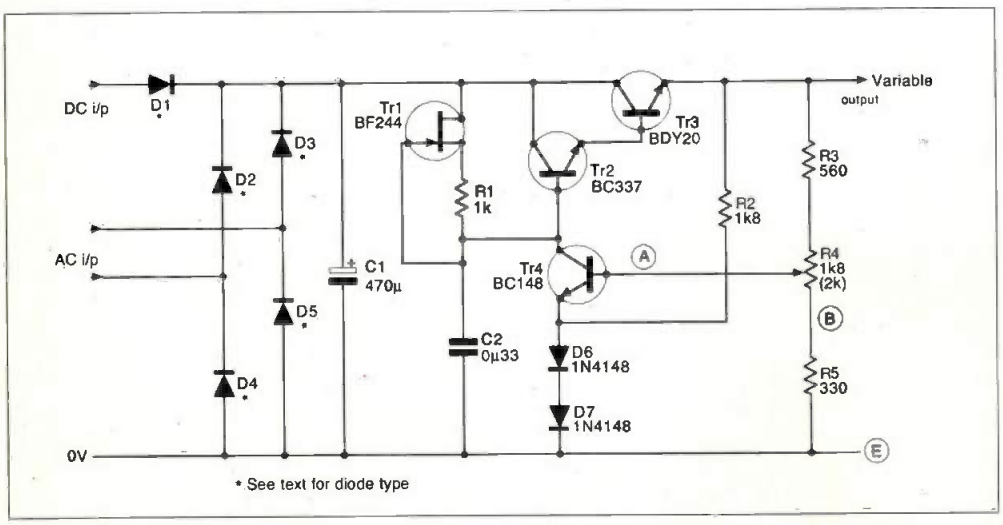


Fig.1: The circuit of my 'junk box' p.s.u.

Severe Interference

Another problem with the commercial p.s.u. is that when powering a transistor radio, severe interference occurred. The lower the received frequency the worse the interference became.

In fact, the Radio 4 long wave transmission was impossible to listen to. The problem turned out to be lack of an electrostatic screen on the mains transformer.

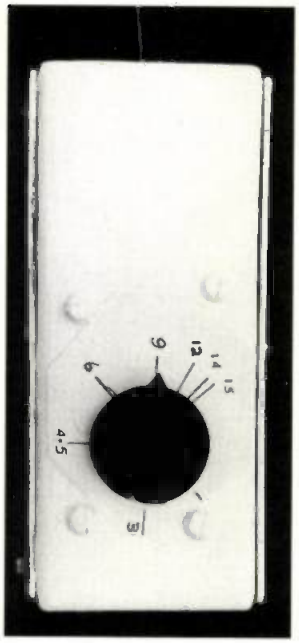
The series regulator in my commercial p.s.u. is an LM317T type of i.c. The heatsink tab, the output, is bolted to two flat sheets of aluminium, dividing the case in half and tight up against the transformer windings. However, any induced e.m.f. has no return path to earth as it is merely a 'two wire' p.s.u.

I fiddled around for hours trying to decouple the induced e.m.f. to no avail. The only successful answer was to make sure that the secondary was securely earthed, whereupon the problem disappeared completely. This is always something to bear in mind.

PW

Shopping List

Resistors (*almost any type*)		
330Ω	1	R5
560Ω	1	R3
1kΩ	1	R1
1.8kΩ	1	R2
Variable		
2kΩ	1	R4
Capacitors		
Polyester (or any other type)		
0.33µF	1	C2
Electrolytic (35V working minimum)		
470µF	1	C1
(or any greater capacitance value)		
Semiconductors		
1N4001	5	D1, 2, 3, 4, 5
1N4148	2	D6, 7
BF244	1	Tr1 (or any simple f.e.t.)
BC148	1	Tr4
BC337	1	Tr2
BDY20	1	Tr3



The front panel of G3UXA's junk box p.s.u.

Tables: Some of the voltages discussed in the text shown in tabular form. See the text for more explanation.

Table 1:

o/p Voltage	3.0	6.0	9.0	12.0
Volts (A-E)	2.17	2.24	2.28	2.31
R (A-B)Ω	1380	565	275	14

Table 2: Commercial unregulated p.s.u. (made in China)

Claimed (V)	1.5	3.0	4.5	6.0	7.5	9.0	12
Measured (V)	2.98	5.42	7.38	9.18	12.72	15.58	18.92
Difference %	99	81	64	53	70	73	58
Ripple (mV)	0.3	0.5	0.7	0.8	0.7	0.7	0.8
V_{noise} (mV)	25	25	25	25	25	25	25

Table 3: Commercial (AL300) regulated p.s.u.

Claimed (V)	3.0	4.5	6.0	7.5	9.0	12
Measured (V)	3.74	5.21	6.77	8.59	10.25	13.79
Difference %	25	16	13	15	14	15
Ripple (mV)	5	5	5	5	5	5
V_{noise} (mV)	10	10	10	10	10	10

RADIO Diary

Compiled by Zoë Shortland

December 16: Computer Fairs (Northern) computer/rally fair and game's fair is to be held at the G. H. Carnall Leisure Centre, Lostock Road, Davyhulme, Manchester, immediately at J4 off the M63 motorway. Doors open 10am to 3pm. The show is open to traders of both computer and radio backgrounds alike. There is easy access for disabled visitors and a massive free car park, cafe and bar. Admission is £1.50 for adults, first 400 + free £2.25 mag or CD. **0161-627 2502**.

1996

January 20: Computer Fairs (Northern) computer/rally fair and game's fair is to be held at the G. H. Carnall Leisure Centre, Lostock Road, Davyhulme, Manchester, immediately at J4 off the M63 motorway. Doors open 10am to 3pm. The show is open to traders of both computer and radio backgrounds alike. There is easy access for disabled visitors and a massive free car park, cafe and bar. Admission is £1.50 for adults, first 400 + free £2.25 mag or CD. **0161-627 2502**.

January 21: Oldham ARC Mobile Rally is being held at Queen Elizabeth Hall, Civic Centre, West Street, Oldham, Lancs. Doors open at 11am (10.30am for disabled visitors). Event features the usual traders and a Bring & Buy stall, Morse tests available on demand. Talk-in on S22 via GB4ORC, commencing at 7.30am. Mobile contact prize, up to 2pm. Refreshments and free parking will be available. More details can be obtained by telephoning **(01706) 846143** or **0161-652 4164**.

February 4: The 11th South Essex Amateur Radio Society Radio Rally is to be held at the Paddocks, Long Road, Canvey Island, Essex. The paddocks is situated at the end of the A130. Doors open at 10.30am - features: amateur radio, computer and electronic component exhibitors, Bring & Buy, RSGB Morse testing on demand (two passport photos required), home-made refreshments, free car parking with space outside main doors for disabled visitors. Admission is £1. Further details from **David G4UVJ** on **(01268) 697978**.

February 11: The Northern Cross Rally is to be held at a new and better venue, the Thornes Park Athletics Stadium, Wakefield, just out of town on the Horbury Road. Easy access from M1 junc. 39 & 40 - well signposted and with a talk-in on 2m and 70cm. Doors open at 11am (10.30am for diabled visitors and Bring & Buy). Details from **Dave G0FLX** on **0113-238 3622**.

February 17: Computer Fairs (Northern) computer/rally fair and game's fair is to be held at the G. H. Carnall Leisure Centre, Lostock Road, Davyhulme, Manchester, immediately at J4 off the M63 motorway. Doors open 10am to 3pm. The show is open to traders of both computer and radio backgrounds alike. There is easy access for disabled visitors and a massive free car park, cafe and bar. Admission is £1.50 for adults, first 400 + free £2.25 mag or CD. **0161-627 2502**.

February 24: The Rainham Radio Rally is to be held at the Rainham School for Girls, Derwent Way, Rainham, Gillingham, Kent. Talk-in on S22 GB4RRR. Doors open at 10am to 3.30pm. Disabled and wheelchair users from 9.30am. Admission is only £1.50, under 14s, free. There will be the usual mix of trade stands, Bring & Buy, many special interest groups, etc. There's plenty of off road parking, a licensed bar, food and refreshments available with an area to sit and eat and watch the world go by. Further details from **Martin G7JBO** on **(01634) 365980**.

February 25: The Barry Amateur Radio Society are holding their annual Radio and Computer Rally at the Barry Leisure Centre, Barry. Doors open at 10.30am (10am for disabled visitors). More information can be obtained from **Brian Brown GW0PUP** on **(01222) 832253**.

March 2: The Aberystwyth & DARS West Wales Amateur Radio & Computer Rally. Details from **Katy GW0SFO** on **(01545) 580675**.

***March 9/10:** The London Amateur Radio & Computer Show is to be held at the Lee Valley Leisure Centre, Picketts Lock Lane, Edmonton, London N9. Doors open 10am to 5pm each day. There will be trade shows, lectures, a Bring & Buy, on-demand Morse tests (two photos needed), talk-in on 2m and 70cm, disabled facilities, priority admission for disabled visitors, bars, restaurants and ample free parking. **Steve White G3ZVW** on **0181-882 5125**.

March 10: Wythall Radio Club will be holding their annual radio rally at Wythall Park, Silver Street, Wythall (near Birmingham on the A435, two miles from junction 3 on the M42). Doors open 10.30am to 4pm. There will be all the usual traders in three halls and a marquee. Bar and refreshment facilities will be available. In addition there will be a Bring & Buy stall run by the club. Talk-in on S22. Admission only £1. **Chris G0EYO** on **0121-430 7267**.

March 24: Pontefract & District Amateur Radio Society Annual Radio Rally & Components Fair. Details from **Colin Wilkinson G0NQE** on **(01977) 677006**.

April 14: Bury Radio Society Annual Rally will be held at the Castle Leisure Centre, Bolton St., Bury. Doors open at 11am and 10.30am for disabled visitors. The Bring & Buy will be run by members of the Rochdale ARS. Refreshments and a licensed bar will be available. Facilities for the disabled. The Leisure Centre is next to East Lanes Railway (steam preservation line), so why not bring all the family and have an enjoyable day out. **Laurence G4KLT** on **0161-762 9308**.

April 28: The Marske-by-the-Sea Radio Rally is being held in the Marske Leisure Centre, High Street, Marske-by-the-Sea, near Redcar. Doors open at 11am. There will be all the usual traders, Bring & Buy and refreshments, plus a talk-in on S22. **Alistair G4OLK** on **(01642) 475671**.

May 18/19: The Yeovil Club's Amateur Radio Convention Weekend. **Note! This year is at a new venue in Sherbourne, Dorset.** Saturday 18th is amateur and family activity day and convention dinner and Sunday 19th is the 12th QRP Convention at the Digby Hall, Sherbourne. Talks, competitions, displays, selected traders, food, etc. Open 9am to 5pm. Admission/prize draw is £2. Talk-in on S22. For full details contact **G3CQR, QTHR** or telephone on **(01935) 813054**.

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.

The Editorial staff of *PW* cannot be held responsible for information on Rallies, as this is supplied by the organisers and is published in good faith as a service to readers.

If you have any queries about a particular event, please contact the organisers direct.

Editor

*** Practical Wireless & Short Wave Magazine in attendance**

Locking The Robin To Droitwich

by Mike Rowe G8JVE

Mike Rowe G8JVE completes his description of the additional 'off air' frequency standard for the PW Robin frequency counter by presenting the p.c.b. designs to enable you to complete the project.

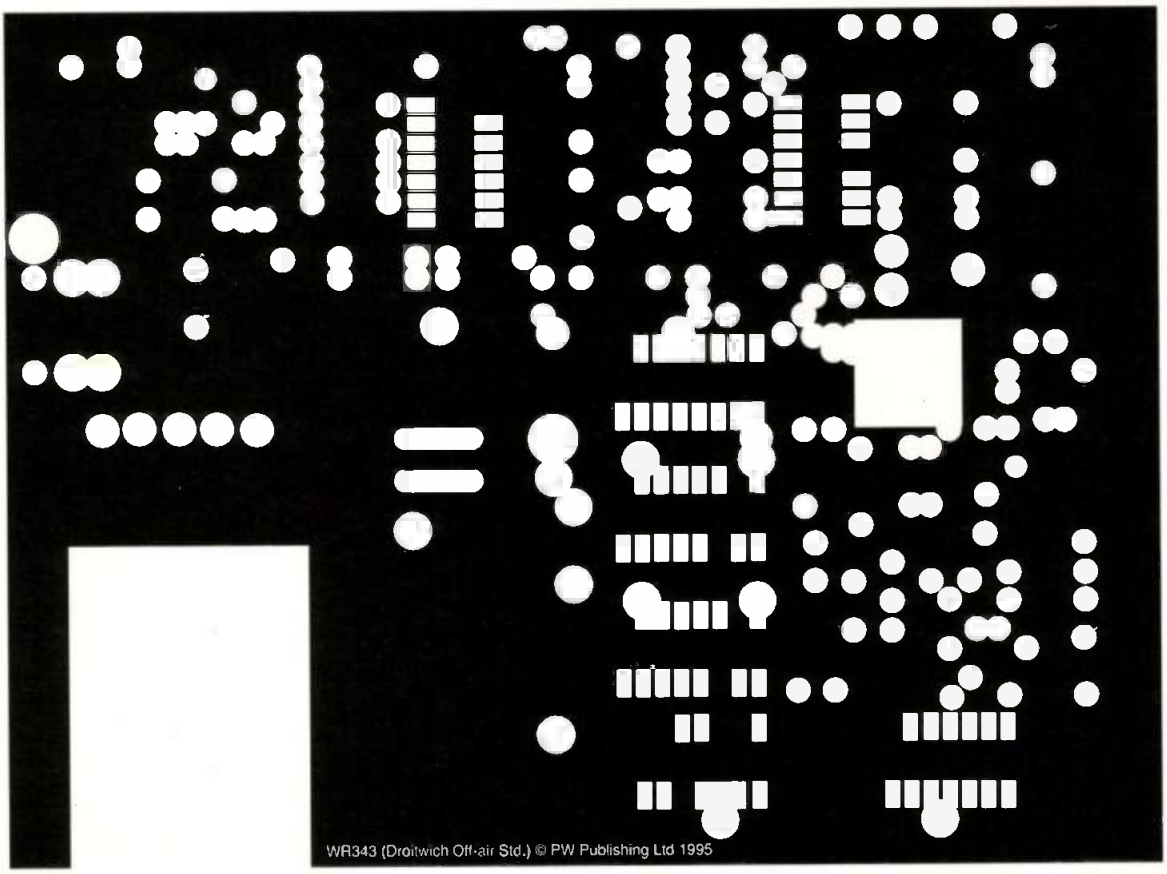


Fig. 1: The p.c.b. ground-plane.

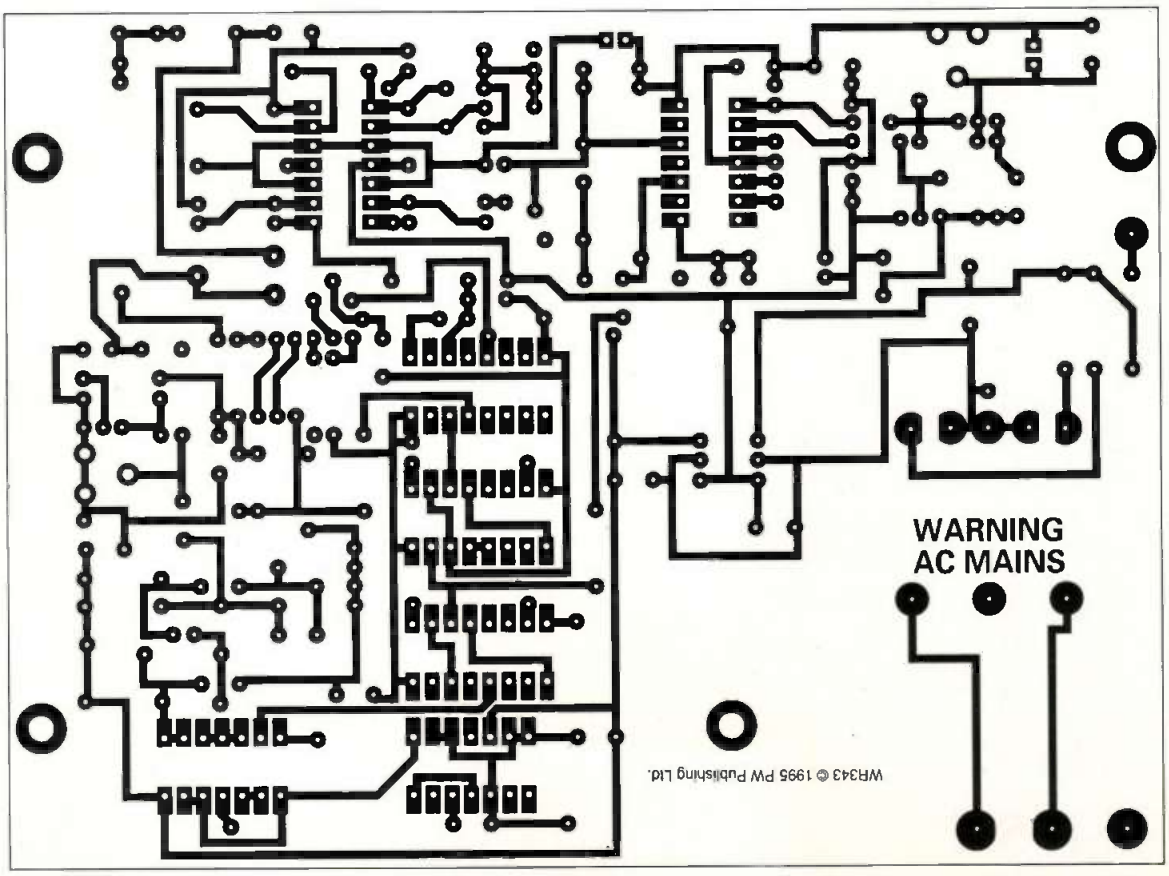


Fig. 2: The p.c.b. track circuit diagram and the component overlay placing diagram for the project. Please note that diodes D4 and 5, although shown as marked on the board (for reference purposes) are of course mounted on the front panel (see text, Part 1). The resistor R41 (value not marked on the circuit diagram) has a combined value of 40MΩ, made up from four 10MΩ resistors. Diodes 2 and 3 are varactor types (see 'Errors & Updates') and R19 (a 'Cermet' multi-turn type) should have its 'slider' soldered through to the earth plane as it's used as a variable resistor in this circuit.

Part 2

There's nothing particularly difficult with the p.c.b. lay-out for the add-on 'off air' frequency standard. However, I recommend that you adopt the usual precautions against static discharge.

Although the p.c.b. designs published in the magazine will be available from the PW PCB Service, I've no doubt that some constructors will be making their own. If you do, please bear in mind the following guidelines:

As a mains supply is used to power the 'add-on' unit, don't forget to ensure there's adequate space between p.c.b. tracks where the a.c. mains potential exist. Bear in mind that the p.c.b. layout published in *PW* has many small pads close together, so great care should be taken to ensure solder does not 'bridge' to adjacent pads.

So, now you can complete the project and make your Robin an even more versatile unit. It's been an enjoyable project to work on and the Editorial team and I have had some interesting letters from readers regarding their own Robin frequency counters.

Finally, I know that the *PW* office has back numbers of the magazine available covering the original project. So, there's no real excuse for you not to have a go yourself now!

PW

Errors & Updates (From Part 1, December 1995 Practical Wireless)

Unfortunately, a few rather annoying errors crept into the first part of the PW Droitwich Frequency Standard, Part 1. The errors mainly concerned the circuit diagram, **Fig. 2** on page 31 of the December 1995 issue of *PW*. Please refer to that drawing and carefully link the following points:

Link The junction of Tr3 collector and R35/R34 to the line joining pins 1 and 2 of IC3. Link the line above R32 (collector load of Tr2) and R35 (load resistor for Tr3) and the +5V rail joined to pin 14 of IC3.

The 10MHz output is taken from pin 11 of IC3. So, bring the pin 11 of IC3 out to a pad similar to the (1MHz) pad connected to IC9. Also on IC9 the pins numbered 2, 3, 6, 7 and 10 should have a 'chassis' (connected to 'chassis' or negative) sign attached to them.

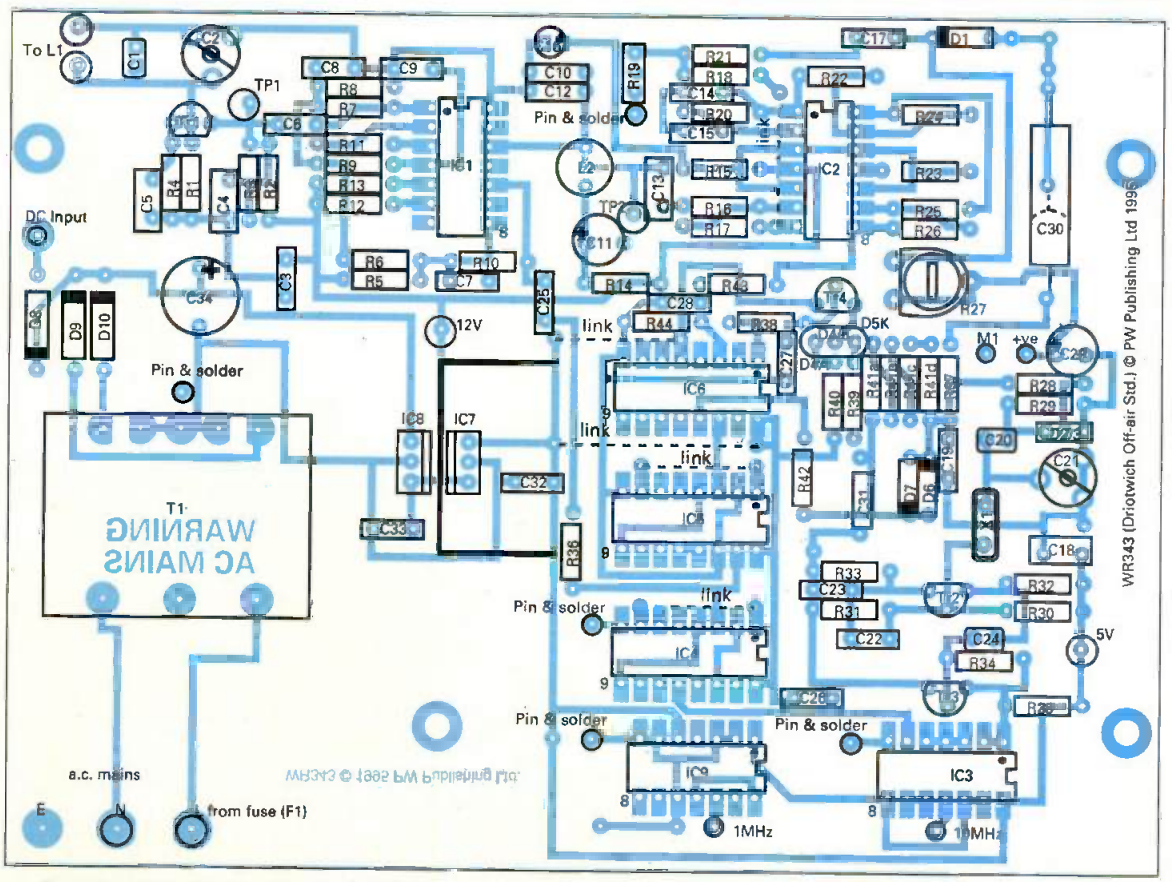
Diodes 2 and 3 are varactor types, although this was not made clear in the circuit, **Fig. 2**. They are in 'double diode' configuration and the appropriate location on the p.c.b. (see p.c.b. overlay) makes allowance for this.

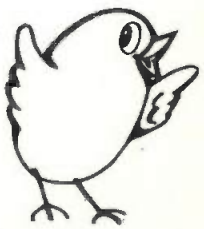
It was also not very clear that transistors Tr2 and 3, along with ICs 3, 4, 5 and 6 have a 0V return back to the chassis or negative side of the power supply section (IC7 and IC8). Please join the rail, joining the junction of R44 and C28 to IC6 pin 8 to the negative point of (pin 2 of IC7 and 8) the power supply section.

The last points referring to the circuit diagram, was that the capacitor C24 has no marked value. The actual value is as shown in the shopping list (10nF). Capacitor C11 also had a wrong value on it in the circuit diagram. Please amend its value to 4.7µF (again as in the shopping list where it's shown correctly).

There's also one small change to be made to the text. Please refer to the first page (page 30) of the article 'Locking The Robin To Droitwich'. In the right hand column there is an incorrect reference to an i.c. In the third full paragraph, the text states "..drive to the divider IC7 (providing....". The corrected text should read: "....drive to the divider IC9 (providing....'..

My apologies for these errors, and I hope they won't put you off building a very interesting project. ***Editor.***





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USED EQUIPMENT

A safe bet or an extended nightmare?

The magazines are full of it, private sellers or traders, everybody is offering USED equipment. In most areas, buying "pre-owned" electronics is reasonably safe. In Amateur Radio however, things can and often are very different. You see, most Amateurs are born twiddlers. Its almost a sign of manhood. "I've tweaked this pot and that pot and managed to get another 20% increase in power". What the owner doesn't realise is the ALC is now inoperative causing the transmission to distort and just as important, the life of the P.A. will be reduced dramatically. Other "tweakings" can bring similar problems usually with no recourse to the buyer.

Buying a used piece of equipment from MARTIN LYNCH doesn't carry quite the same risk. In fact there is no risk at all. Here's a check list that ALL used equipment is subjected to BEFORE sale. Make sure that when buying a used item elsewhere, the same rules apply.

1. *Equipment is checked for operation.*
2. *Equipment is checked for any obvious signs of modification*
3. *Equipment is checked against manufacturers specification and realigned if required.*
4. *Equipment is rechecked after any necessary workshop repairs or alignment in our Customer Services/Quality Control Department.*
5. *Equipment is thoroughly cleaned using special stain and grease removing additives.*
6. *Equipment maybe offered with a fifteen month warranty and a money back guarantee if the goods are not suitable.*
7. *Equipment offered with handbook and any other documentation.*
8. *Where available a history will be offered with each used item, ie. previous owners, original use and so on.*
9. *Equipment will be passed to the showroom for sale, priced and added to the used equipment list.*
10. *Any used item can finally be demonstrated at the request of a customer.*

Any further questions? Buying new or used from MARTIN LYNCH, the confidence is always there. The company keeps getting bigger by making the customer service better. Call into the London showroom and see just how busy the store always is. If you want to buy via MAIL-ORDER, the care is still the same. Whether you live 2 miles or 400 miles away, there is NO RISK in buying from MARTIN LYNCH. TRY HIM TODAY!

HERE'S JUST SOME OF OUR QUALITY USED EQUIPMENT ON OFFER...

AEA	PK232MBX	TNC	£195.00
AEA	PK88	TNC	£99.00
ALINCO	DJ180	2M HANDIE	£129.00
AOR	AR1500E	SCANNER	£199.00
AOR	AR3000	SCANNER	£579.00
AOR	AR3030	RECEIVER	£499.00
AOR	AR8000	SCANNER	£349.00
BNOS	LPM144/3/50	2M 50W AMP	£89.00
BNOS	LPM432/3/50	70CM 50W AMP	£129.00
BNOS	LPM50/10/100	6M 100W AMP	£159.00
DRAKE	TR7+PSU	HF TCV'R	£499.00
ICOM	IC28E	2M 25W TCV'R	£169.00
ICOM	IC2E	2M HANDIE	£99.00
ICOM	IC735	HF TCV'R	£695.00
ICOM	IC736	HF+6M TCV'R	£1495.00
ICOM	IC765	HF TCV'R	£1495.00
ICOM	IC901E	2/70 FM MOB	£425.00
ICOM	ICR7000	BASE SCANNER	£749.00
ICOM	ICR7100	BASE SCANNER	£1100.00
ICOM	ICW21E	DUALBAND H/H	£395.00
ICOM	ICPS55	25 AMP PSU	£129.00
ICOM	ICRM3	CONTROLLER	£45.00
KENWOOD	TS130V	10W QRP HF	£349.00
KENWOOD	TS140S	HF TCV'R	£649.00
KENWOOD	TS680S	HF TCV'R	£695.00
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KENWOOD	TS950SD	HF TCV'R	£1895.00
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LOWE	HF150	SW RECEIVER	£325.00
LOWE	HF225	SW RECEIVER	£349.00
STANDARD	C500	DUALBAND H/H	£226.00
STANDARD	C528	DUALBAND H/H	£249.00
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YAESU	FT1000	TOP HF TCV'R	£2299.00
YAESU	FT101ZD	HF TCV'R	£395.00
YAESU	FT107M	HF TCV'R	£399.00
YAESU	FT2200	2M 50W FM	£249.00
YAESU	FT221R	2M M/M BASE	£295.00
YAESU	FT290RMK1	2M M.5W M/M	£269.00
YAESU	FT290RMK2	2M 2.5W M/M	£399.00
YAESU	FT41	70CM H/H	£239.00
YAESU	FT840	100W HF TCV'R	£679.00
YAESU	FT780R	70CM 10W M/M	£395.00
YAESU	FT530R	DUALBAND H/H	£369.00
YAESU	FT707	HF TCV'R	£295
YAESU	FT790RMK1	1W 70CM M/M	£295.00
YAESU	FT736R	QUADBAND M/M	£1100.00
YAESU	FT23R	2M HANDIE	£125.00
YAESU	FT3R	70CM HANDIE	£145.00
YAESU	FT747GX	HF TCV'R	£549.00
YAESU	FT757GX	HF TCV'R	£549.00
YAESU	FT767GX	HF TCV'R	£895.00
YAESU	FT840	HF TCV'R	£675.00
YAESU	FT990DC	HF TCV'R	£1395.00
YAESU	FT100	HF TCV'R	£2299.00

NEW PRODUCTS

ADI AR-146

First viewed at the Lynchy Open Day, the AR-146 is a real low cost FM mobile for 2 metres. Styled rather surprisingly on another main manufacturer's transceiver, this new offering from Taiwan is a 50 Watt130-170MHz unit offered at a ridiculously low price. But who's complaining? RRP £269. Deposit £49, 12 payments of only £18.33, interest free ZERO APR.

ADI AT-200

Simple to use 2M handie at a very affordable price. Keypad entry, 130-170MHz coverage all for only £164.95. (supplied with empty cell case, nicads and charger are available for £29.95 extra)

ADI AT-400

Identical to that of the 2m version, the AT-400 covers 420 465MHz and operates on 70cm. Priced at £189.95 supplied with empty cell case.

ALINCO CORNER

DX-70

100W on HF
10W on 6M

50/50 PURCHASE PLAN

Alinco's answer to the IC-706.

A mini HF transceiver with all modes from 160M - 6M.
General Coverage RX, remote front panel. Compare the receive audio on both. The Alinco will surprise you and the CW and SSB narrow filters are thrown in FREE, they'll cost you £120 extra with the Icom.

NEW LOW PRICE: £995 with FREE 3 YEAR WARRANTY
Deposit £500.00 (or your trade in's as part payment) Balance £495. 12 monthly payments of only £41.25.
INTEREST FREE ZERO APR
Available on our 50/50 purchace plan.

DJ-G5

The best selling DualBand Handie. Better still, such has been the sales success, ALINCO have actually put the prices down!!

Old RRP: £479.
ML PRICE: £395 !!
Finance & 5 year Warranty also available.

DR-610

PRICES DOWN!

This excellent dual band mobile has earned itself the reputation of "Mr Reliable", due to less frequent visits to the Martin Lynch workshop in comparison to its competitors. 50 watts on 2M and 35W on 70cm, remote head, separate controls for VHF/UHF, all housed in a small and compact little package. Better still, there has been a whopping £80 slashed off the RRP!

New LOW price £649. Deposit £79.00, 12 payments of only £47.50, interest free zero APR.

DJ-191

AS REVIEWED IN PW DEC

Styled upon their already popular DJ-G5 dual bander, the new 2M handie is selling very well. Nice clear display and superb build quality.

RRP: £249. Deposit £29, 12 payments of only £18.33, interest free Zero APR.

STOP PRESS!!

MORSE TESTS ON DEMAND

Due to the enormous success during the OPEN DAY of Morse Tests being taken without the requirement of "pre-booking", for a trial period, the facility for sitting the test will be available for three months at the London Showroom. Starting in February 1996 through to April, the tests will take place on the first and second Saturday of each month, between 10:00 and 14:00 hrs. For those wishing to take the 12WPM Morse test, please ensure that you arrive with two passport photographs and the £18 administration fee.

For further details, call Steve Jelly on 0181-566 1120

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YAESU FT-1000 FREE FINANCE OVER 18

Once again, the massive amount of new HF equipment shifted by Martin Lynch enables some "select" trade in's at real money saving prices. The FT-1000 is a prime example. Retailing at just under four grand, the unit new, is now purchased only by the lucky few. At the time of going to print, we have four used FT-1000's in superb, (in a couple of cases hardly ever used) condition. The 200 watt flagship is offered with a FIFTEEN month warranty and for a limited period, we're allowing any of the four examples to be purchased on INTEREST FREE FINANCE.

RRP £3999. Used (as new) examples, £2299. Saving £1700. FREE Fifteen month warranty. Deposit £499. 18 payments of only £100, interest free ZERO APR.

SPECIAL OFFER
KENWOOD TS-450SAT

Bulk purchase of your favourite "midi" sized HF transceiver has enabled us to offer them on a spectacular money saving offer. The TS-450SAT is despite it's size, a full feature 100W all mode HF transceiver, including a built in AUTO ATU, IF Shift and much more. The list price is £1649.00 but we are offering 10 pieces at only £1195 including FREE DELIVERY, saving a massive £450.00!!

Furthermore, it is available on FREE FINANCE at £196.00 deposit and 12 payments of £83.25

SAVE A MASSIVE £450.00
ONLY A FEW LEFT SO HURRY

HEIL SOUND

Heil Proset-5 Professional Quality Boom Headset, dual padded earphones, flexible mic boom, includes HC-5 "Full range" insert for superb speech quality. Requires AD-1 cable ADAPTOR for KENWOOD/ICOM. **£119.95 incl. VAT**

Heil Proset-4 Identical to Proset-5, but includes HC-4 "DX" microphone insert. Ideal for punching through the pileups. **£119.95 incl. VAT**

Heil HC-4 Replacement microphone insert for existing fist or base microphones. With 10DB peak at 2KHZ and the low end rolled off sharply at 500HZ, (12DB per octave), the HC-4 is the ultimate DX mic insert. **£28.95 incl. VAT**

Heil HC-5 Identical to HC-4, but High Articulation, offering superb SSB quality, rolls off sharply under 350HZ and above 3100HZ, peaking at 2.4KHZ. "Hi-Fi" SSB Audio.**£28.95 incl. VAT**

Heil AD-I/K/Y Adapter leads to interface the proset Headset/boom microphones to 8 pin Yaesu, Icom or Kenwood transceivers. **£11.95 EACH**

ICOM IC-736

The only HF transceiver to offer 100 watts on HF through to six metres, built in PSU, Auto ATU and lots more. Fantastic value.
RRP: £1969. **Lynchy price: £1649.00**

KENWOOD TS-870S

50/50 PURCHASE PLAN

Without question the star of the show during our open day, experienced operators heard for themselves just how good the TS-870S really is. No other HF transceiver employs digital signal processing at the IF - others install a DSP unit at AF - a major difference when it comes to picking out signals buried in the noise.

TS-870S £2399.00 - WITH FREE 5 YEAR WARRANTY
DEPOSIT 50% £1199.00 (or your trade in's as part payment)
Balance £1200.00

YAESU FT-1000MP NEW

The magic in the new Yaesu HF transceiver is the inclusion of "COLLINS" filters. The result is audio that harks back to the "S Line" days. Rounded, full and real depth but with a crispness that is easy on the ear. Add to that the latest in technology with "EDSP" signal processing and the magic turns into reality.

FT-1000MP RRP £2849 with Internal PSU.
FIVE FILTERS THROWN IN FREE WORTH £468 or FIVE YEARS WARRANTY. YOU CHOOSE!

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NEW DSP-232 DSP based data controller RRP £499 **intro price. £479.95**
PK-12 Low cost budget VHF TNC now with FREE software..... **£129.95**
PK-96 The easy way to get on 9k6 baud packet..... **£219.95**
PK-232MBX All mode Data controller - the bench mark..... **£319.95**
PK-900 The best selling commercial grade controller..... **£479.95**

YAESU FT-990AC

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Just when you thought you had a great deal, Yaesu go and step in with £178 quids worth of FREE OPTIONAL FILTERS! The FT-990 is available with or without AC PSU, sports an internal lightning fast Auto Tuner and has "digital" bandwidth control fitted as standard. Buy now. Filter offer must end Jan 96!

AC model: RRP £2399. LYNCHY PRICE: £1949.00
DC model: RRP £2099. LYNCHY PRICE: £1699.00
LIMITED STOCKS - PHONE BEFORE PLACING ORDER

ICOM IC-775DSP

My own personal favourite base station HF. 200 watts for a start, a massive die-cast front panel enabling decent size knobs and buttons to be used. High speed auto tuner, PSU built in and finally a DSP unit for removing fatiguing white noise. Add to that an easy to read display and a beautifully weighted fly wheel tuning knob and its easy to see why the IC-775 is still our best selling top of the range HF Base.

IC-775DSP £3399
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Watson 2090H Add-On Linear Amplifier

By Tex Swann G1TEX

Tex Swann G1TEX, PW's Technical Projects Sub-editor took to the hills recently. Tex was trying an add-on 80W power amplifier for 144MHz hand-helds and here's what he thinks....

The prospect of 'having a go' with some more review equipment overcame my reluctance to take to the hills again. So, just what caused this trek to the hills on two rather cold blustery autumn days?

The easy answer is that I was asked to try out an add-on power amplifier (p.a.) for 144MHz hand-helds, the Watson 2080H p.a. This unit, at first sight, looks just like a 180 x 45x 125mm lump of heatsink material!

The whole thing is constructed out of a single solid section of finned anodised aluminium extrusion. Have a look at the internal shot of the amplifier unit in **Fig. 1**, and you'll immediately see what I mean.

The metalwork dominates the photograph. And the single p.c.b., a little bigger than 160 x 108mm, is just the right size to fit into one of the slots in the body of the heatsink.

The large p.c.b. has space for two r.f. power transistors for the p.a. There's also what appears to be a single m.o.s.f.e.t. 144MHz preamplifier.

The specifications supplied with the Watson amplifier suggest a nominal 3W of r.f. into the unit which will provide 80W out to the antenna. Conversely any incoming signal will get a 15dB 'boost' before being passed to the transceiver. (The supplied 500mm BNC to PL259 patch lead is about the right length to attach the transceiver to the Watson p.a. unit).

Trusty Portable

So, it was out with my trusty FT-290RII portable. Then out with the thermal underwear and after brewing up a flask of hot coffee...off to the hills.

But what antenna should I take? I settled on a modified HB9CV that has an added reflector but little extra gain, just a better front-to-back ratio.

I started by listening to what was happening on 144MHz. To this end the preamplifier most certainly did its job. The amplifier dragged signals out of the noise extremely well and it seemed that any signal benefited, f.m., s.s.b. (all of them) were pulled out of the murk to become fully audible.

Then I decided to have a go calling CQ on s.s.b. frequencies....and had no reply! Oh well, the band was being used by 'three semmers' as 'talk-back' for their microwave operations. (Maybe they didn't want to talk to me).

I then joined in on f.m. with a couple of friends. One was mobile about 75km away, and the other about 15km away (in bed!) with a hand-held. **John G0SKR** heading north in his car and I had little or no trouble with the p.a. on, in spite of my antenna being horizontal and his vertical. **Harry G4TLQ** however, although 'horizontally polarised' - in both senses - was off the side of the beam.

Both stations reported good solid copy from me when I was using the p.a. With John it was almost impossible without the extra power provided by the p.a.

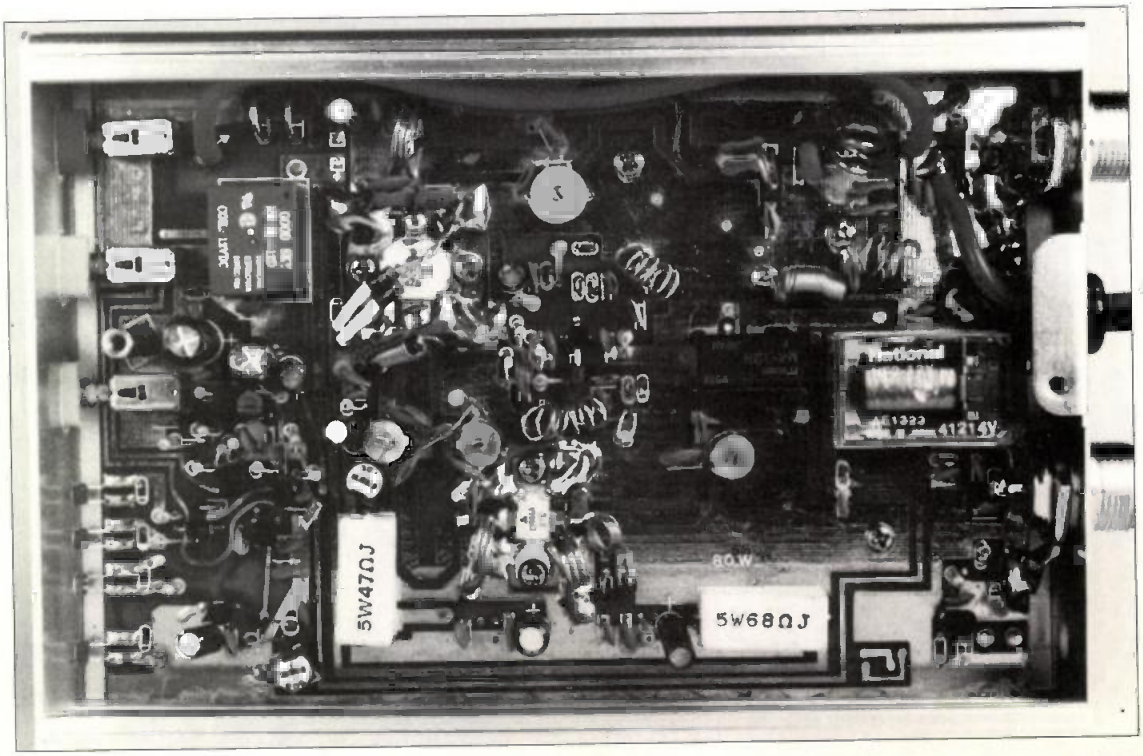


Fig. 1: Photograph showing inside of the Watson 2090H add-on linear amplifier. The whole unit is one great big extruded heatsink behind the p.c.b.

practical REVIEW

The Preamplifier

The preamplifier made both f.m. signals fully quieting most of the time. Despite this, the mobile signal had just too much flutter to be perfect all the time.

Then I had a stroke of luck. **Doug G0CZG** came up on channel and agreed to try out a few experiments on sideband frequencies. As a reference I tried the 'bareback' FT-290 and Doug recorded my signals 'off air' and played them back so I could estimate what effect the p.a. had.

Power Amplifier

So, it was then time to try out the power amplifier section. And at the appointed moment in my transmission when I said I was about to switch it on, I did and the result was....absolutely nothing!

My faithful little FT-290 was unused to 80W of r.f. at close range. The rig's antenna was only about four metres away and mounted at three metres off the ground - and it promptly 'gave up the ghost'.

I heard myself 'coming back' from my own loudspeaker, and so rapidly switched the p.a. off and continued with the transmission. On replay from Doug that period was just blank. Ruined experiment number one!

Some time later, Doug and I parted company and I continued to listen, both with and without the preamplifier in circuit. This I found a nice touch with the Watson, as either amplifier could be in operation independently.

Throughout the test period I was pleasantly surprised at the difference that the preamplifier had on signals. With it in operation I could get signals at what I would consider '479' that the 'bareback' FT-290 was unaware off. (Ten out of ten for that part anyhow).

By now, the cold wind on the hill had help me to decide to call a halt for the day. And it was during the following week, with a longer antenna lead I again ascended the mountain (poetic licence on my behalf).

This time the weather was abysmal. After being unable to put antennas up due to a fairly stiff breeze off the sea, I gave up and left the hilltops to those brave enough and headed home.

Tests And Trials

At home in lieu of real tests I carried out a few rough and ready trials. During these, the p.a. side produces some 80W with the full (2.5W) output of the FT-290. It also produces about 40W with the low power (500mW) output of the FT-290.

Back in the *PW* office I tried with only 200mW of power and the Watson p.a. produced about 10W of r.f. So the p.a. stage is reasonably linear, but not especially so. This p.a. need not be driven with more than 2-2.5W (p.e.p) input.

Note: Tex Swann G1TEX contacted Waters & Stanton on the linearity aspect and they report that during their waveform checks, the amplifier appeared "to be extremely linear indeed". Editor.

The heatsink on the amplifier becomes fairly warm whatever output power is being produced. With a maximum of 14.5A of demand...it makes a suitable 'hand warmer' on cold windy hills!

Using the *PW* test equipment, the preamplifier made the FT-290 so sensitive that leakage from the professional standard signal generator could be heard without being connected to it. So, no figures for that I'm afraid.

The Watson unit has a delay of about one second on the s.s.b. side of the r.f. 'sensed' switch over. This I found just about right, although I suspect the amplifier will find favour more with f.m. rather than multimode users.

For Any Hand-held

I'd recommend the Watson amplifier for use by any hand-held rig user looking for a bit more 'grunt'. Couple the extra power output with the addition of a respectable sensitivity and the amplifier has the makings of an ideal unit.

I mustn't forget the help that came from my friends. And I'd like to thank John G0SKR, Harry G4TLQ and Doug G0CZG for all their patience, help and comments.

Finally, my thanks also go to Waters & Stanton Electronics, of 22 Main Road, Hockley, Essex SS5 4QS. Tel: (01702) 206835, FAX: (0702) 205843. for the loan of the Watson 2090H p.a. and preamplifier combination which they can supply for £139.

PW

Manufacturer's Specifications

Transmit	144-146MHz
Power Out	80W (@3W drive needed, 2.5W on test)
Power	13.8V (Nominal) 14.5A (measured at 80W out No manufacturer's figure given)
Spurious level	Less than -60dB
Input/Output	50Ω (G1TEX found that the input s.w.r could not be reduced below 1.8:1)
Preamplifier gain	15dB (no noise figure was given but it gave low added noise to s.s.b. signals on testing)

Your Coaxial Cable - Any Good?

By Don Johnson K7UGQ

One of the most overlooked pieces of amateur equipment is the coaxial cable transmission line. Don K7UGQ says that the importance of a good coaxial cable line can be the difference between a Q5 signal and no signal at all.

Table 1 (centre column): Use this table when measuring the loss of a length of coaxial cable fitted within an antenna system. (See text for more details).

Fig: 1a: The initial stage of measuring the loss per unit length of coaxial cable. (See text for more details).

The coaxial cable connecting the transceiver to an antenna is very similar in many ways to the transmission of a car. If the car's transmission is highly efficient, then much of the engine's generated power will be sent through to the wheels and out to the road.

Likewise, a highly efficient transmission line will ensure that most of the r.f. power will be coupled to the antenna for radiation. Two simple methods for testing uninstalled and installed coaxial cable transmission lines are discussed in this article.

The results of either test will indicate if there is loss of signal quality on your coaxial cable line. Have look at the two drawings of **Fig. 1a** and **Fig. 1b**. In addition to a signal source (transmitter) you will need a standalone s.w.r. bridge (it must have the ability to switch between forward and reflected power).

The final piece of test equipment is a dummy load. The dummy load must have the same impedance as the coaxial cable under test.

Testing For Loss

So, how do we go about testing for the loss in coaxial cable? The operating frequency greatly effects the performance of coaxial cable (higher the frequency, the greater the loss).

With this is mind, you should perform tests on the cable at the highest frequency you plan to use. But for the tests to be of use, be sure the power or v.s.w.r. bridge is certified for use at the highest frequency.

So, let's begin the tests by attaching one end of the coaxial cable under test as shown in **Fig. 1a**. First start by placing the transceiver in the push to talk (p.t.t.) position, and disable the VOX feature if it's fitted.

You must remove any antenna tuners and low pass filters if these are installed. Then attach the other end of the test coaxial cable to the dummy load.

* Tune the transceiver at the highest frequency you will use on the coaxial cable. You must also be careful not to exceed the capabilities of your dummy load.
* Put the s.w.r. bridge in the forward power position and the transceiver in the tune position.
* Adjust the gain (on the transmitter) or setting knob (on the .s.w.r. meter) to give a reading of 10 (watts) on the forward scale of the s.w.r. bridge (or use a power meter instead).
* Stop the transmission from the transmitter (switch away from the tune position).
* Ensure the s.w.r. bridge remains on the same settings. **Do not change the gain / setting knob on the s.w.r. bridge (or power meter)!**
* Disconnect the s.w.r. bridge from this first test position.
* Attach one end of the coaxial cable directly to the transceiver, see **Fig. 1b**.
* Insert the s.w.r. bridge between the test coaxial cable and the dummy load.
* Place the transceiver in the tune position and make note of the s.w.r. bridge needle.
* The reading will almost certainly be less than 10 (but by how **much** is a function of the quality of the cable).
* Compare the reading with that found on the chart of **Table 1** to determine the losses (in decibels and lost power).

SWR Reading	Loss In dB	Power Loss(%)
8.91	0.5	10.9
7.95	1.0	20.5
7.08	1.5	29.2
6.30	2.0	37.0
5.00	3.0	50.0
3.98	4.0	60.2
3.16	5.0	68.4
2.51	6.0	75.0

Table 1

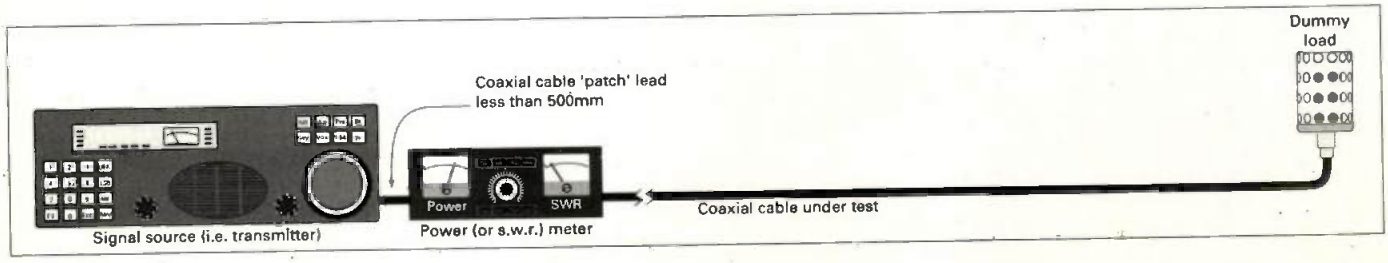
Suspicious Cable

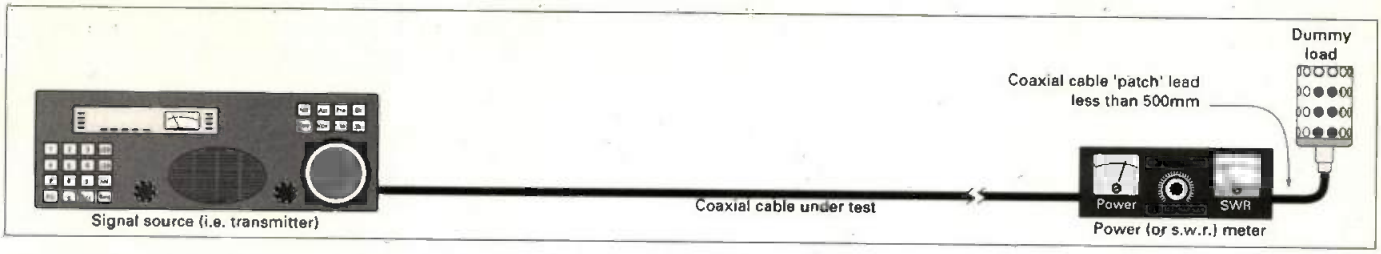
A close friend mentioned that he was suspicious of his coaxial cable line installed between the shack and a monoband antenna. His s.w.r. readings appeared to be improving with time, however, his signal reports were getting worse.

Fortunately there's a simple way to measure the losses in a coaxial cable line that may be fitted in an antenna system. For this test, only an s.w.r. meter is needed to determine the quality of the coaxial cable.

I'll first describe the method used to test installed cable, then for those interested. Then I'll outline how it works. Note: If this test is used with a multi-band antenna, the procedure will give erroneous results.

* Connect the coaxial cable line/antenna combination to your transceiver.
* Set the frequency range switch on the transceiver to a value as low in frequency as possible from the resonant frequency of the antenna. For example, if the antenna system attached to the coaxial cable under test is designed for 14MHz, set the transceiver band





switch to 1.8 or 3.5MHz.

* Adjust your transmitter to provide only enough power to allow you to adjust for full meter deflection (say 100) on the s.w.r. bridge forward power position.
* Quickly switch to the reflected power position and note the value.
* Stop transmitting.

The rest of the test involves a little mathematics. (Eventually mathematical formula always get in on the action!)

As an example, let us suppose you are concerned about the quality of coaxial cable running to your 3-ele 21MHz beam. When you feed a 7MHz signal into the antenna, the forward and reflected ratio is recorded as 100:80.

We begin by dividing the forward power (100) by the reflected power (80). This gives a figure of 1.25.

Then you should take the logarithm of this figure (0.097) and multiply it by 20 (1.94dB) to get a true power ratio. (The readings represent only a voltage or current ratio).

The power loss figure 1.94dB represents the loss of power in two directions (to the antenna, and then the reflections back to the s.w.r. meter). So, to get a true loss figure for the coaxial cable, you must divide this by two.

Doing this calculation gives an absolute loss figure of 0.97dB (for however long the cable is). And for this example let's assume the cable is 30m (100ft) long. A coaxial cable loss (at the highest working frequency) of 0.97dB per 30m is not bad.

Losses of up to 3dB per 30m when used at lower h.f. frequencies is often acceptable while v.h.f. losses should remain below 1.5dB per 30m. The antenna experts are going to take issue with me on this one, however, the above values are only a guide.

Other Length

If the cable had been of a length other that 30m, the loss (in dB) would need to be adjusted by a factor *X*.. Where *X* is the ratio of 30m to the actual length. As an example, if the above cable had been only 15m long, the losses (per length) would have been twice as great (and if it was 60m long, the losses (per length) would have been only half as much per 30m).

If you're not familiar with, or don't like working with logarithms, don't let that stop you doing the test. There are many amateurs with engineering or technical backgrounds that will be more than willing to help.

As a suggestion, you might want to monitor coaxial cable performance over a period of time looking for indications of degradation trend. Also, running this test during inclement weather will reveal coaxial cable performance when it rains or snows.

If a personal computer is available it could help you. A small program written in basic could be developed to solve the maths and keep a running data log of coaxial cable performance.

How It Works

Here's why, and how this second test method works. In spite of the fact that the actual scale reads s.w.r., most inexpensive standalone s.w.r. bridges indicate rectified r.f. voltage. These voltages are relative, not actual, and are usually read on a linear scale.

When the frequency of a signal fed to an antenna system is substantially lower than the resonant frequency of the antenna, the s.w.r. at the antenna will be infinity, or close to it. (To put it another way, the energy sent to the antenna will be reflected back to the transmitter).

Since the s.w.r. is measured at the transmitter end of the coaxial cable, any losses exhibited in the coaxial cable will reduce the reflected energy accordingly. This is the reason that the reflected power reads less than the forward power under these cicumstances.

Keeping my original vehicle anology in mind I'll sum up: No matter how new the tyres, or how much horse power you have in the engine, a lossy transmission will still impair proper performance. And of course this applies to your antenna system as well.

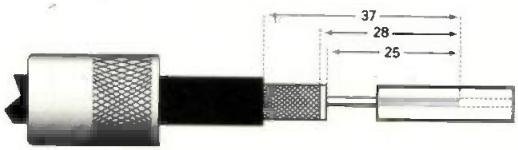
I suggest you try this procedure on the coaxial cable line currently installed on your 144MHz antenna. Test your transmissions! You might be shocked at the losses!

PW

Fig. 1b: Following 1a you should then transfer the

"Before you blame the coaxial cables are your plugs on properly?"

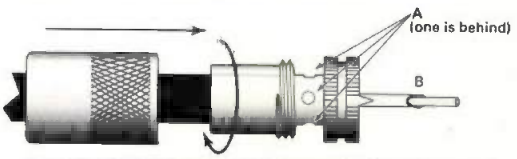
Fitting a PL259 plug with a screw thread to 'bite' and grip the screen



Cut off and carefully remove the various lengths shown here. Try to get the insulation from the inner conductor without nicking or cutting the inner conductor.

Sometimes, depending on the type of plug, the screen conductor must be folded back over the outer insulation to allow the internal thread to 'bite' into the screen.

It is also an advantage to quickly tin the trimmed back section of screen before screwing it into the body of the plug.



Screw the cable tightly into the rear of the plug until the screen can be seen through the small holes in the waist of the plug.

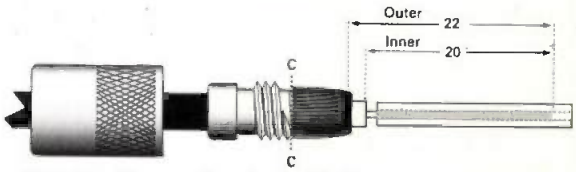
Take care to make sure that all the wires that make up the centre conductor go cleanly down the centre contact tubing without touching the main body of the pug.

Check first with an ohmmeter that no short circuit exists between the metal body of the plug and the coaxial inner conductor. At this stage it's easier to take the plug apart to rectify the problem.

Solder the screening to the body of the plug at the points marked 'A' and then cut the inner short at point 'B' before soldering that also.

Screw the retaining cap down over the body of the plug and it is ready to be used.

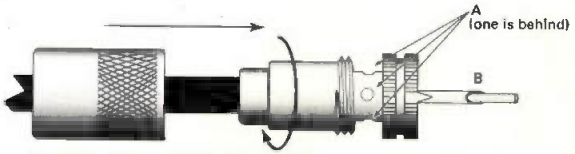
Fitting a PL259 plug with a threaded clamp sleeve for the screen



Cut and carefully remove the various lengths of insulation shown here. Try to get the insulation from the inner conductor without nicking or cutting the inner conductor.

Unpick the screening braid and separate the strands then fold the screen braid back over the clamp sleeve and cut it to the length shown (along the plane 'C' - 'C').

When ready to be screwed into the main body there should be about 2mm of inner insulation showing.



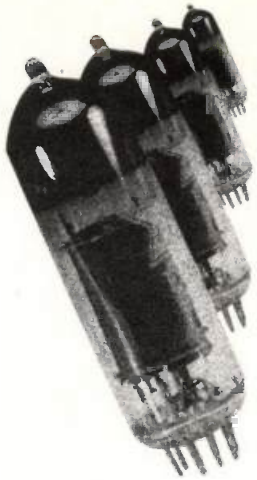
Screw the clamp sleeve into the body of the plug as far as it will go. At this point you should be able to see the braiding through the small soldering holes in the waist of the plug.

Take care to make sure that all the wires that make up the centre conductor go cleanly down the centre contact tubing without touching the main body of the plug.

Solder the screen braid to the body of the plug at the points marked 'A' and then cut the centre conductor short at point 'B' before soldering that also.

Screw the retaining cap down over the body of the plug and it is ready to be used.

Valve & Vintage



By Charles Miller

Charles Miller is looking after the PW vintage 'wireless shop' this month. So, we suggest you settle down comfortably while he continues his story covering the fascinating early history of the radio valve.

Last time I looked at Ambrose Fleming's development of the thermionic diode. At this stage the reference books tend to say something to effect that Lee de Forest took the diode, added a grid and produced a triode that would amplify and oscillate. If only life were that simple.

The books also usually portray de Forest as a naïve genius whose brilliant work revolutionised radio, but who was more or less done down by large vested interests. The truth seems to be somewhat different.

Having taken a good look at his early career I'm inclined to put him down as one of those people to whom ethics is just a county to the north of London. Judge for yourselves.

From Yale

In 1905 de Forest was a 32 year old science graduate from Yale who had worked for the Western Electric Company for a time around 1900. He'd become involved in experiments in wireless telegraphy, and like Fleming, had been looking for an effective detector and almost unbelievably, de Forest spent about five years trying to develop one whose basic component was a Bunsen burner!

It seems that his workshop was lighted by gas jets, and when a nearby spark transmitter was operating the lights tended to dim a little. This was supposed to be due to alterations in the air pressure as the sparks were generated.

It all sounds pretty fantastic, but from it de Forest built up exotic theories about gas-operated detectors. These needed three separate patents to protect them from unprincipled competitors.

In fact, it's hard to imagine anyone wishing to steal the ideas since none of them seem ever to have worked. It may or may not have been coincidence that de Forest changed tack abruptly in late 1905, at just about the same time as the Fleming valves were coming into use in America.

Small Factory

In New York at the time there was a small electric lamp factory run by a man called McCandless. De Forest never seemed to be short of a handy go-between to help him out, and one of them, called Babcock, paid McCandless a visit.

Babcock produced an odd sort of light bulb which he said was a Fleming valve. He then asked McCandless if he could make replicas. McCandless said he could and entered the order in his record book.

Shortly afterwards, de Forest applied for a patent for a new diode type detector which he called the Audion. In later years de Forest maintained that he'd never heard of the Fleming valve before he introduced his Audion, but the facts suggest otherwise.

Quite apart from the transaction with McCandless, which was a matter of record, de Forest seems to have forgotten that in his patent application for the Audion he even referred back to Fleming's early work. (Maybe he was absent-minded).

Barrage Of Patents

From 1906 on de Forest started to fire off a barrage of patents for different kinds of valves. He also addressed various scientific gatherings in New York and Philadelphia, giving talks which suggested that he really believed that the Audion worked in a different way to Fleming's valve.

Unfortunately for himself, he usually ended up by giving the general impression that he didn't really know what he was on about. In fact the difference was only in the design, because de Forest used a pair of parallel-connected flat plates.

The flat plates (he called them wings) were mounted either side of the filament instead of Fleming's cylindrical anode. But for all that, he was on the verge, and would be for the next six years, before stumbling upon something really important.

It all started with what he called a 'Device for Amplifying Feeble Electrical Currents". This was a modified Audion in which the two wings were brought out to separate connections.

The patent application shows this valve arranged in a circuit which looks remarkably like that of a conventional triode amplifier. One of the wings took the place of the grid.

Unfortunately, since the wings were on either side of the filament the one couldn't possibly have had any effect upon the other as in a real triode. It may have detected but it certainly didn't amplify. Nevertheless, it was the first example of a three-electrode Audion.

By this time de Forest had set up the grand-sounding 'American de Forest Wireless Telegraphy Company' to exploit his Audions. This doesn't appear to have been exactly a resounding success since only one receiver employing the two-electrode version was sold, to the United States Navy radio station at Key West, Florida.

Sinking Fast

The result was that whilst de Forest was tinkering with his three-electrode Audions his company was sinking fast and its backers were hounding him for money. Luckily, de Forest, had astonishing resilience in the face of adversity (and he would certainly need it more and more in the future).

He managed to come up with a new idea, of placing both wings on the same side of the filament. By this time, science had established that the diode worked due to electrons being emitted from the filament and being attracted to the anode.

To avoid the inner wing from preventing the electrons reaching the outer one, de Forest didn't use solid metal for it but wire bent to and fro in the form of a grid-iron - the origin of the term 'grid'. McCandless was given the job of making prototypes of this new design late in November 1906.

Only three days later de Forest's luck ran out. His backers took over

the company and unceremoniously dumped him from his position as vice-president and scientific director.

As compensation he was given $1,000 and the rights of the patents that were pending on the Audion, which the backers considered to be utterly useless. In the event de Forest didn't even get his full $1,000, because his lawyers promptly took half of it in fees.

McCandless delivered the new Audions with commendable speed but the embattled inventor, up to his neck in financial problems, had no time to spare to test them. Instead, he entrusted the task to a school lad called John Hogan junior, who worked on it over the Christmas holiday.

Hogan's findings encouraged de Forest to take out yet another patent on 29th January 1907. There was no mention of amplification in this application, which was in respect of something rather vague called 'Space Telegraphy'.

Despite the vague references, the patent drawings have a familiar look for a valve radio enthusiast because they're almost identical to the circuit of a conventional triode grid leak detector. But the new three electrode Audion still did not amplify!

Patent Granted

A year went by before the patent was granted, on 19th February 1908. But on the strength of it de Forest already had been able to attract fresh capital.

With the fresh capital he set up two new firms, the de Forest Radio Telephone Company and a subsidiary called more simply The Radio Telephone Company. As soon as these were established the new Audions began to be sold commercially.

Presumably, that single receiver sold by de Forest to the US Navy must have worked well enough because in 1907 they ordered a large number of radio telephony sets. Over 20 of them were installed in a fleet of ships that set off that year on a round-the-world cruise. His fortunes seemed at last to be looking up.

The fact that the three-electrode Audions appeared to give good service is rather astonishing, considering the way in which they were manufactured. Right up until 1915 all were made by McCandless in conditions in which quality control was conspicuous by its absence!

Apart from the basic design, de Forest specified no exact form of construction and McCandless more or less made them up as he went along, ever with an eye to cutting costs. The grids, for instance, were simply fashioned from copper wire bent around a jig consisting of nails driven into a block of wood!

Anodes were snipped with strong scissors from thin sheet metal with the final shape being left to the whim of the cutter. Various forms of supports were tried for the electrodes, using copper wires suitably bent when in position to give a degree of rigidity.

Evacuation of the bulbs was done literally 'by ear'. This was achieved by the operator judging the approximately right degree of vacuum by the sound made by the pump as that point was reached! Yet the volume of sales suggests that this 'Heath-Robinson' set-up worked well enough in practice.

Working Life

Originally the working life of an Audion was anything between 35 and 100 hours but in 1908 a new type was introduced. This had a double filament, one being a 'spare' to be connected up when the other expired.

Another innovation was introduced in the following year. It was a sort of 'double valve' with two sets of grids and anodes deployed on opposite sides of the filament. Its design foreshadowed the Class-B double triodes of the early 1930s but it still only functioned as a detector.

The amplifying Audion was still several years in the future. Despite this, de Forest is supposed to have transmitted the voice of Enrico Caruso in 1910. Exactly what part was played by the Audion, if any is not clear (but it sounds like a good publicity trick!).

Shaky Resources

It's pretty obvious that de Forest's own somewhat shaky resources, in conjunction with McCandless' primitive manufacturing techniques could never lead to the production of first-class valves. And an example of this was the case of the 'grade-S' and 'grade-X' alternatives.

When it was found that some of the Audions coming from the factory worked a lot better than others, they were given the suffix 'X' as against 'S' for standard examples. However, the de Forest Company made no bones about the purely accidental nature of the 'X' examples.

One hopeful customer who ordered some 'X' samples was told that he must wait until some had been discovered in the testing process. The company explained that their incidence was "beyond our control"!

Financial Trouble

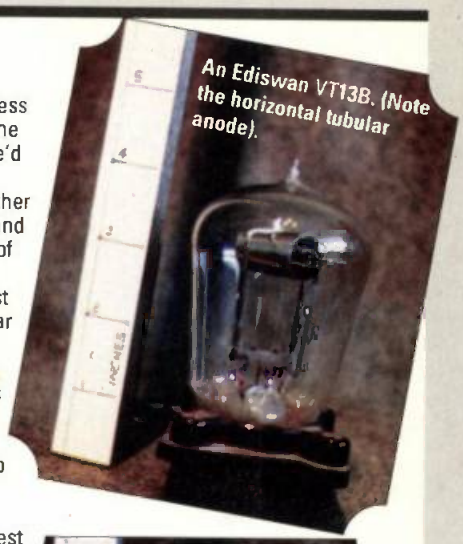
Despite the apparent success of his business, by early 1911 de Forest was again in deep financial trouble. In March the Sheriff of New York County stepped in and sold up both companies through the agency of a brokerage firm called the Ellsworth Company.

At least McCandless wasn't affected by the collapse because he'd already started to supply Audions to other customers. In 1909 and 1910 all but two out of a total production of 656 went to de Forest but the following year de Forest took only 45 of 271. In 1912 the total production was 858 (of which 73 went to American MWT) and in 1913 no fewer than 1716.

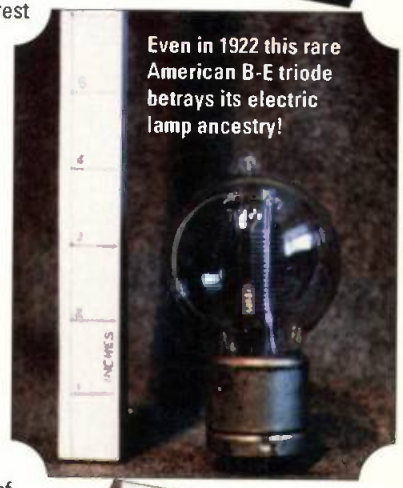
Once his assets were sold up De Forest promptly put 3000 miles between himself and New York by leaving for San Francisco and a job with the Federal Telegraph Company of that city. But this wasn't the end of his valve-making activities by any means.

So, join me when it's my turn to look after the 'shop' once again in the April issue. You can then 'tune in' for the next instalment of de Forest's chequered career!

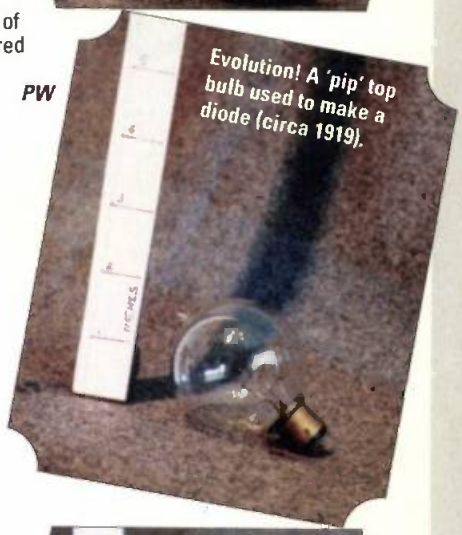
PW



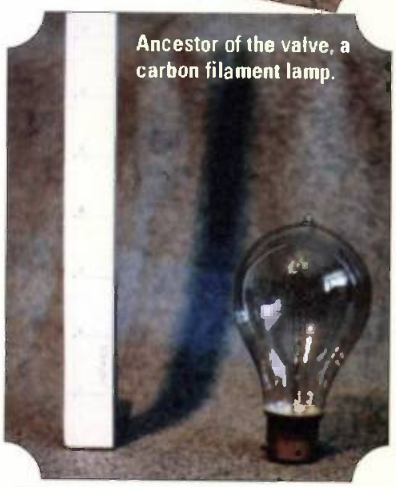
An Ediswan VT13B. (Note the horizontal tubular anode).



Even in 1922 this rare American B-E triode betrays its electric lamp ancestry!



Evolution! A 'pip' top bulb used to make a diode (circa 1919).



Ancestor of the valve, a carbon filament lamp.

Cheerio from Charles, see you in April

Antenna Workshop

by David Butler G4ASR

David Butler G4ASR, our VHF specialist author, describes a pair of 5λ/8 vertically polarised antennas for the 50 or 70MHz band that may be bought as kits.

The ground plane antenna I'm describing, has been designed both for fixed station and portable operation on either the 50 or 70MHz bands. This type of antenna has a horizontal-plane radiation pattern that is omni-directional.

And of course the antenna is vertical polarised. This means that it picks up signals equally in all directions unlike a horizontally aligned beam antenna.

The antenna can be used for fixed station operation mounted at the top of a mast. This use would most probably be for local f.m. communication, either voice or packet radio. (These are the most popular vertical polarisation modes of operation).

The overall layout of the base of the antennas.

Additionally the antenna can also be used for portable operation. Hence the sectional construction which allows it to be carried easily in a car.

The 50MHz version may also prove invaluable for use on DXpeditions. Indeed I reported recently in my 'VHF Report' column that during a transatlantic Sp-E opening in 1994 the station of WB4NFS/VP9 contacted a total of 55 European stations from his QTH on the island of Bermuda.

The various small parts supplied with the kits.

At the time WB4NFS/VP9 was only running 10W into an R5 vertical antenna designed for the h.f. bands. Imagine how many stations he could have worked if he had been using the optimised design presented here!

It's even possible to scale the 50MHz version to enable it to receive BandII TV services in the 48-49MHz region. Used like this it would make an ideal Sp-E or auroral opening spotting antenna.

Antenna Configuration

The antenna illustrated has a five eighths wavelength (5λ/8) radiator. One of the reasons for selecting an extended radiator is radiation angle and efficiency. (If you plotted the field strength and radiation efficiency you would see them maximised with the 5λ/8 antenna as compared to a λ/4 antenna).

Another innovative feature of the design is that it uses a single quarter-wave (λ/4) ring instead of conventional λ/4 radials. No loss of performance is measurable using this technique and mechanically it provides a much neater solution.

Gone are the drooping radials. Not only is it smaller but aesthetically it looks a much cleaner design.

Because the feedpoint of a 5λ/8 vertical is reactive, a series inductance is required to establish a non-reactive termination. This loading coil, placed at the base, is electrically one eighth wave long.

Therefore the five eighths wave antenna is in reality a three quarter wave antenna. The effect of the loading coil is to bring the base impedance very close to 50Ω.

The 5λ/8 vertical produces a low angle of radiation and also a much more narrow vertical beamwidth. A power gain of about 3dB over a quarter-wave vertical is achieved with this type of design.

The low angle lobe is an excellent characteristic for maximum ground wave and tropospheric path distances. It will also be a very good long distance performer via Sp-E propagation.

Easy To Construct

In practice, the vertical base antenna is very easy to construct. The reason why it's so easy is that both the 50 and the 70MHz version of the antenna

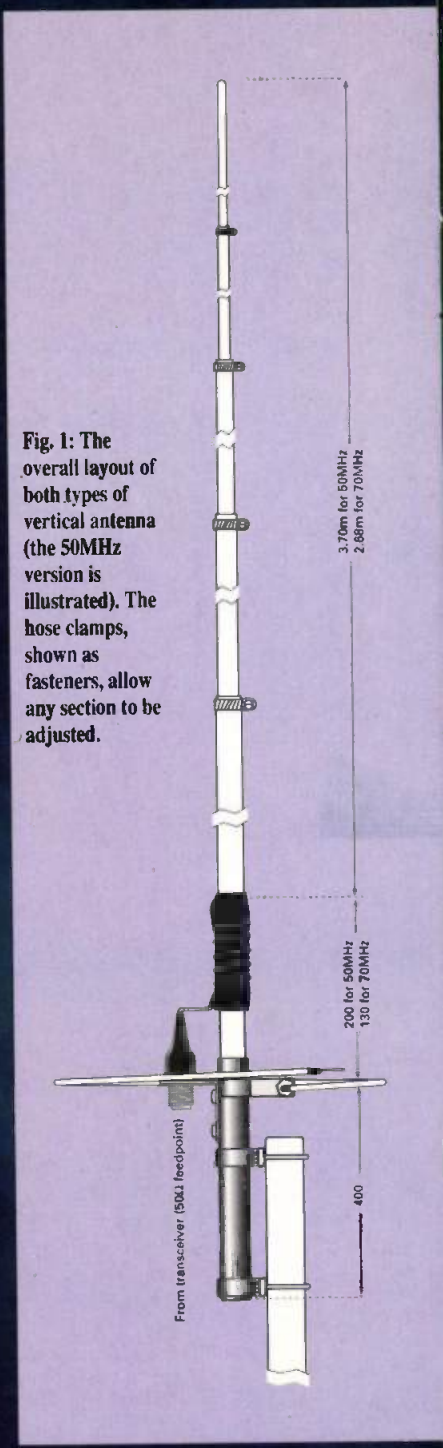


Fig. 1: The overall layout of both types of vertical antenna (the 50MHz version is illustrated). The hose clamps, shown as fasteners, allow any section to be adjusted.

are available as kits of parts from Sandpiper Communications.

In fact, it's more cost effective to buy the antenna this way than obtaining all the materials separately. Another reason for buying the kit, is that it includes all the necessary hardware components such as brackets, insulators and moulded antenna connector. (These are very difficult if not impossible to fabricate yourself).

Apart from the fixings shown in the photographs, the kit also includes all the aluminium tubing, insulating material, wire, heatshrink, in fact everything to make a first class

antenna is supplied.

The basic layout of the antenna is shown in the drawing, **Fig. 1**. Mechanically the two versions of the antenna are virtually identical. The only difference is that the radiator for the 50MHz version has four sections of telescoping tubing whereas the radiator for the 70MHz has only three sections.

Each antenna consists essentially of four sub-assemblies. These are:

* the base tube which enables the antenna to be clamped onto a mast
* the radial ring assembly attached to the base tube
* the loading coil, wound onto a g.r.p. tube insulator
* the radiating element.

The base tube supplied was of 25mm diameter with a 3mm wall thickness. It needs to be this gauge to support the entire antenna and withstand the forces of the mast clamps. The tubing should be between 300 - 400mm long to allow adequate spacing of the mast clamps.

Because the radial must be formed into a circle it is made from a solid rod rather than tubing. This avoids kinking on bends. However, as the radial requires some form of tuning adjustment a short length of tubing was provided. A length of 3mm stainless rod about 120mm long can then slide in or out of the tube and be clamped when the correct tuning position is found.

The radial is a quarter wavelength long which is 1.5m at 50MHz or 1.07m at 70MHz. To enable the kit of parts to be sent in the post the tubing for the radial is supplied as a straight length. A former must therefore be found to make it into a circle. The 50MHz model will be about 400mm in diameter and for the 70MHz model about 270mm diameter.

Surprisingly, finding formers of the size required is not difficult (well not at my QTH anyway!) If you really do get stuck then you could make one from a piece of thick plywood sheeting.

One end of the tube needs to be fixed in a vice and bent to the general shape shown in **Fig. 2**. Before the radial is attached the coil former should be inserted between the base section and first section of the radiator. Leave a space between the two sections of 200mm for the 50MHz version and 130mm for the 70MHz version.

Approximately $\lambda/8$ of 1.5mm (16s.w.g.) enamelled copper wire is required for the loading coil. Allowing for capacitive effects that's about 700mm at 50MHz and 460mm at 70MHz. The coil is wound with a wide spacing, at least 10mm between

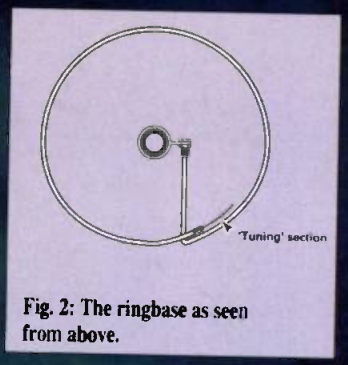


Fig. 2: The ringbase as seen from above.

turns. Coil size is not critical as the length of the radiator can be adjusted to compensate.

One end of the coil is attached to the base of the radiator with the aid of a solder tag and stainless steel screw. The other end is attached to a bracket attached to the g.r.p. insulator and thence to the antenna connector. After completion the entire coil assembly should be covered in heatshrink material or self-amalgamating tape.

The radiator is constructed out of a number of overlapping sections, remembering that the 70MHz version only requires three sections. You will find that 18s.w.g. tubing of 22, 19, 16, 12mm (7/8, 3/4, 5/8 and 1/2in) diameter will be ideal sliding fit. The total length L (in metres) of the radiating element above the loading coil is given by the formula: $300/f(\text{MHz}) \times 0.625$.

To allow for experimental error add 10mm or so to the calculated length. So, for the 70MHz version, adjust the top sections to give a total length above the loading coil of 2.68m. The four sections of the 50MHz version should be adjusted to a length of 3.7m above the coil. Jubilee clips or stainless steel screws may be used for clamping the sections together.

Tuning Adjustments

Tuning is very simple. Having set the length of the radiating element to that given mount the whole antenna so that it is vertical and with the base at least 1m above the ground. It may be clamped temporarily to a short mast or even a pair of steps.

If possible you should use the length of coaxial cable that will be used when the antenna is finally mounted. It is good practice to use a low-loss 50Ω cable such as Uniradio UR67, RG213, Westflex 103 or possibly the new Japanese type 5D-FB. A v.s.w.r. meter should be connected between the base of the antenna and main feed-line.

If it's not possible to mount the s.w.r. bridge at the antenna end, then it may be connected at the transceiver end of the coaxial line. Now inject sufficient power from the transmitter to give an indication on the v.s.w.r. meter.

Then adjust the small stainless steel rod at the end of the ring radial for a 1:1 match. Push the rod in for a higher frequency matching and pull the rod out for a low frequency matching. It's really as simple as that. (With the 50MHz version I obtained a 1:1 match at 51MHz rising to a 1.2:1 ratio at the band edges).

Tested Both Version

I built and tested both versions of the antenna and mounted each of them in turn on top of my tower. I used the 50MHz antenna mainly for f.m. voice contacts above 51MHz. I made many QSOs from my QTH in Herefordshire with stations in the West Midlands and beyond.

I also used the antenna, without retuning, to monitor TV stations around 48MHz. Although the gain was obviously down on my 11m long 6-element Yagi it did have the distinct advantage of omni-directional coverage.

The 70MHz version I used to access a local packet radio node. This was so successful that I have now stopped using the 144MHz band for user access. I'm really pleased that I took the time to make these antennas, and I'm sure you will too!

PW

practical THEORY

The kits of parts for either antenna can be obtained from: Sandpiper Communications, Unit No.5 Enterprise House, Cwmbach Industrial Estate, Mid-Glamorgan, South Wales CF44 0AE. Tel: (01685) 870425. FAX (01685) 876104 The costs for the antenna kit (including postage and packaging) are £30 for the 50MHz (please quote 6M-Ringbase) version and £25 for the 70MHz (please quote 4M-Ringbase) version.

A close-up shot of the method of mounting the ringbase elements, and the coaxial feedpoint devised by Sandpiper Communications.

More Antenna Workshop next month.

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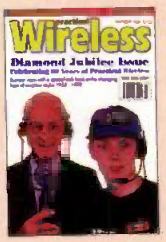
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IAN POOLE G3YWX

EQUIPMENT SPECIFICATIONS

Ian Poole G3YWX takes a look at intermodulation products.

Last month I took a look at spurious signals including harmonics and unwanted mix products. Generally these fall outside the band in use and as a result they often are called out of band products.

Transmitters also produce products which fall very close to the wanted signal, and these can cause interference to users on adjacent frequencies. This aspect of their performance is also very important.

Glossary

The following is a small glossary of terms which you may find useful (I'll feature a selection of these from time to time).

Active Antenna - A compact wideband receiving antenna which includes an active device (a transistor or f.e.t. as part of the design. This enables a small wire element to be used whilst maintaining the correct impedance match to the receiver, and providing sufficient signal output.

AMTOR - Amateur Telex Over Radio. This is a form of data communication used for amateur radio, and is used particularly on the h.f. bands. It includes error detection facilities which enable errors to be detected and the data re-sent when necessary. As data is sent in relatively short bursts it is more suitable for h.f. operation than packet.

Beat Frequency Oscillator (b.f.o.) - This is a circuit used in a radio which produces an oscillation which beats with the incoming signal. It enables Morse code to be received with the characteristic tone. It also allows single sideband signals to be converted into recognisable speech.

Carrier Insertion Oscillator (c.i.o.) - This is another name for a beat frequency oscillator. It takes its name from the fact that when single sideband is being resolved it reinserts a signal where the carrier of the original signal would have been.

Poor Linearity

One of the major causes of transmitter interference arises out of the poor linearity of amplifier stages in the transmitter, and in particular the final amplifier. Here it gives rise to intermodulation products in the same way that happens in a receiver front-end amplifier.

The products arise when two or more signals are passed through the amplifier. Whilst this distortion will not occur in the case of a Morse signal where only one carrier is present, a single sideband signal consists of a whole variety of different frequencies within the transmitted bandwidth.

For the moment I will take a simplified example and say that the single sideband signal consists of just two audio tones, one at 1kHz and the other at 2kHz. In the case of the receiver I looked at how the third order mix products gave signals at 2f1 + f2 and 2f2 + f1.

It's easy to work out that if the difference in frequency between the two signals is 1kHz as in the case of the example, the two third order intermodulation products will appear 1kHz either side of the two main signals, higher order mix products i.e. 3f1 + 2f2 and 3f2 + 2f1 will appear a further 1kHz away and so forth as shown in **Fig. 1**.

In the case of a real single sideband signal, there will be a whole variety of different audio frequencies making up the familiar speech waveform and the spectrum will appear to be like that shown in **Fig. 2**. All these various frequencies intermodulate with one another to generate noise or splatter which spreads out from the main signal.

Normally the worst intermodulation products will be those which are nearest to the wanted signal. Their levels reduce as the offset increases.

Intermodulation Specifications

The specifications for intermodulation products are usually given in terms of the difference between the wanted or main signal and the various intermodulation products. This is expressed in terms of decibels.

Often a transmitter specification will say that all intermodulation products are below a given level. In this case the worst ones are bound to be the third order products. Sometimes (especially in a review) the levels of specific products will be stated.

Typically the third order products will be around -25 to -30dB for the third order products and five of six decibels lower in the case of the fifth order products. (Note the more negative the number the better the performance). A typical modern transmitter should have all its products better than -25dB relative to the main signal.

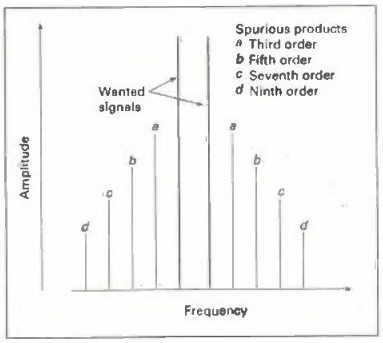


Fig. 1: Intermodulation products from an amplifier.

Amplifier Linearity

As the intermodulation performance depends largely upon the linearity of the final amplifier, it's imperative that it is not over run. When this happens the amplifier will start to limit and there will be a marked increase in the distortion and hence the amount of 'splatter' being caused to nearby users.

To prevent 'splatter' happening, transmitters use an automatic level control (a.l.c.). This detects the level of the signal at the output and reduces the gain of previous stages to prevent overload. In fact it operates in the same way as an automatic gain control (a.g.c.) in a receiver.

When using a linear amplifier care must be taken to ensure this does not become overloaded. If this happens, a good clean signal generated by the transmitter can be transformed into one with very high levels of intermodulation products. To overcome this some linear amplifiers have an a.l.c. facility which can be linked in with the transceiver.

However, others, particularly those for v.h.f. and u.h.f. operation do not have a.l.c.

In addition to this many of them are run very close to their limits. As a result very high levels of intermodulation distortion can be generated when using them.

The main point to note is that no transmitter amplifier should be run close to its limits. Otherwise distortion levels will rise, causing interference to other users.

I hope this has helped to clarify a few points about transmitters and intermodulation products. Next time I'll be looking at unwanted carriers and s.s.b. supression.

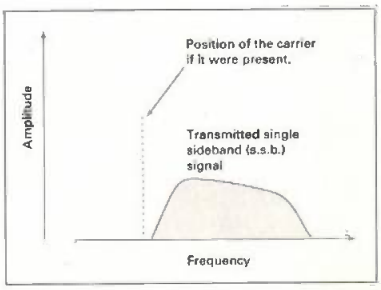


Fig. 2: Spectrum of a single sideband signal.

END

ED TAYLOR WT3U / G3SQX

SCENE USA

Ed Taylor WT3U asks have you ever wondered about the many different styles of American callsigns and what can you learn from the prefixes and formats? Read on - and you'll find out!

Ed WT3U combines his two favourite pastimes.

Callsign Variety

It's true to say that US callsigns come in every shape and size. I once heard a UK club operator saying he thought Americans must 'make them up as they went along!'

In fact the American callsign system is reasonably logical. You can guess location and type of licence from the callsign. And since the USA is one of the most contacted countries on h.f., it's worth knowing what the callsigns tell you.

Basically the USA may issue callsigns beginning K, N, W, and AA to AL (the letter A followed by a letter from A to L). Using these rules, there is plenty of scope, for example, **N2IC**, WT3U, **N0NZR**, **AA0RS**, **KB5LES** are all real callsigns.

Other legal possibilities have not yet been used, including three-character callsigns e.g. W5A and N8P. These could possibly be used for future special events and contests.

Geography Lesson

Look at **Fig. 1**, and we'll begin the geography lesson. It shows how the 50 American states are divided into 10 areas, 0 to 9, giving station location. So, **W1AW**, at ARRL headquarters, is in the '1' district (it's in Connecticut, CT).

Suppose, for example **W0AB** moves from Iowa to Texas. Does he become W5AB? No, he does not change his callsign because W5AB is already allocated.

Now, W0AB resides in district 5 with a '0' callsign. You can only tell the location from when the callsign was first issued, (it's often accurate), but don't be surprised by apparent 'out of area' operation.

There are other choices for W0AB. The operator can request a callsign containing '5', and discard W0AB, but amateurs become attached to calls and want to keep them. Alternatively, in case of doubt, W0AB can sign 'W0AB/5.' However, this lengthens the nice short callsign that W0AB earned.

Licensing Incentive

Now its on to the next point, 'Incentive Licensing'. And this is where it's considered desirable to offer increasing privileges with each class of US licence.

The six classes, in ascending order of difficulty, are: Novice, No-Code Technician, Technician, General, Advanced and Extra. As the licences become harder, the band allocations become larger.

In addition, the higher the class, the shorter the callsign. Extra class licensees received '1 x 2' calls (one letter before the number, and two after), such as **N4AR**. When these ran out, the '2 x 1' format appeared, and we got used to hearing calls like **NQ0I**.

The '2 x 1' format has ran out too, so '2 x 2' calls are now issued. These begin with 'A' e.g. AJ6HM (distinctive, but not particularly short). Note that the licensing authority resisted the temptation to issue 'DX sounding' calls such as K48P and N99Q!

Advanced licensees are normally issued '1 x 2' calls beginning with K, such as KB3GC. Generals and Technicians (both varieties) receive '1 x 3' calls, such as W3LPL. The series is almost exhausted, so these amateurs will have to be content with Novice-style callsigns.

So what about Novices? As you might expect, their calls are longer, and in '2 x 3' format, for example, **KA1SIP**.

Status from Callsigns

So, can you determine status from callsigns. Well in truthful answer, not exactly!

Apart from the fact that Generals, Technicians and Novices now get similar calls, it's also the case that a licensee who upgrades does not have to change callsign. You can spot an operator of high status but not necessarily one of low status!

Every month, the latest callsigns are published. To help I've included The chart **Fig. 2** which lists each call area and licence class in September 1995.

Some areas have a large amateur population, and have advanced further through the alphabet. There is no danger of the USA as a whole running out of callsigns, as long as people are content with '2 x 2'or '2 x 3' calls.

Vanity Calls

A new factor has recently arisen. The authorities for many years allocated callsigns strictly alphabetically, but they now issue 'Vanity' callsigns, chosen by amateurs from calls which are unissued or no longer used. As long as the callsign conform to the class of licence, they are more or less at the choice of the operator.

Normal licences are free, but Vanity calls attract a modest fee of $30 for ten years. Many US amateurs are applying for this bargain.

The Radiocommunications Agency has been considering a similar proposal in the UK, but nothing has resulted. Undoubtedly it would cost more than our American friends pay! Will WT3U be trading in his call to reflect the correct geographical area? Perhaps, if I can get N0ED!

I haven't mentioned Alaska and Hawaii. They are issued callsigns in districts 7 and 6. The second letter is 'L' for Alaskan stations (e.g. **KL7RA**), and 'H' for Hawaiian stations (e.g. **WH6CHR**). Other allocations for US possessions are KC6, KG4, KH and KP, all heard less frequently than mainland USA.

Amateur Profile

From time to time I plan to talk to amateurs who have left Britain and now live in the USA. Many have achieved prominent positions in various walks of life, as well as in radio. Such is the case with **Doc Evans NQ0I (G4AMJ)**, shown in his shack in **Fig. 3**.

Doc came to the USA on a fellowship to study for a PhD in Boulder, Colorado, and stayed on in the same area. Then he worked for the space agency, NASA, on

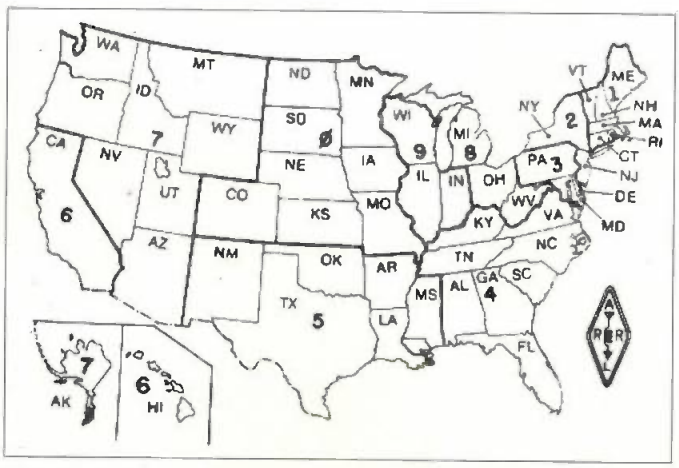


Fig. 1: The Ten call areas of the United States numbered 0-9.

Fig. 3: Doc Evans NQ0I in his shack.

Voyager Missions.

Looking for a complete change, Doc recently decided to try his luck as a writer of novels, particularly science fiction. This is moderately successful, although he still hopes for a breakthrough!

"It was natural for me to get involved with radio, says Doc. "My father is **G3DLH**, my brother became **G4BKI**, and the XYL is now **N0GXF**.

In the early 70s I learnt a lot from *Short Wave Magazine*. Then I studied for the Radio Amateurs Examination (RAE), my instructor was good, but once told me 3.5MHz was only suitable for European work. I decided to prove him wrong! It was a challenge, but eventually I got my first ZL on 3.5MHz s.s.b."

Doc continues "As G4AMJ, I contacted about 250 countries. I used a home-made cubical quad, and a lot of time working DXpeditions and contests. Making h.f. contacts is easier from the UK, which is surrounded by water.

A 'G' with 100W and a dipole is probably equivalent to 500W and a Yagi here. We call this region in the middle of America the 'Black Hole.' Of course, apart from Canada and Mexico, the nearest foreign country is 1500 miles away, whereas the UK has dozens of European countries within that distance.

I hoped for an antenna at a decent height. I have an acre of land, but was thwarted by the county, and restricted to 35ft (see Fig. 4). Local government here has more power than in Britain.

This is generally good, but situations often change completely from place to place. After several court battles which I could probably have continued and won, I decided to use my energy and money on something else."

Doc is a skilled operator, particularly in c.w. contesting, and is frequently a guest at 'super-stations.' This partially makes up for his current antenna system not being what he would like.

More Optimistic

"It's interesting to compare Britain and the USA", Doc continues. "I find Americans generally more optimistic (sometimes without good reason), but Brits are pessimistic. This is true in radio as in other fields.

It's reflected in our national societies and their activities. The ARRL in the USA likes to put a favourable spin on everything. They found it difficult accepting I had lost my antenna fight, because it was obviously bad news.

I suspect the RSGB in Britain would have had a fine time grumbling about it all! By the way, I think the RSGB, although rather expensive, does a good job on the whole.

When you consider that our hobby is fragmented, it must be hard to publish a magazine with wide appeal. There are many facets to our activities, and everyone is not interested in everything!

Americans are mostly positive about amateur radio, an attitude which could be misplaced. When I was first attracted to radio, there was magic about communicating across the world from your own home.

Now that we have mobile telephones and the Internet, it doesn't seem so magical. There are many aspects of radio nowadays, and I don't know how people decide where to start.

Comparing the licensing systems, I prefer the British exams. The USA has a published question pool from which tests are constructed.

The number of questions is ten times as many as those used in any given test. But it's still possible to memorise answers and pass. In Britain, the exam is a better indicator of knowledge.

I got my American licence in 1987. Actually, I failed the Novice Morse test first time (what ignominy!) My wife was away, and I was looking after our first child.

I had a four-month old baby in my arms when I sat down for the five words per minute c.w. The baby cried at critical moments, and I couldn't hear through the earphones! I subsequently surprised the examiners by getting 100% at 20w.p.m.!"

The Future

Like many of us, Doc is concerned about the future. He says, "How on earth do you get the average kid interested in amateur radio? I have no idea!

As we old dinosaurs (the wrong side of 40) die away, ham radio will change and perhaps disappear altogether. Some are attracted by contests, construction, u.h.f., packet and other activities, but is it enough to keep the hobby going? This is a **big** problem".

Doc continues "It used to be that radio amateurs were at the forefront of technology. These days, research is too difficult when you need money, equipment and specialised knowledge.

Now, the best argument for ham radio would be that in an emergency you can find individuals, some of whom know about communication. Many unfortunately don't have a clue!

I have to say that the only amateurs who could really be relied on to set-up stations and pass traffic in extreme conditions would be contesters.

Many of the skills we possess are great fun to acquire, but of no real use to the world. The national societies ought to be concerned. We may be reaching the end of a period in which amateur radio has flourished, and will decline. In 100 years, the ionosphere and its users might be viewed as interesting historic phenomena!"

The Morse Test

Doc and I are both keen c.w. operators, but have similar views concerning Morse code.

"The day of the Morse test is long past" Doc says. "I'm surprised it's lasted so long. I'm an avid c.w. fan, my microphone is not even plugged in. But I haven't heard a rational argument for Morse testing.

You don't make a 144MHz idiot into a good h.f. operator by making him learn c.w.. We really need to test operating ability, perhaps by computer. Alternatively there could be RAE questions on operating.

I also think amateurs need more knowledge of antennas. You know, a local ham asked why I wanted such a high antenna, after all, Boulder is already 5000 feet a.s.l.! It's unbelievable, such ignorance, do you laugh or cry?"

Radio Fantasies

I asked Doc to imagine someone had put up the money for him to spend a week doing whatever amateur radio activity he liked.

Doc's reply was "I would take my gear and operate from somewhere different each day, places I've never been to: Africa, Asia, Alaska, Tristan da Cunha. Then I would run the pile-ups, c.w. of course, and find out what propagation and conditions are like in various locations.

I would also take my TS-930S. It's ten years old, but has almost everything I need. Modern rigs sometimes irritate me, because you need a training course to use them.

It's not progress if you have to puzzle out how to change bands or modes. But perhaps one of the really new h.f. transceivers will tempt me. The TS-870S looks interesting ....."

At this point I had to stop Doc and say his imagination was running away with him. This was a fantasy, and *PW* was not ready to fund his next purchase!

Let me know if you found this interview interesting, and if you would like to hear the views of other amateurs in America.

That's all for this quarter so, 73 and please write to me, Ed Taylor WT3U at PO Box 261304, Denver, Colorado 80226, USA. Deadline for the next 'Scene USA' (April *PW*) is the middle of January.

District	Group A Extra	Group B Advanced	Group C Tech/Gen	Group D Novice
0	AA0ZA	KG0YW	++	KB0TVP
1	AA10J	KE1CX	N1VTZ	KB1BTW
2	AA2YK	KG2DW	++	KB2VRO
3	AA3MK	KE3US	N3WAX	KB3BKX
4	AE4LW	KT4CY	++	KF4DBD
5	AC5EQ	KK5SM	++	KC5QOW
6	AC6PM	KD6ZL	++	KE6YHD
7	AB7ML	KJ7QY	++	KC7MYR
8	AA8UQ	KG8TG	++	KC8AXZ
9	AA9QB	KG9DX	++	KB9LLB
Hawaii	++	AH6OE	++	WH6CYA
Alaska	++	AL7QF	++	WL7CDU
Virgin Is	WP2U	KP2CH	NP2IK	WP2AIA
Puerto Rico	++	KP4ZY	++	WP4NBC

++ All call signs in this group have been issued in this area.

Fig. 2: Chart showing call areas and licence classes showing latest callsigns issued as at September 1 1995.

Fig. 4: Doc Evans NQ0I with his tribander of 35ft.

END

MIKE RICHARDS G4WNC

BITS&BYTES - COMPUTING IN RADIO

This month Mike Richards G4WNC has news of a useful label program, details of new Internet sites to look out for and solves a JVFAX query.

In this job I'm always on the lookout for new software and recently came upon a particularly good label printing program. The program is called *Smart 'n Sticky* and operates under Windows versions 3.1 and '95.

The package takes full advantage of the Windows environment and will output to any Windows compatible printer. Another great asset is its use of OLE so allowing movement of information between other programs and the label printer.

By way of an example, I used Corel Draw to create some jam labels for Elaine G4LFM and then pasted the result into *Smart 'n Sticky* for printing. In addition to these powerful options, the program lets you completely specify the label size. This means that it can be configured to print accurately on virtually any type of label paper.

You can even print single labels and set the program to miss the first x number of labels. This enables you to make maximum use of a label sheet with little or no waste.

For the radio amateur, the program could be used with an electronic log to generate QSL labels. In addition to producing sophisticated labels the program can also be set to generate exclusive serial numbers and even add the current date.

I've tried a vast number of label printing packages and *Smart 'n Sticky* stands head and shoulders above the rest. The shareware versions can be obtained from the Internet at: **http://www.smartcode.com** or **ftp.smartcode.com**

For CompuServe users try the Library 4 in the UKSHARE forum. Alternatively, fully registered versions of *Smart 'n Sticky* are available from **Oakley Data Services, 3 Oakley Close, Sandbach, Cheshire CW11 9RQ. Tel: (01270) 759739** or **CompuServe: 74774,1374; Internet: 74774.1374@compuserve.com**

Internet Update

I've received lots of Internet addresses this month from **Maurice Andries** and **R. Bates**. I'm currently putting together my own home page on the Internet so, you can keep bang up-to-date with the latest hot radio sites.

I will also include a facility for you to let me know of any new sites. Watch this space for the url address.

JVFAX - SSTV Problems

Maurice of Prescot writes asking for help with a problem when using JVFAX to receive SSTV signals. He reports that no matter what interface he uses, his received pictures always show a colour interference pattern.

The only way he's been able to cure the problem is to disable his XMS memory. However, without XMS memory, you can't store the received pictures. To understand the problem you need to appreciate the way in which JVFAX processes the incoming signal.

To measure the frequency of the incoming signal the software makes use of an internal timer to measure the time between each zero crossing of the signal. Whilst this sounds fine the weakness lies in the use of a computer interrupt to start the timer.

Any delays in the processor's response to the interrupt request will cause a timing error when calculating the frequency of the audio signal. The end result is a build-up of noise that's directly related to the processor speed.

In Maurice's case, the problem is confirmed as he's using a 286 processor running at 12MHz. So, what's the cure?

The best solution is to changeover to a more sophisticated interface such as that produced by Martelec. This type of interface includes its own processor to handle the signal analysis and simply passes the data to the computer in digital format. This frees the computer's processor from the time critical activities so overcoming the noise problem.

A second and cheaper solution is to start JVFAX with the command line option: JVFAX /NOOVR. This prevents JVFAX from storing its overlay programs in XMS/EMS memory so you can store SSTV pictures with only 1Mb of RAM and the XMS memory manager disabled.

That's all for now so, Merry Christmas, keep computing and sending your questions to me Mike Richards G4WNC, 'Bits & Bytes' PO Box 1863, Ringwood, Hants BH24 3ZD. CompuServe: 100411,3444; Internet: mike.richards@bbcnc.org.uk

Universities:

Stanford ARC (Club List)
http://w6yx.stanford.edu/clubs.html
U of Madison-Wis RS
http://www.cs.wisc.edu/~timc/w9yt/
US Navy PG Sch ARC
http://www.nps.navy.mil/npsarc/k6ly.html
Boston ARC (Archive)
http://www.acs.oakland.edu/barc.html
Boston ARC (Ham Radio)
http://www.acs.oakland.edu/barc/ham-more/ham-more.html
Boston ARC (Other Sites)
http://www.acs.oakland.edu/barc/other-sites.html
N.OH DX Association
http://www.en.com/users/k8yse
Central AZ Association
http://www.getnet.com/~davidh/cadxa.html

Callbooks - Address Databases:
QSL Info
http://www.systemtechnik.tu-ilmenau.de/ham.html
QRZ (with Email)
http://www.qrz.com/cgi-bin/webcall
UK Callbook
http://www.mcc.ac.uk/cgi-bin/callbook
US-CAN Callbook
http://www.mit.edu:8001/callsign
E-mail addresses
ftp://ftp.cs.buffalo.edu/pub/ham-radio/hams-on-usenet

Special Offers

Here's the full list of reader's offers with all the latest software. Please leave up to **two weeks** for delivery and with the Christmas post please leave a little longer.

IBM PC Software(1.44Mb disks):
Disk 1 (Order Code DK1) - JVFAX 7.0, HAMCOMM 3.0 and WEFAX 3.0
Disk 2 (Order Code DK2) - DSP Starter plus Texas device selection software.
Disk 3 (Order Code DK3) - Ultrapak 2.1 and NuMorse
Disk 4 (Order Code DK4) - Mscan 1.3 and 2.0

Printed Literature:
Beginners Utility Frequency List (Order Code **BL**)
Complex Signals Utility Frequency List (Order Code **AL**)
Decode Utility Frequency List (Order Code **DL**)
FactPack 1 Solving Computer Interference Problems (Order Code **FP1**)
FactPack 2 Decoding Accessories (Order Code **FP2**)
FactPack 3 Starting Utility Decoding (Order Code **FP3**).
FactPack 4 JVFAX and HAMCOMM Primer (Order Code **FP4**).
FactPack 5 On the Air with JVFAX and HAMCOMM (Order Code **FP5**).
FactPack 6 Internet Starter (Drder Code **FP6**).

For the printed literature just send a self addressed sticky label plus 50p per item (£1.50 for four, £2.50 for 7 and £3.00 for 9). For software send £1.00 per disk (£1.75 for 2, £2.50 for 3 or £3.00 for all 4) and a self addressed sticky label (don't forget I provide the disk!).

PETER SHORE

BROADCAST ROUND-UP

Peter says it's time to start planning your 'festive' listening and to help you here are the latest schedules from the international broadcasting world.

As the Christmas holiday season approaches, it's time to start planning your 'festive' listening. So, this month I am including frequencies and times of a number of international radio stations which have special Yuletide programmes for you to enjoy while recovering from an excess of turkey and Christmas pud!

But what about presents for a short wave listening enthusiast? If you have an unlimited budget, I'm sure that a brand new Lowe HF-225 Europa, or a Drake R8A would be well received under the tree on Christmas morning.

But if your budget cannot run to one of those dream machines, how about something highly practical? It never ceases to amaze me that just about everyone insists on having a rooftop antenna for television reception, yet the average radio listener makes do with the telescopic whip antenna!

I am sure that 'making do' is not the case with a majority of *PW*'s readers. But if you know someone who is still using their built-in antenna, then make their Christmas a memorable one by setting them up properly.

Simply invest in a length of plastic coated copper wire, some coaxial cable and fishing line for your nearest and dearest. The cost of such an antenna is just a few pounds, and yet the beneficial effect on reception could be considerable.

Christmas Programming

Vatican Radio always celebrates Christmas and the New Year in style, with relays of services and the Pope's address to St Peter's Square. This year the station plans to repeat *Daniel's Flute* the imaginary tale of a young servant to one of the Three Wise Men.

.Listeners in Europe can tune in to Vatican Radio in English at: 0600 on 4.005 and 5.882MHz short wave and 527 and 1530kHz medium wave (m.w.); 1700 on 4.05, 7.25 and 11.81MHz and on m.w. 2050 on 5.882 and 7.25MHz.

Radio Canada International (RCI) still worries about its future as the Canadian government is reluctant to provide adequate funding. There is the possibility that the station will cease operations at the end of March.

Make sure you tune in to the Montreal-based RCI station, which is including relays of CBC domestic programmes including Christmas specials, at: 1430 to 1500 on 9.555, 11.915, 11.935 and 15.325; 1745 to 1800 on 5.995, 9.555, 11.935, 15.325 and 17.82; 2100 to 2200 on 5.925, 5.995, 7.26, 9.805, 11.945, 13.65, 13.69, 15.15 and 17.82 and 2200 to 2300 on 5.995, 7.26, 9.805, 11.945 and 13.69MHz.

In the United States, funding difficulties from the start of the new US financial year on October 1 forced the Voice of America (VoA) to end short wave broadcasts to Europe. The English, Bulgarian, Czech, Latvian and Polish services all lost their short wave transmissions. However, you can still hear English programmes which are beamed on short wave to Africa and the Middle East.

Delight From Budapest

A musical delight from Radio Budapest for Blues fans. The Friday programme *Talking Blues* includes music written by Hungarian Blues artists and performed by Hungarian bands, as well as traditional standards.

Tune in to the station's second broadcast on Fridays to catch up on the Blues part of the Hungarian music scene. Radio Budapest is on the air daily at 2000 to 2030 on 3.975, 5.97,.7.25 and 9.835 and 2200 to 2230 on 3.975, 5.935, 7.25 and 9.835MHz.

Afghanistan Home-Brew

Radio Afghanistan is back on the air, using a home-brew transmitter, according to a report in the BBC World Service *Waveguide* programme. The station's engineers, faced with an enormous bill for the purchase of a new short wave transmitter from abroad, cast around for the parts needed to build a 100kW sender. And now it's on the air!

Try tuning in on 7.20MHz, or a frequency close to that, at around 1630 for Urdu and around 1645 for English - the station does often go off the air, and change its transmission time, but its worth fiddling around to see what you can hear.

New Station

A new station on the m.w. band from Holland is Veronica News Radio. The station started test transmissions on 1395kHz in mid-September, and sought reception reports to **PO Box 22400, 1202 CH Hilversum.**

Listeners in eastern England should enjoy fair reception, and if you understand Dutch there's a bonus, as Deutsche Welle's Dutch service is carried on the station in the early evening at 1807UTC.

Programme News

Programme news now. The Voice of Turkey is now using five new 500kW transmitters. Transmissions from the site at Emirler, south of Ankara, means reception in Britain should improve.

Try listening to English programmes at: 0400-0500 on 7.19, 9.56 and 9.685;1330-1430 on 9.63 and 9.445; 1930-2030 on 9.445 and 2300-0000 on 7.19, 7.28 and 9.56MHz.

It may now be possible to tune to a station that has not been heard on the short wave bands for a decade and a half. Radio Tanzania has been relayed by South African transmitters at Meyerton during the autumn and the period of the country's election that took place on October 29.

The relay schedule for Radio Tanzania is: 0300-0445 on 7.29; 0900-1100 and 1300-1525 on 15.435; 1530-1655 and 1800-2115 on 7.28MHz

Radio Exterior de Espana continues its hour-long English language service to Europe at 2100 on 6.125MHz. At 2200 the station beams towards Africa on 11.775MHz and at 0000 there is a two hour transmission to North America on 9.54, with a further broadcast between 0500 and 0556 on the same channel.

Finally, a look ahead to English language programmes from a Scandinavian country from January 7 1996. Regular readers of this column will know Radio Denmark in Copenhagen will begin 15 minute English news programmes after an absence of many years.

Radio Denmark is relayed by Radio Norway International, and is on the air to Europe at: 0430-0455 on 5.965, 6.04, 6.195, 7.165; 0530-0555 on 5.965, 7.18 0630-0655 on 5.965, 7.18, 9.59, 11.735; 0730-0755 on 5.965, 7.18, 9.59; 1030-1055 on 7.295, 11.85; 1130-1155 on 7.295, 9.62; 1230-1255 on 7.295, 9.59, 11.84, 15.605; 1330-1355 on 7.315, 9.59, 11.84, 15.605; 1630-1655 on 9.59, 11.84; 1730-1755 on 7.485, 7.525, 9.59; 1830-1855 on 5.96, 7.485, 9.59; 1930-1955 on 5.96, 6.195, 7.485, 9.59; 2030-2055 on 6.195, 7.52 and 2130-2155 on 5.96, 6.17, 7.315MHz. The station can be reached at **Radio Denmark, Rosenorns Alle 22, DK 1999 Fredriksberg C, Denmark. FAX: +45 35 20 57 81, or by E-mail at rdk.ek@login.dknet.dk**

And that's all for this month, so I'll leave you with best wishes for the festive season, and I look forward to receiving details of some of the stations which you have managed to hear during the holidays.

END

DAVID BUTLER G4ASR

VHF REPORT

This month David Butler G4ASR takes a look at tropospheric propagation and recent 'lifts' on the v.h.f. and u.h.f. bands.

For many communication systems, both amateur and commercial, the radio propagation paths established in the v.h.f. or higher frequency bands are confined within the troposphere. This is the layer of the atmosphere closest to the earth surface and extends to a height of about 10km above the earth.

Tropospheric radio waves that travel near the surface of the earth without going through the ionosphere are referred to as ground waves. As these electromagnetic waves travel over the surface of the earth they weaken until they reach a level which is no longer useful.

Radio waves that travel above the surface of the earth result in line-of-sight or direct propagation. It's this mode that TV and f.m. broadcast stations rely on for coverage over their service area.

Direct-wave propagation is dependent on the height of both the transmitting and receiving antennas above ground, the power level of the transmitter and the path length. If the atmosphere is not disturbed or modified by some weather pattern the received signal level will decrease in a predictable fashion with increasing distance.

It's during the periods when the atmosphere is not being disturbed that v.h.f. operators describe the conditions as being 'flat'. And it's important to note that signals at higher frequencies attenuate more rapidly beyond the horizon.

So, all things being equal the coverage area for a station operating on the 1296MHz band will be considerably less than for one being used on the 70MHz band.

Increase Coverage Area

If you want to increase your coverage area, either in terms of signal strength or path length, there are a number of practical ways of accomplishing it.

The useful range of a direct wave is to a great extent dependent upon the antenna system. The height of the antenna above ground and clearance of obstructions will both effect performance.

The station with the highest antenna will usually have a better performance than one at a lower height. For communication beyond the horizon, the situation will alter somewhat as other propagation modes may begin to effect the usable range.

The theory that biggest and highest is always best should be carefully considered however. In some locations it might be better to place a small single antenna up high rather than endure the mechanical liability and windloading of a large array.

Feeder Losses

Consideration should also be given to the increase in coaxial feeder losses as the frequency is increased into the v.h.f. and u.h.f. regions. The resultant loss of signal caused by long feeder runs up a tower may offset the gain of the array.

It's also very important to ensure that the same polarisation is used both for transmitting and receiving antennas. If the transmitting station is using a vertically polarised antenna then a vertically polarised antenna should be used on receive.

If you're using a Yagi vertically polarised, it means that the elements are mounted in a vertical plane. Move the Yagi through 90° and it becomes horizontally polarised.

Exactly the same principle applies to all other antennas, even rectangular waveguide! In this instance, horizontal polarisation is obtained by ensuring that the broad face of the guide is in a vertical plane! My explanation illustrates how easy it is to get polarisation wrong with certain types of antennas.

If you do mount the antenna the wrong way round then the cross polarisation loss could theoretically be infinite. In practice however, it will be between 20-30dB of signal attenuation. (That's like throwing away 4 to 5 S-points of signal strength).

Horizontal polarisation is commonly used for weak-signal work (s.s.b. or c.w.) and vertical polarisation is usually used for f.m. or mobile operation. Although both have their merits it's generally accepted that horizontal polarisation gives better results on long terrestrial paths.

Receiver Sensitivity

After the antenna system the next improvement that can be made is to the receiver sensitivity. And regrettably many (but not all) multi-mode rigs are built to a price and ultimate sensitivity doesn't come into the equation.

For some popular transceivers it's possible to obtain a replacement front-end board. These normally consist of an optimised r.f., mixer and i.f. stage with additional filtering. They are an easy way of increasing the sensitivity and at the same time increasing the dynamic range of the receiver.

Another option is to fit an external pre-amplifier or mast-head low noise amplifier. Although these will increase the overall sensitivity they have an inherent potential for degrading the strong signal handling of the receiver.

You should also bear in mind that the receiver sensitivity can also be improved by increasing its selectivity. In practical terms this means decreasing the receiver bandwidth.

The bandwidth reduction is often carried out at i.f. by the use of crystal filters. It may also be accomplished at a.f. with audio filtering or digital signal processing (d.s.p.) techniques.

After improving the receive system (antenna, feeder and receiver) the final item to change is the transmitter power. This really should be the last option as a QRO amplifier in the wrong hands can be a real liability!

The flat conditions I mentioned earlier almost invariably exist when the atmosphere is not being changed by specific weather patterns. But as most of you already know, the lowest few kilometres of the troposphere are often quite variable.

Indeed it's in this region near the earth's surface that weather changes occur and influence our climate and daily activities. It is thus very true to say that the day-to-day band conditions has its origins very much in the weather.

So, watch the weather! It's some of these changes in weather patterns that rewards the observant operator on the v.h.f. or higher frequency bands with long distance (DX) contacts.

Three Types

There are three types of tropospheric propagation which extend signals significantly beyond the horizon. These are tropospheric refraction, tropospheric scattering and tropospheric ducting.

In practice, the abbreviation 'tropo' is used by radio amateurs to include all three of modes. The term is also applied to any accompanying diffraction.

Enhanced tropospheric refraction of v.h.f. signals is quite common and is the result of a significant increase above the normal value of the 'refractive index' of the atmosphere. Well sited v.h.f. or u.h.f. stations with good equipment will be able to make contacts over many hundreds of kilometres under average tropo conditions.

Tropospheric scattering (troposcatter) is caused by random irregularities in the atmosphere. The forward-scattering mode involves a large transmission loss and it is necessary to use high gain antennas and high power transmitters.

Tropo Ducting

The mechanism responsible for long distance tropo DX is tropospheric ducting. There are two main types, surface ducts and elevated ducts.

Under certain conditions boundaries between dissimilar masses of air provide the mechanism to transport signals

considerable distances. Many stations in the UK have made contacts up to 3000km via this mode.

Ducting the action can be compared to the way s.h.f. signals travel in waveguides. It frequently results in very little path loss and signals can often be extremely strong.

Unlike other propagation modes (Sp-E, Aurora) tropospheric ducting is usually the culmination of several days build up. It will last for many hours, if not days at a time.

Quite often the higher u.h.f. bands, 430MHz and 1.3GHz, exhibit better propagation than the 144MHz band. Indeed it's quite possible for openings to occur on the s.h.f. bands when no effects have been detected on lower frequencies.

Although enhancements are observed on the 50 and 70MHz bands these are never extensive. This is due to the frequency cut-off imposed by the vertical extent of the duct. (At 50MHz a minimum duct thickness of 400m is required).

The listing in **Table 1**, gives details of UK distance records made via tropospheric propagation. The distances achieved on the middle microwaves bands, 2.3 to 5.7GHz, are indicative of lack of activity rather than DX capability.

If you know of any contacts that supersede my list, please contact either myself or **John Morris GM4ANB, the IARU Region 1 Record Keeper**.

Extraordinary Propagation

This year (I'm writing this in 1995 of course!) has seen some extraordinary tropospheric propagation. The conditions resulted in a number of new distance records around the world.

On July 1 1995 **Paul Lieb KH6HME** operating from Mauna Loa volcano on **Hawaii**, worked **Jim Costello W7FI** near Seattle, Washington, on the 144MHz band. The distance for this contact was 4333km, beating the existing record set in 1989 by 58km.

The tropo opening began on June 28 when a 144MHz beacon on Mauna Loa, at 4170m a.s.l., was heard on the west coast of America. During the evening of June 30 KH6HME worked N7AVK, N7KSI and WI7Z.

The world record came the next day, at 0600UTC, when Paul contacted a number of Seattle stations including W7FI. He was also heard by VE7SKA but no contact was made.

Exceptional tropo conditions in the US Midwest also resulted in a new microwave record on the 3.4GHz band. On July 12 1995 **Al Ward WB5LUA** (Texas) contacted **WA0BWE** (Minnesota) to set a record for the band at 1353km. The station of WB5LUA was running 100W to a 1.8m dish antenna whereas WA0BWE was running only 5W output.

Even Better

Even better results were obtained at the end of last year (1994) on the 10GHz band. On December 30, **Roger Bowman VK5NY/P** and **Walter Howse VK6KZ/P** set a new world distance of 1911 kilometres.

Walter reports that there was a typical high pressure cell in the Great Australian Bight, a large inlet body of water. The system used by VK5NY was a DB6NT design transverter running 180mW of s.s.b. output into a 400mm diameter dish with a 'penny-feed'.

At VK6KZ a G3WDG transverter was used running 100mW of s.s.b. into a 400mm dish antenna with a dipole/reflector feed. It's interesting to note that contacts were also established over this 1900km path on the 144, 430MHz and 1.3GHz bands.

Both VK stations are now firmly on course to smash the 2000km barrier before the Americans do it between California and Hawaii. Meanwhile the stations of N6CA and KH6HME are continuing their efforts to bridge the 3973km path across the Pacific Ocean on the 10GHz band.

England To Holland First

The first contact between England and Holland on the 24GHz band (and a new UK distance record) took place on March 23 1995. This was when **Simon Freeman G3LQR** (JO02) made contact with **Hans PA0EHG** over a path length of 210km.

Reports of 55 both ways, peaking to S8, were exchanged by Simon and Hans at 2200UTC. A sea duct, formed under the high pressure weather conditions, was probably the mechanism which allowed the propagation of these microwave signals.

The equipment at the station of G3LQR consisted of a 50mW transmitter into a 350mm off-set fed parabolic dish. A separate system with a 1.2m dish was used on receive. A 500mm dish and 80mW of c.w. was used at the station of PA0EHG.

Extensive Opening

At the end of June and the beginning of July 1995 there was an extensive tropospheric opening in the UK. It effected all bands from v.h.f. to microwaves and lasted for several days.

On June 29 **Sam Jewell G4DDK** (JO02) heard a Dutch beacon on the 2.3GHz band. Later that evening he began testing with **Arie Dogterom PA0EZ** (JO22) on the 24GHz band.

Band	Station - 1	Loc	Station - 2	Loc	Mode	Date	km
70MHz	GM3WOJ	IO77	G4RFR	IO90	s.s.b.	Sept 1988	774
144MHz	GM8COX	IO85	EA8BML	IL27	s.s.b.	Sept 1988	3223
432MHz	GW8VHI	IO81	EA8XS	IL28	s.s.b.	July 1984	2786
1.3GHz	G6LEU	IO70	EA8XS	IL28	s.s.b.	June 1985	2617
2.3GHz	G6DER	IO93	OE2KMM	JN67	s.s.b.	Oct 1987	1256
3.4GHz	G3LQR	JO02	SM6HYG	JO58	c.w.	July 1983	927
5.7GHz	G3ZEZ	JO01	SM6HYG	JO58	s.s.b.	July 1983	982
10GHz	G4BCH/P	IO90	SM6HYG	JO58	s.s.b.	Oct 1994	1177
24GHz	G4DDK	JO02	PA0EZ	JO22	c.w.	June 1995	268

Fig 1: UK distance records made via tropospheric propagation.

At 2130UTC weak signals were detected both ways but no contact was made. Finally at 2115 Sam copied the c.w. signal from PA0EZ on 24192.090MHz at RST419.

He received a 529 report in return. This QSO then extended the UK 24GHz record to 268km. The station at G4DDK was running 125mW output against 80mW at the QTH of PA0EZ. (The Dutch station, located some 50 kilometres from the sea, had not worked any greater than 40 kilometres on this band before his record contact!).

On the following day, June 30 at 2220UTC, G4DDK contacted PA0EHG/P on 24GHz. This QSO was over a path of 215km.

Exceptional Propagation

The best tropo ducting enhancements often occur during the autumn months of October and November. It frequently happens when visibility is hazy. So keep a look out for weather forecasts where fog or mist is indicated and high pressure extends from the UK deep into Europe.

Tropo lifts also occur during the summer months. Typically in July and August, although in my experience these are not as good in the UK as the autumnal openings.

Right on cue, as predicted, a two week period during October 1995 saw possibly some of the finest tropo DX worked this year. Propagation was excellent and extended well up into the microwave region.

During the period October 8-15 many operators reported contacts with stations in OE, OK, OM and SP on the 144MHz, 430MHz and 1.3GHz bands. On some days during this period the best propagation was to the north-east allowing contacts to be made into LA, OZ and SM.

Later in the month, between October 18-20, the best paths were to the south and south-east of the UK. Contacts on the v.h.f. and higher frequency bands were made into EA, F, HB and I.

In next month's column I'll spare a bit more space to station reports but just to whet your appetite here's some examples of DX reported. The stations of IK1LGV/P and 9A2AE on the 144MHz band, LY2BKH and UA2FL on the 430MHz band, OK2QI/P and SP6MLK/P on the 1.3GHz band and finally HB9AMH/P and OE5VRL/P on the 10GHz band!

Time To Close

That's enough of me for this time and it's time to close. Thank you to everyone who has written in to the column with news and photographs. It was very much appreciated.

It only leaves me to wish you a very Happy Christmas and hope that 1996 is yet another year full of DX.

As usual please send any news (to reach me by the end of the month) to: Yew Tree Cottage, Lower Maescoed, Herefordshire HR2 0HP.

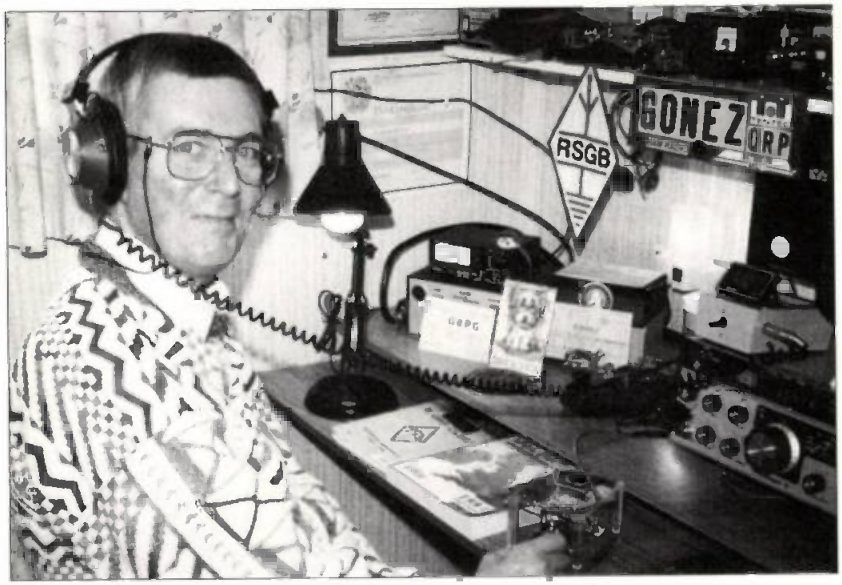
You can also contact me via packet radio @ GB7MAD, the DX Cluster @ GB7DXC or the Internet davebu@mdihr1.igw.bt.co.uk. Alternatively you can telephone me on (01873) 860679.

END

LEIGHTON SMART GWOLBI

HF FAR & WIDE

Leighton Smart GW0LBI welcomes you to the column where your support helps him report on the fascinating world of h.f. activity.



Dave Gosling G0NEZ from Hemel Hempstead, is a very keen QRP operator and a new contributor to 'HF Far & Wide' (see text).

The h.f. enthusiast, whether a licensed amateur or s.w.l., can be forgiven these days for being a little confused over the current prefixes in use. Over the past few years, the political upheavals most notably in the former Soviet Union and the eastern European states, and more recently, in the tragic former Yugoslavia, has meant that some of the more well known amateur radio prefixes have changed, sometimes literally overnight!

One of the most useful Prefix Lists I have found recently is that produced by the International Short Wave League. They have completely updated and combined their prefix lists with a *DXCC Countries List* all under one cover, including all the new prefixes and DXCC countries.

For those of us who have difficulty keeping track of all the new prefixes (including myself!) this 30-page publication will prove very useful. It's available for £2.50 or four IRCs post paid from: **Jim May, ISWL HQ, 10 Clyde Crescent, Wharton, Winsford, Cheshire CW7 3LA**.

At the time of writing, (October) the lower bands have shown a marked improvement, with DX coming in at reasonable signal strengths from most parts of the world. It may be worthwhile spending more time on the lower bands at this time of the year, as the l.f. bands improve generally with the onset of winter.

South Shetland Islands

The RSGB's *DX Newsheet* reports that **Andy SP2GOW** will be active as VP8CQS (South Shetland Islands) until the end of December from the Arctowski Base on King George Island, mainly on c.w. and RTTY. Andy maintains skeds with Polish stations between 17/1800UTC Sundays, on 14.283MHz.

So, it may be worth listening at the end of Andy's SP skeds and giving him a call. His QSL details are: **Andy Grotha SP2GOW, Mikolaja Gomolki 5/1, 80 - 279, Gdansk, Poland.**

Your Reports

On to your reports now, starting with 1.8 and 3.5MHz, **Ted Trowell G2HKU** on the Isle of Sheppey in Kent, using his G5RV, HF6 vertical, and MFJ Loop antennas reports 1.8MHz c.w. contacts with OM2XW (Slovakia), I2ARN/2 (Italy), HA8IE (Hungary), and LX1DA (Luxembourg). All were at around 2000, while early morning operation on 3.5MHz provided Ted with QSOs with K4PQL (USA) and EA8CN (in the Canary Islands) at 0500.

With his 5W QRP Plus transceiver and an 26m end-fed wire antenna, **Eric Masters G0KRT** in Worcester Park lists amongst others c.w. contacts with DK6WL (Germany) at 1749 and G4EYW at 1934 on 1.8MHz, while his 3.5MHz list includes English Novice station 2E0AJE at 2008, LA7AK (Norway) at 2345, and ON4KAR (Belgium) at 0808.

Short wave listener **Tom Edwards GW-95977** in Dyfed using a Yaesu FRG-100 receiver and a G5RV antenna at 6m reports 1.8MHz s.s.b. reception of SM5ACO (Sweden) working LX1UN at 21.43. On 3.5MHz s.s.b. Tom heard 8Q7BY (Maldive Is.) in QSO with I8UDB at 2158, VK6LK (Australia) working G4DFY at 2200, and 9V1XO (Singapore) working G4PKP at 2110 on 3.790MHz.

Keen s.w.l. **David S. Henry RS-102197** up there in Aberdeen reports 3.5MHz s.s.b. reception of Mike ZL1HY (New Zealand) at 1706, and Peter VK6APZ (Australia) at 1840 on 3.799MHz.

(I have received Peter on a number of occasions around this part of 3.5MHz at S8-9 on my h.f. receiver, but I must admit that the operating standards of some of the European stations trying to work him leave a lot to be desired!).

David also heard our very own Rob Mannion working as EI/G3XFD in Cork on 1.960MHz, a 56 signal at 2325 on the 5th of October. David is now using the receive side of a QRP Plus transceiver which he bought in readiness for his 'A' ticket, and a sloping wire for the h.f. bands.

The 7MHz Band

The 7MHz band continues to be very productive. It will continue to do so now that we are in the grips of winter!

Charlie Blake RS-96034 in Milton Keynes has found '40' to be the most interesting band, and his log lists, amongst others, CP6DA (Bolivia) working DL6HW in Germany at 0518, VP5/PA3EWP (Turks & Caicos Is) in contact with ZL1ONE (New Zealand) - nice call! - at 0529, (QSL via PA3ERC), V41ML (St. Kitts Is) working IK0OZD in Italy at 0510 (QSL via N5FTR), XE3RMT (Mexico) in QSO with OE6OK at 0603, and ZL3SZ in Christchurch, New Zealand working Harry G3DAM at 0541 all on s.s.b.

Ted G2HKU has been busy on 7MHz too. He's has worked this month 3V8AS (Tunisia), VK2ZC (Australia), and ZL4SEA (New Zealand) with 70W of c.w. at around 0600,.

Eric G0KRT lists his 7MHz low power contacts with DZ4UN (Denmark) at 2245, EA1TSP (Spain) at 0742, OK2PMT (Czech Republic) at 1920, UA1CEL (Russia) at 1958, and YL2GN (Latvia) at 1726.

Working some interesting stuff on the 7MHz band this month was **John Heys G3BDQ** near Hastings. John lists contacts with UA3YH/KC4 at the South Pole, R0/UN8LV at the North Pole, EX8F (Kirghistan), OY1CT (Faroe Islands), and R9KWK (Narechi Island). All QSOs were on c.w. using his shiny new Kenwood TS-870S transceiver (with which John is 'over the moon!') and up to 100W output into a 55m longwire antenna

Editorial note: *The Kenwood TS-870S transceiver is reviewed in the December 1995 issue of PW.*

The 14MHz Band

It's on to the 14MHz band now. And starting with his monthly propagation report, **Don Mclean G3NOF** in Yeovil says that he has noticed recently several long path openings to Asia at around 0800, with short path to the same area at 1500 onwards, although again, conditions have been 'patchy'.

Using a 100W Kenwood TS-950 SDX transceiver, and a HB 33 SP 3-element beam at 17m for 14MHz, Don's long list includes contacts with J55AUB (Guinea Bissau) at 0901, (QSL to F6FNU), a long path contact with JR5JAQ (Japan) at 0823, SU3AM (Egypt) at 0858 (QSL to DL5ZBV), VS6DA (Hong Kong) at 0829, 4S7AB (Sri Lanka) at 17.22, 5H3DC (Tanzania) at 18.00, and

9L1PG (Sierra Leone) at 1851 (all QSOs on s.s.b.).

Now over to John G3BDQ, who missed a week of the DX due to a well earned holiday on the Isle Of Man. Yet he still managed to work HZ1AB (Saudi Arabia), YI1FC (Iraq), VK3WAC (Australia), E21CJN (Thailand), mostly on c.w. with ZL3UF (New Zealand) on s.s.b.

Another 14MHz propagation report comes from **Steve Locke GW0SGL** in Mountain Ash. Steve reports that openings to Asia have started sometimes at around 1330, and signals received have been up to S9+ at times. African stations have appeared on the band at around 1700, and signals from Oceania have been coming in quite strong from 1440 onwards.

Steve uses a Kenwood TS-940 rig at 100W and TH7 beam antenna at 15m. His large log includes s.s.b. QSOs with A71A (Qatar) at 1646, VU2SK (India) at 1640, BZ1LUV (China) at 0844, (QSL via BY1QH), VI50PEACE (special call, Australia) 59+20dB at 1350, 9N1RHM (Katmandu, Nepal) at 1459, (QSL **via Box 10801 Katmandu**), 9M2AA (Malaysia) at 1608, AP2AMR (Pakistan) at 1512 (QSL **via Box 461, Islamabad, Pakistan**), DU7LA (Philippines) at 1351 (QSL to KD6QV) and BV5GU (Taiwan) at 1401.

From Bristol comes word from s.w.l. **Gordon Foote G7NCR** who sends his usual massive s.s.b. reception report. He uses a Howes 14MHz DcRx receiver and a loft receive antenna.

Gordon has logged (amongst many others) DU1SSR (Philippines) working EA6MQ in the Balearic Islands at 1458, AA1AA (USA) working GM0LYM at 1741, SV5/DL6RAB (Karpathos Island) in contact with G3ZJF at 1800, V73G (Marshall Islands) working UU5J (Ukraine Republic) at 1300, 9H4CM (Malta) working G0HBA, 4U/P/RW3AH (United Nations Mission in former Yugoslavia) working G0OZD at around 1705, and VE1DOT (Canada) working G0PZM at 2045.

Down to Skewen in West Glamorgan now, to **Carl Mason GW0VSW**. Carl's 14MHz log includes c.w. QSOs with AI1L (Boston, USA) at 1136, 8P6EB (Barbados) at 2221, VP5/PA3ERC (Turks & Caicos Is) at 1545, WA3PTY/QRP (USA) at 2102, and VE1AMI (Canada) at 1217.

Carl's s.s.b. contacts were with EA8KIK/P (Canary Islands) at 1820, 9H1BM (Malta) at 0825, ZB2FK (Gibraltar) at 1007, and finally SV5/DL6NBR (Dodecanese Is) at 0946, using 100W into a G5RV dipole antenna.

Using his receiving station, **Tom GW-95977** has been busy, and his 14MHz s.s.b. log includes reception of PR2AT (Brazil) working SP2BRI in Poland at 2052, 5A1AA (Libya) working AA0BS (USA) at 2115. Tom also logged VP8CGC (Falkland Is) in contact with PY6JJ (Brazil) 59 at 2058, TJ1PD (Cameroun) and A22RV (Botswana) working KC1H (USA) at around 2125, and lastly 9G1RL (Ghana) in QSO with KA1JC (USA) at 2038.

Ted G2HKU found conditions on 14MHz to be poor this month, with just a few openings for short periods. However, he used c.w. to contact EA9PB (Canary Islands) at 1800, 8P9II (Barbados), LU6EF (Argentina) and LU1XSI (Tierra de Fuego) at 2000, and YV1NX (Venezuela) at around 2100.

Last but not least on 14MHz comes **David RS-102197**. David's large s.s.b. list includes reception reports of NL7RK (Alaska) at 1000, 9Y4RM (Trinidad) at 1054, VU2SMN (India) at 1505, VK3CR (Australia) at 1112, and XX9AS (Macao) (QSL to KU9C).

David also logged an interesting station - 600A (Somalia) at 1413 (setting up a broadcasting station in Somalia, and using the station equipment for the amateur radio contact!) and YB2ARW (Java, Indonesia) at 1325 (QSL via W4LCL), all using an 11m vertical antenna.

The 18MHz Band

The 18MHz or 'Seventeen' metre band seems to be becoming popular of late. And despite being a narrow band, when open it provides excellent DX contacts without the QRM found on 14MHz. How long this will last is anybody's guess; in fact, I heard an American amateur recently saying that 18MHz is 'amateur radio's best kept secret - until the kilowatt mob find out about it'!

Back to reports, and Don G3NOF indicates this time around that the 18MHz band has opened to Asia on the short path from 0900 to 1300 on odd days. North American stations were 'patchy' with signals heard at various times between 2230 and 2300, while Africans came in during the afternoons.

The cream of Don's log are s.s.b. contacts with AP2N (Pakistan) at 1400 (QSL via AP2MMN), BV5DI (Taiwan) at 1124 on the short path (QSL **via Box 456, Yuanlin, Changhua**), FY5GS (French Guiana) at 1551, J28JA (Djibouti) at 1323 (QSL to F2BU), VK4MZ (Australia) short path at 11.22, TL8LD (Central African Republic) at 1622 (QSL to SM4DDS), and 5N35ALE (Nigeria) at 1531 (QSL to F2YT).

Charlie RS-96034 listened on the 14MHz band and reports hearing CU7BA (Azores Islands) in contact with DJ2SQ in Germany at 1415.

'Nadolig Llawen ar Blwyddyn Newydd Dda i chi!'

PW Listening & Operating Watch List

(All times in UTC)

Charlie Blake RS-96034 listens: 0500 - 0700 on 7.061MHz s.s.b. with an NRD 525 receiver & sloping wire antenna.

Steve Locke GW0SGL operates: 2000 - 2100 (Sundays) on 14.250MHz s.s.b. using a Kenwood TS-940 & TH7 beam antenna.

Don Mclean G3NOF operates: 09.30 Saturdays on 3.685MHz or 3.665MHz s.s.b. using a Kenwood TS-950 & trap dipole antenna.

Leighton Smart GW0LBI/GW-20049 listens: 2000 -2200 on 14.290MHz s.s.b. (Sundays) using a National Panasonic DR49 receiver and 70m long wire antenna.

Rob Mannion G3XFD listens and operates: (weekdays & weekends) 1800 - 1830 3.7MHz 100W s.s.b., & 3.530MHz QRP c.w. using a KW2000B/Trio TS-120V and trap dipole/long wire and wire loop antennas. (Also at 0200 on either 3.530, 7.025MHz (c.w.) or 3.7MHz s.s.b. Occasionally on 7.025MHz c.w. between 0100 - 0200.

Gordon Foote G7NCR listens: 1730 - 1930 & 2030 - 2200 (weekdays) and 1430 - 1630 (weekends) on 14.250MHz s.s.b. using a Howes DcRx receiver and loft mounted wire antenna.

T Ibbitson G0VTI operates: each evening between 1900 - 2000 on or around 7.020MHz c.w., or 14.035MHz c.w. using a Ten Tec Scout at 50W.

He also heard CN8TM (Morocco) working WX4AG (USA) at 1434 (CN8 QSL to JR2ITB), and 4Z4LF (Israel) in contact with K8YSE (USA) at 1600.

The 21MHz Band

I'll start of this month's 21MHz report with John G3BDQ. He reports that he worked VP8CRT (Falkland Is), 600A (Somalia), CN8TM (Morocco) and VP5/PA3BBP all on s.s.b. on the band using a rotary dipole.

On 21MHz Ted G2HKU used 5W c.w. from his Icom IC-721S QRP rig and a G5RV antenna to work ET3KV (Ethiopia) at 1000, and 70W from his Ten Tec Omni V rig to work PU2MHB (Brazil), K4KQ (USA), and 5B4AFB (Cyprus) at around 1700.

There's a brief 21MHz report from new correspondent and QRP fanatic **Dave Gosling G0NEZ** in Hemel Hempstead. Dave lists CX5RV otherwise known as **Louis Varney G5RV** (Uraguay) on 5W c.w., and ZL1BOA (New Zealand) as his best DX.

Dave uses a Ten Tec Corsair rig with the power 'wound down' for his low power exploits. He works with G5RV and doublet antennas for all band operation - all fitted in a 15m garden!

Finally, for this month, comes a 21MHz report from Don G3NOF. He lists s.s.b. QSOs with D2/YO3YX (Angola) at 1720, FH5GB (Mayotte Island) at 1607, TU2JL (Ivory Coast) at 1634, 7Q7RM (Malawi) at 1804, 9G1YR (Ghana) at 1752 (QSL to G4XTA), SV9ANH (Crete) at 17 17, and 9L1PG (Sierra Leone) at 1759.

The 24MHz Band

There are just two reports this month for the 24MHz band. But both are worth mentioning as they indicate that conditions on the higher bands may improve during the winter.

Ted G2HKU reports working 9J2SZ in Zambia on c.w. at 1400 (QSL via SP8DIP). And Don G3NOF contacted Z21CS in Zimbabwe on s.s.b. at 1731.

Keeping a watch on the higher frequency bands this winter as we hide in the warm shack from the frost and snow may well pay dividends. So, get listening!

Reports And Information

And that just about wraps it up for this month. As usual, please send your reports and information by the 15th of January (if you've recovered from the Christmas festivities!) to: **Leighton Smart GW0LBI, 33 Nant Gwyn, Trelewis, Mid Glamorgan., Wales CF46 6DB Tel: (01443) 411459.**

Don't forget...**You** make the column, I merely put it together. Seasons Greeting to all readers of the column, perhaps Santa will fill your stockings with some DX goodies! *Nadolig Llawen ar Blwyddyn Newydd Dda i chi!* Merry Christmas and a Happy New Year to you! (In Welsh from Wales!) Cheerio!

END

ROGER J COOKE G3LDI

PACKET PANORAMA

Roger Cooke G3LDI starts the New Year off with some resolutions. And he's going to try to keep them.

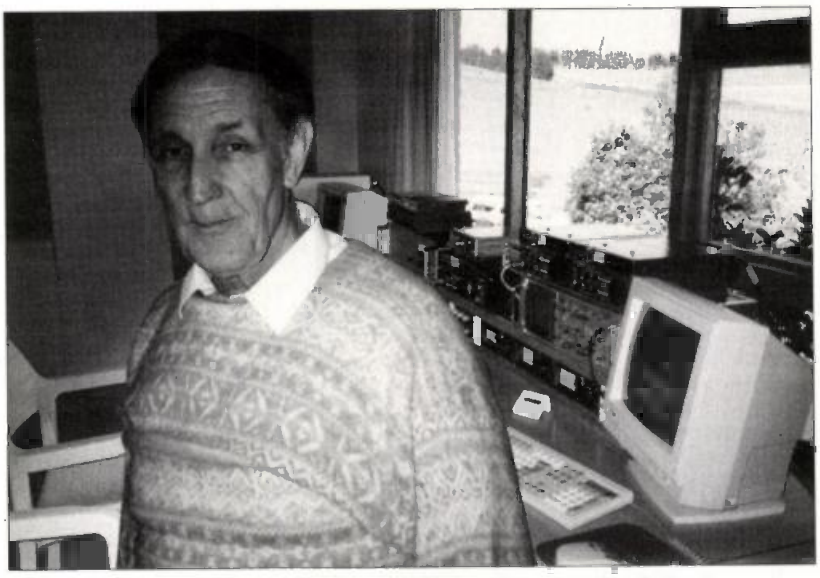


Fig. 1: A photo-montage of Gert ZS0STB, who runs the Satgate, and his station in Stellenbosch South Africa.

Another year, another winter to contend with, but Spring is not far away! I hope you have all made your New Year resolutions? Here are a few more suggestions to add to the list! Just a bit of fun, but they do have their serious side too.

- ✓ I promise to use sensible parameters on my TNC so as to be socially acceptable.
- ✓ I promise to use just enough power to access my HomeBBS and no more.
- ✓ I promise NEVER to write personally insulting or otherwise damaging 'open letters' or at least if I do, then to go away for a few hours and think about it BEFORE actually sending it, then killing it after calming down.
- ✓ I promise I shall never issue bulletins to ALL, WW, or WWW, without thinking about the necessity or the consequences of such an action.
- ✓ I promise to use the Sysop field in a more sensible fashion, and not to allow this to become a means of sending derogatory messages about other Sysops, whether I agree with them or not.
- ✓ I promise NEVER to use the BBS system as a wall for graffitii or use bad language in any message or bulletin.
- ✓ I promise I shall answer all pleas for assistance - as far as my knowledge will allow.
- ✓ I promise I shall try to help all newcomers to the mode in any way I can.
- ✓ I promise I shall support my local AX25 Group in much the same way as the local voice repeater.
- ✓ I promise I shall support, in a similar way, my local BBS, bearing in mind the service and enjoyment I obtain from it and the expenses the local BBS has to endure.

The list is easy for anyone to make, as we all know, but to stick to those resolutions is yet another matter. However, if we all tried to do just that, the network would profit from it and increase in efficiency too. A little thought before hitting the keys is all that is needed.

Mode TCP/IP

The packet mode of TCP/IP tends to be ignored by all but the most courageous (or those with a masochistic approach to data communications). There have been several books written about TCP/IP, including the very informative and well-written book *NOS-View* by **Ian Wade G3NRW**. However, even this new book takes several times of reading through. That problem and the size of the book might well discourage the newcomer.

A booklet, produced by **David Norris G4TJP**, is designed to help somebody on the brink of trying TCP/IP for the first time. The booklet is produced in a similar format to the my own *BBS Survival Guide* and runs to about 40 pages. David's booklet is called *The Why and How of TCP/IP* and is designed as a practical step-by-step instruction set to enable the beginner to get going. The first few pages discuss the history, a description of TCP/IP and how to communicate using the mode. Various computers are discussed in the book, as are the many and various terms used. The book also tells you how to obtain your 'IP' address.

Obtaining and using your own IP address is essential if you are to operate TCP/IP. The book's appendix gives a full listing of the co-ordinators who issue the addresses for various regions.

Co-incidentally I received a couple of enquiries this month from prospective users asking where to obtain their IP addresses. I had forgotten about the BBS-HELP files issued, some while ago, by **Brian G8ASO**.

Most packet bulletin boards will hold the help files, so have a look in the files or library section of your local BBS. However, to provide some help for those having difficulty finding these files, the list is available from the editorial offices, (send a stamped self addressed A5 sized envelope marked 'Pac-Pan list Jan' to the Broadstone address).

In David's book is a section on setting-up the files and directories. This then goes on to discuss the starting of the program together with a lengthy description of how to set-up the configuration files.

Setting-up and configuration are important parts and seem to be the stumbling blocks for many trying to start up with TCP/IP. David finishes off with a help section and glossary of terms plus a few hints and tips.

All told, I think it's a worthwhile booklet for the beginner and a useful addition for the bookshelf. Apparently this book is just the beginning! David already has a sequel, called - *So you want more of The Why and How of TCP/IP* planned.

South Africa Satgate

In South Africa, **Gert ZS0STB**, runs a Satgate in Stellenbosch and he is pictured in **Fig 1**. He has a very neat layout as can be seen in the picture. He sends a list of BBS available in South Africa and this is available from the editorial address. (Use the same details given above for the TCP/IP lists).

Well, that's it for another month. Wishing you all the season's greetings, please keep the news coming my way:

Contact details: on Packet G3LDI @ GB7LDI: E-mail (via) mtaylor@uk.mdis.com or finally, snail-mail to The Old Nursery, The Drift, Swardeston, Norwich NR14 8LQ. Tel: (01508) 570278.

END

Write your advertisement clearly in BLOCK CAPITALS - up to a maximum of 30 words plus 12 words for your address - and send it together with your payment of £3.00 (cheques payable to PW Publishing Ltd.), or subscriber despatch label and corner flash to: **Zoë Shortland, *PW* Bargain Basement, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW.**

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BARGAIN Basement

Compiled by Zoë Shortland

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18 set. TX only, KW Atlanta transceiver 80W o/p (pair 807) 80-10m (3.5-28MHz), five-bands. Lafayette HA600A solid state RX, as new, BC221, Eddystone 870A. Wanted old broadcast radios. Retired electronics engineer. Tel: Cornwall (01872) 862291.

24cm f.m. ATV transceiver, Worthing 1W transmitter, LMW 4W amplifier, Wood & Douglas receiver, sequential logic, metal case, £175 or swap for Icom IC-202S. Prefer buyer inspects and collects. Bob G8VOI, Waterlooville. Tel: (01705) 250830 after 6pm.

934MHz Cybernet Delta TA1 and 934 pre-amp with mag-mount and aerial, £175. Marconi TF995 signal generator a.m./f.m. to 220MHz, £30. Tel: Northumberland (01665) 712288 after 5pm.

AEA Isoloop 10/30 magnetic antenna, complete controller cable, manual, £150. Optional auto tuner controller isolator, manual for above, £50. Geoff G3AOS, Cheshire. Tel: (01260) 252287.

Alinco DR-510 T/E 45/35W v.h.f./u.h.f. f.m. radio, very good condition, never used mobile, easy to use, complete with mounting bracket and instructions, now surplus to requirements, hence, £300 o.n.o. Tony, Reading. Tel: (01734) 332820 or (0973) 726077.

BSX TNCs three, boxed, diode matrix, p.s.u., £100. Atari STFM 1Mb RAM, monitor, 20Mb hard drive, floppy drive, software, £130. Amstrad PPC640DD, DOS 3.3, £80. 4m Pye Olympic, working, £10. Tel: Kent (01322) 613289.

Complete 2m (144MHz) starter station, FT-290R, home-brew 30W amp, p.s.u., 4-ele Tonna, 10-ele home-brew, mobile whip, rotator, cable, £235 (will split). Yaesu FRG-7700 a.t.u., £250. Buyer collects. *VHF/UHF Manual*, £8, others. Steve (ex G1GPW), Kent. Tel: (01732) 740521 evenings or 0171-210 6110 office. E-mail steve@plater.demon.co.uk

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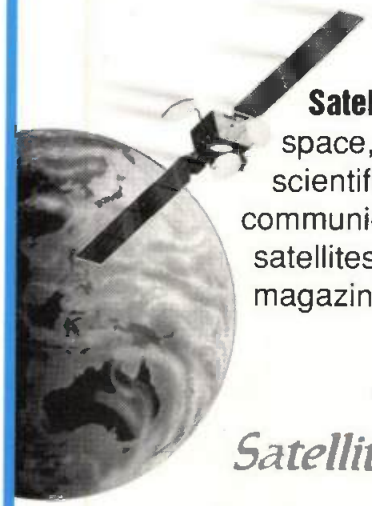

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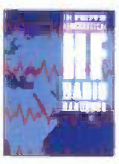

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John Case GW4HWR

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Anita Louise McCormick KA8KGI

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William R. Nelson WA6FQG

How to locate & cure r.f.i. for radio amateurs, CBers, TV & stereo owners. Types of interference covered are spark discharge, electrostatic, power line many 'cures' are suggested. 250 pages. £9.50

THE RADIO AMATEUR'S GUIDE TO EMC (RSGB)

Robin Page-Jones G3JWI

This paperback book provides essential information and reading for anyone who has an EMC (interference) problem. With the help of the well-illustrated text and techniques, much of the mystery from the troublesome world of electromagnetic compatibility is removed. 117 pages. £7.99

Historical

1934 OFFICIAL SHORT WAVE RADIO MANUAL

Edited by Hugo Gernsback

A fascinating reprint from a bygone age with a directory of all the 1934 s.w. receivers, servicing information, constructional projects, circuits and ideas on building vintage radio sets with modern parts. 260 pages. £11.60

THE BRIGHT SPARKS OF WIRELESS (RSGB)

G. R. Jessop G6JP

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WORLD AT THEIR FINGERTIPS (RSGB)

This book comprehensively covers the fascinating history, techniques, equipment used and personalities behind amateur radio from the very beginnings of the hobby to the late 1960s. John Clarricoats G6CL. 307 pages. £6.00

Maps and Log Books

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This standard spirally bound amateur radio log book has 100 pages and is marked out with the format required in the UK. There are columns for date, time (UTC), frequency, power (in dBW), station worked/called, reports, QSL information and remarks. £3.00

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Various Authors

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Pat Hawker G3VA

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Now in its 73rd Edition this 1200 page book is packed with information on everything from What Is Amateur Radio? through Practical Design to Construction Techniques and Operating Practices.

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ARRL OPERATING MANUAL

Another very useful ARRL book. Although written for the American amateur, this book will also be of use and interest to the UK amateur. Topics covered range from short wave listening through operating awards to repeaters, operating and satellites. 684 pages. £12.95

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Edited by Charles L. Hutchinson and David Newkirk

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Mike Mansfield G6AWD

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Stan Horzepa WA1LOU

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Steve Ford WB8IMY

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and receiving packet mail and exploring advanced networking systems. Your Packet Companion goes a long way to explain some of the mysteries of packet radio.
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John Branegan GM4IHJ
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QRP

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Edited by Rev. G. Dobbs G3RJV
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2nd Edition. Doug De Maw W1FB
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In its 3rd edition, this book provides many up-dated test equipment project designs for the radio amateur, complete with p.c.b. template (in the rear of the book). Areas covered include: current and voltage measurements, oscilloscopes, frequency, r.f., antenna and transmission line measurements.
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This is a stiff covered paperbacked novel-sized book. And if you've got an interest in transmitting with valves ..this is a useful reference source for valves up to 4kW input. The RCA authors have included some interesting practical circuits using their valves, including some for s.s.b., v.h.f. and others. Highly recommended reference source. 318 pages. £9.95.

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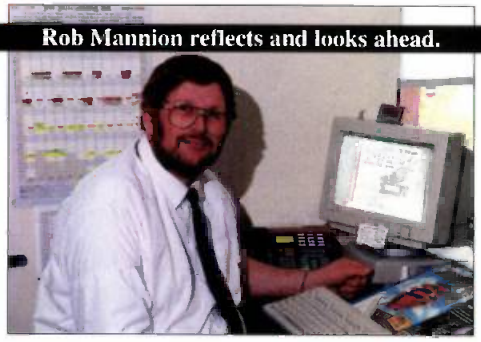
ENDNOTES



Rob Mannion reflects and looks ahead.

This edition of *PW* marks our return to general 'non-themed' issues. Readers will find there's a great deal of general interest within the magazine and apart from the occasional special themed feature editions, this will be our way forward into 1996.

By now, you will have discovered two facts about your January *PW*: that there's a splendid free poster with useful quick reference charts, and that our cover price has increased to £2.20. I've no doubt that all our readers will find the data charts to be very useful and it (like the blueprints of years ago) will also become a 'classic'.

It's remarkable that in this age of spiralling newsprint costs that we've been able to produce 32 issues since the last price increase in May 1993. Three years is a long time in publishing and I feel sure readers will understand the economics behind our decision.

(Subscriptions will remain at the old price until the April 1996 issue and back numbers will cost £2.30 each).

In The Swim

We're going to be in the swim again at the Ringwood Recreation Centre Pool on Saturday February 24 1996. This is the date we've booked for the second 'Dive In And Defeat Diabetes' sponsored swimming event to raise money for diabetic research, and facilities.

The Ringwood Recreation Centre is where the **BBC** TV film their 'The Brittas Empire' programme for BBC1. I'm aiming to swim 50 lengths of the 25m pool. I also hope to raise money for the new Diabetic Centre at the Royal Bournemouth Hospital, and to give a donation to the British Diabetic Association.

As PW Publishing Ltd., have kindly 'donated' the pool by hiring it for the evening, I'd be delighted to be sponsored by readers. And we'll also be delighted if you want to attend on the evening, which will be 'launched' by our good friend TV 'weatherman' **Jim Bacon G3YLA** who 'forecasts' a good splash when he pushes me in to start the event!

Full details of the event (including sponsorship forms) can be obtained from the **Short Wave Shop** in Christchurch, **(01202) 490099**. Please address all enquiries to the Short Wave Shop and **NOT to the *PW* Editorial Offices**.

Bob G6DUN and Colin G3XAS from the Short Wave Shop have also kindly donated some superb 'World Time Clocks' for a prize raffle during the evening. So, if you have the 'time' to come and join us you could meet the team, have an enjoyable evening and help a good cause and perhaps win a prize in the raffle. We're looking forward to seeing you there!

As this is our last issue of *PW* before Christmas 1995, everyone on the team wishes you all well for the season and the coming new year. We also hope you have fun building the various projects this month and enjoy a good read while relaxing over Christmas. May God bless you all, wherever you are.

Rob G3XFD

PW SERVICES

Queries:
Practical Wireless,
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Arrowsmith Court,
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Broadstone,
Dorset BH18 8PW.

We will always try to help readers having difficulties with *Practical Wireless* projects, but please note the following simple rules:
1: We **cannot** deal with technical queries over the telephone.
2: We **cannot** give advice on modifications either to our designs, to commercial radio, TV or electronic equipment.
3: All letters asking for advice **must** be accompanied by a stamped self-addressed envelope (or envelope plus IRCs for overseas readers).
4: Make sure you describe the problem adequately, with as much detail as you can possibly supply.
5: Only one problem per letter please.

Back Numbers

Limited stocks of many issues of *PW* for past years are available at £2.30 each including post and packing. If the issue you want is not available, we can photocopy a specific article at a cost of £1.50 per article or part of article. Over the years, *PW* has reviewed many items of radio related equipment. A list of all the available reviews and their cost can be obtained from the Editorial Offices at Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW for a large stamped self-addressed envelope.

Binders

PW can provide a choice of binders for readers' use. Plain blue binders are available, each holding 12 issues of any similar A4 format magazine. Alternatively, blue binders embossed with the *PW* logo in silver can be supplied. The price for either type of binder is £5.50 each (£1 P&P for one, £2 for two or more).
Send all orders to PW Publishing Ltd., FREEPOST, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW.

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Components for *PW* projects are usually readily available from component suppliers. For unusual or specialised components, a source or sources will be quoted.

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