practical Wireless

AUGUST 1995 £1.90

ANTENNA SPECIAL

18 Pages of Antenna Features

Featuring

THE SLIM COBRA - A CHARMING ANTENNA

MULTI-DELTA ANTENNAS

SD-610 MULTI-BAND ANTENNA REVIEW

Plus

THE KEY TO IRELAND'S AMATEUR RADIO

SPECIAL PRIZE COMPETITION

PLUS ALL YOUR REGULAR FAVOURITES!

reviewed

ALINCO DX-70 HF TRANSCEIVER

ISSN 0141-0857

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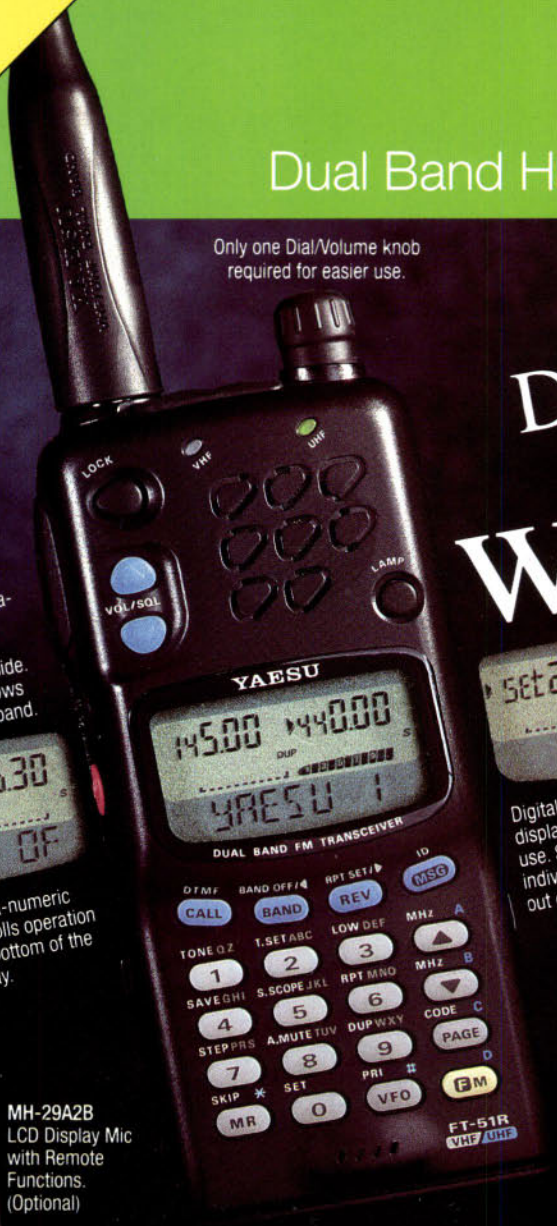
THE UK'S BEST SELLING MAGAZINE FOR AMATEUR RADIO ENTHUSIASTS

NEW
Dual Band HT

Dual Band Handheld FT-51R



The First Dual Band HT with WINDOWS!

Three dual receive configurations VHF/VHF, UHF/UHF, or VHF/UHF with main band frequency on right or left side. Flexible programming allows transmit on main or sub band.

An 8 character alpha-numeric user help menu scrolls operation instructions in the bottom of the large, backlit display.

Digital battery voltage readout displays condition of battery in use. Scan skip function allows individual memory channel lock-out during scanning mode.

Spectrascope™ displays active adjacent frequencies in real time with relative signal strength.

FT-51R
2¼"W x 4¾"H x 1⅛"D
(2 Watt version shown.)

MH-29A2B
LCD Display Mic with Remote Functions. (Optional)

The new FT-51R Dual Band HT is state-of-the-art, and easy to use! So easy, you won't need an operating manual. Its exclusive, scrolling instruction menu located in the large, backlit display "window", guides you through total operation while simultaneously viewing the main display window.

You'll like some of the other new, exclusive features, too. Like Spectrascope.™ This unique feature displays real time, continuous scanning of activity on adjacent frequencies in VFO mode or 8 of your favourite memories. A cloning feature duplicates favourite channels to another FT-51R.

A digital battery voltage display, five power output levels, the largest backlit dual band HT keypad made, Smart Mute,™ two VFOs on both VHF and UHF, as well as available 2 Watt and 5 Watt versions, round out the exciting FT-51R. Plus, the optional MH-29A2B Display Microphone allows you to control volume and also access Memory, VFO, Call Channel, Band Selection and scanning functions. All of this in world's smallest dual band HT radio!

See the FT-51R with "windows" at your Yaesu dealer today!

"I can see two frequencies and alpha-numeric all at the same time."

"Scrolling instructions tell me what to do next!"

"I use the Spectrascope to find new contacts faster."

"Yaesu did it again!"

Specifications

- Frequency Coverage
  VHF RX: 110-180 MHz
  TX: 144-146 MHz
  UHF RX: 420-470 MHz
  TX: 430-440 MHz
- Spectrascope™ Display
- Scrolling User Help Menu
- Alpha-Numeric 8 Character Display
- Up/Down Volume/Squelch Controls & Display
- Selectable Sub-Band TX Mute
- Automatic Tone Search (ATS)
- Digital Battery Voltage Display
- AM Aircraft Receive
- Scanning Light System (SLS)
- 120 Memory Channels (80 w/Alpha-Numeric)
- Large Backlit Keypad & Display
- Automatic Repeater Shift (ARS)
- Multiple Scanning Modes
- 3 Selectable Scan Stop Modes with Scan Skip
- User selectable lock function w/15 combinations
- Automatic Power Off (APO)
- TX/RX Battery Savers Built-in
- Handy Cloning Feature
- 5 Selectable Power Output Levels
- Message system with CW ID
- Selectable RX Smart Mute™
- Cross-Band & One-Way Repeat Functions
- DTMF Paging/Coded Squelch Built-in

Accessories
Consult your local dealer.

YAESU
Performance without compromise.™

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

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

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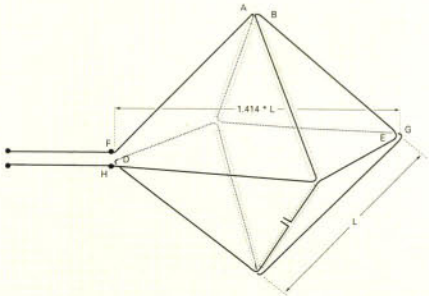

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* 7 mode scan operation
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HF + 6m + 2m mobile transceiver with remote mount capability. 100w on HF & 6m 10w out on 2m. Rx coverage 30kHz-200MHz + FM W

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ALINCO DX-70

HF & 6m remote mountable mobile transceiver. 100w output HF 10w on 6m. Rx coverage 150kHz-30MHz, 50-54MHz all mode including FM.

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PX	FT1000	Yaesu	Unused	HF Transceiver with additional Sub RX	£2,895.00
PX	FT757GX11	Yaesu	Good	HF TX/RX Gen Cov RX	£675.00
PX	TS130S	Kenwood	Fair	HF 100 Watts with Ext VFO	£395.00
PX	FTONE	Yaesu	Good	HF Transceiver Gen Cov RX	£750.00
PX	FT980	Yaesu	Good Cond	HF 100W gen RX/TX ham s/h	£925.00
PX	HL1K	Tokyo	As New	HF 500W lin amp 2x4CX250B s/s	£839.00
PX	HT180	Tokyo	Good	HF 10W 80mtr mobile SSB/CW s/h	£289.00
BX	FT1012DMK3	Yaesu	Good	HF Transceiver Valve WARC	£399.00
BX	FT901DE	Yaesu	Good	HF Transceiver	£449.00
CX	FT101B	Yaesu	Good	HF Transceiver	£275.00
CX	FT101E	Yaesu	Good	HF Transceiver 6 Band	£325.00
CX	FL7000	Yaesu	As New	HF linear, boxed	£1,495.00
CX	FT890AT	Yaesu	As New	HF transceiver, boxed	£999.00
LX	TS820S	Kenw	Good	HF transceiver, no WARC bands	£400.01
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LX	TS850SAT	Kenwood	Excellent	HF TX/RX with internal ATU	£1,350.00
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RX	TS530SP	Kenwood	Good	HF Transceiver	£360.00
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RX	FT277	Yaesu	Fair	HF transceiver	£250.00
RX	JST100	JRC	Good	HF TX/RX	£595.00

VHF/UHF TRANSCEIVERS

PX	FT736R	Yaesu	Good	2m / 70cm All Mode Base Station TX/RX	£1,195.00
PX	FT736R	Yaesu	Excellent	6m/2m/70cm/1296cm all mode base station	£1,650.00
PX	FT73	Yaesu	Excellent	70cms Handheld	£169.00
PX	FT415	Yaesu	Good	70cms Handheld	£169.00
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PX	IC2SET	Icom	Excellent	2mtr Handheld	£195.00
PX	C500	Stand	Good	2/70cm h/held transceiver	£245.00
PX	DJF1E	Alinco	Good	2m h/held transceiver, boxed	£235.00
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PX	TH205E	Kenwood	Good	2m Hand Held	£139.00
PX	M5600	Midland	V/Good	VHF marine 99 ch 25W d/watch s/h	£99.00
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BX	IC2SE	Icom	Fair	2m Handheld TX/RX	£119.00
BX	TS700	Trio	Good	2m All Mode base TX/RX	£289.00
CX	FT221R	Yaesu	Good	VHF Multimode	£325.00
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RX	IC475H	Icom	Good	70cms 75 watt Base TX/RX	£795.00
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RX	TH28E	Kenwood	V.Good	2m Hand Held	£169.00
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SMC18/REXON	Charger for FNB112	£18.00	A
RTN100	CTCSS unit	£25.00	A
RTS102	DTMF unit	£19.95	A
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RBX100	AA cell case for RL102/402	£8.00	A
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HL100B/20	20M Linear, 10W in 100W out PEP	210	C
HL100B/80	80M Linear, 10W in 100W out PEP	210	C
HL66V	6M Linear, 10W in 50-60W out Rx Preamp	169	C
HL166V	6M Linear, 3/10W in Auto select 80/160W out Rx Preamp	299	C
HL37VSX	2M Linear, 0.5-5W in 20-35W out variable gain preamp	109	B
HL62VSX	2M Linear, 5/10/25W in 50W out preamp	235	C
HL36U	70cm Linear, 6/10W in 25/30W GaAs FET Preamp	155	B
HL63U	70cms Linear, 10/25W in 50W out GaAs FET Preamp	259	C
HL180V	2M Linear, 3/10/25W i/p auto select 170W out Rx Preamp	389	C
HL130U	70cms Linear, 3/10/25W i/p auto select 120W out Rx Preamp	485	C

TRANSVERTORS

HX240	2M to HF 80,40,20,15,10M 2.5/10W Drive 30-40W o/p	299	B
HX640	6M to HF Specs as above	299	B

CREATE ANTENNAS

HF

			Carr.
714X-3	3-4 ele Yagi 15-20-40m 3Kw PEP	£1369	E
CD218	3 ele Yagi 10-15 1.5Kw PEP	£289	D
CD318JR	4 ele Yagi 10-15-20m 750w PEP	£439	D
CD318	4 ele Yagi 10-15-20m 2Kw PEP	£539	D
CD318B	5 ele Yagi 10-15-20m 2Kw PEP	£589	D
CD318C	6 ele Yagi 10-15-20m 2Kw PEP	£899	D
CL10	5 ele Yagi 10m 2Kw PEP	£299	D
CL15	5 ele Yagi 15m 3Kw PEP	£450	D
CL4B-4	3 ele Yagi 40m 4Kw PEP	£1375	E
CV730V-1	V-Dipole 10-15-20-40m 1Kw PEP	£199	D
CY103	3 ele Yagi 10m 2Kw PEP	£179	D
CY104	4 ele Yagi 10m 2Kw PEP	£239	D
CV48	40m Vertical 2Kw PEP	£275	D
AD385	40/80m Switch box for CV48	£69	B

MORSE KEYS

HK702	Straight key,1Kg adjustable tension and contacts	£46.00	B
HK706	Straight key, 0.5Kg adjustable tension and contacts	£29.00	B
HK707	Straight key, 0.5Kg similar 706 with cranked arm	£35.00	B
HK808	Straight key 2.5Kg deluxe marble plinth	£110.00	B
HK711	Straight key, knee mounting	£36.00	B
HK802	Deluxe straight key, bearing less solid brass construction	£82.00	B
HK803	Brass high deluxe telegraph key c/w base plate	£77.00	B
HK804	Brass high deluxe telegraph key w/o base plate	£82.50	B
MK702	Single lever paddle 1.0Kg	£34.00	B
MK704	Squeeze key 0.15Kg	£42.00	B
MK706	Squeeze key 0.7Kg	£34.00	B

HOKUSHIN ANTENNAS

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

HOKUSHIN MOBILE ANTENNA MOUNTS

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

COMET ANTENNA

COMET ANTENNA ACCESSORIES

RS20	Mini Gutter Clip	£19.50
RS21		£19.50
CK-3MB	Mini Cable Assembly	£24.00
WS-1M	Window Mount & Cable	£39.00

COMET STATION ACCESSORIES

CBL-30	HF 1:1 Balun 1KW PEP	£23.50
CBL-200	HF 1:1 Balun 2KW PEP	£29.50
CSW-20N	Switch 2 WAY 'N'	£39.00
CF-30MR	HF Low Pass Filter 1KW PEP	£39.00
CF-50MR	6M Low Pass Filter 1KW PEP	£39.00
CF-30H	HF Low Pass Filter 2KW PEP	£69.00
CF-30S	HF Low Pass Filter 150W PEP	£25.00
CF-50S	6M Low Pass Filter 150W PEP	£25.00
CF-BPF2	2M Band Pass Filter 150W PEP	£47.00
CD-160H	SWR/PWR 1.6-60MHZ 20/200/2000W	£99.00
CD-270D	SWR/PWR 140-525MHZ 15/60/200W	£89.00
CMX-2	SWR/PWR 1.8-200MHZ 20/50/200W	£119.00
CA-21HR	7MHZ Mobile Whip	£46.00
CA-14HR	14MHZ Mobile Whip	£46.00
CA-21HR	21MHZ Mobile Whip	£46.00
CH72S	2M/70CM Whip BNC	£17.00
CH600MX	2/70/23CM Whip BNC	£28.00
HR-50	6M MOBILE Whip	£46.00
CA2X4KG	2M/70CM Mobile Whip	£49.00
Z4	2m/70cm M. whip w/locking collar	£35.00
B-10	2M/70CM Mobile Whip	£21.00
B-22		£39.95
CHL21J	2M/70CM Mobile Whip	£19.00
CA-258	2m/6m Mobile Whip	£29.00
CA-350dB	6M/10M Base Colinear	£149.00
ABC23	3 x ¾ Base Colinear	£55.00
GP9N	2M/70CM Base Colinear	£135.00
GP15	6M/2M/70CM Base Colinear	£85.00
GP95	2M/70CM/23CM Base Colinear	£109.00

COMET DUPLEXERS

CF-305	HF/VHF Duplexer	£25.00
CF-306A	HF/VHF/UHF Duplexer	£37.00
CFX-514	6M/2M/70CM Triplexer	£49.00
CFX-431	2M/70CM/23CM Triplexer	£49.00
CF-520	2M/6M Duplexer	£29.00

RadioSport-RSGB Events, 1995

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For further details please contact RadioSport Ltd. 126 Mount Pleasant Lane, Bricket Wood, Herts, AL2 3XD. Tel 01923-893929. Fax 01923-678770.

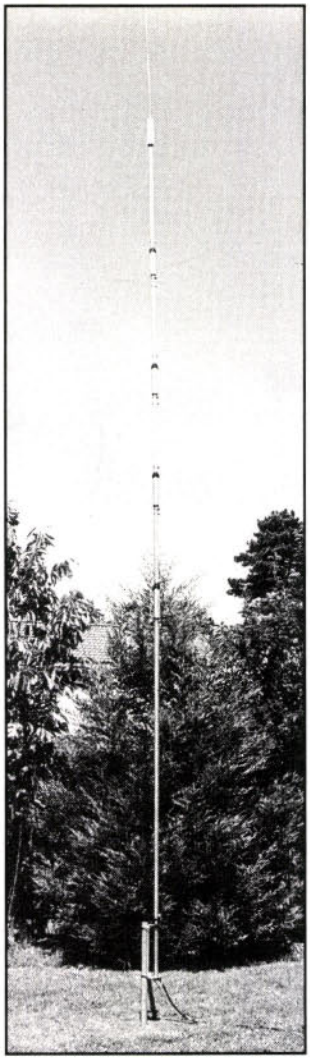
The Hustler 6-BTV, ground mounted

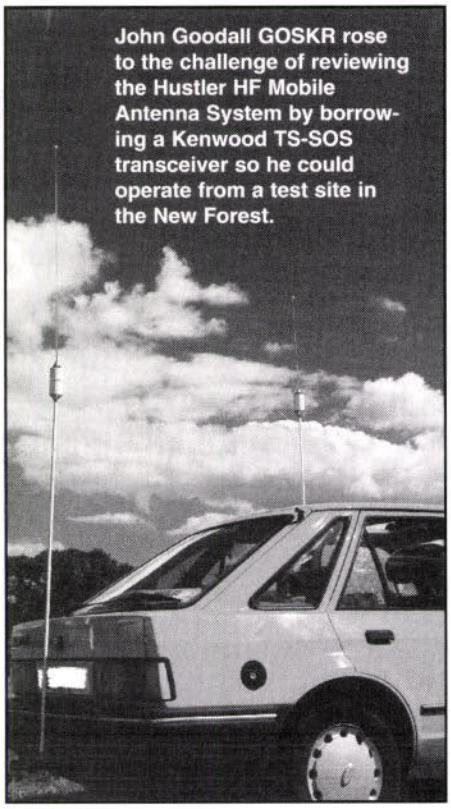
The Hustler 6-BTV in my opinion is very well made, it looks like it should certainly stand up to a few high winds when other aerials wouldn't (as I've found in the past, despite wind survivability claims!). I've used several commercial trapped verticals over the years, and the 6-BTV worked just as well, if not better, than others. When ground mounted, it gave good performance over unobstructed paths.

The supplied instructions were extremely clear and concise, following these I had the aerial assembled in less than half an hour.

What did suprise me was the relatively low price, for the quality of construction I found this to be very reasonable indeed. If you're in the market for a compact ground-mounted HF multi-band vertical, I wouldn't hesitate in recommending the 6-BTV.

Chris Lorek G4HCL





John Goodall GOSKR rose to the challenge of reviewing the Hustler HF Mobile Antenna System by borrowing a Kenwood TS-SOS transceiver so he could operate from a test site in the New Forest.

Before long, I had the RM-20S resonant on 14.160MHz, with the s.w.r. reading just above 1.1:1. This was with 360mm of tip protruding from the adjuster.

At 14.058MHz, the FISTS frequency, I found the s.w.r. was acceptable at 1.6:1. The dial reached on 2:1. This proved an even greater bandwith than that published by the manufacturers.

I worked RA3REM and RK3VWF, both with reports at 5 and 6; YU70GW and 9A1CAH 5 at 9, all on 50W.

I found that using the Hustler HF Mobile Antenna System was indeed a pleasure.I think that the cost of the 'Standard Resonators', which I feel are adequate for this country, is quite reasonable for the excellent quality of the equipment.

Picture and Quote from John Goodhall review in Practical Wireless

HUSTLER Inc. has been producing HF vertical antennas of unusual electrical performance and mechanical integrity since 1959. Many of those original verticals are still in service after over 30 years of reliable operations.

Our exclusive trap design offers the lowest loss possible. A special extrusion process allows us to produce trap covers to an otherwise unattainable close tolerance, assuring accurate and permanent resonances. Our highly accurate traps provide top signal reports and consistent contacts.

Accurate tuning is made possible by the wide range of tuning flexibility designed into our verticals. Not only can you use the normal adjustable tubing to change resonance, but the traps themselves can be field tuned for an additional 2 MHz. shift. This flexibility will enable you to acheive a good S.W.R. even if your installation is not ideal.

All Hustler verticals will easily handle the full legal limit of power and will cover 10/40 meters with a S.W.R. of 1.6:1 at band edges. 75 or 80 metre band width on the 5BTV and 6BTV is 80 Khz. under 2 to 1.

We believe that a fixed station antenna is only as good as its ability to stay up. We further believe that the mechanical design of our verticals is superior to any. Large diameter 1¼ inch tubing is used from top to bottom. Our base assembly utilizes a centre tube. With a .315 inch wall thickness, unequaled in the industry. The trap coils are wound around solid one inch diameter fibreglass cores. Our rugged construction is so obvious that we invite you to look at our verticals and compare them to other brands. One glance will convince you.

Solid signals, solid construction and solid value - three solid reasons to purchase a Hustler vertical, from coastal.

"The best antenna there is for HF!"

I have tested the Huster HF Mobile with the rated power and have measured the Q factor and it is the nearest to 300 in any antenna I have seen! I have also fed it with inductive and capacitor matching including both to obtain 50 ohms input on 40/80 mtr and and have a band width of between 50 and 75 kcs compared with other mobiles which had only 10 to 15kc band width. The best antenna there is for HF! Since using the Hustler I have contacted stations in "India VU2TTC", "Sri Lanka 457RO", "Trinidad 9Y4TD", Africa 9X5GC'. "KA1V/TS, 3DAAOBM, Australia VK7OH, Barbados 3P9EM and the Falklands VP8CGH with signal reports ranging between 5/5 to 5/9, as for 9Y4TO who was surprised when I told him I was mobile due to my signal strength. A station in Johannesburg called me "ZS8BEW" as he thought I was in one of the Johannesburg suburbs, this was when I was in contact with KC9B1 we then had a three way contact, not bad from a car don't you think

As for the antenna, I have tried inductive coupling and capacity matching as per ARRL handbook mobile section and this was not needed.

The resonators are very well constructed as so the most which can be used as a 1/4 wave on 6mtr, the band width is as advertised for each band, "as the instructions state 2.1 swr or better", I obtain 1.5 to 1 and less on 10, 15, 20 mHz but what did suprise me was the band width on 80 mtr as with other antennas. I could only move frequency of about 10 kcs either but with this resonator I can move 30 kcs either side of the tuned frequency. Now when i go camping all I take is the required camping equipment and the Hustler antenna which I use with a TM-band adaptor, so I can operate any three frequencies without having to change resonators. The mast is hinged so it can be folded to fit the trunk and apart from that I also use the quick disconnect attachment which I also obtained from Coastal Communications.

To end this letter which sounds like an advert, all I wil say to past, present or future mobile operators is, try this antenna and I can tell you that they will not be disappointed with the results and also excellent service from Coastal Communications.

73 David Hudson, G4WOE E. Sussex

HUSTLER PRICES

4BTV HF Base 10-15-20-40 meters	£142.95
5BTV HF Base 10-15-20-40-80 meters	£160.95
6BTV HF Base 10-15-20-30-40-80 meters	£179.95
RM-10 10m Mobile Resonator 150-250Khz bandwidth 400W	£17.49
RM-15 15 Mobile resonator 100-150Khz bandwidth 400W	£18.49
RM-20 30m Mobile resonator 80-100Khz bandwidth 400W	£26.49
RM-30 30m Mobile resonator 50-60Khz bandwidth 400W	£26.99
RM-40 40m Mobile resonator 40-50Khz bandwidth 400W	£27.49
RM-80m Mobile resonator 25-30Khz bandwiidth 400W	£28.49
RM-10S 10m Mobile resonator 250-400Khz bandwidth 1.5KW	£24.95
RM-15S 15m Mobile resonator 150-200Khz bandwidth 1.5KW	£26.95
RM-20S 20m Mobile resonator 100-150Khz bandwidth 1.5KW	£29.95
RM-40S 40m Mobile resonator 50-80Khz bandwidth 1,5KW	£34.95
RM-80S 80m Mobile resonator 50-60Khz bandwidth 1.5KW	£45.95
MO-1 Mobile mast 54 inches long. tilts at 15 inches	£27.95
MO-2 Mobile mast 54 inches long. tilts at 27 inches	£27.95
MO-3 Mobile mast 54 inches long, solid rubbercoated	£22.95
MO-4 Mobile mast 22 inches long, solid rubbercoated	£19.95

(All masts end in a 3/8 thread, for mounting. Ideal for any strong CB style mount and cable.)
NB Postage/delivery extra as required

COASTAL COMMUNICATIONS

19 Cambridge Road,
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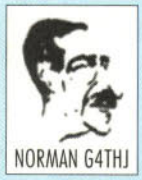
01255 474292

ARE COMMUNICATIONS



ARE...ANNOUNCEMENT...ARE...ANNOUNCEMENT

Hi, I'm Norman, the new boy at ARE.
A lot of you know me from Lee Electronics. Bet you thought I was pushing up the daisies! Wrong, I'm back and waiting to take your hard earned cash off you!

Now for a little background, sorry there aren't any pictures!

As you might be aware, ARE are part of the SMC group and can therefore offer you a vast choice of equipment both new and secondhand at competitive prices plus a varied selection of aerials and accessories, in fact everything you will ever need, radio wise.

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Regards to all,

Norman G4THJ and my faithful assistant Jez

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HF TRANSCEIVERS/AMPLIFIERS

FT902DM	Yaesu	Fair	HF Transceiver Valve PA	£450.00
LA-120	Ham	V.Good	HF 100W amp	£125.00
FT707	Yaesu	Good	HF Transceiver Amateur Bands RX/TX SState	£395.00
TS130S	Kenwood	Good	HF Transceiver	£399.00
FT102	Yaesu	Fair	HF Transceiver PA - 3 x 6416B's	£475.00
FT990DC	Yaesu	Good	HF Transceiver DC Model	£1,350.00
FT747GX	Yaesu	Good	HF 12 v Transceiver	£499.00
TS430S	Kenwood	Good	HF Transceiver	£650.00
TS830S	Kenwood	V.Good	HF Transceiver	£575.00
IC725	Icom	V/Good	HF transceiver, boxed	£624.99
IC726	Icom	V/Good	HF & 6m transceiver, boxed	£699.00
FT747	Yaesu	Good	HF Transceiver	£499.00
TS430S	Kenwood	Mint	HF TX/RX FM, CW filter	£650.00
FT890AT	Yaesu	Mint	HF Transceiver with ATU	£1,199.00

VHF/UHF TRANSCEIVERS

C500	Standard	Good	Dual Band Hand Held	£225.00
IC-P2ET	Icom	Mint	2m Handheld Keypad entry	£189.00
TS60S	Kenwood	V.Good	6m 100w mobile	£750.00
IC2ZE	Icom	Good	2m Handheld	£179.00
IC-W21ET	Icom	V.Good	Dual Band Hand Held	£299.00
FT530	Yaesu	Good	Dual Band Hand Held	£399.00
DJ580E	Alinco	Fair	Dual Band Hand Held	£250.00
FT290R11	Yaesu	Good	2m Multimode, case and charger	£299.00
TS770E	Kenwood	Good	2m / 70cms Base Station	£425.00
FT470	Yaesu	V.Good	2m / 70 cm Handie + charger + mic	£285.00
TH78E	Kenwood	Pristine	2m / 70 cm Handie as new	£325.00
IC125	Icom	Good	Commercial Radio	£80.00
C844	Stand	Fair	Handheld	£50.00
IC02E	Icom	V.Good	2m handheld + Bits	£150.00
FT728	Yaesu	V/Good	Transceiver	£299.00
M40FM	HRC	Good	Transceiver	£45.00
TEMPO		Good	2m handheld	£88.99

DATA/COMPUTER

MICROREAD	E.R.A.	Good	CW, RTTY, Decoder,Tutor	£110.00
5000E	Tono	V.Good	CW / RTTY / Decoder and Sender	£325.00
CD660		Excellent	Data decoder, boxed	

MISCELLANEOUS

AT250	Kenwood	Fair	ATU	£160.00
FAS14R	Yaesu	Good	Remote Antenna Switch	£70.00
PG1	Datong	Good	HF Converter	£65.00
HK703	HiMound	Good	Morse Key Straight	£25.00
BC11	Kenwood	Good	Charger + 2 Batteries	£50.00
LPM144/10	BNOS	Good	2m Linear Amp 10w in 100w out	£149.00
AT230	Kenwood	Mint	Antenna Tuner	£189.00
FC757AT	Yaesu	Good	Automatic ATU	£225.00
AL811X	Ameri	Mint	HF Amp 700watts	£550.00
KG2	Kurani		Pre amp	£44.74
PP1	Icom	Not Working	Phone patch	£139.00
SP520	Trio	Fair	Speaker	£20.00
SW100	Trio	Good	Meter	£49.00
SYNOPTIC	ERA	V.Good	Decoder	£75.00
UC-1	Daton		Convertor	£69.00
VLF	Daton	Good	VLF convertor	£30.00
FL2025	Yaesu	Unused	25 Watt Amp for FT290R11	£210.00
PS30411	Daiwa	As New	25 amp P.S.U unused	£89.00
VF0180	Trio	V.Good	Matching VFO for TS180	£90.00

RECEIVERS

ICR100	Icom	V.Good	Mobile / Base Scanner	£350.00
R5000	Kenwood	Good	HF Receiver + Internal converter	£825.00
AIR7	Sony	V.Good	Airband Scanner	£169.00
R537	Signal	V.Good	Airband Receiver Hand Held	£55.00
ICF PRO80	Sony	Good	Hand Held Shortwave RX	£179.00
2001D	Sony	Good	S/wave receiver	£169.00
FRG7	Yaesu	V/Good	HF receiver - Digital	£200.00
FRG7	Yaesu	V.Good	HF Gen Coverage RX	£165.00
AR1500EX	AOR	Good	Hand Scanner + SSB	£225.00
RF3100	Panas	V.Good	Receiver	£199.00

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ARE

EDITOR'S Keylines

The 'Valve & Vintage' feature has been a popular column since its introduction into *Practical Wireless*. Because of this, it's with regret I have to announce that Ron Ham, the founding author of the column, has decided to retire from writing regularly, although he will still produce the occasional article for the magazine.

It's always been a pleasure to work with Ron. And although I realise that his retirement had to come eventually, I had hoped he would have enjoyed a slightly less onerous workload, by sharing it with a team of authors.

However, now that Ron has decided on retiring from a regular commitment to *PW* everyone on the Editorial team wishes him well and hopes that both he and his wife Joan continue to enjoy their 'retirement'. (In reality they're working their proverbial socks off!).

Good luck Ron and Joan. I've no doubt the beautiful garden at 'Faraday' will blossom even more now!

When a particular person retires from a job, there's often an indication of the work load involved provided by the replacement machine (in the case of industry) or writers in the case of journalism. And in this case, the Editorial team have decided the only way a column such as 'V&V' can be produced in the future...is with a team of authors, each providing their own speciality and diverse interests.

Rotating Authors

The term 'rotating authors' may convince you that we've got ourselves in a real 'spin'....but you'd be wrong! In this context we're continuing an approach we introduced very successfully some time ago with the 'Antenna Workshop' page where a panel of authors each take their turn in presenting their ideas (and specialised expertise) on a regular 'rotating' schedule.

So, we're now introducing the 'authors team' approach to 'V&V'. But to make it work we have to ensure there's a team with expertise and outlook required for the innovation to be successful. With that in mind, I'm pleased to announce that our new team of authors for 'V&V' has been chosen.

A team of three will take it in turn to prepare the 'V&V' column in future. This is because basically it seems that the interest in

valves and valved equipment can be split into three categories (although with softly blurred borders!).

The three categories seem to be valved and vintage amateur and military radio equipment, practical projects and 'things to do with valves' ('gaseous state' technology as Tex Swann G1TEX calls it!) and the really historical side of the subject.

As *PW*'s core subject is amateur radio, it seems only right that the column dealing with valved and vintage equipment should have a licensed radio amateur author who is totally immersed in the subject. That person is Ben Nock G4BXD.

Ben Nock G4BXD

Of course, Ben Nock G4BXD is already well known to *PW* readers, and I'm pleased to say that I've known him for many years. He's an avid buyer, collector and restorer of equipment and buys, repairs and restores every bit of valved and vintage equipment he can find.

Ben is also very well known for his interest in collecting, restoring and writing about valved and vintage military radio gear. I've no doubt this will please the many enthusiasts for military equipment who have already enjoyed this aspect of 'V&V' as written by Ron Ham.

Phil Cadman G4JCP

Phil Cadman G4JCP wrote a very interesting series of articles on 'Using Those Versatile Vacuums' several years ago. Phil crammed an enormous amount of facts, hints and tips into the articles (I know...I sub-edited the series!) and he seems to be just the author for the 'V&V' column covering 'doing things' and projects for valve enthusiasts.

Like many readers (including me) Phil Cadman has fond memories of the renowned *PW* 'Blueprints' which for so many years were given away with the magazine. Phil plans to feature some of these well known designs and discuss how they can be built - even today - by the keen valve and vintage enthusiast. Hopefully this will satisfy the readers who ask us to re-publish the designs!

Charles Miller

Last...but certainly not the least of our new team of authors is Charles Miller. Having written for *PW* regularly in the past, and being an extremely well-known author in his own right with many years of writing experience, Charles doesn't really need much of an introduction from a relative 'Johnny come lately' such as myself.

Along with his experience in writing on the vintage wireless theme, Charles edits his own subscription-only magazine *The Radiophile*. As it's dedicated to the truly historic and vintage scene, the editorial team feel that Charles' experience on *The Radiophile* make him the ideal choice to cover the pre-Second World period on a general radio theme. He's already got some fascinating topics lined up for future issues of *PW*.

So, as we wish Ron Ham well in his retirement in this issue we'll be starting off with the new-look 'Valve & Vintage' with Phil Cadman G4JCP in the September *PW*. And don't forget that if you have any ideas or queries for any of the new authors...you can send them to us at the Editorial offices in Broadstone or write to the authors direct.

Rob Mannion G3XFD

RECEIVING You

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

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

Ham V Prelto....Round II

Dear Sir

Referring to G6QY's suggestion (*PW* June) that the title 'Ham' be replaced by the acronym PRELTO (Private Radio Experimenter - Licensed To Operate), the longer-toothed of us all may recall suggestions by like-minded readers to the correspondence pages of the *RSGB Bulletin* during the immediate post Second World War period. Conceivably the continuation of a pastime enjoyed by those who had latterly held an administrative post in H M Forces or Government Office.

Such was the variance and degree of thought, ingenuity and interpretation concerning amateur radio communication, that one reader's acronym included the letters 'PR' (Public Relations) - by a DXCC member or successful Planning Permission applicant, perhaps.

The universal tribute now given by the media to 'Radio Hams' during emergencies and crises has established their value and potentiality, hence no further designation would seem necessary and certainly, we are not all 'experimenters', as has been suggested.

The title 'Radio Ham' does not denote an inferior status. The four major dictionaries make a distinction between 'Ham' and Radio Ham' or 'Amateur Radio Operator', the media cannot use the former title alone because it is not definitive by itself, ie.. it has several meanings and for us to expect more from them is unrealistic.

Incidentally, for example, *The Concise Dictionary* gives....' (in full, Radio Ham) coll. the operator of an amateur radio station'. Whilst I respect G6QY's stance and well meaning conviction, I think he might consider a re-think of the acronym 'PRELTO'. I would not be happy if mistaken for a member of the latest deviant religious cult from W6 land!

Frank Rose G2FHV
London

Dayton HamVention

Dear Sir

This is just a brief note to express my appreciation of the efforts you personally expended in making my trip to the Dayton HamVention holiday such an enjoyable one. I particularly enjoyed the visit to the Air Force museum and the Imax cinema, although, of course, the Hara Arena and the flea market will forever remain an unforgettable experience, somehow the Leicester Amateur Radio Show will never seem the same again!

I hope that I will be able to maintain contact with Dick N3AOG and Pat WB3DNI who I met at the Hampton Inn, since they share my interests in microwave operating, as well as many others in the *PW* group without whom the trip could not have been so memorable.

Geoff Findon G3TQF
Leicester

★★★★ STAR LETTER ★★★★

Morse Keys

Dear Sir

I was very interested to read in *Practical Wireless* the articles concerning the construction of Morse keys. I was a member of a small unit during the Second World War just outside Cairo.

One of my concerns was to examine and investigate various pieces of apparatus. We were called upon to produce (as quickly as possible) a number of Morse keys.

The Ministry of Supply produced a large number of knobs and discs. Using one of our own keys as a model, it fell to me to produce the necessary jigs to enable the parts to be correctly drilled.

I brought the jigs and a few spare parts home with me. It was your article which caused me to go through my old kit box.

W. H. Edwards
Sheffield

Editor's reply: From your photographs Mr Edwards, you seem to have enough components to start a 'Pyramid' selling organsiation manufacturing Morse keys!

Lynch Letter

Dear Sir

It's not often I write to magazines, but your most recent issue (*PW* May), featuring 'Computing in Radio' was first class. Not only were the articles well written, they were to the point and underline the way in which our hobby is changing as we approach another millennium.

Since February of this year, I have introduced a new area to my shop in London, dedicated to 'Computers in Radio'. Featuring the Peacock brand of PCs, customers can, at their leisure, view a complete wall of the latest computers, ranging from a basic 486DX2-66, to the Pentium 90 Multimedia, costing a considerable amount more.

In April of this year, a further member of staff joinined the 'Lynch Mob' whose specific function is to guide newcomers to 'Computers Versus Radio' and help them to understand just how important the PC is in the modern amateur or s.w.l. shack.

Once again, *PW* has excelled itself in providing a first class insight into how the hobby is steering itself to total computer control - well done!

Martin Lynch
The Amateur Radio Exchange Centre
London

Editor's reply: Thank you Martin! The team strive to create a balance of subjects in the magazine. We're fully aware that there are a multide of specialities within amateur radio, and although readers point out to us that there many computer magazines, but only one *PW*, there's certainly an interest shown in this aspect of our hobby in the magazine. Incidentally, computing-in-radio enthusiasts interested in writing for *PW* may like to know it's the one area where we're short of articles, whether it be feature or constructional. So, contact us for a copy of *PW Author's Guide* and get writing if you want to share your own enjoyment of this aspect of amateur radio with other readers.

New 430MHz Repeater For Southampton?

Dear Sir

Whilst on the Novice course at my local school radio club, there was talk of a new 430MHz repeater for our area. This would help many newly licensed Novices in the area to obtain the very best from their new licence and enjoy the hobby as much as possible.

I've been licensed for two years, still no repeater. A small group of dedicated amateurs have spent many long hours obtaining equipment, a site for the repeater and producing expected coverage maps. The work should not go to waste.

Formal proposes have been sent to the RSGB Repeater Management Group (RMG), but have been rejected because, according to them, we have coverage from another local repeater. It's been off the air twice this year.

It's a pity that the RSGB view coverage to be operational from a mobile rig running low into a quarter wave vertical antenna. How many Novices do you know that can do this?

It seems very odd that the RA are encouraging new people into the hobby of amateur radio and yet our National Society doesn't want to help. Forget the free membership, free books and the free pocket diaries, just give us something that we want, a repeater licence would be nice!

Dave Childs
Southampton

Editorial comment:
We contacted the RSGB's newly appointed RMG's Publicity Officer Ken Baker G3SPX to comment, and give their own point of view on the topics raised in Dave Child's letter. The letter that follows is Ken's reply.

Dear Sir

Thank you for the opportunity to comment upon the matters raised by Dave Childs in his letter to you.

The u.h.f. repeater system in the UK is very comprehensive with over 180 units operational. The southern part of England has many repeaters and the coverage is almost complete.

It is a very dense network and the criteria for u.h.f. repeater coverage are clearly stated in *The Guide to Repeater Licensing,* which states that units should be based roughly upon one unit per 33 kilometre square. This was agreed with the licensing authority in 1976.

The booklet is available to prospective repeater groups from the RSGB headquarters. It also states that u.h.f. repeaters are deemed to be engineered as local units, where as the v.h.f. network fulfils the role of the area coverage roughly equivalent to a county.

As the number of channels is severely limited by the constraints of the many other users on the bands, in many cases in a particular area, the choice of a repeater for a low power hand-held user will be limited. We are trying to reconcile the needs of two distinct categories of users - those like Novices who operate a hand-held rig with low power to a quarter wave and mobile users who use at least 10W to a double or triple five-eighths collinear.

In order to provide a realistic basis for repeater planning, the coverage map produced by the group should show coverage expected for a mobile user with a quarter wave aerial and a 10W transmitter. With a properly sited repeater, this should allow effective hand-held coverage and RMGs experience is that to obtain hand-held coverage of a city like Southampton, the repeater should be sited on a block of flats or similar structure within the centre of the city and use a down tilt antenna system.

Southampton is covered by three repeaters GB3NF, GB3IW and GB3PH. Unfortunately, GB3NF had to close down earlier this year due to the loss of its site. The group are seeking help in finding a suitable alternative and a message to this effect was broadcast in the RSGB news.

This provides a good opportunity to get a repeater sited in the centre of Southampton to improve coverage to hand-held users. The local RMG committee member has been attempting to contact another group in the area who proposed yet another repeater to see if they can join forces with the GB3NF group in order to provide the sort of coverage needed in Southampton.

It clearly states in the *Guide to Repeater Licensing* that no group should start building a repeater until they receive an agreement in principal from RMG. If we were to have criteria that stated repeater coverage was based upon a quarter wave antenna and a 1W transmitter anywhere in the UK we would, I am sure, be talking of a lot more channels. Perhaps amateurs could consider such a network on the 1.3GHz band.

In view of the pressure for more repeaters in the south of the country, RMG have been attempting to negotiate with the RA the use of some low power repeater channels using the 7.6MHz system, which would fulfil the need for more repeater channels, but at present, this is on hold due to DSI proposals. As you will be aware, this document proposes a loss of 4MHz on the 430MHz band, which would preclude the use of the 7.6MHz system.

Another alternative would be to re-plan the existing 430MHz band repeater system by imposing a lower e.r.p. limit on all existing units, perhaps reducing firstly to 10dBW and then to 1dBW e.r.p. This could enable more repeaters to be fitted in the existing channels, but whether it could give blanket coverage to hand-helds everywhere in the UK is doubtful.

Many see the Novice license as a first step into the hobby and any Novice who wishes to use higher power levels and experience other parts of the hobby should be encouraged to progress to the full 'B' or 'A' licence. The Novice licence owes a great deal to the RSGB who carried out the negotiations with the RA in order to produce a workable scheme.

Finally, may I stress that the radio spectrum is under great pressure from commercial areas as evidenced by DSI-2 reports needing radio amateurs and s.w.l.s to join the society, not only to aid the fight for retention and expansion of bands and facilities, but also to speak for the vast majority of radio amateurs in this country. If spectrum pricing were to be adopted in this country, the cost of the spectrum presently enjoyed by radio amateurs would be far beyond the present £15 a year licence fee.

The RMG would be pleased to hear of any comments on the points raised in this letter. Please address your comments to: **The Chairman of Repeater Management Group, Mr G. Dover G4AFJ, 31 Newbold Road, Kirkby Mallory, Leicestershire LE9 7QG.**

Kenneth Baker G3SPX
RMG Publicity Officer

Help Needed

Dear Sir

I am new to the world of s.w.l./amateur radio. I have purchased a transceiver as an incentive to pass the RAE. I once studied for the exam however, in December of 1991 I was sent to the Gulf War. I have since become disabled and am virtually house-bound and cannot do much for myself.

I would like to ask for some advice. Firstly, I use a 132ft long wire in my loft and a half size G5RV above the bungalow. My problem is that I have constant noise with both antennas at signal strength of 9+. I have a 4ft earthing rod and a short run of earth wire from the a.t.u./rig. I have tried various combinations in my loft and the best is seemingly a north-south position of four runs. Is there anything I can do to reduce my noise levels?

I have tried turning everything off (electrical) and it makes no difference whatsoever. I have disconnected my earth, which does not seem to make any difference at all.

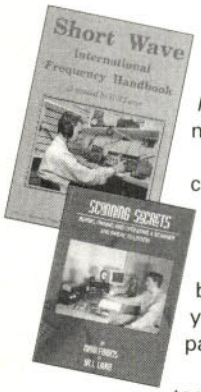
Secondly, I use a Pentium PC 90MHz computer and as soon as I turn it on I get even greater noise level so I cannot use my Badger Board to decode RTTY, etc. I would be most grateful for any help and advice you can offer.

Tony Davidson
Hull

Editor's reply: Tony has an interesting series of problems. Is there anyone in the Hull area who can help? If so, please contact the *PW* office.

NEWS '95

Book News

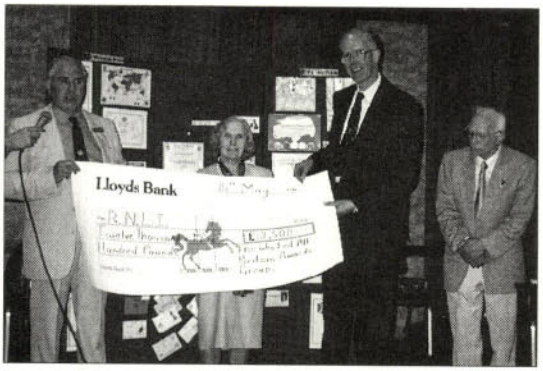


If you were thinking of ordering a copy of *Scanning Secrets* or the *Short Wave International Frequency Handbook* from the *PW* Book Service, now is the time to do it.

Normally, *Scanning Secrets* would cost you £16.95 plus P&P and the *Short Wave International Frequency Guide* would cost you £12.95 plus P&P. However, if you order either of these books between July 13 and August 31 you won't have to pay any postage and packing. (Offer only available in the UK).

So, don't delay place your order today by either using the **Order Form** in this issue or by telephoning our **Credit Card Hotline** on **(01202) 659930**.

Worked All Britain Lifeboat



Anthony Oliver (RNLI) accepting the £12500 cheque from Adrian Keeble G4HPU (WAB Silver Jubilee Award Co-ordinator) at the WAB group's AGM at Drayton Manor Park, on May 14. Mrs Veda Morris (widow of G3ABG) is pictured in the centre with Arnold Matthews G3FZW (Cannock Chase RS) looking on from the side.

The Worked all Britain Awards (WAB) Group recently presented a cheque for £12500 to the Royal National Lifeboat Institution (RNLI). The presentation took place at the WAB's Annual General Meeting at Drayton Manor Park on May 14.

The donation was made possible as a result of the Worked All Britain Awards Group Silver Jubilee Appeal. The Appeal took place over a three year period and funds were raised by a levy on the sale of WAB books, a special Jubilee award, from donations and convenants and the proceeds of a grand draw held in 1994.

Members of the WAB organised special event stations from Lifeboat stations around the country, mobile runs, walks and other radio related activites. Money also came from donations as a result of members selling radio equipment and computer programs.The WAB Committee would like to extend their thanks to all the radio amateurs and short wave listeners and other supporters who have contributed to the Appeal commemorating the WAB's Silver Jubilee.

The money donated to the RNLI will provide a D Class Lifeboat which will be named *C. John Morris DFM G3ABG* in the memory of the late founder of the WAB at a ceremony to be held at the RNLI Headquarters in Poole. The naming ceremony, which will be carried out by G3ABG's widow Veda, will take place during the RNLI's Open Day on Friday July 28 at 2pm and it's open to the public.

Since its foundation in 1969, the WAB group has grown through the voluntary efforts of many individuals. Their motto is 'To assist others' and following this the WAB have made donations to organisations such as the Radio Amateur Invalid and Blind Club and QTI talking newspapers for the blind.

Lifetime membership to the WAB is by the purchase of a WAB book, there is no annual subscription. If you're interested in becoming a member of the Worked All Britain Awards Group you should contact the **Membership Secretary, Brian Morris G4KSQ, 22 Burdell Avenue, Sandhills Estate, Headington, Oxford OX3 8ED** or by joining the Nets 3.76, 7.06, 144.43 or 144.4MHz.

Air Formation Day

Just as this issue of *PW* was going to press, we received notification of the cancellation of the 21 Signal Regiment's Air Formation Signals Open Day. The event was due to be held on July 22 1995 at Colerne Airfield, Wiltshire.

Due to circumstances beyond the 21 Signals Regiment's control, the event has had to be scaled down and will now take place as a Regimental Families Day only. However, it is still hoped to to run the Special Event Station using the call GB4AFS. The 21 Signal Regiment would like to apologise for any inconvenience caused by the change of plans.

A Week Of QRP

During the week of August 28 to September 2 the Marino Institute of Education in Dublin, Ireland plays host to International QRP Week. The Marino Institute is situated close to Dublin Airport and the city centre and should provide a comfortable and scenic setting for the week's QRP activities.

During the week's programme there will be two major presentations by George Dobbs G3RJV on Practical Electronics and Engineering Laboratory Workshops as well as a fully operational QRP Station (EI3RJV). The programme will include plenty of free time to give you the opportunity to explore the area around the Marino Institute.

The cost for attending this QRP event is: £125 per person for the whole week (Monday morning to Saturday lunchtime, for an extra £10 you can stay on the 27th) or £28 per day per person which includes bed, breakfast, four course lunch, coffee/tea breaks plus all the activities.

For more information and an application form contact **Gerardine Quinn, Marino Institute of Education, Griffith Avenue, Dublin 9, Ireland. Tel (from uk): 00-353-1-833-5111, FAX: 00-353-1-833-5290, Email: donalmie@gpo.iol.ie**

Cricklewood Catalogue

Cricklewood Electronics Ltd. now have copies of their 17th catalogue available. This 1995 edition contains a wide variety of components and features new ranges in audio, video, security and computer hardware, as well as an extended range of test equipment and tools.

The catalogue also contains £30 worth of money off vouchers. There are five £1 discount vouchers which can be used against orders of £15 or more and five £5 discount vouchers for use against orders of £60 or more.

The Cricklewood catalogue is available for **£2.50** or is **free** to companies and schools. To get your copy contact **Cricklewood Electronics Ltd., 40-42 Cricklewood Broadway, London NW2 3ET. Tel: 0181-450 0995 or 0181-452 0161** or **FAX: 0181-208 1441.**

£50 Winner

The Winner of the £50 Prize Draw as featured in the Book Service pages of the June issue of *Practical Wireless* was **E. D. Beston** of **Berkshire**.

Don't forget we offer a comprehensive list of books for the radio amateur, short wave listener and electronics enthusiast. See pages 71-74 of this issue.

Antenna Coupling

Alan Lake G4DVW has informed the 'Newsdesk' of a new Antenna Coupling Transformer he's just added to the Lake Electronics range. The CT400 is a broad-band component which has been designed to allow the use of standard coaxial feeder in conjunciton with any end-fed wire antenna.

When fitted into a convenient enclose and connected between the antenna and coaxial cable, the CT400 will work with any receiver, in any mode and on any of the h.f. bands. The CT400 is supplied with full instructions and costs just £6.75 plus £1 P&P.

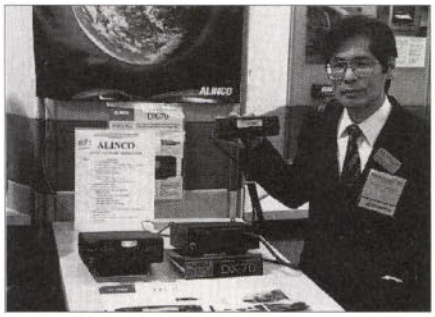
If you'd like to order a CT400 contact **Lake Electronics at 7 Middleton Close, Nuthall, Nottingham NG16 1BX. Tel: 0115-938 2509**. More details on the CT400 can be obtained on receipt of an s.s.a.e.

Dayton '95

Jeff Stanton G6XYU provides the following report on the 1995 Dayton HamVention.

A unique event occurred at the Dayton 1995 HamVention, the largest amateur radio show in the world. It didn't rain! (Well not much anyway).

Between April 28 & 30th thousands of radio enthusiasts from all over the world made the pilgrimage to the Hara Arena. They went to see everything new in radio and an incredibly large 'flea' market with more than 1000 stalls selling everything from wartime aircraft transceivers to the latest in packet radio.



At the 1995 Dayton HamVention the new Alinco DX-70 h.f. transceiver was displayed and the designer Mr Hirohata JA3XGS flew in especially for the show.

Kenwood, Yaesu, Icom, Alinco and the major American manufacturers displayed their wares in a show which took all three days to see properly. As in previous years, a party of enthusiasts from the UK joined *PW*'s **Rob Mannion G3XFD, Donna Vincent G7TZB** and **Kathy Moore** on an organised trip to Dayton and came back loaded with bargains!

Next year, 1996, the HamVention will be staged later, in May, which should guarantee good weather and an even bigger attendance! **G6XYU**

Another Alinco

With Alinco Electronics already having launched several new radios this year we didn't think there could be more on the way - but there is! Following the huge success of the DJ-580 Alinco have launched its replacment, the DJ-G5.

The DJ-G5, described as a compact dual-band hand-held was officially launched at the Dayton HamVention in April. It is said to include many new features.

The DJ-G5 offers full transmit coverage on 144 and 430MHz plus wide-band receive, has built-in CTCSS tone encode and decode, a total of 200 memory channels and a new high efficiency power MOSFET designed to give high output even with a low battery voltage. Other features include: a channel scope facility that allows the user to monitor five channels above and below the displayed frequency or five memories in any mode or any frequency either side to the one displayed together with a central l.c.d. display with illuminated keypad.

The UK distributors Waters & Stanton Electronics say they are expecting first stocks of the DJ-G5 in early July and that the price has been provisionally fixed at £479. *Practical Wireless* hopes to review the DJ-G5 as soon as possible and more information can be obtained direct from **Waters & Stanton on (01702) 206835.**

Jamboree News

The 18th World Scouting Jamboree is taking place in the Netherlands from August 1 to 11th and is expected to attract over 25 000 Scouts from all over the world. The site of the Jamboree is near to the town of Dronten which is 40km east of Amsterdam at the bottom of the former Ijsselmeer, which has fortunately now been drained, but just hope it doesn't rain!

Ever since 1957 the World Jamboree's has run an amateur radio station and has enabled Scouts to experience radio contact. This year's station will be on the air continuously during the event using the callsign PA6WSJ.

Scouts attending the World Jamboree will be able to use the radio equipment. The following is a list of frequencies and times which will offer the best contacts: Australia & New Zealand on 14MHz at 0800-1000; South East Asia on 14MHz, 0800-1400; Africa on 21 & 14MHz, 1700-2000; North America on 14MHz, 2000-2400; South America on 21 & 14MHz, 2000-2400; Europe on 7 & 3.5MHz, 0900-1800. World Scout frequencies will be used throughout.

For more information on the World Jamboree contact the **Jamboree Secretariat, c/o Amateur Radio 4.72.01, PO Box 1995, NL-3830 EZ Leusden, Netherlands.**

Sharing Printer Links

South Midlands Communications of Hampshire are currently distributing a new printer sharing system. The Auto Link LU7000RX and LU7000TX allow one printer to be shared by up to four computers.

The LU7000RX is fitted to the Centronics connector of your printer and takes its power from that socket. It has four telephone style sockets and is capable of accepting data from up to four PCs. The LU7000TX takes its power from the 25pin parallel printer port on a PC and is supplied with a 5m length of telephone style connecting lead.

Both Auto Link modules are sold separately to allow for the possible expansion of your printer sharing set-up at a later date. The LU7000 series connectors are available for £19.95 each plus VAT from **South Midlands Communications Ltd., S. M. House, School Close, Chandlers Ford Industrial Estate, Eastleigh, Hampshire SO53 4BY. Tel: (01703) 255111.**

Editorial note: *Mike Richards G4WNC has a review of the Auto Link LU7000RX/TX in this month's 'Bits & Bytes' column.*

High Frequency Convention

The 1995 RSGB International HF Convention is being held on September 9 & 10th at the Beaumont Conference Centre, situated a few minutes from the M25 and Heathrow Airport. The conference is once again being organised by the HF Committee of the Radio Society of Great Britain in connection with the HF Contest & IOTA commitees and the Chiltern DX Club.

The programme for the HF Convention will include talks on DXpeditions, equipment, IOTA, DX-Clusters, EMC HF DXing, Antennas and Contesting. There are to be displays of the latest radio equipment from major manufacturers as well as the presentation of the Young Amateur of the Year Award.

A full prospectus and booking form for the Convention will be available shortly from **Marcia Brimson, RSGB HQ, Lambda House, Cranborne Road, Potters Bar, Hertfordshire EN6 3JE.**

Please enclose an s.a.e.

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DR-130	~~£369.00~~	£299.95
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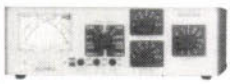

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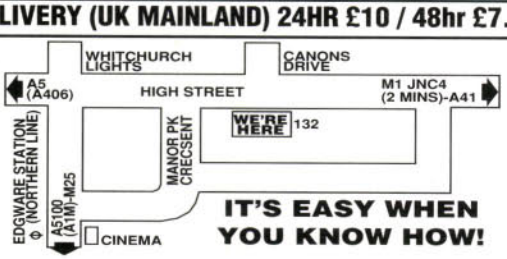

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2m H/Held amp
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Pocket VHF/UHF SWR/PWR meter.144-440MHz (60W)

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Top rated digital audio/data filter OUR PRICE **£229.95**

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FT-990DC	ex-demo	£1549.00	PK-232	VGC	£119.95	ICF-2001D	VGC	£219.95
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NOVICE Natter

Elaine Richards G4LFM has more hints and tips for you from the 'natterings' she's received this month.

For Radio Beginners of all Ages.

Elaine Richards G4LFM, PO Box 1863, Ringwood, Hants BH24 3XD.

This month Elaine Richards G4LFM looks at special event stations, has some ideas for some summer reading and asks if you've ever thought about joining RAYNET.

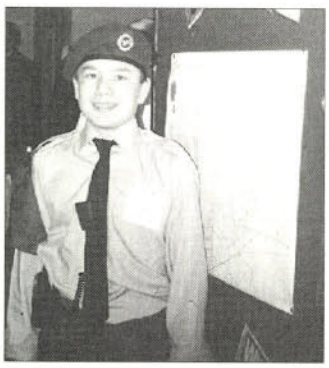
Air Cadets Radio

Whilst at the London Amateur radio Show in March I met **Alex Genner 2E1DBP** from 57 Squadron ATC, Potters Bar. I didn't realise that the Air Training Corps (ATC) did any amateur radio work, I thought they just had their own communications. How misguided can you get?

The Air Training Corps is a national Voluntary Youth Organisation aimed at encouraging a practical interest in aviation, adventure and sport. It's for 13 to 18 year olds, both young men and women.

Another activity that the ATC get involved in is tuition in radio operations. The ATC Cadets don't need a Novice Licence to get on the air as the RAF have allocated several frequencies to the ATC.

There is an assortment of frequencies in the h.f. and v.h.f. bands as well as two spot frequencies in the 430MHz amateur band. Many ATC groups have Novice classes too, which makes for interesting radio work.



Alex Genner 2E1DBP is an Air Cadet from the 57 Squadron based at Potters Bar.

Once again the Air Cadets will be helping during Flight Activities Week at the RAF Museum, Hendon between August 12 and 20. The callsign for the event will be **GB4ATC**.

If you're interested in getting involved with the ATC, then either contact your local group - the public library should be able to help you there - or ATC HQ on **(01949) 20771 ext. 7350**.

Special Event Stations

I enjoy logging and hunting special event stations. For a start they feature some of the most interesting QSL cards and are often on air long enough for you to be sure of the station and all its details. The trouble is they are not always easy to find if you don't know which ones are likely to be on the air.

I've been sent some details of several stations that are going to be on the air over the summer. The National Trust is celebrating its Centenary and so there are a whole range of special stations using the callsign **GB100NT** from all over the country.

Date	Location	Radio Club Involved
July 8/9	Flatford Mill	Colchester ARC
July 15/16	Orford Ness	Leiston ARC
July 22/23	Penrhyn Castle	Dragon ARC
July 29/30	Patterson's Spade Mill	Ballymena ARC
August 5/6	Ickworth	Bury St Edmunds ARS
August 12/13	Wimpole Hall	Cambridge & District ARC
August 19/20	Sheringham Park	N.Norfolk ARG
August 26/27	Aberdulais Falls	Swansea ARC and Port Talbot ARS
September 2/3	Calke Abbey	S.Derbyshire and Ashby WARG
September 9/10	Mullion Cove	Poldhu ARC

The QSL address for all the GB100NT stations is **Roger Powell G4VAA**. Don't forget that all these stations are run by volunteers and I'm sure they wouldn't say no to a bit more help - even if all you can do is make the coffee and tea.

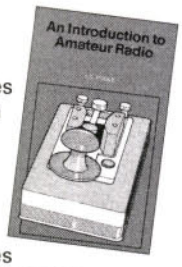
Why not contact the club nearest you and introduce yourself. I'm sure they'll welcome any new helpers!

Summer Reading

With the long summer holidays ahead of us, it's time to think of holiday reading. Whilst I'm sure there must be a dozen new novels out at the moment, how about turning your attention to a technical book?

I've picked out two Babani books by Ian Poole G3YWX as good starters. They aren't too heavy as they are written in a mainly non-technical style.

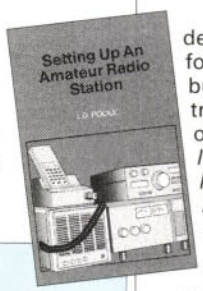
The first one I read was *An Introduction to Amateur Radio*. It's not an expensive book at £3.50, but with about 140 pages of writing will take a while to get through.



The book starts with the question 'What is Amateur radio?' and discusses the beginnings of the hobby and where it's going now. After that the author moves on to deal with things like the type of transmissions you could use, the jargon you will hear and on through to the various bands you can be licensed for.

The book goes on to talk about receivers, transmitters, antennas and finally how to get started. It's assumed that the reader will be a non-licensed person interested in taking up the hobby.

I found it interesting as it deals with topics that I take for granted, such as do you buy a receiver first or a transceiver in anticipation of getting your licence. *An Introduction to Amateur Radio* is available from the ***PW* Book Service** for **£3.50 plus £1 P&P (UK), £1.75 P&P (overseas)**.



The other book I thought was a good one to read is *Setting Up An Amateur Radio Station*. How to set-up your station, what should I buy first, what is the best antenna, what test equipment is essential? - all these questions are ones frequently asked by those just starting out. The book discusses all these questions along with ones like, do I buy new or second-hand?

The author takes the time to explain why he makes decisions about the antenna choice and also how to use the test equipment chosen. If you are just starting out in the hobby, the summer months are a good time to do all the reading and planning so that you can spend the long winter months actually getting going.

Setting Up An Amateur Radio Station is just **£3.95 plus P&P** from the ***PW* Book Service**

First Steps

RAYNET

Not everyone who has started in the radio hobby will know what RAYNET is all about. I expect many of you will have heard the name, but what is it and why does it exist? Well, RAYNET (or Radio Amateur's Emergency Network) is a national body of volunteer radio amateurs who will provide communications in times of emergency and disaster.

History

The RAYNET organisation was formed after a disaster on the east coast in 1953. During severe flooding, radio amateurs provided emergency communications.

According to the amateur licence, amateurs are not allowed to pass on messages for third parties. So, agreement had to be reached so that third party messages on behalf of 'user services' was permissible. The list of 'user services' are those such as police, fire brigade, British Red Cross, St John Ambulance, government bodies, etc.

Get Involved

If you decide to get involved with RAYNET, you will have to have an agreement with your employer so that they will release you from work if an emergency arises. Obviously, training is important with a volunteer group like this.

The RAYNET organisation provide local training exercises and also provide additional communication at events like fun runs, marathons, car rallies, yacht races, Scout and Guide events, etc. This is an ideal time for them to hone their message handling techniques and to make sure that events such as these pass without incident.

It is vital that all members of the group know how to pass a message and how to receive them accurately too. If ever a RAYNET group is called upon in an emergency then this training will be invaluable.

There are about 3000 RAYNET members country-wide and these are all organised into local groups. All the groups have a controller and there are Country and Regional controllers too.

Communications In Disaster

The members of RAYNET have provided communications in disasters such as Zeebrugge and Lockerbie as well as smaller, more local, emergencies. Overseas work has involved passing on messages from disaster hit countries to relatives here.

If you think you'd be interested in helping with the work of RAYNET then you need to contact the Zonal Co-ordinator nearest you. The following is a list of Zonal Co-ordinators throughout the UK.

Zonal Co-ordinator	Address
Frank McLoughlin G1GAD	21 Darwin Crescent, Gosforth, Newcastle upon Tyne NE3 4TT
Brian Tindall G4HVA	Hunters Moon, Newton-le-Willows, Bedale, North Yorkshire DL8 1SX
Dave Hocking G4FSS	10 Garfit Road, Mirby Muxloe, Leicester LE3 2DE.
David T Seabrook G6HPY	Lyndene, 5 Mill View, Gazeley, Newmarket, Cambs CB8 8RN.
David Whiteman G1ADW	17 May Close, Chessington, Surrey KT9 2AP.
Cthy M Clark G1GQJ	9 Conigre, Chinnor, Oxon OX9 4PY.
Chris Hampson G8RXA,	7 Merryfield Close, Bransgore, Christchurch, Dorset BH23 8BS.
C. Madeley Smith G8KVU,	48 Sherbourne Crescent, Coundon, Coventry CV5 8LE.
David G C Hicks G6IFA	Beggars Roost, 12 Toll Bar Road, Christleton, Chester CH3 5QX.
Iain Stracham GM4FLP	Hope Cottage, 238 Coupar Angus Road, Muirhead, Dundee DD2 5QN.
Tom Stewart GM0BKX	104 Barrhill Road, Cumnock, Ayrshire KA18 1PU.

Novice Fund Raising

Robert Snary G4OBE has found a way of fund raising to help with the costs of his extra *Novice Training Notes* and *Worksheets*. He has been given a large number of ZTX753 transistors when Ferguson's closed down their factory in Enfield.

Robert says the transistors are ideal for keying on c.w. sets and great for the QRP operator. They are mounted in a cardboard Bandelier and have come direct from the production line.

If anyone would like some of these transistors, they are available for 50p plus a self addressed label for 10 transistors from **Robert Snary G4OBE, 12 Borden Avenue, Enfield, Middlesex EN1 2BZ**.

The specification for the ZTX753 transistors is: General purpose high current *pnp* small signal transistors; E-line case; Ic = 2A; Po(max) 1W; Vce (max) -100V; Vcb max -120V; hfe 100-300 at Ic = 0.5A, Vce -2V and F_t 140MHz.

Oh yes, if you do take up this offer from Robert, drop me a line with details of how you are using the transistor. Best idea gets a prize from the Editorial Office!

Competition Results

The 'Time Check' competition, which I ran in the May issue of *PW* to win a multipurpose l.c.d. clock timer donated by Maplin Electronics has now closed. The answers were: **Q1**: 1955; **Q2**: +12.

The first three names out of the biscuit tin were: **John Bytheway 2E1DVE, Dorset**; **Mr Rigby, Lancs** and **Eric Parvin, York**. The Editorial Office will be organising the dispatch of your prizes. Many thanks to those who entered.

That's all the 'natterings' I have for you this month. Don't forget I look forward to receiving your letters and suggestions for this column, so get writing and let me know what you've been up to in the world of radio. All letters to the address at the top of the column please.

Cheerio for now.

Elaine G4LFM

LISTENING TO

New from JPS Communications

JPS, leaders in the field of DSP filter technology now introduce the ANC4 Antenna Noise Canceller

*The **ANC4** cancels noise from:*

* Power lines
* Computers
* TV sets
* Refrigerators
* and many other electrical appliances

The **ANC4** is an r.f. device designed to provide cancellation of locally-generated noise from signals received by a primary antenna. The unit is employed right at the antenna connector of the receiver or transceiver to cancel locally-generated noise, to allow reception of signals well below the noise level induced by the local interference. This will typically give you a 40dB drop in interference signal level, so you can see just how effective it is!

This unit may be used with any receiver or transceiver with r.f. power out put of 150W p.e.p. or less. An r.f. detector built into the unit automatically bypasses the network whenever transmit r.f. is detected. This unit is NOT designed to be used at the output of a high power linear power amplifier, but must be installed at the lower r.f. level of the transceiver, if transmitting is anticipated.

Controls are provided on the front panel to allow adjustment of both the phase and magnitude of the local interference, providing extremely deep cancellation of the offending interference.

The unit connects between the main station antenna and the receiver antenna connector. The d.c. power mating connector for the **ANC4** is supplied with each unit. UHF (SO239), which mates with a PL259 plug) connectors are used for the outside antenna and the output to the receiver. A short wire antenna and a short collapsible unit to act as the noise pick-up antenna.

Also from JPS is the new NIR12 - a true state-of-the-art DSP audio filter.

***NIR12** Professional Dual DSP Noise and Interference Reduction Unit.*

★ Digs out weak, difficult to read signals
★ Both spectral subtraction and dynamic peaking noise reduction provided
★ Operates on audio from any radio receiver
★ All modes useable simultaneously
★ Greatly reduces listener fatigue
★ Manual and automatic NIR control
★ Dual digital signal processors
★ Notch filter removes all tones from voice signals, including c.w. and RTTY
★ Access to the dual d.s.p.s via RS232 for experimenters
★ **SPECIAL OFFER** – previous model NIR10 £299 to clear. While stocks last.

INTERNET ADDRESS:
orders@lowe.demon.co.uk
info@lowe.demon.co.uk
New check out Lowes new pages on the World Wide Web
http://www. demon.co.u.k/lowe/index. html

BERKSHIRE
3 Weavers Walk
Northbrook Street
Newbury
Tel: (01635) 522122

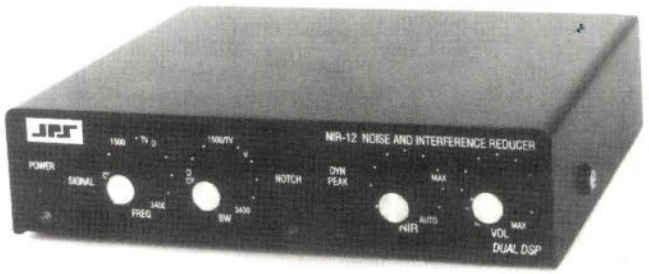
NORTH EAST
Mitford House
Newcastle Int. Airport
Newcastle Upon Tyne
Tel: (01661) 860418

WALES & WEST
79/81 Gloucester Rd
Patchway
Bristol
Tel: 0117-931 5263

LOWE

Lo
Chesterfield Road

THE WORLD



The **NIR12** is an advanced audio signal processor designed to provide the user with maximum flexibility of removing interference from voice, c.w. and data transmissions. The unit uses dual Digital Signal Processing (DSP) to provide simultaneous bandpass operation, noise reduction and multiple tone/heterodyne removal. The special notch filter provides cancellation of multiple heterodynes from tune-ups adjacent carriers, c.w., RTTY or similar signals without interfering with voice signals when a voice bandwidth has been selected. The notch filter operates in five milliseconds or less. A multi layer printed circuit board provides superior shielding to virtually eliminate r.f. radiation from the DSP data bus.

For experimenters, access to the dual DSPs is provided via RS232 on an internal header. A section in the manual is devoted to describing how to use this input to generate your own filters and develop other uses for the dual DSP chips.

This is the ultimate DSP unit! If you haven't already invested in a d.s.p. filter, try this one out. By the time this ad appears we should have received our first batch - make sure you're one of the first and give us a call right now to reserve yours. Just £399 will get you the ultimate DSP.

Vårgårda Radio AB

All good things come in threes and our third bit of good news this month is that we've just been appointed UK distributors for the Vargarda range of antennas and what's more, our tremendous buying power has enabled us to make quite a few price reductions across the range. If you've never considered a Vargarda Antenna before, now's the time. These Swedish made antenna use superb quality materials and are really built to last. Long spacing between elements ensures higher gain for a smaller number of elements and gains figures are quoted in real dBs, not 'isotropic', so don't be fooled by the numbers when comparing them with other makes. If we are going to make any comparisons, I guess we could call Vargarda the 'Volvo' of the antenna world - we'll leave you to decide who the 2CV is!

	Model	Description	Boom Length	Gain	Price
2m antennas	VDIP2	144MHz vertical dipole	0.15m	0	**£30.00**
	HDIP2	Horizontal dipole 2m	0.15m	0	**£35.00**
	Active2	2-ele 2m beam	0.4m	5dBd	**£30.00**
	3EL2	2-ele 2m beam	0.8m	7dBd	**£35.00**
	6EL2	6-ele 2m beam	2.25m	10dBd	**£45.00**
	9EL2	9-ele 2m beam	4.5m	13.0	**£60.00**
70cm antennas	VDIP70	vertical dipole 70cm	0.15m	0	**£30.00**
	HDIP70	horizontal dipole 70cm	0.15m	0	**£35.00**
	6EL70	6-ele 70cm beam	1.0m	10dBd	**£35.00**
	13EL70	13-ele 70cm beam	2.5m	13dBd	**£50.00**
	19EL70	19-ele 70cm beam	3.95	14.5dBd	**£75.00**
6m antennas	3EL6	3-ele 50MHz beam	1.7m	7dBd	**£80.00**
	5EL6	5-ele 50MHz beam	3.6m	9dBd	**£120.00**
4m antennas	3EL4	3-ele 70MHz beam	1.6M	7DBD	**£70.00**

SOUTH EAST
Communications Hse.
Chatham Road
Sandling, Maidstone
Tel: (01622) 692773

YORKSHIRE
No. 12 Station Road
Crossgates
Leeds
Tel: 0113-232 8400

SOUTH WEST
117 Beaumont Road
St. Judes
Plymouth
Tel: (01752) 257224

EAST ANGLIA
152 High Street
Chesterton
Cambridge
Tel: (01223) 311230

ve Electronics

, Matlock, Derbyshire DE4 5LE Tel: (01629) 580800 Fax: (01629) 580020

CLUB Spotlight

Send your information to the 'Club Spotlight' newshound Zoë Shortland at the PW Offices.

Scouting Around

During the Easter weekend April 14-17th, the **Torfaen Scouts Amateur Radio Club** provided an Amateur Radio Station for the 72 Welsh Scouts that are to attend the World Scout Jamboree in Holland this coming August. The station operators were **Bill GW0FGO**, **Richard GW0VAW** and **Dave GW8SZL**.

The campsite/station was located in the Black Mountains on the eastern side of the Brecon Beacons. This turned out to be a rare WAB square - SO22. NGR: SO257257, WW Locator IO81LW.

The station was set-up using an FT-980 running 100W into an 'old faithful' G5RV antenna. There were also two packet stations, one in the shack and another in a tent at the other end of the campsite.

The reason for the packet operation is that many of the youngsters today prefer to 'talk' using the keyboard, rather than on a microphone. The Scouts were soon communicating with each over the packet system and as the club were located in a valley, there didn't seem to be much chance of reaching anyone else.

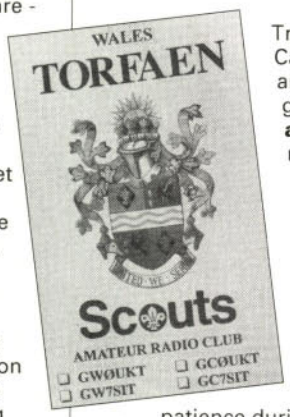
At the end of the first day, Dave GW8SZL (Computer/Packet Manager) conducted a few tests and actually found a route out of the valley using 144.650MHz. The following day saw a sudden increase in the number of visitors to the packet system located in the tent.

The interest was due to Dave connecting to an 'outside' station and the Scouts were suitably impressed. Dave also managed a connection to a BBS and was able to demonstrate how packet messages can be distributed world-wide.

On 3.5MHz, activity was mostly h.f., as this provided inter-G contacts and by using the club callsign GC0UKT/P allowed the club to get Scouts to pass greetings messages (yes, they did use a microphone!). Conditions changed quite rapidly, but many contacts were made and the scouts were kept quite busy.

A link-up was also obtained with scouts at Milton Keynes (GX0SMK). It was great fun for the scouts to hear other scouts pass their greetings messages.

The Torfaen Scouts Amateur Radio Club were very pleased to have been asked to participate in the Welsh Scout



Training Camp and are very grateful to **all** of the radio amateurs who took the time and trouble to make contact with them. Their patience during long 'overs' was very much appreciated.

The Torfaen Scouts ARC will always welcome any radio amateur that would like to help out with Radio Scouting activities. You can contact **Dave GW8SZL @ GB7IMB** (Packet Manager) or direct to the Secretary **Richard GW0VAW** for more information.

Steaming Ahead

The **Scarborough Special Events Group** will commence their summer season of Special Event Stations by celebrating the 150th anniversary of the opening of the Scarborough to York Railway line during the weekend on July 8-9 1995.

George Hudson's York and Midland Railway Company built the 42 mile line in less than a year and sparked the dramatic development of the resort as a tourist destination. A carnival atmosphere swamped the town on July 7 1845 when the 'Hudson' and 'Lion' steam locomotives, drawing 35 first class carriages, completed the journey between the coast and the county's capital city.

The Special Event Station will be on the air as part of a week's celebrations, culminating in a series of trips between Scarborough and York by the steam locomotive 'George Stephenson'. A special full coloured QSL card will be issued to celebrate the occasion and will be number 11 in the Group's series of commemorative QSL cards.

Operation of the special event station will be around 3.725 and 7.055MHz s.s.b. on the h.f. bands, plus a c.w. station and 144/430MHz activity. The callsign GB150SY has been requested from the RA.

Further information on this event can be obtained from **Roy Clayton G4SSH, 9 Green Island, Irton, Scarborough YO12 4RN.**

Peter G3JBR, Roy G4SSH, Andrew 2E1AUZ and Phil 2E0ABI (L to R) alongside 'George Stephenson'.

Aid For Croatia

Members of the **Bromsgrove Amateur Radio Society** (BARS), recently provided a full set of h.f. equipment to the war-torn Croatian town of Lipik, in a bid to bring a little joy to the school children there. Members of the Bromsgrove Society decided to help the children, and fellow Croatian radio amateur **Professor Biscanin**, (Headmaster), after hearing of their plight from Bromsgroves **Dr. Tony Pratt**, Director of Aid International Direct, which is a charitable organisation providing aid to Croatia and Bosnia.

John Yarnall G1JLQ (BARS Chairman) handing the equipment over to Dr. Tony Pratt, watched by BARS Secretary Barry Taylor G0TPG.

Before the war, the Croatian school ran a very successful and enthusiastic amateur radio station, which was destroyed by Serb and Croatian invasions. The new station will provide the town with a vital means of communications with the outside world.

Dr. Pratt took the equipment with him on an aid trip at the end of February. The members of Bromsgrove Amateur Radio Society are now awaiting the first contact.

The rig supplied was a Kenwood TS-830S h.f. transceiver, which BARS had serviced and tested, plus the usual ancillary equipment, including an a.t.u., s.w.r./power meter, c.w. key, headphones, desk microphone, etc. The antenna, a full size G5RV plus coaxial feeder and all connections, was very kindly donated by DeeComm of Brierley Hill.

The Bromsgrove Amateur Radio Society is now 12 years old and has 15 full members, who are very friendly and helpful, especially to their fellow amateurs. Meetings are held on the 2nd and 4th Tuesday of each month at the **Lickey End Social Club, Alcester Road, Burcot, Bromsgrove**. The Secretary is **Barry Taylor** and he can be contacted on **(01527) 542266.**

Rooster Net Breakfast

Members of the Devon 'Rooster Net' showing (L to R) George K4DSB and Ray G0KZQ in the front row.

Paddy G0TQR shares his story of GB3WD and the 'Rooster Net'.

After I retired from the armed services, I put my roots down in south west England and after finding a job, set about getting myself a hobby. As I'd been interested in s.w.l. from about the age of 13, I thought I'd give the RAE a go, to see if I could get on the air and talk to some of those amateurs that I'd listened to for all those years.

I got my pass and soon got myself a hand-held, which I fitted into the car along with a 5λ8 whip. So now for the real test, would anyone speak to me? I put out a call on the local repeater 'Whiskey Delta' and was soon chatting away with some of the locals.

As I made my way to work each morning, which is about 11 miles from my QTH, I spoke with many of the local amateurs in the area. One of the leading lights on the Net was **Ray G0KZQ**, who acted as a sort of Net controller and kept everyone informed about everything from the weather to whose turn it was to speak next.

Ray would come on air at about 0630 until 0900 and knew exactly where everyone was and how long they would be on the road before arriving at work. A typical response from Ray would be 'We better bring Paddy in as he must be at the Derriford Roundabout and hasn't got too far to run', and you could bet your bottom dollar he wouldn't be far wrong!

One morning on the way to work, a strange voice was heard, it was **George K4DSB** who was over on holiday from the USA. George had been to Plymouth many times over the years, and had in fact married a local girl, Pattie, who he had met when over here with the US Navy.

George told us all about the Net in Florida they called the 'Rooster Net' and how that once a month they would hold a breakfast so that everyone could meet up and have a chat. George and his good lady Pattie returned to the States, and Ray thought he'd try and get a 'Rooster Breakfast' off the ground, over here in the west country.

That was over two years ago now, and since then, usually on the first Saturday of the month, a breakfast is held at a different location somewhere either in Devon or Cornwall. The most we have had at one of these gatherings is about 45.

The 'Rooster Breakfast' has been a huge success and we've had s.w.l.s, and amateurs from other countries who have been here on holiday come along for support. There are no fees, you don't even have to have breakfast, just a cup of tea if you like.

Since I have moved down to the south west, I have been impressed by the good manners and all the help I have received from everyone who uses GB3WD. I have now got my Morse, but still use 'WD' every day as that is where I met most of my new friends.

So, if you are coming this way for your holidays, tune into GB3WD and find out where the next 'Rooster Breakfast' is being held. Come along, you'll be in for a pleasant surprise!

Peak 95

During the week of July 29 to August 5, the **South Notts Amateur Radio Club** (SNARC) are operating the special event station **GB2PIC** to celebrate Peak 95. Peak 95 is a Scout and Guide Camp, held every five years, in the grounds of Chatsworth House in the Derbyshire Peak District National Park, the ancestral home of the Duke of Devonshire.

The event will be attended by approximately 6000 scouts and guides from all over the world. The special event station GB2PIC will be operating on h.f. and v.h.f. and will QSL direct via **SNARC, PO Box 4, Clifton, Nottingham NG11 9DE** or via the RSGB QSL bureau.

New Era

Group photo of members and guests at the official opening of the Barry Amateur Radio Society.

Chairman of the Barry Amateur Radio Society Glyn Jones GW0AGA handing the scissors to Clive Trotman GW4YKL before ceremoniously cutting the tape and declaring the shack officially open. Colin Dunkley, Mayor of Vale of Glamorgan Council is shown on the far right.

Thursday May 18 marked a new era for the **Barry Amateur Radio Society**, when **Clive Trotman GW4YKL**, President of the RSGB, together with the Mayor of the Vale of Glamorgan presided at the official opening of their radio shack. The President, in his speech, recalled the time years ago when the Barry Club was a flourishing well attended concern, and was pleased to learn that after some years in the 'doldrums' and at one stage almost becoming extinct, was now staging a comeback.

A new management team ably led by **Glyn Jones GW0ANA** has, in the space of barely seven months, revived the club's fortunes, found a venue in beautiful surroundings at Sully on the Bristol Channel coast barely three quarters of a mile from the spot where Marconi made history in May 1897 by exchanging radio messages across open water.

The shack was formerly a disused storeroom and was converted with the assistance of club members to well laid plans masterminded by **Jorge GW0AGA**, the incumbent Shack Manager. The future looks very promising with lots of interest being shown, membership increasing and emphasis being placed on future activities, which will surely reflect those aspect of our hobby, which perhaps in the past had tended to become neglected.

Air Cadets Airborne

At this year's Royal Tournament, the **Air Training Corps** will be operating an h.f. special event radio station. This station will be on air between 1100 and 2200 hours local time, for the duration of the Tournament, which is being held on the July 18 to 29 1995.

Air Cadets will be on hand to pass and receive greetings messages. Alongside will be a demonstration station operated by Air Cadets, using their own allocated Air Cadet frequencies.

Further information can be obtained from **Malcom Wood, 12 Lime Tree Walk, Enfield, Middlesex EN2 0TJ** or by telephoning **0171-438 6053.**

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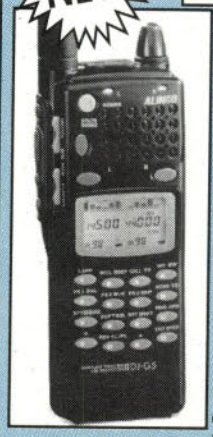
NEW

DJ-G5 2m / 70cms



The new dual bander from ALINCO has been released. What a specification! Don't consider anything else until you have received the full story!

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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 you'll be amazed at all its hidden features. Send today for full details of tomorrow's handheld.

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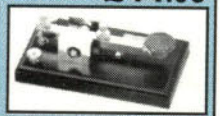

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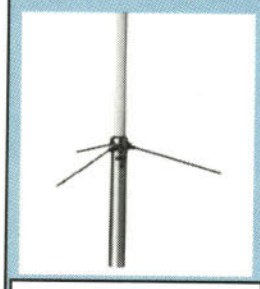

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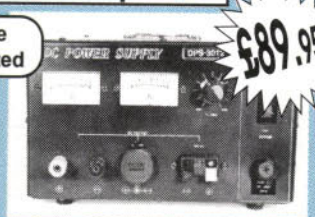

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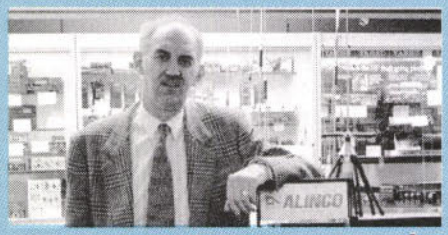

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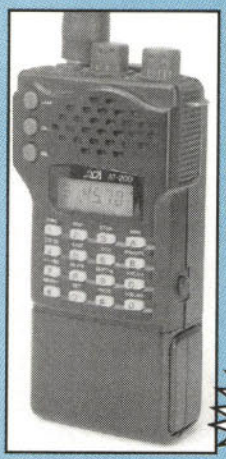

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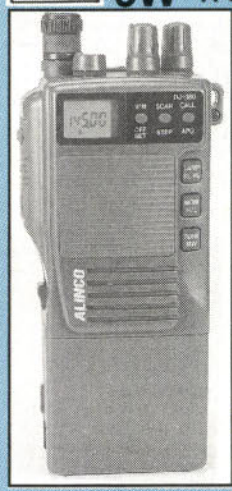

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- 130 - 170MHz Rx
- 5 Watts on 12V DC
- 10 Memories
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- 1750Hz Tone
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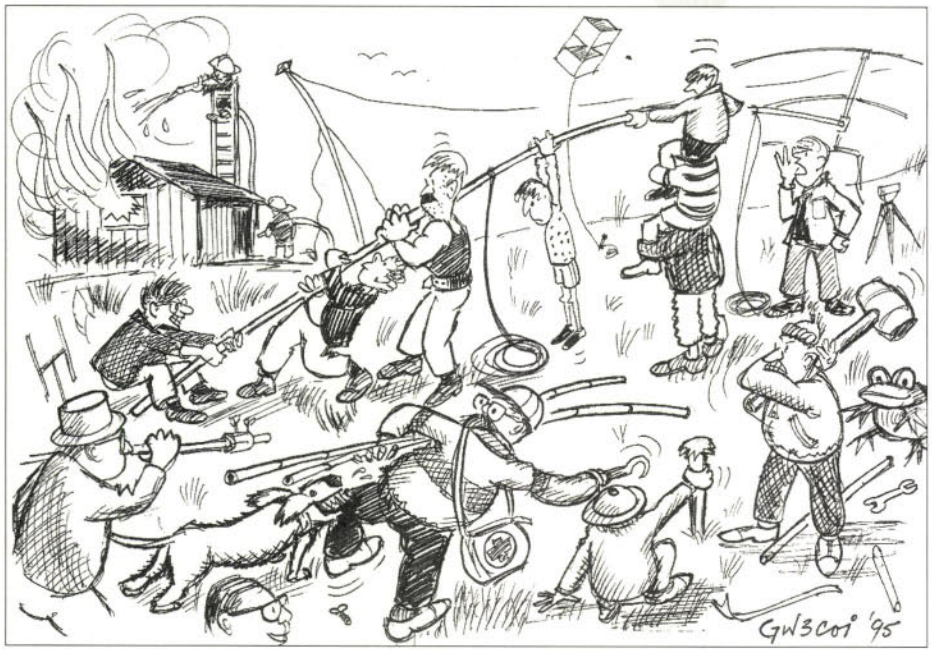

SPOT THE DIFFERENCE

John Worthington GW3COI seems to have caught the flavour of the eventful *PW* 'field day' just right. Only Donna 'Toad' Vincent G7TZB seems to be out of harm's way, supervising...or is she about to be at the end of 'chain' reaction?

There are 12 differences to mark on the bottom version of the cartoon this month, good luck.

FIRST PRIZE:

A SD-610 multi-band trap antenna kindly donated by **Eastern Communications** and a year's subscription to *Practical Wireless* or a £20 book voucher.

SECOND PRIZE:

A pair of Antenna Traps for the band of your choice kindly donated by **Eastern Communications** and a six month subscription to *Practical Wireless* or a £10 book voucher.

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A pair of Antenna Shorteners for the band of your choice kindly donated by **Eastern Communications** and a £10 *Practical Wireless* book voucher.

❑ SUBSCRIPTION ❑ VOUCHER

Send your entry (photocopies acceptable with corner flash) to: **Spot The Difference Competition, August 1995, 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.

Entries to reach us by Friday 25 August 1995

Name .....

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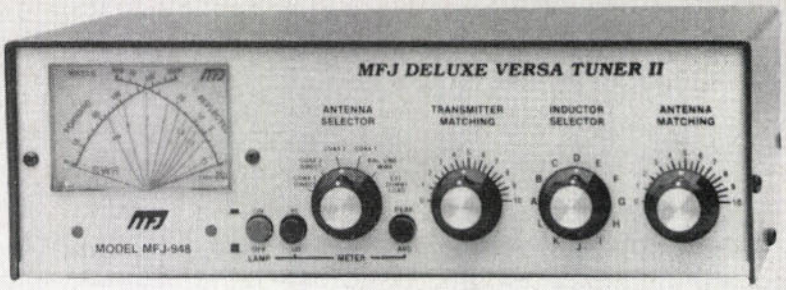
COMPETITION CORNER AUGUST 1995

SUBS CLUB

Get Tuned Up With This Month's Subs Club/Reader Offer!



As this month is our 'Antenna Special' issue, we've got a rather special offer for members of the Practical *Wireless* Subs Club in the shape of the **MFJ-948 Deluxe Versa Tuner II**.

The MFJ Company describe it as "The World's Best Selling ATU" and you can try it out for yourself for a very special price! And, this month we are able to extend this offer to non-subscribers as well.

The Versa Tuner II features up to 300W power handling from 1.8 to 30MHz, cross needle metering (with illuminating facilities) and shows s.w.r., forward and reflected power simultaneously. The a.t.u. will read peak or average power on 30 or 300W ranges, tunes dipoles, verticals, random wires, beam, whips and short wave listening antennas.

The a.t.u. will take coaxial cable feed, random wire or balanced line and has a built-in 4:1 balun. The operator can use the front panel switch to select between coaxial fed antennas, random wire or balanced lines or by-pass for direct connection or external dummy load.

The MFJ-948 Deluxe Versa Tuner II normally retails at **£149.95** including VAT, plus P&P but *PW* Subscribers' Club Members can get theirs for **£129 including VAT & P&P**. Non-subscribers can also take advantage of this offer and can get their MFJ-948 for **£129 including VAT plus £5 P&P.**

All P&P prices apply to UK, overseas readers please contact the *PW* Post Sales Department for postage prices.

So, now you can enjoy versatile antenna tuning with the MFJ-948 Deluxe Versa Tuner II and get *Practical Wireless* delivered to your door every month.

Offer open until August 11 1995 (UK), August 25 1995 (overseas).

To take advantage of this offer just fill in the details on the order form on **page 70** of this issue. Alternatively call **Ann** or **Michael** on our **Credit Card Hotline on (01202) 659930** and **quote SCPW8** to place your order.

Isn't It Time You Became A Practical Wireless Subscriber?

RADIO Diary

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.

*PRACTICAL WIRELESS & SHORT WAVE MAGAZINE IN ATTENDANCE

July 16: The Norfolk RAYNET Barford Rally will be held at the Village Hall, Barford, on B1108, Norwich to Watton Road. Doors open 10.30am to 3.30pm. There will be trade stands, a raffle and refreshments. Free car parking and talk-in on S22. Further details on **(01603) 625833** daytime or **(01362) 820820** evenings.

July 16: The 12th McMichael Rally and Car Boot Sale will take place at the Haymill Youth and Community Centre, Burnham Lane, Slough, near Burnham Railway Station. Talk-in on S22. Doors open at 10.30am. Admission is £1.50. For more details contact **Dave G3SET** on **(01628) 486554**.

July 23: Britain's biggest Outdoor and Leisure Show is due to take place at Powderham Castle, Nr. Exeter, Devon between 10am and 6pm. The show is situated in the grounds of the magnificent Powderham Castle on the edge of the River Exe. The show has a variety of different sections to cater for all, new and used sailing and power boats, used boat jumble, new equipment and lots more. There is to be an amateur radio section (new and used equipment) and a special event station is planned. Any enquiries to: **The Outdoor Boat and Leisure Show Ltd., c/o The Estate Office, Powderham Castle, Exeter, Devon EX6 8JQ** or you can ring **(01626) 890243**.

July 29: Computer Fairs (Northern) held at the Clayton Arms Sports Hall, Fulwood Park Road, Boundary Park, Oldham (next to Oldham Athletic Football Club). There is free parking. There will be a Bring & Buy stall and computer games, etc. Admission is £2 for adults, £1 children/OAPs and £5 for families. Doors open 10am to 3pm. **0161-627 2502**.

***July 30:** Scarborough Amateur Radio Society will be holding their Radio Electronics and Computer Rally at the Spa, South Foreshore, Scarborough. Doors open at 11am. There will be many traders a Bring & Buy, refreshments and a bar. **Ross Neilson G4ZNE** on **(01377) 257074**.

July 30: The Rugby ATS are holding their 7th annual Amateur Radio Rally at the BP Truckstop on the A5, three miles east of Rugby and just 2.5 miles north west from junction 18 on the M1 motorway. Doors open from 10am and admission is £1 per car. Facilities include a good cafeteria and toilets. Talk-in on S22 by GB7RRR. **Peter (01455) 552449**.

***August 6:** The RSGB Woburn Rally is being held at Woburn Abbey, Bedfordshire. Further details from **Norman Miller G3MVV** on **(01277) 225563**.

***August 13:** Flight Refuelling ARS Hamfest '95 will take place at the Flight Refuelling Sports Ground, Merley, Wimborne. The event will run from 10am to 5pm and will include the usual mix of traders, Bring & Buy, craft exhibitors, car boot sale and field events. Talk-in on S22. New traffic routing - please follow signs. **Richard Hogan G4VCQ (01202) 691021**.

August 18: Cockenzie & Port Seton Amateur Radio Club are holding a radio junk night. Bring your own junk and sell it yourself. Tables will be provided on a first come, first served basis (no charge for the table), 6 to 9pm. Raffle at approximately 8.30pm. Entrance fee is £1 and refreshments will be available. All money raised is being donated to the British Heart Foundation. Further information on this event from **Bob GM4UYZ** on **(01875) 811723** or via **GB7EDN**.

August 19/20: The Stafford Amateur Radio & Computer Show, (incorporating RSGB National Convention) is to be held at The County Showground, Stafford. Doors open at 10am to 5pm. There will be Morse tests, special interest groups, a Bring & Buy and lectures on each day. There will be free parking, bars and catering. FREE stands available to radio/computer clubs and societies! **(01923) 893929**.

August 20: The Kings Lynn Amateur Radio Club will be holding their 6th Great Eastern Rally at The Cattle Market, Hardwick Narrows, Nr. Kings Lynn. Doors open at 10am (9.45am for disabled visitors). There will be an outdoor car boot area, a Bring & Buy, Talk-in on S22. There is a spacious indoor area with major national exhibitors, and easy access for disabled people. Refreshments and free parking too. Further info. from **Ian Cooper G0BMS** on **(01553) 765614** or **@GB7OPC Packet BBS**.

August 27: The Galashiels Club are holding their Open Day at the Focus Centre, Livingstone Place, Galashiels. Doors open at 11am till 4.30pm. There will be many traders, a Bring & Buy, club stalls, a raffle and refreshments will be available. **John Campbell GM0AMB**. Tel/FAX: **(01835) 822686**.

August 27: The East Coast Amateur Radio & Computer Rally is to be held at the Clacton Leisure Centre, Vista Road, Clacton-on-Sea, Essex. Doors open at 10.30am to 4pm. There will be major suppliers and manufacturers of radio equipment, computers and computer software, accessories, antennas and second-hand gear. There will also be a Bring & Buy, plus a bar and cafeteria available from 11am. Free car park and talk-in on S22 and SU22 (GB1ECR). Further information can be obtained from **Sharward Promotions** on **(01473) 272002** or **FAX: (01473) 272008**.

August 27: The Torbay Rally is being held at the Clenon Valley Leisure Centre, Paignton, Devon - where there's room to stop and chat! Doors open at 10am. There will be trade stands, a Bring & Buy, special interest displays, the use of leisure facilities, a restaurant and bar. For the family, only a four minute walk away, there is a beach, boating lake, steam railway and a flume water park. Further details can be obtained from **John G3YCH, QTHR. (01803) 842178**.

August 28: The Huntingdonshire Amateur Radio Society are holding their Radio Rally at St. Peter's School, St. Peter's Road, Huntingdon, Cambridgeshire. Doors open at 10am and admission is £1. Refreshments available. There will be two halls and a car boot sale. Talk-in on S22. **David Leech G7DIU. (01480) 431333**.

Controlling That Magnetic Loop!

Gordon Lumley G3DJE shares his experience of developing an interesting system to remotely control the increasingly popular form of antenna - the 'magnetic loop'.

My article is further to the large number of words that's been written on the so called 'Magnetic Loop Antenna'. My idea is to overcome a problem area which can arise in tuning the loop to resonance as it's vital to tune the antenna accurately.

When tuning a remotely sited 'magnetic loop antenna', it's quite likely that the operator will soon lose all track of the approximate position of the capacitor vanes when they are free to rotate through 360°. 'Pigtail' connections might be employed on the capacitor. And if the loop is out of sight will cause problems when the limit of capacitor travel is reached and the 'pigtail' tightens.

You can imagine a state of affairs with the 'pigtail' tightened and the tuning motor stalled. With the loop being out of sight, resonance will never be found because the operator is attempting to rotate a stalled motor, quite unable to move the tuning capacitor.

Suitable Solution

A suitable solution can be found by fitting a semi-circular Perspex (or other suitable material) cam on the capacitor spindle. This would be used together with a pair of microswitches mounted on the adjacent end plate.

The technique I've suggested is not as difficult as it might sound in some cases. Provided one or other end plate can be temporarily removed and the spindle is available to fit the cam, it's well worth while reading on!

Important Cam

To understand the system, it's important to realise that the cam is fitted and shaped so as to trip the microswitches when the vanes are fully open. They must also do the same when they're fully closed, each switch changing over at these positions.

In practice, the semi-circular cam is placed in coincident plane with the vanes. In other words, it looks like an additional moving vane, in line with the others. It could be placed in opposition to the moving vanes, but the wiring of the microswitches would then need to be changed.

The device is basically simple. It employs a two colour l.e.d. to indicate when the vanes have reached their limits, fully open or fully closed. The motor drive current is interrupted at these points and thus protects any 'pigtail' which might have been fitted.

To help, the system also tells the operator which end of the tuning scale has been reached. This is because when the capacitor is fully closed, the l.e.d. lights red and when the vanes are fully open, the colour changes to green.

No further tuning will be possible until the limit switch and over-ride button is used. This eliminates the problems already mentioned.

A three position, centre-off, two-pole switch is used for tuning. This is nothing other than a polarity reversing switch as can be seen from the diagram.

The legend on the panel can show the up position of the switch as green and the down as red. Note that the cam holds microswitch S4 'pressed' and S3 'free', except (and only when) the capacitor is fully open.

Motor Mention

The motor supply is worthy of a mention. The control potentiometer is a wire wound item and the large capacitor following it is important.

I've used a large capacitor as it's used to store a charge at full power pack voltage when tuning is not taking place (no load condition). This enables the motor to start, even at minimum speed (maximum potentiometer setting) since the fully charged capacitor provides the 'kick start' necessary to overcome static friction of the drive chain.

Static friction being greater than dynamic friction, means that once the motor has started, it will continue to run while the tune switch is used. It will continue to do so, even at minimum speed setting.

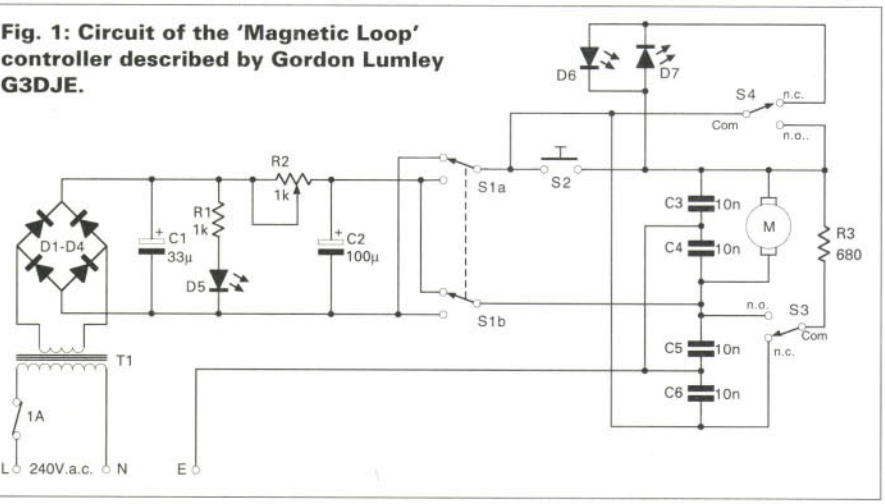
Tuning Frequency

When tuning to a particular frequency, the tune switch is used in the normal way. It's operated to produce a maximum signal from the receiver and then a minimum s.w.r. on low power transmit.

If your station log shows the frequency last used, it's a simple matter to know whether to tune red or green (increase and decrease frequency) on the tune switch.

Should the resonance point not be achieved before the l.e.d. lights, then the resonance point has been overshot and missed. Alternatively, it could mean that the tune switch has been turned in the wrong direction.

Fig. 1: Circuit of the 'Magnetic Loop' controller described by Gordon Lumley G3DJE.



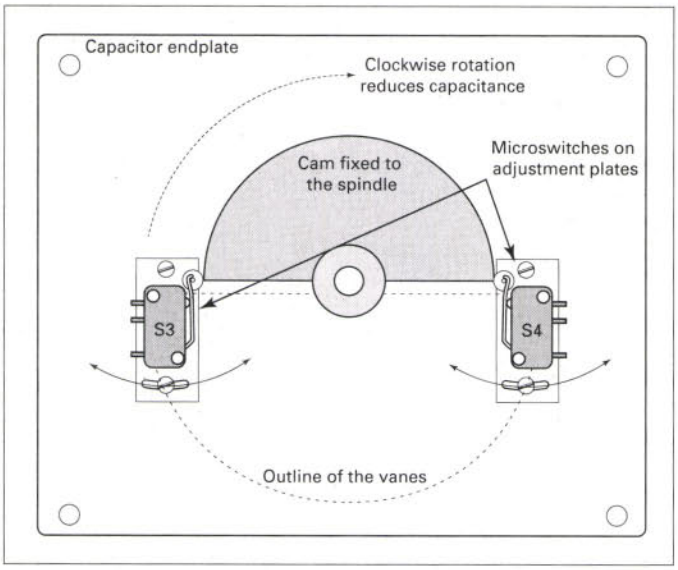


Fig. 2: The system described by G3JDE relies on a separate cam, fabricated from Perspex (or similar) material, mounted on the rear shaft of the loop antenna's variable capacitor. The author stresses the importance of setting the microswitches (operated by the cam) for correct operation (see text).

Shopping List

Resistors 5% 0.4W		
680Ω	1	R3
1kΩ	1	R1
Variable 5W wirewound		
1kΩ	1	R2
Capacitors		
Disc Ceramic		
10nF	4	C3, 4, 5, 6
Electrolytic 35V working		
33µF	1	C1
100µF	1	C2
Semiconductors		
1N40054	D1, 2, 3, 4	
l.e.d.s	3	D5, 6, 7 (colours to suit)

Miscellaneous

Suitable small motor and gearbox (probably a 3-12V version designed for driving models with a gearbox giving up to about one revolution per minute at maximum voltage), T1 is a suitable transformer capable of supplying the maximum current, two changeover microswitches (S3 and 4), a two-pole changeover switch (S1) and a single-pole push-to-make switch, connecting wire, multistrand linking wire, suitable boxes to house the project parts, a protractor to make the cam, and various pieces of insulating material to make other support sections (each case is individual).

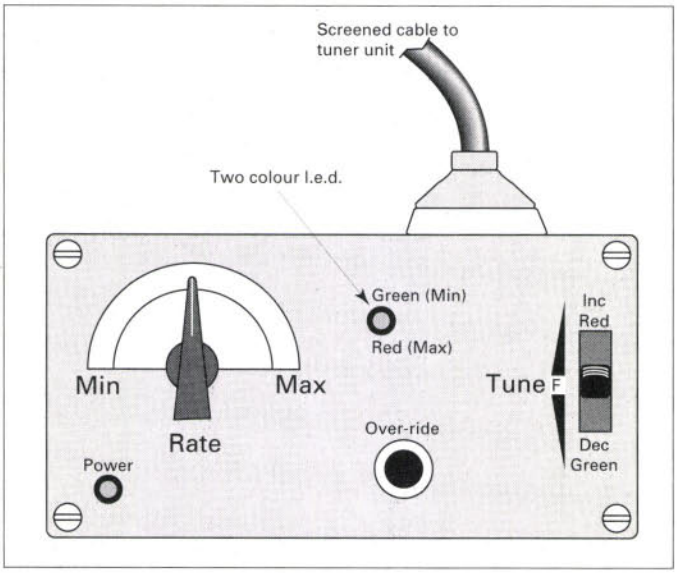


Fig. 3: Suggested control panel for the loop control system. See text for details and recommendations for materials and cable types and lengths.

Whichever problem has occurred, the error cannot persist for long. This is because the colour of the l.e.d. will indicate which limit has been reached, either fully open capacitor vanes (green) or fully closed (red) and the motor will cease to run.

At this point, the operator should reverse the tune switch. This is because there's nothing else that can be done if re-tuning is to continue in the opposite direction.

The l.e.d. will change colour upon reversing the tune switch. This tells the operator to over-ride the limit microswitch by simply pressing the over-ride button until the l.e.d. is extinguished. The motor can now tune the loop once again.

Should the tuning operation continue and (by some ridiculous mischance) the other limit be reached, the l.e.d. will light once again. It's important to note that when the l.e.d. lights, the tune switch must be reversed before the over-ride button is pressed.

Once the l.e.d. has been extinguished, the over-ride button must be released. This sequence comes quite naturally when the unit is in use.

Controller Box

The controller should be housed in a metal box as good screening is essential. I used a 150 x 80mm cast aluminium box, some 45mm deep for my prototype.

The six-way, plus screen, control cable should terminate in a suitable plug/socket at both ends. All earth connections should be made to the loop earth itself (the bottom of the loop diametrically opposite the capacitor) via the screen.

The decoupling capacitors at the loop end of the cable are bought to the same common loop earth point. Mica or some dielectric similarly acceptable at h.f. should be chosen and it's preferable to avoid low voltage types (low voltage disc ceramics for example).

The microswitches are single-pole changeover types, biased to one side. The diagram **Fig. 2** shows the connections and the normal switch conditions (**these are important points, otherwise the system will fail to work**).

My prototype model worked very well with over 7m of connecting cable. There was no sign of r.f. leaking back to the controller once the decoupling capacitors were fitted.

Strange results occurred when the loop was tested in my conservatory and rotated. The loading factor (radiation resistance) then changed considerably...the conservatory's wooden glazing bars had been waterproofed on the outside with aluminium faced adhesive tape. Taking the loop into the garden eliminated the problem!

Elegant Stand

I was able to make an elegant stand for the loop by adapting one of those rotary clothes line! You know, they look somewhat like the framework of an umbrella! With the washing line removed I inverted the device and altered the geometry to reduce the height and to widen the base now formed by the three spokes.

A suitable tube on the 'magnetic loop' fitted into the tubular centre stalk of the clothes drier. A 'stop' on the centre tube located the whole thing, but permitted orientation of the loop.

So, now that I've described my practical approach perhaps you'll have a go. The design and testing has been done, all you've got to do is build your version! **PW**

The Slim Cobra

...the charming idea

John Heys G3BDQ's describes a portable antenna - the Slim Cobra - for work on the h.f. bands.

I first saw a description of the Cobra antenna in a little book entitled *S-9 Signals*, which was written by Bill Orr W6SAI in 1959. It appeared again in a slightly modified form in his later book *Simple Low-Cost Wire Antennas*.

In May 1990 and in July 1991, W. Sykes G2HCG had articles in *Radio Communication*, which described Controlled Feeder Radiation (CFR) antennas, which were very like the earlier Cobra systems.

The W6SAI and G2HCG antennas used bulky chokes or current baluns at their lower feed ends, which were made by either coiling the coaxial cable or winding it on a ferrite end. These items had inspired the word 'Cobra' for they suggested the head of such a reptile above which was the wire 'body'.

I have used ferrite beads slipped on a length of RG58C/U coax to make current baluns just beneath the feed points of dipoles for several years. They are used here in my 'Slim Cobra' design.

Half-Wave Antenna

The Slim Cobra is an end-fed half-wave antenna. The far end quarter-wave used wire and the quarter wave at the feed end is made from 50Ω coaxial cable.

The coaxial cable braid is not connected to any part of the antenna. But its centre conductor joins the wire section.

About one quarter wavelength below this connection is a current balun. This performs as an insulator at the quarter wave end where high r.f. voltages are present.

The half-wave Cobra antennas work because of r.f. currents at h.f. flow on the surface of a conductor. This is known as 'skin effect.

The surface conducting the r.f. currents can be either the outside, or the inside of a tubular conductor such as coaxial braid. In simple terms, the power from the transmitter goes up to the centre of the Cobra antenna via the inner surface of the coaxial cable braid.

At the antenna centre, the r.f. divides between the end wire quarter-wave and the outer surface of the braid. The cleverness of the Cobra design is that the last quarter wave of the coaxial feeder is also an active quarter wave radiator and is half of a dipole.

The W6SAI Design

In the 1959 W6SAI design, the active length of coaxial cable and the wire quarter wave were equal in size. However, in his later design, and also in the case of the CFR antennas described by G2HCG, the coaxial cable section is slightly longer than the wire quarter wave.

The coaxial section is longer because the usual 'end effect' of insulators at the ends of a half-wave antenna is not present when the current balun or choke is located.

The wire section of the 'Slim Cobra', **Fig. 1**, is a normal quarter wavelength long (l_1), whereas the coaxial section (l_2) must be approximately 0.27 of a wavelength long.

To achieve the best

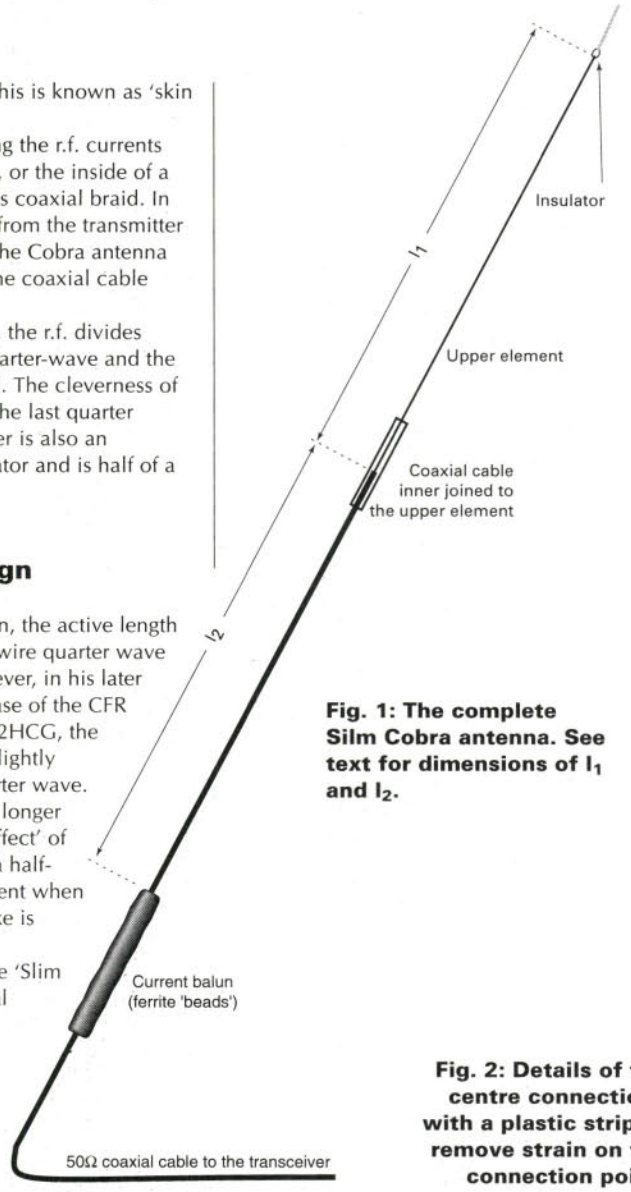


Fig. 1: The complete Silm Cobra antenna. See text for dimensions of l_1 and l_2.

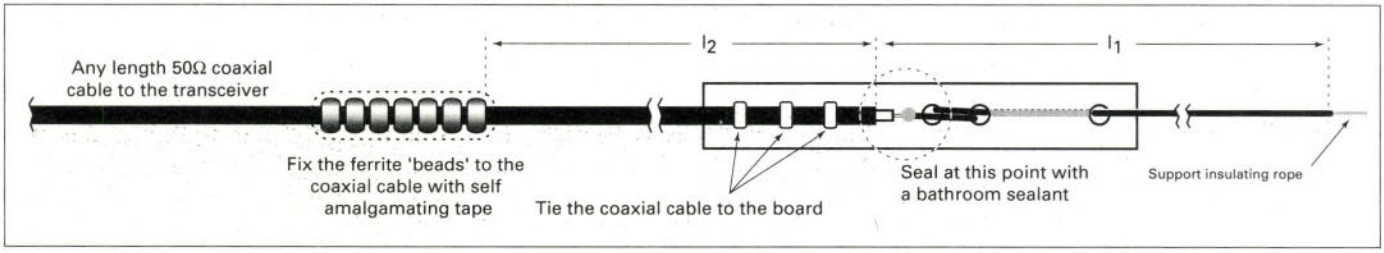


Fig. 2: Details of the centre connections with a plastic strip to remove strain on the connection point.

match with the lowest s.w.r., the coaxial section must be adjusted in length. This can prove a difficult task when the current balun is wound onto a ferrite toroid or a ferrite rod. But, by employing ferrite beads, which can be slid along the coaxial cable, the adjustment for lowest s.w.r. becomes easy.

Practical Details

Let's now look at the practical details. The wire section, l_1, should not need trimming and its length for the different bands is shown in **Table 1**.

Starting point lengths for l_2 are also given in **Table 1**. And in most cases will prove to be accurate without any adjustment of the ferrite beads.

The beads are made from Type 73 material, which works well over the 1.8 to 30MHz frequency range. The number of beads used depends upon the lowest frequency use envisaged.

For the 14 to 30MHz range of frequencies, 30 beads will be ideal. If an antenna for 10 or 7MHz is made, I would suggest 50 beads. The beads can be obtained from Messrs. Ferromagnetics and are type FB-73-2401.

The beads are a tight fit on RG58C/U, but by lubricating the coaxial cable sheath with a little 'Three-in-One' oil, fitting becomes easier. Twisting the beads on the coaxial is more effective than pushing.

It's best to space each bead from is neighbours by about 1mm. This allows easier cable flexing and better heat dissipation. Slight heating will occur, for the beads have to absorb the unwanted r.f. current trying to flow back along the coaxial braid.

Little Heating

With 100W output from the transmitter, very little heating will be noticed. And it's unlikely that many portables will be running at the full legal 400W output.

The junction of the wire section and the coaxial is shown in detail in **Fig. 2**. A 100mm strip of insulating material is used and the wire is anchored quite simply by threading it through a couple of holes and tying it into a knot.

The coaxial cable must be held in place securely with nylon cable ties. However, taken note that the coaxial cable braid **does not connect** to anything.

My Slim Cobra was thoroughly weatherproofed by a liberal application of silicone rubber sealant. This is particularly important at the end of the coaxial cable to stop any ingress of moisture by capillary action and corrosion of the copper braid.

A flexible multi-strand plastic covered wire is the best choice for the wire quarter-wave. The end insulator can be a home-brew job using strong plastic or a commercial glass or ceramic item. **Do not use wire between the insulator and the antenna support point.**

On The Air

Now it's time to get on the air, and you should remember that the antenna is a half-wave dipole and its radiating characteristics are those of a dipole antenna. This means that the higher it's placed, the better will be its DX performance.

The Cobra is ideal for hanging from a tree branch and then using it as a 'sloper'. This arrangement will give low angle radiation away from the low end of the antenna and means that it may be positioned to point in any desired direction.

Do not use a metal support as it will influence the operation of the antenna. The coaxial cable below the ferrite bead balun will be 'dead' to r.f., so a length of cord or rope can be tied there to lift the lower part of the Cobra and vary the slope angle.

When the angle is more acute than 45°, the antenna will behave like a vertical half-wave and be vertically polarised. This can be useful if you're contemplating working 29MHz f.m.

Third Harmonic

A 7MHz Slim Cobra will also work well on its third harmonic (21MHz) and have a low s.w.r. on that band. It may be possible to achieve the ideal s.w.r ratio of 1:1 with this antenna, and mine, which was designed for 14MHz, had an s.w.r. of between 1:1.2 and 1:1.5 over that band.

The s.w.r. readings of the order I obtained mean that there's very little power loss due to mismatch. Low s.w.r.s also mean that the portable expedition will not need an a.t.u. and tuning up is simplified.

All you need in addition to the gear is a hard rubber ball on a nylon cord to throw over that really high tree branch. You also need reasonable h.f. conditions and, of course, a little fine weather!

PW

Table 1

Frequency	l_1	l_2
29MHz	2.46m	2.66m
28.1MHz	2.54m	2.74m
21.1MHz	3.38m	3.65m
18.1MHz	3.95m	4.26m
14.1MHz	5.07m	5.47m
10.1MHz	7.07m	7.64m
7.05MHz	10.14m	10.95m

Clive Hardy G4SLU comments on his prototype construction of the Cobra antenna:

I made up several versions of the Slim Cobra antenna. I stripped off the outer and used the coaxial cable inner for l_1 rather than an extra piece of wire. The first antennas I made were for the 28MHz band and then for the 21MHz band. For both I used 30 and then 50 ferrite beads.

Starting with John's suggested dimensions the s.w.r. for all the antennas was around 3 :1. There wasn't any noticeable difference using 30 or 50 beads. The antennas were slung about 2m above ground level to keep them within easy reach for adjustments.

I juggled around with the length of l_1 and the position of the beads to try and improve the tuning. With all the antennas I got the s.w.r. to around 1.7:1, but no better. Having tuned the antennas, the s.w.r. was pretty flat across each band. Both the 21 and 28MHz bands were very quiet at the time so I couldn't properly test the antennas.

There's always a worry with any new antenna that it might turn out to be an elaborate dummy load! To find out I also made a 14MHz version with 50 beads. Instead of trying to improve on the 3:1 s.w.r. by adjustment I used an a.t.u. to keep the transmitter happy. Using 10W s.s.b. I worked around Europe with good signal reports being received.

I tried to obtain the beads from several suppliers, but only succeeded with Ferromagnetics. The beads cost £19 for 50 including postage.

When sliding the beads onto the coaxial cable the outer covering can crease up between them. Keeping the cable taut helps and John's suggestion to use a lubricating oil is very helpful (Hellerman Oil, used for sliding sleeves onto cable, although not cheap, is ideal for this job). Avoid cable with a soft outer covering. Although they look alike, there are also slight variations in the diameters of cables. A piece of UR43 that I tried seemed a little thinner than some RG58 types. Loose beads could be held in place with adhesive.

G4SLU

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Alinco's Award Winner

The DX-70, Alinco's first entry into h.f. operations. The transceiver also offers 50MHz coverage and an indication of its size is provided by the hand-held microphone which is itself smaller than standard.

Rob Mannion G3XFD has tried the new DX-70 h.f. plus 50MHz mobile transceiver. Rob's so impressed...he thinks it's got to be "Alinco's Award Winner".

The DX-70

HF & 50MHz Multi-mode Transceiver

It's not often I think I can lay claim to be 'in' on the start of a major new project other than those we're preparing for publication in *PW*. However, I really do think I've some justification in claiming some credit for encouraging Alinco to enter the h.f. market with a transceiver.

Over four years ago I was busily suggesting to Alinco's European representative that his company should enter the market. Now, they have!

Despite my delusions of grandeur, I have my feet firmly anchored to the ground! Knowing how inscrutable the gentleman are, I have no doubt they were probably already working on the project.

There are only a very few Europeans who can penetrate the very formal barriers around the Japanese manufacturers and their designers and I'm not one of them. However, it's good to think that I may have influenced Alinco to develop their new DX-70, which I'm sure is going to be an award winner. It certainly gets my vote!

So, what's so interesting about the new DX-70. How does it work, and why do I like it so much?

Feel Comfortable

One of the major points with a new rig is that the operator has to feel 'comfortable' with it (especially with the ever increasing cost of professionally built transceivers). And I can report that I was immensely impressed with the DX-70 from the very start, the ergonomics and the very look of the rig with its simple panel and well-styled appearance was most impressive.

Yes, it's got its faults. But, for a first time entry from a manufacturer new to h.f. transceiver design...I can honestly say I'm amazed that they have done so well!

Nowadays, with the expertise available from many sources, it should not be surprising that a manufacturer new to h.f. should do so well at the first attempt. However, I was a little disappointed that Alinco had not tried to keep their well known budget price advantage.

Instead of aiming for the budget price market with their new rig, Alinco decided on including 50MHz. And although I'm a keen v.h.f. operator, it's not really clear to me whether or not there will be a demand for 50MHz built into a rig of this nature.

On the other hand, I think there will be a demand for a well laid out, extremely easy-to-operate transceiver, such as the DX-70. Especially as it comes fitted with features either not offered on other rigs, or which are sold as extras.

Design Package

So, what's in the design package of the new Alinco DX-70? Let's take a look at what you get for the money.

Basically, the rig covers all the amateur bands from 1.8 to 28MHz, plus the 50MHz band. It operates in the s.s.b., a.m., c.w. and f.m. modes.

The Alinco DX-70 provides a maximum of 100W on the h.f. bands. On the 50MHz band the transceiver provides a maximum output of 10W.

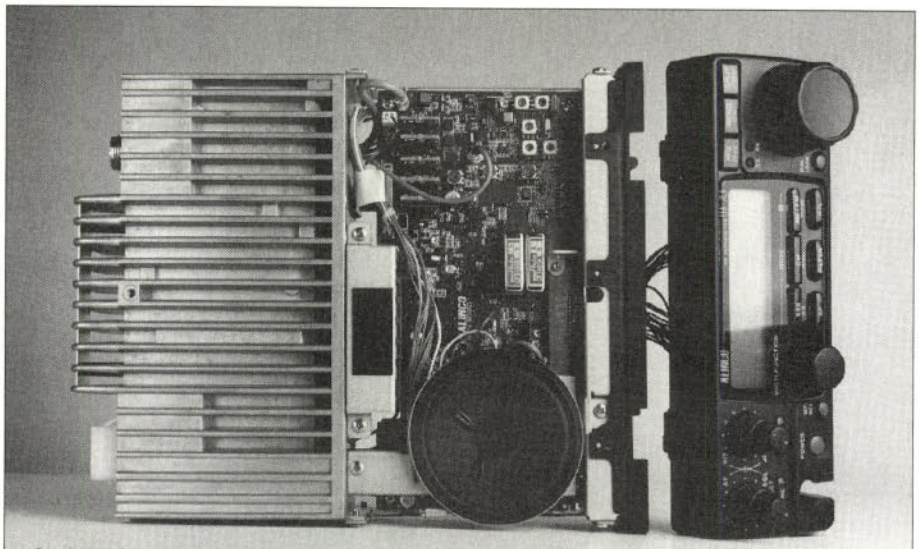
A double conversion superhet forms the basis of the receiving side of the transceiver. The first i.f. is high at 71.75MHz, with the second i.f. being the standard 455kHz.

In common with other manufacturers, Alinco have provided a general coverage receiver in the design package. However, unusually, the manufacturers have fitted narrow filters for c.w. reception as standard (more of this later).

Detachable front panels are becoming almost standard nowadays and the Alinco DX-70 has been provided with this helpful facility. And in fact, this is the area where I have to congratulate and criticise Alinco at the same time!

Alinco obviously decided (wisely in my opinion) to fit the DX-70 with the type of robust microphone plug and socket arrangement so commonly found on amateur radio equipment. They've neatly got over the problem of allowing the front panel to detach, by mounting the microphone onto the main rig by 'tunnelling' the cable through a slotted gap on the front panel. Very neat and effective.

However, I was not impressed by Alinco's plug and socket arrangement and associated wiring which connects the rig to the detachable front panel. I hope the manufacturers modify this in production because I feel it could be a source of problems in the long term to the detriment of what I think is an otherwise excellent transceiver.



A view from above the Alinco DX-70, with case removed, showing detachable front panel and main circuitry and substantial heat-sinking.

First Impressions

My first impressions of the Alinco DX-70 were that I liked it very much indeed. It 'felt right', operated extremely well and I (despite my very large fingers) had no problems with the controls on this extremely attractive and compact rig.

In fact, I was on air within moments of unpacking the rig, as it's so simple to operate. My yardstick (or should that be metrestick now?) is based on how quickly I can get on the air without having to delve into the (albeit comprehensive and well laid out) handbook for the simplest instructions. The DX-70 scored very highly in this respect.

Tuning, switches and general operation of all the controls on the DX-70 are pleasing, positive and simple to carry out. The display is also good, with clear l.c.d. enunciators.

Personally, I would have preferred to have had the tuning rate on the receive side completely under my control. As supplied though, the operator has no direct control of the tuning rate, the steps being automatically changed to a rate decided on by Alinco, depending on whichever mode is selected.

Important Controls

As far as I'm concerned, the important controls and functions under the direct selection of the operator should include: r.f. gain, i.f. gain, and variable selectivity. And in the past I've often criticised manufacturers for not providing what I consider to be vital controls.

When I first discovered that the Alinco DX-70 didn't have a fully variable r.f. gain control I was dismayed. However, after experiencing the efficient way the r.f. amplifier could be switched in and out, with the option of cleverly chosen attenuators, I decided I could live with it!

I was also very surprised and pleased to find that the DX-70 came supplied with a narrow band filter as standard. The provision of the i.f. shift facility also proved to be extremely helpful.

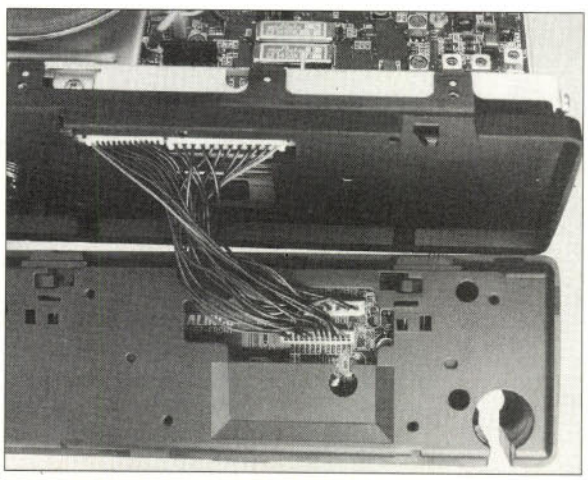
However, from a personal point of view, I would have gladly sacrificed some of the 100 memory facilities in return for a variable i.f. gain control and a fully adjustable r.f. gain control. Perhaps Alinco will offer this as an option later?

On 50MHz

During the review period I didn't hear anyone on 50MHz! However, with the advent of this type of transceiver, perhaps it will be a band where people appear on occasions other than DX openings!

Personally speaking, I would not buy this rig just because it provides 50MHz. But having said that, I feel sure that once there are more multi-mode transceivers around for this band, there will be a great deal of fun to be had, especially bearing in mind the fascinating results which keen mobile operators can get on the nearby 70MHz. The potential on 50MHz is mind boggling!

A separate 50MHz antenna connection is provided on the DX-70. Once the rig is established I wonder how long it will be before someone modifies one to cover 50 **and** 70MHz?



Left: Close-up view of interconnecting wiring between the detachable front panel and main transceiver and 'tunnel' for microphone connection (see text for comments by G3XFD).

On The Air

I was keen to get on the air, and despite the fact that h.f. conditions weren't good, I worked some good DX. The DX-70 immediately proved itself under very difficult conditions on 3.5 and 7MHz.

In practice (and I must say that I was surprised) the simple system for controlling r.f. gain seemed perfectly adequate for the day-to-day operations on 3.5 and 7MHz. Even under the very heavy QRM on 3.5MHz in the evening I found I could copy everything.

Working with the combination of the i.f. shift, the in-built narrow filter (ideal for the c.w. operator) and the r.f. attenuator I found that the rig was operating and coping very well. And in fact (just in case you're thinking it's a 'twee' little rig) it continued to pump out its 100W hour after hour with no trouble.

In fact, the only problem I discovered was that the particular DX-70 I had, seemed to be unhappy if the supply voltage was less than 12V. This meant that when I was operating from the car, I had to run the engine every now and then to keep the volts up.

Anyone operating the DX-70 will soon find themselves forgetting it's not a 'main station' rig. In fact, if you're considering buying one, I suggest that you regard it as being the 'main' rig. The on-air performance certainly endeared the transceiver to G3XFD.

I found that on c.w. I was able to work consistently into the USA and Canada, despite much near European QRM. And even though I found that the extra power (100W) available to me proved invaluable in raising the DX, I could still work them at 50 and 30W.

Break-in for c.w. seemed to be excellent. There was a choice of full break-in, semi break-in and auto break-in (delay time automatically adjusts to your keying speed!).

However, the c.w. side-tone was not at a comfortable level for me and during the review period I was unable to discover how to adjust it! But, given time I've no doubt that I would have found how to do it, with the help of the comprehensive manual.

Audio reports obtained when I operated on s.s.b. were very good, particularly from people who knew my voice. However, the DX-70 seems to share a common problem along with other compact rigs...in that it suffers from odd audio distortion when receiving a relatively strong incoming signal.

The received audio problem disappears immediately headphones are plugged in. And I can only assume that the odd distortion is caused by the strong magnetic field from the speaker (mounted on the top of the cabinet) affecting the audio amplification chain.

I don't see the audio distortion on the DX-70's speaker as being a problem. This is because when it's used mobile most operators will normally use a single headphone/microphone unit (or should do for safety) or a separate loudspeaker for better audio reproduction.

General Coverage

The general coverage receiver facility is a great asset for anyone interested in broadcast listening. I found that I had the DX-70 tuned to my favourite 49metre band broadcast station - Radio Netherlands from Hilversum - a great deal.

In fact, with the Alinco DX-70, you don't really need another rig. It's especially likely to be popular with keen travellers and the performance on the h.f. broadcast bands is very good. It will keep you in touch with the BBC World Service and other English language programmes, provide amateur radio h.f. and 50MHz into the bargain!

Award Winner

In my opinion, I think Alinco have got themselves an award winner in the DX-70. It looks good, feels good and provides excellent service on h.f. (and no doubt on 50MHz when you can hear anyone!).

Yes, the Alinco DX-70 does have one or two little problems, but none that would really make me hesitate in buying one. The audio problem on strong signals is directly due to the small speaker, which has to be a compromise.

I also think that in the long run Alinco will have to pay attention to the interconnecting wiring between the detachable front panel and the rig. But that won't stop the transceiver from being an excellent prime mover.

With its clear l.c.d. display, user friendly controls and attractive looks, the DX-70 is going to appeal to many radio amateurs. It's an excellent little transceiver, a delight to use and Alinco have to be congratulated for an amazingly well designed transceiver for their first entry into the h.f. market.

I think the DX-70 will be with us for a very long time. A transceiver such as this amazing little package will establish itself and become an industry standard. Personally, I wouldn't be surprised if the DX-70 is still being made in 10 years time, albeit with the production modifications that all manufacturers introduce into their popular range.

Well done Alinco. I really do think you've got a winner with your DX-70 first time entry into the 'h.f. stakes'.

My thanks for the loan of the Alinco DX-70 go to Waters & Stanton Electronics of 22 Main Road, Hockley, Essex SS5 4QS. Tel. (01702) 206835, FAX (01702) 205843, who can supply the DX-70 for £1095.

PW

Afer seeing a copy of the G3XFD review, Jeff Stanton G6XYU of Waters & Stanton Electronics sent us the following comments:

Thanks for giving me the chance to comment on Rob Mannion's very comprehensive (and enthusiastic) review of the DX-70. Regarding pricing, of course the strong Yen is not helping we importers to fix low prices.

However, at only £100 more than the TS-50, the Alinco rig offers additional features including the 50MHz (6m) band, detachable front panel and comprehensive filtering compared with the Kenwood.

Alinco chose individual flexible leads to the front panel after exhaustive testing as the alternative 'flat ribbon' connection is more rigid and difficult to use.

Finally, DX-70 accessories are appearing now including a manual a.t.u., EDX-1 at £249. No auto a.t.u. yet, but the Kenwood or Icom ones will work nicely.

G6XYU

Manufacturer's Specifications

General		
Operating mode	J3E (l.s.b., u.s.b.), A1 (c.w.), F3 (f.m.)	
Number of memory channels	100	
Antenna impedance	50Ω unbalanced	
Power requirement	13.8V d.c.± 15% (11.7 to 15.8V d.c.)	
Grounding method	Negative ground	
Current drain	Receive	1A max
	Transmit	20A max
Operating temperature	-10°C to +60°C)	
Frequency stability	± 10ppm (-10°C to +50°C)	
Dimensions	178 x 58 x 228mm	
	(179 x 71 x 268mm with projections included)	
Weight	Approx 2.7kg	
Transmitter		
Transmit frequency	160m band	1.8000 to 1.9999MHz
coverage (US version)	80m band	3.4000 to 3.9999MHz
	40m band	6.9000 to 7.4999MHz
	30m band	9.9000 to 10.4999MHz
	20m band	13.9000 to 14.4999MHz
	17m band	17.9000 to 18.4999MHz
	15m band	20.9000 to 21.4999MHz
	12m band	24.4000 to 24.9999MHz
	10m band	28.0000 to 29.9999MHz
	6m band	50.0000 to 53.9999MHz
Power output h.f. bands	s.s.b., c.w., f.m.	100W (high)
		Approx 10W (low)
	a.m.	40W (high)
		Approx 4W (low)
Power output 50MHz band	s.s.b., c.w., f.m.	10W (high)
		Approx 1W (low)
	a.m.	4 W (high)
		Approx 0.4W (low)
Modulation	s.s.b.	Balanced modulation
	a.m.	Low power modulation
	f.m.	Reactance modulation
Spurious emission	h.f. bands	Less than -50dB (-45dB in 10MHz band)
	50MHz band	Less than -60dB
Carrier suppression		More than 40dB
Sideband suppression		More than 50dB (at 1kHz)
Maximum f.m. deviation	h.f. bands	± 2.5kHz
	50MHz band	± 5kHz
Microphone impedance		2kΩ
Receiver		
Receiver circuitry	Double conversion superheterodyne	
Receive frequency range	0.1500 to 30.0000MHz	
	50.0000 to 54.0000MHz	
Intermediate frequency	71.75MHz (1st) 455kHz (2nd)	
	500kHz to 1.8MHz	0dB (1µV)
s.s.b., c.w. (S/N 10dB)	1.8 to 30MHz	-12dB (0.25µV)
Sensitivity	50 to 54MHz	-16dB (0.15µV)
	500kHz to 1.8MHz	+20dB (10µV)
a.m. (1kHz, 30%, mod	1.8 to 30MHz	+6dB (2µV)
S/N 10dB)	50 to 54MHz	+6dB (2µV)
Selectivity	s.s.b. (narrow)	2.4kHz/-6dB, 4.5kHz/-60dB
	s.s.b. (narrow), c.w. (standard)	1kHz/-6dB, 3kHz/-60dB
	c.w. (narrow)	500Hz/-6dB, 3kHz/-60dB
	a.m. (standard), f.m.	9kHz/-6dB, 20kHz/-50dB
Spurious and image rejection ratio		> 70dB
Audio output power		>2.W (at 8Ω, 10% THD)
RIT/TXIT range		± 1.4kHz

Multi-Delta Antennas

Denis Payne G3KCR, has been doing some experiments folding-up antennas into three dimensional shapes. Here are some he made earlier!

Most antenna enthusiasts are always looking for new antenna ideas, particularly antennas requiring limited space. The reduction of physical size with some designs has been achieved in many different ways, but the primary task is to reduce the length of the basic dipole.

The three basic ways to reduce the physical size of dipoles and maintain resonance are: inductive loading, end loading and by bending the elements. Inductive and end loading follow a set of parameters that are known. But many, if not most designs, have their own limitations of low impedance, poor bandwidth and efficiency.

Bending the elements is one method which still lends itself to experimentation. Some of the methods currently used are shown in **Fig. 1**. A careful examination of various bent and folded antennas was carried out to find a shape that had the minimum of inductance and very little cancellation of the radiation.

A bent form antenna should also be easy to construct. In my experiments I found the equilateral triangle was the most suitable for experiments.

I reasoned that when formed into a chain, each consecutive loop inductance is cancelled by the next loop. This should result in an overall low inductance compared with a straight wire inductor.

My reasoning for the reduction in inductance is illustrated in **Fig. 2**. With the exception of the two outer legs, each vertical (approximately) leg has an opposing inductive effect.

In theory, reversing the current loop to reduce inductance should cancel the radiation properties. This effect doesn't appear to be the case though.

Measurements I've made, using the same length and gauge of wire, to check the difference in inductance between various wire forms are shown in **Fig. 3**. The results I obtained are listed in **Table 1**.

Inductance Bridge

I used a digital inductance bridge operating at 1kHz for all the measurements. I found that measurement of a straight wire inductance was not practical on the bridge. Reverting to theory, the inductance was calculated to be 0.8μH at low frequency.

The folded antennas, shown in **Fig. 3**, may be summarised as follows:

In **Fig. 3a** shows the standard method of minimising the inductance of a wire, but this of course would cancel most of the radiation, while the forms shown in **Fig. 3b** and **c** are commonly used forms of antenna.

The multiple isosceles (equal sided) triangular layout is shown in **Fig. 3d**. This is the form I was interested in, and has less inductance than the single loops.

Changing the winding method to that shown in **Fig. 3e** is a way of further reducing the overall length of winding. This is a flat winding, in that you are moving to the right, or left, all the time. However, this winding method has the cost of increased inductance.

I've shown two other winding forms in **Figs.**

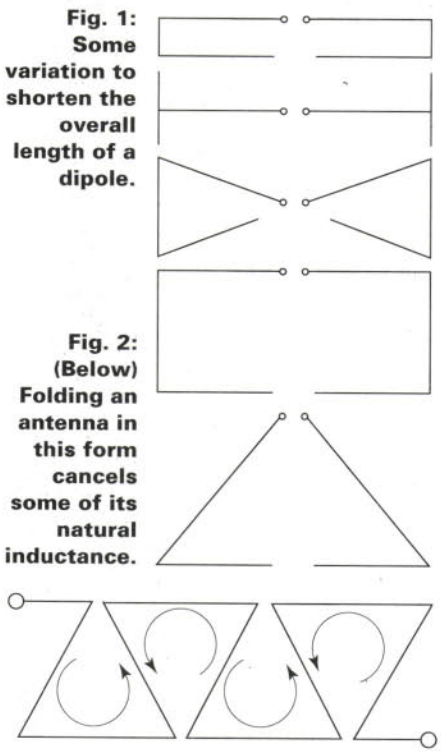


Fig. 1: Some variation to shorten the overall length of a dipole.

Fig. 2: (Below) Folding an antenna in this form cancels some of its natural inductance.

Table 1

Figure Number	Inductance (μH)
3a	0.5
3b	1.58
3c	1.50
3d	1.01
3e	1.05
3f	3.00
3g	2.12

All measurements were made with a 1200m length of 0.6mm pvc covered copper wire.

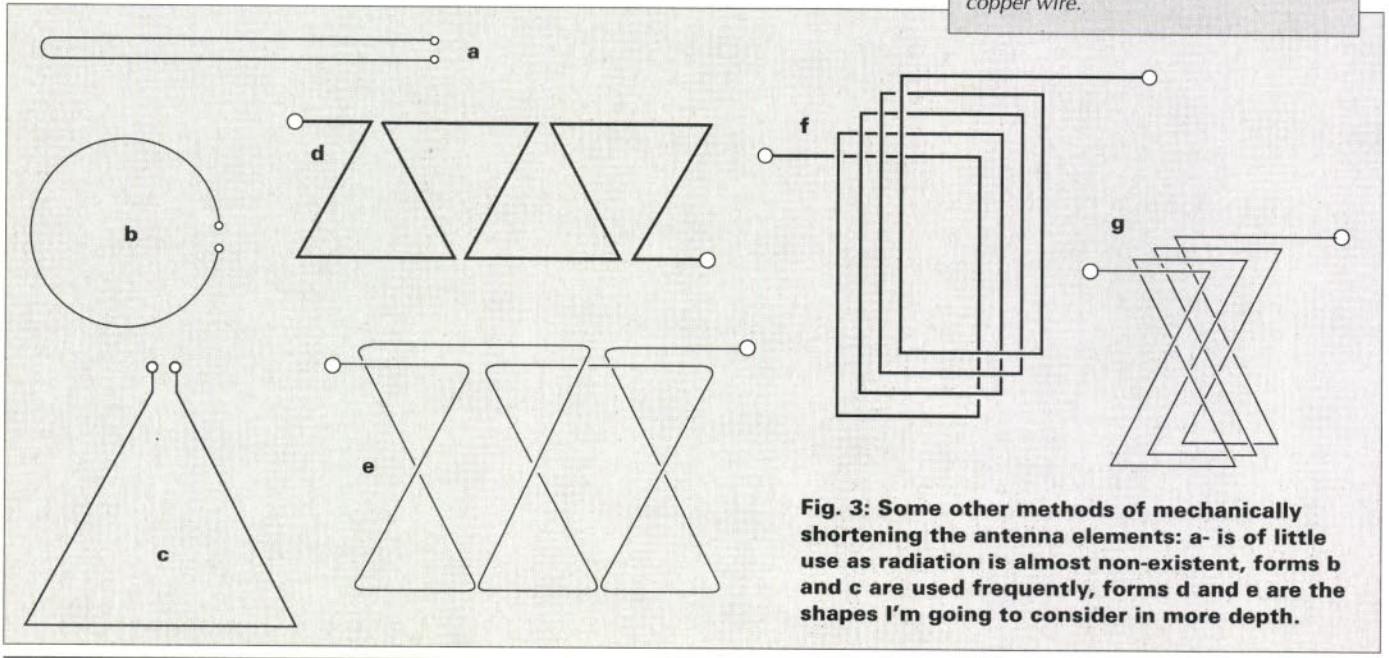


Fig. 3: Some other methods of mechanically shortening the antenna elements: a- is of little use as radiation is almost non-existent, forms b and c are used frequently, forms d and e are the shapes I'm going to consider in more depth.

3f and **g** to show the effect of overlay windings of the rectangular and triangular forms. From **Table 1**, you will see that the inductance is greater with these shapes. The box form is sometimes used to make medium and short wave frame antennas.

Basic String

The basic form of a stringing triangles I've shown in a little detail in **Fig. 4**. You can use this to form the dipole shown in **Fig. 5**. This is a good starting point for experimenters.

Leaving the centre, or inner portion straight increases the radiation resistance, and with it a general increase in efficiency. I've found that 2.5% of a wavelength each side is a good compromise.

I've also found leaving another straight section of about 1-1.5% of a wavelength each end has a beneficial effect. And I've found that leaving this short length lowers the Q and improves the bandwidth.

After experiments, I've found the size of the triangles doesn't effect the shortening factor of the antenna. For example, one triangle with a side of one metre length uses the same amount of wire as three triangles with side lengths of of 330mm. This is best illustrated in **Fig. 6**.

Folding an antenna in this way is fine but there is an important factor to be remembered. A dipole folded using this triangular method requires more wire than the standard length to resonate at the desired frequency. This length increase can be as much as 30% for antennas wound with small triangles.

Back To Resonance

This additional length of wire to bring the antenna to resonance (as a percentage) reduces as the size of the triangle increases. The exact relationship between triangle size and wavelength is not yet known, but when the length of one side of the triangle increases to 0.16λ or greater, the percentage increase effectively reduces to nil.

There are many ways of utilising the triangular shape winding. I've shown a variety that I've tried in **Fig. 7**. The shape **Fig. 7a** can be made on a flat surface using thin nails. Ensure all the angles of the triangles are 60°, and that all sides are equal. I've used this form in a roof space.

Another flatform variation is shown in **Fig. 7b** using narrow strips made from thin (0.5-2mm thickness) plastic material. Cut notches down each side in appropriate places. The notches are the equivalent of the pins in **Fig. 7a**. Using this shape, an antenna can be made to fit into standard plastic material drainpipe.

A further variation, **Fig. 7c**, shows a 'figure-8' winding version. Using this winding method has a greater shortening effect.

The variants shown in a, b and c are 'flat', I've also tried a version that uses a 25mm diameter former. This could be either a wooden dowel or plastic water pipe. Short panel pins, spaced 43mm apart are placed in a straight line along the former.

Look at the illustration **Fig. 7d**, and I'll explain. Assume the wire is coming from the left hand side. The wire goes: around pin b, is wound back to go around pin a. From here it is taken to pin c, where it is again wound back to pin b. From pin b the wire is taken to pin d, when it is wound back to pin c. This shape of path is followed as long as necessary.

I've used this method to construct an antenna for the 21MHz band, shown as a thumbnail sketch in **Fig. 8**. The main element is wound around a 25mm diameter dowel, two metres long. Some 15 panel pins were inserted in a straight line from each end. The spacing between pins was 43mm.

I used 0.6mm single strand, pvc covered wire, and formed the windings as shown in **Fig. 7d.** Leaving a short length at each end (to connect to the 'capacity hat'), I started each winding from the 'capacity hat' end.

From the windings, the wire was brought to the centre for the feeder junction. Both sides of the antenna were held in place (going between the pins) with insulating tape. To finish off, the

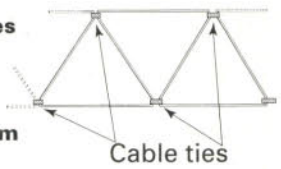
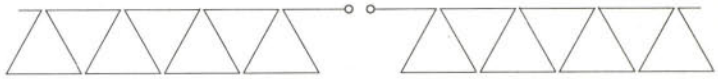


Fig. 4: When using isosceles triangles to shorten elements, this is the form used.

Fig. 5: A physically short dipole with the sides made up as shown in Fig. 4.



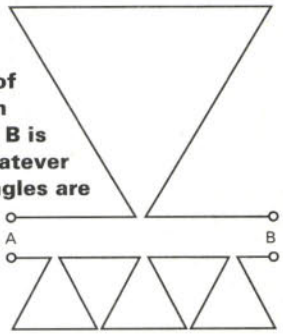


Fig. 6: The total length of wire between points A and B is the same whatever size the triangles are made.

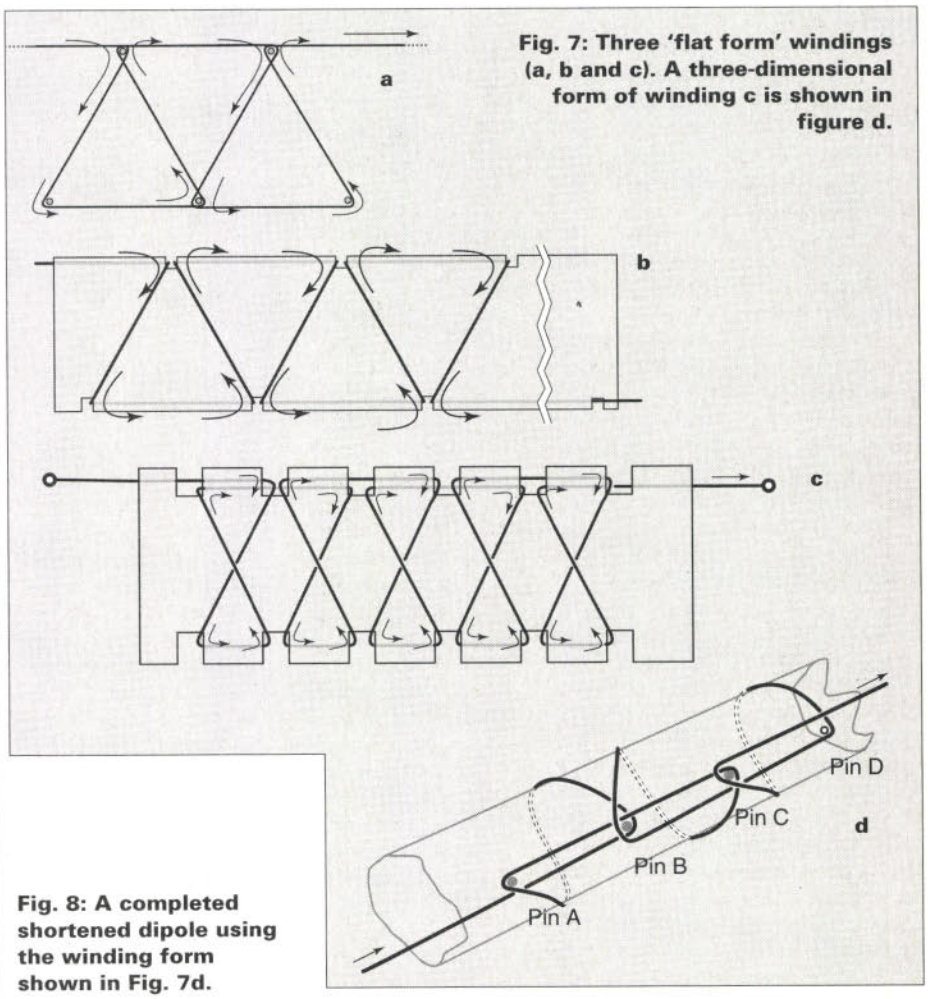
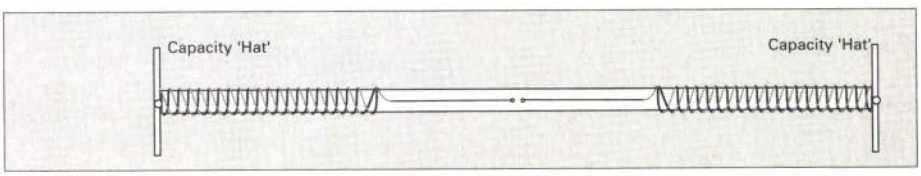


Fig. 7: Three 'flat form' windings (a, b and c). A three-dimensional form of winding c is shown in figure d.

Fig. 8: A completed shortened dipole using the winding form shown in Fig. 7d.



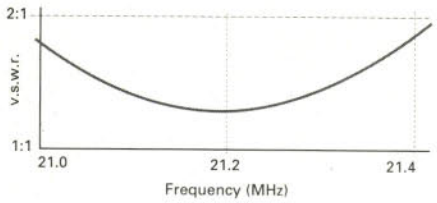


Fig. 9: The v.s.w.r. graph of the antenna of Fig. 8.

pins were then removed and a complete second layer of tape applied.

At each end of the dowel a capacity hat was mounted and connected to the outer ends of the windings. Each capacity hats consists of four 180mm length rods of 3mm diameter.

The method of tuning the antenna to resonance, was to check the antenna then, if needed, trim the longest rod at each end before checking again. I found the radiation resistance to be some 43Ω, and I've shown the s.w.r. graph of my antenna in **Fig. 9**.

Excellent Results

The results from the 21MHz antenna have been excellent, with good reports from all continents. Because of limited space it has not been possible to compare it by switching to a dipole at the same height.

I plan to convert the antenna to a beam by adding a second element. It's worth noting that the current is in the same direction in all parallel parts of the wire.

I've tried many experiments over several years and made dozens of variations of multi-delta antennas for both h.f. and v.h.f. Some versions, using the forms already shown, were disappointing. Although resonance and a reasonable impedance were achieved, the operating results were poor.

Three Dimensional

Some experiments with three dimensional versions have resulted in the ideas shown in **Fig 10** and **Fig. 11**. The flat construction is using plastic tubes or canes taped to the wire. **Fig. 10** has nine equal edges, or sides.

This shape was formed into a cage by folding the ends 'A' and 'B' up to meet above. The overall length of the cage is 1.63 times the length of one of the triangle sides.

The resulting cage antenna can be fed at the centre and used as a dipole, or fed at one end as a quarter-wave. It can be strung horizontally or vertically using a single pole. A third method is to use two identical cages as shown in **Fig. 11**.

The balanced form of **Fig. 11** was used to make a dipole for the 28MHz band, with an overall length of 1.65m. The resulting antenna had a radiation resistance of 36Ω, and the resulting s.w.r. graph is shown in **Fig. 12**.

Again, the results of this antenna were good, and for QSOs with the USA the received signals were one S point up compared to a conventional ground plane antenna. The completed antenna was pinned across the corner of my shack!

Fig. 10: The flatplan and three-dimensional view of a cage antenna. See the text for more details.

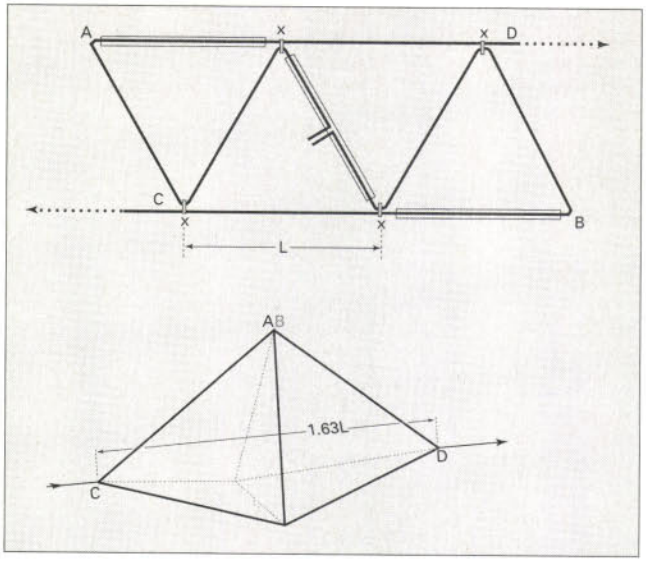
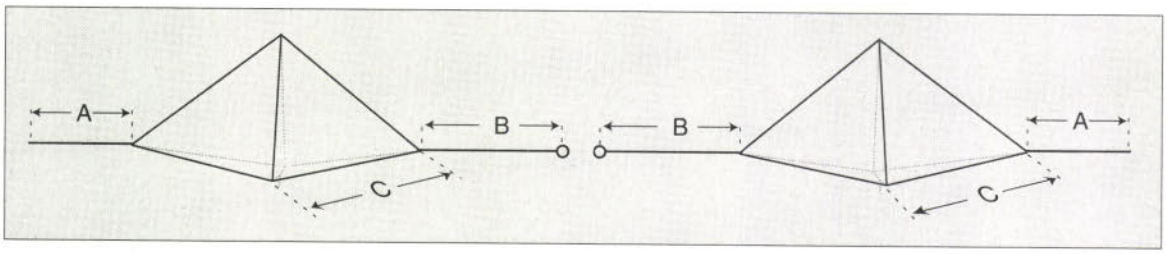


Fig. 11: (below) Two cages almost 'back-to-back' make an ideal antenna for the 28MHz band. Dimensions are: A = 255mm, B = 125mm and c = 310mm.



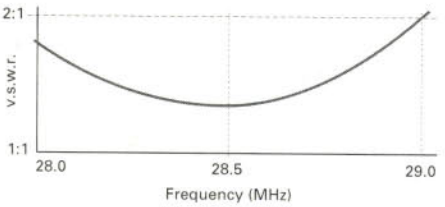
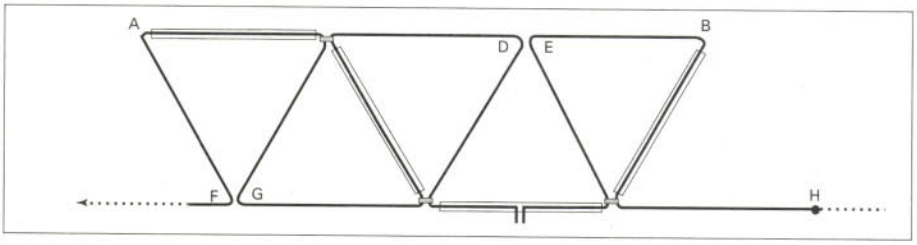


Fig. 12: The v.s.w.r. graph of the antenna of Fig. 11.

Fig. 13: (below) Adding one more triangle to the cage antenna of Fig. 10 allows a 3D diamond shape (far bottom) to be built.



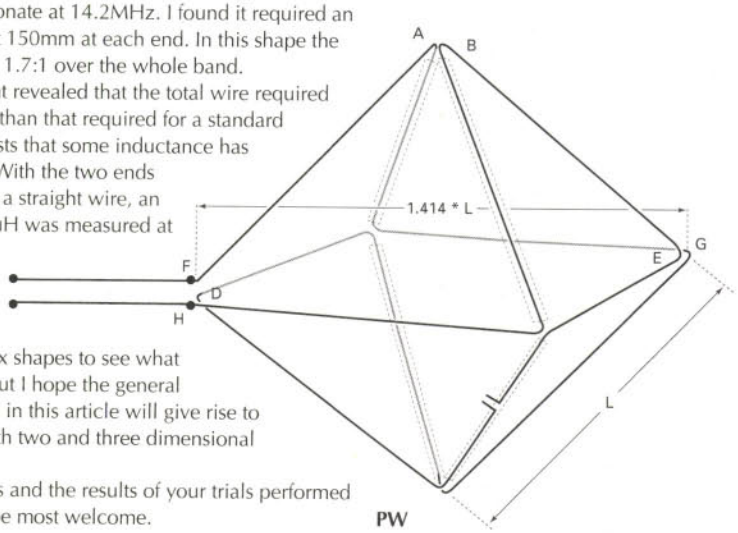
A vertical form of the antenna shown in **Fig. 10**, was constructed to resonate at 14.2MHz. I found it required an extension of about 150mm at each end. In this shape the v.s.w.r. was within 1.7:1 over the whole band.

The experiment revealed that the total wire required in this form is less than that required for a standard dipole. This suggests that some inductance has been introduced. With the two ends joined together by a straight wire, an inductance of 1.6μH was measured at the feedpoint.

I plan to try some other experiments with more complex shapes to see what effect they have. But I hope the general principles outlined in this article will give rise to further ideas in both two and three dimensional models.

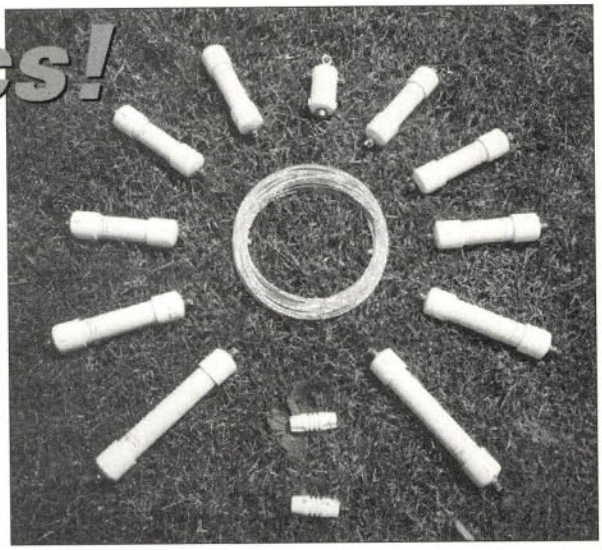
Your comments and the results of your trials performed but others would be most welcome.

PW



Antenna Antics!

John Goodall G0SKR, invited to try out the Sigma SD-610 h.f. antenna for PW, recruited some of his many friends and got on with the job and presents a rather different equipment review!



The Sigma SD-610 upacked and ready for assembly by 'Team G0SKR'.

Window shopping was never one of my favourite pastimes, but, window shopping with the thrill of trying what I see, is something quite different! And this month I've had the pleasure to view some items having the common theme of antennas.

I started off by trying the SD-610 multi-band, 10 trap dipole from Sigma Communication Products. This was the interesting antenna I had the pleasure of reviewing.

The SD-610 antenna is designed for operation on 1.8 through 28MHz, excluding the WARC bands, without an antenna tuning unit.

Self Assembly

The SD-610 antenna arrived in kit, or rather self assembly form. It was neatly packaged, and inside I found one roll of copper coated, multi strand steel wire, approximately 56m in length.

There was also one centre connector (an SCE-1 de-luxe), two low loss end insulators and ten traps of varying sizes. These included two each of ST-10 (28MHz), ST-15 (21MHz); ST-20 (14MHz), ST-40 (7MHz) and ST-80 (3.5MHz).

The centre connector is a heavy duty tubular device. It's made from a waterproof sealed white hard plastic type material.

The connector has two heavy duty, non ferrous screw terminals for connecting each leg of the antenna. There's also one stainless steel support hook and an SO239 connector for the connection of the coaxial feed line.

Wire supplied with the SD-610 is steel, copper coated. And because of this should present no problems of stretching during its life.

Each of the ten heavy duty traps, are manufactured from waterproof sealed tubular enclosures of identical white material to the centre connector. The tubing is 32mm in diameter.

The enclosures vary in length according to the frequency band for that particular trap and have at each end, a cap of similar material. These end caps are 40mm in diameter, 38mm in length and sealed to the trap tubing.

Fitted within each end cap are the heavy duty non ferrous, solderless screw terminals. No jumper leads are needed with these traps!

Total Length

The total length of each trap are as follows: ST-10 184mm, the ST-15 184mm, the ST-20 184mm, the ST-40 208mm and ST-80 245mm.

The cable, centre connector and traps are made to an extremely high standard. I feel that once in place they should require no servicing for many years.

Though quite large, the SD-610 traps will accommodate up to full legal power limits in the UK. But having an added high current centre connector, the SD-610 PRO-C, they will accept up to 3kW!

Whilst on the subject of the traps I feel black would have been a preferable colour. I am aware of the problems with the carbon content of black plastic, but I feel the traps do have a striking resemblance to high voltage insulators, and would have looked better somewhat darker in colour.

The instructions for the full range of multi-band trap dipoles were contained on a single side of a single sheet of A4 paper. Clear though the measurement details were, I thought the actual working and assembly details could have been more elaborate, particularly for first time antenna installers.

Garden Space

My home and garden being somewhat on the postage stamp size, does not offer any way near the required space for the SD-610. That's because the published length (end-to-end) is 44.8m!

The space problem offered me the opportunity of going 'stroke portable'. A fine weather day was duly ordered and upon its arrival, with the consent of the Flight Refuelling Sports and Social Club, Merley, Dorset for the use of one of their football pitches, I set forth with the neatly packaged SD-610.

Single-handed the task would have proved to be (although I'm now partly bionic!), impossible on crutches! So, I summoned the assistance and able bodies of four willing (and local) radio amateurs: **Don G0IJE**, **Roger G0TYX**, **Walter G0WAL** and **Chuck G0MDK**.

The contents of the packed SD-610 were carefully laid out on the grass. We took extra care to ensure that none of the trap-end, wire retaining screws, had gone missing as a magnet would have proved worthless in finding any!

All items were present and correct. We then needed something to hang the antenna from. For the centre point of the antenna a guyed portable mast was used. Once this was erected on the centre spot of the football pitch, the delicate job of uncoiling, measuring and cutting the multi-strand wire started.

Skill And Dexterity

The measuring and cutting procedure took the skill and dexterity normally only found in Neuro Surgeons! "Cut Here!" then "No, Here!" and "What about the extra 250mm!" followed by "No that's the wrong end!".

Each and every measurement was treble checked with the site foreman. This was whoever happened to be holding the instruction sheet at that time, and the required surplus added.

The instructions recommend allowing a surplus of around 250mm for each length of

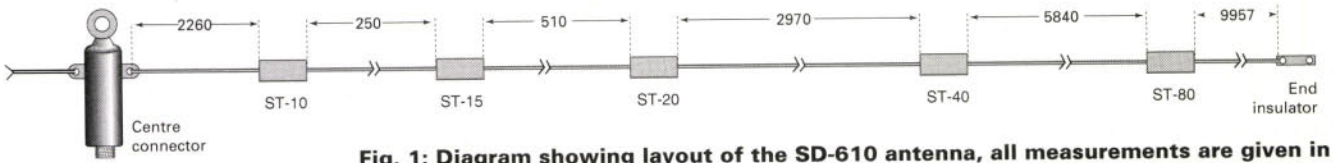


Fig. 1: Diagram showing layout of the SD-610 antenna, all measurements are given in millimetres (see text).

MARTIN LYNCH
G4HKS
THE AMATEUR RADIO EXCHANGE CENTRE

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Motherboard	VLB
Cache	256K
RAM	See each machine
HDD	See each machine
Controller	VL Bus
VGA card	SPEA VEGA PLUS
VGA Mem	1MB, VLB
FDD	3.5" 1.44MB
Keyboard	Yes - Cherry
Mouse	Yes - Logitech
Software	DOS V6.2, WFW V3.11
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wire to accommodate fastening to the trap screw terminals, leaving around 100mm to be wrapped back on itself, loosely at this stage to allow for any tuning adjustments.

Large Coil

Anyone who has never worked with a large coil of high tension steel wire has never lived. And although I've no wish to try and teach my proverbial grandparents to suck eggs, this type of wire must be rolled carefully from the coil not pulled off.

The consequences of pulling the wire off would leave you with a superb wire 'bird's nest' requiring two weeks spare time to unravel. Take care and unroll it...you have been warned!

Trap Polarised

Each trap is polarised and identified as such with a heavy indented dot in one end cap. This end of the trap must be facing in the direction of the centre connector.

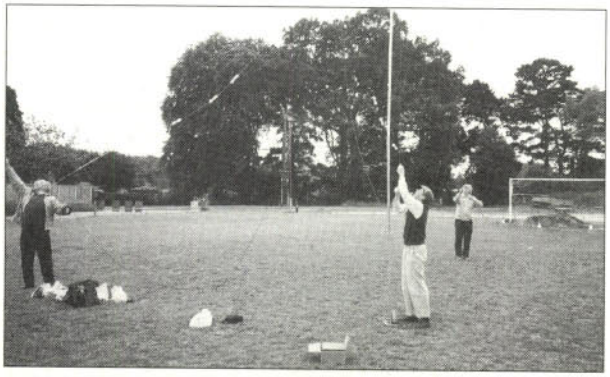
Luckily, we only had three traps to turn around! Only one leg of the antenna measurements are shown on the instructions for simplicity, the other being a mirror image.

From the centre connector to each end insulator, the five traps are separated by six different lengths of wire. The connectors and traps being set out as follows: Centre Connector - measured wire - ST-10 - measured wire - ST-15 - measured wire - ST-20 - measured wire - ST-40 - measured wire - ST-80 - measured wire - end insulator (see **Fig. 1**).

Wire measurements between the centre connector, traps and end insulators, as set out on the instructions, were the starting point for each band. Fine tuning for the required segment of each band, would be achieved after the complete assembly of the antenna.

Table 1
To each of the following measurements an extra length of 250mm for fixing and later fine tuning purposes.

Centre Connector	To	ST-10 (28MHz Trap)	2.26m
ST-10 (28MHz Trap)	To	ST-15 (21MHz Trap)	250mm
ST-15 (21MHz Trap)	To	ST-20 (14MHz Trap)	510mm
ST-20 (14MHz Trap	To	ST-40 (7MHz Trap)	2.97m
ST-40 (7MHz Trap)	To	ST-80 (3.5MHz Trap)	5.84m
ST-80 (3.5MHz Trap)	To	End Insulator	9.957m



The team finally have the complete antenna up for testing.

Minimum Height

Sigma recommend the centre of the dipole to be a minimum height of 12.2m above ground. And if it's used in any form of sloping or inverted 'V', the ends should be at least 4.6m above ground.

Unfortunately, on the day we could only reach a centre height of just under 3.7m, with the ends about 2.7m from the ground. The ends were in fact tied off to the cross bar of each goal post!

The overall length of the completed review antenna was 48.6m, somewhat larger than the published length. The difference can easily be explained, as all five of my trusty team were schooled in Imperial measurements.

Added to the 'imperial only' problem, the tape I used, only gave Imperial measurements, and our grey matter was none to quick at converting from the metric. This explains the slight discrepancies with the given conversions. (When asked to comment. Eastern Communications said that although the measurements weren't given in furlongs they were available in inches!).

Antenna Hoisted

The antenna centre connector was then connected to the feed coaxial, and the antenna hoisted up the mast. We kept the mast vertical by pulling each dipole leg outwards.

The total weight of the antenna at this stage is quite high. So, the supporting cord for the centre and each end insulator, must be strong enough for the load and the stress and strain when the antenna is finally in position.

The strength aspect should not be overlooked. It's not recommended to be in mid QSO with a much sought after DX, as one leg of your antenna clatters against the centre pole as the retaining cord snaps!

Before connecting the feed to the transceiver, we carried out a quick check with the antenna analyser to establish what part of each band we had to play with. The results from this revealed that the s.s.b. segment of all bands was fully useable and even certain parts of the c.w. segment.

Our tests showed that 14MHz was the only band with a v.s.w.r. reading of over 1.3:1. And even then 14.170 - 14.300MHz with the 1.3:1 reading was workable. Heath Robinson would have been proud of us!

Antenna Orientation

The antenna orientation, end-to-end was almost north east to south west, providing stronger transmitted signals north west to south east. This was borne out by a 5 and 1 signal report from **Dave G4AQY** near Greenwich, almost in a direct line with the end of the antenna.

The first QSO was then followed by a 5 7-9 report from Janice GW0KPD from near Port Talbot. Both contacts on the same frequency on the 3.5MHz band.

Without an a.t.u. and the antenna running directly into my Kenwood TS-140S I was impressed with the performance of the SD-610, on all bands from 1.8 to 28MHz, not counting the WARC bands. However, with the a.t.u., the 10, 18 and 24MHz bands were available.

From scratch (discounting hiccups in assembly), the SD-610 was erected and operational in just over two and a half hours. Although impractical in my case, the nature of the multi-strand copper coated wire meant that cutting and premeasuring would have reduced assembly time.

High Standard

To round off the review, I must say I think that the Sigma Communication Products SD-610 Multi-band Trap Dipole is manufactured to an extremely high standard. And providing space allows, for fixed or portable use, it would be a very useful single antenna for multi-band operation.

However, I feel that at a price of £349.95, for a wire antenna, it's a little on the high side of expensive. This is my own personal view and in no way should it detract from the superb quality and excellent performance of the antenna.

Also, Sigma Communication Products produce over 150 wire antennas for every pocket, requirement and location. The SD-610 being one of their two most expensive antennas. However, you do need to bear in mind that there are ten traps included, which makes the overall cost of the SD-610 not that high for a complete h.f. antenna.

I would also like to thank all those amateurs contacted during this review, who for space alone, have not been named. A special thanks go to the trusty team who gave up a day's sanity to assist me. Thank you Don G0IJE, Roger G0TYX, Walter G0WAL and Chuck G0MDK, without you this review would not have been possible. Thanks also to Flight Refuelling Sports and Social Club for the use of the football pitch!

Finally, my thanks go to Eastern Communications of Cavendish House, Happisburgh, Norfolk NR12 0RU, Tel: (01692) 650077, FAX: (01692) 650925, for supplying the review antenna which costs £349.95 including UK P&P. **PW**

Pascoe's Penny Pinchers

Dick Pascoe G0BPS has come up with some more of his practical 'penny pinching' antenna projects. This time Dick has been playing around on h.f.

I know of several radio amateurs who have a selection of towers, some as high as 60m with single band Yagis on each one. That's a selection of towers at one location for the use of just one amateur!

The lucky people I'm thinking of have single band beams for the h.f. bands from 28MHz right through to 7MHz two element beams. Some are even rotatable. I mean the whole is rotatable including the tower!

The beams are fixed to the uprights of the metalwork at various spacing. A huge gearbox at the bottom turns the whole thing.

Something like the station I've just mentioned would only fit into a very large plot. And this one belongs to a friend in the mid USA.

My American friend's antenna farm cost thousands of dollars. But what most of us need is a simple system that will still provide gain (over a dipole) at a cost of a few pounds and in most cases just a few pence.

Size Problem

Size is of course the main problem with most of us in the United Kingdom. Our gardens are much smaller than the average American house plot but we do have one area that we can exploit. If we cannot go out we can (in most cases) go up!

Those readers who regularly go to their local rallies should keep an eye out for the large rolls of wire often found on sale. (Go for the multi-stranded, not the single strand as this has more inherent strength).

The larger the roll of wire the better. Often these will be found for just a pound or maybe two and with this you'll have the makings for a selection of antennas.

Cheap Insulators

Look out for the cheap egg insulators on sale at rallies. If they cannot be found, don't despair, a section of plastic bottle can be used, as in **Fig. 1**.

The resultant insulator I've shown in **Fig. 1**, has been cut from a polycarbonate bottle. They're easy to cut out...but be careful when using the scissors!

The first thing to do when contemplating a new antenna system is to make a small drawing of the area available. You should note the high points such as the roof, trees and where poles can be fitted.

Next, you should locate the north. If this is difficult there's an easy way. On a sunny day go out at midday GMT (**not BST**) and look for the sun. It will almost due south of you and will (within a few degrees) be accurate.

Long, in terms of wavelength, dipole type antennas mounted in a north - south direction give good lobes off in the 45° in all four directions. This is good for North America, South America and of course for the far east. It's not good for the south and Africa, but we have to do what we can!

What Antenna?

Having drawn the layout and decided on the high points you can now decide what type of antenna is best for the space you have available.

The simple dipole needs a support at the centre but the Windom antenna needs support at the one third point. If the rear garden is long and the front short then some form of array may be of use.

Small house plots can be terrible to fit an antenna into. But I well remember getting a full size 7MHz loop in a garden that most would consider impossible.

In the space of this article it would not be possible for me to say which one is the best for you. I will however, remind you that the antenna that works extremely well here may not work well at your home, and of course the reverse may apply.

Notable Success

Most of the antennas I'm describing in this article have been built at some time or other by me and I've achieved some notable success.

Try out different ways of erecting the antennas. The Delta Loop for example may be mounted horizontally. The main aim is **not** to spend your hard earned cash on the antennas but to save that for more important things.

The measurements I'm providing are all for an antenna working on the 14MHz band. It's centred on 14.100MHz.

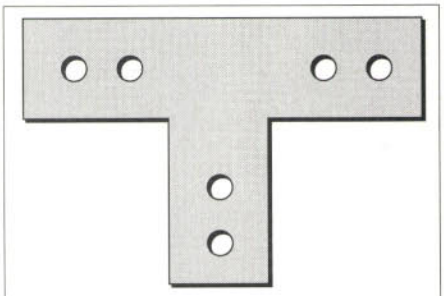


Fig. 1: Simple and effective insulators can be cut from polycarbonate plastic bottles (see text).

Each length should be cut slightly long and then trimmed to resonance. For those who have never done this, don't worry, it's very easy to do.

There are two easy ways to set the antenna up. One method uses a valved grid dip oscillator, or the a transistorised 'dip' meter. Both types of dip oscillator are known as grid or gate dip oscillators (g.d.o.) even if it uses an ordinary transistor.

In use, the dip meter is coupled to the antenna, and the resultant 'dip' as the meter tunes across the antenna resonant frequency will indicate resonance. If the dip is below the frequency required the wire is too long and some will have to be removed.

Other Method

The other method requires a transmitter for the frequency required and a good power meter or an s.w.r. meter. To start off, 'fire-up' the transmitter and check the v.s.w.r. or reflected power, and then take a reading.

Next, change the frequency by about 50kHz and take another reading. If the frequency reading is lower, then the wire is again too long. If it goes high you have cut the wire too short.

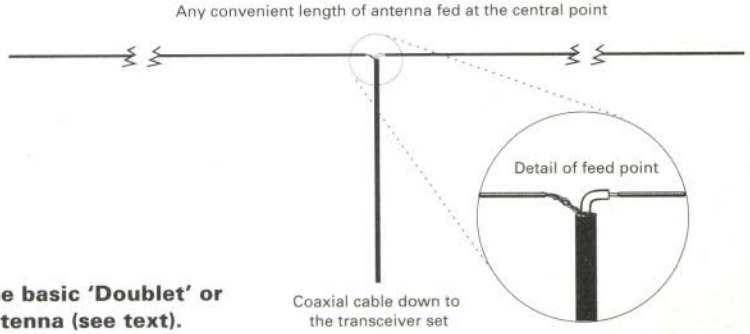


Fig. 2: The basic 'Doublet' or dipole antenna (see text).

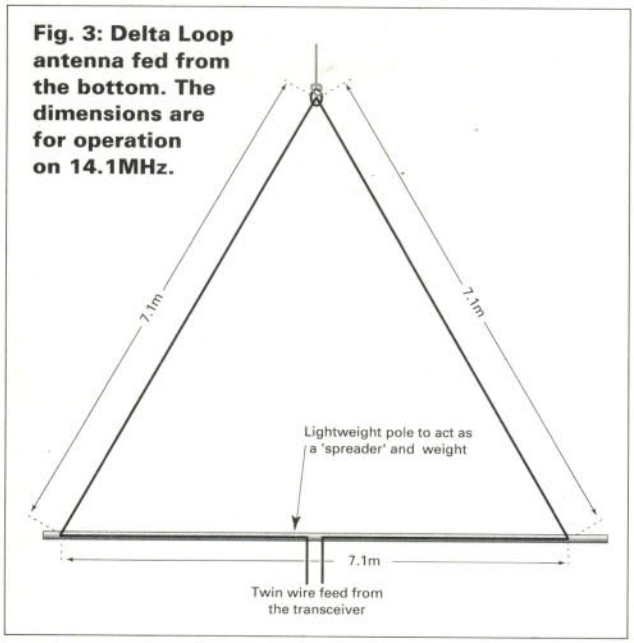


Fig. 3: Delta Loop antenna fed from the bottom. The dimensions are for operation on 14.1MHz.

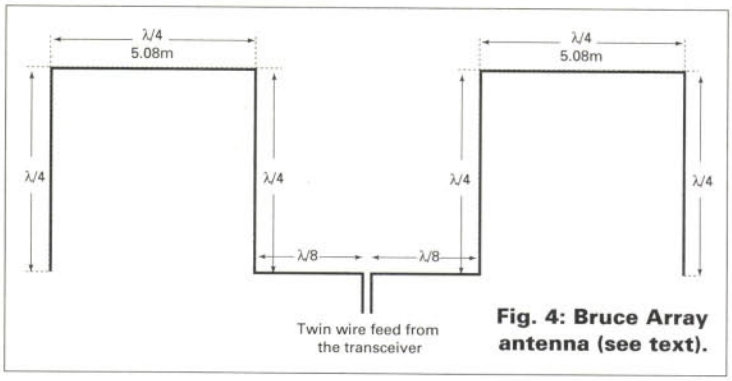


Fig. 4: Bruce Array antenna (see text).

Keep trimming until you get close. A few centimetres at a time to start with should be satisfactory, and then reduce gradually down to a few millimetres or so until resonance is obtained.

Doublet Antenna

The 'doublet' is the simplest of all h.f. antennas to use. And it's the antenna I'm currently using at my home at the time of writing.

In practice, the doublet is comprised of two equal lengths of wire fed either by coaxial cable or by twin feed. The length of the wire is unimportant as long as it is greater than a quarter wave long on the lowest band intended to be used.

So, if 3.5MHz is your favourite band, each leg of the doublet must be at least 20 metres long. The actual length doesn't matter as long as you use an antenna tuning unit to resonate the system.

As usual the higher the antenna goes, the better it will work. And even if the antennas 'legs' sag a little or even bend at the ends...does it matter so much? No, it doesn't!

You're looking for an antenna that will radiate a signal. But if you really want gain then try one of the following, or go ahead and buy that very expensive beam antenna!

Delta Loop

As its name implies the Delta Loop is a simple loop made of a single wire and hung from a suitable high point. It's a full wavelength long on the band required.

For the centre frequency of 14.100MHz the Delta Loop will require 21.3m total length of wire. Each side is 7.1m.

I've used the Delta Loop at home, and as it 'fires off the sides of the loop it has a small amount of gain. It can also be turned by the used of a rope to the corner much like a rotatable beam, **Fig. 3**.

If the loop of wire is used as a box configuration, then a change of feed point from one corner to the middle of the bottom, or even one side may give a better radiated signal. Experiment, try them out!

Bruce Array

The Bruce antenna based on the Array, **Fig. 4**, may provide slightly more gain, as it acts as a broadside array. This means that the main lobe of the signal is off the sides of the wire.

A rope slung between two points such as the house and a tree will carry the Bruce Array easily. In a perfect world it should be at least a quarter wave above ground. But we don't live in a perfect world so give it a try as high as you can. It will still work!

Another version of the Bruce Array array is to use them in phase. By using 300Ω ribbon as the phasing line a good array may be obtained.

Start by using just one side and cut it for resonance on half the required frequency. This will provide the two outside elements.

Next, cut a dipole at the resonant frequency which will be the middle element. The two phasing lines should also be resonant at a quarter wave and fitted as shown in **Fig. 5**.

The beauty of the Bruce Array is that because the phasing lines should not radiate they may be rolled up and tucked away! It leaves an antenna that looks much like a dipole!

The W8KJ

The only difficulty with the W8KJ or 'Lazy H' antenna one is the feed point. You connect the feed to the middle of the two legs and adjust for resonance.

The W8KJ is one antenna that I have not yet tried. But I've heard of reports where it has been used with some success.

Of course there are many more wire antennas that you may try. There's a multitude of books on the subject!

Fence Antenna

I have even used a barbed wire fence as an antenna. I had nothing else available, but I still made the contact I wanted!

Even a length of wire thrown over the house can be used for a simple antenna. Just remember that with any of these you cannot compete with a big beam or cubical quad antenna systems.

But you can, and will radiate a signal that will work the world. You may not break the pile-ups so easily but you'll still have lots of fun in this fascinating hobby of ours.

PW

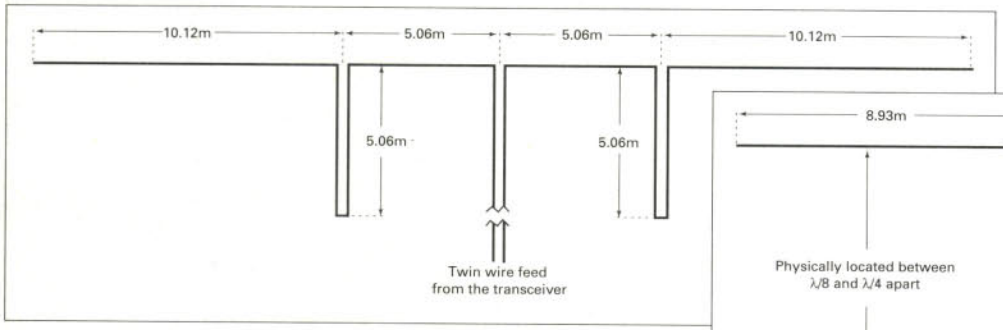


Fig. 5: Alternative version of my version of the Bruce Array (see text).

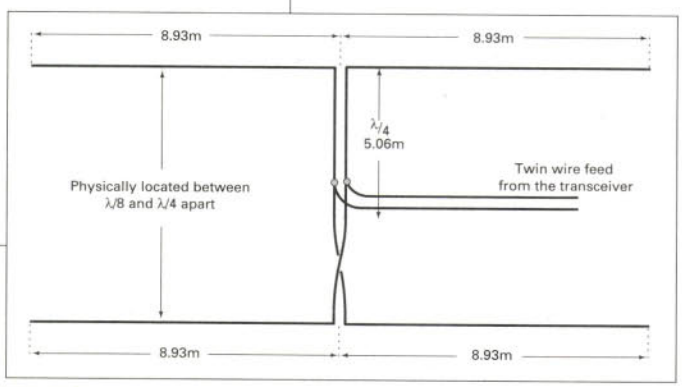


Fig. 6: The W8KJ or 'Lazy H' antenna (see text).

Antenna Wo

Terrarium Antennas

I've been interested in unusual antennas. I've made v.h.f. antennas that sit in a window, and h.f. antennas that ran up a drainpipe. These antennas are made up from an adhesive backed copper foil that I found at a shop specialising in Terrarium ornaments.

The tape used is available in a variety of widths. I've found that I use mainly the 7/32in (5.56mm) wide rolls. These rolls cost only a few pounds for some 30+ metres long. The adhesive is very tenciaous and sticks to glass very well. The copper side is very solderable, making joints very easy to create.

There are several widths of tape available up to about 25mm. I've also seen larger sheets, up to about 300mm square that could be used as earth planes for u.h.f antennas. Out of the terrarium, into the pile-up perhaps.

Ian Wye G0OKY
London

QRP ATU For 50MHz

This compact unit should fit into even the smallest shack. Using this unit I can cure the mismatch from my 3-element Yagi. In fact, I can even load up the G5RV on 50MHz.

As you can see the circuit, **Fig. 1**, is extremely simple, both capacitors C1 and 2 are both 50pF (C804 types). The coil consists of seven turns of 1.5 - 2mm diameter copper wire wound with on a 15mm former. After winding the coil, the former is removed and the turns are pulled to cover about 21mm.

The output tapping point is two turns down from the 'hot' end as shown in the drawing, **Fig. 2**. Should you be unable to bring the s.w.r. down to unity, then try adjusting the tapping point one turn more or less.

All the items I used came from the scrap box so it was a simple and cheap item to build.

Ken Grover G3KIP
Tunbridge Wells

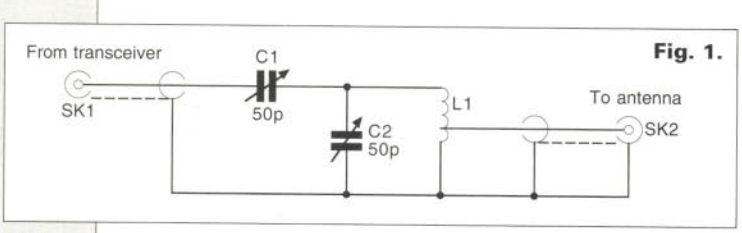


Fig. 1.

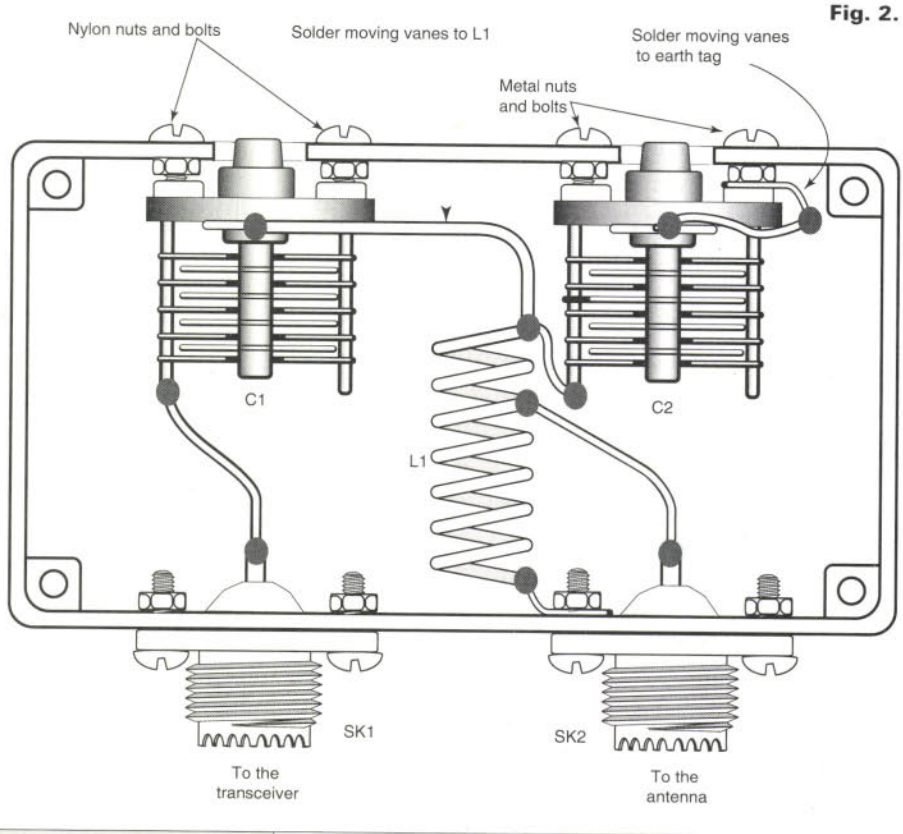


Fig. 2.

Ring Pull Ropes

How often have you cut and trimmed a length of polypropylene, or nylon rope, and then found it frayed and was impossible to get through the narrow holes? Then you found out that if you held a flame to the end, as you cut the rope, the end sealed and didn't fray anymore.

However, after sealing the end of the rope you found it had had congealed into a massive blob that still wouldn't go through the hole. I suppose you then discovered that if you pulled the blob before it hardened you could get it to become a tapering blob, that will go through the holes. But, pulling molten blobs of nylon (or polywhatsits) removes vast areas of skin in the most painful way possible.

Enter my 'ringpull' method. You don't use a ringpull, but the rope is put through a ring (a washer with a suitable sized hole). Once the washer is in place you can set a match to the end of the rope to seal it, then smartly pull the rope back through the washer.

Pulling the rope through the washer tapers the molten blob into a hole-fitting size without causing blistered fingers. Go on, pull-a-ring-a-rope, it's safer!

Godfrey Manning G4GLM
Middlesex

rkshop

Antennas, ancillaries and ideas! One roll-up, a stick-up, a tune-up and some pointers to make your station prettier or safer.

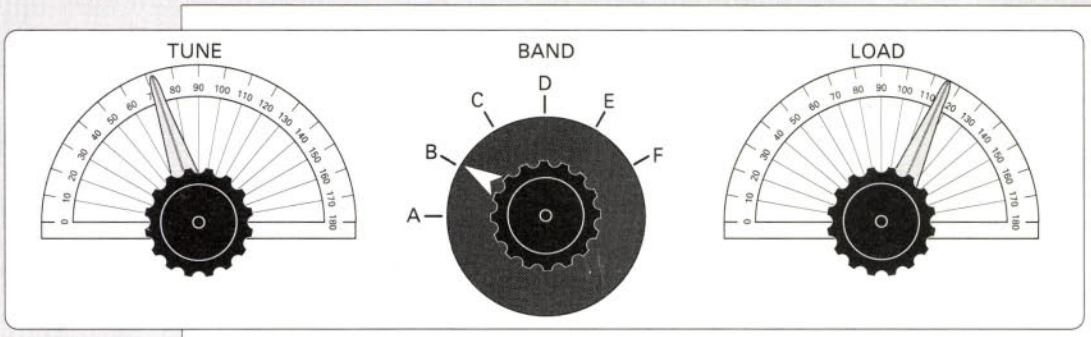


Fig. 1.

Scales From The Schoolroom

I suppose that most of you haven't seen the humble 180° protractor since you left school however many years ago. But I have found an excellent use for them.

Have a look at the sketch, **Fig. 1**, If you are building your own a.t.u. then what better way to put a reference scale on it. I use white cartridge paper, or card, as the front panel. The protractors are stuck to the card with Copydex adhesive. I leave the panel drying overnight with a heavy weight on top of it to make sure it's flat.

You could use an instant, cyanoacrylate, glue to fix the protractor onto the sheet. **But** for goodness sake don't use the polystyrene type of modelling glue. You will probably end up with an awful mess, as it will probably dissolve the protractor.

The pointers are from Maplin Electronics (order code HP47B) and are the pointers sold as being for the 6:1 reduction drive. But if you are a dab hand with tools, you could make your own.

Another idea is to glue two of them together as shown in **Fig. 2**. Make your own rotator scale with two of them. You will need to trim off the section below the 0-180° line on both protractors.

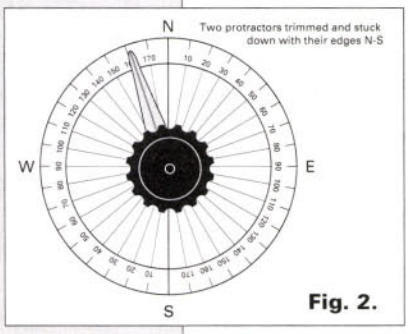


Fig. 2.

As scales for all sorts of projects, the humble 'school' protractor is unbeatable. There are two sizes, 100 and 120mm, available cheaply from many newsagents and other shops. Can you think of an easier way of creating an accurate scale?

J. Bolton G4XPP
Co. Durham

Personal Pointers

Many times when looking for items to finish off projects I've come across a need for a pointer to attach to knobs. Being handy with a few tools has its advantages as the drawing of **Fig. 1** shows, you just make one!

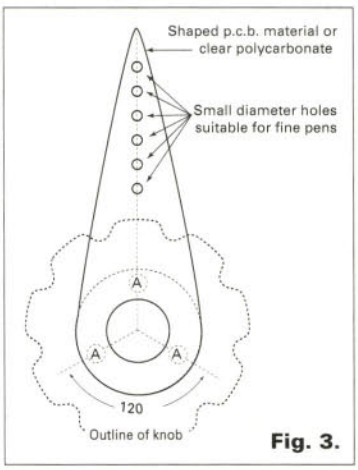
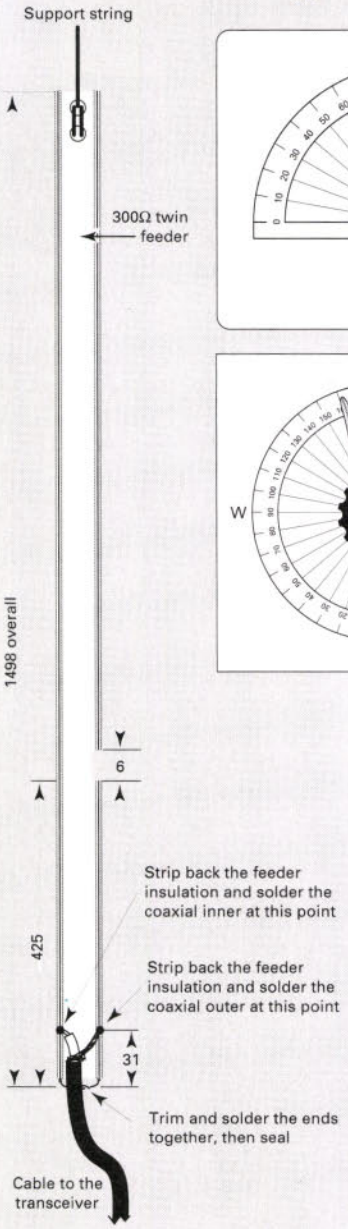


Fig. 3.

The beauty of making your own is that they fit the job in hand, and are just the right size. The drawing shows the type of knob that I tend to use. It was designed to have a pointer added, as it has three small threaded holes on the bottom suitable for 8BA bolts, (shown marked 'A' in the drawing).

A further possibility is to drill a series of small holes along the centre line of the pointer. If these holes are just big enough for a fine line drawing pen, then a series of fine parallel lines can be drawn around controls on the front panel. You can make up your own scales.

William Andrews G3DVW
Liverpool



Pocket Pole

An easy to make antenna for 144MHz

One day at breakfast, while on holiday in Saint Johns (In 'VE' land), I was handed a single sheet of paper with the design for a portable 'J' pole antenna for 144MHz. I didn't have time to try it whilst I was over there, so it had to wait until I got back.

When I got back I built the antenna as described, but found that the v.s.w.r. was at least 3:1 over the band. Then it struck me that their band was wider than ours (144-148MHz) and that the design was resonant at 147MHz.

A few changes later I came up with the design shown here in **Fig. 1**. The v.s.w.r. was now acceptable over the band and makes a useful antenna to stick in a pocket when going out with the hand-held.

Arnold Moon G3RGB
Middlebrough

Goodall's Goodies

John Goodall G0SKR has been busy looking at a range of antenna accessories and he's come up with some rather interesting gadgets.

The MFJ-934 antenna tuner and artificial ground (top) and the MFJ Deluxe Versa Tuner II.

This month I have had the pleasure to view some items having the common theme of antennas. But unfortunately this heading covers far too many items to list, even using every page of *Practical Wireless*!

However, with a small cross section of antenna-related equipment, I hope to whet your appetites with a number of items, some new and some not so new. So, here goes!

Sigma Communications

Sigma Communications is a name that has been around for many years, though I feel not associated with amateur radio. Nowadays though, they produce no less than 150 wire antennas for the amateur radio market.

It would seem from the extremely comprehensive array of wire antennas and accessories, that aside from a general move to the 'Black Box' trend, radio amateurs would much prefer to purchase custom made wire antennas.

There are still many amateurs out there who enjoy the trials and tribulations of the home-brewed antennas. You know the 'twice round the garden - up the side of the house - over the roof - down the chimney and into the shack' type of wire antenna!

But why go to all the trouble? You can, for a few pounds, get a wire antenna, purpose-made for your location 'over the counter' and be up and running in a couple of hours.

Multi-band trap dipoles, multi-band trap slopers, single-band dipoles, single-band slopers, all-band balanced line antennas, off centre fed dipoles, shortened dipoles, baluns, antenna shorteners, lightning arresters are all available. This gives some idea of the extensive range available from Sigma Communication Products.

From Diamond Antennas, the SX-200 s.w.r. and power meter.

From the same stable of Sigma, I also reviewed a range of antenna shorteners. These comprised type **SLC-40**; **SLC-80** and **SLC-160**. And as the name Antenna Shorteners implies, they do just that!

Limited Space

For those with limited space, the 'Shorteners', are used singly for a vertical sloper, and two for a dipole. They are manufactured to the same high standard as the traps, and of the same high quality materials but having longer tubing between the end caps.

The SLC-40 is for 7MHz. It's 198mm long end-to-end and makes a dipole for that band only 11.5m long.

Next, there's the SLC-80 which is for 3.5MHz. This version is 248mm in length and makes a dipole at 21m long.

Then there's the SLC-160 for 1.8MHz. This model is 334mm long and makes a 'Top Band' dipole 30m in length.

All the Shorteners are for single band operation, on the bands specified. They provide a half-wave dipole for each with a maximum distance, end-to-end as I've already mentioned.

In practice, the SLC-160 for 1.8MHz Shorteners are inserted half way along each leg of the dipole. On 3.5 and 7MHz respectively, the SLC-80 and SLC-40 Shorteners are fixed at slightly over halfway from the centre connector, on each leg.

Due to shortened dipoles or slopers, having a narrower bandwidth than a full size half-wave dipole, a tuner could be used to increase this bandwidth. The Shorteners are available from **Eastern Communications** and are priced as follows: the SLC-40 7MHz version at £19.95 and the SLC-80 3.5MHz and SLC-160 1.8MHz Shorteners cost £21.95.

Antenna Safety

It seems appropriate to include a mention at this point on antenna safety aspects. And to this end Sigma produce a couple of quality lightning arresters, and a small range of antenna coaxial switches incorporating lightning arresters.

To start off, there's the **SLA-2000** lightning arrester. This is a beefy little number contained in a die-cast aluminium box measuring 92 x 38 x 30mm, having an SO239 at each end, for operation up to 500MHz at 2kW.

The secret of the SLA-2000's efficiency is not just due to the usual spark gap protection, instead it uses a replaceable ceramic gas filled tube.

The gas-filled component is 8mm in diameter and 6mm deep and it's aptly named the 'Arc-Plug Cartridge Pill'. It's soldered within the SLA-2000, and it can also be found in the SLA-250 and the small range of antenna coaxial switches.

Antenna Switches

There are two antenna switches, the **Delta-2**, or the four antenna switch the **Delta-4** available for either SO239 or N type coaxial plug and socket fittings. The review model was the **Delta-2N**.

The **Delta-2N** is rather a large item, measuring 140 x 90 x 32mm deep. But the switch's cast alloy casing is also used for the four antenna switch models.

The **Common** output from the Delta 2, is on the upper edge, midway between the two **Input** connectors. The switch has three and five switched positions respectively.

The centre switched setting is the **Earth** position. This switches the centre conductor of **all** inputs to ground.

Lightning Pill

The output of the switch is protected against lightning surges by the Arc-Plug Cartridge Pill. This ceramic pill can be replaced by simply unscrewing a carbon plug on the front of the switch, and removing the 'pill' with a magnetic screwdriver.

The instructions state that the ceramic pill will short to earth should your antenna system be unfortunate to suffer a lightning strike. The accompanying literature says that "The pill will remain shorted to earth and need replacing, in the event of a severe strike", but "will return to open circuit with a less severe hit".

A separate ground should be connected to both the arresters and the switches. A hefty brass

screw terminal on the SLA-2000 provides this facility.

The coaxial switches are provided with a connector, to attach to the ground lead and fasten under the left hand of two fixing holes. The alloy around this hole is milled to expose bare alloy for the purpose.

The SLA-2000, (500MHz at 2kW) is priced at £59.95 and the Delta-2 Coaxial Switch (500MHz at 1.5kW) costs £59.95.

The Delta-2N (1300MHz at 1.5kW) is available for £69.95 and the Delta-4 (500MHz at 1.5kW) costs £79.95.

Finally, the **Delta-4N** (1300MHz at 1.5kW) is priced at £89.95. The replacement cartridge pill costs £8.95 and although this price may seem high - but should we price safety?

Flex-Weave

I also tried a range of reasonably priced wire antennas using Flex-Weave multi-strand copper wire. The range included the ever popular full size **G5RV** antenna at £45, with the half-size G5RV available at £35. There was also the full size **G5RV Plus**, having Flex-Weave copper wire and 450Ω feeder with balun at £68.95.

A half-size G5RV Plus was also available in the Flex-Weave copper wire, 450Ω feeder and balun, at £57.95. There was also a **Windom** type antenna covering 3.5 to 28MHz including the WARC bands, at £65.

Another Windom type antenna provided 7 to 28MHz, and is available at £55. There's a **Long Wire Balun** at £39.65.

Finally, there's a **Long Wire For Restricted Locations**. This comprises 20m of Flex-Weave copper wire, having an insulator at one end and the long wire balun at the other allowing coaxial feed from the long wire into the shack. This is an excellent antenna, and is the type I use for my own station, and it's priced at £59.95.

All the wire antennas can be obtained from **Southern Scanning and Shortwave**, who I should like to thank for the use of the review models.

Antenna Analyser

Antenna analysers are fast becoming much sought after items for use in amateur radio. And some makes and models are more sophisticated than others.

Prices don't always reflect what levels of sophistication you are buying. You should always thoroughly check the specifications to establish if the item you are about to buy does the job you want it to do!

One relative newcomer to the world of amateur radio r.f. analysers is the **Autek RF Analyst RF1**. This is obtainable from **Eastern Communications**, at a moderate price of £159.95 inclusive of delivery within Europe.

Appearances are often deceptive when it comes to specifications and the microprocessor powered RF1 is no exception. Its black plastic casing measures only 105 x 65 x 38mm. Placing two standard audio cassette cases back-to-back will give you some idea of its size.

On its front or upper surface the RF1 has seven push-to-make microswitches. There's one for each of the following functions: **Band Selector**, **Frequency Read-out**, **SWR Read-out**, **Z** (impedance) **Read-out**, **L** (inductance) **Read-out**, and **C** (capacitance) **Read-out**.

The RF1 also has a large 43 x 18mm four digit l.c.d. read-out; plus two sensibly-sized rotary tuning knobs. External connections are via the SO239 and an earthing post.

Although the RF1 is powered from an internal 9V PP3 battery (not supplied) it can be powered from any external d.c. source providing 6.5 to 15V at around 75mA. Sadly though, the unit does not have any external d.c. jack facility and connections for an alternative power supply would have to be through home-brew leads.

Instructions supplied with the RF1 are comprehensive and not over technical. They give details of how to operate and perform all of the many tasks and tests necessary.

On first powering up the RF1, after borrowing a PP3 from a nearby smoke detector, the first brief reading on the display gives the internal software version. In this case Pc 2.2.

The borrowed battery was from the Duracell range, and for those not familiar, this battery is of slightly larger proportions than the average 9V PP3 off the shelf. This slight oversize caused the battery housing cover on the review model to distort.

I didn't find any problem with the opening and closing of the cover on the RF1. The careful paring away of two small swages on the cover would have prevented the Duracell battery distorting the cover.

Microswitches are used for selection of the various modes of operation of the RF1. They require only a slight tap to operate.

Band switching on the RF1 toggles through the available frequency bands. This is (in the case of the review model) from 1.12 and 36.33MHz. Five bands are available giving the following coverage with coarse and fine tuning, one rotary knob for each.

The MFJ-259 h.f./v.h.f. s.w.r. analyser.

The Autek Research RF-1 r.f. analyser.

Band	Coarse Tuning	Fine Tuning
1	1.120MHz - 2.364MHz	12 to 90 kHz
2	2.111MHz - 4.548MHz	21 to 130kHz
3	3.753MHz - 8.432MHz	31 to 165kHz
4	7.930MHz - 18.82MHz	47 to 170kHz
5	14.83MHz - 36.33MHz	60 to 320kHz

You can use the Autek RF1 to tune an antenna, cut one quarter and one half-wave coaxial cable for phasing or matching. It can also indicate the velocity factor of a length of coaxial cable, check baluns and carry out many more tests (too numerous to mention here!).

When tuning an antenna, by simply tapping the RF1's **Frequency** and **SWR** buttons together, the read-out alternates between the frequency in use and the s.w.r. reading. This makes life somewhat easy if you have to climb a tower! And in fact, pressing any two buttons together will cause the display to alternate between the two chosen readings.

Highly Popular

One analyser that has become highly popular over the last twelve months, is the **MFJ-259**. This instrument has two moving coil meters plus a large clear l.c.d. display.

The MFJ-259 can also be used as a frequency counter. It can count up to 200MHz as well as analyse antennas operating on frequencies from 1.8 to 170MHz.

Although portable and having its own internal power supply, the MFJ-259 is powered from eight AA batteries and is much larger than the Autek RF1. Cased in black plastic covered aluminium the MFJ-259 measures 173 x 102 x 60mm. It can also be powered from any external d.c. power source giving between 8 and 18V, at around 200mA, via the unit's standard d.c. chassis plug.

Comprehensive instructions supplied with the MFJ-259 cover all aspects of its use. And for example, when it's used for tuning an antenna, the operating frequency is set on the l.c.d. read-out. This is done by switching the multi-position inductor switch to the relevant position and then turning the left hand tuning knob until the exact frequency required is displayed.

On the MFJ-259's two moving coil meters the s.w.r. can be read from the left hand meter, and the resistive load measured on the right. Additionally, by simply altering the rotary tuning knob, the resonant frequency of the antenna can be quickly found.

Used as a frequency counter, the MFJ-259 has four different gate times for measuring frequencies from a few Hertz to 200MHz. The gate time on power up 0.01sec with 0.1sec, 1sec, and 10sec being available on each press of the **Gate Time** push button on the top of the case.

Antenna input on the MFJ-259 is via an SO239 socket. The frequency counter input employs a BNC socket, and both are fitted on the top of the case.

Testing and the tuning of stubs, transmission lines, determining the velocity factor and a host more tests are possible with the MFJ-259. I think it's an extremely useful piece of equipment for the amateur radio operator.

Priced at £249.95 the MFJ-259 is available from **Waters & Stanton Electronics**, as is the optional foam-filled pouch to protect the instrument in use. (The pouch catalogue reference is MFJ-29) and it costs £35. I think it's well worth buying so as to protect your investment in the MFJ-259.

Budget Priced

The MFJ h.f. s.w.r. and wattmeter.

While looking at meters I reviewed a budget priced s.w.r./power meter which is useable on h.f. frequencies from 1.8 to 30MHz. This model, the **MFJ-816**, also reads s.w.r. and power up to 300W.

Power measurement on the MFJ-816 is provided in two ranges, up to 30 and then 300W. It's small in size (measuring 112 x 76 x 58mm) and is ideal for mobile or portable use. Connections to the transceiver and antenna are made via SO239 sockets on the rear panel of the meter.

On the front panel the MFJ-816 has a small but easy to read meter. This has calibrated scales for s.w.r., power 300W and power 30W. There's also one push **On**/push **Off**, **Forward/Set** and **Reflected/SWR** switch and the rotary calibration knob with marked settings for 30 and 300W.

The MFJ-816 is simple to use and comes complete with circuit diagram and instructions. It's priced at £35.95 and is available from Waters & Stanton Electronics.

Diamond Variety

Diamond Antennas produce a variety of s.w.r./power meters. I had just a 'taster' in the shape of the **Diamond SX-200 Precision SWR:Power Meter**. All meters from Diamond are manufactured to an extremely high standard and are state-of-the-art in technology, design and finish.

The SX-200 measures 155 x 105 x 62mm, and it has a large moving coil meter with easy to read scales for high and low power, s.w.r., and 5, 20 and 200W power levels. Three triple position switches control **Range**, **Function** and **Power**.

The **Range** positions reflect the scale readings, 200, 20 and 5W. Function positions are **Power**, **Calibrate** and **SWR**. The **Power** switch positions are **Reflected**, **Forward** and **Off**.

Also on the Diamond SX-200's front panel is the rotary **Calibration** knob, together with a push **On**/push **Off**, and **Peak Envelope Power**, in position/ **Average Power Out** position switch. The rear panel houses the two SO239 antenna and transceiver connectors along with a d.c. power chassis plug.

The rear mounted d.c. input chassis plug on the SX-200 allows coupling to an external 13.8V d.c. source, via the supplied power lead. This power source is not essential for the efficient operation of the meter, and when this facility is used, immediately the **Power** switch is moved from the **Off** position, the meter dial is illuminated. The SX-200 can be obtained from Waters & Stanton Electronics for £94.95.

Tuning Units

Two antenna tuning units now from the MFJ stable. They are the **MFJ-949E** and the **MFJ-934**, (a newcomer to the scene).

The MFJ-949E, is described by MFJ as being a "Deluxe 300W Tuner" and has been around for quite a time. The manufacturers say that in a recent survey of world-wide radio amateurs "it proved to be one of the most popular of tuners". The a.t.u. is priced at £169.95, has eight switched antenna positions, four via the tuner and four through the tuner.

The MFJ-949E offers two coaxial line inputs, one balanced line input via a 4:1 balun, a long wire input and an internal 300W dummy load. Three tuning controls make operating this tuner a simple exercise to tune almost any antenna to any transceiver.

The MFJ-934 is a relative newcomer to the UK amateur radio market. It's an a.t.u. that comes **complete with** an 'artificial ground'.

Any radio amateur who has a shack on upper floors or in fact live in flats, will have come across at some stage the problem of r.f. ground. And to help, MFJ have produced a unit which will match any transmitter to almost any antenna. Additionally, the artificial ground circuit within the tuner cancels out any reactance of a ground lead or counterpoise.

The MFJ-934 uses a 'T' network and operates on all amateur bands from 1.8 through to 28MHz. The manufacturers claim it will work on dipoles, inverted 'V' antennas, verticals, wire antennas, beams and even mobile whips. After trying it, I think the claims could well be correct.

The tuner unfortunately only offers one coaxial input and a long wire or balanced line input. Only one of which can be connected at any one time.

The circuitry for the ground matching, together with the two controls on the front panel for this purpose take up space in the unit. The result is they've substantially reduced the size of the twin needle meter which is now synonymous with the name of MFJ.

To the left of the meter on the MFJ-934 are the ground matching capacitance and inductance controls, whilst to the right is the (smaller than usual) meter. This does I feel, make reading the meter, for those of us without 20/20 vision, somewhat difficult. Having said that, after frequent use, the various important positions of the needles on the meter, can be memorised, not too difficult even for me!

Initial operation of the tuner starts with adjusting the ground capacitance control to '0' and the ground inductance twelve position switch to 'A'. The antenna controls are then adjusted to give the lowest s.w.r. reading.

Next, the ground matching controls are adjusted to give maximum forward current. Then the antenna matching controls are again adjusted to give minimum s.w.r. readings.

The Delta-2 coaxial switch and surge protector.

Simple Counterpoise

The artificial ground used with the MFJ-934 is achieved via a simple counterpoise. This should have a physical length of as near as possible to one quarter wave of the operating frequency, or multiples thereof.

All instructions supplied with both the MFJ tuners are comprehensive, and easy to understand. The MFJ-934, although not having the facility to by-pass the tuner, is I think good value for £189.95.

Finally, there's also a simple but essential piece of equipment for every shack in the form of a dummy load. It's available in the form of the **MFJ-264**.

The MFJ-264 is an air cooled, 100W for 10 minutes or 1.5kW for 10 seconds unit. It's useable up to 750MHz and costs £79.95.

I don't think instructions should be necessary with the MFJ-264, but I feel one part could have been omitted. I have in mind the part where MFJ state "should the unit become too hot - the cooling process can be speeded up by immersing the load in a bucket of **water**". Radio shacks and water **do not** mix in my opinion!

Well, that's the lot. I hope you've found something of interest. I certainly enjoyed researching, trying and preparing the article! And of course, my thanks go to all the suppliers of the review equipment. **PW**

A 1.5kW dummy load unit from MFJ, the MFJ-264.

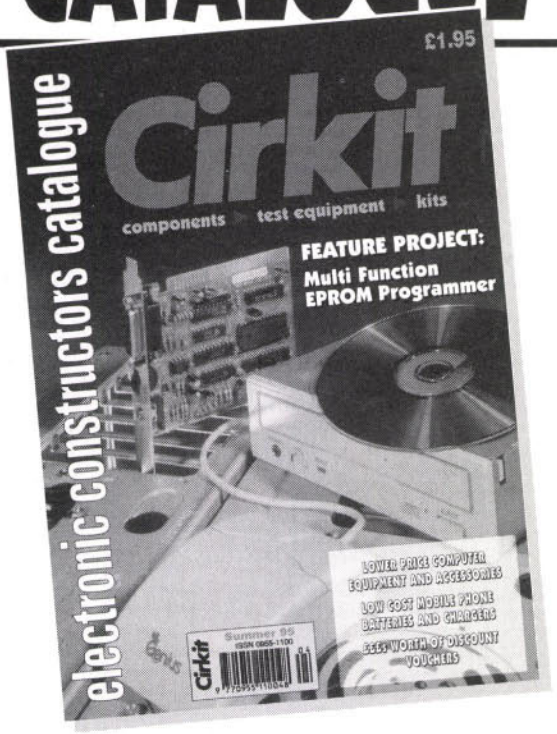
Contact addresses:

Waters & Stanton Electronics, 22 Main Road, Hockley, Essex SS5 4QS. Tel: (01702) 206835, FAX: (01702) 205843.

Eastern Communications, Cavendish House, Happisburgh, Norfolk NR12 0RU. Tel: (01692) 650077, FAX: (01692) 650925.

Southern Scanning and Shortwave, PO Box 2126, Bournemouth, Dorset BH11 9YH. Tel: (01202) 590779.

SUMMER 1995 CATALOGUE



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The Two-Fold

Kevin James G6VNT has come up with another interesting antenna design. This time Kevin describes a lightweight 144MHz beam antenna which packs a useful feature - it folds up for transport. There's no excuse for missing that portable operation now!

Antenna's can be unwieldy things. Especially when trying to transport them in the car to the local DX spot.

If you don't poke your eye out or upset the XYL, you mark the car's upholstery. Then you end up bending the elements of your masterpiece manoeuvring it in or out of the rear passenger door!

So, with all the problems in mind, I decided to design an antenna that would fold down to 550mm long x 50mm square. This little beam would have to be capable of either being pushed under the front seat of the car, or just the job for throwing in the boot, taking up no space at all.

I had considered a folding HB9CV, but discounted it because of the elaborate Z matching arrangement, which would not fold down satisfactorily. So, I set about to design the 'Two-Fold'.

Beam Results

For the odd bit of DX hunting I think you need a beam of some sort to get results. A 2-element beam is the smallest you can get, (excluding quad loops) and being less to fold up, I chose this approach for the basic design.

Various samples were tried to maximise the gain. A 2-element beam has an optimum theoretical gain approaching 6dB over a dipole (though it's rarely achieved due to losses in matching, etc.).

However, aiming for 4-5dB gain is not unreasonable. With the parameters in mind, the format for the antenna was set.

Optimum Gain

Optimum gain for a 2-element beam is achieved around an element spacing of 18% of a wavelength. At 144MHz this means a boom length of around 350mm. (This was increased slightly in this design purely to make it easy to fold up).

Further gain was realised by narrowing the bandwidth, which was centred around 144.300MHz. I achieved a narrower bandwidth by making the difference between driven and reflective element lengths smaller than you would normally use.

Matching Problem

Reliable matching is always a problem with v.h.f. beam antennas. To help, I chose an unbalanced straight gamma matching arrangement, mounted on a p.c.b.

The matching unit provided good s.w.r., repeatability, ease of adjustment and stability. All the parts should be available at most rallies, and I bought the aluminium tubing used on the prototype from at a local TV antenna manufacturer for a couple of pounds.

Building The Antenna

The task of building the antenna should be well within most constructor's capability. Provided you have some basic d.i.y. constructional skills and a few tools there should be no problems.

You'll only need a vice, padsaw, file, screwdriver, pliers, soldering iron, and drill. Basically, these are all the tools you need. You can now start the construction stage by looking at the information provided in the diagram, **Fig. 1**.

Take a length of 15mm square aluminium tube and cut it to 525mm. This will form the boom of the antenna. Then drill the two 3.5mm holes in the top and a single 5mm hole in the side where shown.

A small groove should now be filed across the boom over each hole. This helps stop the elements rotating whilst it's being hoisted aloft.

The front and rear elements on the antenna are divided in two. This enables them to fold up when not in use thus halving the size of the beam. (For element lengths, refer to **Fig. 1.**).

You now have to drill 3.5mm holes, 10mm in from one end of each half of an element. These will be bolted one half on top of the other, onto the boom.

When the antenna is in the unfolded state,

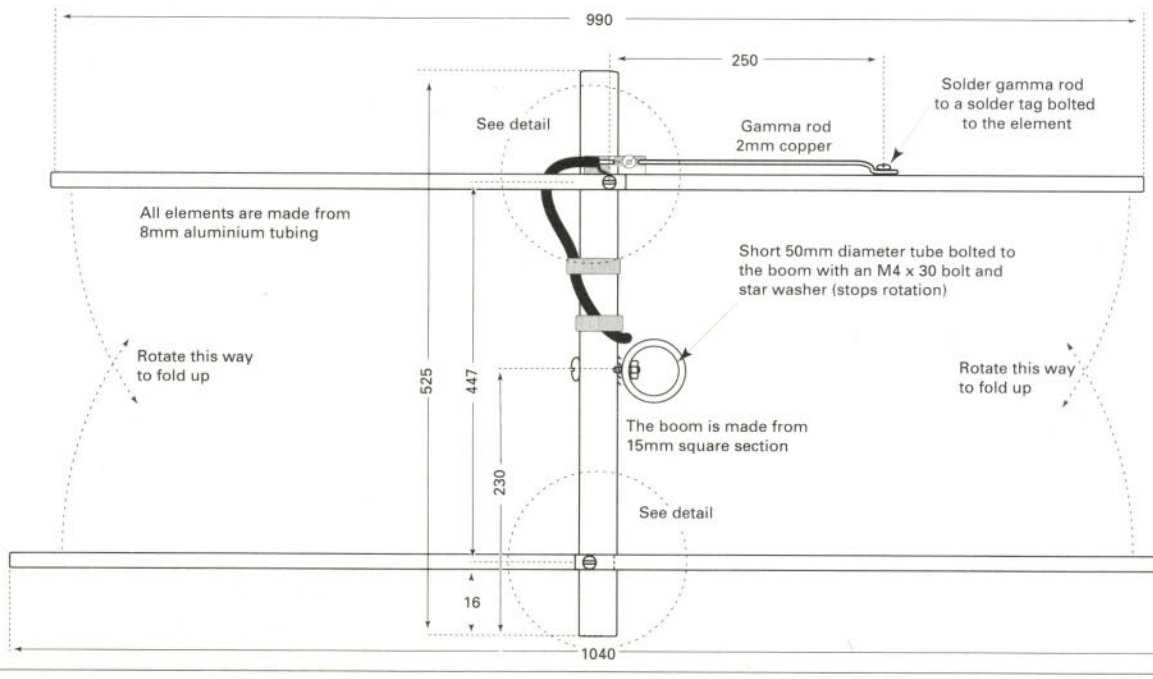

Fig. 1: Diagram illustrating the 144MHz beam antenna. (See text for detailed constructional information).

the front or driven element should have an overall length of 990mm, and the reflector 1040mm. The diagram **Fig. 3** shows more detail as to how the folding antenna is constructed.

Gamma Matching

You'll see from **Fig. 2**, that a small p.c.b. holds the gamma matching rod and reactance trimming capacitor. It also doubles as a cable clamp.

The cable clamp was found to be very important. This was because after using the prototype antenna a few times, I found that the centre core fractured at the solder joint due to flexing.

Basically speaking, the adjustable capacitor balances out the inductance of the gamma rod. The p.c.b. on which it's mounted, is assembled under the front left hand element so that the large pad is in contact with the element itself.

A small cable tie is passed through the remaining hole. This acts to clamp the RG58 coaxial cable to the board.

I suggest you avoid the use of excessively long lengths of RG58 from the antenna to the radio. This is because the attenuation per metre is quite high at these frequencies.

In practice I recommend that you use no more than four metres, as appreciable losses will be incurred. The RG58 cable was chosen because of its flexibility, particularly in cold weather.

The gamma matching rod itself was made from 14s.w.g. enamelled copper wire. Once formed, it's then soldered between the solder tag on the driven element and the pad on the p.c.b. Follow the gamma length and spacing carefully, or the residual s.w.r. will be high.

Single Sided Board

The p.c.b. can be made taking a piece of 1.6mm single sided board material. I recommend covering the copper laminate surface with pvc tape or similar material.

Cut the tape off with a sharp knife in the areas where copper is not required. Next place the board in a bath of p.c.b. etchant and agitate until all the uncovered copper is etched away, then drill as shown in the diagram.

Portable Mast

I've had a portable telescopic mast for years, and I really think that one should be part of the portable enthusiast's standard kit. Mine was pressed into service yet again with this antenna.

The portable mast basically consists of three 1.25m lengths of aluminium tubing. One has a diameter of 16mm, there's one of 19mm, and finally one of 22mm.

All the mast sections slide conveniently one inside the other. The imperial sizes of the diameters are 5/8", 3/4", and 7/8" respectively.

Springs used in caravan awning stays are fitted on one end of both inner tubes at 25mm in. A 6mm hole is drilled at this point and the spring is pushed down inside the tube until the formed button part pops out through the hole.

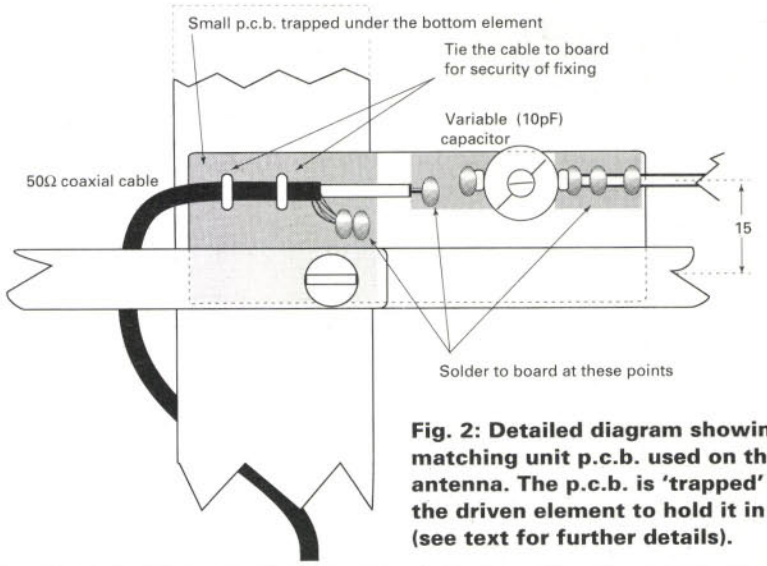

Fig. 2: Detailed diagram showing the matching unit p.c.b. used on the antenna. The p.c.b. is 'trapped' under the driven element to hold it in place (see text for further details).

The formed button pops up and into a 6mm hole in the end of the preceding tube. This is also 25mm from the end, and when the mast is fully extended, stops it all collapsing.

Fortunately, the springs are available in most camping shops on the 'Pick-a-Pak' stand for a few pence. They fit a variety of sizes of tubing.

A nylon plug with a 75mm steel spike embedded in it, (used on awning stays) is also available, fitting into the end of a 7/8in tube. This is hammered into the bottom of the mast, and pushed into the ground for stability during in use.

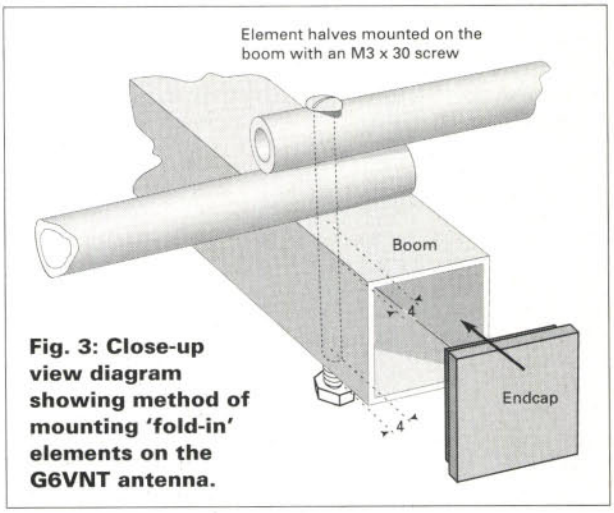

Fig. 3: Close-up view diagram showing method of mounting 'fold-in' elements on the G6VNT antenna.

Setting-Up

Setting-up is easy. Start the process by placing the antenna on top of the un-extended mast, and then stick the mast into soft ground in an open space.

Make sure all elements are parallel and rotated correctly. Now with your s.w.r. meter in line, transmit on low power adjusting the small trimmer on the gamma matching unit with a plastic trimming tool for the lowest available s.w.r. (Once the antenna adjustment is set it should not be necessary to do it again - unless it's knocked somehow).

Now, with some old rag wrapped around the lower part of the mast (so as not to scratch the car), tie it to a door handle or wing mirror with a rubber 'bungy' rope (as used on roof racks). Stick the spike in the ground for stability, extend one section, place antenna on top of mast, then hoist to full height and you're ready to go on air!

On The Air

I used my Kenwood TS-751E for on-air tests as it's a stable and reliable signal source. I also used a reference antenna (HB9CV), and the mast already described.

With a reading of S9 on the front-end of the beam from a constant signal source at 100ft, swinging the antenna through 180° gave an S4 from the rear. Not a bad front-to-back ratio for only two elements !

Gain (when compared to my standard HB9CV) was identical. The null on the back of the new beam was not as deep as the HB9CV, but I considered this to be a small price to pay for the fold-down portability.

Finally, as the matching unit is open to the weather don't use the antenna in pouring rain it will ruin the capacitor! The whole area could be covered in a silicone sealant (bathroom sealant) after adjustments are complete. But I haven't tried this idea to see how much the antenna is detuned by adding the sealant.

Memorable Contacts

I'm pleased to report that I've had several memorable contacts to date on this antenna. The QSOs all earned 5 and 9 reports and I'm only awaiting lift conditions to exploit it even further.

And I round off with a final tip. Always choose a good DX spot, it's worth half a dozen elements on a beam...so good hunting on 'two'!

PW

IAN POOLE G3YWX

EQUIPMENT SPECIFICATIONS

Ian Poole G3YWX answers the question "What Is Direct Digital Synthesis"?

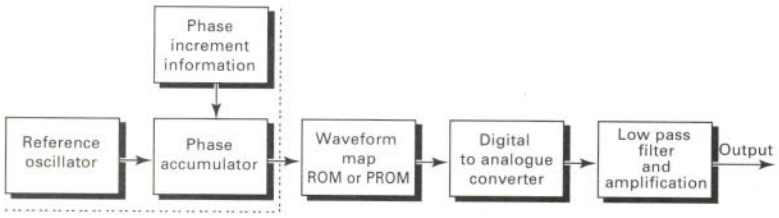

Fig. 1: A block diagram showing the four stages of a basic synthesiser (see text).

Most frequency synthesisers used in amateur rigs today use a phase locked loop (p.l.l.) oscillator as their basis. Now a new form of synthesiser known as a Direct Digital Synthesiser (DDS) is starting to appear.

These synthesisers have a number of advantages over the more common p.l.l. versions. But in view of their cost they are generally restricted to the higher priced sets.

Different Concept

The direct digital synthesiser uses a totally different concept to its more familiar p.l.l. relations. As the name suggests it synthesises or generates the waveform in a direct fashion.

The DDS makes up a digital representation of the waveform which it then converts into an analogue format. After this, the waveform is filtered and amplified as required.

The basic synthesiser consists of four basic blocks. These are a phase accumulator with its reference oscillator and setting information input, a waveform map which is normally a PROM or ROM, digital to analogue converter (D to A), and filter possibly with an amplifier as shown in **Fig. 1**.

To understand how a direct digital synthesiser works it's necessary first to look at an ordinary sine wave. By looking at **Fig. 2** you'll see this is a repetitive waveform, and any point on it can be defined by giving its angle as shown in the diagram. Not all points on the waveform map need to be used.

In fact, the amplitude of the waveform is equal to the sine of the angle for any particular point. The angle at any given point is known as its phase, and as the signal progresses through the sine wave its phase angle progressively increases from 0° to 360°.

The first stage in the synthesiser is the phase accumulator. This is basically a counter which adds a given number to its value every time it receives a clock pulse. When it reaches its maximum value, it resets and returns to zero.

The value held in the phase accumulator is proportional to the phase. As it increases this is equivalent to the phase of the sine wave increasing. Once the maximum value is reached the wave starts all over again.

The next stage is to convert this phase into a digital representation of the signal itself.

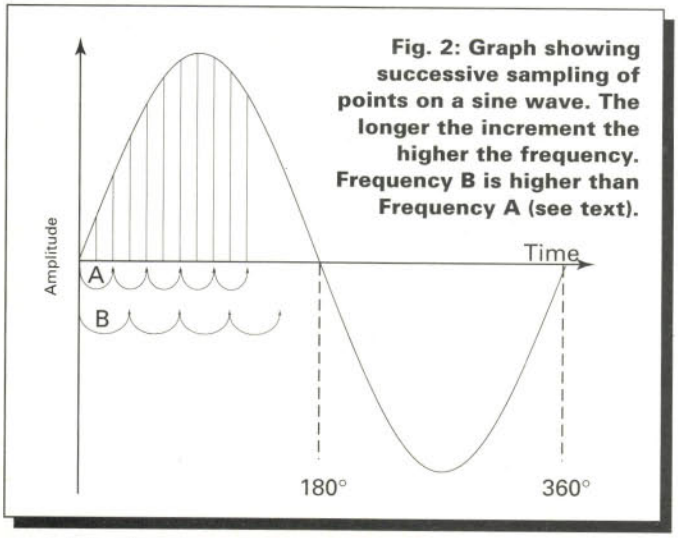

Fig. 2: Graph showing successive sampling of points on a sine wave. The longer the increment the higher the frequency. Frequency B is higher than Frequency A (see text).

This is accomplished by using a PROM or ROM. This stores the digital value of the sine wave for any given value of phase.

Once the digital value for the particular point on the waveform has been generated, it's converted into a real analogue voltage by using an i.c. called a digital to analogue converter. The output from this is then filtered to remove any unwanted signals which may have been produced.

Number Of Steps

The phase accumulator and waveform map have a very large number of steps. These are way above the limit required to generate a very good representation of the signal.

Often many million points will be stored. If each one was accessed in turn then only one frequency would be available because the reference oscillator is normally crystal controlled and very stable.

The large number of points are stored so that the frequency can be changed. It's not necessary to use every sample and it's possible to change the rate at which the phase advances simply by altering the step size.

For example, one frequency may be generated by adding 5045 to the accumulator at each clock pulse. Then the next frequency is generated by adding 5046, and so on.

A typical phase accumulator may have a 24bit resolution. This will give just over 16 million points on the curve. When clocked with a 5MHz signal it will give a resolution of just 0.25Hz - more than sufficient for any amateur purposes.

Number Of Advantages

Direct Digital Synthesisers are more expensive than their phase locked loop counterparts because they demand very high speed i.c.s, and the technology is relatively new. However, it's to be expected that as they become more widespread prices will fall.

Despite the cost, DDS offer a number of advantages. The most important for amateur applications is that they are likely to give a lower level of phase noise than their p.l.l counterparts. This will result in a much better reciprocal mixing specification.

Direct digital synthesisers can also operate over a very wide frequency range. They are not limited by the range of the oscillator.

The wide frequency coverage makes DDS ideal for any receiver covering a very wide band. Their frequency is only limited by the speed of the i.c.s and this places a top limit on their operation. This means that in many applications they are combined with a p.l.l. synthesiser to obtain the best of both systems.

That's all for this month. I hope I've helped to answer some of your questions surrounding Direct Digital Synthesis. Next month I'll be looking at things to consider when buying a second-hand radio.

END

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Friendship - The Key To Ireland's Amateur Radio

In May, Rob Mannion G3XFD, accepted a long standing invitation from Irish friends and ventured over to the Emerald Isle again. It seems that friendship was the key that opened the green door to the famous Irish hospitality for EI/G3XFD!

Above: The man who started it all! John Taite EI7BA (the Leprechaun himself) invited G3XFD to stay in Cork.

Right: Members of the Cork Club made Rob Mannion very welcome. Aedan EI3EG (front row, second from right) set G3XFD quite a task. He wants someone to read all of *PW* onto cassette each month. Can you help?

Anyone who doubts the welcome awaiting them on entering Ireland is in for a shock. The welcome waiting is overwhelming and there's no doubt you'll want to go again!

My old friend **John Taite EI7BA** was at the bottom of it all. 'Echo India Seven Bad Apples', as he phonetically calls himself on the air, had been trying to get me to visit Ireland again for a very long time.

Well, to cut a long story short, after a lot of arranging I found myself on the Pembroke Dock to Rosslare ferry bound for County Cork as the guest of EI7BA, the Irish Radio Transmitters Society, the Cork Club and the Cashel Club in County Tipperary.

I was due to be in Ireland for a week, staying in the old Coastguard Station at Power Head, near to Cobh Harbour in County Cork. It turned out, like the welcome I received from everyone, to be a delightful place to stay. I soon realised that it was a mistake to come for just one week!

Club Talks

While in Ireland I was due to give some club talks, chat about *PW*, meet old friends and make new ones. However, I was soon in the debt of the President of the IRTS, **Jim Ryan EI3DP**, because he'd arranged that I was to visit only two clubs, rather than three or four. And as it turned out...he did the right thing!

Also, it was my pleasure to have lunch with another magazine Editor. This happened when **Dave Moore EI4BZ**, the *IRTS Newsletter* Editor took me out to lunch.

Our lunch turned into an afternoon and I ended up fully appreciating that running a national radio society magazine is more difficult than *PW*. I only have to run *PW*, I don't have to do another job during the day as David does.

I had already had a sample of the welcome waiting for me as I travelled from the ferry at Rosslare towards Cork. John EI7BA and all the others were sitting on the Cork 144MHz repeater channel and even at a distance of 100km (warning to all British drivers...all distances in the Irish Republic are now in kilometres, even though they resolutely refuse to metricate a pint of Guinness!) they were waiting up for my very scratchy signal into the repeater.

On Monday May 22 I was guided into the Cork Club by Jim Ryan EI3DP. Without his help I would never have arrived, and that would have been a great pity because several club members had travelled great distances to attend.

The actual club talk about *PW*, its history and what we're planning in the future, went down very well. They were a very appreciative audience and one or two showed me copies of the magazine dating from the 1930s and 1940s.

Also during the meeting, I met **Aedan O'Mara EI3EG**. Aedan is a Vet who gradually lost his sight over the years. But although now completely blind, Aedan now works for the Irish Government Veterinary Service and he's set me a really difficult task!

Aedan EI3EG wants me to find someone to read **ALL** of *Practical Wireless* onto cassettes each month. Do you live in Ireland and can you help? It's likely to be quite a job, but if you'd like to help, please contact me at the *PW* office.

I was quite unprepared for the buffet meal, which was provided after the talk. The Cork Club provided mountains of sandwiches, good humour and rounded off the evening with yet another surprise.

The surprise came in the form of a hallmarked solid Irish silver medallion. It had been engraved with my name in Gaelic, 'Rubard', inscribed in ancient 'omish' writing.

Dick Bermingham EI6HH and **Antony O'Rourke EI2HY** presented it to me on behalf of the club, then told me that they think 'omish' (it consists of groups of horizontal lines either side of a vertical line, similar to a code) probably inspired Samuel Morse. He happened to be sailing back to America from Ireland when he dreamed up the code that now bears his name!

I finally arrived back at Power Head at 1.30am! It had been a wonderful evening. I was alright but poor Jim Ryan EI3DP, the IRTS

Dick Bermingham EI6HH and Antony O'Rourke EI2HY present G3XFD with an inscribed Irish silver medallion on behalf of the Cork Club.

President (who guided me back through the remote country lanes), had to go to work later that morning.

Cashel Club

Really speaking, I should have been prepared for the next helping of Irish Amateur Radio hospitality at the Cashel Club in County Tipperary. But their kindness and the welcome still took me by surprise.

I'd had a leisurely drive through the beautiful countryside, had a ride on a (brand new) Irish train from Limerick Junction, before arriving in Cashel. Cashel, as you may have guessed, is Gaelic for 'castle', and it's aptly named because the town is dominated by a fortress, complete with church and ancient fortified tower.

The club, which has only been formed fairly recently, meet in a room above a pub. It looked as if there wasn't going to be enough room for everybody, but we all managed to squeeze in.

I had been busy on 144MHz just after my Labrador Mandy and I had our tea. This was when **Hugh O'Donnell EI2HI** welcomed me over the air.

Hugh had driven close on 100 miles to be there, as he was a founding member of the club, despite the fact he was working on the other side of Cork. I found out later that he drove back to work **after** the meeting! (I hope it was worth it Hugh).

The Cashel Club in Tipperary provided another really enjoyable evening for G3XFD. In front of the friendly throng (to Rob's left) are Liam EI7FE and Janet. On the far right of the picture is Jim Ryan EI3DP, President of the IRTS, with Jim Barry EI8GS to his immediate right.

Late Finish

It was another late finish, with plenty of food (they'd heard of my appetite!). However, it broke my heart to have to leave the two pints of Guinness they had served up for me!

Finally, I had to say cheerio to all my new friends at the Cashel club, wishing **Liam O'Brien EI7FE** and everyone else a goodnight at close on midnight. And I didn't even have to worry about finding my way back to my temporary home as Jim Ryan EI3DP, with **Jim Barry EI8GS** driving, accompanied me most of the way.

Again, I got back to Power Head at nearly 2am. It had been a wonderful day and I had met many old friends, and made many new ones.

I slept well that night (or should I say morning) and had a good session on the air later that day. But all good things had to end and I headed for home on Saturday May 27.

However, I enjoyed it so much that I'm going back in the first week of October this year. So, if you'd like to work EI/G3XFD, you can do so later in the year, thanks to the goodwill of John Taite EI7BA and the East Cork Contest Group - EI7M, who extend the welcome and facilities.

Listen out for me on 3.5 and 7MHz. I'd enjoy a QSO with you from Power Head, and thanks to our EI friends in Cork...I can!

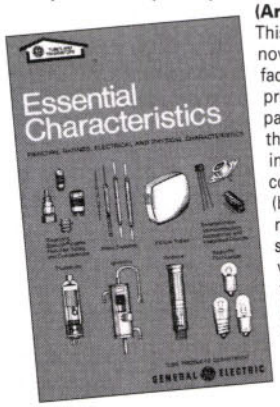
PW

Valve Book Victory!

One of the biggest problems for anyone contemplating working with valves nowadays...is finding information on particular valves. However, Rob Mannion G3XFD has scored a distinct victory in support of 'valve & vintage' enthusiast by discovering some interesting American valve data reference books.

On my recent trip to the Dayton HamVention I was delighted to discover some very helpful valve (or should I say 'tube') reference books for sale. I immediately thought of the large number of readers who call us asking where they can buy books with valve details. Well, I've found some and I can tell you they're fascinating to read...even if you're not working with valves! And of course, they're to be found on my bookshelf now!

Essential Characteristics (Tubes & Transistors)
(Original Publishers General Electric)
Re-published by Antique Electronic Supply (Arizona).



This stiff covered, novel-sized paperback facscimile book is printed on good paper and is packed throughout with information, and connection details (base pin charts) on receiving valves, special purpose valves, cathode ray tubes, thyratrons (still used some older oscilloscopes!), vidicons and many others (including semiconductors). I regard it as being extremely useful, and (bearing in mind it's a facscimile publication) even the small print is clear and easy to read, even for those of us who are at the bi-focal stage. Highly recommended as a valve reference book. *475 pages.* **£9.95**.

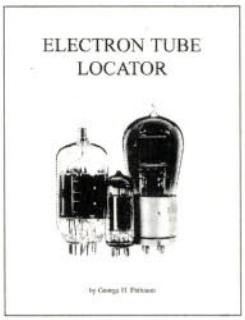
RCA Receiving Tube Manual
(Original Publishers Radio Corporation Of America)
Re-published by Antique Electronic Supply (Arizona)

This novel-sized stiff covered paperback book is absolutely fascinating for anyone interested in valves! In reality it's a designer's handbook with potted details, characteristic curves, information and descriptions of typical applications for each valve listed. It's even got a section showing receiver circuits and applications! Thoroughly indexed, this is a one valve book I've been looking for, for a very long time. Again, it's a facscimile copy but the quality of reproduction is excellent. If you get a copy I'm sure you'll find yourself building with valves again...particularly the circuits RCA provide. My book is my top choice of those I saw in the USA. Excellent reading and reference. *384 pages.* **£9.95**.

RCA Transmitting Tubes
(Original Publisher Radio Corporation of America)
Re-published by Antique Electronic Supply (Arizona)

This is a stiff covered paperbacked novel-sized book. And If you've got an interest in transmitting with valves...this is a useful reference source for valves up to 4kW input. The information on the 807 valve (for example) runs to two pages. With a good reference section, I consider it would be a good buy for anyone contemplating building a valved linear. I was amazed to find out (for example) that RCA state that the 807 can be used at up to 85MHz (officially!). The RCA authors have also included some interesting practical circuits using their valves, including some for s.s.b., v.h.f. (there's an interesting project for 50MHz) and others. Highly recommended reference source. *318 pages.* **£9.95**.

Electron Tube Locator
George H. Fathauer
Published by Antique Electronic Supply (Arizona).



A spirally bound (opening flat) style book, this should prove to be of great interest to valve collectors, historians and anyone trying to identify particular valves. The author has gone to a lot of trouble researching American, British and valve types from all over the world. There's an interesting and seemingly comprehensive description of valve coding and how various countries go about the job of confusing the user (you won't be confused after you've read it). The author provides a comprehensive list of American and British Service valves and 'civilian' equivalents and the valve base details are provided, with description of valve type and although there's no comprehensive valve characteristic information, the filament voltages and currents are given in a clear and precise style. Ideal for the researcher and collector. *350 pages.* **£19.95**.

To order any of the books mentioned here use the Order Form on **page 70** of this issue or call **Ann** or **Michael** on our **Credit Card Hotline on (01202) 659930** to place your order. (Don't forget to add P&P, £1 UK, £1.75 overseas).

Ron Ham, who has been looking after customers in the PW vintage 'wireless shop' since it first opened, announces his retirement this month and prepares to hand over the immaculately kept shop to a new team.

Valve & Vintage

After 51 years in radio, the time has come for me to retire and hand over 'Valve & Vintage' to Phil Cadman G4JCP, Charles Miller and Ben Nock G4BXD who will be writing the column in future.

I'd also like to thank you for your letters and the kind remarks that you've made about my past efforts. I really have enjoyed writing the column and stretching my memory over the multitude of sets that I have handled in those years.

Television Sound

However, before 'shutting up the shop', I want to tell you about two of the broadcast receivers which received TV sound. They were built in the late 1930s.

The radio receivers included the television sound channel, 41.5MHz, among their special features. I was reminded about these sets by **Tony Hopwood** (Upton-on-Severn) who found a Pilot U106 in a second-hand shop. It has six-wavebands, eight valves, including a 'magic eye' and a rectifier.

The designer certainly had long-distance listening in mind! Three of the bands are the short wave 12-30, 26-70 and 65-195metre broadcasting bands.

The other bands covered are: 750-2200m long wave, 190-550 metres medium-wave and 4.5-15m (I quote) "Ulta Short Waves".

A write up in the *Broadcaster Service Man's Manual* (July 1938) says of the USW band: "Television sound received with reasonable strength at about 15 miles. No undue drift, although retuning was occasionally necessary". A drawing of the chassis layout shows the provision for a dipole as well as a long wire antenna.

Alexandra Palace

The BBC began a regular television service from London's Alexandra Palace, on 45MHz (41.5MHz sound), in November 1936. But because of the Second World War, it ended in September 1939.

Television was a new and exciting field of entertainment but, the receivers were expensive. And the reception range was limited to between 40 and 60 miles.

However, returning to the special receiver it's interesting to note that apart from the UX based 'magic eye', the Pilot uses International Octal valves types, 6U7, 6B8, 6L7, 6J7, 6Q7 and 6N6.

A similar set, the Marconiphone 561, employs the Marconi range of octal valves types W63, X64, Z63, D63 and KT63. Both are handsome looking table models with polished wooden cabinets and once had a price tag around £25.

According to the *Broadcaster Service Man's Manual* (January 1936) the Marconiphone's "Ultra Short Wave" coverage was 4.85-12m and the TV sound was receivable at about 30 miles.

An article in *Television and Short Wave World* (June 1938) refers to the "exceptional quality" of the Alexandra Palace sound channel. It explains that "Owing to the wide band width available with this sound transmitter, all musical frequencies are radiated with very little distortion or attenuation".

Both sets I've mentioned have large loud-speakers. They also include adequate tone controls and a pair of output valves to provide good quality sound reproduction.

Younger Collectors

It's good to know that many of our younger readers are preserving sets from the past and are keen collectors. Very often a particular set is associated with a period in history, like those that could receive television sound or the range of sets that were used in anger during the Second World War.

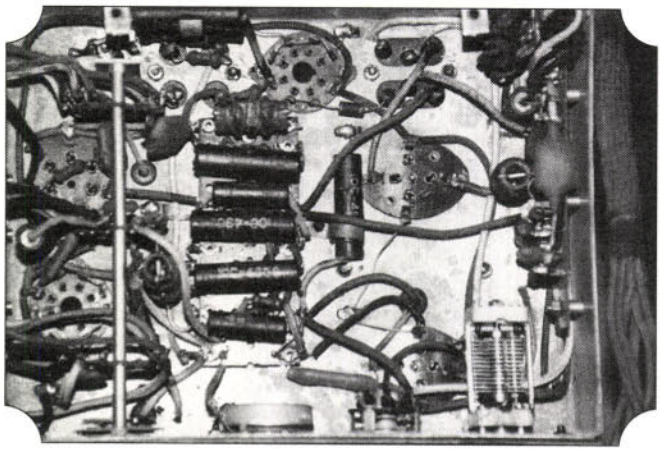


Fig. 1: Under chassis view of the R1224A receiver, built for the RAF (see text).

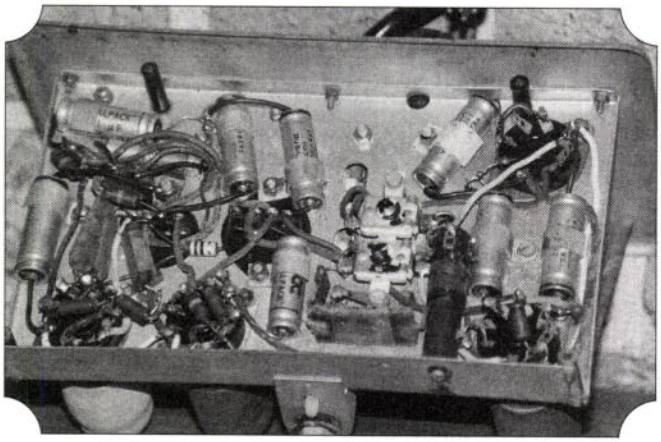


Fig. 2: Receiver section of the 18 set, removed from case for servicing, showing metal cased tubular capacitors (see text).

For example, referring to the military gear I wrote about last year, **A. J. Moffat** (Ross-on-Wye) tells me that he used the WS 11 when he served with an artillery signals section. These were later replaced with the 19 and 22 sets. While in Northern Italy he and another operator used a Canadian WS 19 Mark III continually for 12 weeks and it was only switched off for a battery change!

Collectors' Preferences

Some collectors' preferences are that they like their vintage sets to work, while others keep them in their original state for exhibition. So, with this in mind, let's look at the under-chassis wiring and components of two historic receivers.

Firstly the R1224A, **Fig. 1**, was built for the RAF in the 1930s. The other unit, the receiver section of the WS 18, **Fig. 2**, was used throughout the Second World War.

Although **Figs. 1** and **2** show

the chassis in their original condition, it's almost certain that after 50 years, the capacitors and resistances will be faulty. The capacitors are likely to have a partial or complete short-circuit, whereas the resistors may have gone 'high' in value or totally open circuit.

Let's take for example, a basic audio stage of a valved receiver. They often use the triode section of a double-diode-triode valve as the driver and an output-pentode as the main amplifier.

The anode of the triode is fed through a resistance from the main h.t. rail and a capacitor is connected from the anode of the triode to the control-grid of the pentode. The resistance ensures that the voltage required by the triode is present.

The audio coupling capacitor 'blocks' the voltage at the anode. But it permits the wanted audio signal to pass to the grid of the output-pentode.

Should the anode feed resistance go 'high', then the audio becomes weak. However, if it went completely open-circuit then the driver stage could not work.

A 'leaky' audio coupling capacitor would cause distorted sound. This happens because some of the voltage from the driver's anode appears on the grid of the pentode.

Shorted Capacitor

Often a 'shorted' capacitor will destroy the feed resistance. For example, the voltage required for the screen-grid of a pentode, working as a radio-frequency amplifier, is fed through a resistance. A capacitor is normally connected between this junction and earth.

Now, if the capacitor shorts, then a high current is 'forced' through the resistance which consequently overheats and 'cooks'. Both components should be replaced in the event of either one failing.

From my experience I've known the general performance of a set to deteriorate and found that a screen-feed resistance, perhaps 27kΩ, had gone as 'high' as 1.5MΩ!

About nine tubular capacitors which are likely to have suffered through age can be seen in each picture. Those in **Fig. 1** have waxed cardboard cases. Six are soldered on tag-boards, two are clipped to the upper left side of the chassis and the other is on the base in the centre.

Most of the capacitors are marked with a '10C' Air-Ministry part number. This in itself is historic and would lost if the component was replaced.

The capacitors in **Fig. 2** have metal cases. They're secured to the chassis by pre-formed metal clips.

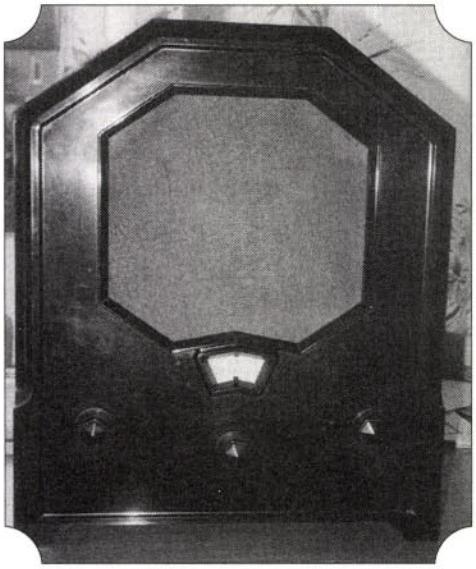


Fig. 3: After reading 'V&V' in a copy of *PW* he found on a train, a reader remembered that many years ago this vintage GEC (circa 1933) had been stored by his father and when rediscovered this is how it looked (see text).

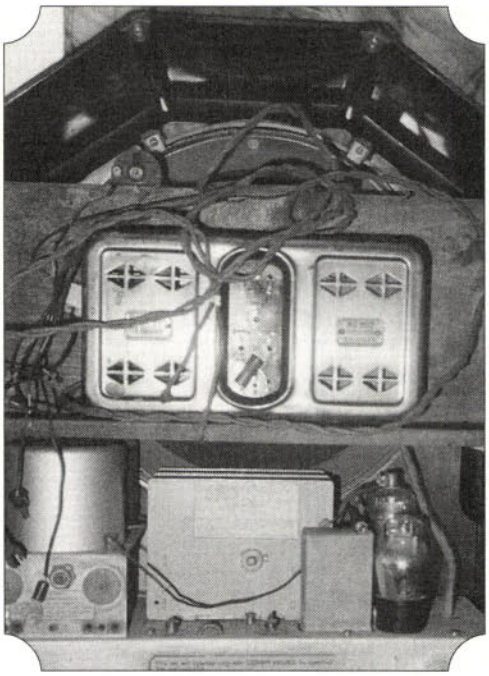


Fig. 4: Inside view of the 1933 GEC set (see text).

Direct Current

My reference to direct current (d.c.) mains in the February issue stirred the memory of **Fred Penny** (Balham). He built his first 'Telsen' radio in the 1930s followed by a Mullard 'Master Three'. Fred also made an h.t. eliminator using several carbon filament lamps in series with the d.c. supply.

I've also used carbon lamps on d.c. mains for charging accumulators Fred! There was a bank of these in batten type holders on a board and the number of lamps in use was determined by the number of cells on charge.

One day, heavy rain found a tiny hole in the roof. And of course, the cold rainwater just had to hit the hot lamps and shattered the glass!

Vintage Train

I've received a letter from a gentleman who read 'Valve & Vintage' in a *PW* which he found while travelling by train. The article reminded him of an elderly radio which was placed in the loft by his father many decades ago.

He then decided to get the receiver down and photograph it. While doing so he noted that the Bakelite cabinet is still in pristine condition, as in **Fig. 3**.

Furthermore, inside, on the battery shelf, **Fig. 4**, he found a mains operated h.t. eliminator. My correspondent tells me that the set, Cat. No. BC 130, was made in 1933 by the General Electric Co. and the metal-cased, HT Unit, Type D.C. 15/25, was made by Ekco for d.c. mains.

Originally, a 120V 'dry' battery and a 2V 'wet' accumulator powered the set in question. High tension batteries were always expensive and needed replacing two or three times per year.

In many cases a battery set was purchased because the house had no mains electricity. However, when it was installed a mains unit was often purchased to save the cost of a new h.t. battery.

When I gave the original photograph, shown in **Fig. 4**, a close look, it revealed black and red wander plugs and spade connectors on the ends of the battery leads. The plugs go into the appropriate sockets on the eliminator and the spade connectors slide under the terminals on the accumulator.

Good Reading

Finally lads and lasses, I'd like to recommend some good reading. It's a book entitled *Wires, Wheels and Wings*, (A Wireless Mechanic's Diary), by Harry Reddin, published by The Pentland Press Ltd. at £16.50 ISBN:1 85821 128X.

Harry Reddin's book is hardbound with approximately 360 pages of good reading. It's not a technical book full of circuits and pictures of valves and sets, but a fascinating life story of the author.

Harry was born in 1914 and attended school during the 1920s. He worked in the family's hardware business as a wireless engineer in the 1930s, served as a wireless mechanic in the RAF during the Second World War and spent the post-war years, until his retirement, as a Murphy dealer in Glastonbury, Somerset.

To my mind, the story of this Yorkshire lad is typical of the men who built the British Radio Industry. Harry grew up with the cycle, motorcycle and car and was interested in most types of engineering.

Harry Reddin was bitten by the 'wireless bug' at an early age. "Scratching away at the crystal with the cat's whisker to find the 'best spot' gave endless satisfaction," he wrote and added that there was no running costs with a crystal set!

Well that's it! Time for me to close the 'V&V' vintage 'wireless shop' for the last time. Cheerio for now.

Editorial note: *Regular readers will be pleased to know that Ron Ham will still be writing for PW on an occasional basis (see 'Keylines'). In the meantime I've no doubt that readers would like to join the Editorial team in wishing him well in his retirement.*

LEIGHTON SMART GW0LBI

HF FAR & WIDE

Leighton Smart GW0LBI welcomes you to the page where you can now get that 'little bit extra' from your h.f. operating.

This month I would like to offer a brief introduction to *PW*'s forthcoming 'HF Initiative', as mentioned by the Editor Rob Mannion G3XFD in the last issue. Already a significant number of readers have responded to Rob's rallying cry.

The broad aim of the initiative is to create *PW* 'monitoring frequencies' where our readers will call CQ in the hope of working fellow readers from around the world. And in the case of s.w.l.s we anticipate that our listening stations will report to this column what they hear.

With the *PW* initiative even if your CQ calls are not answered, you may still get a report via the pages of this column. The report will be provided by one or more of our s.w.l.s readers and if your calls are answered by a fellow reader and a QSO results, so much the better!

The hope is to generate some activity amongst readers of this column, both transmitting amateurs and s.w.l.s alike. In next month's issue I will publish a list of the amateurs and s.w.l.s who have supplied details of their proposed listening times, frequencies, equipment, etc.

Everyone on the *PW* team hopes that both our transmitting and receiving readers will take part. We also hope to publish QSL details for the benefit of those who require confirmation.

I hope that this initiative will grow. I also hope that along with that growth, this column will grow in size with both our regular monthly reports and the new *PW* Listening Watch.

The 3.5MHz Band

I'll start off with the 3.5MHz band, and the first of our nine reporters this month is **Eric G0KRT** in Surrey, who has 'gone QRO' so to speak, with a full 5W Index Labs 'QRP Plus' and an 84ft end-fed wire.

Eric worked G2FDF, G0ENS/P, and GM0TGE, all on c.w., but was disappointed that he couldn't find any Novice stations on the band. He'd like to work some of our Novice readers on the band around 3.565MHz or thereabouts. How about our Novice readers helping Eric out here?

Short wave listener **Keith Goodchild** in Hertfordshire listened briefly on 3.5MHz, and reports s.s.b. reception of G3WDR (Felixstowe) and G0NFJ (Romford), while G3MYU in Marlow, and G3WMZ Somerset were heard calling CQ. Also logged were G3UUH (Market Harborough) and G0AFT (Buckinghamshire) in QSO.

The 7MHz Band

It's up to 7MHz now and new reporter **Peter Finbow G0DEH** spent some time on this band raising 4X6UV Israel at 2210UTC, TI4CF Costa Rica, at around 2300, VK4MZ Australia, at 0600, and ZL4BO New Zealand, at 0500, all on s.s.b. Peter uses a Yaesu FT-902 DM at 100W and a 12m long wire in a very restricted location.

Eric G0KRT using his 5W on 7MHz hooked up with RA1AQ Russia, OH1JMH Finland, and EA4AAM Spain, again all on c.w.

Also on 7MHz, s.w.l. **Charlie Blake RS96034** (Milton Keynes) has received signals from ZL4BO New Zealand, and VK9NS Norfolk Island at 0500UTC, TL8CK Central African Republic at 21. 26, and YB5UX Indonesia at 0735. Charlie uses a JRC NRD 525 receiver, and an 11m sloping wire at 9m height, his complete station is shown **Fig. 1**.

Fig. 1: Receiving station used by Charlie Blake RS96034. Charlie, based in Milton Keynes in Buckinghamshire is waiting to use the KW2000A (his original listening station) for transmission once he's passed his RAE and Morse.

The 14MHz Band

On to 14MHz now and **Don Mclean G3NOF** in Yeovil, Somerset starts off. Don reports that the best time on this band has been from 1600UTC onwards for the short path to Africa and Asia while North and South America came in during the evenings.

The pick of Don's 14MHz s.s.b. log are A71BY Qatar, BS7H Scarborough Reef, Taya BV5BG Taiwan at around 1700UTC (QSL via Box 215, Chayghua, Taipan, Taiwan). He also raised DX9O Philippines at 1711, Tony HS0/G4UAV Bangkok Thailand, at 1721, J28JJ Dijibouti at 1633, VP5/JH7MQD Turks and Caicos Island, and 3V8BB Tunisia at 13.47. Don uses a Kenwood TS-950 transceiver and a TET HB33SP beam antenna on 14MHz.

The 14MHz band was where **Steve Locke GW0SGL** worked in April and May. Steve reports conditions as excellent particularly in the evenings.

Using a Yaesu FT-757 GX at 100W into a 3-element HI GAIN beam antenna at 10m, Steve worked Hugh 6Y5JA in Kingston Town, Jamaica, 59 at 2214UTC. He then raised FG5GZ (QSL via F6CLK) Guadaloupe Island, 59 at 2110, John HH2J Haiti, 59 + 10db at 2328, and Ed, XT2CH Burkina Faso (QSL via Box 35, Ouagadougou Burkina Faso) 59 at 2247UTC.

John Heys G3BDQ near Hastings used 14MHz for the first time in a long while. John had s.s.b. contacts with VU2BK India, A47RS Sultanate of Oman, JQ3UDL Japan, and Russian Special Event stations UZ100GG, and R100R.

Our Swedish QRP reporter **Clemed Nilsson SM7DRH** has been using a 3-element beam and a maximum power of 5W to work JR1EYN Japan and VK3CP Australia. Clemed worked G4ZVR England with 20mW!

Clemed also raised KP4P Puerto Rico, at 1020UTC, ZS1AD South Africa at 1911, FY5YE French Guyana (QSL via F5JLU) at 1933, HP1AC Panama, at 1947 and GW3RVF Wales, at 1915 (another 20mW contact!), as well as countless American stations.

The 18MHz Band

Don McLean G3NOF says that in mid April the 18MHz band was open for a few days between 0900UTC and noon on the short path to Japan. There were also a few Asian signals and Africans came in around 1600, with Americans heard until 2300.

The cream of Don's 18MHz log include BY3AE China, at 1053UTC, D68QM Comoro Islands at 1300, PJ7/WB5JHK Leeward Islands, at 2146, and VP8CQR South Shetland Islands, at 1833UTC amongst a very long list of other contacts.

Charlie Blake RS96034 reports s.s.b. reception of JA1FBB Japan at 1040UTC, Bob AP2JZB in Karachi, Pakistan, at 1240, and AZ1BI Argentina in QSO with W6MHC/MM on board the research vessel *Sedco BP471* in the Mediterranean Sea at 1503UTC.

The 21MHz Band

Space is limited, so now let's take a brief look at the 21MHz band. John Heys G3BDQ reports conditions here as very poor, with the solar flux down to 67. Nevertheless John worked 9V/F5FHI Burundi, Z22JE Zimbabwe, Bob 9K2ZZ Kuwait, (QSL via W8CNL) 9Q5TR Zaire, and (a pirate John suspects) 3D1M , and 9J2CW Zambia, all on s.s.b.

Finally, I have received a massive log from **John Constance G0VGD**. John who reports QRP s.s.b. contacts with T91ENS Bosnia at 1530UTC, VE3VHB Canada at 1510, EA8BZV Canary Islands at 1630, CT3FT Madeira Island at 1202, 9H4CM Gozo Island (Malta's 'garden'), at 1150, RZ6AXO Russia, at 1225, and KA2CYN at 1615UTC. Note that John uses, his 10W Yaesu FT-7 on s.s.b. and an inverted 'V' style G5RV antenna at 5m in height.

Time To Close

Well, it's time to close the log for this month. My grateful thanks to our reporters for your invaluable help. Without you this column would not be possible, and your reports tell everyone just what can be achieved, even with simple stations.

Photographs of you - **facing the camera please!** (why are radio enthusiasts camera shy?) and your station are very welcome. Please send them and your reports to me please by the 15th of each month (**at the latest**) at: **33 Nant Gwyn, Trelewis, Mid Glamorgan CF46 6DB Wales.**

END

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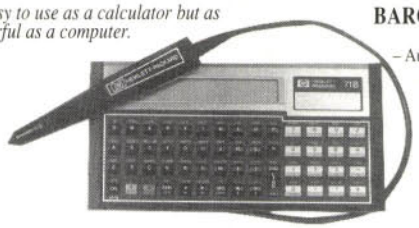

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MIKE RICHARDS G4WNC

BITS&BYTES - COMPUTING IN RADIO

Mike Richards G4WNC tries out a new printer sharing system, talks about d.s.p. shareware programs and summarises the 'Bits & Bytes' special offers.

Graham Taylor of **South Midlands Communications** has just sent me a brand new printer sharing system that they are distributing. The Auto Link LU7000 series enables the automatic sharing of one printer with up to four computers or other devices.

Unlike the simple manual switching system, the Auto Link is extremely compact and uses thin, easily hidden, connecting leads between the various devices. The system comprises two distinct elements, the receiver and remote transmitters.

The receiver is the largest unit yet measures only 84 x 58 x 25mm This unit connects directly to the printer's parallel port and also derives its power from that port. At the back of the receiver unit are four miniature telephone type connectors that accept the leads from the remote computer or other devices.

At the other end of the link, the smaller transmitters just plug into the computer's printer port. As with the receiver, the power is derived from the computer port, so there are no power supplies to hide away. The connecting leads are no larger than a standard telephone instrument cable and in the review model were approximately 5m long.

Having tried the Auto Link system on my computing set-up, I can confirm that it really is a very simple and trouble free way to share printers. The transmitters and receiver are available separately and currently cost £19.50 plus VAT each.

For more details on Auto Link contact **South Midlands Communications Ltd., SM House, School Lane, Chandlers Ford Industrial Estate, Eastleigh, Hampshire SO53 4BY**. My thanks to Graham Taylor for the loan of the review models.

Digital Signal Processing

Following my comments on the Digital Signal Processing (d.s.p.) aspect of computing earlier this year, I've now managed to put together what I think is an interesting selection of information. One of the prime authors in this field is **Johan Forrer KC7WW**.

Johan has produced a number of shareware programs to support amateur use of d.s.p. And, with his permission, I've put together a selection of software for *PW* readers - more later.

Let's just take a quick look at the principles of digital signal processing. The first stage is to convert a signal (normally audio in our case) into a digital format ready for processing by a computer. In simple terms, this means sampling the signal at frequent intervals and producing a number that represents the instantaneous value of the signal as it's sampled.

In order to build-up a reasonable digital representation of the signal, you have to sample the signal at a rate that's at least twice the highest frequency. So, for h.f. audio, a sample rate of 6kHz or 6000 times a second is required.

Having converted the signal to a digital format, you can process the data to create all manner of complex functions. One of the most common requirements is to filter the audio signal, e.g. to narrow the pass band for c.w. work.

To do this, the d.s.p. software has to examine the incoming digital signal, identify the various frequency components and extract all those that fall outside the pass band. This part of the operation is performed using complex mathematical formulae.

However, because the filtering is a precise mathematical function, a d.s.p. filter can produce results that are virtually unachievable using conventionally analogue components. Once the filtering software has completed its work, the digital signal is converted back into an audio signal.

Completing all this work requires a very fast processor with a command set optimised for this type of work. Fortunately for us, this type of d.s.p. hardware has a wide commercial appeal so the prices are becoming well within the reach of the amateur.

In addition to being able to deliver outstanding performance, d.s.p. systems offer enormous flexibility as you can completely change the function simply by downloading different software. Probably the ultimate in flexibility is what's become known as adaptive filtering.

Adaptive filtering is where the filter characteristics adapt to suit the incoming signal. So how do you start? Fortunately there are a couple of ways to do this without breaking the bank!

The first option is to use the Texas Digital Starter Kit. This is a very compact ready-built p.c.b. that contains all the basic components for an experimental d.s.p. system.

Signal input and output is handled through miniature jacks with a standard 9-pin connector for linking-up with the serial port of your computer. In addition to the p.c.b., the kit comes complete with comprehensive documentation and development software. If you want to try this route, **Macro, Tel: (01628) 604383** seem to be offering the best prices at around £68 plus VAT and carriage.

The second alternative, is to use the d.s.p. hardware that's included in some of the more sophisticated computer sound boards. One of the best examples is the Orchid Soundwave 32. Not only is this a very good sound board boasting compatibility with all the other standards, but it features an Analogue Devices AdSP-2115 d.s.p. chip.

The heart of any d.s.p. system is the software and that is where the fine work of Johan Ferrer comes to play. He has produced a wealth of software specifically designed to meet the needs of amateurs.

The two main developments are an audio filter system and PACTOR, RTTY, ASCII and AMTOR transceive systems. I'll give a detailed description of these programs next month. However, to help you get started, I've put together a d.s.p. starter disk for the PC that contains a selection of software - see the special offers below for details.

Special Offers

Here's a summary of the latest special offers for 'Bits & Bytes' readers. I try to turn orders around in a week or two, but **please allow up to two weeks for delivery.**

- **DSP Starter** - AMTOR, PACTOR, RTTY and audio filtering software for ASP sound boards plus h.f. modems using Texas DSK.
- **JVFAX 7.0** - FAX & SSTV transceive for IBM compatible computers.
- **HAMCOMM 3.0** - RTTY, CW & AMTOR transceive also for IBM compatible computers.
- **NuMorse** - Comprehensive Morse tutor for Windows 3.1 users.
- **UltraPak 2.1** - TNC-2 driver for Windows 3.1 users.
- **FactPack 1 Interference** - Help with those difficult computer interference problems.
- **FactPack 4 JVFAX and HAMCOMM Primer** - Receiving your first FAX and RTTY signals.
- **FactPack 5 On the Air with JVFAX and HAMCOMM** - preparing for that first transmission.
- **FactPack 6 Internet Starter** - Basic guidance to get you started on The Internet.

To receive any of the offers just send a self addressed sticky label plus 50p per item (£1.50 for four or all eight for £3.00). If you're ordering JVFAX/HAMCOM/NuMorse/UltraPak /DSP Starter you will also need to send a blank, formatted 3.5in 720k disk for each program or just two 1.44Mb high density disks.

That's all I've got room for this month so until next time 'happy computing' and keep sending your computing queries to me Mike Richards G4WNC, 'Bits & Bytes', PO Box 1863, Ringwood, Hants BH24 3XD. CompuServe: 100411, 3444; Internet: mike.richards@bbcnc.org.uk

END

DAVID BUTLER G4ASR

VHF REPORT

David Butler G4ASR has some important news about proposed changes to the v.h.f. and u.h.f. bands. He also provides details of the 144MHz Transatlantic Challenge.

In case you haven't already heard, the European Radio Committee is busy. It's currently in the process of conducting the second phase of a Detailed Spectrum Investigation (DSI).

The terms of reference for DSI-2 (as it's known) are as follows: "To investigate the current and foreseen use of the radio spectrum in CEPT countries in the frequency range 29.7 to 960MHz and the way in which it's managed and administered; to produce a detailed document addressing the issues that shall include, as appropriate, recommendations to the ERC of the CEPT".

A Little Heavy?

Now as the terms as I've reproduced them seem a little heavy, I'll try to explain what this actually means in practice!

A Detailed Spectrum Investigation is being conducted by the European Radiocommunications Office (ERO) on behalf of the European Radiocommunications Committee (ERC).

The ERC is part of the European Conference of Postal and Telecommunication Administrations (CEPT). The ERO (headed incidentally by David Court OZ3SDL/G3SDL) is the centre of expertise on radio communication issues. They also develop proposals for long term European spectrum plans and provide support to the ERC.

The CEPT is a group of 40 European countries. This organisation brings together the various regulatory administrations throughout Europe.

Acting on our behalf in the UK is the Radiocommunications Agency (RA) which is an executive agency of the Department of Trade and Industry (DTI). Phew, I did say it was heavy!

Spectrum Reviews

In recent years there have been a number of spectrum reviews, carried out on a national and international basis. The aim is to provide a European table of harmonised frequency allocations and utilisations.

In effect, it's just like our amateur band plans and usage but on a much wider scale. The DSI-1 covered the frequency range 3400MHz to 105GHz.

At a CEPT meeting in March 1995 the ERC agreed to its many recommendations. One of the major gains of the DSI-1 review was the allocation, on a secondary basis, of the band 3400-3500MHz.

Although the UK already had access to the 3400-3500MHz microwave band, many European countries did not. So, it's therefore pleasing to record that administrations in Denmark (OZ) and Switzerland (HB9) have recently issued licences for this part of the spectrum.

As I mentioned earlier DSI-2 has been completed. The results have been published in a document entitled *Results of the Detailed Spectrum Investigation Phase II: 29.7-960MHz and Call for Comments.*

At the moment the published results are only proposals which may change significantly as a result of the ongoing consultation process. The ERC will then consider all inputs later this year.

An initial response from the ERC will be made in April 1996 with the final position being known at the end of 1996. The intention is to implement the agreements by the year 2008. However, it may be possible to implement some proposals earlier than this date whilst some recommendations may require a longer timescale.

Amateur Radio

As regards the Amateur Radio Service the DSI Management Team have made recommendations applicable to frequencies in the 40, 50, 70, 144, 430 and 920MHz bands.

In the context of the European Table of Allocations the team's recommendations are as follows: That frequencies in the vicinity of 40.68MHz be considered for propagation beacons. The band 50-52MHz be allocated to the amateur service on a primary basis.

The recommendations also suggest that the band 51-52MHz additionally to be allocated to the mobile service. A minimum of 100kHz in the band 70-70.45MHz be allocated to the amateur service on a secondary basis according to national considerations, if feasible, centred on 70.2MHz.

The team also recommended that the band 144-146MHz be maintained with its current status. The band 430-440MHz be reduced to 432-438MHz with primary status for the amateur service. The band 435-438MHz to be allocated to the amateur satellite service on a primary basis.

It is additionally recommended that the 433MHz Industrial Scientific and Medical (ISM) and low power band be reviewed after an appropriate time period to ascertain whether alternative arrangements for ISM and low power render its retention unnecessary. The band 919.5-920MHz be allocated to the amateur service on a secondary basis.

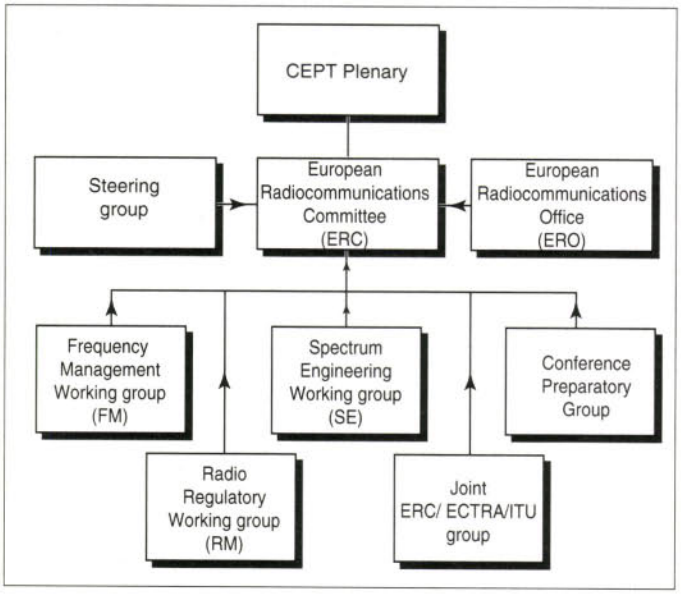

Fig. 1: Block diagram showing structure of European Radiocommunications Committee (ERC) whose activities are discussed in the text.

Implications And Reasons

What are the implications and reasons for the changes I've outlined? Between 30-50MHz there are no allocations to the amateur service in any of the three ITU regions.

So, for propagation studies the absence of reliable and identifiable signals between 30 and 50MHz there can be a problem. Therefore, it's suggested that individual frequencies within the ISM band at 40.68MHz be utilised for low power beacons.

The suggested beacons would operate with an e.r.p. of around 10dBW and would identify with f.s.k. Morse signals with low deviation and minimal bandwidth. (In common with this concept, a similar allocation at 60MHz may prove to be of scientific value. It's believed that this possibility should be re-assessed when television broadcasting is no longer operating below 68MHz).

Regarding the 50-54MHz band, it should be noted that this is already allocated to the amateur service in ITU Regions 2 and 3. The proposal to allocate the band 50-52MHz to the amateur service on a primary basis therefore aligns Region 1 with the other two regions of the world.

In several CEPT countries (G, ZB, 5B4) the amateur service operates in the 70MHz band on a secondary basis. In other countries it's used for sound broadcasting or mobile applications.

The 70MHz band is interesting from a propagation point of view. This is because the allocation is understood to be the currently known extent of F2 ionospheric propagation.

Sound broadcasting in eastern Europe is likely to cease in the 70MHz band within the next 15 years. Because of this and other rationalisations it would therefore seem possible to allow limited access for the amateur service to at least 100kHz centred on 70.2MHz. (It's also hoped that the existing beacon network between 70-70.15MHz can be maintained and extended).

Exclusive Band

The only exclusive amateur band in the v.h.f. and u.h.f. range is that between 144-148MHz. It's heavily used throughout the world for amateur terrestrial and satellite communications.

A wide variety of modes of emission are in use on 144MHz. Many voice repeaters and data networks are complemented by a number of amateur satellites.

In addition to popular propagation mechanisms like tropospheric scatter or super-refraction radio amateurs communicate on 144MHz by reflection from the surface of the moon (e.m.e.), meteor trails (m.s.) and auroral scatter.

Sporadic-E (Sp-E) events appear much more frequently at 144MHz than was believed possible. Additionally, a number of amateurs have observed propagation phenomena either previously unknown or believed to be extremely rare at these frequencies.

Many amateur beacons support monitoring of propagation conditions. In many areas the already heavy occupancy does not allow for the accommodation of any additional activity despite the rapid growth of the amateur population.

Because the 144MHz band is so busy the IARU has requested the retention of the existing exclusive world-wide allocation of 144-146MHz. They have also suggested consideration of global harmonisation by allocating 146-148MHz segment to the amateur service in CEPT countries.

However, the DSI Management Team could not agree to this latter suggestion. This was in view of the current and foreseen extensive use of the band 146-148MHz by the land mobile service.

Particular Importance

The 430-440MHz band is of particular importance to the amateur service. Propagation at these frequencies allow for interesting combinations of propagation modes to be used.

Communication on 430MHz can be via tropospheric ducting, and the moon and meteor scatter can be utilised. It's also the only band below 1GHz where amateurs may use conventional fast-scan television.

The amateur satellite service relies on the sub-band 435-438MHz which presently is the only allocation between 146MHz and 2.4GHz allowing amateur space-to-earth emissions.

Suffer Interference

Amateurs in CEPT countries, suffer particularly from interference in the 433.92MHz ISM band. Similarly manufacturers of low power systems using this band are concerned at the interference potential of amateur emissions.

The DSI Management Team were concerned with the situation. It's hoped that a recommendation to open up the band 403-404.5MHz for low power devices and establish the band 915-920MHz as a low power and ISM band will, after an appropriate transition period, render the ISM band at 433MHz obsolete in the very long term.

Unfortunately, additional spectrum in the low u.h.f. range is urgently required for land mobile services in the major European cities. As a consequence the DSI Management Team has determined that the band 432-438MHz and the band 435-438MHz be allocated to the amateur and amateur satellite services respectively on a shared basis.

It's believed that amateur television activities should be transferred to bands above 1GHz. This is unless modern digital processing techniques can facilitate such emissions in the available bandwidth (*See 'Focal Point' in this issue. **Editor***).

Requested Allocation

Several contributors requested consideration of a secondary amateur allocation in the range 902-928MHz. This will be to align with the situation in ITU Region 2.

If the recommendation to introduce ISM to the band 915-920MHz is accepted it would seem feasible to allocate the band 919.5-920MHz to the amateur service on a secondary basis.

The DSI document states that it's hoped that the loss of 4MHz of band, 430-432MHz and 438-440MHz will be balanced. The balance could be provided by the improved status of the remaining 6MHz together with a gain of up to 2.95MHz to the amateur service from other parts of the DSI range.

However, a quick look at the 430MHz band plan will show many varied activities and usages within IARU Region 1. Nationally the lower 2MHz sub-band is used for packet radio links and low power repeater input channels.

The upper 2MHz sub-band is also used for packet radio, low power repeater output channels and fast scan television. It's also worth remembering that much DX Cluster traffic and BBS traffic are passed via high-speed links within the 430MHz band.

So, although you may not directly use this u.h.f. band, indirectly you may well be a user! Every MHz taken away from the 430MHz band will give rise to enormous allocation problems. It is therefore very important to lobby our national society to retain the full 10MHz of band.

Although the RSGB's initial response was required by the RA by the end of May, views on the proposals are still being sought. Any further comment should be sent **immediately** to: **Dr. Julian Gannaway G3YGF c/o RSGB Headquarters, Lambda House, Cranborne Road, Potters Bar, Hertfordshire EN6 3JE**.

Finally, it's interesting to note that among the 99 contributors to the DSI document were the International Amateur Radio Union (IARU), three national amateur radio societies; DARC (DL), OVSV (OE), RSGB (UK) and the UK Six Metre Group (UKSMG).

Transatlantic Challenge

Since the early days of radio, when Marconi achieved the first transatlantic contact on very long waves, radio amateurs have attempted to challenge and equal his success on very much higher frequencies.

Experience has proved on many occasions that it's possible to increase the maximum usable frequency for transatlantic contacts to at least the 50MHz band. And during years of high solar activity crossband contacts have even been made on the 70MHz band between the UK and Canada.

A few dedicated enthusiasts have even arranged extensive transatlantic tests on the 144MHz band. Although such tests proved very interesting with parts of callsigns being heard, no **confirmed** two-way terrestrial contact has ever been made on the 144MHz band.

Many operators throughout Europe and North America use the 144MHz band for local communications. However, within the hobby exists that special interest known as DXing.

To work consistent DX means fine tuning your station for maximum efficiency to conduct long-range radio contacts. On the 144MHz band this can mean contacts around 2300km via tropo, ionospheric scatter, meteor scatter, Sp-E or aurora.

On occasions contacts have been made with stations over 3000km away. For example, from England to Israel via Sp-E or from Scotland to the Canary Islands via tropo.

The DX contacts have generated much interest and have motivated some amateurs to establish the first contact on the 144MHz band across the Atlantic Ocean. For this reason a group of like-minded operators from EI, G and GW have, under the auspices of the Irish Radio Transmitters Society (IRTS), approached the Waterford Crystal Company (Ireland).

As a result the Company have kindly donated a pair of Waterford Crystal glass trophies for the 144MHz Transatlantic Challenge. The rules are fairly lengthy (contact me if you require a copy) but I'll provide the basics.

The two stations must be located on land or non-tidal waterways within the continental shelves of Europe and America. The contact must be made via natural reflectors within the atmospheric mantle of the earth.

The use of man-made reflectors such as aircraft or satellites as well as e.m.e. is excluded. Two-way communication will be deemed to be established when each station has; received both call signs in full, received a signal report and received a confirmation (R or Roger).

The generally accepted systems of reporting are the RST or meteor scatter number system. All information must be exchanged within a maximum period of four hours.

The challenge has now been set! Experts would say that this venture is much more difficult to achieve than Marconi's early transatlantic short wave contacts.

Radio amateurs in Europe and the Americas can now prove to the experts that the true spirit of Amateur Radio knows no bounds. Who will be the lucky people to achieve this milestone in radio history. Could it be you?

News And QSOs

Have you any news or made any interesting QSOs recently? Or if you just wish to pass on any information...please let me know about it.

As usual send details (to reach me by the end of the month) to: **Yew Tree Cottage, Lower Maescoed, Herefordshire HR2 0HP** or via packet radio @ **GB7MAD** or the DX Cluster system. Alternatively you can telephone me on **(01873) 860679. Please note the new number!**

END

PETER SHORE

BROADCAST ROUND-UP

Peter Shore has news of a short wave newsletter aimed at women, details of a computerised RDS tuner plus all the latest programme schedules.

I'll start this month with a letter I've received from **William Rigby** in Morecambe, Lancashire. William bemoans the fact that it seems difficult to get QSLs from a number of stations. He has sent reception reports to All India Radio, Radio Pakistan, Radio Kuwait, Radio Ukraine International and Radio Yugoslavia. Some reports were mailed in February, complete with international reply coupons, but as yet nothing has come back.

What's the solution? Some stations get thousands of letters every year from listeners, and replying to them all takes time - and costs money. In the world of international broadcasting, money is all too often tight.

So, it can be quite a while before a radio station will get around to replying to your letter. The only answer is to be patient, I'm afraid. But perhaps that increases the thrill when the postman drops that envelope covered with exotic stamps through your letter box when you have all but forgotten about that elusive QSL card.

William goes on to report that he has logged Radio Tashkent with English at 1200 for 30 minutes on 7.285, 9.715, 15.295 and 17.815MHz, and at 1330 on the same channels. At 1930 there is a transmission on 13.785MHz, and at 0100 try 7.19 and 9.715MHz. Radio Tashkent's address is **49 Khorezm Street, Tashkent, Uzbekistan.**

Not Men?

How many readers of this column are not men? A strange question, I hear you say. Maybe, and then again, maybe not.

Women are definitely in the minority when it comes to short wave listening (and the radio amateur hobby, too), but some people are out to change things.

Nina Allen and **Sylvia Charshoodian** in Massachusetts in the USA have inaugurated a publication called *Wavelengths*. This a short wave newsletter for women.

Nina and Sylvia plan to interview the producers of women's programmes aired by international stations. They also hope to talk to women producers.

If you are interested in finding out more, contact *Wavelengths* at **PO Box 381766, Cambridge, Massachusetts 02238-1766 USA** (enclosing an international reply coupon), or FAX on **+1 617 489 1249**.

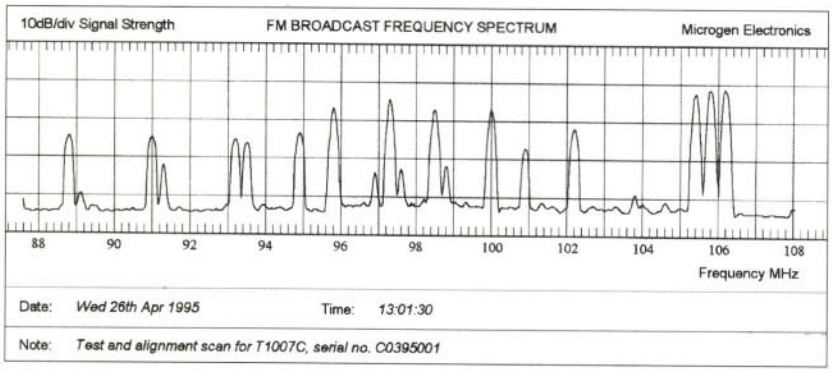

Fig. 1: The MicroTuner produces an f.m. broadcast frequency spectrum display. The peaks show when a signal has been received.

Computerised Tuner

Do you DX the f.m. bands when conditions are right? Do you have a home computer? If so, you might be interested in a new product to arrive on the market, the MicroTuner, produced by a small electronics firm in Surrey.

The MicroTuner consists of a small box, about the size of a paperback book, finished in a similar style to the housing of a PC, together with a mains adapter, f.m. dipole antenna, connector for loudspeakers and cable to link with the serial port of a computer. There is also a disk which contains the software to operate the device, which is based on the ubiquitous Windows operating system. All this adds up to a computerised f.m. tuner with all the advantages of complete Radio Data System (RDS) compatibility.

Load the software and switch on the MicroTuner, click with the computer mouse on one of the icons in the 'Launchpad' window on the computer screen. Up comes a display showing the complete f.m. frequency spectrum from 88 to 108MHz.

Click on 'scan' and the tuner will cruise up in frequency, displaying a peak when it receives a signal. This gives a result rather like a section of very mountainous terrain (**Fig. 1**). You can click on any of the peaks and the tuner instantly calls up that frequency.

If you click on the RDS icon, up comes another window which displays the frequency and signal strength. For those stations transmitting RDS (which most European broadcasters do these days) the station name, programme type (news, pop music, classical, drama and so on) and alternative frequencies, if there are any for that station are displayed.

You can store up to 32 different frequencies, and recall them instantly simply by clicking on the appropriate number. The beauty of this system from an f.m. DXers point of view is that you can get instant identification of a station, without having to wait for a spoken announcement or to decipher a foreign language jingle.

I have played with the MicroTuner for a couple of weeks and think it works well. It has remarkable sensitivity (coupled with a rooftop antenna, signals were coming in from far and wide).

You can leave the unit running while you use a word processor or any other package that you work with. It's ideal for computerised DXing.

The only downside is the cost, at the moment it retails for just under £300 in the UK. More information from **Microgen Electronics, 43 Salisbury Road, Carshalton, Surrey SM5 3HA. Tel: 0181-647 8238.**

Schedule News

Radio Exterior de Espana carries English to Europe at 2100 for an hour on 6.125MHz, and to North America at 0000-0200 and 0500-0556 on 9.54MHz.

Polish Radio Warsaw is on the air with English at 12000 on 6.135, 7.145, 7.27, 9.525 and 11.815MHz, at 1700 on 6.095, 7.27 and 7.285MHz and at 1930 on 6.095, 6.135 and 7.285MHz.

Croatian Radio has introduced a short wave service. It has ten minute English language news bulletins on the hour throughout the night between 2200 and 0500. You can tune in on 5.895, 7.37 and 13.83MHz.

Radio Yugoslavia appears to have regained the use of its transmission facilities in Bosnia. Try for English at 1830 on 6.10 and 9.72MHz, and 2100 on 6.10 and 6.185MHz.

The Voice of Turkey carries English to Europe at 2000 and 2200 on 9.445MHz, and the latter broadcast is also beamed to the Middle East and North America on 11.71 and 7.185MHz. At 0300 there is another transmission to the Americas on 9.445MHz.

Moldova, one of the former Soviet republics, has an international service with English on Monday, Wednesday and Saturday at 2030 for half an hour. Try 15.29MHz. On Sunday, Tuesday and Thursday the previous day's broadcast is repeated on the same channel.

Finally, extreme right-wing political programmes have been dropped from US religious short wave broadcaster, WWCR, based in Nashville, Tennessee. Following the bombing of the Federal building in Oklahoma City in which more than 160 people lost their lives, WWCR decided that programmes such as *The Intelligence Report* should no longer be aired.

The WWCR service is on at the following times: 0000-1100 on 7.435; 0100-1200 on 5.935; 1100-2100 on 15.685; 1200-0100 on 13.845; 1400-2300 on 12.160; 2100-0000 on 9.475 and 2300-1400 on 5.065MHz.

That's all for this month. Keep writing with details of what you've heard on the broadcast bands. Good listening!

END

ANDY EMMERSON G8PTH

FOCAL POINT

In this edition of his bi-monthly column Andy Emmerson G8PTH rounds-up the latest happenings in the world of Amateur Television.

The CAT94 amateur television convention last summer saw the usual array of television outside broadcast vehicles owned by BATC members. An ex-BBC Wales truck owned by Dave Caroline G8NND stands alongside a much older BBC vehicle (partly hidden) belonging to Brian Summers G8GQS.

The 1996 amateur television rally, organised by the BATC, will be held at the Sky Blue Connection at Ryton, near Coventry. The date to mark in your diary is Sunday May 5.

There will also be a repeat of the BATCs successful biennial convention, probably at Shuttleworth Hall in Bedfordshire again. The date will be in early September.

The Government's Detailed Spectrum Investigation or DSI has the task of reviewing the use of the v.h.f. and u.h.f. radio spectrum. Many of the allocations have not been changed for years, even though many new uses have been devised for radio.

Inevitably, the amateur bands come under pressure and commercial users point out with some justification that they could make more regular use of 'our' bands and put more licence money into the Government's purse to boot. The 430MHz band in particular is being eyed enviously for business radio use and in many (not all) areas, this band has little use most of the time.

To ATV operators, 430MHz is particularly important, since it is the lowest band capable of supporting conventional wideband television signals. It's also relatively economical for newcomers to equip an ATV station.

Nonetheless, it's quite possible that we shall lose at least 2MHz of spectrum on 430MHz, which would put paid to ATV as we know it there. The Radiocommunications Agency has received representations on behalf of the amateur community from the RSGB, who have put forward the BATC viewpoint on behalf of all ATVers.

It's suggested that some other frequencies may be made available to compensate for the loss of 430MHz, including half a Megahertz at 915.50-920.00MHz on a secondary basis, of course, but this will be cold comfort to ATVers. Of course, if the band had been actively occupied by ATV transmissions, this discussion might never have happened, proving the old expression 'use it or lose it'.

No Decision

No decision has been taken yet, so retaining the current allocation on 430MHz does remain a possibility. If we do lose it, however, what to do?

With every efficient filtering, it could be possible to radiate limited bandwidth monochrome pictures (the Germans call this SATV, ie. narrow bandwidth ATV). This is very effective for DX working when highly detailed pictures are not a consideration anyway. Given the amateur tradition of experimentation, it might be better to start considering digital techniques.

To produce moving pictures, exploiting current information compression technology, you will need a data rate of at least 1Mbit/s, occupying an r.f. bandwidth of 1.5MHz minimum. Initial thoughts are that ATV should use orthogonal frequency division multiplex (OFDM), which is a more spectrally efficient form of modulation than a.m. or f.m., and that ATVers should look at the technology coming out of digital video recorders.

Data-VHS or D-VHS has just been announced and this might be a fruitful starting point, although D-VHS won't be on the market for a few years yet. The NTL has already demonstrated extremely good pictures using OFDM and MPEG-2 coding with test transmissions on channel 34 from Crystal Palace.

At 1kW, the power level was far below what's needed for a.m. television, yet pictures were better. The future really does look very rosy with digital techniques.

The Internet

Are you on the Internet? If so, you'll be pleased to know there is an ATV service where any news items, queries and answers are mailed automatically to all who find them of interest. Here's the 'low down' from **Doug Ferell KD4MOJ.**

"Welcome to the ATV Information Server! The ATV ListServe run by Doug Ferell KD4MOJ is open to any and everyone who has an interest in Amateur Television (ATV).

The ATV ListServe is like a mailing list for E-mail, in that all messages addressed to 'ATV@exchange.tlh.fl.us' are reflected to all users who are participants of this list.

In this way, a discussion of ATV equipment, information or products are re-directed to each participants personal E-mail account, no matter where you receive your mail (AOL, CompuServe, Freenets, Internet providers, etc.). The ATV ListServe was created by me because I am interested in ATV and there is little on line information out there.

I have had to savour every bit of information that I run across from magazines (*ATVQ* is excellent! - a little plug) so, maybe on line input will help those that are new to this exciting hobby such as myself.

Now for the particulars of this list. To add yourself to the list, send a message to **ATV-Request@exchange.tlh.fl.us** with the following words in the body of the message: ADD JOIN SUBSCRIBE.

You can also delete yourself from the list by including any of the following commands in the body of your message: DELETE UNSUBSCRIBE REMOVE. Address a message to ATV@exchange.tlh.fl.us to have your message re-directed to the ATV ListServe for others to read and enjoy!

Alternatively, address a message to Doug KD4MOJ at one of the following addresses if you have any questions or comments; **doug@exchange.tlh.fl.us** or **kd4moj@exchange.tlh.fl.us Tel Nos:** (all USA): **Voice: (904) 575-6577, BBS: (904) 575-7900,** or **FAX: (904) 575-6577.** Hope to see you on line".

Interesting Message

I have been connected to the 'Net' for a fortnight and have already seen several interesting messages. There are several amateur radio conferences on Usenet, although I haven't explored these yet.... I waste enough time in the CP/M, obsolete computer and telecomms forums (or is it fora?)

If you know any good Internet addresses and Usenet groups, do write in and share them. I did also find instructions for 'How To Build Your Own Underground television Transmitter Using Commercially Available Parts'!

The file, in Usenet/alt.2600, starts "Yes, for some time now it has been possible to construct a clandestine television station, which you can operate from your Telecommando Lair, or modify for Mobile Media Guerrilla campaigns. We have named this device the Snow Box, due to its cool nature and the snow seen on blank television channels, waiting to be commandeered....".

Much of the information was along the right line, although as always, there was not quite enough information to actually build a station! Fascinating stuff if your aim in life is to overthrow the State!

That's all for now, normal service will be resumed by next time, meanwhile, keep those letters and photos coming to me Andy Emmerson G8PTH at 71 Falcutt Way, Northampton NN2 8PH.

END

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Clark telescopic mast, type QT9MHP, mint condition (pump operated), perfect for home base or field op., £100 o.n.o. (cost £330). Chas, Hants. Tel: (01425) 470298.

Collins R390A-URR nice example. Telefunken comms receiver E127KW/5, excellent. GRC-9 (angry nine) TX/RX, 2-12MHz, excellent. HRO complete, mint, restored. Hallicrafters S27, excellent, sell or swap or w.h.y.? Jim G4XWD, Norfolk. Tel: (01692) 630285.

Comminique C766 u.h.f. mobile radios, 25W, 4 channels, diode programmable for 430MHz with full info, £30. 144MHz 80W linear, £80. Tel: Beds (01525) 406043.

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Silent key sale: GW3YXC. Kenwood TS-520SE, boxed, good, £300. Datong multi-mode filter FL3, £80. Colt 510 120/a.m., f.m., 10m conversion, 28MHz, no other info., £35. Bremi a.m., f.m., s.s.b. BRL 35/45W Collaudato 3 amplifier, thought to have been used with above, £15. Tel: Cardiff (01222) 512959.

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Radio and Electronic World, around 1985, photocopy of circuit and information for band pass unit, using Kank 3333-4-5 Toko (have PCB), costs met. Thanks. Bill, Glasgow. Tel: 0141-649 4345.

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Bargain Basement August 1995

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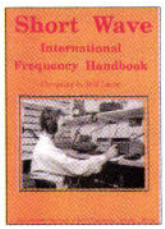

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John Breeds

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Peter Rouse
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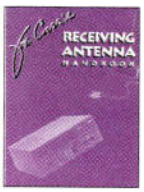

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92 pages. £4.99

REVISION QUESTIONS FOR THE NOVICE RAE (RSGB)

Esde Tyler G0AEC
In effect Esde Tyler's book could be considered as being a training manual for the NRAE. Answers are supplied and the book provides a useful reference source.
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THE NOVICE LICENCE STUDENT'S NOTEBOOK

John Case GW4HWR
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TRAINING FOR THE NOVICE LICENCE A MANUAL FOR THE INSTRUCTOR (RSGB)

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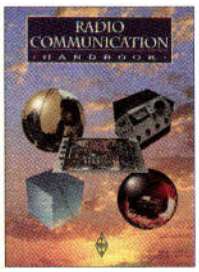

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Mike Wooding G6IQM

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VHF

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W. I. Orr W6SAI

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R. A. Penfold

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ENDNOTES

Well, we've certainly been able to pack some interesting articles into our 'Antenna Special'. The Editorial team hope you enjoy them as much as we did. In fact, the preparation of this issue meant we had to do some very interesting prototype work.

I've been thinking hard on how I could pay tribute to Tex Swann G1TEX's extraordinary efforts to ensure the 'Multi Delta' article would make good reading. This entailed a lot of liaison with the author, and Tex constructing three-dimensional antenna models (using drinking straws and string!) in the office. All this to ensure we provide the best representation of three dimensions in our two dimensional magazine illustrations!

John Goodall G0SKR's article reviewing the multiple-trapped dipole system highlighted an often neglected aspect of our hobby - teamwork. I feel sure that many more of us could benefit from working together, especially erecting antennas. John says he couldn't manage it on his crutches, and I feel sure I'd be a liability up a tree (my hook would be bound to get stuck!). In fact, I've fond memories of Tony Harwood G4HHZ (who was my **boss** at the time, and our gardens backed onto each other!) climbing a very tall tree to prepare a rope ready to erect an antenna. Teamwork does **work**, and Tony's efforts were much appreciated, and perhaps a little more of this would help the hobby to help itself.

Finally this month, I hope you enjoyed the article on my recent trip to Ireland. They were a great bunch, and I'm going back soon! And next month I'll be reporting on how PA/G3XFD went 'tram mobile' in the streets of Rotterdam!

Cheerio for now.

PW SERVICES

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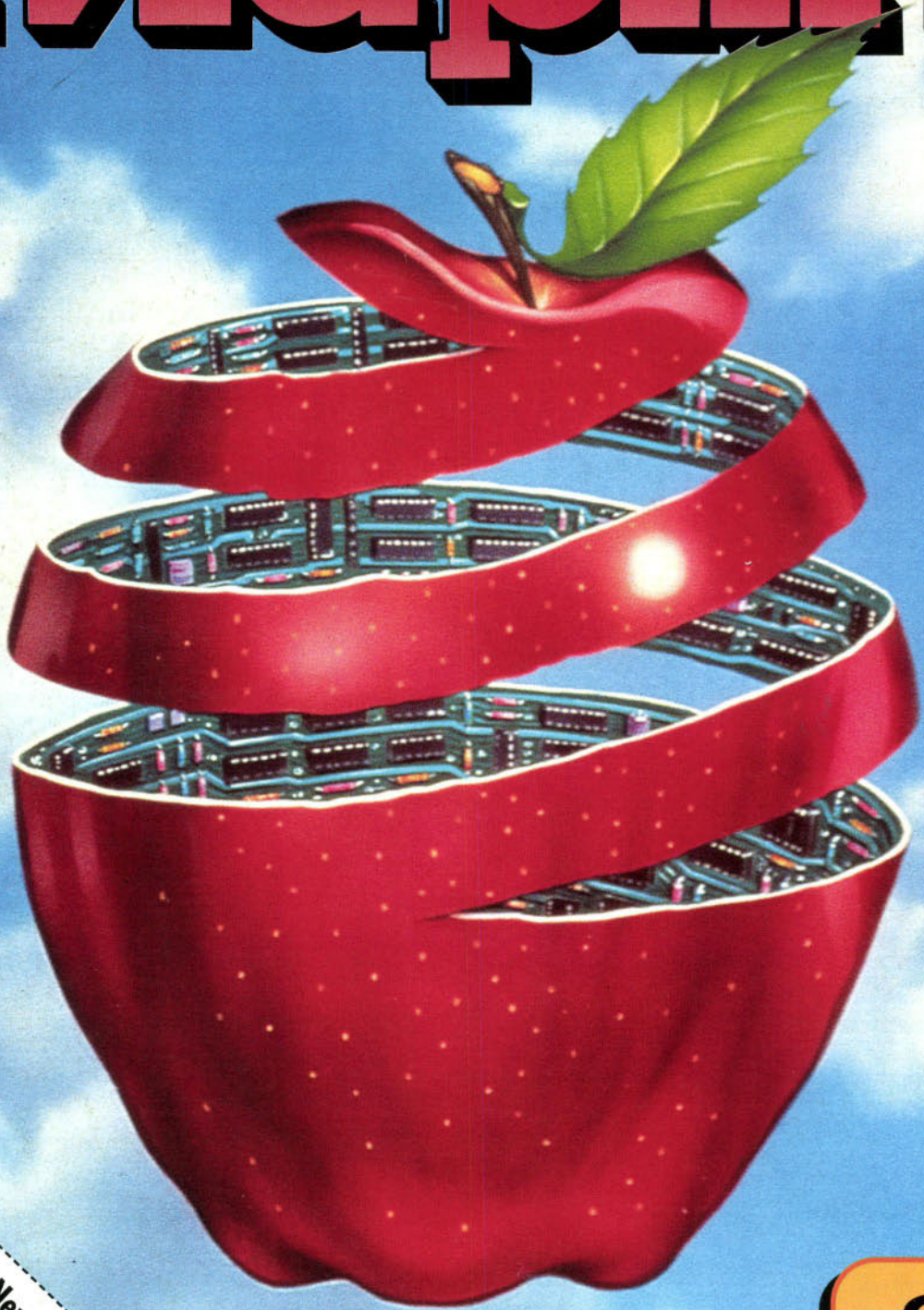

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