THE UK'S BEST SELLING MAGAZINE FOR AMATEUR RADIO ENTHUSIASTS

practical Wireless

FEBRUARY 1996 £2.20

It's Arrived!

Icom's IC-706 'Mobile Dream Machine' Reviewed By G0RSN

FREE INSIDE

Pull-Out PW Amateur Radio Year Planner

BUILD

A TABLE TOP LOOP ANTENNA

A TRANSISTOR CHECKER

READY FOR CTCSS? - G8JVE HELPS YOU PREPARE

FEATURES

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PLUS ALL YOUR REGULAR FAVOURITES

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ADMS-1 COMPUTER PROGRAMMABLE

Ultra Compact Handhelds FT-10/40R

ARTS
Tracks range of 2 identically programmed HTs.

TOP NOTCH™
Multi-function knob controls programming and volume.

PTT THUMB SWITCH
Ergonomically designed, conveniently located, insures maximum comfort.

ALPHANUMERIC DISPLAY
Allows 4-character labelling of important frequencies.

SUPER LOUD AUDIO
State of art miniaturization givest greatest RX volume and clarity.

RUBBER GASKETS
Protects against corrosion from dust, rain or spray.

12 V DC JACK
Use optional E-DC-5B power adapter in your car for 5 W PWR O/P.

"This HT is the first amateur radio with built-in Digital Coded Squelch (DCS) for RX and TX."

"For a radio this small and rugged, the audio is genuinely LOUD!"

"I used ADMS-1 to program my FT-10 when we went camping, and the new ARTS system to keep track of my kids on the trails!"

"Yaesu did it again!"

Military spec commercial grade HTs loaded with new features and a choice of keypad, too.

FTT-10/A16S
16-Key, CTCSS Enc/Dec, DCS Enc/Dec, Digital Voice Recorder 99 Channels

FTT-10/A16
16-Key, CTCSS Enc, DCS Enc/Dec, 30 Channels

FTT-10/A06
6-Key, CTCSS Enc, DCS Enc/Dec, 30 Channels

FTT-10/A16D
16-Key, CTCSS Enc/Dec, DCS Enc/Dec, 99 Channels

Specifications

- Frequency Coverage
  FT-10R
  2m: RX: 140-174 MHz
  TX: 144-146 MHz
  FT-40R
  70cm: RX: 420-470 MHz
  TX: 430-440 MHz
- Choice of 4 keypad options (6, 16 or Deluxe and DVRS16 Keypads)
- Auto Range Transpond System™ (ARTS™)
- MIL-STD 810
- High Audio Output
- 12 V DC Direct Input
- Alphanumeric Display
- RX/TX Battery Savers
- Digital Coded Squelch (DCS)
- Digital Voice Recording System (DVRS) w/FTT-10/A16S
- True FM for better voice clarity
- High Speed Scanning System
- 2.5 and 5 W available
- Full line of accessories

The FT-10/40R is a totally new HT concept! Built to rugged, tough military spec, commercial radio standards inside and out, it's small, powerful, feature-packed and ready to roll out in four versions!!

Four different keypads – count 'em, FOUR! First true user-choice customized HT on the market, offers a 6, and three 16 keypad selections plus 2.5 and 5 W battery choices, too! Easy for Yaesu, the electronics are in the keypad. Easy for you, they're already installed. Just pick the one that suits your HT "style"!

New technology high-efficiency speaker design provides super-loud audio. No small surprise – after all it is Yaesu!

First ever, amateur HT rated MIL-STD 810! What else could you hope for? This, maybe. Dual Watch – see two frequencies displayed simultaneously in the display. No other single band HT has this feature. Another Yaesu exclusive, the Auto Range Transpond System™ (ARTS™) alerts you visually and audibly when a companion HT is out of simplex range. Most radio functions, are controlled of the Top Notch™, the neatly placed knob on the HT. This minimizes complex key sequences. Only Yaesu has this. Digital Coded Squelch (DCS) – for convenient semi-private operation. Digital Voice Recording System (DVRS) – records voice messages for playback, and received messages. And, of course Omni-Glow™ display, because you won't be able to put this one down!

The FT-10/40R is a military-tough, commercial-quality force in a small package. Exactly what you've come to expect from Yaesu! Better get one now, before the dealer sells out!

FT-51R
Dual Band with Windows Spectrum Scope™, Alphanumeric, Scrolling Menu, Battery Voltage Display. 2 or 5 W. World's smallest dual band HT!

FT-11/41R
Slim, trim and powerful! Alphanumeric, Compact Battery Design, Up/Down Thumb Control, RX/TX Battery Savers. 2 or 5 W Available.

YAESU

Performance without compromise.℠

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

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Lowe Electron

Introducing the Lowe Electronics HF Starter Kit

Just about to take your first steps on to the HF bands? Worried about getting all the right bits and pieces together? Worry no more because we've done it all for you. Yaesu's magnificent FT-840 is an ideal transceiver for the beginner. Easy to operate put packed with features and performance. It comes with fist mic but we're throwing in a Morse key too.

Buy that lot as separate items and you will spend a little under £1300. Get it all together for just

£999

Okay, now you need something to power it with – Mansons EP-925. 25A at 13.8 volts and we've sold thousands of them – the UK ham's favourite power supply. That takes care of all the inputs and for the output we've got an ATU and an antenna. MFJ's 941E ATU. This accepts a wide variety of antennas and is rated at 300W. It's also got a built-in SWR meter. For an antenna, we've chosen the G5RV. A tried and tested design with thousands sold every year. We're throwing in a half-size Chelcom Aerials G5RV, so you're getting great quality (if you've got the room, you can have a full-size one instead!)

You'll need a patch lead as well from the FT-840 to the ATU and then out to the antenna so we're also giving you 10m of coax and a four PL-259s and, oh yes, you'll also need a logbook to enter all your new contacts into. All that is part of our superb package deal. The numbers are strictly limited so if you want to take advantage, you better call us today!

Master Dealer YAESU

Kenwood TM-733E

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Normally £729 but just **£629** from Lowe Electronics.

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AT-200 – just £164.95

AT-400 – just £189.95

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RRP is £479 but pay only **£399** from Lowe.

Yaesu FT-51R

The only dual band handheld featuring "Windows" – the manual is built-in so all the commands are at your fingertips. If you want real Windows control, ask about the ADMSI control software and interface available as an option.

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RL-402 UHF 410-470MHz only **£149** save £50

(both supplied C/W cell case antenna & hand strap)

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HF TRANSCEIVERS/AMPLIFIERS

PX	FTONE	Yaesu	Excellent	£895.00
PX	FT1000	Yaesu	Pristine	£2,399.00
PX	FT980	Yaesu	Good Cond	£925.00
PX	FC757AT	Yaesu	V/Good)	£295.00
PX	FC700	Yaesu	V/Good	£169.00
PX	FL7000	Yaesu	Good	£1,495.00
PX	FT400C	Yaesu	Unused	£169.00
PX	FT902DM	Yaesu	V/Good	£475.00
PX	YO901-Panadaptor	Yaesu	V/Good	£339.00
PX	FC902	Yaesu	V/good	£135.00
PX	FV901DM	Yaesu	V/Good	£119.00
PX	STATION (x4)	Yaesu	V/Good	£959.00
PX	TS850SAT	Kenwood	Pristine	£1299.00
PX	HL2K	Tokyo	As New	£ 1495.00
PX	HT180	Tokyo	Good	£289.00
PX	IC725	Icom	Good	£599.00
PX	IC726	Icom	Ex-Demo	£899.00
PX	IC735	Icom	Excellent	£895.00
PX	IC737	Icom	As New	£1239.00
PX	IC729	Icom	Unused	£1060.00
BX	FT901DE	Yaesu	Good	£449.00
LX	FT990	Yaesu	Excellent	£1525.00
LX	FL7000	Yaesu	As Now	£1,650.00
LX	FT767GX/2mtr	Yaesu	Good	£1,300.00
LX	FT767GX	Yaesu	V/Good	£1,450.00
LX	FT890AT	Yaesu	As New	£1,250.00
LX	FT7B	Yaesu	Fair	£275.00
LX	FT101B	Yaesu	Good	£275.00
LX	TS140S	Kenwood	V/Good	£575.00
LX	TS850SAT	Kenwood	Excellent	£1,350.00
AX	LA-120	Ham	V/Good	£125.00
AX	FT990	Yaesu	Good	£1,650.00
AX	FT102	Yaesu	V/Good	£484.99
AX	FT901DM	Yaesu	Fair	£449.00
AX	IC751A	Icom	Fair	£850.00
AX	IC765	Icom	Fair	£1699.00
AX	IC725	Icom	V/Good	£624.99
AX	IC720A	Icom	Good	£399.00
AX	IC726	Icom	V/Good	£774.99
AX	TS830S	Kenwood	V/Good	£575.00
AX	TS450SAT	Kenwood	Good	£1025.00
AX	TS450S	Kenwood	V/Good	£575.00
AX	TS440SAT	Kenwood	Good	£825.00
AX	TS440S	Kenwood	Good	£699.00
AX	TS130S	Kenwood	Good	£395.00
AX	AT50	Kenwood	Good	£216.00
AX	HX-240	Tokyo	Good	£220.00
RX	30L-1	Collin	Good	£425.00
RX	FL2100Z	Yaesu	Good	£595.00
RX	FR/FLDX500	Yaesu	Good	£195.00
RX	FT101Z	Yaesu		£475.00
RX	FT101ZD	Yaesu		£474.00
RX	FT102	Yaesu		£474.00
RX	FT7	Yaesu	Fair	£249.99
RX	FT767GX	Yaesu		£1,650.00
RX	FT747	Yaesu	Good	£550.00
RX	FT77	Yaesu		£420.00
RX	FTONE	Yaesu	Good	£750.04
RX	HT120	Tokyo	Good	£175.00
RX	IC720A	Icom	Poor	£350.00
RX	IC737	Icom	V.G.C	£1,095.00
RX	IC768	Icom	Fair	£1778.00
RX	JST135	JRC	Good	£795.00
RX	SB104			£225.00
RX	TS440SAT	Kenwood	V.G.C	£750.00
RX	TS850SAT	Kenwood	As New	£1,649.00

VHF/UHF TRANSCEIVERS

PX	2002A	Henry	As New	£1435.00
PX	FL2025	Yaesu	Good	£119.00
PX	FT290R	Yaesu	Good	£295.00
PX	FTC740A	Yaesu	New	£99.00
PX	FT727R	Yaesu	Fair	£225.00
PX	FT415	Yaesu	Good	£169.00
PX	FT2500M	Yaesu	V/Good	£309.00
PX	FT23R	Yaesu	Pristine	£169.00
PX	FT5200	Yaesu	Good	£559.00
PX	FTC740A	Yaesu	V/Good	£99.00
PX	Mariner-99	Yaesu	Good	£189.00
PX	IC900E	Icom	Good	£475.00
PX	IC2SRE	Icom	Good	£295.00
PX	IC2SET	Icom	Good	£195.00
PX	TH205E	Kenwood	Good	£139.00
PX	DJF1E	Alinco	Good	£120.00
PX	5600	Midland	Good	£99.00
PX	C500	Standard	Fair	£245.00
BX	FT290R	Yaesu	Good	£219.00
BX	ICU	Icom	Good	£139.00
LX	DJ580	Alinco	Mint	£380.00
LX	DJ580E	Alinco	V/Good	£350.00
LX	FT2500M	Yaesu	Good	£295.00
LX	FT2200	Yaesu	Good	£275.00
LX	FT727R	Yaesu	V/Good	£259.00
LX	FT470	Yaesu	Good	£250.00
LX	TH21	Kenwood	Fair	£145.00
LX	TH21E	Kenwood	Good	£100.00
LX	TH47E	Kenwood	Good	£195.00
LX	IC2SET	ICOM	Good	£176.00
LX	C528	Standard	Good	£175.00
AX	C500	Standard	Good	£225.00
AX	C844	Standard	Fair	£50.00
AX	FT290R	Yaesu	V/Good	£275.00
AX	FL2010	Yaesu	V/Good	£65.00
AX	TM-732E	Kenwood	V/Good	£525.00
AX	IC4E	Icom	Good	£110.00
AX	IC2ZE	Icom	Good	£17900
AX	IC02E	Icom	Good	£169.00
AX	IC-W21ET	Icom	V/Good	£299.00
AX	IC2IE	Icom	V/Good	£189.00
AX	M40FM	HRC	Good	£45.00
AX	TEMPO		Good	£88.99
RX	AMR1000		V/Good	£175.00
RX	FT290R	Yaesu	Fair	£199.00
RX	FT727R	Yaesu	Good	£225.00
RX	FT5100	Yaesu	Fair	£325.00
RX	IC4E	Icom	Fair	£150.00
RX	IC32A	Icom	Fair	£335.00
RX	TH28E	Kenwood	Good	£195.00

RECEIVERS

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PX	HF225	Lowe	Pristine	£425.00
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PX	FRG9600	Yaesu	Good	£380.00
PX	ICF-SW1	Sony	As New	£129.00
PX	ICF-SW7600	Sony	V/Good	£139.00
PX	AIR7	Sony	Good	£169.00
PX	Satellit 500	Grundig	Good	£219.00
PX	MVT7100E	Yupiteru	V/Good	£295.00
BX	PRO2006	Realistic	Good	£249.00
BX	PRO39	Realistic	Fair	£129.00
BX	SW8	Drake	V/Good	£429.00
BX	R2000	Kenwood	V/Good	£399.00
BX	AR3030	AOR	V/Good	£449.00
BX	R532		Fair	£99.00
LX	HF225	Lowe	Good	£385.00
LX	FRG7	Yaesu	Fair	£165.00
AX	MVT7100	Yupit	Good	£299.00
AX	2001D	Sony		£169.00
AX	HF225	Lowe		£410.00
AX	RF3100	Panas		£199.00
RX	220	B/Cat	Fair	£90.00
RX	HF150	Lowe		£345.00
RX	R1	Icom	Good	£285.00
RX	HF225 Europa	Lowe	Good	£395.00
RX	ICFSW77	Sony	Good	£269.00

DATA/COMPUTER

PX	MM4001+KB	M/M	Fair	£169.00
PX	FIF80	Yaesu	Good	£25.00
PX	RM1	ICS	Good	£29.00
PX	PK232/BBC	ICS	Fair	£10.00
PX	MeteorSAT	M/M	Fair	£495.00
AX	MM2001	M/M	Good	£65.00
AX	PK232/MAIL	AEA	Fair	£199.00
AX	CD660		Excellent	£154.99
BX	KPC4	Kantronics	V/Good	£159.00
RX	MK	Datong	Good	£55.00
RX	DSP-2232	AEA	VGC	£695.00
RX	PK232MBX	AEA	Good	£210.00
RX	MBA-RC	AEA	Good	£210.00
RX	AMT-2	ICS	Fair	£69.00
RX	KPC3	Kantronics	V/Good	£130.00

MISCELLANEOUS

PX	2002A	Henry		£1435.00
PX	DX1296	SSB-Elec.		£139.00
PX	FC700	Yaesu		£169.00
PX	FRT7700	Yaesu		£59.00
PX	TM1000	Nevada		£179.00
PX	DX1296	SSB	New	£129.00
PX	12/25	BNOS	Fair	£159.00
PX	FAX1	ICS	As New	£299.00
PX	FC757AT	Yaesu	Excellent	£295.00
PX	HL180V	Tokyo	Good	£310.00
PX	AS-300L	Tokyo	New	£149.00
PX	AS-800	Tokyo	New	£165.00
PX	IF-100PC	Rico	Recond	£145.00
PX	IF-100C64	Rico	Recond	£145.00
LX	9467	BNOS		£160.00
LX	FC757AT	Yaesu	Good	£200.00
LX	FP757HD	Yaesu	Good	£219.00
LX	FP757HD	Yaesu	V/Good	£219.00
LX	HX240	Tokyo	Good	£259.00
LX	TB3MK2	JBeam	Good	£340.00
AX	AL811X	Ameri	Mint	£550.00
AX	FV102DM		Excellent	£165.00
AX	TL-120	Kenwood	V/Good	£150.00
AX	PP1	Icom		£139.00
AX	232 Display	ERA		£189.00
RX	AT230	Kenw	Good	£185.00
RX	DSP100	Kenw	As New	£335.00
RX	FP757ND	Yaesu	Good	£195.00
RX	LPM144-1-100	BNOS	Good	£150.00
RX	PS55	Icom		£145.00
RX	LP432/10/100	BNOS	Good	£210.00

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Includes a host of exciting features. You get **CTCSS built-in, 200 memories** as standard and a wideband receiver covering **108-174 / 420-470 / 800-950MHz**. You'll love its compact size and its electronic vol. / squelch controls. Send today for full details of tomorrow's handheld.

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Works with All Handhelds

80 Watts from Your Handy!

Superb Pre-amp

See Review This Issue

Can be Used with IC-706

DX-70 100W HF + 6M

Best Value Today

£995

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DX-70 Budget Station
100 Watts, Narrow SSB & CW filters
Hand Mic. £995

DX-70 Home Station
100 Watts, Narrow SSB & CW filters
Base Mic, 230V AC Supply £1099

DX-70 Mobile Station
100 Watts, Narrow SSB & CW filters
Remote Head kit, Pro-Am Single Band whip of choice, HF Magnetic Mount £1099

Additions

Manual ATU Coax feed. (if ordered at the same time) £229
5 Year Extended Warranty £89

HF Deals

INDEX QRP Plus Now in stock!

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Waters and Stanton stock all the popular models and every one is offered at a discounted cash price.

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Alternatively we can offer free interest terms calculated on retail prices with 10% initial deposits.

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Kenwood TS-870

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Icom IC-775DSP

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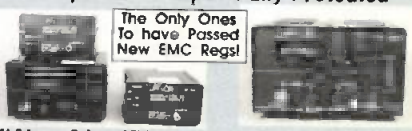

W-3A	3 Amp 12V current/Volt protected	£22.95
W-5A	5 Amp 12V current/volt protected	£29.95
W-10A	10 Amp 12V current/volt prote	£49.95
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W-20AM	20 Amp 3-15V variable	£89.95
W-30AM	30 Amp 3-15V variable	£119.95

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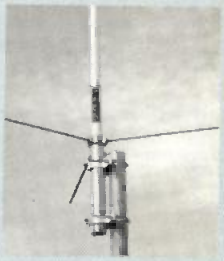

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EDITOR'S Keylines

Rob Mannion's viewpoint on the World of Amateur Radio

Popular Section

'Receiving You' always seems to be a popular section of *PW*. Readers' letters reflect the modern amateur radio scene in an effective way. And this month, I'm actually taking the opportunity to reply to a letter in 'RY' from the Radiocommunications Agency where their spokesman considers that my recent 'Keylines' on 27MHz CB to amateur bands conversions was "unfair".

In his letter Colin Richards of the RA's Radio Investigation Service (RIS) says that my editorial was "Unfair on us on a number of counts". Colin then goes on to detail the RIS point of view in detail.

The final part of Colin's letter then (as far as I'm concerned) goes on to fully justify my reasons for allowing radio amateurs to convert multi-mode CB equipment for 28MHz operation! And in my opinion the argument "these sets are easily converted back again for illegal CB use" does not hold water!

From my point of view, once a converted CB multimode transceiver is converted to amateur radio use, it's unlikely to be released by the amateur fraternity. Our (very healthy) second-hand equipment market would snap up equipment like this...once everyone knew that they were not likely to be breaking the law.

The vast majority of radio amateurs are honest, decent and trustworthy. I'm certain that we could be trusted to ensure that converted equipment did not fall into the wrong hands. We would be helping the RA by removing the transceivers from the 'black market', enabling the RIS to concentrate their limited resources on illegal equipment entering the country and being used by the people we can all hear on 27MHz s.s.b.

I'm pleased that *PW* is read carefully by the various Government departments. Our readers' opinions, thoughts and ideas are often commented on and personally I'm pleased that we're not a 'voice in the wilderness' with nobody listening!

I should also remind readers that Amateur radio in the UK has many friends and a lot of support from the RA. And of course there are many radio amateurs working within the Agency itself.

Personally, I have tremendous respect for Colin and his colleagues. They often fight a corner for us, but I know that by not allowing licensed amateurs to continue buying and converting illegal multi-mode CB radio equipment for 28MHz use - the RA have got it wrong this time!

Rob Mannion G3XFD

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

Wordsearch

Words To Find:

Antenna
Electronics
Focal
Icom
Point
Transistor
Dayton
Ferranti
Helta
Planner
Servicing
Wall

Wordsearch rules:
Twelve different words have been hidden in the letter grid. They have been printed across (forwards or backwards), up and down, diagonally, but they are always in a straight line without odd letters between. You can use the letters in the grid more than once for different words. Once you have found all 12 words, mark them on the grid and send it, along with your name and address (photocopies accepted with the corner flash) to our editorial address, marked 'Competition Corner' Wordsearch February 1996.

L	D	C	I	D	Z	U	U	A	G	M	R	Y	P	C	K
J	G	M	F	E	R	R	A	N	T	I	D	U	Q	Q	S
L	A	C	O	F	A	N	N	E	T	N	A	W	S	E	K
F	R	O	T	S	I	S	N	A	R	T	O	E	P	O	P
S	R	N	P	I	M	R	K	E	I	K	R	O	B	N	H
F	P	W	H	S	P	P	K	L	K	V	I	R	A	M	P
K	V	L	L	A	W	P	O	E	I	N	Q	N	A	R	I
D	P	E	T	P	L	E	L	C	T	W	P	O	L	J	B
P	E	G	G	A	P	S	I	T	Q	R	U	T	F	Y	W
N	L	F	N	B	Q	N	W	R	R	K	I	Y	Q	L	L
B	F	N	X	X	G	M	S	O	G	I	F	A	Z	I	U
L	E	O	S	B	X	A	X	N	F	T	X	D	C	P	G
R	S	X	Z	A	P	T	A	I	E	I	G	O	K	B	Y
Y	E	B	R	D	Y	L	Q	C	I	J	M	U	C	O	Q
L	H	W	T	J	G	E	Y	S	I	P	Q	X	L	L	O
D	Q	I	P	B	I	H	Q	H	V	V	O	N	K	M	G

Name.....

Callsign.....

Address.....

.....

.....

Postcode.....

Send your entry (photocopies acceptable with corner flash) to: **Wordsearch Competition, February 1996, PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW**. Editor's decision on the winner is final and no correspondence will be entered into.

FIRST PRIZE: A year's subscription to *Practical Wireless* or a £20 book voucher. **SECOND PRIZE**: A six month subscription to *Practical Wireless* or a £10 book voucher.

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Entries to reach us by **Friday 23 February 1996.**

Wordsearch Feb. '96

RECEIVING You

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

Unfair To The Radiocommunications Agency

Dear Sir
Reference Illegal CB Transceivers: Your 'Keylines' editorial for October was rather unfair on us for a number of counts. Even with unlimited resources, we would be unlikely to catch every sale of an illegal CB set in the country. Nevertheless, the introduction of the restriction Order in 1988, which made sale, advertisement, importation, possession, etc. of illegal CBs an offence, had a dramatic effect on the numbers in circulation.

In 1994/5 we applied for forfeiture on 15 occasions, a figure that has steadily dropped from the 102 applications for forfeiture for use of illegal CB in 1987/88 immediately before the Order came in and 406 in 1985/6. Sometimes, the possessors of illegal CB sets decide to voluntarily disclaim ownership which spares the need for forfeiture proceedings. We continue to be vigilant against illegal CB as part of the RIS's annual work programme and we do act when we find illegal sets.

The Agency did allow the conversion of illegal CB sets to the 28MHz (10m) band for two years after the Order came in. We still get honest amateurs who tell us when they have obtained one of these sets and who ask us to transfer the specific permission to possess it from the previous owner. We willingly grant this. However, having been converted to amateur band use, these sets are easily converted back again for illegal CB use.

We are concerned that if we were to allow a relaxation, the sets would get into the wrong hands and we would quickly see a return to the old days of widespread, illegal, high power CB, particularly on s.s.b. That would bring with it a resurgence of the high levels of interference to the emergency services and to domestic broadcast reception, which we have largely eradicated and which the current legislation allows us to control.
Colin Richards
Radio Investigation Service
Radiocommunications Agency
London

Editorial note: Please see 'Keylines' for comments on this letter.

Comparisons & Reviews

Dear Sir
Ref: 'Keylines' and *PW* reviews. Comparisons are odious, at least that has been my axiom over the years. So that when it comes to rig reviews, I think these should be strictly objective, without even any opinion of the tester.

With hand-helds and such, an observation of all the salient qualities could be made. How powered, are all connectors standard, how controls are placed and useable. In fact, all the things that are observed with a hands-on approach.

Larger items can be treated, with colour, case, etc., all coming under review. Performance figures are already supplied by the manufacturer, and if a set does not perform to these figures, then we know the remedy! In short, I would like more of a visual review with the makers supplying performance specs. Just let us be objective!
J. G. Openshaw G2AYG
Lancashire

Top Band Transverter

Dear Sir
In the March 1995 issue of *PW*, I saw an interesting article by Ben Nock G4BXD - a Top Band Transverter. As 'Top Band' has been a favourite band of mine for many years (using home-brew, both for mobile and fixed station operations) I thought this looked an interesting one to build. I should also add that I'm a keen *PW* reader and project builder.

After 'badgering' John for the boards (pun intended!), I found that no artwork was available, even as late as October. At the bottom of the transverter article was a note from your good self which said that in future issues, this article would be continued, but having read every issue since, I find no mention.

This project would be nice on say, two boards. Is there any chance of it appearing as a whole article? Finally, as a reader and home-brewer for over 50 years, it was nice to see you and chat at Leicester.
Ron Roberts G3TAR
Rugeley

Editor's reply: Ron has a good point, and I'm sorry that we've not yet produced the final part of the project mentioned. The difficulties were caused by the original designer - Dereck Pearson G3ZOM of 'Jandek'

Scanners - The Last Words!

Dear Sir
Ref: The letter from Walter Farrar in the November issue. He asks why shops are allowed to sell radio equipment such as 'scanners' that cannot be licensed and therefore legally used. One possible answer is that its because we are not yet a police state.

As M. Langford points out in the same issue, there are many radio amateurs who use such receivers on the amateur bands perfectly legally. Those using them to listen on aircraft frequencies, whilst offending against the Wireless Telegraphy Act, are officially tolerated, they are pretty harmless.

Mr Farrar's comparison of buying and owning radio equipment with buying and owning firearms, ie. both should require production of a licence before being sold, is frankly laughable. The possession of firearms in the UK is strictly controlled for one very simple reason, in the wrong hands they can kill. Short of physically striking someone with it, how do you kill them with a radio scanner?

A more realistic comparison would be with a dog licence. I know that dog licences are no more. They were done away with because (a) they were too expensive to administer and (b) the system was widely abused. The excessive bureaucracy to 'police' such a system as Mr Farrar advocates would lead to an unrealistically high licence fee being imposed upon legitimate users of such equipment, after all, who else would pay? I doubt it would stop what would become unlicensed possession.

I agree with Mr Farrar that it is useless having laws that are not enforced, and I agree with a recent Home Secretary who said that unenforceable laws are bad laws and bad laws should be swept aside.

As for the lamented visits of Post Office officials to inspect radio amateurs stations. Could it be that these are only made these days as the result of a complaint, TVI or similar. There are many more amateurs now than in years gone by. Mostly using 'commercial' equipment. Perhaps, as a ratio to these greatly expanded numbers, they cause less problems to others.

Maybe the DTI take a view that if nobody is complaining there is probably nothing wrong. To re-introduce random visits would require an increased bureaucracy and a consequent increased licence fee. Anybody want to pay £30-40 a year for their licence?
W. G. Jones GW4KJW
Gwent

Editor's comment: Because of lack of space this letter was held over from a previous issue and is POSITIVELY the last on the subject of scanners. I thank readers for their tremendous interest.

ceasing production. However, the project is under way and I hope to make an announcement soon and also apologise for keeping readers waiting for the rest of this interesting project.

The Wonder of Morse

Dear Sir,
Why do we really enjoy using Morse code? Although I cannot speak for everyone, I'd like to share some of my reasons with you.

I enjoy c.w. for the same reasons that a person will go out and hunt with a bow and arrow rather than a rifle and for the same reason a person will get in 'sync' with nature and sail rather than ride in a motor boat. It is interesting that all the activities mentioned require greater skill, are more difficult and less convenient than their counterparts.

A gun is much more efficient for hunting, and a motorboat will always get you places faster. There are of course 'plusses' and 'minuses' to all of these activities and there may be times that we prefer one over the other, but this does not discount the value of superiority of either. For me, good c.w. is like listening to a well disciplined orchestra 'sing' its symphony. Good code 'sings' to me. It has rhythm, melody, form, style and texture (some of the basic elements of music) and these elements bind and draw me to it.

Yet there is an aesthetic pleasure which I get from listening to c.w. and I believe there is an existential reason why we enjoy c.w. Code does have its merits, just as riding a bicycle is good for the health or home-grown vegetables are better for you. We enjoy c.w. because our association with it brings us pleasure and our ability to communicate in a dialect which is unique and exclusive and which some outsiders find mysterious is part of code's attraction.

Is c.w. dying out? Absolutely not! It will live as long as people love the bow, sailing, and crafting with their hands - c.w. will live as long as people remain human.

(With acknowledgement to WB5ZJN)
E. Longden

Editor's comment: This letter came in via the 'Internet' and like many others only had the E-mail address. Please remember that to accept your letter for publication we need your full name and postal address, although the full address will not appear in the magazine. Additionally, anyone not equipped with Internet facilities does not have to worry about E-mail 'jumping the queue'. All incoming mail (electronic or not, and this includes FAXes!) is dealt with equally and as soon as possible.

Pricey RAE

Dear Sir
I have delayed writing to you for some time, but having just read December 1995 'Keylines,' I feel that I must finally put pen to paper. In September of this year, having held my Novice licensed for about two years, I decided to try and do the RAE in May 1996. I felt this was the natural thing to do as I was progressing along the route to a full licence.

Thankfully, finding someone to teach me was no problem. There are many kind amateurs in my club who were willing to and ready to help and soon a small group studying for the RAE were set up within the local radio club.

Nevertheless, I was more than shocked when I rang the college (where I was to sit the exam) to find out about the prices. As you know, the two papers to the RAE, plus an extremely moderate centre fee, totalled over £40. Then I added £10 for the RAE book, which is pretty much a necessity. This is a lot to pay in one go, added to the fact that there are no guarantees that I would pass first time.

I am not saying that it is unfair that I cannot afford it, whereas others can. However, I find it unjust that I will be paying the same amount as an adult amateur who will be earning a full wage, particularly as I am under 16.

Radio amateurs do their best to encourage young blood into the hobby via the Novice Licence. Once they have obtained this, they are told that they should get a 'proper licence' (whatever one of them is!) and do the RAE. However, nobody seems to take account of the fact that being young they are obviously not earning a full wage.

Why don't those responsible for administering the RAE organise some kind of discount scheme for young novices (or indeed those who cannot afford it, such as the unemployed, etc.)?. This would result in Novices being able to afford to take the full exam.

The other solution is for people who do hold a full licence to realise that not all Novices can afford the RAE and stop all this 'when are you getting your full licence?'.

You may say that my parents could afford this. But when you were young, did you ever try to get £50 out of your parents?!!
Tom Girdler 2E1
Leicestershire

Citizen Band Transceivers

THIS MONTH'S STAR LETTER

Dear Sir
Ref: comments in *PW* regarding 28MHz single band rigs. When I came back from the USA after 16 years in various parts, I dutifully wrote to the Radiocommunications Agency (RA), informing them that I would be bringing into the country a 28MHz monoband rig (it actually transmitted/received and ran 26-28MHz).

Having given the RA both my USA address and the one I would be going to in England, I heard nothing. So I continued to use it until I sold it at a rally. A multiband that can transmit on both 27 and 28MHz is quite legal in the USA and I don't see why it could not be made legal here.

We very rarely get CBers on the amateur bands, but a lot of amateurs could be found on 27MHz. In fact, that is how I first came into amateur radio through contact with amateurs on 27MHz. The sideband users were generally a good crowd and most were as proud of their stations as amateurs and were polite on the band, a lot more so than some radio amateurs I have heard, especially during contests (they think they have the right to the band because there is a contest on).

When you come down to it though, the very people that would like to see 28MHz monoband rigs legal, would strongly object to CBers being given sideband facilities on 27MHz. This facility of course would make more convertible rigs available to the starting amateur.

I can hear the outcry now..."we had to pass the RAE and Morse test to get on the h.f. bands, now they are giving them to the CBers" when, in fact 27MHz could be the starting point for the next generation of radio amateurs. Come on G3s and G4s, let's hear your views!
Dennis Barber G0UFS/KB8GCF

Comparative Reviews

Dear Sir
I read with interest the comments of G7PRD in his 'RY' letter and also your views in 'Editors Keylines' and couldn't help rising to the bait! I believe that Russell has a point in suggesting comparative reviews between similar types of equipment in an effort to assist those either contemplating an initial purchase or up-dating at a later time.

Your comment that the "reviews can only be the opinion of the reviewer" is really only a part truth as it depends on whether the reviewer is being subjective or truly objective. The feel of the controls and the ease of band changing, for example, may be of some importance, but you can't be subjective when using a signal generator, an oscilloscope or an accurate power meter!

As far as choosing appropriate equipment to compare, categories might include price (value for money?), QRP, British made, mono-band or dual-band, necessary and not so necessary 'gimmicks' or even just lightweight equipment with simple functions for those of us who like to operate on holiday away from the home QTH.

Familiarity with the comparison equipment is helpful, I agree, but anything that enthuses us to make a more regular visit to the local 'emporium' can only be a good thing for our continuing education as well as encouraging to the suppliers. Finally, after your comparison with the motoring press, I'd much prefer to be 'driving' the new FT-1000MP than a Ferrari!
N. J. Plumb G0PBV
West Sussex

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

NOVICE Natter

For Radio Beginners Of All Ages

Elaine Richards G4LFM has details of the Yeovil Award, encourages you to get your school on the air and asks 'Watts a dBW?' in 'First Steps'.

Happy New Year! I hope Santa brought you all the goodies you hoped for, if not then perhaps you'll have to drop a few heavier hints next year!

A nice addition to the shack wall for the New Year could be a very commendable resolution. The **Yeovil Amateur Radio Club** have an award on offer that's available to all transmitting amateurs and s.w.l.s.

It's nice to see an award that doesn't rely on you contacting/hearing club members to achieve success. You have to work or hear **22** British stations where the last letter of their callsigns finally spells out Yeovil Amateur Radio Club. So, G4LFM is Ok, as is **G3XFD** and G7TZB, but G1TEX isn't (sorry Tex!).

The breakdown of the 22 callsigns you need to qualify for the award are: **3** ending in **A**; **1** ending in **B**; **1** ending in **C**; **1** ending in **D**; **2** ending in **E**; **2** ending in **I**; **2** ending in **L**; **1** ending in **M**; **2** ending in **O**; **2** ending in **R**; **1** ending in **T**; **2** ending in **U**; **1** ending in **V** and **1** ending in **Y**.

The callsigns you log can be G, GD, GI, GJ, GM, GU, GW or GB Special Calls. If you've kept an accurate log over the years then you can look back to July 1 1983 to find the correct calls on any band with any mode. You don't have to wait for those radio amateurs to send you their QSL cards either.

You need to send a copy of your log signed by an official of a radio club or by two active radio amateurs. If that part of it proves a problem to you, if you contact the *PW* Editorial Office they will put you in touch with your nearest club or a local amateur who can help with the verification.

The Yeovil award costs just £2 (or $4 or 6IRCs) and you should send your certified list and money to: **A.C. Dening G4JBH, Awards Manager, 19 The Park, Yeovil, Somerset BA20 1DN**.

Thanks to *Monitor*, the International Short Wave League's (ISWL) Newsletter for the information on this award.

Learning Morse

Another useful tip I picked-up from a recent copy of *Monitor* is about learning Morse, from **Walter NS8N**. Basically, one problem with practicing receiving plain language text is that you start guessing what comes next in the sentence. This is all very well at slow speeds, but can be a very bad habit to break once you start speeding up.

Walter suggests you have practice tapes (or whatever) in plain language sent backwards. So you start with a full stop and then have each word spelt backwards.

For example 'tam eht no tas tac eht' is much harder to 'read' than the 'cat sat on the mat'. If you can't anticipate what's coming next it stops you guessing and you never know how many letters are going to be in the next group of letters.

It was after reading the article that I remembered that this was the way I was often given a Morse test when I was learning. Morse tutors would often give us foreign language text or things sent backwards just to make sure we didn't start reading and guessing.

Another favourite trick was to put a 'rogue' word into a sentence. If the sentence made sense then you had guessed and anticipated the word because they had actually send a similar one that didn't make sense.

When you are trying to learn Morse it seems a daunting task. But once you can stop thinking so hard about what you are hearing and start reacting automatically, that's when it starts getting easier. Honest!

Old Radios

When you first start telling people that you are taking up the hobby of radio, especially short wave listening, often someone offers you the use of an old radio to 'get you started'. These 'old' radios have a habit of being the really old 19in rack mounted sorts or ones that takes three people to lift!

If they are working well then these old receivers can be a real asset and shouldn't be snubbed. But, where do you find out more about how they work ("the manual was around but I can't find it at the moment, I'm sure you'll work it out"!).

If you've been loaned an Eddystone, then your luck is in. There is a very active Eddystone User Group (EUG) judging by their latest Newsletter.

Apart from sending out six newsletters per subscription year, the EUG can help with supplying copies of manuals (sometimes an original) with prices ranging between £3 and £10. They can even help with queries, although you may need to be patient as although Eddystone Radio Ltd help with the administration of the group, they don't have the resources for unlimited time on technical queries or 'phone answering.

The subscription year 1995/6 costs £10 for the UK and £11 overseas. You'll receive back issues of No. 31 and 32 Newsletters. The one I looked through (No. 32) was packed with information, not all of it really technical either. There was also 'For Sale and Wanted' adverts, hints on operating, sources of components and stories of members and their radios.

If you are interested in finding out more, contact: **The Eddystone User Group, c/o Eddystone Radio, Alvechurch Road, Birmingham B31 3PP**.

Radio At School

Is your school/college (or your children's/grandchildren's school/college) into amateur radio? Well they could be.

Over 120 schools, from primary through to universities are actively running an amateur radio station. One group dedicated to getting amateur radio into education is STELAR, it stands for Science & Technology Through Educational Links With

Tinkering with old radios like these is a great way to get started in radio.

Amateur Radio.

The STELAR group produce a magazine called *AMRED* three times a year they also run RAE crash courses for teachers once a year. These are held at the Trio-Kenwood HeadQuarters in Watford, along with the RSGB who are sponsors of the scheme.

To add to the incentive, it doesn't cost anything for teachers to go, they get free hotel accommodation and meals, free course materials and tuition. It's an amazing deal that has obviously taken a great deal of work to set-up.

I'm pleased to say that they must work their students very hard because they are getting brilliant results, (perhaps it's that they get good students?) I'm not sure which it is!

Anyway, if you think about what a school can get out of amateur radio, then perhaps you can persuade your local educational establishment to join the others and get on the air. So, how about setting-up an amateur satellite station, voice and data comms world-wide?

You may even get a chance to talk to the Shuttle or MIR astronauts as schools are often allocated special schedules. How about packet in the classroom or talking to other schools on the Wednesday lunch-time STELAR Net?

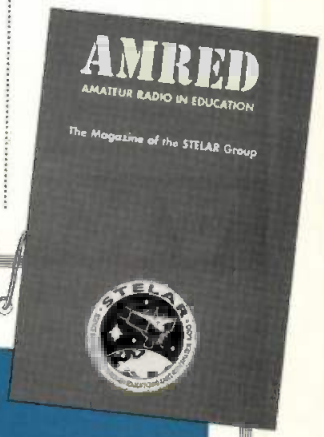
Amateur radio can offer so much in the education arena, it would be great if a few more schools had a go. Reading the STELAR newsletters, once a teacher has become licensed, then PTAs or local businesses have been very supportive in helping to set-up a station.

The newsletter *AMRED* is very informative. I'm sure some readers will remember **Pat Gowen G3IOR** who wrote a satellite column in *PW*, well he has also writtain a series explaining satellite in recent issues.

They've also run articles of JVFAX, SSTV, antennas, transmitters and all kinds of other things too. All these are aimed at making things easier to understand for both the teacher and pupil.

If you are interested in the work of STELAR, then please contact **Richard Horton G3XWH, Harrogate Ladies' College, Clarence Drive, Harrogate, North Yorkshire HG1 2QG.** Or you could contact Richard using Internet: **g3xwh@amsat.org**

Many thanks Richard for all the information you sent and so quickly. I hope you get lots of new schools signing up for the next crash course.



First Steps

Watts a dBW?

The use of the Watt as a measurement of power is understood by many people. So why should we have to put up with dBW for transmitter powers?

Despite initial reluctance to use an unfamiliar measure, there are a number of advantages from using a dB based power measurement. A simple example is when you look at the way your valuable r.f. is transported into the ether.

A look through the adverts will show that everyone quotes coaxial cable losses and antenna gains in dBs. So what's the big deal?

The answer is that the use of dBs actually makes life easier. This is because, once converted to dBs, you can simply add and subtract to find the result of interconnecting amplifiers, cables, etc.

As an example, if we consider a transmitter with an output power of 20dBW connected to the antenna with a feeder having a loss of 1.8dB, the power at the antenna would be 18.2dBW - just some simple subtraction (20dBW - 1.8).

Using Watts for the transmitter power you would have to first convert the 1.8dB feeder loss to a power ratio by dividing by 10 and taking the antilog of the result which is 1.51. You can then divide the 100W transmitter power by this number to give the result which is 66.23W (I think it's clear which is easier).

The chart in **Fig. 1** (taken from the BARTG) provides a useful guide if you want to convert back to Watts. It's also worth remembering a few useful benchmarks such as: 3dB changes the power by a factor of 2. So a 3dB increase doubles the power and vice versa. A second useful point is 10dB, which represents a ten times change in power.

That's all for another month, so keep writing to me with all your useful 'natterings'.

Elaine G4LFM

Fig. 1.

Watts	dBW
1.25	0.97
2	3.01
3	4.77
4	6.02
5	6.99
6	7.78
8	9.03
10	10
15	11.76
20	13.01
25	13.98
30	14.77
35	15.44
40	16.02
50	16.99
60	17.78
80	19.03
100	20
120	20.97
140	21.46
150	21.76
160	22.04
180	22.55
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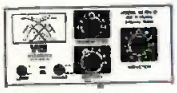

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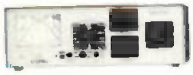

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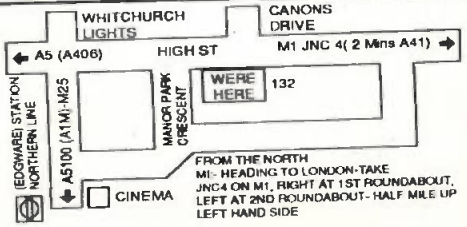

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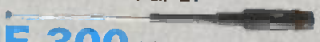

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CLUB Spotlight

Compiled by Zoë Shortland

Canadian Amateurs

Jim Hatch G3OOL, also ex VE2BEV & VE3CIJ is looking to form a loose Net of amateurs who have been connected with the Canadian Radio Amateur fraternity. The connection could either be by being born in Canada and now holding a European licence, or holding a Canadian licence and working under reciprocal agreement.

The Net would be held on 3.5MHz at the outset, and could also be held on 7 or 1.8MHz if the need should arise. Anyone who is interested in joining such a Net, please write to **Jim Hatch at 42 Bowden Road, Templecombe, Somerset BA8 0LF.**

Long Association With Radio

Elaine Hicks-Arnold G0CDZ tells of her husband Frank G6MB's long association with radio.

Frank G6MB was first licensed in 1920, "authorised to transmit not more than 500 yards, the apparatus to be attached to no aerial or earth other than short rods with or without vanes". This was an authorisation to use a gamage's 1913 spark and coherer transmitter and receiver!

On Sunday September 25 1955 at 1000UTC, the first news broadcast was made by the RSGB with the call GB2RS and Frank was the original newsreader from his station in Walton-on-Thames on 3.6MHz. He continued to read it without a break for three years. Frank was a council member of the RSGB from 1949-55.

Frank had held other radio callsigns, in Malaya, between 1927-31 he held the call 2HQ, which was a Singapore area marine call as there were no amateur calls there. He was issued with G6MB in 1931 on his return to the UK. He also held VK4AKD from 1980-86.

Elaine says "I was first licensed in 1984 and have no claim to fame at all!"

Live Radio Link-Up With German Astronaut

'Club Spotlight' has recently received a FAX **from Noel Moore GI7CMC**, Head of Technology Department, Belfast Royal Academy. It described the recent live radio link-up by the **Belfast Royal Academy Amateur Radio Club** with German Astronaut Thomas Reiter DP0MIR during his 135 day mission on board the soviet MIR space station. The space station had been tracked by computer and its transmissions monitored since the club learned that they were scheduled to talk to the busy astronaut.

The club became involved when **Jonathan Sherlock GI0VGQ** noticed a packet message inviting schools to become involved in the EUROMIR Project. The school replied and nothing was heard again until a FAX was received from Jorg Hahn of Ham Radio Group in der Deutschen Forschungsanstalt, indicating that the school had been given a schedule with the MIR crew three days later.

The 144MHz equipment was thoroughly checked out in preparation for the f.m. semiduplex contact. No guarantee was given of Thomas' availability, but there was a full turn-out of club members to witness the attempted schedule. A sigh of relief was observed as Thomas returned the school's call.

Thomas described the greetings that the visitors, their first human contacts since saying farewell to the previous MIR crew in September, would receive on their arrival. He went onto describe the work planned during the docking.

Thomas and his Russian crewmates Yuri Gidzenko and Sergei Avdeev sent their greetings to the school and to the city of Belfast.

Meetings AT MAXPAK

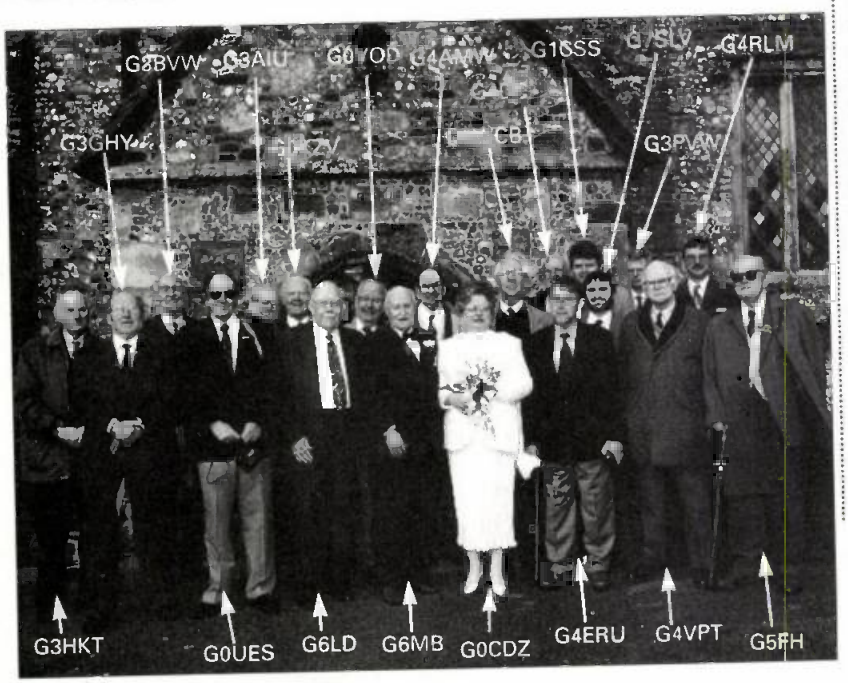
Edward Loach from **MAXPAK** (The Midlands AX25 Packet Radio Users Group) has recently sent in a programme of events for the coming months. Meetings are held on the first Monday of every month, except when there are bank holidays, meetings are then held on the second Monday.

Meetings begin at 8pm, ending at 10pm, at the Perton Community Centre, which is next to Sainsburys in Perton, near Wolverhampton. A licensed bar is on the premises! Perton is on the A1, approximately five miles west of Wolverhampton.

All non-members and visitors please note - there is a charge of 50p when attending any evening where there is a talk or practical demonstation. This is made to help recover the cost of hiring the room.

Well, what's happening soon? - well, on February 5, there is an evening using a PC computer and packet radio, followed by a practical demonstation of black and white and colour ink jet printers, re-inking of the cartridges will also be demonstrated. The February/March *Digicom* (the bi-monthly newsletter) will be available at this meeting.

To obtain more information, contact **Edward Loach on (01902) 741877** (evenings).



It was a truly 'amateur' wedding when Frank G6MB and Elaine G0CDZ got married in 1995!

Zoe says:

"keep that News and those Club magazines coming!"

■ Members of the **Salop Amateur Radio Society** meet every Thursday evening, commencing at 8pm, at The Oak Hotel, Shelton. Membership now totals over 60 members from the surrounding areas.

On January 18th they will be discussing contesting, a chance to suggest what contests the club should enter, all suggestions are welcome. Then on February 1 there's a surplus equipment sale. So, don't forget your wallet!

More information is available from **Ian Davies G7SBD, 56 Roselyn, Shrewsbury SY1 4LP.**

■ The **Derby & District Amateur Radio Society** meet on Wednesday evenings at 7.30pm at 119 Green Lane, Derby. Just a few of the up and coming events are: January 24 - Amateur Astronomy - illustrated talk by Trevor Smith, February 5 - Amateur TV group meeting.

Further information about the Society is available from the Chairman, **Richard Buckby G3VGW, 20 Eden Bank, Ambergate, Belper, Derbyshire DE56 2GG** or by telephoning him on **(01773) 852475.**

■ Club members meet at the regular meeting hall, 'Terra Nova', The Waldrons, Waddon, Croydon, Surrey for the **Surrey Radio Contact Club.** Find out about Propagation on February 7 when Raymond Favell G3LTP gives a talk on the subject.

Berni G8TB is on hand if you want to find out more. You can telephone him on **0181-660 7517.**

■ The **Liverpool & District Amateur Radio Society** meet at 8pm every Tuesday evening at the Churchill Club, Church Road, Wavertree, Liverpool. The Society also run courses for the RAE, NRAE and Morse.

A few of the Society's up and coming events are: January 16 - Club night on the air, 23rd - Talk by G7PGE, 30th - Surplus sale and on February 6 - Contest planning.

More details can be obtained from **Ian G4WWX, QTHR.**

■ The **Dundee Amateur Radio Club** meet on Tuesdays at 7pm in the Dundee College, Graham Street, Dundee. Morse code is taught every Tuesday evening.

The club radio shack and technical library are available to club members. A club newsletter is published bi-monthly and a club Net is on 7.070 at 1400hrs daily.

Find out more from **Allan Martin GM7ONJ, 11 Langlee Place, Broughty Ferry, Dundee, Tayside DD5 3RP.**

■ Members of the **South Manchester Radio Club** meet every Friday at the Community Centre, Norris Road, Sale from 8pm onwards. The club caters for the many interests of its members and also runs Novice courses.

For further enquiries about the club, contact **Edward G7FQY on 0161-969 1964.** All are welcome to attend.

■ Meetings are held on the 2nd and 4th Tuesday of each month at the Lickey End Social Club, Alcester Road, Burcot, Bromsgrove for the **Bromsgrove Amateur Radio Society.** Catch a talk on January 23 by Len York on 'Manhattan Experience'.

For further details/information, contact **Barry Taylor G0TPG on (01527) 542266.**

■ Formal and informal evenings for the **Norfolk Amateur Radio Club** are held at the Norman Centre, Bignold Road, off Drayton Road, between Asda and the Mile Cross Roundabout, Norwich. Just a few of events happening soon are: January 17th - Night on the air/construction QRP/Morse practice, 24th - 'Science for all' by Arnold G3PTB, 31st - Night on the air/construction QRP/Morse practice, February 7 - Surplus PMR conversion by Steve G0UYA.

More information from **Mike Coan G4EOL on (01603) 789792.**

■ Members of the **Dunfermline Radio Society** meet at Outh Muir, five miles north of Dunfermline on the A823 (near Knockhill Race Circuit) on Thursday evenings at 19.30hrs. A few up and coming events are: January 11 - HF operating evening, 18th - A talk by James GM4WZP on 'Offshore Pirates of the 1960s and 1970s', 25th - Natter night, February 1 - HF operating evening, 8th - Natter night.

For more details, contact **Adrian Donaldson GM0SRD**, Secretary, on **(01383) 735967.**

■ The **Manchester & District Amateur Radio Society** meet at the Simpson Memorial Civic Centre, Moston Lane, Moston, Manchester every Tuesday evening at 7pm. RAE and NRAE courses together with Morse lessons are given free of charge and the Society is also registered as a City & Guilds examination centre.

On February 6 there is a DX night. Further information and details of the society's forthcoming activities are available from **Barrie G3IOA on 0161-681 5406 or Harold G0VJZ on 0161-338 4412.**

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

SUBS Club

Hot Off The Press!

The Radio Amateurs' Question & Answer Reference Manual (5th Edition) by Ray Petri G0OAT.

This month's *Practical Wireless* Subs Club offer is a book which is so popular it has now reached it's 5th edition. Ray's newly published edition has been expected for a long while...so here's your chance to get the latest book to help you pass your RAE (and it's handy for reference) and get *PW* delivered direct to your door every month into the bargain!

Ray Petri G0OAT first published *The Radio Amateurs' Question & Answer Reference Manual in 1984.* From its humble beginnings as a 'self publication' effort, Ray's work has grown from strength-to-strength. He's still publishing it independently and as each new edition appears new chapters, revisions and innovations are included.

Although specifically aimed at students taking the City & Guilds 'Radio Amateurs' Examination' the book contains material suitable for C&G 'Electronics Servicing' and BTEC 'Radio N' and 'Electrical and Electronics Principles N'.

Within its 388 or so pages this softback book contains a wealth of information including over 1240 multiple choice questions, a section on circuit recognition and (very useful!) examples worked through on a scientific calculator.

Additionally, Ray has also included a number of useful radio data charts in appendix A (And readers with a copy of the free data chart supplied with the January 1996 issue of the magazine will already have an example of how good his work is in this area).

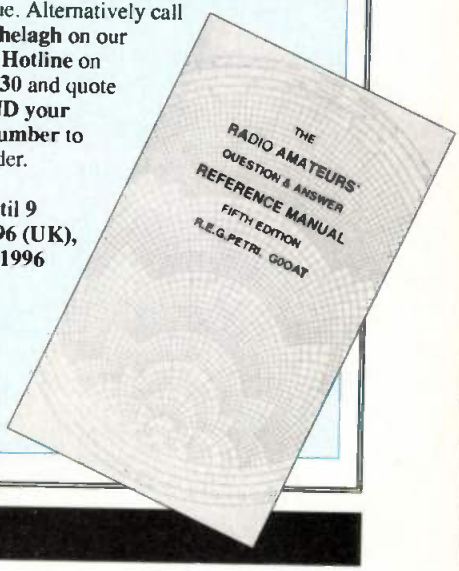
So, if you're an RAE student, or are attending Technical College or just need a sensible reference work which you can use and understand with the minimum of fuss and bother, this month's Subs Club offer is for you. It certainly gets my vote and Ray Petri is to be congratulated for an excellent publication.

Rob Mannion G3XFD

If you are a *PW* Subscriber you can get your copy of the *The Radio Amateurs' Question & Answer Reference Manual* for **£13.95 inc. P&P (UK) or £13.95 plus 75p P&P (overseas).**

To take advantage of this offer just fill in the details on the Order Form on page 62 of this issue. Alternatively call **Michael** or **Shelagh** on our **Credit Card Hotline** on **(01202) 659930** and quote **SCPW01 AND your subscriber number** to place your order.

Offer open until 9 **February 1996 (UK), 23 February 1996 (overseas).**



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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.
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NEW DSP-232 DSP based data controller RRP £499 ..... **£479.95**
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MODEL MULTITRAP NEW

AS REVIEWED IN RADCOM DECEMBER

Built exclusivly for MARTIN LYNCH, the new wire antenna is trapped for 80 through to 10 metres, uses heavy guage multi strand plastic-sheathed wire, heavy duty 1 kW traps and totals only 20 metres in length. The "MULTITRAP" is a fan type design, having 2 "legs" either side of the dipole centre. It's very easy to install, takes minutes to tune, guaranteeing an SWR of less than 1:5:1 on spot frequencies throughout the entire 5 bands. A far better alternative to the old G5RV antenna. **£69.95, P&P 37.50**

MODEL MEGATRAP NEW

From the same stable as the Multitrap, the new design offers coverage of the 160/80 and 40 metre bands. 1KW power handling, stocks should be arriving during January. call for further details.

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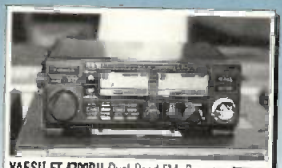

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parts & labour, (most 3 months), and a chance of FIFTEEN months at minimal cost.

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DX-70

100W on HF
10W on 6M

50/50

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.

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DJ-191

AS REVIEWED IN PW DEC

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FOR FURTHER DETAILS, CALL STEVE JELLY ON 0181-566 1120

The Icom-706

HF & VHF Mobile Transceiver

By Richard Newton G0RSN

It's taken PW a long time to get hold of an IC-706, but Richard Newton G0RSN has had quite an experience using the latest 'all in one package' mobile from Icom. He thinks its been well worth waiting for!

There are many avenues leading to being a licensed Radio Amateur. Mine was short wave listening encouraged by my Dad, **John G8EAM**. I have therefore always been interested in the h.f. bands.

However, I'm not going to bore you with my whole life story, although the reason for mentioning my 'early radio life' will become apparent.

I now have children of my own, two in fact. And, I found (as many before me have) that time in the 'shack' takes a firm back seat to the role of father to two babies.

So, I decided that the only way around the lack of 'shack time' was to take my radio with me when I was out of the house. That's how my 'love affair' with h.f. mobile was born.

When I saw that Icom had brought out the IC-706 I was very excited. Here was a radio that would give me all my h.f. bands mobile with the added bonus of 144MHz s.s.b. (something I had to give up in order to get h.f. mobile in the first place).

Something Impressive

I was expecting something impressive and was not disappointed. The first impression this unit gives you is robust professionalism. It looks really good in my opinion.

So, out it came, along with the supplied accessories. A fist microphone, d.c. power cable, spare fuses, RTTY connection plug, electronic keyer plug, and the accessory cable.

When I had laid out all the contents of the box I was somewhat perplexed. There was no mobile bracket!

After some 'phone calls and reading the handbook (always the last thing I do in crisis!) I discovered that the mobile bracket was an optional extra!

Well I will not labour this point, but suffice to say, this did not impress me one bit. You would have thought a mobile radio would have been supplied with a mobile bracket!

While I was awaiting the arrival of my optional extra mobile bracket I set the IC-706 up in my shack at home. I operated it into a home-brew doublet of random length, (approx. 15m in each leg) fed by 300Ω ribbon and connected by a balanced a.t.u.

Switching On

When first switching on the IC-706 it looked rather daunting. But I didn't let this put me off and the rig has the normal controls that I would want and expect to see as primary hardware on a front panel including the **On/Off** switch, **AF** (volume) control and **RIT** to name a few.

Other well situated controls were the **Freq Lock** button, **IF Shift** and **Up/Down** keys. The main tuning knob is also a very well designed feature.

I get the distinct impression the Icom IC-706 was designed by a mobile radio operator. The large rotary knob is just that. Large but well proportioned. The soft rubber collar and hard plastic free moving finger hole greatly assist in accurate fast and slow tuning. These factors, coupled with the variable tension control, made tuning an easy, effortless task.

Finding your way around the IC-706 is really quite simple. I would say it took me a few hours to get to grips with the basics. After a couple of days operating and reading the manual I experienced no trouble at all.

Menu Banks

The IC-706 has different menu banks. Icom have obviously chosen what they consider to be the more often used settings. The more used features are situated in menus that are more easily accessible. The less used ones are placed in menus taking a few more key presses to get to.

It's most important for the mobile operator to operate the equipment easily. For the h.f. operator it may well be switching between the two v.f.o.s or perhaps switching in the voice compressor to grab that bit of rare DX.

For the v.h.f. operator it will perhaps be moving through the simplex frequencies on 145MHz or being able to monitor the local repeater. I also like to be able to monitor the reverse frequency of the repeater as well. It seems that Icom have been very mindful of these requirements.

On the whole I would agree with their choices. However, I would have like to have seen the output power more easily adjustable. But considering just how much this little radio will do for you I think that Icom should be very pleased with the way the designers structured the menus.

However, the actual power settings on the Icom IC-706 are very versatile indeed. On the h.f. bands the r.f. power is adjustable from 5 to 100W with a total of 11 separate levels. The same is true of 50MHz. The power settings for the 144MHz band are also variable between 1 and 10W and again with 11 setting levels.

All The Facilities

The IC-706 has all the facilities that one would expect in a modern transceiver. It has two v.f.o.s and 99 memory channels. In addition to these are two other memory locations for programmed scan limits and a Call memory for the 144MHz band only.

Configuring the memories is very simple and extremely straightforward. And when in memory mode the operator is still free to tune away from the frequency set in the memory channel, with the memory remaining unchanged. I found the method of tuning away from the frequency stored in memory very useful when operating mobile.

The IC-706 has many ways in which to move through its vast v.f.o. range at different rates. But all of these methods require several key presses and the use of the main tuning dial or **Up/Down** keys on the microphone.

However, if you programme each amateur band in a memory, you can then select each band by pressing the **Up/Down** key on the transceiver. You are then free to fine tune from there. This feature I found to be the best for my mobile requirements.

For those interested in data modes the IC-706 seems to be well able to fit their needs. It has selectable menus dealing with RTTY settings and details are supplied on both this mode and ASFK outputs.

Treat For Morse

There is an absolutely wonderful treat in store on the IC-706 for the Morse enthusiast. I was absolutely overwhelmed when I found that this wonderful little transceiver was supplied with a built-in electronic keyer!

From the menu, the operator can select the type of key being used and set the parameters of the electronic keyer. This feature impressed me a great deal.

Unfortunately I'm a straight key operator myself so I was resigned to writing about the facility and not experiencing it. Until I read the handbook that is! It would appear that Icom had thought of that and I was not going to get away so easily!

You can configure the keyer so that the **Up/Down** keys on the fist Microphone become a Morse key! **Up** becomes 'Dah' and Down provides the 'Dit'. It was great fun, I put out some CQ calls but had no reply. No reflection on the radio here, it was more likely my sending. (More practice with a 'microphone key' required I feel!).

I was also extremely pleased to see the IC-706 is provided with an r.f. gain control and an i.f. shift. These features, along with the 20dB attenuator and the preamplifier were to prove their worth when I went on the air.

The transceiver's front panel display is really something to behold. It's clear and well set out. Important information is extremely well represented.

The display's excellent green back lighting has three settings, **Off**, **Low** and **High**. The **High** setting is so good, I found that I could not drive with it on high at night as it dazzled me! It had to go on **Low**.

Other Facilities

Just before I tell you of my 'on the air' adventures, with the IC-706 I'd like to briefly mention some other operating facilities that caught my eye. And I'll start with the S-meter.

The S-meter can be set to be many things. On receive it's always an S-meter. However, it can also be set to show you relative r.f. power out, or s.w.r. across the h.f. and 50MHz transmission line and also provide an automatic level control (a.l.c.) meter on transmit. (A 'must' for adjusting the microphone gain and compressor).

I found the meter's s.w.r. facility to be extremely useful in the car, so much so that I removed the separate s.w.r. More space, what luxury!

Another must for me as a mobile operator had to be the VOX control. I was a little disappointed with the use of the telephone style modular plug on the microphone though. This inhibits home-brew hands free microphones for the car. (Unless you purchase a conversion cable of course...another optional extra!).

Continuous Coverage

The IC-706 provides continuous receiving coverage from 300kHz to 200MHz! It offers s.s.b., c.w. a.m., w.b.f.m. (wideband f.m.), and RTTY as modes, (w.b.f.m is available on receive only). The specifications are guaranteed on the Amateur bands only.

I was able to receive my local Band II f.m. broadcast station on 102.3MHz with ease. Goodbye car radio! More space reclaimed. I was beginning to like the IC-706 a lot.

Setting Up

When I was setting up the first thing I noted was that the 50MHz output was on the **h.f.** output and **not** with the 144MHz output.

I've no doubt that there are extremely good reasons for Icom's decision to place the 50MHz output on the h.f. output side of the transceiver. But it would seem that all those antenna manufacturers who appear to be desperately flooding the market with dual band 144/50MHz mobile whips will be forced to have a re-think!

So, the time had come to put the transceiver through its paces. I put a call out on the 145.500MHz f.m. calling frequency. I could just hear a station down in the noise. We moved to a simplex frequency and I had the pleasure of chatting to **Chris G0DFN** in Hythe, Hampshire.

Chris gave the '706 a very favourable report. I however could not hear him very well at all. I connected my Kenwood TH-205E 144MHz hand-held to the WX1. He was then a very good 5 and 7 signal.

I then went back to the IC-706, and Chris was still only just breaking the squelch. I then

Rear panel of IC-706 showing h.f./50MHz antenna sockets (see text for comments) and separate 144MHz antenna socket.

Continued from page 21

switched in the preamplifier. Well, what a change! (I've never experienced such a difference). Chris was now 57 to 59.

I briefly explained to Chris what I was doing. He confirmed a good report on the transmitted audio. Then came "Break". This was a call from **Gerry G0WHE** in Bulford, Wiltshire. Gerry had joined in so that I could hear the transmitted audio on the IC-706, because he was actually using one!

Because of Gerry's call I can confirm the IC-706 transmitted audio is good quality. Perhaps it's a little on the 'trebly' side but it's nevertheless an excellent QRM cutting audio.

We then changed modes to s.s.b. and had a very enjoyable chat. Gerry agreed that it appeared that with the IC-706 you had to employ the preamplifier on v.h.f. to get a decent receive capability. (The fact that Icom have listed all the sensitivity specifications with the preamplifier on seems to support this theory).

Very Low Noise

The preamplifier is a very low noise type and works extremely well on f.m. and s.s.b. But, on h.f. the performance of

The Icom IC706 as fitted in G0RSN's car for mobile evaluation.

Manufactuer's Specifications

General

Antenna Impedance	50Ω
Usable Temperature range	-10° C to +60° C
Frequency stability	Less than ± 7p.p.m. from 1 to 60 minutes after power ON. After that, less than ± 1 p.p.m./hr at 25° C.
Power supply	13.8 v d.c ± 15%
Current Drain at 13.8V	Transmit = 20A Receive squelched = 1.5A
Dimensions	167 x 58 x 200mm (projections not included)
Weight	2.5 kg

Transmitter

Output Power	1.8-30MHz: SSB, CW, FM, RTTY 5-100W, AM = 2-40W 50MHz: SSB, CW, FM, RTTY = 5-100W, AM = 2-40W 144MHz: SSB, CW, FM, RTTY = 1-10W, AM = 1-4W
Spurious emissions	
1.8-30MHz:	Better than -50dB
50MHz:	Better than -60dB
144MHz:	Better than -60dB
Carrier suppression	Better than -40dB
Unwanted sideband	Better than -50dB
Microphone impedance	600Ω

Receiver

Receive system	Double or triple conversion superhet
Intermediate Frequencies	MODE 1st (MHz) 2nd (MHz) 3rd (kHz) SSB 69.0115 9.0115 AM 69.010 9.0100 CW/RTTY 69.0106 9.0106 FM 69.0115 9.0115 455 WFM 70.700 10.700
Sensitivity (pre-amplifier ON)	
SSB and CW	
1.8-29.9950MHz	<0.16µV (for 10dB S/N)
50-54MHz	<0.16µV (for 10dB S/N)
144-148MHz	<0.16µV (for 10dB S/N)
AM	
0.05-1.8MHz	<13.0µV (for 10dB S/N)
1.8-29.9950MHz	<2.0µV (for 10dB S/N)
50-54MHz	<2.0µV (for 10dB S/N)
144-148MHz	<2.0µV (for 10dB S/N)
FM(N	
28.0-29.7MHz	<0.5µV (for 12dB SINAD)
50-54MHz	<0.3µV (for 12dB SINAD)
144-148MHz	<0.3µV (for 12dB SINAD)
FM(W)	
76-108MHz	<10.0µV(for 12dB SINAD)
Squelch sensitivity	(pre-amplifier ON) SSB <5.6µV at threshold FM <0.3µV at threshold
Selectivity	SSB and CW: >2.3 kHz @-6dB, <4.0 kHz @-60dB AM: >6.0 kHz @-6dB, <20.0 kHz @-40dB FM(W): >12.0 kHz @-6dB, <30.0 kHz @-50dB FM(N) >8.0 kHz @-6dB
Spurious and image rejection ratio	Better than -70dB (HF bands only)
Audio output power	>2W at 10% distortion with an 8Ω load
RIT variable ranges	± 1.0 kHz max

the IC-706 is so good anyway that I hardly used the preamplifier even when mobile.

On a radio of such a wide specification as the IC-706 there has to be compromise. And I'm sure that Icom have gone the way they did instead of opening it up to all the awful breakthrough from which other wide-band transceivers seem to suffer.

To further discuss the IC-706 Gerry and I made a sked. The following evening we tied up on 145MHz and then went to 3.740MHz. There we had a very enjoyable contact and having to surrender eventually to the QRM and finished the contact back on 145MHz.

Using the attenuator and the i.f. shift I managed to fend of the increasing QRM and QRN on 3.5MHz for some considerable time. The IC-706 coped very well and it was very interesting to be able to review the radio from both ends of the QSO.

Hardest Band

The following day (still operating from the shack) I decided to test the IC-706 on what I consider to be the hardest band...7MHz. If a radio copes on this cluttered busy band then it can cope with most things!

It did extremely well, and the '706 swathed through the hordes to get a very favourable report from **Blaine GI4XJA** in Coleraine County Londonderry in Northern Ireland. Later the same day, again on 7MHz, I had a brief but again very favourable report from **Uri RX3ZB** in Staryoskol near Moscow.

I also went onto 50MHz where **Rob G6DUN** and **Gerry G7JEZ** were kind enough to help. Again it seemed that the preamplifier was a 'must' but apart from that, all seemed very well indeed.

I did receive a mobile bracket eventually and enjoyed operating from the car on h.f. and v.h.f. The radio suits mobile operation very well and I found it very easy to operate indeed. I consistently had good reports on the audio both v.h.f. and h.f., f.m. and s.s.b. (Most of the reports were unsolicited).

Perhaps the most interesting mobile QSO I had with the IC-706 was on 7.062MHz with **Chris**, operating **4U0ITU**, the **United Nations** station in Geneva. I heard Chris calling CQ, he was a terrific signal. I returned his call with no response. Perseverance paid off and I got the response of "the G0 station try again" which I did. Still no solid contact, until I put the compressor in. After that I had no problems, having a very pleasant QSO with Chris. So I think that rather tells its own story.

There are many things I liked about the IC-706, and to say that I enjoyed operating it would be an understatement. I found that it coped well as a base station and a mobile radio.

When I go away camping I would want for nothing else if I had an IC-706. You get h.f. 144MHz and 50MHz (all modes) and broadcast radio as well.

Although the IC-706's front is easily detachable, (a good security feature even if you do not go for the separation kit) I would still like to see a slide-in mobile mount for this unit. This is so it can be easily move from shack to vehicle.

I had great hopes for this radio, and some secret fears. I originally thought Icom may have pushed things too far and were expecting too much from one transceiver. Despite the earlier thoughts, I'm delighted to say that my fears were not realised.

The IC-706 is a lovely radio. It's well made, very well laid out and does its job very well. Speaking as a mobile operator I would be more than happy to own one.

My thanks for the loan of the review model go to Icom (UK) Ltd., Sea Street, Herne Bay, Kent CT6 8LD. Tel: (01227) 743000, FAX: (01227) 741742. The recommended retail price for the IC-706 is £1195 and is available from Icom dealers.

Afer seeing a copy of G0RSN's review Dennis Goodwin G4SOT of Icom UK Ltd., sent us the following comments:

Just a few lines in answer to Richard's review of the IC-706.

Icom have been besieged with orders for this exciting new model, since its initial announcement in June this year. However, customers have been very patient waiting, our supplies are just catching up with the many orders we received.

The IC-706 is a mobile transceiver, but I wonder how many are actually used mobile. Like many similar sized models, many of these are purchased and used as a main base station, (probably more than mobile).

Icom could easily supply a mobile bracket, c.w. filter, etc. as standard. The catch being that the retail price would increase to cover the cost. With options, the customer has the choice, why pay for something that you do not want or use?

Like Richard, I was also able to operate the IC-706 easily without the handbook, the sample we received earlier this year did not have one as it had not been printed at the time. Later I discovered the CTCSS encode and 1750Hz tone facility, memory naming, c.w. sidetone frequency adjustment when a handbook was available in English.

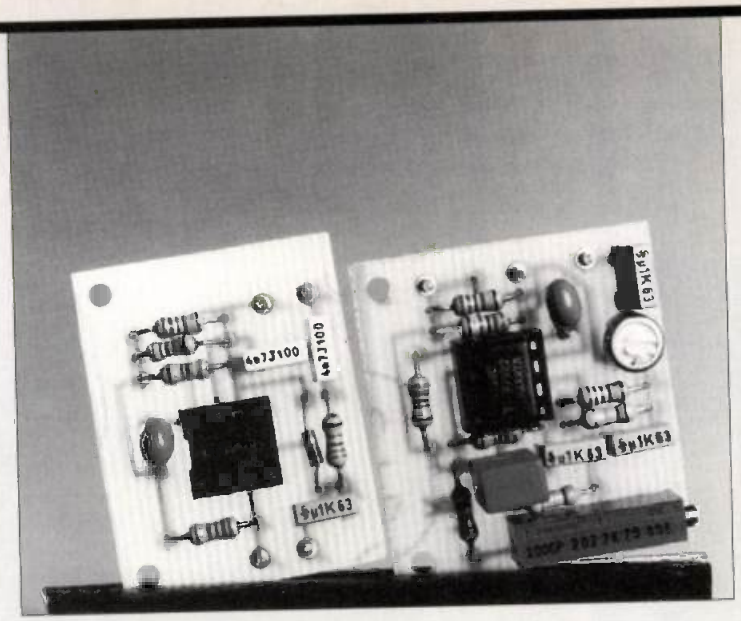
The 50MHz output to the h.f. antenna socket is quite simply because the main final p.a. section ranges from 180m to 6m with a separate section for 2m. Already antennas such as the Outbacker (available from Nevada Comms) are available for h.f. and 6m and I would expect more to follow.

Two new products available in the new year to add increased operational features are the IC-FL232 RTTY filter 350Hz bandwidth and the IC-MB-65 multi-position bracket for controller heads used with the IC-706 and IC-2700H.

Dennis Goodwin G4SOT

The detachable main control panel on the IC-706 shown demounted. An accessory cable is required to remotely operate the transceiver from the front panel unit (see text).

Are You Ready For CTCSS?



Mike Rowe G8JVE says that if you're not ready for Continuous Tone Coded Squelch System (CTCSS) operation, he's got just the thing for you in the form of a simple CTCSS add-on tone and filter conversion project.

Heading photograph: The prototypes of the add-on CTCSS unit project designed and built by Mike Rowe G8JVE. The audio filter is on the left, and the tone-unit on the right.

Fig. 1b: Diagram illustrating how the add-on CTCSS unit can be incorporated in an existing f.m. transceiver (see text).

Fig. 1a: The oscillator circuitry (see text).

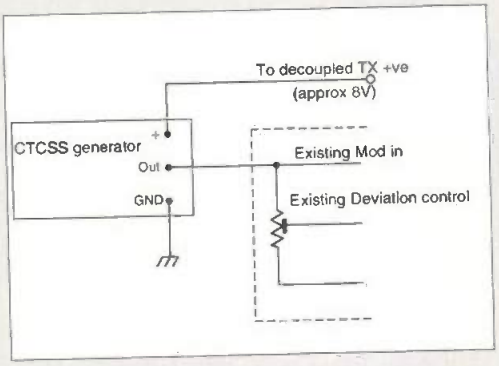
Traditionally, repeater access has been by a 1750kHz tone burst, but now more and more repeaters are following the p.m.r. method of CTCSS access. In effect CTCSS (Continuous Tone Coded Squelch System) is a method of replacing the control by means of a low level low frequency tone.

The Electronic Industries Association (the relevant standards body) has defined a series of 38 tones in the sector between 67 and 250.3Hz, although in the UK, only nine are used. The lowest of these is 67Hz and the highest 118.8Hz, each area has allocated its unique tone for use on all repeaters. One tone should therefore suffice.

During transmission, a sub-audible tone is superimposed on the speech information at a very low level (approximately 10% amplitude). This is detected by the repeater and only if the correct tone is present will the speech be passed through to the output.

You'll realise that in the p.m.r. field, CTCSS would allow several users on the same channel. But each one would only be able to hear their own base or mobile.

The simple CTCSS add-on I'm describing does not limit the speech path (ie. no decoder). But it does supply an encode signal and a high pass filter for receive to eliminate the low level hum associated with repeaters using CTCSS.



The encoder consists of a quadrature type resistance/capacitance (r.c.) oscillator providing a sine wave output, tuneable between approximately 50 and 135Hz. The circuit is stable and is tolerant of minor supply variations.

Construction And Installation

Construction and installation of the unit is not difficult. If you make your own board, the p.c.b. should be checked for any errors and the components fitted where shown.

Don't forget the one link under the i.c. on the p.c.b. design I've provided. Make sure that the i.c. and the tantalum capacitors are fitted the correct way round.

Connect a supply of approximately 9V and a frequency counter to the output. Then adjust R1 for the correct tone for your local repeater.

The 200mV output should be connected across the existing deviation control in the host transmitter. Ideally, it should not be connected to the microphone input as this is usually filtered to pass only the audio frequencies in the range 300-3000Hz.

In the unlikely event of there being insufficient modulation, either decrease the value of R4 or increase the value of R5. (The supply should be switched so that a tone is only transmitted when required).

The receive amplifier is a simple high pass filter. It's based around a 741 op-amp with a cut off frequency of 100Hz. In effect, the filter allows the speech to be passed, but not the low frequency CTCSS tone.

Setting Up

There is no adjustment needed when setting the unit up. To test, apply a 9V (approximate) supply and connect to an audio source (earphone socket or audio oscillator) and check with an oscilloscope if available that the audio is passed through.

The filter should be connected as shown to a prior point to the volume control should be connected in the host receiver. This may involve either cutting a wire to the volume control. Although in many cases, all that is required is to locate the audio coupling capacitor to the volume control and removing it, fitting the filter in its place.

Once you've built the project, you're ready for CTCSS. And you built it yourself!

PW

Fig. 1a.

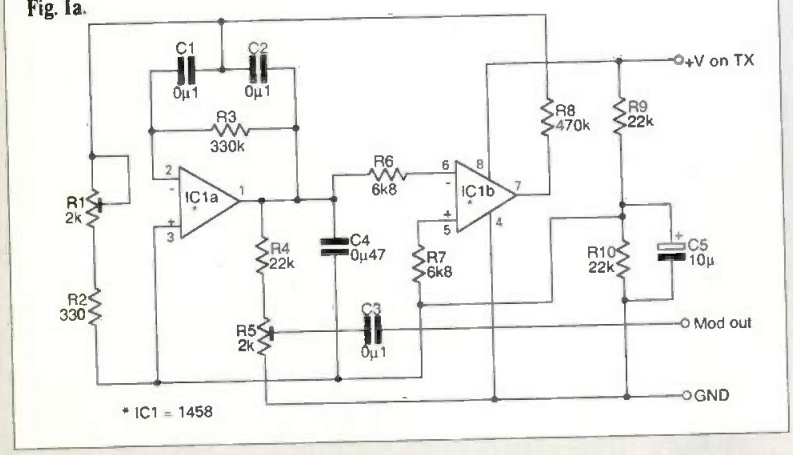


Fig. 2a.

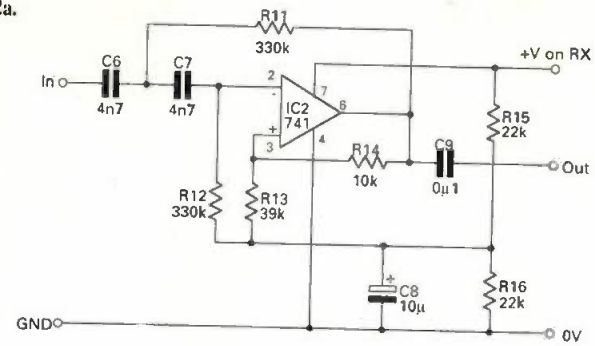


Fig. 2a: The filter circuit (see text).

Shopping List

Resistors

Metal Film 0.6W 5%

330Ω	1	R2
6.8kΩ	2	R6, 7
10kΩ	1	R14
22kΩ	5	R4, 9, 10, 15, 16
39kΩ	1	R13
330kΩ	3	R3, 11, 12
470kΩ	1	R9

Miniature rotary horizontal mount

2kΩ	1	R5

Cermet (18t) horizontal mount.

2kΩ	1	R1

Capacitors

Polyester film (miniature)

4.7nF		C6, 7
0.1µF		C1, 2, 3, 9

Tantalum bead (16V working)

10µF	2	C5, 8

Semiconductors

1458	1	IC1 (or any pin compatible dual op-amp)
741	1	IC2 (or any pin compatible single op-amp)

Miscellaneous

Hook-up wire to suit the transceiver, insulating tape to cover the two boards.

Fig. 2b.

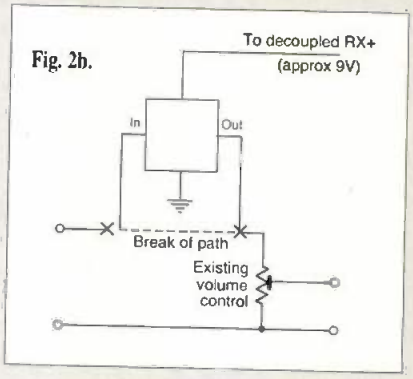
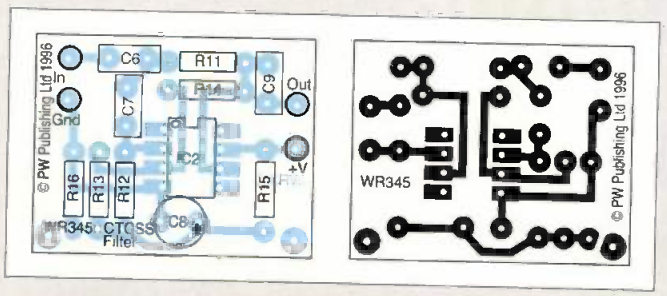


Fig. 2b: Diagram illustrating how the filter unit can be inserted in the audio pathway of an existing transceiver (see text).



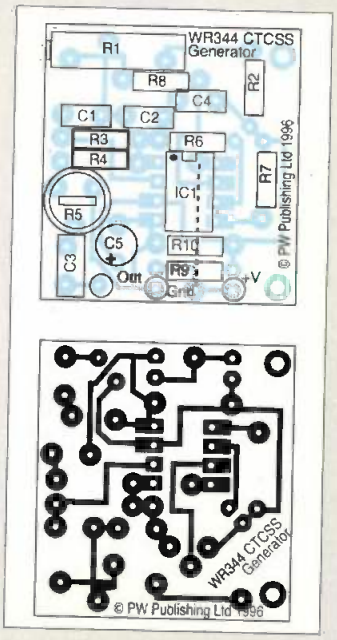


Fig. 3: The oscillator p.c.b. track design and associated component overlay.

Fig 4: The filter p.c.b. track design and associated component overlay.

NEWS 1996

Compiled by Donna Vincent G7TZB

Valve & Vintage At Pickett's Lock

RadioSport, promoters of the London Amateur Radio & Computer Show, have announced that this year's show on March 9 and 10, will have one complete hall set aside for valved and vintage equipment. The hall, dedidcated to the technology of yesteryear is to be known as the Vintage Sound & Vision Fair.

The new exhibition will include radio, TV, hi-fi, electronic, telecommunication, mechanical equipment and memorabilia. Along with seeing vintage wooden and Bakelite-cased wireless receivers, the many *PW* readers who revel in nostalgia will have the opportunity to meet specialists dealing in rare spare parts and hard-to-get valves for domestic and military equipment.

RadioSport also announce that the entry price to Picketts Lock remains the same as 1995. Valve & Vintage enthusiasts can also wallow in nostalgia for free as one ticket will cover admission to both events.

Further information from **Steve White** of **RadioSport. Tel: 0181-882 5125.**

Morse Course

A Morse code course commences on January 12 1996 at Newbury College in preparation for the RSGB 12w.p.m. test. The course will run on Friday evenings from 6 - 7.30pm. More information can be obtained by telephoning **(01635) 37000/35353** and quoting course **99208B** or direct from **Ray Oliver G3NDS** on **(01672) 870892.**

Satellite Donation

At the Annual General Meeting of the Radio Society of Great Britain (RSGB) held on December 2 1995 a cheque for £25,000 was presented to **Ron Broadbent G3AAJ** by the RSGB President **Clive Trotman GW4YKL** for the AMSAT Phase3d satellite project. It was also announced that the RSGB's Council has agreed to make a further donation of £25,000 providing that AMSAT-UK raises a similar amount from other sources.

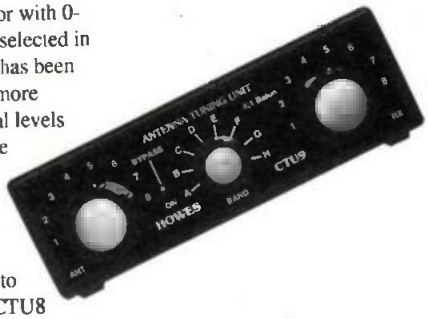
Selective Tuning From Howes

Daventry based **C.M. Howes Communications** have just added the CTU9 antenna tuning unit (a.t.u.) and ASU8 antenna selector to their range of kits.

The CTU9 is a 'T' match design a.t.u. with two tuning capacitors and eight switched inductance ranges which cover 500kHz to 30MHz. It also features a bypass switch, balun transformer and additonal terminal posts for the connection of balanced and unbalanced wire antennas. The CTU9 is available as a kit complete with case with printed and punched panels and all the necessary parts. The price for the kit is **£39.90** or **£69.90** for a ready built unit.

The new ASU8 antenna selector enables a shortwave receiver's input to be switched between three antennas using a rotary switch. It also has a switched attenuator with 0-25dB attenuation selected in 5dB'steps, which has been designed to give more control over signal levels compared with the standard 20dB attenuator offered by many general coverage receivers. Styled to compliment the CTU8 and CTU9 a.t.u.s the ASU8 comes complete with case, printed and punched panels and is avaialable for **£27.90** as a kit or **£49.50** ready built.

Both the CTU9 and the ASU8 are available from **C.M. Howes Communications, Eydon, Daventry, Northants NN11 3PT. Tel: (01327) 60178** and please remember to add £4 P&P to your order.



Transmitting Tube

Svetlana Electron Devices Inc., who are based in the USA have introduced the 572B a high power triode valve (tube) designed for use in class AB, class B, class C r.f. and audio amplifiers. The Svetlana 572B can be used as direct drop-in replacement in equipment using the 811A.

The new Svetlana power valve features a massive graphite anode for high peak overload capability and high average plate dissipation of 160W. It also has a low-loss white ceramic base together with a bonded white ceramic anode (plate) cap thermal insulator for high power r.f. transmitting valve capability.

Svetlana say that the temperature initiated 'getter' material which is embedded in the surface of the graphite anode, gives superior gas absorption and is more effective than flash 'getters' silvered on the glass envelopes of valves made with receiving valve techniques. There is also a matching ceramic socket, the SK4A and anode cap, the PC1A available.

Free technical data on the 572B together with a full list of Svetlana tubes is avaiable from either **Svetlana Electron Devices Inc., Headquarters, 8200 South Memorial Parkway, Huntsville, AL 35802, USA. Tel: 00 205 882 1344, FAX: 00 205 880 8077** or **Svetlana Electron Devices Inc., Marketing & Engineering, 300 Alpine Road, Portola Valley, CA 94028, USA. Tel: 00 415 233 0429, FAX: 00 415 233 0439.**

New From Procom

Procom are a Danish company who are known for their involvement with the communications field in both the professional and amateur sense and especially for their manufactuer of antennas, duplexers and filters. They have just released news of two new products which are available in the UK from **Communication Technical Services Ltd.**

Firstly the DANMIKE DSP-NIR is a Digital Signal Processing Noise and Interference Reduction unit which is microprocessor controlled and has been designed to improve short wave reception and remove noise. Features include s.s.b., c.w., p.b.t., Packet, SSTV, RTTY, notch and peak filters, automatic multi-tone notch, a.g.c., passband tuning and an integrated l.f. amplifier with 3.2W @ 4Ω. The price of the DSP-NIR is **£260**.

Secondly, the MCW-3000 is a microwave watt meter which covers a frequency range of 10MHz to 18GHz when used with the PRO-18G probe, supplied as standard or up to 50GHz when used with an optional probe. It is described as being extremely broadbanded with a dynamic range of 70dB and hypersensitive as it is capable of measuring down to minus 50dBm (10 nanowatts). Powered from a 9-12V d.c. power supply the MCW-3000 is applicable for most diode probe types and costs £665.

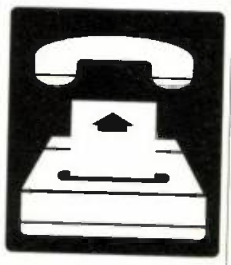
For more information on the DSP-NIR or the MCW-3000 you should contact **Communication Technical Services Ltd., Unit 15, The Gatwick Metro Centre, Balcombe Road, Horley, Surrey RH6 9GA. Tel: (01293) 822602 or FAX: (01293) 822612.**

FaxBak Service

Martin Lynch & Son, The Amateur Radio Exchange Centre, have recently introduced a new 'interactive' service known as Faxbak. The Faxbak system allows the caller to have his number re-dialled in the UK (overseas callers have to stay on the line) and request (using the telephone's keypad) any amateur radio equipment brochure.

For example if you require a brochure on the FT-990, once connected to the FaxBak sytem you would dial '990' and the brochure would then be faxed to you by return. Martin is also able to offer equipment reviews, a used equipment list, his newsletter and many other things via FaxBak.

Why not call the Martin Lynch & Son FaxBak service today? Just dial **0181-5660 007** (note the last three digits!) and follow the voice prompts given by Martin.



New Council Elected

Following the **International Short Wave League's** (ISWL) biannual Council Elections, with effect from January 1 1996 the ISWL council is:

President
Mrs Evelyn May G0OZI/G-17197
Honorary Secretary
Mrs Maggie Carrington G0WDM/G-20542
Honorary Treasurer
Mr David Beale G0DBX/G-10618
Editor-in-Chief
Mr Ray Miller G8JGH/G-12537

The most significant change to this year's council is the election of **Maggie Carrington G0WDM** to the position of Honorary Secretary. This means that the address of the ISWL Headquarters has changed to **3 Bromyard Drive, Chellaston, Derby DE73 1PF** and all correspondence should now be addressed as such.

QSL Bureau Manager
Mr Tony Gale G7NUR/G-13287
Publicity Officer
Mr Chris Carrington G0IYZ/G-20365
Council Members
Mr Herbert Yeldham G6XOU/G-20006
Mr Peter Rayer G-13038
Mr Bill Mackie GM4AIE/GM-9137

Silent Key - G2VF

Long time *PW* advertiser **F. G. 'Bob' Rylands G2VF** passed away on November 9 1995. Bob, first licensed in 1935, was well known in Southampton area and although he was 82, still kept busy producing the antenna loop project designs and kits which he advertised in *PW* for many years.

The Editorial team extend their sympathies to Bob's widow Dorian and family.

Rob Mannion G3XFD.

Picture Cards

The three QSL cards pictured here are just a small sample of the cards which are available from **Jean-Michel Gueugnot F1IXQ** of Magic Work in France. Jean-Michel's cards are already successful in France and he feels they would also appeal to the keen DXer elsewhere in Europe.

The price of F1IXQ's cards are 1500 French Francs for 1500 cards or 2750 Francs for 3000 cards (including postage). Special prices are available for producing DXpedition and Special Event Station cards.

If you would like samples of the various card designs which are available, you are invited to send an s.a.e. to **Magic Work, 11 Avenue Léonard De Vinci, Pat la Pardieu, 6300 Clermont-Ferrand, France. Tel: (33) 7328 9100/9200 or FAX: (33) 7328 9110.**

Illuminating Display

On Friday November 3 1995 **Waters & Stanton Electronics** played host to representatives from the three major amateur radio manufacturers in the UK. This was to mark the opening of their refitted and enlarged radio department.

As the photograph shows (L - R) **David Wilkins G5HY** from Kenwood, **Dennis Goodwin G4SOT** from Icom and **Barry Cooper G4RKO** from Yaesu attended the event to view the new purpose-made illuminated display cabinets which have been installed. Also shown in the photo is **Mark Francis G0GBY** who co-ordinated the refit. The new display houses the full range of amateur radio equipment from Kenwood, Icom, Yaesu and also the Alinco display which is thought to be unique in the UK.

Simple Transistor Checker

By John Thornton Lawrence GW3JGA

John Thornton Lawrence GW3JGA shows you how to build a useful piece of test gear.

Heading Photo: The finished prototype showing clearly the various lid markings.

Basically, transistors come in two types, *npn* and *pnp*. Each has three connections, emitter, base and collector. A small current applied to the base-emmitter connection produces an amplified current from the emitter to the collector.

The current amplification, (the ratio of the collector current to the base current) is called the 'beta' or gain of the transistor. For small transistors, the gain may be around 50-500.

In circuits which use an *npn* transistor, the collector is taken to a positive supply and for a *pnp* type, the collector is taken to a negative supply. In my transistor tester, a meter is connected in the collector circuit and a small known current is fed to the base.

The meter then indicates the gain (beta) of the transistor. Two ranges are provided, 0-100 and 0-500. An *npn-pnp* switch provides a positive voltage for *npn* transistors and reverses it for *pnp* types.

An insulation check switch is provided to increase the sensitivity of the meter in the collector circuit from 2 to 0.25mA to check for leakage current. The circuit is shown in **Fig. 1**.

The transistor tester is built on the inside of the lid of a small plastic case using point-to-point wiring. No circuit board is used.

Fig. 1: Circuit diagram of GW3JGA's transistor tester.

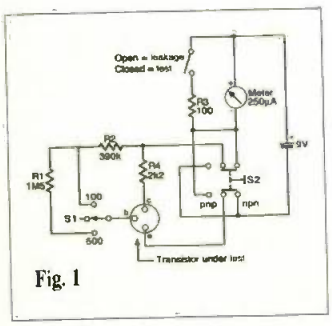


Fig. 1

Marking Out

Marking out information is given in **Fig. 2**. The reference point is the right hand end of the lid when held horizontally. Other dimensions are from a centre line along the lid.

A small electric drill may be used to drill 1.5mm diameter pilot holes. But use a hand drill to enlarge the holes to the required size.

An electric drill is usually too fast and unless the lid is securely clamped down, it may be drawn up the drill as the tip breaks through (from first hand experience). The following drills are required: 1.5mm for drilling pilot holes and for the transistor socket 2.5mm for the switch washer locating pegs 6.35mm (1/4in) for the toggle switches and for starting the meter hole.

For the meter cut-out, first drill two or three 1/4in holes within the 18 x 18mm marked area and then use a file to join up the holes, then keep filing carefully until the hole is the correct size to take the body of the meter.

Label Lettering

When all the holes are drilled, label the control position using rub-down lettering. The lettering must then be fixed using a spray lacquer or by carefully painting over the letters using a small brush and thin clear lacquer.

Warning: some lacquers may dissolve the lettering, so do a test first. You must do the lettering **before** you fit the switches as it's almost impossible to do a neat job after the switches have been fitted.

Check which type of switch goes where on the lid. The switches come with two nuts, a washer with a location peg and a shakeproof washer. Remove one nut and the two washers.

Screw the remaining nut down as far as it will go. Fit the shakeproof washer.

Insert the switch into the correct hole from the back of the lid. Now fit the washer with the location peg on the front of the switch and rotate the switch until the peg drops into the location hole. Fit the remaining nut and tighten.

Repeat for all switches. Check that they are in the correct position before wiring.

When fitting the transistor socket in place you can use instant adhesive. Make sure that the socket is fully seated against the lid.

Instant adhesive can also be used for fitting the meter. But just in case you need to remove it at some time, I suggest that you use double-sided sticky tape between the back of the meter and the panel.

Wiring Diagram

The wiring diagram is shown in **Fig. 3**. Check off each wire and component on the diagram as you fit it. Start by putting in the wires followed by the resistors.

Where there are two wires or components going to the same tag, only solder when both are in position. It's easy to poke both wires through the tag and they will usually hold themselves in position while you solder. Check and (double check) each item against the diagram before soldering.

If everything appears to be correct, fit the battery and using a known good *npn* transistor and a known good *pnp* transistor, check that the tester is functional. Stick the battery to the bottom of the box with double-sided sticky tape, and fit the lid and secure in position.

Congratulations! You now have a useful piece of test gear.

Using The Tester

Cont. on p.30

simple as building it. Just follow this routine:

1 Set the *npn-pnp* switch to suit the transistor to be tested.
2 Insert the transistor in the socket correctly and check that there is no reading on the meter. If there is, it may be the wrong type for the *npn/pnp* switch setting, incorrectly inserted in the socket or faulty.
3 Press the 100-500 switch to 500 and note the meter reading, 5 represents a gain of 500. If the reading is less than 1 (the gain is less than 100) press the switch to 100 and note the meter reading, 5 now represents a gain of 100.
4 Leave the 100-500 switch in the centre 'off' position and press the ins switch to check for leakage current. A reading of 5 represent 0.25mA. For silicon transistors, the leakage current is negligible. For germanium transistors, some small leakage current may be detected. A high leakage current would indicate a faulty transistor.

PW

Fig. 2

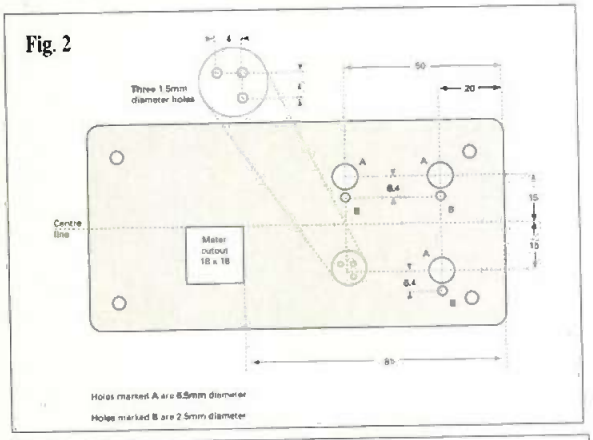


Fig. 2: Marking and drilling information.

Fig. 3

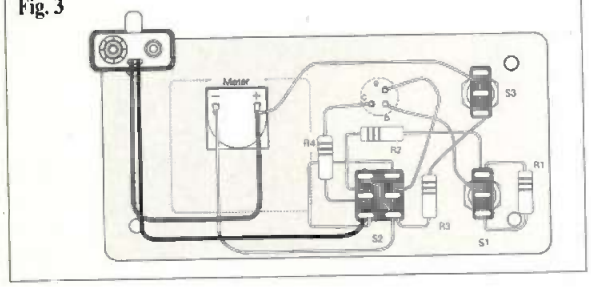


Fig. 3: Wiring layout.

Shopping List

		Maplin Order Code
Resistors		
R1	Resistor Metal Film 0.6W IM5	M1M5
R2	Resistor Metal Film 0.6W 390	KM390K
R3	Resistor Metal Film 0.6W 100R	M100R
R4	Resistor Metal Film 06W 2k2	M2K2
Switches		
S1	SP.DT Min. Tog. Switch biased centre off	FH03D
S2	DP.DT Min. Tog Switch	FH04E
S3	SP. CO Min. Tog switch biased to one side	FF70M
Miscellaneous		
1	Meter 250uA 675Ω 40x040x29	LB80B
1	Socket for transistor	WR31J
1	Case 129.5 x 64.5 x 42.5	YU53H
1	Battery connectorH	F28F

Overall cost approximately £12

RADIO Diary

Compiled by Zoe Shortland

1996

January 20: Computer Fair's (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 disabled visitors and Bring & Buy). Details from **Dave G0FLX** on **0113-238 3622**.

February 17: Computer Fair's (Northern) computer/rally fair and games 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 by 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 17: The largest single day amateur radio rally in the UK - the Norbreck Radio, Electronics and Computing Exhibition by the Northern Amateur Radio Societies Association at the Norbreck Castle Hotel Exhibition Centre, Queens Promenade, North Shore, Blackpool. Doors open at 11am (10.45am for disabled visitors). Over 100 trade stands, Bring & Buy stand, RSGB stand and book stall, club stands, amateur computer stands, construction competition, free car parking, free shuttle bus from car park, wheelchair access to all stands, radio talk-in on S22. Admission is £2, OAPs £1 and under 14s free. More information obtained from **Peter Denton G6CGF** on **0151-630 5790**.

March 24: Bournemouth Radio Society's 9th Annual Sale will be held at Kinson Community Centre, Pelhams Park, Millhams Road, Kinson, Bournemouth. Doors open at 10.30am until 4.30pm. Talk-in from GI8RS on 2m S22. Amateur radio, computer traders, clubs and specialised groups. Excellent refreshments. Admission £1. Details from **Malcolm G0UCX, QTHR** on **(01252) 845900**.

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 Lancs Railway (steam preservation line), so why not bring all the family and have an enjoyable day out. **Laurence G4KLT** on **0161-762 9308**.

April 14: Lincolnshire AMS 96 - Computer & Electronics Show, Springfields Exhibition Centre, Springfields Gardens, Camelgate, Spalding, Lincolnshire. Admission price includes free entry to 25 acre show gardens. **Sharward Promotions, Upland Centre, 2 Upland Road, Ipswich, Suffolk IP4 5BT. Tel: (01473) 272002.**

April 14: The Launceston 10th Amateur Radio Rally is being held at the Launceston College. There will be well-known traders, Bring & Buy, Morse test on demand (bring two passport photos) and hot snacks. Talk-in on S22. Ample parking. **Roy G0IKC** on **(01409) 221624** or **Paul G0UFV** on **(01566) 776108**.

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.

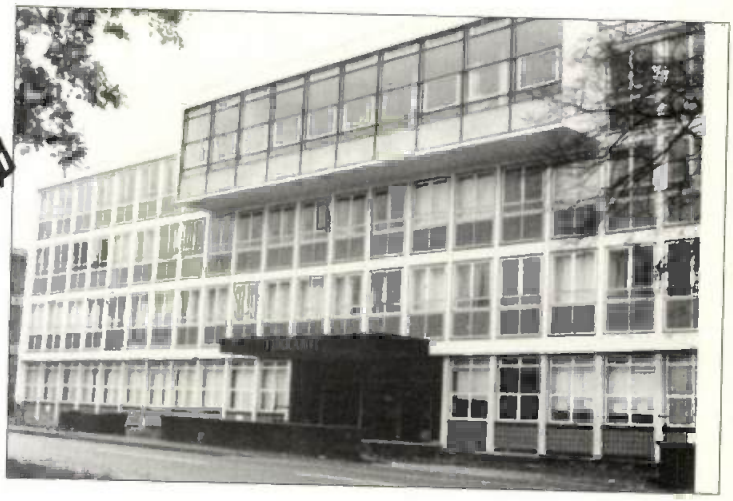
The Editorial staff of *PW* cannot be held responsible for information on Rallies, as this is supplied by the organisers and is published in good faith as a service to readers.

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

Editor

* Practical Wireless & SWM in attendance

Farewell to Ferranti



Ian Poole G3YWX acknowledges a famous name in electrical, electronic and radio engineering as another era in British technological history ended with the closure of Ferranti.

Heading Photo: A great name did buisness from here. Some of the dissused Ferranti offices in Bracknell, Berkshire.

Ferranti, one of Britain's oldest and most innovative electronic companies took its final bow at the end of 1993. The receivers were called in at the end of a struggle lasting several years which started after Ferranti took over a company called ISC and a massive fraud was discovered. This was a sad end for a company which was formed over a 100 years ago.

Since its founding, Ferranti had been at the leading edge of technology in areas as wide as electrical machines and power distribution, radio, computers and semiconductor manufacture. In fact, during its life, Ferranti made a wide range of contributions to technology of which it could be justifiable proud.

Founding Ferranti

Sebastian Ziani de Ferranti was the founder of the firm named after him. He formed the company in London in 1882, when he was just 17 years old.

Ferranti was a great innovator and he turned his talents towards the new and growing electrical industry. It didn't take long for Ferranti to start making alternators of his own design. This was very successful and enabled him to make a significant impression in this particular field.

In the 1880s many developments were taking place in the distribution of electrical power. Initially, many people favoured d.c. supplies. However, Ferranti had other ideas of his own, as direct current (d.c.) supplies had many drawbacks which could not easily be overcome.

The d.c. supplies could not be transformed from one voltage to another and the whole distribution network had to run on the same voltage. This meant that close to the generator, extremely large currents would arise and even small levels of resistance in the wires would introduce significant losses.

Alternating Current

Ferranti saw the advantages of using alternating current (a.c.) By using a high voltage a.c. generator and distribution system, the currents would be much smaller and resistive losses would be reduced.

A transformer close to the point of use could reduce the voltage to the values needed for its use. By following these ideas Ferranti effectively fashioned the power distribution system we use today.

One of Ferranti's first major successes was achieved in 1885 when he was appointed to refit a small power station at the Grosvenor Gallery in London. He successfully completed the job and with the experience he gained here, he proposed a scheme for building the largest electrical system of the time.

In his scheme, Ferranti outlined the generating station at Deptford, where land was cheap and there was easy access from the river for coal. Power from the station at a voltage of 10kV would be routed to the Grosvenor Gallery where there would be a transformer sub-station. The plan was that the system would supply enough power for approximately 1,000,000 light bulbs.

Beset With Problems

Like many revolutionary design ideas, the project was beset with problems. The Grosvenor Gallery sub-station burned down and the original alternators were never finished, being replaced with several smaller ones. In addition to this, the project was almost a financial disaster, and only started to supply power in 1891.

Nevertheless, Ferranti's project was a major technical achievement which was years ahead of its time. Over 25 years later, there were still only two other power stations in operation in Britain, which equalled the size of Deptford.

Radio Field

The Ferranti company did not enter the radio field until the 1920s. However, about this time it was a natural development for them. Their experience in the manufacture of transformers was invaluable in the development of mains and inter-stage coupling transformers in radios.

Initially, the company just manufactured components. But even here they did not restrict themselves to transformer manufacture as they also made capacitors (condensers) and loudspeakers as well as a variety of other components.

In the mid 1930s, they even started to manufacture valves. Some of these were of their own design, while others were Ferranti versions of existing British or American types.

In 1929, Ferranti decided to manufacture complete radios and a year later their first set was seen on the market. This was a four valve tuned radio frequency (t.r.f.) set. At this time, t.r.f. receivers were still very popular.

Using less valves than a superhet, the t.r.f. designs were much cheaper. But they still gave sufficient selectivity as there were comparatively few stations broadcasting.

A year later, the company launched two new radios. The first was another t.r.f., but seeing the increase in the number of broadcast stations, Ferranti launched a superhet. And for its time, this set was a very advanced design, having six valves plus a rectifier in the line-up.

Business Booming

With its radio business booming,

Ferranti set-up a new factory in 1935. It was located at Moston outside Manchester, and all the manufacture was undertaken there.

The sets were also designed at the Manchester site. This was carried out under the leadership of their chief engineer who went by the memorable name of Albert Hall!

The expertise which Ferranti gained in designing radio sets meant that the company could make a valuable contribution to the war effort between 1939 and 1945. As a result, the company was soon producing radios and also equipment for the new radar systems, which were just beginning to be employed.

Friend Or Foe?

Amongst the other equipment the company made during the Second World War was a system called IFF (Identification Friend or Foe?). For this system a ground station transmitted a pulsed signal which was picked up by the aircraft and a series of coded pulses transmitted back to the ground.

If the correct pulsed IFF 'reply' was received, then the aircraft would be British. Otherwise it could be assumed to be an enemy.

In one of the Ferranti transmitters used in the IFF system, a pair of 807s were used. They generated peak powers of about 1kW, proving again how robust these valves were!

Resumed Production

After the Second World War, Ferranti resumed its production of domestic radio sets. And in line with its innovative approach to radio design, many new types of set started to be produced. These included car radios and later some television sets.

By the late 1950s, Ferranti had developed its main core businesses in other directions and domestic radio production did not fall in line with the main thrust of the company's business. As a result, the radio business was sold to E. K. Cole Ltd., who produced radios under the Ekco name. For a while Ekco sold radios under the Ferranti label until they themselves were taken over by Pye.

Military Market

During the Second World War, Ferranti entered the military electronics market. Having achieved a considerable amount of success here, Ferranti devoted many of its efforts towards manufacturing equipment for the defence market.

The company built up a radar business of considerable renown, becoming a world leader in the field. One of its early successes was the 'Bloodhound' guided missile programme which was a joint venture with the Bristol Aeroplane Company.

The Computer

Surprisingly, Ferranti also entered the computer market. They started work in this field as early as 1946 and soon became a world leader. As proof of this, in 1960 Sebastian de Ferranti (a descendant of the founder) proudly announced that over 200 of his company's computers were in use world-wide.

Ferranti's announcement marked a significant achievement as very few computers were in use at this time. Unfortunately, the lack of Government support slowed its growth very considerably allowing IBM, which was receiving assistance from the American Government, to overtake it. Nevertheless, some of its offshoots formed the foundations of what is ICL today.

Ferranti also entered the semiconductor market, and in typical fashion they were well up with the front runners. In the late 1950s, they were well ahead with the development of commercially viable f.e.t.s.

Then after the first i.c.s had been made in the USA, Ferranti was one of the first in the UK to start manufacturing them. Later on, they were one of the very few companies outside the USA and Japan to design and manufacture their own microprocessor.

Radio Chip

However, most radio amateurs will remember Ferranti Semiconductors for their ZTX range of transistors and their ZN414 radio on a chip i.c. This elegant little device contained ten transistors and with a few external components, it made a high performance t.r.f. radio suitable for a.m. reception.

Using it, excellent audio quality could be obtained from the ZN414 and the operating current was very low. (And as the ZN414 is still available...it can still do the same for you!).

Continued To Grow

Ferranti continued to grow, through the 1960s, 70s and 80s. However, in 1987, the company took a step which was to bring its downfall some years later.

In wanting to grow and enter new markets, they took over an American firm called International Signal & Control for £400m. Only in 1990 was it discovered that massive frauds had left ISC with debts of millions of dollars. Six months earlier the ISC boss, James Guerin left the firm before the losses were discovered.

Ferranti tried valiantly to stay afloat. They sold off some of their businesses to make up the shortfall. However, they were left too small and insecure to be awarded any of the major contracts they needed to remain in business.

Major Trouble

By late 1993 it was obvious that Ferranti was in major trouble. An offer came from GEC for 1p per share, but after careful consideration of their situation, GEC decided not to proceed.

The only option left to Ferranti management was to call in the receiver. This was a tragic end for a company which gave so much to British electrical and electronic technology.

So, when you look at a vintage Ferranti interstage valve transformer and use one of the Ferranti designer ZN414s...you too can pay tribute. You can appreciate a once great British company that now lives on in name only.

PW

Ferranti might have gone, but they left a lasting legacy behind, including this table model ratio produced in 1953.

Hurry.....The Dayton HamVention Flight '96 Calling

At New York & Dayton is Boarding At Gate *PW*

Come & Fly With Us On The Practical Wireless HamVention Holiday May 13-21 1996. Don't Miss The Flight....We're looking Forward To Your Company!

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. And like the passengers who travel aboard the Cunard Line's *Queen Elizabeth II*, you too can enjoy the sights of New York!

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.

London To New York

The 1996 *PW* HamVention Holiday departs from London (Gatwick) 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.

Following the opportunities to explore and enjoy 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 Holiday Inn has a good sized indoor heated swimming pool, a bar and restuarant, and there are a good selection of reasonably priced 'diners' nearby, together with the excellent 24-hour opening Meijer's department store only a short walk away.

The HamVention opens Friday lunchtime ('Flea' market open from 6am) and runs until Sunday afternoon and there's plenty of good shopping in the nearby shopping malls (public transport is frequent and is good value in Dayton). The HamVention bus service departs from the Hotel car park and although a small charge was made in 1995, we understand that the service will be free this year (subject to confirmation).

The party then departs from Dayton on the Monday lunchtime **May 20**. We then fly on to New York to join our connecting flight, arriving in London (Gatwick) 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.

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

Cunard Line's RMS *Queen Elizabeth II* in New York with Manhattan and the twin towers of the United Nations Building in the background.

(Photograph courtesy of Cunard)

Queen Elizabeth II passing Liberty Island, complete with its famous occupant! A gift from the French people to America, the statue is of copper sheet on a metal frame. It was first erected in France and sent to the USA as a giant 'Jigsaw Puzzle'. You can join the *PW* party and take an optional trip to the statue in 1996, during the HamVention Holiday two-centre holiday. If you've got the energy and determination you could admire the view from the statue's head or (if you're really keen) make your way up the steep staircase to the observation balcony under her torch!

(Photograph courtesy of Cunard)

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.

Hurry! Places on the HamVention Holiday are limited...so send for your information pack today. Don't miss the flight to the holiday of the year with *PW*!

1996

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August					1	2	3	4 Woburn Radio Rally	5 ☆	6	7	8 Sept 96	9	10	11 Morley Hamfest (G4RFR)	12
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Club/Society	Contact/Address/Tel Number	
Amateur Radio Caravan & Camping Club	Mr A. Gard G4LWA	(01462) 811208
AMSAT-UK	Mr R. Broadbent G3AAJ	0181-989 6741
British Amateur Radio Teledata Group (BARTG)	Mr P. Adams G6LZB	464 Whippendell Rd, Watford, Herts WD1 7PT
British Amateur Television Club (BATC)	Mr D. Lawton G0ANO	Greenebarst, Pinewood Rd, High Wycombe, Bucks HP12 4DD
British Rail ARS	Mr G. Simms	85 Surrey Street, Glossop, Derbys SK13 9AJ
British Young Ladies Amateur Radio Assn (BYLARA)	Mrs M. Ritson G7FYV	14 Dunsdale Rd, Holywell, Whitley Bay, Tyne & Wear NE25 0NG
Chiltern DX Club	Mr D. Mann G0HXN	(01344) 761937
Civil Service ARS	Mr J. Pinnell G3XWK	0171-732 8605
G-QRP Club	Rev G. Dobbs G3RJV	(01706) 31812

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International Police Association Radio Club	Mr M. Hammond G3PGA	(01271) 860930
International Short Wave League	Mrs E. May G0OZI	10 Clyde Cresecent, Wharton, Winsford, Chesire CW7 3LA
Radio Amateurs Old Timers' Association (RAOTA)	Mrs S. Gabriel G3HCQ	Millbrook House, 3 Mill Drove, Bourne, Lincolnshire PE10 9BX
Radio Amateurs Invalid & Blind Club (RAIBC)	Mrs S. Chambers	78 Durley Avenue, Pinner, Middlesex HA5 1JH
Remote Imaging Group	Mr J. Tellick	0181-390 3315
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Royal Naval Amateur Radio Society (RNARS)	The Secretary	Royal Naval ARS, HMS Collingwood Fareham, Hants PO14 1AS
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World Association of Christian Amateurs & Listeners	Mr D. Chivers G3XNX	51 Alma Road, Brixham, Devon TQ5 8QR

OTHER USEFUL CONTACTS

City & Guilds of London Institute
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London EC1A 9DD
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Radiocommunications Agency
Amateur & Citizens Band Radio Unit, South Quay Three
189 Marsh Wall, London E14 9SX
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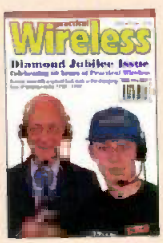
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Antenna Workshop

By Gerald Stancey G3MCK

Gerald Stancey G3MCK provides a non-mathematical view of voltage standing wave ratio, and what it means in reality.

The objective of this article is to give an overall explanation of a subject that is shrouded in mystery and confusion. And it does not have to be!

So let's start by giving the subject its full title of Voltage Standing Wave Ratio (v.s.w.r.). Although in practice this is usually shortened to just s.w.r.

I'll be taking a common-sense approach and will not be using much mathematics. In this spirit we will not be finding out the basic formulae for (v.)s.w.r. as these are dealt with in the standard text books.

The difference between power and energy is not within the context of this column. So, for the purposes of this article, I'm going to treat power and energy as being the same thing. We can consider power flowing over unit time, and I think it is helpful to make this simplification.

What Is SWR?

We must first ask the question, what is s.w.r.? And the answer is that the simplest definition is: that v.s.w.r. is a measure of the mismatch that occurs when a transmission line is terminated with a load that is not resistive and equal to the impedance of the line (pause for breath!).

The higher the s.w.r. the greater the mismatch. But before getting too involved, let's consider a simple loss-less system which consists of a transmitter, a line and a load, see **Fig 1**. From this it's obvious that if the load is dissipating W watts of power, then the output of the transmitter is also W watts.

Badly Terminated

When a line is badly terminated, the load can't absorb all the power coming down the line from the transmitter. This means that the 'excess' power, with nowhere else to go, is reflected back towards the transmitter.

Exactly where the reflection takes place is an interesting question. Where does the line end and the load begin?

Luckily however, in the context of this article, this question can be ignored. Let us just accept that '**there is a point at the end of the line where reflection occurs**'.

The power flows associated with the reflection of energy at the load are shown in the diagram **Fig. 2**. The diagram is the result of simply applying the **law of Conservation of Energy**. This law states '**that energy can neither be created nor destroyed**'.

At The Generator

What happens to this reflected power when it arrives back at the generator? If we go back to **Fig. 1**, you can see that to maintain energy conservation reflection must also occur at the generator, see **Fig. 3**.

The further reflection at the generator leads us to the apparently strange fact that if the line is not matched to the load then the forward power is greater than the output power of the transmitter! To clarify this statement let's look at **Fig. 4**.

The half wave length of 150Ω coaxial cable is, by the way we define s.w.r., suffering with an s.w.r. of 3:1. But here is the strange thing, by being exactly half a wave length long, it shows an impedance of 50Ω at the transmitter end.

Time To Consider

Having looked at what causes s.w.r. it is now time to consider what it means to us. The answers are: increased line loss and an impedance at the input to the line which differs from the impedance of the line.

The first is the easiest to consider but we now have to move into the real world of lossy systems. Any real line has a loss which depends on: the length of the line, the

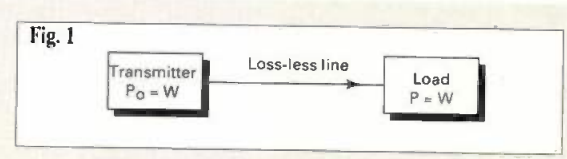
Fig. 1: The ideal situation - all the power from the transmitter gets to the load without loss.

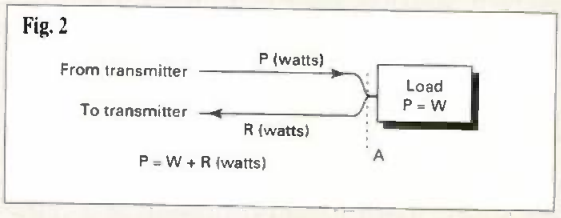
Fig. 2: Power balance at the load with forward power P and reverse power R (both measured in watts). Here the load (not matched to the line impedance) reflects some power back down the line towards the transmitter.

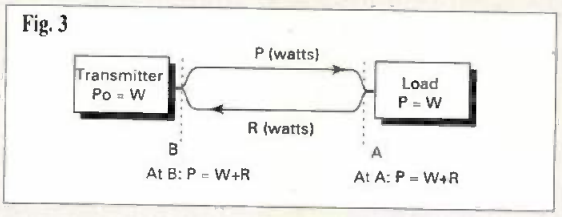
Fig. 3: Power balances at both ends of the (mismatched) line. Powers P and R are as in Fig. 2.

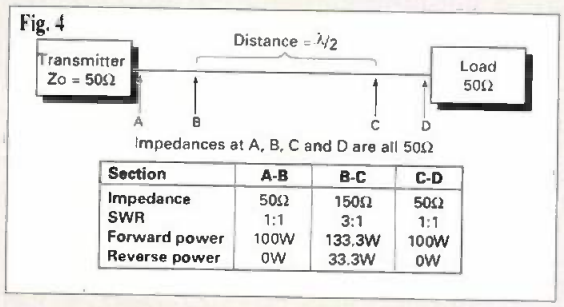
Fig. 4: Assume loss-less lines. Sections A-B and C-D have characteristic impedances (Z_0) of 50Ω and section B-C has a characteristic impedance of 150Ω (but is mismatched to the 50Ω impedances of the A-B and C-D sections).

Fig. 5: The power balance in the real situation shown in Fig. 4: The transmitter produces W watts, and the load absorbs W' watts. Due to real line losses ΔP and ΔR are the losses in the forward and reverse directions.

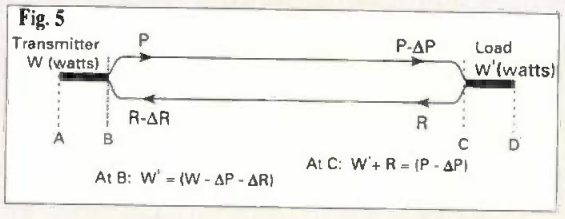








Section	A-B	B-C	C-D
Impedance	50Ω	150Ω	50Ω
SWR	1:1	3:1	1:1
Forward power	100W	133.3W	100W
Reverse power	0W	33.3W	0W



frequency of operation and the construction of the line.

If the diagram **Fig. 3**, is redrawn to show these losses, it appears as in **Fig. 5**. It is now clear that the losses on a mismatched line will be greater than on a line that is correctly terminated. However, these extra losses due to s.w.r. are not usually too great. **Table 1** puts them into context.

From what I've mentioned, it appears that it's true that any effort to reduce the s.w.r. to lower than 2:1 is wasted. However, this is **not** the full story!

Until now I've ignored the fact that (at the transmitter end) the forward power reacts with the reflected power from the load. The effect of this interaction is to change the impedance of the line at the transmitter end, from its nominal (say 50Ω) to some other value. Invariably this new interaction impedance will almost certainly contain a reactive element.

If your transmitter is designed to load into a 50Ω resistive load it may not be happy if you try to load it into another impedance. It may show its displeasure by not giving full power. (The drop in power may be due to s.w.r. protection circuit reducing power or simply that the transmitter is unable to deliver its full power output into the load).

The problem can be solved by one or more of the following options:

- By directly reducing the s.w.r. on the line (altering the loading).
- Changing the line length so that the impedance seen by the transmitter is more resistive and lower than 50Ω.
- Putting a matching circuit between the transmitter and the line to ensure that the transmitter sees a only a resistive 50Ω.

Note that putting an a.t.u. in circuit does not alter the s.w.r. on the line. However, if the transmitter has a self contained a.t.u. or uses a valved power amplifier stage with a Pi-tank output circuit, you may find that s.w.r. reading as high as 2:1 or 3:1 can be handled by the set itself without operator action.

Correcting Readings

How do you know what is a correct reading and how do we find it? The normal reflectometer (or s.w.r. meter) works by measuring the magnitude of the forward and reflected voltages. From these two voltages, the s.w.r. can be calculated by using the formula:

$$\text{v.s.w.r.} = \frac{V_f + V_r}{V_f - V_r}$$

Where V_f and V_r are the forward and reflected voltages respectively.

On a lossy line the value of V_f at the generator end of the line is higher than its value at the load. The reverse is true for Vf. Hence the measured value of the s.w.r. will vary along the line, the only true s.w.r. being that value measured (or calculated) at the load.

The table, **Table 2**, shows what happens when a lossy line is used to feed an antenna. In practice, it is reasonable to ignore this correction at h.f., when the line loss is small and if the line is operating at a moderate s.w.r. However, at v.h.f., where the line losses are greater, the extra losses due to a high s.w.r. is something of which you should be aware.

Line Loss (dB)	Apparent v.s.w.r.				
	1.0	1.6	2.0	3.0	5.0
0.6	1.0	1.7	2.2	3.7	7.6
1.0	1.0	1.8	2.4	4.3	>10.0
2.0	1.0	2.1	3.3	8.4	>10.0
4.0	1.0	3.7	10.0	>10.0	>10.0
	Actual v.s.w.r. at the antenna				

Table 1: When a line, constructed from 30m RG58/U, operates with an s.w.r. 2:1 extra losses are incurred. These losses are tabulated at three different frequencies.

Summary

In this article I've presented a non-mathematical overview of the effects of s.w.r. From the point of view of the average amateur we can usually say that for an s.w.r. of 2:1 or less, the following generalities may be applied:

- The extra transmission line loss due to the s.w.r. can be ignored.
- It may be necessary to use an a.t.u. to ensure that the transmitter is presented with the correct load.
- The s.w.r. as measured in the shack will be better than the s.w.r. measured at the load. But usually the difference will be small, and, can be ignored.

So, now you know if you have a problem to deal with, or if you can ignore it.

PW

Frequency band (MHz)	3.5	21	144
Line Loss (dB)	0.68	1.90	5.70
Extra v.s.w.r. loss (dB)	0.15	0.30	0.47
Total losses in line (dB)	0.83	2.20	6.17

Table 2: The true line s.w.r. (at the antenna end) is a function of line loss and s.w.r. measured at the transmitter end of the line. For example, if the s.w.r. in the shack is 2.0:1 and the line loss is 1dB, then the true s.w.r. is 2.4:1.

Further Reading

The subject of voltage standing wave ratio (v.s.w.r. or usually just s.w.r.) is improperly understood by many radio amateurs. When looking at the way it is sometimes handled in articles and book available, it's not surprising!

In many books the subject of s.w.r. is dealt with in a very mathematical way and can leave the average amateur completely baffled. So I've looked at the various books I think may be around in the average shack and tried to grade them as to how they deal with the matter.

The simplest way of dealing with s.w.r. is to ignore the mathematics of s.w.r. In Doug DeMaw W1FB's book *W1FB's Antenna Notebook* it's merely said that for maximum efficiency you should just tune for minimum s.w.r. But he does provide a wonderful practical s.w.r. bridge you can build for yourself.

John Heys G3BDQ, in his book *Practical Wire Antennas* treats s.w.r. in the same way as Doug DeMaw. In John's book he shows an s.w.r indicator using two small bulbs that's suitable for parallel wire (or 300Ω twin) feeder. John also includes, under the label of 'Old-time' antenna matching, some methods for matching without using an a.t.u.

In the *Antenna Impedance Matching* and *Antenna Compendium (Vol. 1)*, both also from the ARRL, s.w.r. is treated a little more technically. The book *Antenna Impedance Matching* treats the subject in greater depth and with more mathematics.

In the new *Radio Communications Handbook* from the RSGB s.w.r is given quite an in depth mathematical treatment. Appearing in section 12 (HF Antennas), s.w.r. and its effect on feeders is dealt with in a mathematical, but fairly easy to understand way.

One small observation I would make for anyone reading more than one of the above books. Each book seems to have an individual style of what the formula is to calculate s.w.r. However, when applying first principles they are all the same, merely differing ways of showing forward and reverse energy.
All the above books are available from the *PW* Book Service. See those pages within the magazine for more details.

'Tex' Swann G1TEX

More Antenna Workshop next month

PW Helta An Experimental Loop Antenna

By Richard Marris G2BZQ

Richard Marris G2BZQ presents The PW Helta (Helical Loop Transmitting Antenna) an experimental table-top loop antenna.

One of the most used antennas is the conventional dipole. But for the 3.5MHz band its length would be around 41m long and around twice that length for 1.8MHz making it difficult to erect in a small space.

I've spent many years experimenting with loop antennas to reduce the space required for my 'antenna farm'. A typical physically small multi-turn loop might consist of one or more turns of wire wound on a box frame configuration. A typical schematic of a box frame loop is shown in **Fig. 1**.

To be able to use such loops, as in **Fig. 1**, over a whole band, variable tuning must be incorporated. And as I prefer loops to be located on a table alongside my operating position, the overall dimensions of the loop are dictated by the space available within arm's length.

Finished Loop

My overall finished loop is shown in **Fig. 2**. This was a first attempt to investigate and construct a viable helically wound loop.

The antenna consists of a tubular plastic frame and the complete frame structure plus base is some 750mm wide by one metre high.

The various parts are helically wound over the tubular frame with a 6A rating pvc covered wire in the form of five coils, L1 to L5. I've found I needed approximately twice the length of wire that a corresponding multi-turn box loop needs.

As built the loop is series tuned by variable capacitor C1 with matching to coaxial feedline achieved with a helical 'hairpin' matching device. This device allows 50Ω impedance coaxial cable to connect to the transmitter.

On 1.8MHz, additional capacitors are added in parallel with C1 to bring the loop back into resonance. The simple tuning meter, just sensitive enough to monitor the antenna radiation, is an essential feature to enable easy, quick and accurate resonating and loading of the loop.

In the interests of domestic and personal safety I use a low power (10W) c.w. transmitter. And to be honest (and safe) this power level is to be recommended for inside the home.

The components used should be satisfactory up to about 20W. Though no doubt the components could be upgraded for higher power.

It's difficult to accurately plot a radiated polar diagram pattern with the loop located indoors. This is due to interaction with nearby objects, but it has been assessed as approximately egg shaped as shown in **Fig. 3**.

Simple Format

The loop is constructed in a simple format, which I used for later experimental modifications and improvements as I thought of them. The profile, shows the 760 by 1000mm wide helical loop supported vertically, on the baseboard. The baseboard also has the resonating variable capacitor (C1) and front panel mounted on it.

The loop helical winding frame consists of four lengths of 22mm (7/8in) white extruded pvc water piping. When assembled the loop must be made as rigid as possible by glueing the corner joiners. You will also need plastic stand-off wall clips to fix the tubing tightly.

A word of warning when creating the windings, it is absolutely essential that the specified wire is used. A thinner conductor will result in losses in radiated power, possible heating and loading difficulties.

The top horizontal coil L1 consists of 77 wire turns spaced approximately 6mm apart to cover the whole tubing length. Coils, L2 and L3, are wound to fill the whole of the two vertical limbs. Each coil consists of 75 turns spaced approximately 9-10mm.

Coils L4 and L5 are each 33 closewound turns on the bottom limb. On completion of the coils the loop is mounted onto the baseboard.

Use two of the plastic stand-off wall clips to hold the loop. They are both fixed to the top batten of the mount. Pieces of single sided copperclad board are used for the baseplate and panel, the overall layout is shown in **Fig.s 4** and **5**.

The front panel is 100 x 85mm high and is screwed to the baseboard front with the baseplate screwed to the baseboard behind the panel. The edges to the panel and baseplate must be seam soldered together.

I suggest that the variable capacitor C1 is fitted to the front panel with an slow motion drive between panel and knob. (I used an older type of metal framed receiving type (Jackson type E 150pF) for C1 which should be soldered to the baseplate). Of course, other types of capacitor can be used providing the plates are wide spaced with ceramic support insulators and rigid construction.

The 'helical hairpin match' is a coil made of 9 turns of 1.6mm (16s.w.g.) tinned copper wire, and is shown in the three views of **Fig 6**. This coil is located between the rear of C1 and the loop mounting.

One (50mm) tail is soldered direct to the chassis plate and the other (25mm) is soldered to a 25mm long insulated post as shown. The coaxial feedline is soldered on at 81/2 turns and the cable screen soldered to the baseboard.

The loop frame is now clipped into the stand-off wall clips on the loop mounting. Next L4 is soldered to the

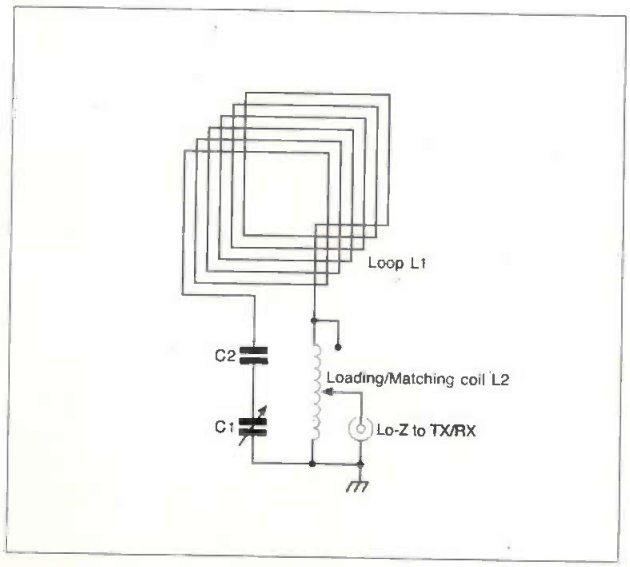
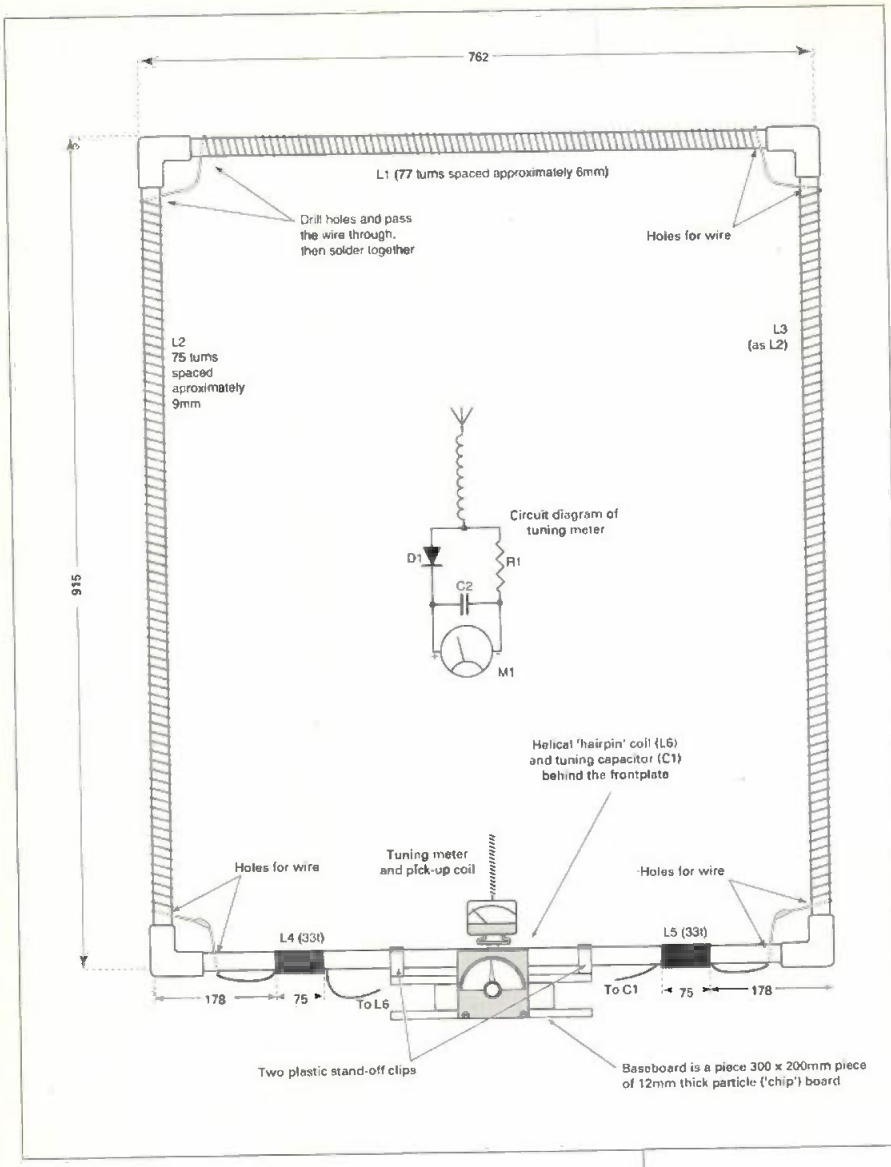


Fig. 1: The basic box-frame loop antenna.



should be half way between loop centre and L5.

Minor adjustments to C1 may be needed, depending on the transmitter power being used. The tuning meter should be moved along towards L5 until the meter needle is about 75% full scale and a reference mark made on the meter front. (Maximum radiation loop radiation occurs when the tuning meter has been peaked to maximum meter reading).

Useable bandwidth is the amount the transmitter v.f.o. can be adjusted without major readjustment of C1. This I found to be approximately 20kHz (±10kHz) on the 3.5MHz band.

On 1.8MHz, with 'add on' capacitors I found the useable bandwidth was approximately 9kHz. I found no harmonics could be measured on either band.

Fig. 2: This is what the loop looks like from the front. The circuit diagram in the middle is of the simple power sensing, or tuning meter.

Continued on page 41

helical hairpin and L5 to C1. And apart from fitting the tuning meter (the details are shown in **Fig. 7**) the loop is now complete for 3.5MHz band operation.

For the 1.8MHz band extra capacity is put across C1. For this extra capacitance I used two 56pF 3kV ceramic disc capacitors, in parallel on a small circuit board. (Two short flexible leads with crocodile clips, are used to clip across C1 for 1.8MHz use).

Tuning Meter

The tuning meter is a 200µA movement in a simple circuit, fed from rectified signals picked up from the loop. The diode used was a small signal diode mounted with C2 and R1 onto the meter itself. (I used a 1W resistor to give the assembly rigidity). Now look at the drawing of **Fig. 7**. Here the components on the meter support a 125mm long 6mm diameter coil of 0.7mm (22s.w.g.) wire with spaced turns. This forms a convenient lightweight 'pick-up' probe.

The meter is clipped into a suitable plastic coated tool clip , which is itself fitted to a plastic stand-off clip to fit the bottom rail of the loop frame. The tool clip and standoff clip are bolted together at 90° to each other.

To increase the sensitivity of the tuning meter, the meter assembly is moved. This is achieved by sliding it towards L5.

Loop Tested

With the loop connected to the transceiver via a coaxial cable, I tested it on 3.5MHz receive by turning C1 while listening to signals on the band. There is a substantial increase in signal strength at resonance.

To test 'on transmit', the transmitter is set on low power into the loop, producing a reading on the tuning meter. At this point the meter

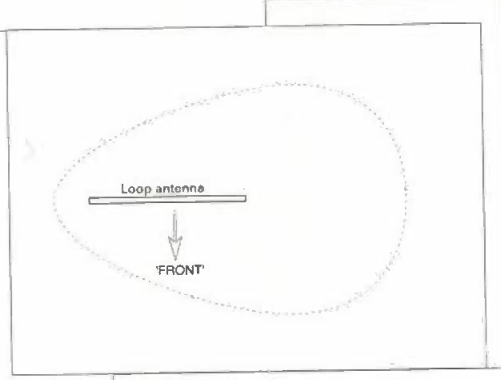
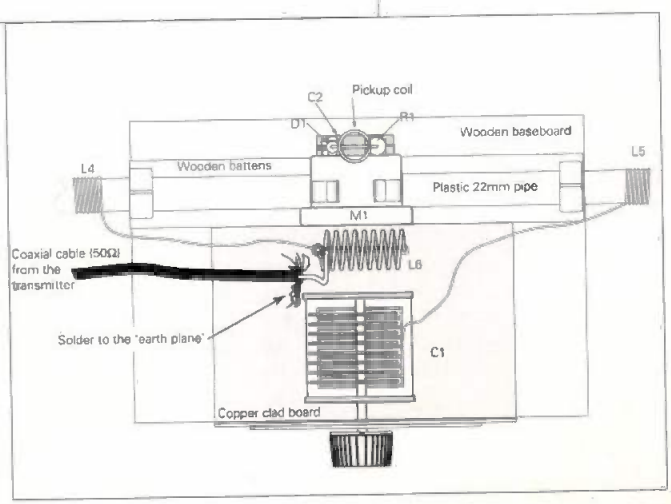


Fig. 3: The loop exhibits an 'egg' shaped directivity as shown.

Fig. 4: Looking down on the baseboard of the assembled loop antenna.



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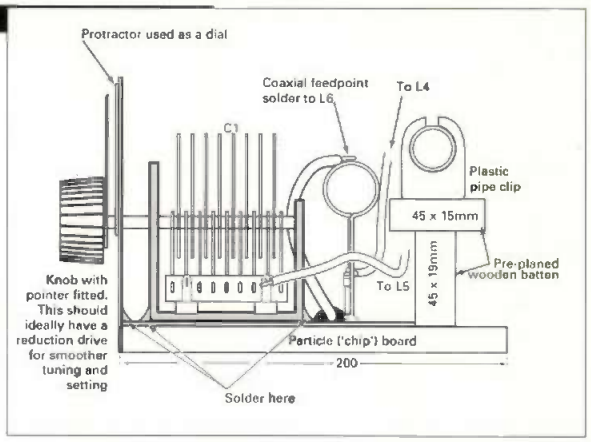


Fig. 5: The baseboard seen from the right hand coil (L5) side of the loop.

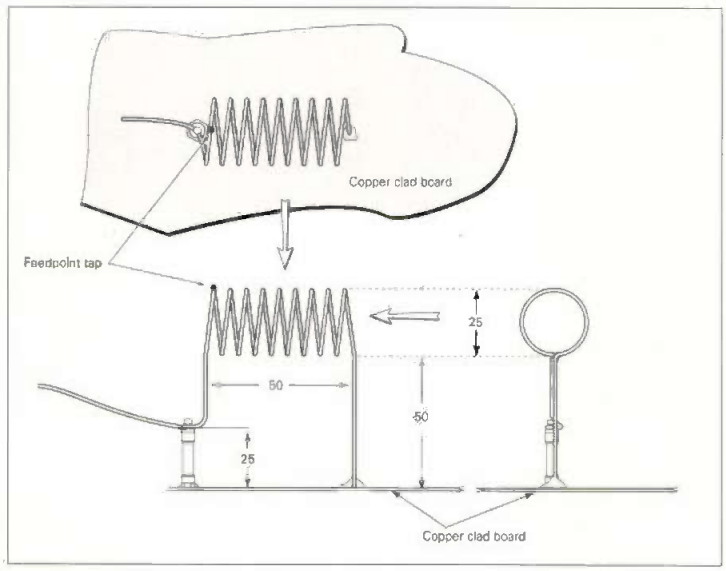


Fig. 6: Three views of the helical 'hairpin' matching coil.

Now for some of my observations during the experiment. Obviously the extra capacitors could be eliminated by using a 250 or 300pF capacitor for C1. Unfortunately, the tuning then becomes far too sharp.

My experimental transmitting loop has gone some way to showing that a very small transmitting loop, using a single helical wire turn is a viable proposition. I think a two-band 7 and 10MHz antenna could be made on a frame of about half the size of the one now used.

There are many interesting possibilities, such as using larger diameter tubing for the frame thus reducing the frame size but keeping the same amount of wire. Reducing the overall size would, at some point, reduce radiation to such an extent that the loop would have little practical use, except for local communication. This point could only be found by experiment.

Ideally, C1 could be replaced by a 100pF capacity of at least 2kV working to accommodate a much higher power TX could be accommodated. You would need to substantially increasing the loop wire gauge, which will probably mean altering the number of wire turns in the helical windings.

The higher power version could be placed in an attic or loft, well clear of surrounding structures. It would also be necessary to design and fit an external tuning meter.

The ideas resulting from this project opens up the way to many further hours of experimental work for so minded amateurs. I would be interested in hearing about such successful experiments. And to that end my address is in the callbook.

Happy Looping!

PW

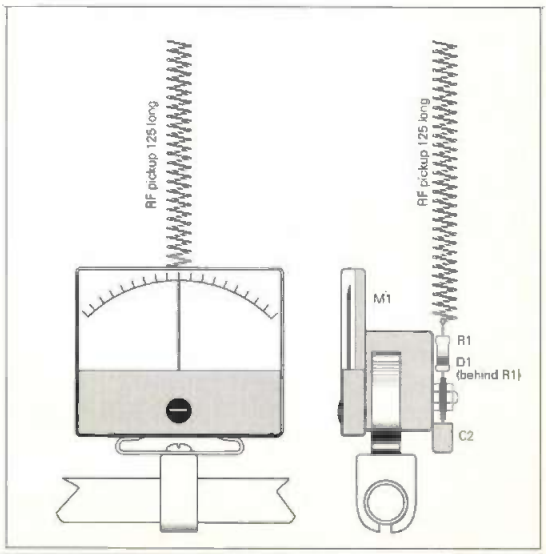


Fig. 7: Two views of the r.f. power sensing tuning meter.

Shopping List

Capacitors

56pF	2	extra capacitors for the 1.8MHz band (I used two 3kV working capacitor but it could be single 100pF)
Variable		
150pF	1	C1 (Jackson type E or similar - see text

Resistors

1kΩ	1	R1 1W carbon

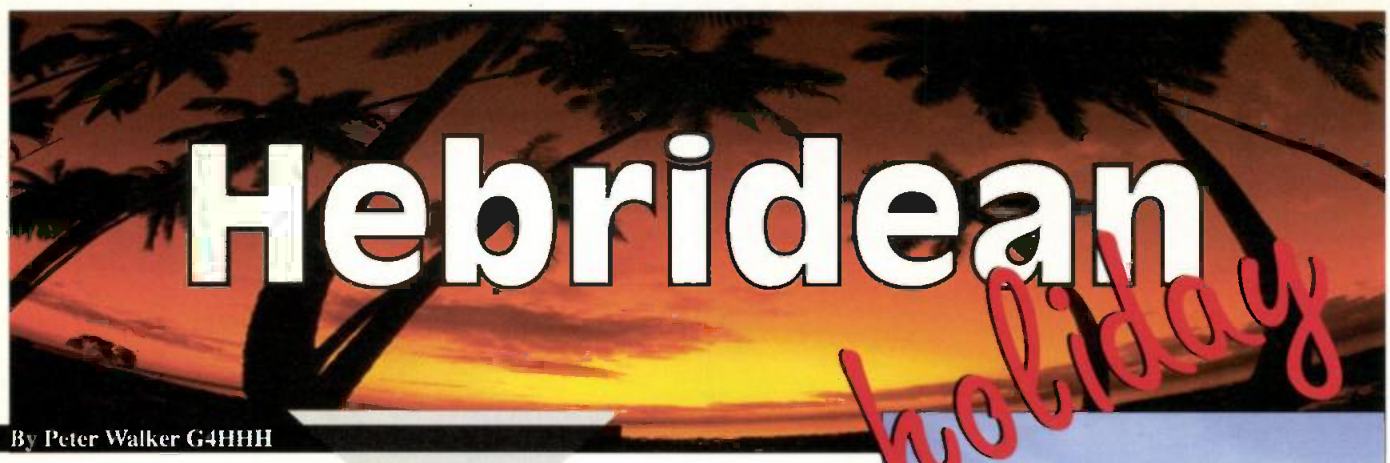
Semiconductors

1N4148	1	D1 (or any other silicon signal diode)

(I obtained my tuning capacitor from **Sound Systems of 111 Felixstow Road, Ipswich, Suffolk IP4 IP4. Quote catalogue number 488)**

Miscellaneous:

You will also need a 200μA meter, four lengths of 22mm pvc (water) tubing - plus 4 x 90°elbows plus three pvc standoff wall clips/brackets, a slow motion drive with pointer and 0 to 180° protractor for a tuning scale, copperclad undrilled board for panel and base chassis plate, 25mm standoff insulator, a plastic covered tool clip to fit meter body, and a 300 x 200 piece of 12mm plywood baseboard.



Hebridean holiday

By Peter Walker G4HHH

Peter Walker G4HHH tells how his love of islands and radios gave him the perfect excuse for a Hebridean Holiday.

Heading Photo: Peter's camper van showing Scalar antenna with top loading coil.

Tony GM6UNJ shown in his shack, Benbecula.

Islands have always fascinated me, although maybe not consciously in my youth. But some 38 years on, I took considerable pleasure in working **GB4OOD**, operating from Drake's island in Plymouth Sound to celebrate the 400th anniversary of Drake's return from circumnavigating the Globe.

The QSO bought back memories. Rubbing sleep from one's eyes at 0200 hours when the watch was changed, seeing the Australian manned Sunderland flying boats from Mount Batten, silvered by moonlight, taking off on patrol.

Even greater pleasure came later when I worked **Charles VK4QM** in Queensland. That was when I learnt he'd flown in those same Sunderlands disappearing into the dawn.

Island Connection

The connection between islands and radio didn't really occur until my late wife Bobbie and I drove our camper van to Oban. And with the assistance of MacBrayne's Shipping, played 'Island Hop Scotch' along the chain of islands forming the Outer Hebrides.

The first hop was to Barra, sailing in bright sunshine across a wind chopped sea into what seemed a howling gale (Scottish seamen would have put it higher than a fresh breeze!). We landed safely, seemingly halfway to America so distant was the receding mainland.

Barra is small, the circumnavigating road being only 19km long. It has one town, Castlebay and one mountain, Heaval, 378m high with magnificent views from the summit.

Our first priority was to find somewhere for the night. That was no problem. The roads are mostly unfenced, verged by grass cropped short by sheep and never far from the sea.

Provided no fence was crossed, it was permissible to drive off the road on to soft green sward above a sandy beach and be in paradise. Mind you, permission to stay in paradise was always sought whenever a croft was in sight.

First Contact

My first contact was on May 29 1983 from a location above the golden sands of Traig Mhor, also used as landing ground for the daily flight from Glasgow (Yes, the runway is on the beach, when the tide is out!).

Using 7MHz, I worked **Gordon G3LEQ, Charles G4PC,** husband and wife **Bob G3WWF & Rae G4JMT, Pete EI7CC** and **Jim GM4RSU**: (a mini pile-up which operating from Barra invariably provoked!).

Later, I used 144MHz f.m. to work **Barry GM8SAU** on South Uist who, with others, provided frequent simplex contacts throughout the holiday. I also used a Kenwood TS-130S transceiver for h.f. with an Australian-made vertical Scalar (SC6M) antenna and a Trio TR-7800 for 144MHz f.m.

The Scalar is a five-band antenna. It's fed at the bottom of a 1.35m metal rod, screw threaded at the top to take one of five top-loading coils (3.5 to 30MHz) with an adjustable tuning spike protruding from each.

My mobile antenna worked brilliantly when clamped to a metal roof-rack above the cab. Its one drawback was the narrow bandwidth on 3.5MHz, requiring tedious adjustment of the tuning spike to cover the full band.

That same day, I chanced on **Paul KW7Y (G3UID)** in Marsyville, Washington State, on 21MHz. Paul and his XYL Margaret, had provided coffee and cookies when Bobbie and I called en route to the Grand Canyon from Canada, two years earlier.

The following morning I had a surprise when another friend, **Neil VK6NC** in Perth came up on 14MHz, followed by **Jim G3TFG/MM** (then in dry dock) in Miami and **Ernie WA4CCP** in Florida, all worked from a small bay, only yards from the Atlantic. But it wasn't all radio.

Glorious Barra

Barra has glorious sandy beaches, firm for walking and stretching forever. One adjoined a sandbank thick with basking seals, only separated from the shore by a strip of water, in which the seal pups played. (The seals were fascinated by our hound 'Podger'!).

Other memories are of fields, carpeted bright yellow with primroses, whitewashed crofts, brilliant against a backdrop of mountain, moor and ocean. Then there were the terns, whiter than white, practising aerobatics under a blue heaven, matching the colour of the sea.

Eventually, we took the evening ferry to Loch Boisdale on South Uist, arriving at midnight and finding a site opposite Eriskay. This is famed for the haunting 'Eriskay Love Lilt', which I'd heard so often in Scottish Youth Hostels before the Second World War.

Amateur Activity

I worked a number of amateurs on Uist, including **Colin GM4HNK, Basil GM6VRT/P, Barry GM6SAU, Jim GM4CXF** and also **Tony GM6UNJ** on Benbecula which is further north. Tony and I had previously met when mobile and both

within shouting distance of Stonehenge!

For those further afield, I used the Mull Repeater GB3HI, working **Alan GM4PWR** at Corpach and **Alan GM4TRH** on Skye, later using GB3IG near Stornoway. Most activity however, came from 14MHz for DX and 7MHz for the UK.

On June 1, at a lovely site on Loch Stilligarry, I again worked Neil VK6NC, followed by **Brian EA8ANZ** on the Canary Islands. The next morning, from Ardivachar Point, I worked **Jean F6GRY**, followed by another 14MHz mini pile-up of G stations.

My popularity resulted from operating from a normally silent island on the IOTA (Islands on the Air) list. But my enjoyment included a view of sun-lit seas, broken only by the peaks of the St. Kilda group, misted and magical, some 50 miles away.

The day ended on a high. Operating from above a small fishing station on Benbecula, I worked **Carlos PY2BPE** in Brazil, as clearly as if he were beside me.

On June 3 I spoke to near neighbour **Denis G3FYW** who told me it was raining at home! Rain was widespread throughout England that morning as reported by the 3.5MHz Net I joined...while I sat in sunshine!

We'd been invited to call on Tony GM6UNJ and dropped by in the afternoon. It was good to meet, but we were hardly prepared for the sumptuous lobster tea his wife provided. Later, Tony and I added a long list of 3.5MHz contacts, using his Yaesu FRDX500 'separates' and 14MHz dipole.

Uist Causeways

Benbecula sits between North and South Uist, connected by causeways built during the Second World War. Its flatness lacks the attraction of most Hebridean Islands, so next morning we drove to North Uist and a lovely grassy headland above Scalpaig Bay.

From Scalpaig Bay, on June 5, I had some of the best DX, meeting **Frank DL8FL**, (5/9 each way) who helped me contact **Tom Christian VR6TC** on Pitcairn Island. I'd worked Tom before operating mobile in one of the rarest of island-to-island contacts was an unexpected thrill. 'A bulldozer has just been landed by helicopter' he said, 'and a system for watching video recordings'. Civilisation was catching up!

On June 6, from Clachan Sands, I worked **Werner HB9BX**. And, next day, old friends **Fred VK3ALG** at Geelong and **Peter VK2BZA** at Lake Cathay, before our third ferry hop from Loch Maddy to Tarbert on Harris, which, together with Lewis, forms the biggest of the Outer Isles.

Wave Tossed

Memories of Harris are of wave tossed seas, with the surf pounding into sandy bays beneath a blue sky flecked by white clouds. I also remember quiet roads, empty beaches and a fresh view round every corner, of the freedom to camp where the fancy led.

We'd taken a narrow winding road to Husinish Point, passing the beautiful Amhuinnsuidhe Castle where J. M. Barrie wrote *Mary Rose*. On the return, near Ardhasig Bridge, two men were leading a cow along the beach. Neither the leaders nor the cow were in a hurry.

The men then pointed the nose of the cow towards the opposite shore of the inlet. They gave it an encouraging clout on its rump and watched whilst it took to the water and slowly forged its way across. Its direction was unerring and the men disappeared.

In time, another arrived on the far side, attached a rope as the cow came ashore and led it away. We watched, fascinated. Was this a daily event and if so, why? We never found out.

Maybe one day it'll provide the excuse for me to return!

Weather Fine

The weather continued fine. We walked by day and I talked on the radio in the early morning, occasionally at night, sometimes 144MHz mobile, but with frequent diversions when a wayward road invited exploration.

We spent a night on the Great Bernera, now linked to Lewis by a bridge. The site was empty, save for ourselves, and a man came to clean an already spotless 'loo'. It had the most stupendous view and, in such splendid isolation, one could sit with the door open. 'A loo with a view' and no peeping-Tom nearer than North America.

And the DX came flooding in. On June 8 I worked **Larry HV3SJ** in the Vatican, **Lloyd VE3PT** at Niagra on the 9th and had a 14MHz pile-up on the 10th, including some WAB (Worked All Britain) members, delighted with the NA square from which I operated.

On the 12th, using 21MHz, I worked 5Z4DT, a missionary station over 2000m up in South West Kenya, followed by a scattering of 'State Siders'. In between, we marvelled at the standing stones of Callanish, inspected a 'But & Ben' (the traditional Highland home) and came finally to Stornoway, parking on the Eye Peninsula whilst waiting for the Ullapool ferry early the next morning.

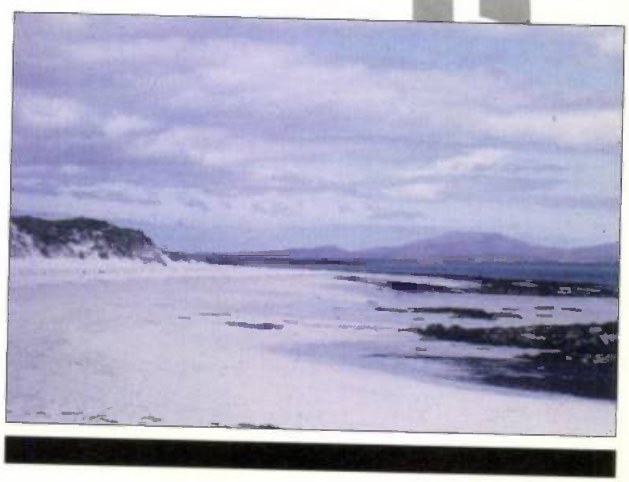
I switched on the 144MHz rig. **John GM3JIJ** (John Item John) was booming in, as if only a field away. He was! And promptly asked us over. We had a fascinating evening before returning to the quayside, ready for the morning boat. Our Hebridean holiday was over and only happy memories now remain of the 'lone shielings and misty islands'!

PW

practical FEATURE

Left: Standing Stones, Callanish, on the Isle of Lewis.

Yes! Palm trees do grow in western Scotland. And when you enjoy a highland holiday make sure you visit Inverewe Gardens (the most Northerly open air tropical gardens in the world!).



Sandy Beach, north Barra, looking towards South Uist.

Three Legged Winners

Ron Ham looks back at the early days of transistorised radios. Their introduction changed the lives of service engineers...including Ron who tackled overheated transistorised receivers and one that had taken a bath!

Fig. 1: An early GEC portable transistor receiver (chassis removed). It is shown together with one of the low consumption miniature glass-based valves which the transistor ousted in portable receivers.

Fig. 2: A wooden cased GEC transistorised 'table' set.

Fig. 3: An inside view of the GEC portable, note the large good quality loudspeaker, battery connector and 'top hat' transistors (see text).

In previous *PW* articles I've discussed wireless sets that used the thermionic valve. Such sets rapidly became obsolete when the valve was replaced by a tiny semiconductor device called a transistor which was to dramatically change my life as a service engineer.

The transistor was developed in the USA by the Bell Telephone Laboratories in 1948. The low consumption transistor is a tough little device which revolutionised the entire radio industry. Within a decade transistor sets of all shapes and sizes were being manufactured around the world.

Miniature Valves

Just prior to the widespread introduction of transistors the latest miniature glass valves designed for battery receivers needed 1.4V at 25mA to light its filament and 90V for high-tension. In addition, each of the four valves in a set needed a seven-pin holder fitted to the chassis.

On the other hand, the transistor's three 'legs' were soldered directly into a printed circuit board. The GEC receiver, shown with its chassis removed in **Fig. 1** and complete on the right of **Fig. 7**, measures approximately 95 x 60 x 25mm and is compared to the size of a single valve standing on the left.

Two of the receiver's transistors are just above the transformer at the bottom left of the chassis. Its ferrite rod antenna is along the top and the PP3 style battery connector at the bottom. So, the new technology began.

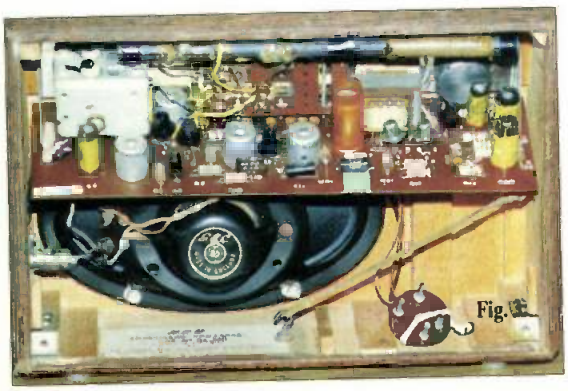


Fig. 3

Only A Fraction

Because the transistor only required a fraction of the power needed by a valve, a new range of layer construction batteries were soon in quantity production. These included the 6V PP1 and the 9V batteries PP3, PP6, PP7 and PP9.

At that time the PP9 was the most expensive at 3/9d (about 18p) and, like the PP1, was often sold in pairs to suit different sets. There were a few specials like the 4.5V AD28 and the double 4.5V PP11.

Prior to the advent of the transistor, our stocks of 'AA' cells were relatively small, mainly for pen torches. However, when the first electronic calculators and the multitude of imported pocket radios began fitting two or four of these types of batteries, sales rapidly increased.


Fig. 2.

Wooden Cased

In 1958/9, GEC produced a wooden cased set, model BC 501, as in **Fig. 2**, with push-button on/off and wave-change. The photograph in **Fig. 3** shows the '501's six 'top-hat' profile transistors, large loudspeaker and the dedicated four-pin plug for the PP11 battery.

If you service one of these receivers, be very careful when removing the plastic volume and tuning control knobs because these can easily break if levered off incorrectly. I can remember that these were a tight fit when new and the tuning knob, right in **Fig. 2**, has two sections, an outer for hand control


Fig. 1.

and an inner which carries the scale.

The Roberts R200, **Fig. 4**, also has a wooden case, two wavebands and a large speaker. The cradle and clip for the PP9 battery, the long ferrite rod antenna and the main chassis can be seen in **Fig. 5**.

The R200 uses Mullard OC44 and OC45 transistors in the front-end and OC81s in the audio output stage. The OC81D driver is just above the transformer, top right of **Fig. 5**, and the output pair are between the transformers.

Although care must be exercised at all times with all sets, the R200 chassis is relatively easy to remove. The knobs are secured to the spindles by inset screws, centre knob **Fig. 4**, and the chassis is held by two wooden wedges at the bottom corners of the cabinet, **Fig. 5**.

Later Herald

The later Dansette 'Herald' had two chassis, **Fig. 6**. It also employs Mullard AF117 transistors in the front-end (left) and the OC81 arrangement in the audio amplifier (right).

The stud and socket connectors for the battery are just below the speaker. It's very important that the battery polarity is correct on all sets. For example the stud and socket on the 'PP' range are opposite to those on the set's battery leads.

Now if you find a set with the connectors missing, make doubly sure that the new ones are put on the right lead. Otherwise, the transistors may suffer when the set is switched on.

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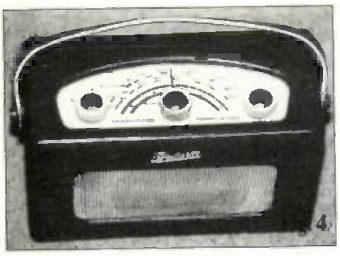


Fig. 4: An early Roberts Radio transistor portable. They are very collectable and in 1994 Roberts Radio introduced a modern 'Collector's Reproduction'...but not at 1950s prices!

Communication Receivers

Looking back, I remember that the first all-transistor communications receivers to appear were the Eddystone EC10 and the Heathkit Mohican. Zenith, another American firm soon followed their valved range of Trans-Oceanic multi-band portables with a transistor version.

The Trans-Oceanic transistorised receiver used a turret tuner and a robust rod antenna. This retracted into the carrying handle when not in use.

Now, 40 years later, transistor sets, especially the early ones, are sought after by collectors. Happy hunting grounds are dumps, car-boot sales, second-hand shops and dealer's trade-ins. You are more likely to find a set with mechanical damage than one with faulty components.

Among the UK makes of transistor portables that I remember seeing for sale and service in the 1960s/70s were Bush, Cossor, Dansette, Decca, Dynatron, Ekco, EverReady, G.E.C., Hacker, Perdio, Philips, Pye, Regentone, Roberts, Stella, Ultra and Vidor. These ranged in size from the personal sets in **Fig. 7**, to the 'beefy' portables built by Dynatron and Hacker.

Sets Collectable

Each of the sets, displayed in **Fig. 7**, are collectable because of their age or a special feature. For instance, the 'Signal-601', made in the USSR (left), has a wind-up watch-come-alarm next to the tuning dial.

The Ekco (bottom of **Fig. 7**) tunes through the medium-wave band and then 'clicks' into a preset 'Light' programme (now BBC Radio 4) on the long wave. A transparent plastic carrier was made for the GEC and the 'SIGNAL' has its case fitted.

Service Points

Now let's look at some service points. And generally speaking transistor portables were reliable and we had very little trouble with components or semiconductors.

Our main service work was replacing control knobs, battery connectors, telescopic and ferrite rod antennas. We were also kept busy cleaning volume controls and wavechange switches and tracing and resoldering broken joints on printed circuit boards (p.c.b.s.)

Perdio Bath

I remember a Perdio 'Town & Country' that had been dropped in a bath. The hot water had terminated the life of a couple of AF117s and of course written off the batteries.

Other problems were the effect of

Fig. 5: Inside view of the Roberts Radio receiver. The metal bracket on the left (with spring clip immediately underneath the top of casing) held the large battery in place (see text).

soapy water on the volume control track, wave-change switch, tuning mechanism and speaker-cone. However, after a thorough dry out, a good lubrication of the moving parts and a couple of new transistors the set was working again.

I asked the delighted customer if I could see it again in a month. This I did and found corrosion building up under the output transistors' heat-sinks and under resistances and capacitors that were tight on the p.c.b. This meant more cleaning, but we won in the end!

Hissing Driver

A few sets came in with a low 'hissing' noise which proved to be the OC81D driver. One Roberts R200 had unstable whistles which we traced to an open circuit ferrite rod coil, bottom left in **Fig. 5**.

Each time the owner changed the battery the coil winding was rubbed which eventually caused the wire to break. After undoing a few turns, the break was found and the wire resoldered to the coil's terminal post.

Common Complaint

The day after one very hot Bank Holiday Monday we had several good quality portables in with a common complaint. "It's dead". Also our radio battery sales were well above normal.

By midday when we began looking at these particular sets some were working normally. However, a word with the owners revealed that their respective sets had been exposed to the hot sun on a picnic, on a windowsill and on the rear parcel shelf of a car.

I think that most of the battery sales were also due to the heat. This was because when people found their sets not working they automatically purchased new batteries. This got it going again because a good 'pulse' from a new battery switched on the transistors that the excessive heat had turned off.

Lightning Strike

One Philips set was standing unused in a kitchen during a thunder storm and a nearby lighting strike destroyed the front-end transistor. *(This used to be quite a problem with car radio receivers with OC44 transistors, as I know to my cost! Editor).*

'Thin' sets with large centre tuning knobs can be a problem when they fall forward on their face. I have known such a 'fall' to damage the tuning capacitor's shaft and vanes.

If there is plenty of 'mush' coming from the speaker but the station sensitivity seems poor, touch the ferrite rod coils. An increase in performance means that the position of the coil needs adjusting on the rod.

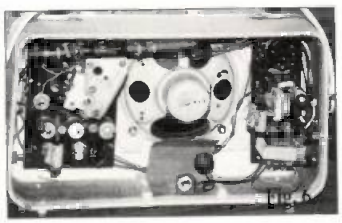


Fig. 6: Inside view of a Dansette 'Herald' receiver. These used the Mullard AF117 transistor (see text) and incorporated a two-chassis design.

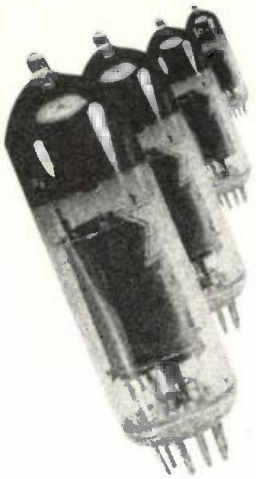
Move the coil carefully until there is good reception and then secure it with wax or tape in the correct position. Finally, if a set is generally weak, try a new detector diode, I've known this to work wonders.

Have fun repairing any older transistor radio you find. With a little care and attention they'll last you many years.

PW

Fig. 7: Collectable transistor receivers. (Left) the Russian-made 'Signal 601 with wind-up watch type alarm. The Ecko (bottom) tunes through the medium wave band and 'clicks' into a preset 'Light' programme on the long waves (now BBC Radio 4).

Valve & Vintage



By Ben Nock G4BXD

Ben Nock G4BXD is looking after the specialist valved and vintage amateur radio and military equipment department in PW's 'wireless shop' this month.

It's my turn to look after the 'shop' this month and here I am again with a few items of Valve & Vintage memories. And I'm pleased to say I've received lots of letters from readers which has proved that a real interest in this era of radio sets does exist and it's nice to see this trend increasing.

All too often these days, the rig in use at the other end of the QSO is a nondescript, faceless plastic item, with a serial number as unique as a bag of pegs! As the last 'number' I remember was on a rig in the 1970s I usually have no idea what the rig is the nice gentleman is using when they quote them over the air to me!

Real Radio

A letter from **Eddy Swynar VE3CUI**, gave me the phrase "Real Radio Still Glows in The Dark". I think it's a lovely sentiment .

Eddy still uses the great AR88LF receiver, along with its predecessor the AR77. They're used in conjunction with an E F Johnson Ranger I transmitter.

Nearly everyone will know of the AR88, but perhaps a little less well known is the AR77 receiver. I think you can see the family resemblance from the photograph in **Fig. 1**, the lines of the AR88 closely follow those of the AR77.

The AR77 was produced around 1940 to 1941 at an original price of $139.50 (probably about £35 at that time if my grandma is right). The 10 valved set covers 540kHz to 31MHz, has a crystal filter and bandspread coverage of the amateur bands.

The AR77 is slightly smaller than the AR88 but seems just as heavy! This weight problem is probably the main thing stopping a lot of us from having one of these sets in the shack. Let's face it, with modern building techniques, most bedroom floors wouldn't stand the weight.

The R1155 Receiver

Ken Hutley G0VDP, wrote to ask if there was any interest in the R1155 these days. Again, this is one of the old sets that many people know about.

Many of us, myself included, had the R1155 as their first 'communications' receiver. I had my first one in 1967, complete with p.s.u.

My 1155 took pride of place in my shack and was aptly named the 'BBC' (Ben's Broadcasting Company). This R1155 was in use for many years and gave sterling service.

Today there are still many 1155s in use. As a general receiving set they are quite good. The 14MHz band is a bit crowded but 7MHz is usable, as is 3.5MHz. If you have the L or N versions of the 1155 then you'll also be able to receive 1.8MHz.

In all there were some ten versions of the 1155 receiver, and 13 of the associated transmitter, the T1154. The differences being frequency coverage (as already briefly mentioned) and in the cases which were of steel or aluminium, and the odd radar suppression coils.

As far as modifications go, this is something that is inherently abhorrent to the serious collector. But in reality, the R1155 needs little to make it usable.

A power supply with an a.f. output stage is needed. The R1155, as it is, has no a.f. power output stage, just a low power stage designed to drive headphones.

Practical reminder: One note to remember here, is that the h.t. negative line on the 1155 **does not go direct to the chassis,** but has a resistor to the chassis to 'hold off' and produce negative biasing voltages (with respect to the chassis).

South Africa

Karl Langer ZR1AAP, wrote to me from South Africa and said how difficult it was to get parts, accessories and circuits for wartime sets out in Cape Town. He has a very nice collection

Fig. 1: The AR77 receiver (see text).

himself, and also assists with the South African National Museum of Military History in Johannesburg and the South African Air Force in Cape Town with their collection of military communications gear.

The Cape Museum hopes to have a fully working vintage shack soon. equipped with Second World War gear. They plan to enable visiting radio amateurs to operate, using the callsign ZS1MUS. (I might add that I would be most interested in operating that station myself, hint hint!).

Karl kindly sent me a copy of the September 1944 edition of *QST* magazine, which detailed the US Army Signals Corps and some of the equipment in use at that time. Particular mention is made of the SCR-300, a development of the SCR-194, the first walkie-talkie as such, later copied and called the WS No. 31 here in the UK.

The SCR-300. **Fig. 2,** was a wartime marvel, with 18 valves, f.m. and 1W output. The complete unit weighed just 35lbs with batteries. (The set illustrated is the British version).

Design work started in Autumn of 1941, with the first model completed in early 1942, with large scale production commencing in spring of 1943. This set, apparently, played a great part in the United State's beach landings at Anzio in Italy.

Modification Confession

Having just moaned about modifications to vintage equipment, I now have to provide a confession to doing just that to a 19 Set recently! I must quickly add though, in my own defence, that this particular 19 Set was a bit rough, as 'collectability' goes. The 'B' set had gone and the front panel was poor, someone having 'Lettrasetted' it.

I replaced most of the capacitors as a matter of course. The 50 year-old waxed paper capacitors don't like 500V nowadays!

There was plenty of room for a mains p.s.u. for the 19 Set where the 'B' section had been. The major modification though was to replace one of the i.f. transformers with a mechanical filter.

For the replacement I used the KW Vespa unit (a 455kHz unit with a bandwidth of 2.1kHz). As the 19 Set was 465kHz this meant a slight readjustment of the oscillator and the remaining i.f. transformers.

The 19's response is now far better on the crowded 3.5MHz band when I'm attempting to have an a.m. QSO. The 'splatter' from nearby s.s.b. stations is now greatly reduced.

With the replacement filter, see **Fig. 3,** the s.s.b. reception has of course greatly improved. But I'm still deciding whether to use the Vespa crystals for the b.f.o. circuit on the 19 Set.

Stabilising Circuits

Further additions were aimed at stabilising the h.t. going to the local oscillator (l.o.) and b.f.o. circuits. Fortunately, there are easy ways to provide stabilisation.

Fortunately, Maplins advertise a range of 200V Zener diodes rated at 5W. And, in conjunction with a 10kΩ 'dropper' resistor (from the h.t. to the original b.f.o. h.t. resistor, the 200V Zener goes between the junction and ground.

The l.o. needs about 7.5kΩ from the h.t. to the existing resistor. So, I suggest you use a 4.7kΩ and a 3.3kΩ in series, the zener again going from this new junction to ground. (This modification reduced the chirp on c.w., which was a result of the h.t. dropping when the p.a. stage starts up).

Following the modifications, I now have a 19 Set that can be easily used on 3.5MHz c.w. with quite good results. However, please bear in mind that I would (of course) never consider 'butchering' a particularly fine specimen.

Finally, I carried out some finishing touches. I sprayed the case and front panel in what can only be called 'desert camouflage' (a dual sandy shade) something it never would have had, which does give it a surprisingly modern appearance, as in **Fig. 4.**

Bedford QLR Group

The photograph, **Fig. 5,** shows a group I met at the 1995 Bletchley Park rally. The Bedford QLR Group is an independent group of guys portraying a 1944 unit of the Royal Corps Of Signals as faithfully as possible.

Pictured (left to right) are **Phil Webb G0KUE, Jeff Flanagan G7NMO** and **Ted Butler G0JJQ** with their Bedford QL radio truck and some of their equipment. They certainly put on a good demonstration, very original. Keep up the good work lads! Phil G0KUE, can be contacted on **0181-682 1163,** if you are interested in helping out in any way, donating equipment or time.

Fig. 2: The British 31 Set, a copy of the American SCR-300.

Time To Close

Well, that's it for now, I can hear the fat lady singing, so it's time to close the shop. Don't forget that I would be pleased to hear from any readers on topics of military and amateur vintage equipment. Photographs are always welcome.

I can be contacted on packet via GB7BBS.#28.GBR.EU or by post at **62 Cobden Street, Kidderminster, Worcestershire DY11 6RP.** And remember "Real Radio Still Glows in The Dark"!

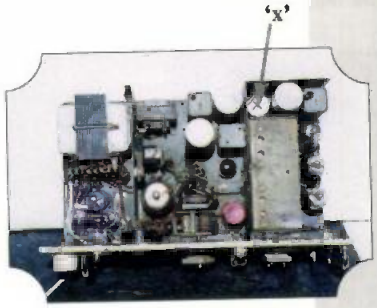


Fig. 3: New life for a 19 Set. Ben Nock fitted a new narrow filter (marked X on the photograph) when he modernised an otherwise "poor specimen" of the well known British Army transceiver (see text). This transceiver has a built-in power supply.

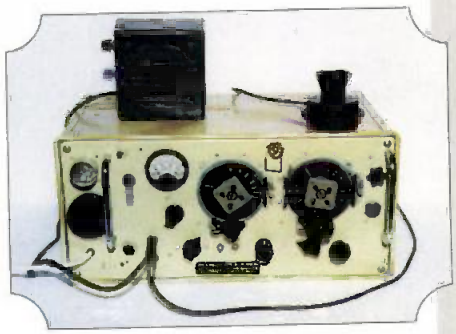


Fig. 4: Ben's modified 19 set, which he uses for 3.5MHz a.m. operations.

Fig. 5: Keen types! (Left to right) Phil Webb G0KUE, Jeff Flanagan G7NMO, and Ted Butler G0JJQ in front of their preserved Royal Corps of Signals Bedford truck (see text).

Cheerio from Ben, see you next time!

IAN POOLE G3YWX

EQUIPMENT SPECIFICATIONS

This month Ian Poole G3YWX looks at unwanted carrier and sideband suppression.

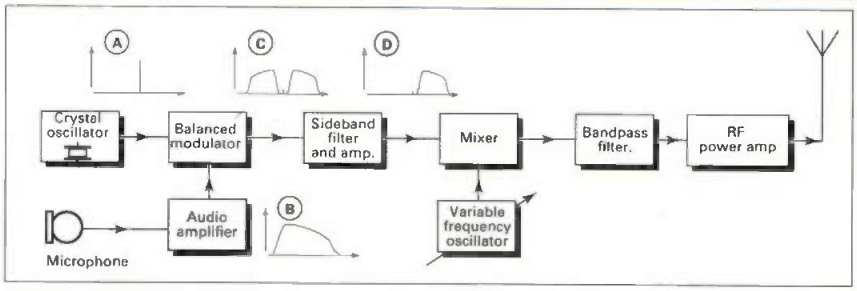


Fig. 2: Block diagram of an s.s.b. transmitter, showing at (a) the carrier, (b) audio, (c) double sideband supressed carrier and at (d) single sideband signal.

In any single sideband (s.s.b.) transmitter the unwanted sideband and carrier must be reduced in level as much as possible. However it's never possible to remove them completely, the remaining levels of these unwanted signals need to be known.

In most radio equipment the unwanted signals are specified in terms of carrier and unwanted sideband suppression. (If the levels of the unwanted signals are too high then they can cause interference to people using adjacent channels as shown in Fig. 1.).

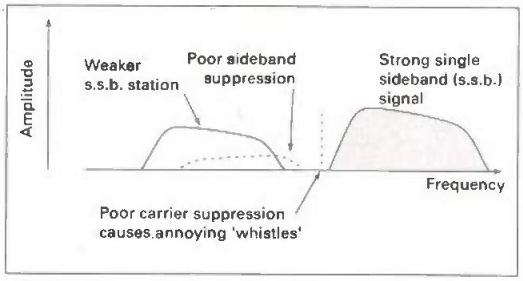


Fig. 1: Unwanted sideband and carrier can cause interference to other stations.

A single sideband (s.s.b.) signal is derived from an ordinary amplitude modulated (a.m.) signal. The process is carried out by various stages in the transmitter where the unwanted portions are removed to leave only the wanted sideband.

The most common way of generating an s.s.b. signal is shown in Fig. 2. Here the output from a crystal oscillator is applied to one input of a balanced mixer and the audio to the other. Being 'balanced' this type of mixer generates only the sum and difference frequencies which in this case are the upper and lower sidebands and the carrier is suppressed.

To remove the unwanted sideband a crystal filter is used. This also serves to reduce the level of the carrier still further as shown in Fig. 3. Even if another method of generating the single sideband signal is used, then the levels of the unwanted sideband and carrier are still of importance.

Once the basic s.s.b. signal has been generated it's mixed with a local oscillator (l.o.) to convert it to the right frequency. Then it's amplified to bring it up to the required level.

There are two main reasons for using s.s.b. The first is that the carrier serves no useful purpose apart from transmitting a reference signal for demodulation.

As the 'reference' can be supplied equally well by the receiver, transmitting it (the 'carrier') just wastes transmitter power which could be better spent transmitting a signal which will convey the audio, i.e. the sideband.

The second reason for using single sideband is that an a.m. signal takes up twice the bandwidth of an s.s.b. signal. The second sideband gives no improvement, and without the carrier being transmitted it actually makes proper demodulation more difficult.

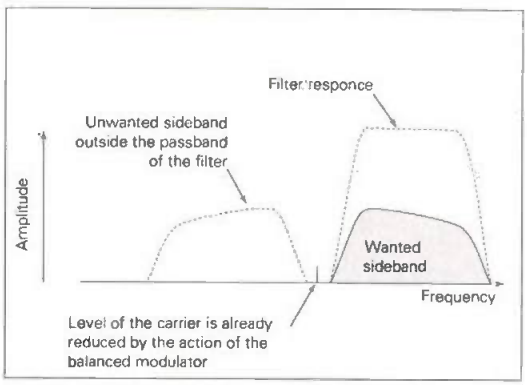


Fig. 3: Action of filter in removing the unwanted sideband and reducing carrier level.

In fact the easiest way to demodulate a proper double sideband suppressed carrier (d.s.s.c) signal is to use the receiver filter to remove one of the sidebands and then demodulate it as ordinary s.s.b. As there is no advantage in transmitting the second sideband it can also be removed, leaving a signal which takes up less bandwidth.

If high levels of the carrier and unwanted sideband are transmitted they can overlap other transmissions and cause interference to other stations. In view of this it's necessary to ensure that levels of these unwanted components are kept to an absolute minimum.

To measure the levels of the unwanted components a single audio tone can be applied to the transmitter and its level adjusted to give the full output. Using a spectrum analyser connected to the output through a suitable attenuator the levels of the carrier and unwanted sideband will easily be seen as shown in Fig. 4.

The difference between the level of the wanted sideband and the carrier is the amount of suppression. And as it's a ratio it is expressed in decibels.

The specifications for most sets these days will quote figures of at least 35dB suppression. In other words, the unwanted carrier or sideband will be at least 35dB below the wanted sideband. However, in practice most sets will achieve much higher levels of suppression, often reaching 50dB or more.

Before making any measurements of this parameter it's worth bearing in mind that some single sideband transmitters cannot withstand a continuous tone at full power for long. This is particularly true of some of the older sets which used line output valves. **Therefore this measurement usually has to be undertaken quickly,** or the operator's manual consulted to see how long full power can be applied in this way.

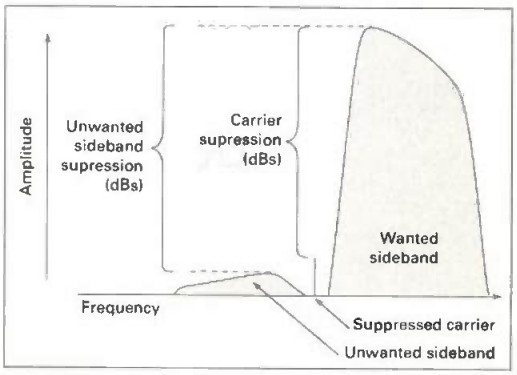


Fig. 4: Measurement of unwanted carrier and sideband levels.

That's all for now, next month I'll be taking a look at speech processing. If you have any queries please write to me c/o the Editorial Offices.

END

DAVID BUTLER G4ASR

VHF REPORT

This month David Butler G4ASR takes a look at the many tropo 'lifts' that occurred last summer on the v.h.f., u.h.f. and s.h.f. bands.

Some well known v.h.f. DXers. (From left) Michael OE1MCU, Alan GJ4ZUK, David G4ASR, Nick G4KUX and Andy G4PIQ.

Last month I took a look at tropospheric enhancements and how they effect propagation on all bands from v.h.f. through to s.h.f. However, there's one detail I forgot to mention related to the chart, shown last month, of UK records made via tropospheric propagation.

If you look carefully you'll see that every distance record was made either in June/July or September/October. That's well worth noting if you fancy a spot of DXing from a local hill-top this year!

Tropo conditions during the summer months of 1995 were actually very good, possibly due to the elevated temperatures that we all experienced throughout the UK. Because of this there was much DX to be found via this propagation mode during the period June through to early November.

Best Propagation

For stations located in England and Wales, the best propagation paths during June (and the latter part of May) were towards Scandinavia, northern Scotland and islands situated further north. There were also brief openings on various days in the month to stations in EA, HB, I and SP.

Among the callsigns noted on the 144MHz band were EA1NV and EA1YO in IN73, HB9DFP and HB9RDE in JN37, IK2EAD located in JN45. There were also the Polish stations SP0AFT and SP1EOI in JO73.

The period between June 23-29 was particularly good with many stations working into LA, OZ and SM on both the 144 and 430MHz bands. Some operators, favourably located in JO01 and JO02, managed to work the Faroese stations OY6FRA and OY9JD on the 144MHz band.

John Quarmby G3XDY (JO02) even heard the OY6UHF beacon on the 430MHz band. Propagation also favoured the microwave bands, especially on June 28, when a small number of enthusiasts made contacts deep into Germany on the 2.3 and 5.7GHz bands.

Way up on the 10GHz band **Sam Jewell G4DDK** (JO02) did well. He made an excellent 900km s.s.b. contact with SM6ESG (JO67).

Good July

The good tropo conditions to LA, OZ and SM also continued throughout the first week of July. A bonus during this period was the build-up of propagation deep into Europe allowing contacts also to be made with stations in OE, OK and SP on all bands.

Additionally, the v.h.f. field day contest (covering 70MHz to 1.3GHz) coincided with the excellent propagation. This brought with it of course the potential to work much DX.

One interesting station heard on the 144MHz band was OE9BGV/M (JN47). He was being worked by a number of stations in south-east England.

Dave Storrs G8GXP (IO93) made many contacts during this period with stations in OK and SP on the 144MHz, 430MHz and 1.3GHz bands. These included OK1KIR (JD70) and SP6LB/M (JO70) on the 430MHz band and OK1DFC/P (JO60) on the 1.3GHz band.

Propagation was excellent during the latter weeks of July. All bands were open to LA, OZ, SM, HB9, OE, OK and SP yet again.

A number of SM stations were contacted from the UK on the 1.3GHz band. They included SM5STU/5 (JO78), SM7ECM (JO65) and SM7SCJ (JO65) and **Keith Hewitt G6DER** (IO93) worked SM6HYG (JD58) on the 5.7GHz band.

Openings on the 144MHz band also occurred to Spain, mainly to the north coast region. However, on July 28, around 2200UTC, propagation extended unusually to the IN90 region allowing contacts to be made with EA5/DJ3MY, EA5/DL3MGL and EA3KU/5.

Earlier in the evening, at 1800UTC, the extremely long (but often noted) path to the Canary Islands off the coast of Africa opened up. The station of **GW0PZT** (IO73) reported hearing EB8BTV (IL18) on 144.280MHz s.s.b. peaking around 52.

The path length between GW0PZT and EB8BTV is an amazing 2955km! This path, more often than not, exists at some time every year during the period June-August.

The DX pathway generally favours stations on the western side of the UK, from Cornwall up into GW, EI, GI, GD and southern Scotland. Signals are present for an hour or more but are generally very weak, peaking S1-2, with lots of fading.

Into August

Moving on now into the month of August and propagation still remained excellent in most directions. In fact, according to the DX Cluster there was not a single day between August 1-26 when DX over 900km was not reported on the 144MHz band.

Although the best paths were towards Scandinavia, openings also occurred to the east and south of the UK. One particularly good contact on the 144MHz band was between **G4CLA** (IO92) and OH1CF (KP00) at 0730UTC on August 19.

A few days earlier, on August 15, the station of **Andy Cooke G4PIQ** (JO01) reported hearing I2FHW. Even more unusual was a report from **John Regnault G4SWX** (JO02) who heard the Croatian station 9A2AE (JN86) at 0950UTC on August 6.

The Croatian station was only peaking 41 but was quite audible. Around this time the band was open to Austria with OE/PA3CNX/P, OE1XTU/3, OE5D, OE5EBO/2, OE5XDL and OE5XXL/2 being worked from eastern UK.

Openings to Spain were also noted during the month, possibly the best occurring on August 12. In Scotland, **David Anderson GM4JJJ** (IO86) heard the EA1VHF beacon peaking 539 over a path in excess of 1500km.

The super-tropo path to EA8 also opened up again with **Andy Stafford G4VPM** (IO80) very nearly working EB8BTV over a 2705km path.

Never mind Andy, there's always next time! Other UK stations reported working EA2ARD/MM (IN93) and ED4CXM (IN81) during the same period.

Club Station Active

The club station 7S6AG was also active on the 144MHz band during August, primarily for meteor scatter. But it was also heard and worked in the UK on a number of occasions via tropo.

Another unusual prefix - SI7GM - was also worked from the UK later in the month. If you don't know where SI7 or 7S6 are located I suggest you read my previous article about callsigns featured in the December issue!

It appears there was even better DX to be found on the 430MHz band.

During the evening of August 21 the station of **G4FUF** (JO01) heard LY2BKH (KO05), LY2WR (KO24) and UA2FL (KO04). Why didn't you hear them? Because they were on c.w. that's why!

The specialist microwave operators were also having fun during the month. At the QTH of **G6DER**, contacts were made with LA/DB1DI/P (JO37) on 2.3GHz, OZ2OE (JO45) on 3.4GHz and OZ1IPU on the 5.7GHz band.

During the evening of August 11 **G4DDK** was busy operating on the 10GHz band. He worked LA8OJ (JO28), OZ1DOQ (JO65) and OZ2OE.

September

Compared to the previous three months, propagation during September was not particularly exceptional. Nevertheless the bands were still open on a few occasions to LA, OZ, SM, DL and HB9.

The IARU Region 1 144MHz contest was held at the beginning of the month. It provided an excellent opportunity to work many of those multi-Yagi contest stations that ordinarily would not be available.

October Finest

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 and OM and SP on the 144, 430MHz as well as the 1.3GHz band. 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 could then be made with stations located in EA, F, HB and I.

With such quantities of DX being worked on the 144MHz band I have had to leave out the run-of-the-mill contacts with stations in OK and SP (!) and only highlight a few of the real OX contacts. Some of the more interesting stations included IK1LGV/P, I2FAK, OE3NHW, OE3VHL/3, OM3LQ, OM7SM and 9A2AE.

Matt Cabban G1WPF (IO91) is fairly active on the 430MHz band but mentions that owing to planning restrictions he is unable to erect fixed antennas. To get round this he operates from his car parked outside the flat with power provided via a mains extension lead.

Matt uses a 5m portable mast which sticks through the car sun roof. Onto this is attached an antenna for the band in use at the time.

Despite the obvious limitations, Matt reports a large amount of DX worked during the lifts in October. In the contest, on October 7-8, he ran 20W into a pair of 19-element F9FT Yagis.

A total of 69 QSOs were made, many of which were in central Germany. His best contacts were with OE5XDL (JN78) and OK2KKW (JO60). Later in the week, October 12-13, with conditions still extremely good he worked much DX including seven stations in the Czech Republic and OE3EFS/3 (JN78).

At the QTH of **G4FUF** the station of IK2NHL and beacons I2B and I2U. They were all in locator JN45 and were heard on October 19.

The 1.3GHz band was also in fine fettle with **John G3XDY** making numerous s.s.b. QSOs including HB9AMH/P (JN37), HG7B/P, HG5FMV, OE5VRL/5 (JN78), OK2QI/P (JO80) and SP6MLK/P (JO80).

Record Broken

Interestingly, the 10GHz record (shown in the distance chart last month) made in October 1994 between G4BCH/P and SM6HYG was broken yet again. It occurred during the October 1995 IARU s.h.f. contest when the contest group G0VHF/P (JO01PU) contacted OE4DMA/1 (JN87).

The new record increased the UK 10GHz achievement to a distance of 1185km. I wonder if the record will be broken again this year? (The 3000km path between GW-EA8 is definitely possible if only there was the activity!).

Incidentally, the station of **G0VHF** worked three OE stations around 1000km and some OK stations over 800 kilometres. And indeed, a contact with OK1OKL on October 8 may have been a 'first' on the band.

According to the RSGB *Microwave Newsletter*, **Mark Turner G4PCS** was also active during the IARU contest in October. He was one of the operators at the station G4LIP/P operating from the Kent coast in locator JO01.

Conditions were excellent. There was a high pressure weather system to the south-east and a deep inversion layer clearly visible throughout 360°.

Enhanced propagation was observed from 1600UTC on October 7, peaking around 0700UTC on October 8. On the 1.3GHz band **G4LIP/P** worked many stations in F, ON, PA, DL, HB9, OE and OK.

Some stations in Hungary were also contacted, including HG5B/P, HG5FMV and HA5BDJ/7. The latter was at a distance of 1321km.

The excellent propagation also extended to the 10GHz band. The equipment at G4LIP/P consisted of a G3WDG design transverter, a 7W travelling wave tube (t.w.t.) amplifier and a low noise amplifier using a high electron mobility transistor (h.e.m.t.) device.

All the equipment was mounted at the antenna, a 600mm diameter prime focus dish, to eliminate feeder losses. A total of fourteen DL, HB and OE stations were worked on the 10GHz band, distances ranging from 400-900km. Their best DX was OE5VRL/P (JN78) at 973km.

Incidentally, if you're interested in any aspect of microwave building or operation I would thoroughly recommend that you take out a subscription for *The Microwave Newsletter*. It's obtainable from the RSGB, their credit card hotline is **(01707) 660888.**

November

The first two weeks of November saw a continuance of the excellent tropo conditions. There was a good opening to Spain on November 5-6 with the duct extending into northern England and Scotland.

At the QTH of GM4JJJ the stations of EA1BL and EA1DKV were copied very well with EA1BL peaking 57. The EA1VHF beacon (144.870MHz) was also heard at this time. The station of EA1DKV (IN53) was also heard by David on the 430MHz band for over an hour over the 1506km path.

Paul Tomlinson GW7LHI (IO81) reports that he heard the EA6VHF beacon on Ibiza (JM08), peaking 529 during the afternoon of November 5. It faded out after a few hours but returned later in the evening but at much reduced strength. (At 1473km this is not as long as the GM4JJJ-EA1DKV contact but even so is still a very interesting reception). Paul mentions that at the time the EA1VHF beacon was 30dB over S9 with him with very little fading.

Paul uses an FT225RD with MuTek front-end. This is used in conjunction with a Microwave Modules preamplifier and a 13-element F9FT Yagi fed with 10m of RG213 feeder.

Active In Germany

Reg Woolley GW8VHI, previously an operator at the RAF club station G6RAF, is now active in Germany (JO31) using his German callsign DA4RG. He will be particularly active on the 144, 430MHz and 1.3GHz bands and expects to be QRV during the contest in March.

Keen v.h.f. operator Reg also mentions that he is often active from the club station DL0CG on Tuesday evenings from 1800UTC. Reg can normally be found on 144.285MHz running a 4CX250B power amplifier and four 9-element Yagis. He reports that it is easy to work into southern G and GW under flat band conditions.

Deadline Time

Deadline time again! And 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 E-mail via davebu@mdlhr1.igw.bt.co.uk. Alternatively you can telephone me on **(01873) 860679.**

PS: According to ITU allocations, stations in the block SAA-SMZ and 7SA-7SZ are located in Sweden and that's where SI7GM and 7S6AG were located! See you next month.

END

MIKE RICHARDS G4WNC

BITS&BYTES - COMPUTING IN RADIO

Mike Richards G4WNC has news of a personal navigator programme, advice on increasing your hard disk space and starts off with an ideal winter project for your club.

A recent lecture visit to the Bournemouth Radio Club (BRC) reminded me of a fine technique for introducing amateurs to new areas within the hobby. In this particular case they had been systematically working through the digital modes.

One of the great advantages of using BRC's approach is that the members can work together to support each other and learn more quickly. This technique is particularly suitable for the data modes as, other than Packet, most other modes tend to be few and far between.

To get things moving you can also set-up a local Net for the mode in question. In this way those that are unsure of the operating practice and procedures can follow the example set by the others. I generally find that once the ice is broken amateurs quickly gain confidence to work the world using their new found skills.

The Bournemouth Club, having introduced people to packet, their recent efforts have been centred on SSTV using simple computer based systems with JVFAX. They are now turning their attention to FAX again using the popular JVFAX software.

Why not try the technique that the Bournemouth Club use at your club? It would make an ideal winter project as you could start by building your own interface.

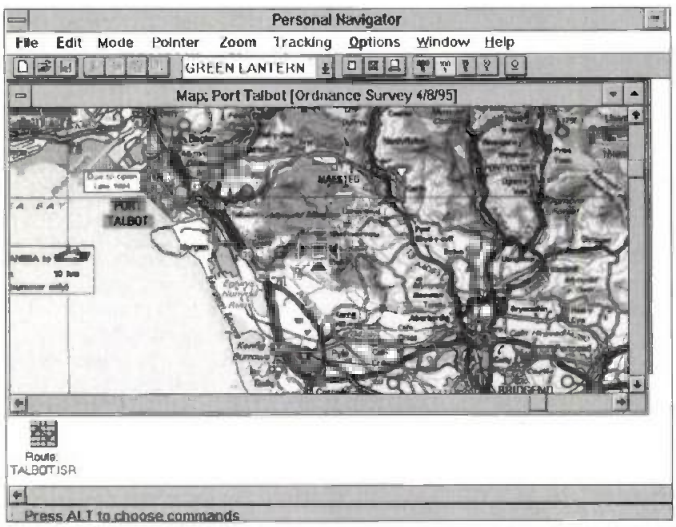
You could even extend the idea by linking-up with other local clubs and even running a local contest. If you would like me to publicise your efforts just write or E-mail to the addresses in the column.

Personal Navigator

I tried what is perhaps the ultimate in personal navigation systems. This new system produced by **Softwair Ltd.** of London combines the positional technology of the NavSat GPS system with PC based digital maps. The result is a system that can show you position on a map to an accuracy of 25m!

You will no doubt have realised the value of the 'You are here' maps often found in town centres. Imagine having that at your disposal anywhere in the country. But in addition to just letting you know where you are, the system reports height, speed and progress along a preset journey. Future versions of the software will include full route planning facilities as well.

At around £1000 plus a PC the NAvSat system is currently only likely to find its way into the executive and professional markets - but it's clearly a sign of things to come - especially if the system could be expanded to include traffic flow information. If you'd like more details contact **Softwair Ltd. at Standbrook House, 2-5 Old Bond Street, London W1X 3TB. Tel: 0171-491 8021, FAX: 0171-499 7517.**



Hard Disk Space

If you've got a PC and are thinking about Windows '95 the first problem you're likely to encounter is a lack of hard disk space. With hard disks currently at their lowest prices for a long time it's a good time to think about either changing your existing drive or, more likely, adding another drive.

It's at this point that you can hit a problem with a conflict between Integrated Drive Electronics (IDE) drives and the BIOS on your computer's main board. The important point to realise about IDE drives is that they contain a certain amount of processing power used to perform a translation between the actual number of cylinders, heads and sectors on the drive and what the computer's BIOS wants to see. It's a problem with this translation process that limits the size of hard disk to just 504Mb.

Even if you add a larger drive, the BIOS will only be able to access 504Mb. To overcome this you need to add some new code to the BIOS. Fortunately this is quite easy and can be done in one of three ways.

The most drastic solution is to replace the BIOS ROM on your motherboard. However, this is not normally very practical as the BIOS is specific to the chip set used on your board and it's unlikely a suitable upgrade will be available.

The next best option is to use a replacement disk controller board with an updated hard disk BIOS built-in. This new hard disk BIOS takes advantage of the facility to shadow parts of the main BIOS in RAM.

The final solution is to use software to overcome the barrier. This is the weakest solution as the software has to perform some trickery, usually with the first track on the disk, to create the desired effect.

Whilst the result is generally fine, you can run into problems later if you upgrade your operating system. This is because this type of upgrade often overwrites the Master Boot Record (MBR) on the first track.

From all of this the best way to uprate your system to handle a large hard disk is to add a new or updated hard disk card with enhanced BIOS. If your existing controller is not too old, you may find a ROM upgrade is available so it's worth checking with the manufacturers.

If you do have to change the hard disk controller I would recommend going for a modern cached Enhanced IDE (EIDE) unit. In my case, I chose the Promise EIDE-4030 Plus as this includes cache, large disk support and a secondary controller that can be used for IDE tape and CD-ROM systems.

Final advice when choosing your additional drive - try and stick with the same manufacturer as your original drive. This can save all manner of interworking problems.

High Speed Radio Modem

Matthew Phillips of GMSK Data Products has written with details of their latest packet radio modem kit. The VFast 28.8 modem has been developed specifically for use with radio links and uses the GMSK modulation method that has proved so successful with the digital Cellphone network.

In order to maintain compatibility with existing TNCs, the VFast 28.8 employs the standard 20-way header to connect to the TNC. The data rates supported by the modem range from 3600 to 38400bits/s.

However, achievement of the higher data rates demands both an excellent radio link and specially modified transceivers. As an example, to operate at a 19.2kb/s data rate, your transceiver will require a channel bandwidth of 50kHz and a flat phase and frequency response down to 20Hz.

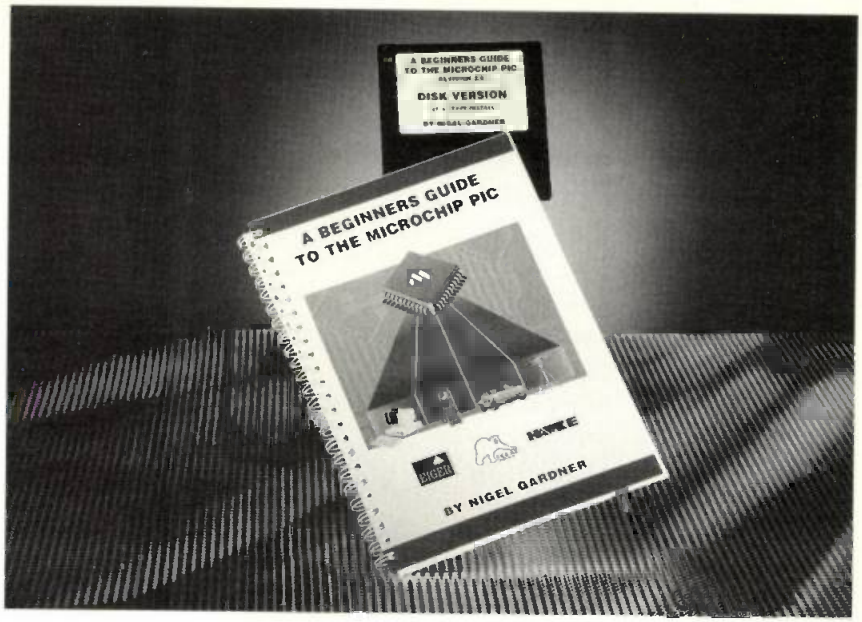
You'll be pleased to hear that the VFast 28.8 will work successfully with transceivers modified to operate with the G3RUH modem standard. For a very high speed specialist modem the VFast 28.8 is very well priced at just £39 for the kit and £80 ready built.

For more details contact **GMSK Data Products, 80 Colne Road, Halstead, Essex CO9 2HP**, E-mail: **matt@nuthatch.dungeon.com** If you have Internet access, full technical data on the modem is available from **http://www.dungeon.com/~nuthatch/vfast288.html**

Microcontroller

If you're into fairly advanced home construction you may well be interested in a new publication from

"The overall package is a must for anyone thinking of making use of a microcontroller". G4WNC



Polar Electronics called *A Beginners Guide To The Microchip PIC*. This provides a complete beginner's introduction to the Microchip PIC microcontroller.

The microcontroller has great potential in all manner of projects as all the main elements for programmable control are contained in the one chip. With clock rate support up to 20MHz the microcontrollers have immense potential.

As a topical example, the VFast 28.8 modem mentioned elsewhere in this column sports a PIC device. Getting back to the PIC guide. This is a very well presented, spiral bound, book that takes you through all the main elements of program development with lots of practical examples.

To support the book, a 3.5in disk (IBM PC format) was included with ready prepared examples. The disk also contained a selection of useful tools such as an editor, assembler and simulator.

The overall package is a must for anyone thinking of making use of a microcontroller. The book is available for £19.95 from a number of electronic catalogue outlets, namely: Farnell, Maplin, RS or Rapid. My thanks go to Polar for supplying the review copy.

Special Offers

Here's the full list of reader's offers with all the latest software. Please leave up to two weeks for delivery.

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 (OrderCode **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 (Order 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!). If sending a cheque please make it payable to M. Richards.

Interference Problems

Simon Gilpin has this month provided some useful commentary on a number of computer/radio interference problems. To provide a degree of isolation between the transceiver and the computer interface he has fitted a Maplin 600R 1:1 isolating transformer at the audio end of the interface lead. This provided a significant reduction in general computer hash.

Simon also tried earthing the case of the transformer, but, whilst this gave a further improvement at around 14MHz, the noise was worse at 3.5MHz. Simon reported the same phenomena when using ferrite rings mounted on interconnecting cables. (This may simply be a question of trying to get more turns around the ring). Overall Simon rates the isolation transformer as the single most effective cure.

The next stage is to experiment with an optical interface between the computer and transceiver. Hopefully this will bring the noise down to the levels experienced when the interface lead is unplugged. If you have succeeded in reducing your interference problems, please write and let me know the details so I can pass on your success.

Switch Box

The plea from **Dave Dyngley** that appeared in December's 'Bits & Bytes' has raised a number of letters from readers.

Firstly **Alex Gorden LA0GV/G4TTB** reports having tried a number of options over the years and advises that an important factor to consider is the ability to hear the incoming signal. Ideally this means the data signal needs to be taken from a line output point.

A line output provides a relatively stable signal level that's independent of the volume control setting. With many rigs this is now available via the multi-pin microphone socket.

In fact, **Ray Parnell G7TKS** has sent in a diagram for a switch box that links to the microphone socket of a Yaesu FT-211 transceiver. If I can find space next month, I'll include the diagram. An alternative is to go for the ready-built switch box produced by MFJ.

Stop Press - UltraPak 4.0

Just as I completed this month's column I heard that Tim Kearsley has released version 4.0 of the UltraPak powerful Windows based TNC control package. I will be shipping the new version with all orders for my special offers disk 3. More information will follow next month.

That's all from the 'computing in radio' world this month, so until next month 'happy computing' and keep those letters coming to me Mike Richards G4WNC, 'Bits & Bytes', PO Box 1863, Ringwood. Hants BH24 3ZD. CompuServe 100411,3444; Internet mike.richards@bbcnc.org.uk

LEIGHTON SMART GW0LBI

HF FAR & WIDE

Leighton Smart GW0LBI provides the latest up-date on the h.f. bands in his first column of 1996, which you've helped him to prepare!

Carl Mason GW0VSW has recently lost the shack shown in the photograph due to the arrival of a baby on November 25. It's now a nursery and Carl now operates from the living room while baby Alastair Lewis Mason enjoys the privacy of the shack!

So, here we are at the beginning of a brand new year. And I'm starting this month with some snippets of DX information culled from the RSGB's *DX News Sheet*, which may hopefully provide our DX operators with some comfort during the cold month of January!

Art NN7A and **Mike NG7S** will be active from Turneffe Island between the 3rd and 7th of February, as V31JZ and V31RL respectively. They will be using c.w. for the most part, with a little s.s.b. operation thrown in for good measure.

I read that **5U7AA** is active mainly on 21MHz s.s.b. between 21.255 to 21.270MHz, QSL to HH2M. **Bill KM1E** will be operating as C6AGN in the Bahamas until mid-February, on all bands, but with particular emphasis on 1.8 and 50MHz.

Your Reports

On to your reports now starting with 1.8 and 3.5MHz.

Ted Trowell G2HKU in Kent, reports conditions as not being very good this month. He lists (all c.w.) contacts on 3.5MHz with T77C (San Marino), DJ7MX (Germany) and 3A2MD in Monaco at around 0600UTC.

Regular reporter s.w.l. **David Henry** RS-102197/ILA236 up in Aberdeen reports reception of SM6DOI (Sweden) OY9ID (Faroe Islands), HB0/HB9AON (Lichtenstein). He also heard 4U1ITU in Geneva), all on 1.8MHz s.s.b. using a Kenwood R-1000 receiver and end-fed wire antenna.

John Heys G3BDQ the 'all wire man' near Hastings lists some of his 1.8MHz c.w. contacts including US7IID (Ukraine) at 2133, RA2FAD (Kaliningrad) at 2004, U3YV (Russia) at 1957, and SV8ZS (Greece) at 2123, using 100W or less into his all wire antennas.

The 7MHz Band

For the 7MHz band reports it's over to new s.w.l. reporter **Geoff Wallis** (ex ZB2R) now who hails from Chippenham in Wiltshire. Geoff, using a Sony ICF 6000W receiver, and an inverted 'V' dipole reports 7MHz s.s.b. reception of PY7IM (Brazil), ZL8AN (New Zealand) CM8EI (Morocco), W1DN (USA), JA9AA (Japan), FY5YE (French Guiana), and 9G5RR (Ghana) all between 2300 and 0130UTC.

Now it's down to Skewen in West Glamorgan, and **Carl Mason GW0VSW**, see **Fig 1**. Carl reports he's worked LA6JHA (Norway), at 0755, ZB2AZ (Gibraltar) at 0636, OK2PAY (Czech Republic) at 1743, and TK5MH (Corsica) at 2050, using 100W and a G5RV dipole.

Charlie Blake RS-96034 in Milton Keynes is a '40m' enthusiast. His very long s.s.b. reception report lists: HB9FAD in contact with G0WBT at 0630, TI4CF (Costa Rica) working IK6DI in Italy at 0624, ZL2APW (New Zealand) working OE6MPG at 0619, CP6DA (Bolivia) working EA5YW at 0659, and CX8BBH (Uruguay) in contact with Harry G3DAM at 0607UTC.

Ted G2HKU reports working ZL6KCM at the Communications Museum, Waikanae in New Zealand. He also managed VK3MR (Australia), OY5IPA (Faroe Islands), and EG9A (Alhucemas Island) all at around 0600 with 70W output on c.w.

The 14MHz Band

Once again, the 14MHz band sees the highest level of DX activity. So, I'll start with the regular band report from **Don McLean G3NOF** in Yeovil.

Don says that "14MHz has been open on the long path to Asia at around 0800, and on the short path to the same area at 1400, with African stations heard at around 1700. North and South American stations came in at various times during the day, until the band closed".

For his operations log Don reports s.s.b. contacts with BV8AE (Taiwan) at 0947, J53UAW (Guinea Bissau), AP2JZB (Pakistan) at 1528, VS6DA (Hong Kong) at 1814, PX0UP (Santana Island), XX9KC (Macao) at 1012, (QSL to PO Box 58, Macao), 5H3DC (Tanzania) at 1700, 8R1AK (Guyana) at 0943, and XY1HT (Burma, now renamed the 'Union of Myanmar') at 1410UTC.

Keen 14MHz listener **Gordon Foote G7NCR** in Bristol, using his Howes DcRx 20m receiver and a loft antenna reports conditions as being slightly better this month. Gordon's s.s.b. loggings include Canadian special event station VX1YX (celebrating 50 years of the UN) working Paul G0VRL at around 1736, WZ1Y (USA) working Jeff GW4KYJ at 2005, YV5EUX (Venezuela) in contact with Fred GW2DDX in Cardiff and Dave G4ABU in Liverpool at around 1900, and ZD8Z (Ascension Island) working G4BCC and 7X2BK (Algeria) at 1800UTC.

Back to the valleys of south-east Wales now, and to the report from **Steve Locke GW0SGL**. This intrepid reporter writes from his hospital bed and offers, (in his own words) 'half a report' after taking his station logbook to hospital with him!!

Steve reports working YC1XUR (Indonesia) QSL via Box 99, Karawang, Indonesia, DU1SAN (Phillippines), 4S7RF (Sri Lanka) QSL via 4S7NMR, 0V1ZK (Singapore), V58BG (Brunei), and XU6WV (Cambodia) QSL via Box 2011, GPO, Hong Kong, all on 100W s.s.b.

***Editorial note:** Hope you're feeling better now Steve. Regards from everyone on the PW team. G3XFD.*

Chris G0UNJ in Manchester reports TU2DP (Ivory Coast) at 1653, (QSL via K4MQL), Z21CS (Zimbabwe) at 1710, S92YO (Sao Tome) at 1005 plus various US stations. All were worked on 20W s.s.b.

Listener David Henry RS-102197 reports hearing (on s.s.b.) VP2E (Anguilla), V47NS (St. Kitts Island), and 9U4FM (Burundi), and Carl GW0VCSW hooked up with A71BI (Qatar) at 0950, VK5QQ (Australia) at 1000, LU1CPF (Argentina) at 2012. on s.s.b.

Lastly, **Dave Gosling G0NEZ** in Hemel Hempstead offers a short log indicating his 3W c.w. contacts with OY4AH (Faroe Islands), SV1AOZ (Greece), using a Ten-Tec Corsair rig and a dipole antenna.

The 18 & 21MHz Bands

I'm starting off the 18 and 21MHz band reports this time with Ted G2HKU. He reports some excellent c.w. DX here, with 9Q5MRC (Zambia), HK7AAG (Colombia), 9Y4KB (Trinidad) on 18MHz at 1200, and ZS4XJ (S. Africa), 7Z5OO (Saudi Arabia), and FY/DJ0PJ (French Guiyana) at 1100 on 21MHz.

New reporter **Richard Evans G0VCW** in Rushden Northamptonshire, sends in a QRP report indicating low power contacts with FS5PL (French St. Martin), VU2TRI (India) and HK4DF (Colombia) on 8W s.s.b., plus CN2EWE (Morocco) on 3W c.w.

John G3BDQ has been busy working PJ8AD (Netherlands Antilles), YC1XUR (Indonesia), 5N3ST (Nigeria), A61AM (United Arab Emirates), H5ANX (Bophutatswana), TU2JL (Ivory Coast), 5R8DS (Madagascar) and 6Y5DA (Jamaica) at around 1400 on 21MHz s.s.b.

The 28MHz Band

The 28MHz bands reports round up this month. Firstly there's a report from **Graham Rogers VK6RO** in Ferndale, Western Australia, who is a specialist in 24 & 28MHz DXing.

Graham reports some excellent 28MHz f.m. contacts with BV2NT (Taiwan) at 0921, IK2WRV (Italy) at 0729, JH3MKP (Japan) at 0332, 3V8BB (Tunisia) at 1057, DL6NB (Germany) at 0933, G0KPU (England) at 0754, and HS0ZBI (Thailand) at 1014 from his huge log.

Finally, there's Don G3NOF who says he hooked up with FH5CB (Mayotte Island) at 1246, ZS50A (South Africa) QSL via WA3HUP, 9J2FR (Zambia) at 2.41, and A47RS (Sultanate of Oman) at 2145. Both reports indicating that 'Ten' is rising from the dead at last!

Signing Off

Well, that's it, time to be signing off. Once again, my grateful thanks to our reporters for the vast amount of input received. I'm afraid that due to space limitations I have to be very selective, but always try to feature everyone in the column.

As usual, reports by the 15th of each month to: **Leighton Smart GW0LBI, 33 Nant Gwyn, Trelewis, Mid-Glamorgan, Wales CF46 6DB. Tel: (01443) 411459.**

PETER SHORE

BROADCAST ROUND-UP

Peter Shore has news of a new radio from Grundig as well as all the latest programming schedules.

The New Year has brought with it some new radio sets. Three models from Grundig have recently arrived on my desk, and I will be looking at them in turn over the next couple of months.

To tempt you now, there is a pocket-size digitally-tuned travel receiver, the Yacht Boy 320. It has medium wave and f.m., with (stereo through) headphones, and two short wave bands offering between them continuous coverage from 2.30 to 7.40MHz, and from 9.40 to 26.10MHz.

The 320 has an easy-to-read liquid crystal digital display that shows clock time when the radio is switched off, and the frequency in MegaHertz when the radio is on. This can be illuminated by holding a button on the well laid out keypad.

Five memories are available on each of the 320's four wave bands, and there is an alarm for automatic switch-on with the option of a buzzer instead of radio sound as your wake-up call. Tuning is manual using two buttons either to increase or decrease the frequency.

The various meter bands on short wave can be selected in succession by tapping a single button alongside the tuning keys. The radio is powered by three AA-size cells, or by means of an optional 4.5V adapter. A carrying case is also supplied with the Yacht Boy 320.

The YB 320 is adequate in terms of sensitivity and selectivity for travellers who want to keep abreast of news from the world's major international stations. Its sub-paperback book size means that it is easily accommodated in most people's luggage. The cost here in Britain will be around the £60 mark and the radio will be available sometime in early spring.

Broadcast Band Developments

Now on to developments around the broadcast bands. In November, the US government all but stopped work as a result of the failure of Congress and the President to agree on the Federal budget. A significant proportion of government employees were sent home - or 'furloughed', as the Americans describe the process - and that included America's international broadcasting operations.

The Voice of America (VoA) remained on the air, although 20% or staff directly connected with broadcasting had been suspended, and well over 80% of administrative staff had been told not to attend their workplace. According to an interview with VoA Director, Geoffrey Cowan, on Radio Netherland's Media Network programme, there is less antagonism towards US foreign broadcasting than there had been in the early part of 1995 when it looked as though VoA could be drastically cut.

However, VoA's Munich-based medium wave transmitter on 1197kHz is silent between 0700 and 1200UTC. Until November 1995, it carried VoA Europe during the day, and a mixture of English and European languages at night.

Now VoA Europe has disappeared completely from the 1197kHz channel, and it transmits VoA English between 0530-0700, 1200-1500, 1500-2000 and 0000-0430UTC, with Czech, Slovak and Polish at other times. Meanwhile, VoA has changed the time - or at least its description of time!

The Voice of America is now, according to *Communications World*, announcing the hours as 'Universal Time' as opposed to UTC, or GMT which it says went out of existence with an international treaty that came into existence in 1979. What do you think about this?

Should this column use UTC or Universal Time instead of GMT? And what should other international broadcasters do? Drop me a line via the *PW* Editorial Offices in Broadstone with your views.

Schedules

Let's look at schedules now. Austrian Radio is on the air in English to Europe at 0530-0600, 0830-0900, 1030-1100 on 13.73, 6.155; 1430-1500 on 13.73, 11.78, 6.155; 1930-2000 on 13.73, 9.665, 6.155, 5.945 and 2230-2300 on 9.87, 6.155, 5.945MHz.

Greek language broadcasts to expatriate Cypriots in the UK from the Cyprus Broadcasting Corporation are transmitted from the BBC's East Mediterranean relay station on Friday, Saturday and Sunday at 2215 for 30 minutes on 9.675, 7.125 and 6.18MHz.

Deutsche Welle in English is on the air at 2000 daily on 5.96 and 7.285MHz.

The Italian Radio Relay Service in Milan is on the air at 0600-0830, 1530-2100 on 3.985; 0830-1530 on 7.125 and 2100-2300 on Friday, Saturday and Sunday on 3.95MHz. They also have a site on the Internet:
http://www.nexus.org/

There are two radio services from Moldova, the former Soviet republic, compete for the attention of short wave listeners world-wide.

The state broadcaster, Radio Moldova International, transmits on weekdays only on the frequency of 7.50MHz, beamed to Europe in English at 2200 and 2300, and to America at 0330 and 0430UTC.

All transmissions are 25 minutes in length. Then Radio Dnestr International has English at 2130 on Monday, Wednesday and Thursday, and at 2200 on Sunday, all on 6.205MHz.

Terrible Noises

Some readers may be able to cast their minds back ten years ago when if you switched on a short wave radio set here in Europe, you'd be bombarded with terrible noises across almost every band. This was jamming by the Soviet Union of the US stations Radio Free Europe (RFE) and Radio Liberty.

Time has marched on, and RFE now has its headquarters in one of the countries it used to broadcast to - and which jammed it. And at the end of October, the Spanish transmitter site of Radios Liberty and Free Europe ceased operations after 36 years of work.

Six 250kW short wave transmitters were installed at Playa de Pals, beaming in to Eastern Europe and the former Soviet Union. This site was chosen, along with another in Portugal, as it was just the right distance from the target area to allow 'first-hop' reception. (The strongest short wave signals are always those which are heard on the first hop or bounce - each subsequent hop renders the signal less strong).

A Reminder

A reminder that Danmarks Radio is to reintroduce English language transmissions from January 7. I'll mail the first reader who sends me a QSL card from Copenhagen for the country's new English programmes, a small gift from the world of international radio, and he or she will see their name in print. So, keep your radios switched on and your ears open!

Around The World

If you want to find out what other English language services there are from around the world, a new guide has just been released by an organisation called the **Association for International Broadcasting (AIB)**. *The Guide to World Radio in English* costs £5.45 and lists, country-by-country, all the English language transmissions from international radio stations. For more information write to **AIB, PO Box 990, London SE3 9XL**.

That's all for this month. Please write to me if you make any interesting discoveries on the broadcast bands that you think other readers would like to know about. Until next time, good listening and 73s.

END

GRAHAM HANKINS G8EMX

FOCAL POINT

This month we welcome Graham Hankins G8EMX who is joining regular author Andy Emmerson G8PTH in presenting our bi-monthly ATV column. Graham, who is the British Amateur Television Club's Publicity Officer, starts off with a brief over-view of ATV techniques and provides a fascinating news round-up.

I'm pleased to work in partnership with Andy in writing for *PW* because television is a considerable technical achievement and an enjoyable aspect of amateur radio. Somewhere in the vision chain there will be signal circuits from d.c. to low r.f., analogue and digital processing, switching, high voltage, carrier frequencies at u.h.f. or above. Think of anything you have known in electronic studies - television uses it somewhere!

Everything I've mentioned makes television a fascinating mode to the keen radio amateur. Fast-Scan TV (FSTV) uses the same system as broadcast - 625 lines, 50 fields per second in the United Kingdom.

For some enthusiasts (like me!), creating watchable pictures and transmitting them to another radio amateur, then receiving their noise-free vision in colour is the ultimate aim. The result is not just a voice, the other station is sending their video tape of that last rally, or showing what their new bit of home-brew kit really looks like. Each of you is producer, director, editor, vision controller, engineer and performer!

Other radio amateurs use fast-scan to investigate propagation phenomena. This is the exchanging of recognisable, even if sometimes weak and noisy, pictures with distant stations (DX) and the further away the better, particularly on 10GHz!

Fast Scan Television needs a wide bandwidth. Broadcast pictures contain a vision signal up to 5.5MHz wide, amateur pictures can get close to this so the first band available for FSTV to UK amateurs is 430 - 440MHz, (70cm).

Our precious 10MHz at u.h.f. is currently under threat of reduction, but is the easiest band to use for ATV provided the needs of other users are considered. The recommended ATV carrier frequency on 70cm is around 436MHz, amplitude-modulated and double-sideband (d.s.b.).

With a video modulator filtered to cut off at 3MHz, this still gives a good monochrome picture and remains in-band. Receiving 70cm ATV is simple, 436MHz comes in to an up-converter where it is mixed to give an output around 600MHz.

The signal is then fed to the antenna socket of a normal domestic television set tuned to channel 36! Even though the TV set is not expecting a d.s.b. signal, it still works.

If you take a 436MHz transmitter down in frequency a bit, add a tripler and amplifier (to boost the signal and reduce harmonics), this will put you at around 1250MHz (24cm). Frequency modulation is (almost) standard here and there is enough bandwidth for colour and inter-carrier sound.

There may even be an ATV repeater serving your area. A surplus satellite receiver will demodulate a strong 24cm signal but a dedicated 1250MHz ATV receiver is best. For reasons why, and simpler ways onto 24cm, see the next 'Focal Point'!

Slow Scan TV

Slow Scan ATV is very different. A still image will be scanned (slowly - several seconds!), or generated in a computer, then encoded to audio frequencies which modulate an h.f. transmitter.

Any news of slow-scan activity will be welcome. If you are a radio amateur who has not tried vision yet but keen to start, or an established ATVer, membership of the British Amateur Television Club (BATC) is highly recommended.

The BATC produces a quarterly magazine *CQ-TV*, supplies some components, p.c.b.s and books. They are also planning a video for this year.

Your ATV Questions Answered

A new feature for 'Focal Point' will be a section called 'Your ATV Questions Answered'. Post or (preferably) Packet Radio your enquiry to me, I will reply to you direct and your question, with answer, will be in the next available column.

Repeater News

The ATV repeater **GB3HV**, in High Wycombe, is operated by the Home Counties Television Group. Their Autumn newsletter *Line Out* has two intriguing pages listing faults, adjustments and modifications that have occurred in or have been made to the repeater during 1995. The power unit, for instance, has suffered from no less than three lightning strikes!

Mike Sanders G8LES, Technical Officer for GB3HV, has redesigned the switching logic for the four receive antennas. The computer now quickly steps round them, looking for line syncronising pulses and measuring inter-field noise. The four results are compared and the best antenna used. **John Stockley G8MNY** reports that this has given a 6dB gain advantage over an unswitched system!

I've received a nice long Packet report from **Brian Davies GW4KAZ**, chairman of the Arfon Repeater Group administering GB3TM in Anglesey. Brian writes: "GB3TM has been on-air for over 12 months without many problems and has handled contacts from G, GW and EI - yes, even some of the lads in Dublin come through under good conditions.

"Activity on 1250MHz has certainly increased since GB3TM came on, as 24cm does not go through 1000 metres of rock easily! There are over a dozen regular users, including **John Lawrence GW3JGA**, who helped put TM on air and is a regular contributor to the British Amateur Television Club's magazine *CQ-TV*".

Another GB3TM regular, **John Cronk GW3MEO**, writes "On Saturday September 2, I worked **Denis Jones G3UVR** (Wirral) via GB3TM, who was able to relay live pictures from a 10GHz link to and from G3SMU (Bolton), who in turn was receiving a 10GHz signal from special event station GB2QM on the Liverpool lighthouse. The pictures of the cruise liner *Queen Mary II* leaving Liverpool were excellent. Great fun and a first-rate historic event to watch, thanks to GB3TM".

In the Midlands, **Arthur Bevington G5KS** (Oldbury) is a stalwart, active on 1250MHz, 430MHz and slow-scan. Arthur receives the Stoke repeater **GB3UD** at about P4 and **GB3GV** (Leicester) weaker at P2.

In November 1995 Arthur became an Honorary Member of the RSGB with more than 60 years membership. Congratulations! If anyone wants a contact or a test, they can ring Arthur on **0121-552 4456** but not before 11am please.

A bit further south now. I had a 'phone call from **Tony Reynolds G8CEQ** (Ashwater). Tony wants to put an ATV repeater into North Devon, so watch out for any developments on this! He is presently active on 430MHz with 20W on transmit and QTHR if you want to support a repeater project.

Much further south now, to New Zealand for an update on the Manawatu project mentioned in the June 1995 'Focal Point'.

Michael Sheffield ZL1ABS sent an early Christmas card and says: "While on holiday in Palmerston North, Wayne ZL1UJK and I assisted the Manawatu Technology Group to put their 615.25MHz (NZ Channel 39 50cm amateur band) ATV transmitter on air for testing. It is running about 2W using a BLV93 in Class A linear mode into a log-periodic 14-element yagi.

"The test card is an 'ATV Compendium' design (BATC) with 16 teletext pages. The transmitter is in Feilding and furthest reports are P2 strength pictures (locked and resolvable but noisy) at Palmerston North, 27km away. Input will be in the NZ 430MHz amateur band with v.c.r. recording".

So, that's it for now! Please send reports of simplex activity, repeater news, photo's, Slow Scan, questions on Fast Scan, BATC, to me, Graham Hankins G8EMX at 11 Cottesbrook Road, Acocks Green, Birmingham, B27 6LE. If you prefer, as I do, Packet messages, my BBS is GB7SOL. Soon, maybe, I could have an Internet address as well! Meanwhile, 73's and, of course, P5!

BARGAIN Basement

Compiled by Zoë Shortland

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.**

Subscribers must include the despatch label bearing their address and subscription number to qualify for their free advert.

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Advertisements from traders, or for equipment that is illegal to possess, use or which cannot be licensed in the UK, will not be accepted. No responsibility will be taken for errors.

For Sale

A collection of old radio, TV and military equipment, s.a.e. for list. eg. receiver R1120TR9, R1155A, Bush TV80, Marconi radio 556, aircraft parts, bomb switch SD656, Morse key type D, etc. Paul Brown, 22 Raby Terr, Chilton, Nr. Ferryhill, Co. Durham DL17 0JD.

AOR-2800, 500kHz to 1300MHz, all modes, programmable scanner with NiCads, charger and manuals, including frequency directory, £240. Can deliver. Tel: Northants (01933) 277946.

Classic collection: Eddystone EC10 receiver, 555kHz to 30MHz, immaculate, £85. Wireless Set No. 19 MkII, £135. Hammurland HQ170A (RX), amateur bands, 1.8-148MHz. £155. Pye Cambridge 70MHz transceiver (valve p.a.), £18. Tel: Yorkshire (01482) 869682.

Drake 2-C c/w 2CQSP, extra bands, spare valves, v.g.c., £180. Leader audio gen. LAG-26, v.g.c., £15. KW Vespa MkII, manual, £65. Bill, Glasgow. Tel: 0141-649 4345.

Icom 735 transceiver, mic., boxed, manuals, mint condition, £600. Icom 240 2m (144MHz) f.m. transceiver, ideal mobile, v.g.c., mic., manuals, £100. PSU Bremi 13.8V 3A, v.g.c., £15. Bert G4HTM, Basingstoke. Tel: (01256) 25124.

Kenwood TH-78E 2m/70cm (144/430MHz) hand-held TX/RX, box as new with CTCSS, spare NiCad, d.c. lead, charger and eartalker mic., £325 o.n.o. Pete, Surrey. Tel: 0181-393 9115.

Kenwood TS-850S, box, manuals, as new, £1000. Kenwood TL-922 amplifier, good condition, £1000. Trio SM-220 monitor scope, £200. Eric G0CGL, Dorset. Tel: (01202) 524901.

Oscilloscopes: Telequipment D52 and D43, £35 each. Tektronix 565 and RM502, £40 each. Frequency meter - BC221, £20. G8KOV, Glos. Tel: (01453) 546971.

Sony ICF-SW77 l.w., m.w., s.w., f.m. stereo synthesised receiver, excellent condition, inc. Sony AN1 l.w., m.w., s.w. wide range antenna, instructions, two h.f./s.w. books, £220 o.n.o. Mr A. Ashford, Dorset. Tel: (01202) 531407.

Ten Tec Century 22, 6-band h.f. c.w. transceiver with keyer, calibrator, boxed with manual, £200. Diamond SX-200 s.w.r./p.w.r. meter, 1.8-200MHz, £40. Chris G0PVN, Dunstable. Tel: (01525) 220576.

Ten-Tec omni D series B transceiver, 100W output, £350 o.n.o. and Racal RA17L receiver in excellent condition, with manual, £200. Les, North Yorks. Tel: (01729) 840513.

Ten-Tec Paragon 100W solid state s.s.b./c.w., twin v.f.o.s, superb filters and memory facilities (displays callsign, etc.) general coverage RX, £400. John G0VGD, Maidstone. Tel: (01732) 846107.

Two 934 NPR Comtel rigs, £150 each. Kenwood TR-7625 f.m. 2m (144MHz), £150. 12-element ZL special, £40. David G7TEC, Leamington Spa. Tel: (01926) 425220.

Wayne-Kerr direct reading LCR bridge, £65. Marconi signal generator, £45. AVO valve tester, £85. Venner frequency counter, £70. Marconi frequency counter, £75. Usher, 85 Bromham Road, Bedford. Tel: (01234) 354767.

Yaesu FRG-100 top communications receiver, plus Lowe PR-150 pre-selector. MFJ-752C signal enhancer. DXers audio processor. Howes a.t.u. Active antenna system. Magnetic balun. Speakers. Manuals. Books. Cost, £1200. Under guarantee, £595. Tel: Manchester 0161-998 6285.

Exchange

5-band CP5 vertical and tuned radials, v.g.c., little use, for magnetic loop antenna. G4KIN, Merseyside. Tel: 0151-531 1305.

Wanted

AR88 receiver in perfect working order. Mike, Alton. Tel: (01420) 86892.

AR88D receiver, must be in working order and reasonable condition. Adrian, North London. Tel: (01582) 833451 anytime (answerphone).

Parts for T1154 transmitter restoration, especially case, both meters, yellow master oscillator, tuning knob and dial. R1155 'meter deflec' and 'aural sense' knobs and controls also required. Please write to: P. Brocklebank, c/o TSB, Louth, Lincs LN11 9NB.

Transceiver with digital frequency tuning read-out, must cover 160m (1.8MHz) band, looking for US army transceiver PCR47. Selling WWII German military broadcast radio, original markings on dial, Swastika, Eagle, £200. K. Jones G3PSZ, Devon. Tel: (01837) 53021.

Transistors from the 1950s - the components that is, not radios. Also transistor data books and sheets from that period. Write for details of wanted types and prices offered. Dr. A. Wylie, 21 Brancaster Lane, Purley, Surrey CR8 1HJ.

If you are selling equipment via 'Bargain Basement' it is in your interest to ensure cheques have been 'cleared' by the bank before parting with your equipment. If in doubt about cheque clearance times and bank fees for 'express' cheque clearance, or for returning un-paid ('bounced') cheques, you are advised to consult your bank.

When advertising equipment for sale, you should clearly state in your advert whether equipment is professionally built or 'home-brewed' or modified. **You are also advised to insure equipment against damage during transit (details available from the Post Office or carrier of your choice).**

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Bargain Basement feb '96

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To advertise on this page see booking form below.

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Computer Software & Hardware

JVfax/SSTV, HamComm, PktMon. 9FD/25FD Tx/Rx Interface, programs, manuals, pictures. £28.50. SASE leaflets. G8SLB (QTHR). Tel: 0181 595-0823.

Miscellaneous

DIY INEXPENSIVE RADIO PROJECTS. Easy to make, SAE, RYLANDS, 39 Parkside Avenue, Southampton SO1 9AF.

VALVE ENTHUSIASTS: Capacitors and other parts At attractive prices! Ring for free list. Geoff Davies (Radio), Tel: (01788) 574774.

REMEMBER RADIO LUXEMBOURG, London, Caroline etc. Radio tapes from £2.20. Camradio, 70 Willow Way, Ampthill, Beds MK45 2SP.

Wanted

WANTED FOR CASH Valve or solid state communication receivers Pre-1980. Preferably working and in good condition. Non working sets considered also domestic valve radios. Items of Government surplus wireless equipment and obsolete test equipment. Pre-1965 wireless and audio components and accessories. Pre-1975 wireless and TV books and magazines. Also, most valves wanted for cash. Must be unused and boxed. CBS, 157 Dickson Road, Blackpool, FY1 2EU. Tel: (01253) 751858 or Fax: (01253) 302979.

WANTED high gain ferrite rod aerials must be half inch in diameter no more or less. Must be six inches long or more. Contact Peter Tankard on Sheffield 0114 2343030 any time.

EDDYSTONE 730/4 communications receiver, must be in good working order. Tel: Brian 0181-651 5345.

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Some of the products offered for sale in advertisements in this magazine may have been obtained from abroad or from unauthorised sources. *Practical Wireless* advises readers contemplating mail order to enquire whether the products are suitable for use in the UK and have full after-sales back-up available.

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For Sale

VINTAGE SERVICE DATA, circuits & manuals – for: HiFi, Military, Radio, Television & car radio up to the 1060's. Free brochure. Savoy Hill Publications, "Seven Ash Cottage", Seven Ash, Combe Martin, North Devon, EX34 0PA. Tel: (01271) 882665.

TRANSCEIVER PRC 316 HF, AM, CW, 4 watts output last few. £105 including p&p. Various faulty P.R.C. 316 radios £40 each including p&p. Send SAE for latest list. C.P. Electrical, 56A Worcester Street, Wolverhampton WV2 4LL.
Tel: (01902) 203115.

TECHNICAL MANUALS, AR88, CR100, R210, HR0. £5 each. Circuits £1.50. Hundreds available. SAE list. Bentley, 27 De Vere Gardens, Ilford, Essex IG1 3EB.
Tel: 0181-554 6631.

JAPANESE GAAS-FET, RF power module, microwave TR's and devices for communication and industrial use. T.YOSHIHARA OSAKA 564, JAPAN, Cable: TYOSHIHARA SUITA.
FAX: 816-338 3381.

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ENDNOTES

Rob Mannion reflects and looks ahead.

Working on the *PW* team is a busy job and as everyone knows, I'm prone to forgetting things (I even forgot to put my artificial arm on once and only realised it when I tried to tie my shoelaces up!). So, a year-planner is a great help in organising my time and making sure I turn up at clubs to do the right talk at the right time! With that in mind the team thought that readers would find a wall mounting year planner useful. I hope you do find your planner helpful. There's only one problem...it graphically shows you how short a time we've got in each year!

This magazine has been an interesting issue to work on, and we think you'll enjoy *PW* for February. We've provided some interesting projects which can be built over a weekend and there's some fascinating reading too.

I'm pleased to announce that a great favourite of *PW* readers, the Rev. George Dobbs G3RJV, will soon be returning to write a new series. The new series 'Carrying On The Practical Way' will follow in the footsteps of 'Getting Started....The Practical Way', but at a higher level. In his new series George will concentrate on providing complete 'weekend' style projects in his own inimitable way.

As he's to be writing a monthly column again, George will be standing down from his occasional (on the 'rotating author schedule') tenure of 'Antenna Workshop'. His place is to be taken by Dick Pascoe G0BPS of 'Pascoe's Penny Pinchers' fame! And I have no doubt readers will continue to enjoy Dick's simple approach, especially as he will be writing on a regular basis.

So, in hoping you enjoy this issue as much as the team has enjoyed preparing it, I've got to get on with March, (and there's even better to come then!). Cheerio for now.

Rob G3XFD

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