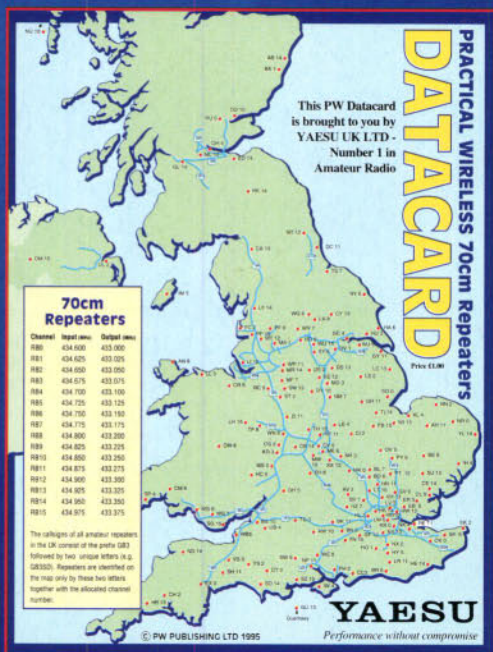


practical Wireless

MARCH 1995 £1.90

FREE

70cm DATACARD



MOBILE SPECIAL

Amateur Radio On The Move

Features

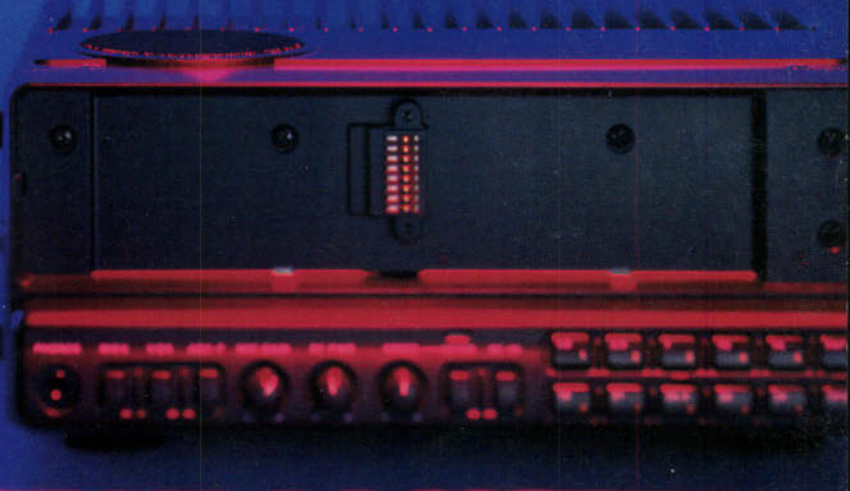
PUSH START Getting Going On Mobile

EMC The Mobile Menace

Reviewed

YAESU'S FT-900AT TRANSCEIVER

More Than A Mobile



SPECIAL OFFERS

Hurry To Catch Our Special Deals On Mobile Antennas And A Booster Amplifier

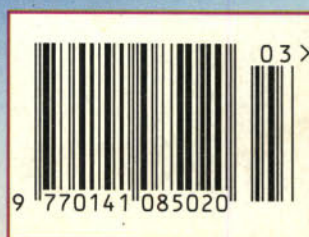


Build

The PW Martlet
70MHz Transceiver
And A 'Ten To Top
Band' Transverter

pull Out

LONDON SHOW GUIDE



NEW
Dual Band HT

Dual Band Handheld **FT-51R**

Only one Dial/Volume knob
required for easier use.

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.

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

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

"Scrolling instructions tell me what to do next!"



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 use the Spectrascope to find new contacts faster."

"Yaesu did it again!"

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.

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.

practical Wireless

March 1995
(ON SALE FEBRUARY '9)
VOL. 71 NO 3 ISSUE 1056
NEXT ISSUE (APRIL)
ON SALE MARCH 9

EDITORIAL & ADVERTISEMENT OFFICES

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

Editor

Rob Mannion G3XFD

Art Editor

Steve Hunt

Layouts Richard Gale

Technical Projects Sub-Editor

NG ("Tex") Swann G1TEX

Production/News

Donna Vincent

Editorial Assistant

Zoe Shortland

Advertisement Manager

Roger Hall G4TNT

PO Box 948

London SW6 2DS

☎ 0171-731 6222

Cellphone (0850) 382666

FAX 0171-384 1031

Advert Sales and Production (Broadstone Office)

Lynn Smith (Sales),

Ailsa Turbett G7TJC (Production)

☎ (01202) 659920

FAX (01202) 659950

CREDIT CARD ORDERS

☎ (01202) 659930

(Out-of-hours service by answering machine)

FAX (01202) 659950

Front Cover Photograph: Craig Dyball

Copyright © PW PUBLISHING LTD. 1995. Copyright in all drawings, photographs and articles published in *Practical Wireless* is fully protected and reproduction in whole or part is expressly forbidden. All reasonable precautions are taken by *Practical Wireless* to ensure that the advice and data given to our readers are reliable. We cannot however guarantee it and we cannot accept legal responsibility for it. Prices are those current as we go to press.

Published on the second Thursday of each month by PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW. Tel: (01202) 659910. Printed in England by Southernprint (Web Offset) Ltd. Distributed by Seymour, Windsor House, 1270 London Road, Norbury, London SW16 4DH. Tel: 081-679 8999, Fax: 081-679 8907, Telex: 8812945. Sole Agents for Australia and New Zealand - Gordon and Gotch (Asia) Ltd.; South Africa - Central News Agency. Subscriptions INLAND £22, EUROPE £25, OVERSEAS (by ASP) £27, payable to PRACTICAL WIRELESS, Subscription Department, PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW. Tel: (01202) 659930. PRACTICAL WIRELESS is sold subject to the following conditions, namely that it shall not, without written consent of the publishers first having been given, be lent, re-sold, hired out or otherwise disposed of by way of trade at more than the recommended selling price shown on the cover, and that it shall not be lent, re-sold, hired out or otherwise disposed of in a mutilated condition or in any unauthorised cover by way of Trade, or affixed to or as part of any publication or advertising, literary or pictorial matter whatsoever. *Practical Wireless* is Published monthly for \$45 per year by PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW, UK Second Class postage paid at Middlesex, N.J. Postmaster. Send USA address changes to *Practical Wireless*, c/o Permit to post at Hackensack pending. The USPS (United States Postal Service) number for *Practical Wireless* is: 007075.

9 GUEST KEYLINES

Clive Trotman GW4YKL 1995 President of the Radio Society of Great Britain.

20 MOBILE SPECIAL OFFERS

Practical Wireless gives you the chance to buy three pieces of mobile, equipment all at very special prices.

21 DAYTON HAMVENTION 1995

Make sure you don't get left behind - last chance to book your place on the amateur radio holiday of a lifetime.

24 REVIEW - THE YAESU FT-900AT TRANSCEIVER



Find out why Rob Mannion refers to the latest h.f. transceiver from Yaesu as being 'more than a mobile'.

27 EMC - THE MOBILE MENACE

Richard Ayley G6AKG passes on some advice to help you minimise the problems of Electromagnetic Compatibility when using mobile equipment.

29 TRAFFIC SIGNS FOR THE RADIO AMATEUR

James Glanville G3TGC shares his zany ideas for possible amateur radio roadsigns - elderly G3s look out!

32 BUILD THE PW MARTLET 70MHz FM TRANSCEIVER PART 1



Designer Mike Rowe G8JVE has come up with another interesting project, this time in the shape of a versatile synthesiser tuned f.m. transceiver for 70MHz.

Other Regular Features

- 76 Advert Index
- 67 Arcade
- All PW Services under one roof
- 69 Bargain Basement
- 59 Bits & Bytes
- The Computer In Your Shack
- 72 Book Service
- 65 Broadcast Round-Up
- 19 Competition

CONTENTS March

38 THE LONDON AMATEUR RADIO & COMPUTER SHOW

Your guide to which exhibitors you can expect to find at this year's London show held on March 11 & 12th.

41 BE CAREFUL USING YOUR WHIP

Jeff Harris G3LWM shows you how to 'whip' up a budget mobile antenna.

43 THREE CANES IN A MOUNTING

Brian Shersby G0ISL constructs a 1.8MHz antenna using three canes and a short whip section.

45 PUSH START

John Goodall G0SKR takes a look at a selection of equipment to give you some ideas for mobile operating.

48 THE ROAD TO TOP BAND - THE BUDGET WAY

Why not have a go at building Ben Nock G4BXD's simple 28 to 1.8MHz transverter?

54 ANTENNA WORKSHOP

Ray Fautley G3ASG encourages you to get up in that loft and put up an antenna capable of multi-band operation.

64 PACKET PANORAMA

This time Roger Cooke G3LDI welcomes Thetford in Norfolk onto the evergrowing packet network.

We apologise that due to Editorial space limitations this month, 'Valve & Vintage' has been held over.

COMING NEXT MONTH

In the April issue of PW we take a look at low power operating with a QRP Special, plus bring you Part 2 of the PW Martlet 70MHz f.m. Transceiver project, all your regular features and much more.

DON'T MISS IT!

- 18 Club Spotlight
- 60 HF Bands
- 12 News '95
- 16 Novice Natter
- 68 Order Form
- 20 Radio Diary
- 10 Receiving You
- 62 VHF Report

SMC, A.R.E. & REG

We believe in offering our customers the best deal possible, by *the middle man*". Most of the following products we import *previous*

THIS MONTHS SPECIALS

YAESU FT-736R Manufacturers list price **£1789**

SAVE
£400



ONLY
£1389

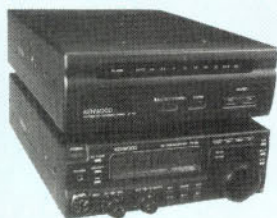
+ FREE
2M/7CM base
antenna. TSB-3301
6.5/9dB gain
worth £68

total package saving from list prices £468

KENWOOD TS-50S + matching AT50 ATU.

Manufacturers list price **£1299**. Package price **£1075**

SAVE
£224



ONLY
£1075

Full manufacturers
12 month warranty
on both items.
Offer valid from
publication date
until 31st March

VHF/UHF Handi's and Portables

ICOM

IC-26XE	Our Price £219	Save £30
IC-26XET	Our Price £249	Save £30
ICW-21E	Our Price £389	Save £50
ICW-21ET	Our Price £439	Save £50

KENWOOD

TH-22	Our Price £209	Save £30
TH-28	Our Price £259	Save £40
TH-78	Our Price £399	Save £40
TH79E	Our Price £399	Save £50
TH-42	Our Price £239	Save £30



YAESU

FT-11R	Our Price £269	Save £30
FT-41R	Our Price £299	Save £40
FT-815	Our Price £229	Save £140
FT-530	Our Price £375	Save £124
FT-290R2	Our Price £459	Save £80
FT-690R2	Our Price £459	Save £80
FT-790R2	Our Price £549	Save £90



HF EQUIPMENT

YAESU

ICOM

IC-765	Our Price £2695	Save £300
IC-737A	Our Price £1379	Save £170
IC-736	Our Price £1649	Save £200
IC-738	Our Price £1399	Save £150
IC-729	Our Price £1175	Save £150
IC-728	Our Price £885	Save £110
IC-707	Our Price £785	Save £110

FT-1000	Our Price £3299	Save £400
FT-990	Our Price £1999	Save £300
FT-990DC	Our Price £1749	Save £250
FT-890	Our Price £1079	Save £220
FT-890AT	Our Price £1279	Save £220
FT900	Our Price £1199	Save £150
FT900AT	Our Price £1379	Save £170
FT840	Our Price £799	Save £100

KENWOOD

TS-950SDX	Our Price £3349	Save £450
TS-850S	Our Price £1529	Save £170
TS-850SAT	Our Price £1649	Save £200
TS-450S	Our Price £1249	Save £150
TS-450SAT	Our Price £1379	Save £170
TS-690S	Our Price £1379	Save £170
TS-50S	SEE THIS MONTHS SPECIAL OFFER	
TS-140S	Our Price £799	Save £100

VHF/UHF Base & Mobile

KENWOOD

TS-790E	Our Price £1649	Save £200
TM-742E	Our Price £749	Save £80
TM-732E	Our Price £599	Save £90
TM-733E	Our Price £659	Save £70
TM-702E	Our Price £489	Save £60
TM-255E	Our Price £799	Save £100
TM-455E	Our Price £899	Save £100
TM-251E	Our Price £349	Save £40



YAESU

FT-736R	SEE THIS MONTHS SPECIAL OFFER	
FT-5200	Our Price £579	Save £100
FT-5100	Our Price £529	Save £100
FT-2500M	Our Price £329	Save £40
FT-2200	Our Price £329	Save £50

All discounts are based on recommended retail prices.

CARR A = £2.50

CARR B = £5 (Handi's)

CARR C = £9.50 (Mobiles)

CARR D = £12.50 (Base Stations)

CARR E = £16.50

Head Office

9-5pm Tel: (01703) 255111
Showroom/Mail Order
9.30-5pm, 9-1pm Sat
Tel: (01703) 251549
Service Dept 9-5 Mon-Fri
Tel: (01703) 254247

SMC HQ Southampton

S M House, School Close
Chandlers Ford Ind Estate
Eastleigh, Hants SO5 3BY
Tel: (01703) 251549/255111
Fax: (01703) 263507
HQ Monday - Friday

ARE Communications

6 Royal Parade
Hanger Lane, Ealing
London W5A 1ET
Tel. 0181-997 4476
9.30am - 5.30pm Monday-Friday
9.30am - 1.00pm Saturday

Reg Wan

1 Weste
West Str
Axmins
Devon E
Tel. (012
9.00am - 5

Dealing direct with the manufacturer we are in effect "cutting out the middle man". Consequently, we are able to offer **LOWER PRICES** than anywhere else possible.

FT 51R

The First Dual
Band Handi
with Windows

Features

- * Dual band 2m/70cm
- * Full duplex operation
- * Spectrum Scope
- * User help menu
- * Message paging with CW playback
- * Auto sub Rx muting
- * Built in CTCSS
- * Automatic Repeater Shift
- * 120 Memory Channels
- * Dual in-band receive U&V, V&V or U&U



SPECIAL INTRODUCTORY PRICE
£449 inc

NEW

Q What is probably the most reliable tried & tested medium duty antenna rotator ever.
A. Yes you were right the Yaesu G400 & 400RC and what's more they are still available at amazing value for money prices.



Carr D



G400 with meter controller

ONLY **£199 inc**

G400RC with circular dial controller

ONLY **£239 inc**

Other models

G250 light duty.....	£119
G600RC H/D 400 series.....	£339
G800SDX 450° DeLux.....	£399
G1000 SDX H/D version of G800.....	£459
G2700SDX H/D rotator.....	£859
G500A Elevation rotator.....	£265
G5400 AZI/ELE rotator.....	£499
G5600 H/D AZI/EE rotator.....	£569
RC5-1 medium duty create.....	£299

Carr

C	RC5-3 medium duty + preset.....	£399.00	D
D	RC5A-3 H/D + preset.....	£599.00	D
D	RC5B-3 Very H/D + preset.....	£599.00	D
D	GC-038B Lower clamp G, 400, 800, 1000.....	£23.00	C
D	GC-038 Lower clamp G-600.....	£23.00	C
D	GS-065 Rotary bearing.....	£39.95	C
D	CK46 Create bearing.....	£53.95	C

MIRAGE KLM

Mirage is not a new name in amateur radio products.

We believe that their current range offers outstanding performance at realistic prices

LINEAR AMPLIFIERS

	£ inc vat	Carr
B108G 2m, 10W input, 80W output preamp.....	189.00	C
B1016G 2m, 10W input, 160W output preamp.....	299.00	C
B2516G 2m, 25W input, 160W output preamp.....	269.00	C
B5016G 2m, 50W input, 160W output preamp.....	269.00	C
D1010N 70cm, 10W input, 100W output.....	349.00	C
D3010N 70cm, 25W input, 100W output.....	329.00	C
RC1 Remote switching unit for Mirage amps c/w 18ft cable run.....	38.00	B

MAST HEAD PREAMPS

KP2/2M 2m GaAs fet 0.6dB NF 20-25dB gain or 10-15dB adjustable 165W through power.....	149.95
KP2/440 70cm GaAs fet 0.6dB NF 20-25dB gain or 10-15dB adjustable 165W through power.....	149.95

POWER METERS

MP2 50-200MHz, 50-500-1500W average and PEP reading + SWR 9-13.6VDC internal battery.....	189.00
MP4 1260-1300MHz, 1-10-100W average and PEP reading + SWR9-13.6VDC internal battery.....	229.00

CARR.

CARR.

B

B

B

B

B

B

B

B

B

B

B

B



TNC's and
Data Modems

PK12 - A new VHF TNC that offers superb performance and simplicity of operation. "I only needed to type '*' and the TNC adjusted itself to my terminals parameters". (quote HRT March 1995).

ONLY **£119.00 INC** Carr B



PK12/100K -
100k Mail Drop
Memory Upgrade
£39.95
Carr A



PK232/MBX - An
old favourite that
still offers state of
the art performance.

BETTER VALUE THAN EVER AT

ONLY **£299.00 INC** Carr C

PK900 - Deluxe multimode data terminal.

ONLY **£459.00 INC** Carr C

PK96 - 9600 Baud packet TNC with 14k of mail drop memory.

£189.00 INC Carr B

PAK WIN - Windows based software programme

ONLY **£79.00 INC** Carr A

COMET ANTENNA

CA-21HR 7MHZ Mobile Whip.....	£38.00
CA-14HR 14MHZ Mobile Whip.....	£38.00
CA-21HR 21MHZ Mobile Whip.....	£38.00
CH72S 2M/70CM Whip BNC.....	£14.00
CH600MX 2/70/23CM Whip BNC.....	£25.00
CA-50HR 6M MOBILE Whip.....	£38.00
CA2X4KG 2M/70CM Mobile Whip.....	£45.00
Z4 2m/70cm M. whip w/locking collar.....	£33.00
B-10 2M/70CM Mobile Whip.....	£18.50
CHL21J 2M/70CM Mobile Whip.....	£15.00
CA-350dB 6M/10M Base Colinear.....	£140.00
ABC23 3 x 1/2 Base Colinear.....	£55.00
GP9N 2M/70CM Base Colinear.....	£123.00
GP15 6M/2M/70CM Base Colinear.....	£85.00
CX-902 2M/70CM/23CM Base Colinear.....	£84.50

COMET DUPLEXERS

CF-305 HF/VHF Duplexer.....	£25.00
CF-306A HF/VHF/UHF Duplexer.....	£34.00
CFX-514 6M/2M/70CM Triplexer.....	£39.50
CFX-431 2M/70CM/23CM Triplexer.....	£42.50

CF-520 2M/6M Duplexer.....	£24.50
----------------------------	--------

COMET ANTENNA ACCESSORIES

RS-9 Mini Boot Mount.....	£6.75
RS20 Mini Gutter Clip.....	£15.00
CK-3MB Mini Cable Assembly.....	£19.50
WS-1M Window Mount & Cable.....	£36.50

COMET STATION ACCESSORIES

CBL-30 HF 1:1 Balun 1KW PEP.....	£20.00
CBL-2000 HF 1:1 Balun 2KW PEP.....	£25.50
CSW-20N Switch 2 WAY 'N'.....	£39.00
CF-30MR HF Low Pass Filter 1KW PEP.....	£34.00
CF-50MR 6M Low Pass Filter 1KW PEP.....	£35.00
CF-30H HF Low Pass Filter 2KW PEP.....	£69.00
CF-30S HF Low Pass Filter 150W PEP.....	£19.00
CF-50S 6M Low Pass Filter 150W PEP.....	£19.50
CF-BPF2 2M Band Pass Filter 150W PEP.....	£36.00
CD-160H SWR/PWR 1.6-60MHZ 20/200/2000W.....	£95.00
CD-270D SWR/PWR 140-525MHZ 15/60/200W.....	£82.00
CMX-2 SWR/PWR 1.8-200MHZ 20/50/200W.....	£110.50

CARRIAGE: Base Antennas £9.50

Mobile Antennas £5.00

Station Accessories £5.00

1 & Co
n Parade
et
er,
X13 5NY
97) 34918
15pm Tues-Sat

SMC (Northern)
Nowell Lane Ind. Estate
Nowell Lane
Leeds
Tel. (0113) 235 0606
9.30am - 5.00pm Monday-Friday
9.00am - 1.00pm Saturday

SMC (Midlands)
102 High Street
New Whittington
Chesterfield
Tel. (01246) 453340
9.30am - 5.30pm Tuesday - Saturday

SMC Birmingham
504 Alum Rock Road
Alum Rock
Birmingham B8 3HX
Tel. 0121-327 1497
9.00am - 5.00pm Tuesday - Friday
9.00am - 4.00pm Saturday

S.M.C., A.R.E. & REG WARD

LONDON AMATEUR
RADIO SHOW STAND 'M'
IN THE RED HALL



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

HF Antennas

R5	10/12/15/17/20 vertical	£279.00
R7	10 thru to 40m vertical	£369.00
AV-3	14-21-28MHz vertical 4.3m long	£85.00
AV-5	3-5-7-14-21-28MHz vertical 7.4m long	£149.00
AP8A	8 Band Vertical	£199.00
APR18A	Radial Kit	£49.00
40-2CD	2-ele 40m Yagi	£439.00
A3S	14-21-28MHz Yagi	£349.00
A3WS	12/17m 3-ele Yagi	£275.00
A103	30m Extension A3WS	£115.00
204CD	4 ele 20m Yagi	£439.00
154CD	4 ele 15m Yagi	£249.00
D4	Dipole 10/15/20/40m	£229.00
D3W	Dipole 12/17/30m	£169.00

A4S	3-4 ele Yagi 10/15/20m	£425.00
-----	------------------------	---------

VHF Antennas

AR-270	2/70 Dual Band Vertical 1.13m long	£60.00
AR-270b	2/70 Dual Band Vertical 2.3m long	£89.00
AR2	2m Vertical 1.2m long	£35.00
AR6	6m Vertical 3.1m long	£48.00
A148-10S	2m 10-ele Yagi 13.2 dBd	£59.00
A144-20T	2m 10-ele Cross Yagi 12.2 dBd	£99.00
13B2	13-ele 2m Yagi	£99.95
17B2	17-ele 2m Yagi	£169.00
A50-3S	3-ele 6m Yagi	£75.95
424B	24-ele 70cms Yagi	£115.00
22XB	2m 22-ele Yagi c/w polarization switching	£199.00
738XB	70cms 38-ele Yagi c/w polarization switching	£185.00

HOKUSHIN ANTENNAS

HS-702S	2M/70CM Whip BNC	£12.50
HS430	5 1/2 Wave Whip BNC	£8.50
2NE	5 1/2 Wave Mobile Whip	£19.00
VM-2HP	2M 1/2 Wave Mobile Whip	£26.00
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 2L Beam	£65.00
HS-GP62	2 X 1/2 Base Colinear	£65.00
GP23	3 X 1/2 Base Colinear	£39.00
SO44	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



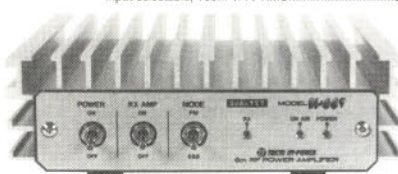
LINEARS

		£ Carr
HL100B/10	10M Linear, 10W in 100W out PEP Suitable for 21/24/28MHz	210 C
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

Tokyo Hy-Power. One can only describe their products as "Japanese design and build quality at its very best"

TRANSVERTORS

HL130U	70cms Linear, 3/10/25W i/p auto select 120W out Rx Preamp	485 C
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
HX650	10M to 6M transvertor high performance, MGF1302 Preamp dB/12dB selectable 10/50W selectable output input selectable, 100m V/1V RMS	369 B



HOKUSHIN MOBILE ANTENNA MOUNTS

GCCA	Gutter Clip & Cable	£19.50
SOCAL	4M Cable Assembly	£11.50
SOCAL	6M Cable Assembly	£12.50
HS-TMK	HD Boot Mount & Cable	£19.50
SOMM	Magnetic Mount & Cable	£17.50
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



PS120MIIA	PSU 3-15V 9/12A	£65.00
PS140MIIA	PSU 13.8V 12/14A	£67.00
PS304IIA	PSU 1-15V 24/30A	£119.00
RS40XII	PSU 1-15V 32/40A	£159.00
CN101L	1.8-150MHz	
	15/150/1500W	£59.50
CN103LN	150-525MHz	
	20/200W 'N'	£68.00
CS201	2 Way Switch S0239 1KW	£15.00
CS201GII	2 Way Switch 'N' 1KW PEP	£23.50
LA2080H	2M L/AMP 1.5-5W IN 30-80W OUT	£136.00
DLA80H	2M/70CM Dual Band Amp 0.5-25W IN 80-60W Out Pre Amps	£345.00
DX10N	2m/70cm Duplexer UHF/N	£19.50
CP10Y6	Cigar plug lead for FT530, etc.	£6.50



MFJ PRODUCTS

MFJ-259	1.8-170MHz Antenna Analyzer with built in Counter, SWR and RF resistance meters	£229
MFJ264	1-650MHz Dummy load 100W continuous or 1500W for 10 seconds	£69.00
MFJ941E	Antenna tuner 1.8-30MHz 300W	
	8 position antenna switch +4:1 balun	£119.00
MFJ949E	Antenna tuner 1.8-30MHz 300W	
	8 position antenna switch 4:1 balun Built in dummy load	£159.00
MFJ-962C	Antenna tuner 1.8-30MHz 1.5kW PEP	
	6 way antenna switch 4:1 balun	£259.00
MFJ-986	Antenna tuner 1.8-30MHz 3kW PEP	
	Rotary Inductor 6 way antenna switch built in current balun	£319.00
MFJ-989C	Antenna tuner 1.8-30MHz 3kW PEP	
	Rotary Inductor built in 300W dummy load 6 way antenna switch built in balun	£369.00

REXON VHF/UHF HANDI'S

RL102	VHF handi, 138-174MHz, 5 watt, complete with cell case	£189.00 B
RL402	UHF handi, 410-470MHz, 5 watt, complete with cell case	£199.00 B
RNB111	7.2V 600mAh nicad for RL102	£21.50 A
RNB112	12V 500mAh nicad for RL102	£39.95 A
NC28/REXON	Charger for RNB111	£18.00 A
SMC18/REXON	Charger for RNB112	£18.00 A
RTN100	CTCSS unit	£25.00 A
RTS102	DTMF unit	£19.95 A
RCC101A	Vinyl case RL102/402 + RNB111	£9.00 A
RBX100	AA cell case for RL102/402	£8.00 A
CBB186	Universal belt clip quick release	£14.95 A

REXON OFFER

RL102 C/W NICAD &
CHARGER ONLY
£189

RL-402 C/W
NICAD &
CHARGER ONLY
£199



ANTENNAS

		Carr.
HF		
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

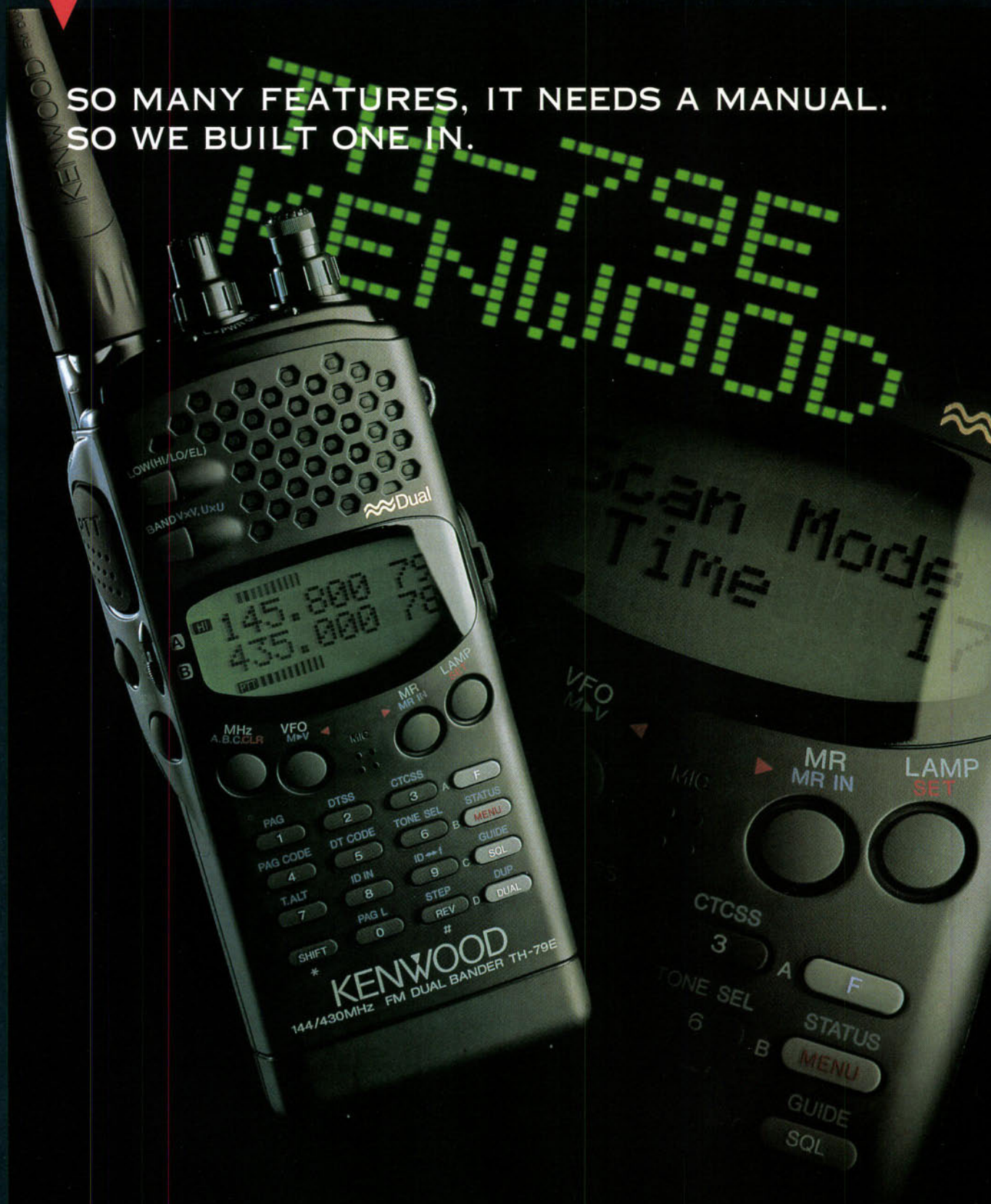
MORSE KEYS

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

SEE PREVIOUS PAGE FOR ADDRESSES AND TELEPHONE NUMBERS

THE THREE POINTS OF THE KENWOOD TRIANGLE REPRESENT ADVANCED TECHNOLOGY, QUALITY AND STYLE

SO MANY FEATURES, IT NEEDS A MANUAL.
SO WE BUILT ONE IN.



Kenwood's TH-79E marks a new high in user-friendly handheld transceivers. This slim-line FM dual-bander features a dot matrix LCD menu, which helps you to access the many class-leading features of this stylish unit.

Features that include an FET power module for longer battery life, 82 memory channels with ID, DTSS and pager functions, Automatic Band Change and DTMF memory function for auto-dial operation. Confused? You won't be. Just call up the menu. Or ring 0923 816444 for a full information pack.

KENWOOD

HOME AUDIO, CAR AUDIO, COMMUNICATIONS EQUIPMENT, TEST AND MEASURING INSTRUMENTS, TELECOMMUNICATIONS



***Where in the World
will you find Better?***

Price Down
DJ-480E 70cm
£239

Price Down
DJ-580E 2m/70cm
£389

Price Down
DJ-180E 2m
£199



ALINCO is distributed in the UK by:

WATERS & STANTON ELECTRONICS

Tel 0702 206835

0702
206835

Waters & Stanton



DR-M06 50MHz FM Dx Machine!

- * 10 Watts output
- * 100 Memories
- * CTCSS Encoder built-in
- * Programmable "Time Out"
- * Channel or Frequency Display
- * Receives 40 - 60MHz



50MHz

£299

- 10 Watts
- 100 Memories
- 6 Ch. Steps
- Offsets
- High/Low Power
- CTCSS Encode



NEW ADI-200

2m Handheld

- 144 - 146MHz Tx
- 130 - 170 Rx
- 2W Batt 5W 12V
- 20 Memories
- Triple Power Output
- Dual Watch
- 6 Channel Steps
- Battery Saver
- Scanning
- Auto Power Off
- Input Listening

AT-200
£169.95

WATSON

Speaker - Mic.

Fits modern handys
state model



NEW
£14.95

Post £1.50

Long Wire Receive
Balun. 1.5 - 30MHz



£19.95

Post £1.50

0% APR Deposit £59 + 12 mths @ £20

0% APR Deposit £34.95 + 12 mths @ £11.25

P-335 2m Mobile 30W Amplifier



£59

- * RF Sensing
- * 1 - 6W Input
- * Ideal For FM
- * 12dB Power Gain

DR-599E



45/35 Watts



2m/70cms
Dual-Band
£599

0% APR Deposit £98 + 12 mths @ £41.75



FT-530 2m/70cms

**Save
£130!**



£379

Plus
Free Case!

Commission Secondhand Sales - Phone for details

MFJ Aerial Analyser 249



1.8 - 170MHz

- Checks resonance, VSWR, and impedance
- Digital display
- Frequency counter
- 8 x AA cells or 12V

Free Case this month

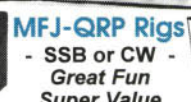


16010 ATU

1.8 - 30MHz 300W £49.95

948 ATU Deluxe

1.8 - 30MHz £149.95



MFJ-QRP Rigs
- SSB or CW -
Great Fun
Super Value

40m 30m 20m or 15m all in our catalogue!

March 11th & 12th



LONDON AMATEUR RADIO & COMPUTER SHOW

We'll be there!

FREE CREDIT on Yaesu
0% APR

Plus £50 Accessory voucher
Compare these deals!

Model	Deposit	12 months	Total APR
FT-990AC	£232	£172.25	£2299 0
FT-990DC	£202	£149.75	£1999 0
FT-900AT	£157	£116.00	£1549 0
FT-900	£137	£101.00	£1349 0
FT-890AT	£152	£112.25	£1499 0
FT-890	£132	£97.25	£1299 0
FT-736R	£181	£134.00	£1789 0
FT-51R	£52	£37.25	£499 0

Written details on request

WATSON

Communications Headsets



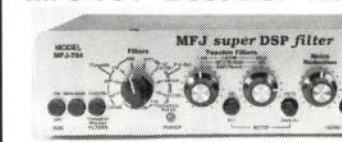
Superb transmitted audio quality. Supplied with FREE mic lead adaptor for Yaesu or Kenwood 8 pin sockets. (state which). Use VOX or external PTT.

£32.95

£89.95

30 Amp version £119

MFJ-784 "Best DSP filter Today"



£249

This amazing DSP filter is fully programmable with memories and features no other DSP offers. You can adjust bandwidth, upper and lower limits. Every parameter can be varied - makes the rest yesterday's models.

Exciting New
Book!

"SCANNING SECRETS"

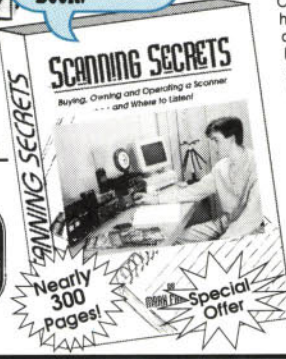
At Last The Truth!

Over 250 pages. Secrets and hints on all those topics not covered by other publications. Hunt those elusive signals down. Nothing's secret any more! We expose all the myths and folk lore. If you own a scanner you can't afford to miss this valuable reference book. It's UNIQUE. Publication date 18th March.

Order today and we'll send you a copy
POST FREE plus a
10% voucher for
accessories.

£16.95

Postage £2.00



MAIL ORDER: Spa House, Main Road, Hockley Essex SS5 4QS **Tel. 01702 206835/204965**
SHOPS: 22, Main Road, Hockley, Essex. SS5 4QS **Tel: 01702 204965**
12, North Street, Hornchurch, Essex RM11 1QX **Tel. or Fax 01708 444765.**
ACCESS Hours of Business 9.00AM - 5.30PM Monday to Saturday **VISA**
24 Hour Orders Fax: 01702 205843 Answerphone 01702 206835

IC-Z1 - SPECIAL AGENT IN THE FIELD



ICOM

You all know that ICOM are constantly expanding the frontiers of radio communication - the very latest IC-Z1 is no exception to this tradition, now read on...

ICOM introduce a unique new dual-band handheld transceiver with a difference... namely an optional, detachable front panel that can be used as a remote control microphone. The radio's keypad is removed instantly allowing the installation of the dummy panel and extension lead creating a remote speaker/mic that can be hand held or clipped to your lapel for hands-free operation, (see diagram below).

To help you to store station names etc., alphanumeric notes can be programmed into each memory channel and displayed together with the operation frequency.

Up to 6 messages can be transmitted using DTMF codes, ideal for transmitting 'secret' codes etc.

Other features include:

- Twin tuning dials for both main and sub-band control.
- Electric volume control via detached panel.
- Wide 4.5 -16 Volt operating via external DC jack.
- V/V and U/U for simultaneous 2 signal receive capability in the same band.
- Large memory capacity of 100 channels (50 channels for each band).

We anticipate that this truly innovative dual-band transceiver will catch on in a big way, just imagine being able to walk around and communicate hands-free, very 'Special Agent', in fact... *VERY SPECIAL!*



**ALL ICOM HAM PRODUCTS CARRY A FULL 2-YEAR WARRANTY COVERING SPARES AND SERVICE.
FOR MORE DETAILS ON THE ICOM IC-Z1 CONTACT US OR YOUR LOCAL ICOM VERY SPECIAL AGENT!**

HERNE BAY: Unit 8, Herne Bay West Ind. Estate, Sea Street, Herne Bay, Kent CT6 8LD.
Tel: 01227 741555 Fax: 01227 741742.

OPENING HOURS: Tuesdays to Fridays: 09:00-17:00 & Saturdays: 09:00-16:00.
Closes for lunch 1300-1400.



GUEST Keylines

After writing the first line of my guest 'Keylines', I stopped and stared at the blank sheet of paper with an equally blank mind. So, I went and had a cup of coffee, came back, and still I could not understand how, or why, I had achieved the highest accolade that could be awarded to a British Radio Amateur.

Clive Trotman, who is he, where has he come from and what's his achievements in the world of Radio or Electronics? The simple answer is, not a lot! My general background has been in Management within the manufacturing industries, so my working life has been quite mundane. It's even more apparent to me when I look at the very eminent names that have achieved the position I now occupy and that have been very prominent within the field of radio and/or electronics.

My only claim to fame in this field has been the Radio Amateur Examination Courses that I have conducted since 1981 both here in Bridgend and at the Highfields Amateur Radio Club in Cardiff. During that period I was very fortunate to have helped 437 students successfully through the examination, many of whom are now involved in Novice Training.

I have a thing about training and education. I honestly believe that if we have a skill or special knowledge we should have a moral obligation to pass that skill or knowledge on. If any young person asks what, why or how, we should find the time to give them the answer.

I know that sometimes the timing of the questions can be difficult, but we should all make the effort. I speak from experience, as I have a very inquisitive 10 year old grandson and his questions come at me like a machine gun burst. But I've found that helping young people is extremely satisfying and is certainly good for the ego!

When Rob Mannion G3XFD first invited me to write the 'Keylines' editorial I was thrilled to bits, because I first had sight of *PW* in the late 1930s when my father used to buy it. I did not understand *PW*, and to be truthful I do not think my father understood it too much either, but he did enjoy listening to broadcast stations from all over the world and he would become quite excited if he

heard a new one. At that time I could never understand why!

As a boy I used to love climbing trees and my father took full advantage of this. I can remember climbing the apple trees to pull up weird and wonderful pieces of wire. Many of these antenna ideas I believe were dreamt up by Fred Camm but whether they worked or not was another matter!

In those days we lived in the country in Herefordshire on a small holding of some 10 acres. What I would give to be living there now!

My father would spend hours turning the dial trying to catch another elusive signal from his battery powered receiver. It was powered by a 90V h.t. battery, 4.5V grid bias battery and the inevitable lead acid accumulator, and I think he must have been a frustrated DXCC hunter.



Clive Trotman GW4YKL
President of the Radio Society of
Great Britain 1995.

Over the years I have continued to read *PW* (and dare I say, *Everyday Electronics*) and build some of the small projects. Many of these had no real use and others didn't work, but it was great fun finding all the bits and pieces and putting it all together. Unfortunately, I did not have the skill or knowledge at that time to figure out why the projects didn't work.

I also played with radio controlled models for many years and I became quite skilled with the technique. But more to the point, I was still doing something, but in a different form, that I had been doing in my boyhood and teens.

During 1978/9 a friend called to see me and very furtively called me to his car, there he removed a blanket and revealed a shiny new CB transceiver. I must admit, I was intrigued, we went up to the local mountain top, some 1000ft a.s.l., and he gave me a demonstration.

The first CB station he worked was from San Paulo, and I was hooked! Here was a little box some 10 x 8in in size running at low power which allowed you the ability to converse with someone halfway round the world for **FREE!** During this time I learnt a lot about propagation and all that goes with it and had lots of fun.

So, I took stock and realised that retirement was not 10 million miles away. And, apart from playing golf, I had no hobby to occupy my time or exercise my mind (by this time I had given up radio controlled modelling). It was then that I made some enquiries about Amateur Radio, took the RAE and started life as GW6LDX.

That basically is the story so far although I still don't know how I've become President. I'm just a typical talkative Welshman who enjoys meeting people and helping whenever I can. I have been working for the RSGB since 1984/5 in various capacities and I hope that I have returned something to Amateur Radio to repay the enormous enjoyment that I have got from it.

Some time ago Rob started the *PW* 'Elmer' theme and I think we should all become 'Elmers'. How else will Amateur Radio survive? In this way I can ensure everyone that to learn something about any subject try teaching it, for sure it focuses the mind.

I have made thousands of friends over the years through Amateur Radio. And through advice and encouragement, I've also helped those 437 RAE candidates. That must be why I'm President for 1995, and it was a great pleasure to help them on their way into our great hobby.

Clive Trotman
GW4YKL

Send your letters to the editorial offices in Broadstone. They must be original, and not duplicated in any other magazine. We reserve the right to edit or shorten any letter. The views expressed in letters are not necessarily those of *Practical Wireless*.

RECEIVING *You*

Bureaucratic Nightmare

Dear Sir

I read your 'Keylines' page (January) with keen interest. As you have bought up the subject of radio amateurs and the local planning authority, I recount my own experience of this bureaucratic nightmare for the benefit of other readers who venture into the planning minefield.

At the end of last summer, I was approached by one of the local schools who had read of my activities with the space shuttle in the local paper. They had seen me on Sky TV News demonstrating amateur communications, and asked if it would be possible for me to arrange a school contact with the space-craft and allowing them to participate in the SAREX (**S**huttle **A**mtateur **R**adio **E**xperiment) mission.

A few consultations and relevant paper work completed, we sent it all off to the Education Activities Director of ARRL. The next stage was to sort out the equipment needed, and here the local amateur community came to the rescue. They were offering not only equipment, but also that very precious commodity - time in the form of operators to man the station on a 24 hour rota. So far, all well and good. Then came the antennas, and the problems!

I have a WX01 on my roof as my only antenna. So, for the purpose of the SAREX enterprise, I dug out a 144MHz 10-element X-Y beam with the intention of testing it with a view of using it for the SAREX mission, mounted on a temporary mast in the garden.

The antenna was seen by a neighbour and I was duly reported to the local authority. I then had a visit from the chief planning officer, who advised me by letter that I had to either apply for planning permission or remove the offending antenna within 28 days of receiving

the notices.

I made the mistake of applying for temporary planning permission to cover the duration of the tests. This resulted in a deluge of letters and visits from, **1:** The chairman of the local Parish Council, **2:** The Chief Planning Officer, again, and **3:** A local town council official.

The cause of the interest was that the neighbour who had complained originally, had found out that I was seeking temporary planning permission. The neighbour had fabricated a complaint that my previous antennas had blown down and damaged her garden, all untrue, I may add.

As I mentioned earlier, I only have a WX-1 antenna on the roof, but the local authority had taken her word without any mention of the nature of this complaint being made to me. Well, letters were passed back and fourth to county hall and numerous telephone calls were made.

I was then informed by the bureaucrats that the existing scaffold pole was 'A blot on the landscape' (the objectors words) and temporary permission would not be granted for the existing mast. At this point, I was wondering if trying to help the school and pupils was worth all the hassle!

So, I revised my planning application after consultation with the Chief Planning Officer, and applied for a permanent mast to be sited in the garden. Now, here is a bureaucratic logic. My existing scaffold pole is approximately seven metres in height. And it's considered a blot of the landscape, although only intended to stay up for three or four weeks.

The permanent mast that I've been told to apply for, even though I have no use for one can, when erected, be anything up to 100ft in height. (Well, what the hell, let's go the whole hog!).

So, amended plans were put forward to the planning committee. They were duly passed with enough restrictions imposed on them to make you wonder why you bothered in the first place.

The restrictions include the paragraphs **1:** That permission is only granted for a period of two years, after which, if no complaints are received, it will become permanent, **2:** The support mast can only be fully erected two or three times a month, **3:** When not in use that mast must be wound down and tilted over to reduce the possibility of damage to neighbouring residential properties and in the interest of visual amenities, **4:** Any mast erected at the above dwelling must have plans submitted to the Planning Department, who will then pass said plans to the Building Department for assessment to the possibility of structure collapsing under adverse weather conditioning in the interest of visual amenities and safety of neighbouring residential properties. **5:** The proposed structure must not be more than 4 metres from the dwelling.

With regards to condition **1:** the neighbour who complained has informed me that no matter what I put up, she will complain and oppose it. So, where do we go from here? I feel that had the local authority contacted me and said 'Look, we have received this objection, do you have any comment to make?' The whole thing could have been resolved.

If any reader is considering helping local schools or thinking of ways to benefit the community via amateur radio, forget it. You will have nothing but bureaucratic hassle for your trouble. I for one will never offer the services of this station again to anybody!

Colin Grellis G1YIL
Dorset

In Different Ways

Dear Sir

While I accept that we are all different and enjoy amateur radio in different ways, I cannot bring myself to compete. To say 'Thank you, 5/9, QRZ' is not my cup of tea.

To me, amateur radio is about breaking down barriers and getting to know people of different countries and different ways of life.

How much does 'G0—, 5/9, QRZ' tell you about the two people in contact? What I propose is a 'Getting to know you', DXCC. To win this award, you would need 100 countries, of these, at least five minute QSOs must have taken place, details of each contact must contain callsign, QTH, name, occupation, other interest (either in radio or another hobby). And 25% must be accompanied by a photo of contact, or spouse, cat, dog, etc., or coin, postage stamp or some other thing from the country. Of course, it would take a little longer, but it would be great fun.

I remember one of my country hunting friends from when I was in the USA. I would be mobile on 28MHz and break in to tell him I was going through another country.

I did not mind this type of collecting, he knew me and had made a long QSO with one. When I said I was returning to the UK, they sent me newspapers, etc and offered help.

This is what radio is about, when I hear 5/9 QRZ, I move on, when I hear someone exchanging details and getting to know each other, I stay awhile and may even break in if the QSO permits.

So, how about it folks? Not a 'rag chewers' DXCC, but a genuine 'get to know you DXCC'!

Dennis H. Barber
G0UFS/KB8GCF
Swinton

Planning Permission

Dear Sir

With reference to Editor's 'Keylines', January *PW* and, planning permission. I noted all your comments about the unfairness of Planning Authorities and I would like to emphasise one point which arose from your comments.

Everything higher than 10 feet needs planning permission. Therefore, when applying for planning permission, you apply to erect a mast of **X** feet to hold an antenna. The authority shouldn't need to know what antenna, because they know a sight less about radio and antennas than you do!

I think you should only state what antenna you intend to erect if the planning authority ask you for the information, and inform them in the nicest possible way that they are only required to decide upon the erection of the mast.

I recommend that you **only** send in a site plan, with **X** marking the spot where you are going to put the mast. Don't give any more information than you absolutely need to give.

Remember, most of the people sitting on the planning committee, are in effect, ordinary members of the public, guided by a planning officer. If you give them too much information, you will only confuse the issue.

You may think that I am talking through my hat, and so you are entitled to. However, as a radio amateur, I have applied for planning permission in three different areas, Bournemouth 50ft, Wimborne 30ft and Powys 40ft, and using the above information, I have been successful in each case.

Thank you for an interesting magazine.

Arthur Bagley GW4EKE
Powys

Editor's reply: Thank you Arthur for some interesting advice! Let's hope others can be as successful as you, using the simple procedure outlined.

GB2SM Saved(?)

Dear Sir

I am not too sure whether there should be a question mark (as above) on the front cover (and Keylines article) of your December issue 'GB2SM Saved'. It's fairly obvious from the packet 'bulletins' I've enclosed (from those that operated the station until its closure on the 7th November), that there are very differing ideas on this subject.

There are obviously 'internal' memos which they have seen that '*PW*' (understandably) does not of course have access to. Perhaps the time has come for '*PW*' to get the **facts** to us with a somewhat more 'in depth' article in a future issue?

Neville Cooper G3LMO
Cornwall

Editor's reply: I have to agree with you Neville, as there appears to be much confusion over the future of GB2SM. The only thing that seems certain with the Science Museum amateur radio station is that a final decision has yet to be taken (contrary to the information we had been given). When contacted, the Science Museum were unable to provide any comment or information. However, Peter Kirby G0TWW, the RSGB General Manager, informs me that there is a meeting scheduled (it was originally planned for December 14 1994) soon to discuss the future of GB2SM and the RSGB's proposals for the station. You can be assured that *PW* will provide an up-date on the situation as soon as information is available.

★★★★★ STAR LETTER ★★★★★

Trying Morse

Dear Sir

As a Class B Amateur (G7MPQ) for over two years and trying to learn Morse code in order to gain my A class licence, I thought I would never master the code. Although I bought the RSGB tapes and also a computer, with c.w. programs, the going seemed hard.

On discussing c.w. with a very experienced war time operator, he offered to teach me one-to-one. After a few weeks I learned the code, then I had a contact with another amateur who offered to send me c.w. over the air.

He sent me c.w. for several weeks, he kept me at it. At my third attempt, I am pleased to say I have now passed the c.w. test and acquired the callsign G0VIJ.

Without the help and mainly the encouragement of Vic G0CWD who taught me the code and Jim G0FVS who according to my log sent over 50 hours of c.w., I think I would have given up. They assured me my 60 years plus would not let me down, and they reminded me of amateurs who make it at much older ages than mine.

It makes one feel proud being a radio amateur knowing we have colleagues who will give so much of their time to help others. I would like to say a sincere thank you to Vic G0CWD and Jim G0FVS, without their help I would still be hoping.

Joe Johnson G0VIJ
Norfolk

Editor's reply: Looks as though you have two possible *PW* 'Elmer' award nominees there John! Congratulations to you and well done to your friends who helped out in the true spirit of amateur radio.

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.

Support For CBers

Dear Sir

I read with dismay the letter from G3BEC concerning ex CBers. I myself started with CB and consider myself, and many of my friends, sensible operators. You will always find someone with bad behaviour in anything that is ruled by self discipline.

The attitude of G3BEC is not typical, thank goodness, and most of the G2s, 3s and 4s, etc. on h.f. are most helpful to newcomers without the finesse gained by practice. What G3BEC forgets is that without the influx of CBers, the hobby was dying and some of the funny terms sometimes used is for amusing banter only.

Perhaps G3BEC wants people to use BBC 1946 style of language, one only has to see an old film to see how ludicrous this would be. But please do not be offended by this reply, as everyone has the right to speak his mind.

Remember, most ex CBers used CB as a 'Novice Band' before the now official scheme. On the other points about security, G3BEC has some valid points, but as I am a figurehead of a club, I must be accessible to the public via the call-book.

Glen Loake G0GBI
Chairman of Bedford DARC
Bedford

QuartSLab Crystals

The Kent based company QuartSLab Marketing Ltd., who have been supplying crystals for more than 20 years have just announced a new addition to their range. The DIL14 (TTL or CMOS) and DIL8 (CMOS) are crystal clock oscillators which are available in frequencies between 2.5 to 80MHz. Both crystal types have a standard adjustment tolerance of ± 50 ppm but alternatives are available on request.

For more details on the DIL14 and DIL8 and the full range of available crystals you are invited to contact **QuartSLab Marketing Ltd. at PO Box 19, Erith, Kent DA8 1LH. Tel: (01322) 330830, Fax: (01322) 334904.**

Yaesu's Smallest

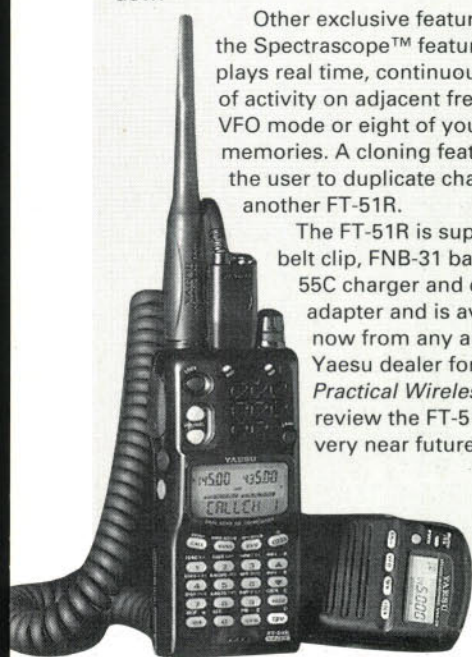
As reported in the February issue of *PW* the latest offering from the YAESU stables is the FT-51R, a new hand-held, which is described as a state-of-the-art dual-band HT. The FT-51R is a dual-band f.m. hand-held paging transceiver, is smaller than the FT-740 and FT-530 and is described as the world's smallest dual-band.

The compactly designed FT-51R utilises dual-microprocessor control giving easier operation and boasts more features than ever before in the palm of your hand. The manufacturers say that using the FT-51R is so easy that you won't need an operating manual.

Features of the FT-51R include a scrolling instruction menu located in the large backlit display window. The menu is designed to guide you through the total operation while simultaneously viewing the main display window.

Other exclusive features include the Spectroscope™ feature. This displays real time, continuous scanning of activity on adjacent frequencies in VFO mode or eight of your favourite memories. A cloning feature enables the user to duplicate channels onto another FT-51R.

The FT-51R is supplied with belt clip, FNB-31 battery, NC-55C charger and charger adapter and is available now from any authorised Yaesu dealer for £499. *Practical Wireless* hopes to review the FT-51R in the very near future.



Send in your news, photographs and product information to **Donna Vincent** at the editorial offices in Broadstone.

Ham Holidays

German amateur Ulrich Kolbe DL3HUM is currently running 'Ham' holidays in central Germany. The holidays are designed to appeal to people interested in Germany, the way of life, the language, sightseeing and of course amateur radio. For more information you are invited to contact **Ulrich Kolbe, Bergstr. 10, D-06502, Weddersleben, Germany. Tel/FAX: 01049 3946 705442. PR: DL3HUM @ DB0ERF.THR.DL.EU**

NEWS '95

Buy Books & Win £50!

Don't forget that if you order books from the wide selection offered in the *PW* Book Service you will automatically be entered into the £50 Prize Draw for that month. The lucky winner from the January 1995 issue of *PW* was **Colin Dynes** of **County Armagh, Northern Ireland.**

Nevada - Twenty Five Years On

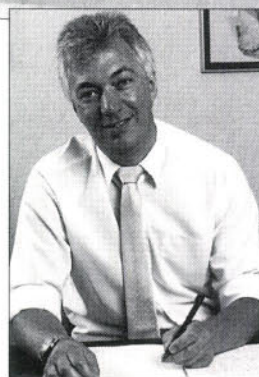
Nevada Communications of Portsmouth are this year, about to enter their 26th year of trading. Mike Devereux G3SED sent us this photo showing him in 1969 standing in the doorway of his very first shop.

Mike told *PW* that he has been fascinated by radio since the age of 12 and got his callsign G3SED when he was 15. After he graduated Mike decided to make a career out of his hobby and opened a small shop called Telecomms.

In the early days Mike sold mainly ex-government equipment and remembers that Kenwood were only just coming into radio and that their equipment was distributed by B. H. Morris, a Hi-Fi supplier. Other memories from Mike include those of radio enthusiasts spending hours in his shop carefully looking through the piles of components searching for parts that they could use in their 'Top Band' transmitters.

Today Nevada Communications enjoy a multi-million pound turnover, are well known throughout the amateur world and offer a wide range of amateur and short wave equipment. Mike is still very active as an amateur and has travelled to many parts of the world, operating from remote locations. He believes in treating his customers in the way he would like to be treated - Mike thinks this philosophy is the reason behind Nevada's continued success.

Mike Devereux G3SED as he is today as Managing Director of Nevada Communications.



Bureau Change

The Radio Society of Great Britain have informed the 'Newsdesk' that there has been a change of address and telephone number for the UK Novice QSL Bureau. All correspondence should now be sent to **Mr Michael Shread GM6TAN, RSGB Novice QSL Bureau Sub-Manager, 15 Hardie Court, Aberchirder, Huntly, Aberdeenshire AB54 5T. Tel: (01466) 780739.**

Conway Repairs

Peter Conway G3UFI, who is based in Sussex, has recently set-up an Amateur Radio repairs service. Peter will be specialising in Kenwood, Icom and Yaesu equipment and looks forward to welcoming customers from Sussex and further afield. To find out more about Peter's repair service why not give him a call on **(01424) 753949.**

Club Call Operational

The Club Callsign of the International Short Wave League (ISWL), **GX4BJC** will be operational throughout 1995 using a variety of modes and bands. The call will be activated by a different member of the ISWL each month (see table below) with each operator signing GX4BJC/P, except for Dick G2BRR who will sign G4BJC.

Anyone hearing or working GX4BJC is eligible to receive a special ISWL Club Callsign QSL card. Cards will be sent out on receipt of an incoming QSL or reception report and QSLs should be sent either via the bureau or direct to the ISWL Club Callsign Manager, **David Beale G0DBX/G-10618, 'Kenwood', London Road, Louth, Lincolnshire LN11 8QH.** An s.a.e. would be appreciated from anyone wishing to receive a QSL direct.



Month	Operator	Name
February	G4GQH	Alan
March	G4EQQ	Paul
April	G4KJV	John
May	G0DBX	David
June	G3JFD	Bernard
July	G4CPA	Geoff
August	G4ICC	Mike
September	G4DMS	Philip
October	G0IYZ	Chris
November	G2BRR	Dick
December	To Be Announced	

Eddystone News

The Eddystone User Group (EUG) have recently sent the PW Newsdesk a copy of a new publication they have put together. The A4 sized publication entitled a *Compilation of Faults Found on the Older Valve Models* has been made possible with the help of many of the EUG members.

The Eddystone User Group is very active, with members all over the world. The group prides itself in being able to provide its members with unlimited technical help, together with copies of all manuals and circuits for Eddystone models from the 1920s onwards.

The *Eddystone User Group Newsletter* is sent out six times a year and starts with the May/June issue, as May is the annual subscription date. Subscriptions are £10 for a year (UK), £11 (Europe). Back copies of the Newsletter are also available for £2 each.

If you wish to become a member of the EUG send a sterling cheque made payable to the Eddystone User Group to the **EUG, c/o Eddystone Radio Ltd., Alvechurch Road, Birmingham B31 3PP.** **Chris Pettit G0EYO** the Managing Director of Eddystone Radio is himself a member of the Eddystone User Group. Chris will be attending the National Vintage Communications Fair in May to help promote the EUG.

Savoy Hill Leaflets

Savoy Hill Publications who are based in North Devon can supply vintage circuits, manuals and historical information on all things electrical.

For the enthusiast they currently have the following pamphlets available: *Military service manuals & data catalogue listing, Hi-fi, & audio service manuals, Valve manual copies availability list, Wholesaler catalogues listings, Radios & components 1992 onwards, Test equipment listings - Valve testers, oscilloscopes etc., Radio Receivers 1914 onwards to early transistor, Styli listing for record players 1950/60s.* If you would like copies of any of the pamphlets you should send a large s.a.e. to **Savoy Hill Publications, Seven Ash Cottage, Combe Martin, North Devon EX34 0PA.**

Lowe's Test Equipment

Lowe Electronics are now stocking the Trio-Kenwood range of general purpose test equipment and measuring equipment in its chain of shops. Lowe Electronics, whose Head Office is in Matlock also have retail outlets in Bristol, Cambridge, Cumbernauld, Leeds, Maidstone, Newbury, Newcastle-upon-Tyne and Plymouth. Each branch will stock and provide technical help for a range of test instruments and will also be able provide instore demonstrations of the equipment.

The Trio-Kenwood range of test equipment includes oscilloscopes, power supplies, multimeters, frequency counters and function generators. For more information on the range of test equipment available from **Lowe Electronics** you can contact Lowe's direct at **Chesterfield Road, Matlock, Derbyshire DE4 5LE. Tel: (01629) 580800.**



Successful Launch

Southern Scanning & Shortwave (SS&S) held their official opening launch on January 15 1995 at the Southern Electric Museum, Christchurch, Dorset. The event was well supported with nearly 500 people attending throughout the day.

The SS&S team for the launch was made up of **John G1HOK, Bob G6DUN, John G0SKR, Colin G3AXS, Martin s.w.l., Debbie 2E1CFQ, Jessica 2E1DHK and Carla 2E1CCB** (pictured L-R). Also attending were **Mike Devereux G3SED** and **Phil Jeffery** of Nevada and **David Wilkins G5HY** of Kenwood UK Limited.

Southern Scanning & Shortwave can supply a wide range of amateur, s.w.l., airband and scanning equipment and are the authorised Kenwood dealer for the south of England. They are also agents for Yaesu and Icom and can supply equipment from most leading manufacturers such as AOR, ADI, AKD, Alinco, Create, Diamond, Lowe, MFJ, Microset, Revex, Taiwan Serene, Tonna and Yupiteru. In addition to this SS&S can put you in touch with their recommended antenna contractor, Eclipse, who will erect antennas bought from SS&S at a very reasonable price.

You can contact **SS&S** at **PO Box 2126, Bournemouth BH11 9YH. Tel: (01202) 590779 or (0836) 246955/246847.**



Jack Hum G5UM

Jack Hum G5UM, one of the pioneer v.h.f. amateur radio operators passed away at his Leicester home in early January. Jack 'Uncle Mike' was a very popular and familiar voice to many on v.h.f. He will be greatly missed.

Practical Wireless and *Short Wave Magazine* were represented at the funeral on January 17 by Dick Ganderton G8VFH, Editor of *SWM*. (A full appreciation of Jack G5UM will appear in the April issue of *PW*. Editor).

IN TOUCH WITH

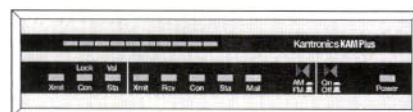
If you're coming to Pickett's Lock - visit the Kantronics Packet Village on the Lowe Stand

Kantronics' experts will be on hand to offer expert advice on the Lowe stand as well as providing interesting talks as part of the lecture stream.

Your chance to make sure your views are fed back to the manufacturers.



They'll be demonstrating all the latest products and we'll have the whole lot on working demonstration showing you just what you can achieve with Packet. We'll also be demonstrating the new GTOR mode and you'll find out just what is making GTOR the real mode for h.f. data communications in the 90's, so make sure you come along.



Lowe Electronics is THE place to buy your datacoms gear. We can supply you with everything you'll need from the antenna to the rig to the TNC and everything in between, including all the leads you'll need. Whether you want a simple v.h.f. only Packet station or a full blown h.f. multimode capability, Lowe are the right people. No one else combines our expertise in datacoms products and transceivers.

P.S. - There's a new type of 'Packet' on the air. Tune to 131.725MHz a.m. and just listen to the data bursts. Wonder what it is? Well, its called ACARS, and means Aircraft Communications and Reporting System. This is a system that allows airliners and controllers to keep in touch with aircraft in flight and automatically report engineering and flight information, together with the ability to send messages in plain text. Basically, it's Packet radio for planes and you can decode it with AIRMASTER - the cheapest way to monitor ACARS. See it in action on the Lowe stand.

Check Out Our Other Pickett's Lock Goodies!

Lowe Electronics probably has the biggest range of Ham radio equipment and accessories available on the shelf in the whole of the UK, many of which we are the factory appointed distributor - (and we could do AEA too if we wanted!). Here's just a few of the goodies you'll be able to see at the show...

Manson power supplies.... We're really famous for these. Who else gives you a variable voltage supply with separate voltage and current meters rated at 25A continuous for just £99.95. Have you got your's yet?

At Pickett's Lock you'll be able to see and hear just why JPS digital audio filters are the best in the world. We'll have the full range on working demonstration so you'll be able to try them out for yourself.

With spring approaching, you'll need to think about upgrading, improving or just maintaining your antenna system. Talk to Lowe about Butternut, Hygain, Maldol, Vargarda, Tonna and don't forget our rotator range.

If you are just looking for small accessories, make Lowe your number one call at Pickett's Lock. We stock more accessories than any other dealer you will find anywhere, from crystal filters, CCTSS units to voice synthesisers, a.t.u.s to d.c. leads, cases, battery packs, headphones, speakers - just about everything you will ever need!

We've got everything the mobile operator needs from Maldol mobile antennas and a super range of antenna mounts to suit all types of vehicle. We've also got some special d.c. leads ideal for using your hand-held transceiver or scanner in your car and a perfect mobile mount to hold it in place, and if you need a bit more sound, check out our range of extension speakers.

You'll really be able to put Lowe to the test as we are now stocking Kenwood's superb range of test gear, including 'scopes, signal generators and digital meters. This really increases our usual test gear range and makes Lowe Electronics your number one choice for great test gear at affordable prices.

BERKSHIRE

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

NORTH EAST

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

SCOTLAND

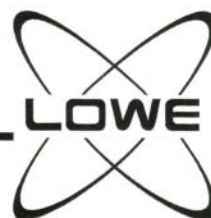
Cumbernauld Airport
Cumbernauld
Strathclyde
Tel: (01236) 721004

WALES & WEST

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



Lowe Electronics have been appointed
'Master Dealer' by YAESU UK



Lov
Chesterfield Road,

H THE WORLD



We'll have the usual range of products from leading manufactures like Yaesu and Kenwood and you'll see everyone else advertising, but we'll have our own super deals and special offers, including some that our competitors wouldn't DARE to offer! We'll have super clearance lines too so make sure you visit the Lowe stand first for a real bargain. If we haven't got it, it's probably not worth having.

And if you can't make it to Pickett's Lock, all our show rooms around the country are still open on the Friday and Saturday - unlike some of our friends in the business, we don't need to close up just because there's a show on somewhere!

Great New Wire Antenna Systems From

CHELCOM
Aerials

Chelcom's CAHFV1 h.f. vertical antenna (see last month's ad) has become the fastest selling h.f. vertical in the UK, with over 250 happy users. Hot on the heels of this wonderful antenna, Chelcom have now produced a superb range of new wire aerial systems and components. Once again they've chosen to use only the highest quality components, from specially designed balun cases and dipole centres to the wonderful new FlexWeave™ antenna wire. Just wait 'till you see FlexWeave™ - a multi standard wire so flexible you can tie knots in it and undo it time and time again. It is used in all their ready to hang antennas and also available on its own for those who like to roll their own!

Chelcom Windoms - Ready To Hang!

Two Windom antennas, one covering 80 to 10m and 133 feet long and a shorter version just 66 feet long covering 40 to 10m for those with smaller gardens! Both made from the same high quality components including FlexWeave™ antenna wire and a 4:1 balun. Supplied ready to hang. Both antennas will let you loose with a whole 1000W p.e.p.!

CA80W for 80m is just £65.00 and the CA40W for 40m is just **£55.00**.

Chelcom G5RV's

These G5RV's really need to be seen to be appreciated. You really need to check out the quality compared to other cheaper varieties - there is no comparison! Again the components used are of the highest quality, specially designed for heavy duty use and built to last. For most people, erecting antennas is a major problem - better to do it just once! Chelcom offer the largest range of G5RV's catering for most installation requirements.

- | | |
|-----------------|---|
| CAG5RVH | Quality half size G5RV using FlexWeave™ and 300 Ohm slotted ribbon feeder. Supplied ready to hang at just £35.00 . |
| CAG5RVF | Quality full size G5RV FlexWeave™ and 300 Ohm slotted ribbon feeder. Supplied ready to hang at just £45.00 . |
| CAG5RVHP | Quality half size G5RV with FlexWeave™ balun and 450 twin feeder. Supplied ready to hang at just £65.00 . |
| CAG5RVFP | Quality full size G5RV with FlexWeave™ balun and 450 twin feeder. Supplied ready to hang at just £75.00 . |

End-Fed Antenna. For those that like the simple life or don't like feeders hanging about, the Chelcom end-fed design offers a simple, unobtrusive solution. Just 66 feet long, the CA66EF will fit nicely into many smaller gardens and costs just **£55.00**, ready to hang.

Chelcom MultiSystem Aerial Components For DIY Aerial Systems

CABALUN11	1 to 1 balun.....	£30.00
CABALUN41	4 to 1 balun.....	£30.00
CAINS	Insulator (pair)	£1.50

CABALUN51	5 to 1 balun.....	£30.00
CADIPOLE	Dipole centre	£3.95
CAFLEX	FlexWeave multistranded antenna wire 20m pack	£16.00

Plus

CAHFV1	HF vertical antenna resonant on 80m	£119.00
---------------	---	----------------

Lowe also stock a wide range of books covering all aspects of antenna design and construction. A full range can be seen in all of our branches. We also stock a superb range of quality test equipment that anyone building antennas really needs to have, including Diamond power and s.w.r. metres, MFJ antenna, s.w.r. analysers and AEA analysers.

Just send us four first class stamps for our complete Antenna Fact Pack which includes Chelcom's MultiSystem components and verticals, Hygain, Butternut, Vargarda and the full range of rotators from Hygain, Yaesu and Emotator.

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

YORKSHIRE
34 New Briggate
Leeds
North Yorkshire
Tel: 0113-245 2657

SOUTH WEST
117 Beaumont Road
St. Jude's
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

NOVICE *Natter*

This month Elaine Richards G4LFM has some advice on safety, takes a humorous look at the hobby and traces the life of a QSL card in 'First Steps'.

For Radio Beginners of all Ages.

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

Hobby Humour

Something that appeared in Central Scotland FM Group's newsletter, *FM News* back in 1991 caught one reader's eye. Here are some quotes from Shakespeare that could be spoken by or be about amateur radio types:

"She shall watch all night:

And if she chance to nod I'll rail and brawl, And with the clamour keep her awake". - A Contester

"My father named me Autolycus; who being as I am, littered under Mercury, was likewise a snapper-up of unconsidered trifles". - A Bring & Buy Addict

"If the first heir of my invention prove deformed. I shall be sorry it had so noble a godfather". - A Home-brewer

"That affable familiar ghost which nightly gulls him with intelligence". - A Top Band Man

"Marry, Sir, sometimes he is a kind of puritan". - A Compulsive Morse Diehard

"Farewell! thou art too dear for my possessing". - All of us as some time, in a radio shop!

Newsletters, like the *FM News* issue that supplied the above quotes, are a brilliant source of humour.

If you've got any good quotes send them in. After all, it is a hobby we're involved in and it does us good not to take it too seriously once in a while.

Safety

During the dark winter evenings, many radio enthusiasts get around to either building the projects they've always been meaning to. Or they might have a go at building that antenna ready for the summer, or perhaps repairing that piece of kit that's been giving trouble for a while.

The problems that this can bring are many - not least the chance of hurting yourself if you don't pay attention to safety. Newcomers to the hobby may not be aware of the dangers and sometimes even old hands can become complacent!

So, you've got all your tools out on the kitchen/dining room table. Then you just happen to drop a screwdriver or leave the soldering iron lying down and either chip or burn the table.

Ooops! I expect that would go down like a lead balloon. **Please** use a board to protect the table or other important work surface.

When working with the soldering iron, be careful as it can give you a very nasty burn if you touch the wrong end! Soldering irons can also start fires if carelessly left around. They are usually mains devices too, so care should be taken when either connecting the plug or taking it in and out of the socket.

I know it sounds over cautious, but you should wear old clothes and probably goggles too. Don't sneer. I ruined a very good (and new) pair of jeans after dropping hot solder from the end of the iron onto them many years ago, it's a lesson I've not forgotten.

If you've decided to build an antenna, take care when you get around to putting it up in the air. Ladders are accidents looking for somewhere to happen.

On a personal note, if you wear a wedding ring please take it off before doing any jobs like erecting antennas. My husband, Mike, fell from a ladder last year and severed the tendons and nerves in his ring finger.

Mike was lucky to keep the finger on the hand. According to the nurses in hospital, many people aren't so lucky!

If you're letting someone else climb the ladder and you are 'footing' it, perhaps it might not be a bad idea to consider a hard hat. Antennas can be large, heavy items and if they are dropped could have some very unpleasant effects.

I'm sure you can think of other calamities that can befall you, these are only a few suggestions as to what to protect yourself from. Think about it, you could be glad you did.

Digital Multimeters

Roger Doyle's article in the December '94 *PW* inspired Mr Hartland of Worcester to write asking for more practical information on how to use a digital multimeter. In a later column I'll give a few tips on using a digital multimeter, but I'll start by pointing out a few of the limitations of these meters.

If you've used a digital meter before you will no doubt have discovered that they are almost useless for measuring a changing value. If you were to try and measure the audio output from your receiver whilst tuned to a typical broadcast station you would just be faced with an assortment of flickering digits. This is caused by the meter continually sampling the measurement point and having to display a totally different value every time.

Some meters try to overcome the flickering digit problem by providing a thermometer-like bar display at the bottom of the main display. This then runs from left to right in-line with the selected measurement scale. Although rather crude, it can at least help to give an indication of what's going on.

The other alternative is to use a meter with a peak hold facility. This is where the meter automatically monitors the measured value, but only displays the highest value noted. This generally gives a fairly steady display that's a very accurate representation of the maximum value at the measurement point.

One other point to note is the effect of the leads between the item being measured and the meter. Most meters come with a set of simple wire leads with probes and crocodile clips.

Probes and clips are fine for most d.c. and low frequency measurements. But it's not so good when trying to take measurements in sensitive radio or audio equipment. In these cases the leads themselves can dramatically effect the item being measured and give misleading results.

The solution is to use a special measurement probe. These are usually available as an optional extra with the more sophisticated meters. However, as space is limited I'll come back to the subject of using digital multimeters next month.

First Steps

Proof Of Contact - QSL Cards

This month I thought I'd look at QSL cards and how they travel around the world. But I'm not going to talk about what QSL cards are as I'm sure you've worked that out by now.

The QSL cards come in very useful if you are applying for one of the many awards on offer, as some awards require them as proof of the contacts. They are also a good collectors item and proof of your achievement.

If you're just starting out, getting your QSL cards is the first hurdle. Do you want a unique card, or a standard card overprinted with your callsign, or perhaps a 'rubber stamp' you can place on the back of a suitable postcard?

The possibilities are immense. Now, obviously the individual card is the most expensive, although with computer clip art these days, getting the artwork done is much easier.

Use the *Yellow Pages* and 'phone a few local printers to get the costs of having the cards made. Beg, borrow or steal a friends card to get the size and details correct.

If you want an overprinted card then there are lots of advertisers in the amateur radio magazines who will be able to help. If you are a member of a specialist organisation - the International Short Wave League, G-QRP Club or Royal Naval Amateur Radio Society for example - then that group will often have their own design of card that you can use or have their own printers who will overprint the cards.

It's worth finding out about as some of the cards can be very eye-catching. They are also usually very good value for money.

Finally, if you can get suitable postcards - say of a famous local landmark - at a good price you may want to stamp your own. It's up to you.

Right, so you've had the cards printed, you've worked a few stations and filled in their cards, now what happens. And in answer you have a few choices!

The Radio Society of Great Britain (RSGB) runs a QSL bureau for its members, which is a marvel of organisational logistics. To use it, you send your cards, sorted alphabetically, to one address in the UK.

The RSGB then arrange for the cards to be sent to the appropriate organisation in the correct country. Here, the cards are sorted and then sent on to the amateur radio concerned.

To receive cards, members (and non members too, which is generous) simply give stamped, self-addressed envelopes of a suitable size with the correct QSL manager for their callsign. Then, when your envelope has a reasonable content, it is posted to you!

The whole operation world-wide is amazing, I wonder just how many cards are exchanged this way in a year - I'm sure there is someone out there who has the answer too!

Personally, if you are going to be sending a lot of cards each year then I think this justifies the membership fee to the RSGB alone. And you get all the other benefits for nothing.

There are alternatives, again if you belong to a Society or specialist group, they usually run an inter-club bureau for sending cards to and from members. They are often enclosed with copies of the newsletter when it arrives.

Or, you can send the cards direct, but this can be expensive. You should then send either an s.a.e. or IRC to cover the return costs.

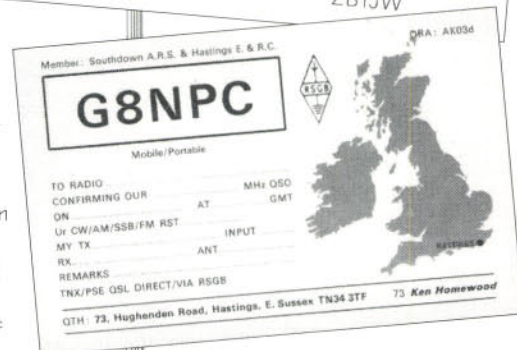
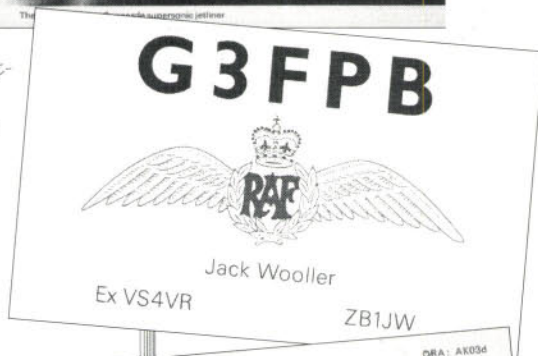
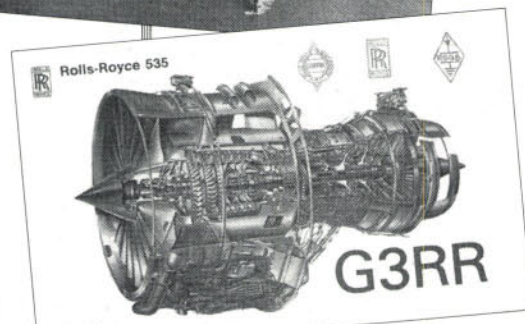
The direct method is fine if you are chasing the last card needed for an award or if it's a particularly special card. But to do this for all your QSLs, you need a lot of stamps!

Another problem is finding out the addresses of the amateurs. Using the bureau you only need the callsign, using the direct postal system you need the full address.

Not many amateurs are willing to read their address out on air, so you have to use the various national and international callbooks. These are very expensive, and the international ones are not always very up-to-date, but hopefully if you live near to a large lending library they will have them.

I hope this has explained the life of a QSL card a little. They really are amazing pieces of paper/card!

Here is a selection of possible QSL card designs.



Space has caught up with me again, so until next time cheerio and don't forget to keep sending me your novice 'natterings'.

Elaine G4LFM

Apologies To Poldhu

The Club Spotlight team would like to apologise to the **Poldhu Amateur Radio Club** for any embarrassment caused by the publication of the incorrect contact telephone number in the January issue of *PW*. The correct contact number for Poldhu ARC is that of the Secretary, **Carolyn Rule G1ZPC** and is **(01326) 240144**.

The members of Poldhu ARC had a busy time in December when they ran a special event station on December 12 to commemorate the anniversary of the first 'S' sent from the club's site on 12/12/1901. The special station resulted in several hundred contacts being made with amateurs from all over the world.

The club has recently been experiencing an increased demand for membership and things within the club are going very well. However, one problem area that has been discovered is that there was a shortage in the number of envelopes sent to the QSL Bureau. Unfortunately, by the time this was realised a lot of cards had already been destroyed. The Poldhu Club would therefore like to apologise to anyone who hasn't received a reply QSL.

John G0JUR has been appointed as the new QSL Manager for the club. Together with a team of volunteers, John will strive to ensure that the QSL system runs smoothly from now on.

Denby's Details

The **Denby Dale Amateur Radio Society** provides RAE, Morse and Novice RAE courses and is a registered City & Guilds examinations centre for both the RAE and Novice RAE. For more information on the courses mentioned, you can ring the club secretary **Brenda G4OTE** on **(01484) 424776**.

The club meets each Wednesday at 8.30pm in the Pie Hall, Wakefield Road, Denby Dale, West Yorkshire. A few up and coming events are a talk on radio controlled aeromodelling by David Brian on Feb 15 and on March 1 there is a talk by David G0EVA on the aspects of sky wave propagation.

Further details can be obtained from the secretary, **Kevin G1FYS** on **(01484) 547553**.

CLUB Spotlight

Send your information to the 'Club Spotlight' newshounds
Donna Vincent and Zoë Shortland at the PW Offices.

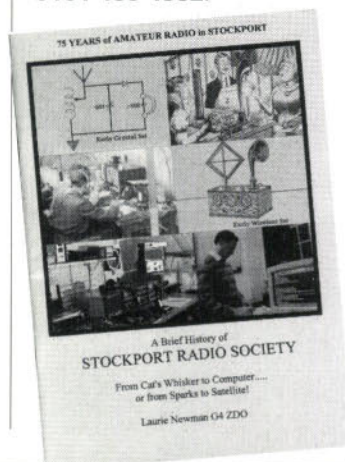
Stockport's 75th

This year, 1995, sees the 75th anniversary of the **Stockport Radio Society** who were formed and inaugurated on June 4 1920. To mark the occasion Laurie Newman G4ZDO has researched and compiled a definitive history of the Society.

The finished publication entitled *A Brief History of Stockport Radio Society* is not intended as a technical book, but as more of a souvenir record to celebrate the 75 years of amateur radio in and around Stockport - the story so far. Laurie has written and produced the book entirely by himself and it's hoped that all the printing costs will be covered by the sales to members and friends. Stockport's local Borough Council have even requested a few copies to place in their Reference and Heritage libraries (The Editor says he thoroughly enjoyed

reading his copy).

The Stockport Radio Society meet on the 2nd and 4th Wednesdays of the month at Room 14, Dialstone Centre, Lisburne Lane, Offerton, Stockport, Cheshire. If you 'd like to be part of the next 75 year chapter of the club's history why not go along and join in with the activities? More details can be obtained from **Jim France G3KAF** on **0161-439 4952**.



Southgate Amateur Radio Club

Since its original inception in 1936 as the Southgate and Finchley Group of the RSGB, the aim of the **Southgate Amateur Radio Club** has been to hold meetings, bringing together persons interested in amateur radio or electronics generally. The club also aims to foster the spirit of amateur radio.

The Southgate Amateur Radio Club provide a meeting

place and forum where those with similar interests can share their experiences, discuss any problems and enthuse about their achievements. Some of the club's activities include talks on technical topics, equipment sales, DF hunts and demonstration stations.

Membership is open to all who are interested in any of the many facets of amateur radio. Members range in age from

Liberation Of Guernsey

On Tuesday May 9 1995 the **Guernsey Amateur Radio Society** will run a special event station in connection with the 50th anniversary of the Liberation of Guernsey at the end of the Second World War. The special event station is to run from Castle Cornet in St Peter Port, Guernsey. The station begins operating from Sunday May 7 until Saturday May 13, with a full 24 hour operation on Liberation day, Tuesday May 9.

The Guernsey Amateur Radio Society is hoping to run on all h.f. bands, 1.8 to 28MHz with s.s.b., c.w. and RTTY. A QRP station will also run for periods during the week, to give QRPers the chance to make contact. The society will also be running packet on 144MHz and, if conditions allow, they will run 144 and 430MHz f.m. and s.s.b. Satellite working is also a strong possibility!

For readers interested in 'Castles on the Air', the Guernsey Amateur Radio Society are running a station from a 13th century castle, built on a rock that was originally a mile from St. Peter Port. The gap has since been bridged by a causeway.

For square hunters, the locator is IN89RK, and the Worked All Britain is WV37, St. Peter Port. To find out more, you can contact **Phil Cooper GU0SUP**.

youngsters to senior citizens and visitors and new members are always welcome.

Subscription rates for full membership for 1995 is £15 with a 50% reduction for under 18s and senior citizens. Family membership, which covers two persons living at the same address, costs £22.50.

Contact **Mary Craine G0UMF**, the club's Meetings Secretary on **0181-889 1448**.

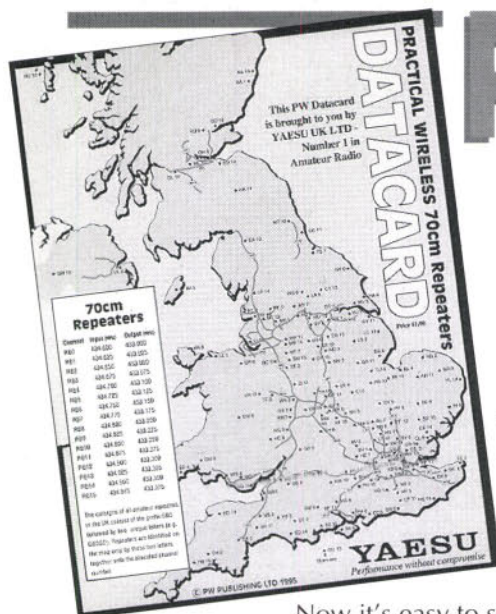
Manchester & District Amateur Radio Society

The **Manchester and District Amateur Radio Society** would like to remind all *PW* readers that they meet every Tuesday from 7-10pm (except Bank Holidays) at the Simpson Memorial

Community Centre, Moston Lane, Moston, Manchester.

Novice RAE and RAE courses are run on a continuous basis and Morse tuition is arranged on demand, all are free to members. Lectures are

normally arranged for the third Tuesday of the month. For further information you can speak to **Anthony B. Langfield G3IOA** on **0161-681 5406**.



PW 70cm Datacard

**FREE
WITH THIS
ISSUE**

Inside this issue you will have found a free gift - an updated 70cm repeater datacard. So many readers had been asking if we still had any of the old ones that we decided it must be time to produce a completely new and revised one. We've updated it and made it bigger than before so that it's easier to read but still a convenient size for carrying in the car.

Now it's easy to see when pinned up in the shack and sturdy enough to take with you when you're driving and, if you're in an unfamiliar area, a quick glance will show you the nearest 70cm repeater, along with it's frequency and callsign.

YAESU

This Datacard has been fully sponsored by Yaesu UK Ltd.

COMPETITION Corner

**SPOT THE
DIFFERENCE**

As this issue of *PW* is our 'Mobile Special' John Worthington our cartoonist has been busy! John seems to have chosen the ideal spot to watch everyone on their way to the rally - whatever mode of transport they were using!

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

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

SECOND PRIZE: A six month subscription to *Practical Wireless* or a £10 book voucher.

☐ SUBSCRIPTION

☐ VOUCHER



Send your entry (photocopies acceptable with corner flash) to:
Spot The Difference Competition, March 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 24 March 1995

Name _____

Address _____



RADIO Diary

February 12: The Cambridge & District Amateur Radio Club are holding their annual rally and car boot sale at the Ambulance Station, New Addenbrookes Hospital, Cambridge at 10.30am (traders from 8am). Further info from **George Benton G00EL** - Rally Secretary - on (01954) 719273/200072.

February 12: The 4th Northern Cross Rally is being held at Rodillian School on the A61 between Leeds and Wakefield (near Jn. M1/M62). Doors open at 11am (10.30am for disabled visitors and Bring & Buy). £1 entry. There will be the usual dealers and groups, bar and refreshments available plus a Morse test on demand with two passport photos. Talk-in on 144 and 430MHz. **Dave Gray** on 0113-282 7883.

February 19: The RSGB VHF Convention is being held at Sandown Park Exhibition Centre. Further details can be obtained from **G3MVB** on (01277) 225563.

February 25: The 10th Rainham Radio Rally is to be held at the Rainham School for Girls, Derwent Way, Rainham, Gillingham, Kent ME8 0BX. It is very easy to find from Jn. 4 of the M2 motorway the A278 or from the A2 from Rainham. Doors open at 10am, 9.30am for disabled visitors. There will be the usual trade stands, plus a few new ones selling computers. Many special interest groups will be represented, ie. RAYNET, RNARS, Packet, KRGroup and Kent TV Group. There is also a talk-in on S22 by GB4RRR, a Bring & Buy, licensed bar, and snacks and refreshments also available with somewhere to sit and eat. Admission is £1, children under 14 free. Further information from **Martin G7JBO** on (01634) 365980 any reasonable time.

March 4: The Aberystwyth & DARS are holding their West Wales Amateur Radio & Computer Rally at The Aberaeron Comprehensive School, Aberaeron. Doors open at 10.30am to 4pm, with entrance fee being only 50p! There will be trade stands, special interest groups, a Bring & Buy, repeater group, computers, WFFAX demo, h.f. and v.h.f. station on the air, packet radio and lots more for the amateur radio and computer hobbyist. There is a free raffle for a Venus DataPack, worth, £50. For more details contact **Katy GW0FFO** on (01545) 580675.

***March 11/12:** The London Amateur Radio & Computer Show will be held at Lee Valley Leisure Centre, Picketts Lock Lane, Edmonton, London N9. Doors open at 10am to 5pm each day. There will be a trade show, lectures, Bring & Buy, on-demand Morse tests, facilities for the disabled, bars, restaurants, special interest groups and ample free parking. For further information you can contact **Steve White G3ZVW** on 0181-882 5125.

If you're travelling a long distance to a rally, it could be worth 'phoning the contact number to check all is well, before setting off.

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

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

March 12: Wythall Radio Club will be holding their annual Radio Rally at Wythall Park, Silver Street, Wythall (near Birmingham, on the A435, just two miles from Junction 3 on the M42). Doors open at 10.30am to 4pm. There will be the usual traders in three halls, a marquee, a bar and refreshments and a Bring & Buy stall, run by the club. Talk-in on S22. Admission only £1. **Chris G0EYO** on 0121-430 7267.

***March 19:** The Norbreck Radio Rally, Amateur Radio, Electronics & Computing Exhibition is being held at Norbreck Castle Hotel, Exhibition Centre, Queens Promenade, North Shore, Blackpool. There will be extended free car parking and a free shuttle service. Novice Licence details and practical demonstrations, a Bring & Buy stall, talk-in on S22 and lots more. Admission is £1.50, over 65s £1 and under 14s free. Doors open at 11am to 5pm. Disabled entry through ramped entrance, 10.45am. More info from **Peter Denton G6CGF** on 0151-630 5790.

March 19: The Tiverton South West Radio Club are holding their 1995 Mid Devon Rally at the Pannier Market, Tiverton. Easy access, only minutes from junction 27 on the M5. Excellent free parking, two halls of trade stands, Bring & Buy stall and mobile snack bar. Further displays and full refreshments facilities in the club room bar, which is open throughout the day. Talk-in on S22. Doors open at 10am. Further details from **G4TSW**, Mid Devon Rally, PO Box 3, Tiverton, Devon.

March 26: Bournemouth Radio Society's 8th annual sale will be held at Kinross Community Centre, Pelhams Park, Millhams Road, Kinross, Bournemouth. Doors open at 10am and close at 4.30pm. There will be a 144MHz talk-in from G1BRS on S22, amateur radio and computer traders, clubs and specialised groups, along with excellent refreshments. Admission is £1 which includes a free raffle. **Malcom G0UCX, QTHR** or (01202) 747745.

March 26: The Pontefract & District Amateur Radio Society are holding their 15th annual Components Fair and Spring Rally at the Carleton Community Centre, Carleton, Nr. Pontefract. Doors open at 11am to 4pm (10.30am for disabled visitors). There will be trade stands, a book-stall, Bring & Buy, a licensed bar and restaurant, all at ground level. Morse tests on demand (usual two passport sized photos required). Admission by prize programme, three prizes, plus ladies prize draw. **Colin G0NQE** on (01977) 677006.

Mobile Special Offers

You'll have to hurry to catch these three mobile special offers!

Offer No. 1. The DB-7900 dual-band antenna (Antenna A)

Get a **FREE** Magmount or trunk mounting kit worth **£24.95**. Only with this dual-band 144/430MHz antenna constructed of high quality materials to withstand the weather.

The offer price is **£49.95** for antenna and the mount of your choice. Fully insured courier delivery is included in the £6.50 P&P cost (UK and Irish Republic only). Charges for overseas P&P are available on application.

We've arranged not one, not two, but three special offers this month. There are two antennas on offer plus a power boosting amplifier to give 30W of power at 144MHz to help your hand-held get out better.

Offer No. 2. The DB-1101 Budget price dual-band antenna (Antenna B)

This dual-band 144/430MHz budget priced antenna is also available with a **FREE** Magmount or trunk mounting kit worth **£24.95**.

The offer price is **£26.95** for antenna and the mount of your choice. Fully insured courier delivery is included in the £6.50 P&P cost (UK and Irish Republic only). Charges for overseas P&P are available on application.

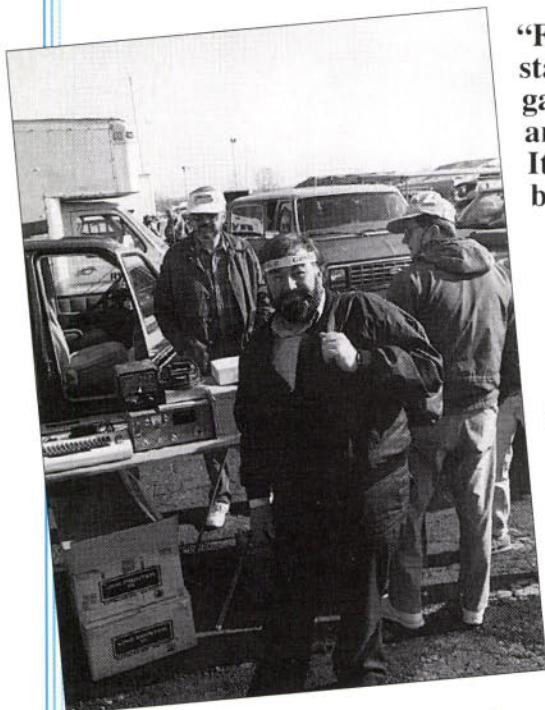
Offer No. 3. NB-30W 144MHz power amplifier

Got a 144MHz hand-held that, from the car, struggles to make the local repeater? Don't struggle any more, boost its output to 30W. And you can get it cheaper than you thought possible.

You have a chance, if you're quick, to get this booster for **£5** less than normal. Usual price for this amplifier is **£44.95** plus P&P, the offer price is **£39.95**. A delivery charge of £3 P&P must be added for UK and Irish Republic only. Charges for overseas P&P are available on application.

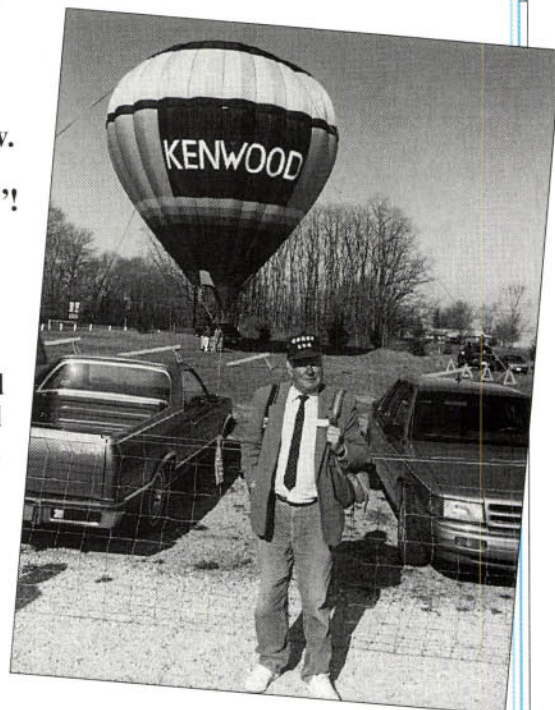
All these items are featured in John Goodall G0SKR's article on **Page 45** of this issue. To take advantage of any of these offers please use the order form on **Page 68**.

DAYTON



"Five miles of flea market stalls and two days of bargain hunting. Then it's another day to see the show. It's marvellous and even bigger than Rob Mannion!"
- Michael Stott G0NEE.

"It's an up, up and away holiday with fun all day and a great trip with the PW Dayton HamVention friends....that's why I come back for more".
- Les Ashworth G0KSF.



Don't Delay - Last Chance To Book For The Amateur Radio Holiday of 1995!

You've read the comments from Michael Stott G0NEE and Les Ashworth G0KSF following their experience of the PW holiday...so why don't you try the Dayton HamVention experience yourself? You can join the Dayton '95 HamVention Holiday for just £650 per person!

Although many couples join us, your partner doesn't have to enjoy the hobby to appreciate the PW HamVention trip. There's so much to see, so much shopping and great company to be had on the holiday of a lifetime.

You can join Rob Mannion G3XFD and the PW party when our 1995 holiday starts on Tuesday April 25 at Gatwick when we fly out on a Delta Airlines scheduled flight to Cincinnati. After transfer by coach to Dayton we'll be staying for six nights at the Englewood Holiday Inn. There's a good choice of eating places nearby, the Hotel has a good swimming pool and is very close to the HamVention itself.

We've arranged a visit to the world famous United States Air Force Museum and there's also an optional shopping trip to see Cincinnati and its famous 'Skywalks'.

The £650 (£100 deposit) includes return flight, meals on the flights, transfers to and from Cincinnati Airport, six nights at the Holiday Inn, HamVention ticket, Air Force Museum excursion, all local taxes and the new UK Airport Tax of £10. We leave for the return journey home on the evening of Monday May 1, arriving at Gatwick on Tuesday morning.

Travelling alone? Don't miss out on the HamVention holiday just because you've not got a travelling companion. We will be delighted to arrange for you to share a twin-bedded room - so remember - 'Singles Save' on this holiday because although single rooms are available for a supplement, you can save and share if you wish. Just let us know and we'll be pleased to arrange shared accommodation on your behalf.

For further details on the PW HamVention Holiday (don't delay...we don't want to leave you behind!) please contact our professional tour organiser Andy Garside of Gulliver's Groups & Incentives at Fiddington Manor, Tewksbury, Gloucestershire GL20 7BJ. Tel: (01684) 293175, FAX: (01684) 290093.

Alternatively, you can call Rob Mannion G3XFD at the PW Editorial offices (between 1 and 2pm only please) to discuss the holiday.

To: Andy Garside
Gulliver's Groups & Incentives
Fiddington Manor
Tewkesbury
Glos GL20 7BJ

Please reserve me ____ place(s) on the 1995 PW HamVention Holiday.

I enclose a cheque to the value of ____ as my deposit (£100 per person).

or charge my Access/Visa card to the amount of ____

Card No. _____

Valid from _____ to _____

Signature _____

Name: _____

Address: _____

Postcode: _____

Tel No: _____

SIMPLY T

YAESU FT-840



UK's best selling HF transceiver. We are selling our display model at a crazy price. To top this we

are throwing in a 25amp power supply *£895
ONE ONLY **£779** + FREE PSU

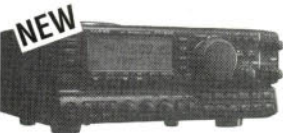
YAESU FT-990DC (AC)



PICKETTS LOCK SPECIAL
We are offering a 990DC **£1099**

£1625 + a FREE 25 amp (240V) P.S.U.

YAESU FT-900AT



SUPERB QUALITY
100W compact H.F. transceiver with A.T.U.
*£1549

SALE PRICE **£Phone**

P-2512

25-30 amp P.S.U. Dual meters. Variable volts. High voltage protection
*£99.95 INTRO OFFER



£89.95

NEW

IMPORTANT NOTICE TO POTENTIAL CUSTOMERS

Not all advertisers in this magazine are authorised dealers for the products they stock. If you check with major manufacturers they will advise you to buy from authorised dealers to ensure full company guarantee back up. Haydon Comms only sell brand new factory sealed stock direct from the manufacturers and is an authorised dealer for all its brands.

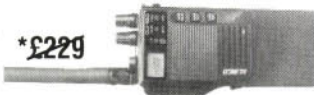
ALINCO DJ-180EB

2m VHF, F.M. handheld transceiver

FREE MS-107 SPEAKER MIC

*£229

£199



Kenwood TM-733E

New dual band mobile transceiver. **PICKETTS LOCK SPECIAL.**



*£729 **£679** + FREE DB-7900 super gain dual band antenna and Magmount worth £75

YAESU FT-2500m

PICKETTS LOCK SPECIAL.

£349

+ choose either FREE DB-285 mobile ant + magmount worth £40.90 or FREE TSB-3002 base antenna worth £39.95 (50W O/P)



Alinco DR-130

With this superb value 2m rig we are giving away a FREE DB-285 mobile ant + magmount worth



£40.90

£289

New Kenwood TH-79E

Dual band handheld transceiver

Back in stock *£449

£Censored



VC-300DLP Bargain!

300W ATU (1.8fi-30MHz)
Built in dummy load.



List *£169

£129.95

£3 DELIVERY

MFJ SALE

	Was	Now
MFJ-259	Analysers	£249.00 £225.00
MFJ-949E	ATU/Load	£170.00 £154.95
MFJ-948E	ATU	£150.00 £139.95
MFJ-202B	Noise bridge	£69.95 £62.95
MFJ-249	Analysers	£230.00 £199.95
MFJ-901B	Small ATU	£72.00 £65.00
MFJ-407C	Elec keyer	£85.00 £74.95
MFJ-945D	Mobile ATU	£110.00 £99.95
MFJ-401B	Econo keyer	£60.00 £54.95
MFJ-105B	24hr clock	£25.00 £19.95

FOR THE BEST PART EX DEALS AROUND - GIVE US A CALL

FT-767 Gx



VGC Incl's 2/6 modules
£1299

FT-990	As new	£1479
TS-430s	VGC	£699
IC-735	As new	£699
FT-747 Gx	As new	£549
TS-140S	As new	£649
FT-102	As new	£499
FRG-100	As new	£429

IC-737A



*Ex demo Incl's Int'l ATU
£1099 (2yr g'tee)

AT-250	VGC	£229
DJ-500E	2/70 H/hld	£249
R-72	As new	£599
R-70	VGC	£449
R-5000	As new	£839
PRO-2005	As new	£219
AT-50	Ex demo	£259

FT-290RII



*Ex demo As new
£399

DJ-580SP	As new	£349
DJ-F1E	As new	£199
IC-P2E	(Incl's Mic)	£189
DR-112E	(25W FM)	£249
TH-215E	VGC	£199
FT-530R	As new	£349
TM-251E	As new	£319
TM-742E	Ex demo	£629

* **GOOD CLEAN 2nd HAND EQUIPMENT NEEDED - TOP PRICES PAID** * **SEE US AT PICKETTS LOCK STAND** *

HAYDON COMMUNICATIONS

THE BEST!

IMPORTANT WARNING

Don't pay through the nose for "named branded antennas". All our antennas are direct from manufacturers and represent a saving of up to 50% on the branded versions. We know they're the best there is - but if you are in doubt check it out on 'packet radio' or your local repeater and ask one of the many hundreds of customers who already have one in use



TSB3303

NEW SERENE BASE ANTENNAS

TSB-3315 GF	144/70, 8.5/11.9dB (5.4m)	£129.95
TSB-3002 AL	144MHz/6.5dB, (2.8M)	£39.95
TSB-3001 AL	144MHz/3.4dB (1.4M)	£29.95
TSB-3301 GF	144/70CM, 6.5dB/9dB(3M)	£79.95
TSB-3302 GF	144/70CM, 4.5/7.2dB (1.7M)	£64.95
TSB-3303 GF	144/70, 3/6dB (1.1M)	£44.99
V-2000 GF	6/2/70 2.1/6.2/8.4dB	£119.95

GF = Glass Fibre AL = Aluminium/Stainless Steel
P&P on above £5.00

ACCESSORIES P&P £1.00 on the following

TSA-6001N Duplexer (+Coax) 2/70	£24.95
TSA-6003 Duplexer (Sockets) 2/70	£19.95

NEW HIGH QUALITY MOBILE ANTENNAS

DB-285	144MHz/5%, 3.4dB (1.3M)	£15.95
DB-EL2E	144MHz/5%, 4.5dB (1.8M)	£29.95
DB-7900	144/70CMs, 5/7.6dB (1.5M)	£49.95
DB-1209	2M/5.2dB (1.6M)	£39.95
DB-1208	2M/70CMS, 3.5/6dB (1M)	£32.95
DB-1101	2M/70CMS, 3/5.5dB (1M)	£26.95
DB-122	2M/70CMS, 3.5/5.5dB (1M)	£26.95
DB-1216	2M/70CMS, 3.2/5.7dB (1M)	£34.95

ALL THE
MOBILE
ANTENNAS
HAVE A
SPRUNG
FOLD-OVER
BASE

P&P on above £3.00

ACCESSORIES P&P £2.50 on the following

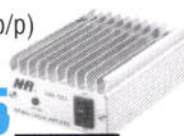
MT-3303 Trunk Mnt + 5M Coax	Top Quality	£19.95
MT-1301 H/Duty Mag Mnt + Coax	Top Quality	£24.95
MT-3302 H/Duty Hatch/Trunk Mnt	Top Quality	£24.95

NB-30W 2m H/Held AMP Back in Stock

2m H/Held amp
(1½-5W input-30W o/p)
13.8V

£44.95

£2 P&P



TSA-6601 NEW

Pocket VHF/UHF
SWR/PWR meter.
144-440MHz (60W)

£34.95

£1 P&P



Coax switches

£2 DELIVERY

CX-401 4Way (S0-239) (1kW)	£39.95
CX-401N 4Way (N type) (1kW)	£49.95
CX-201 2Way (S0-239)	£16.95
CX-201N 2Way (N type)	£21.95

ALL ABOVE (DC-1GHz RATED)

MS-107 NEW

Miniature Spkr. Microphone
with PTT led indicator. Suits:
Icom/Alinco/Yaesu



£19.95 £1 POST & PACKING

THE SCANNER SPECIALISTS

NETSET PRO-44

50 Channel
Scanner
covers 68-88/
108-174/
380-512MHz
*£149.95

£114.95



NETSET PRO-43

200 Channel Scanner
covers 66-88/
118-174/220-512/
806-999MHz
*£249

£199.95

NICADS AND CHARGER FOR
THE ABOVE ADD £15.99



MVT-7000

SPECIAL OFFER

1-1300MHz All
mode. Incl's
Nicads/charger

*£329 £269

+FREE 8" Rubber Ant.



AOR AR-8000

The ultimate Handheld
scanner. Covers
0.5-1900MHz.

For one month only
we are giving away
a FREE BSS-1300
base antenna worth £70

£419

+ FREE antenna



DSS-1300

Desk top Nest of Dipoles

RX- 10-1300MHz
supplied with COAX
+ BNC plug fitted

£44.95 + £3 P&P

Also available MSS-1300 mobile
version of above £44.95



BSS-1300

Double Nest of Dipoles

Rx-10-1300MHz Supplied with
10m COAX + Plugs
34 inches high

£69.95 + £3 P&P

NOTE: ANTENNA MOUNTS VERTICALLY



SCANNING ACCESSORIES

OP-51	Case for 7100	£17.95
OP-50	Case for 7000	£17.95
CA-8000	Case for 8000	£17.95
CA-72	Case for PRO 43/44	£14.95
QS-200	Air vent mount H/helds	£9.99
QS-300	Desk mount H/helds	£19.99
NE-1023	Scanner ant (rubber)	£8.99
NE-1012	Scanner ant (black telescopic)	£9.99
TSC-2602	High gain scan ant with 2m + 70cm transmit	£22.95
ABF-125	AOR airband filter	£24.50
UK Scan	Directory Frequency Guide (The only Series Guide)	£17.50

FREE P+P on all accessories

* Prices based on R.R.P.

NB: ALL PRICES INCLUDE VAT

★ Outside office hours 01850 586313 ★ Mail Order: Same Day Despatch ★

Sales/service:- (Phone/Fax) - 0181-951 5781/2

132 High Street, Edgware, Middlesex HA8 7EL
Close to Edgware underground station (Northern Line). Close to M1, M25, A406.



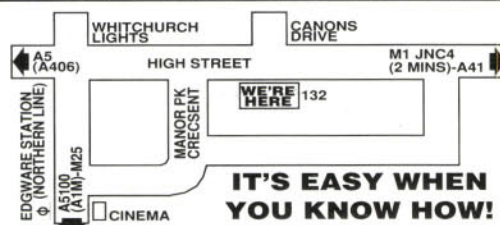
★ FREE PARKING ★



★ OPEN:-
MON-SAT 10-6PM



DELIVERY (UK MAINLAND) 24HR £10 / 48hr £7.50



IT'S EASY WHEN
YOU KNOW HOW!

Rob Mannion G3XFD has tried out the recently introduced mobile transceiver from Yaesu - and found that it's the most versatile transceiver he's ever used.

YAESU

FT-900AT

Transceiver



REVIEWED

Before starting this review, it's got to be admitted that I've had a rather 'soft spot' for Yaesu h.f. equipment. This particularly applies to their mobile gear.

I developed my liking for Yaesu h.f. mobile equipment when I bought my original FT-75...almost 25 years ago. My little s.s.b. transceiver went everywhere with me, worked well (it still does!) and provided me with a great deal of enjoyment.

However, 25 years later, the Yaesu designers have learned a great deal and we've all grown a little older! And, perhaps the most dramatic changes are the spectacular improvement to equipment specifications.

Gone are the limitations of the variable crystal oscillator (VXO) of the FT-75. Also gone forever are the relatively large valve and semiconductor hybrid circuitry. In their place Yaesu have introduced what must be the most versatile transceiver I've ever come across - the FT-900AT.

In their own promotional literature Yaesu describe the FT-900AT as a "mobile transceiver for occasional fixed station use". However, it's not often that I can say that a manufacturer has understated their product capability - and this is one of those (rare) occasions!

Quite frankly I can say that following my experience with the FT-900AT, that the transceiver is much more than a mobile. In fact, I described it to someone on the air as being "a radio and a half".

So, what impressed me so much over the Christmas holidays? What's so special about the FT-900AT? To answer, I'll describe my findings, which were gained 'on air', both mobile and from home.

The Concept

In practice, the designer's concept behind the Yaesu FT-900 is to provide a multiple purpose, versatile amateur bands only transceiver, combined with a general coverage receiver.

And, in conjunction with the small physical size, Yaesu decided to offer the transceiver with a detachable front control panel with 'remote' control facilities.

The concept behind transceivers with detachable, remote control facilities available isn't new. In fact, it's quite 'old hat' nowadays.

However, Yaesu have combined the idea along with an excellent transceiver, general coverage receiver - producing what I think is the ideal rig. In fact, I've never seen or worked with a better all purpose amateur radio station and it's an absolute winner.

Transceiver Design

So, now I've set the scene, let's take a look at the transceiver design. And, although there are one or two points I would liked to have seen incorporated, it again scores well.

The transmitter is rated at 100W output on c.w. or s.s.b. on all the h.f. bands. It also provides 25W of carrier for a.m. operation.

A v.h.f. intermediate frequency is becoming standard practice nowadays, and the double-conversion superhet on the FT-900AT uses 70.455MHz.

A general coverage receiver is provided within the package, while the amateur bands have their own coverage. Tuning is provided by either using the main tuning knob (driving a magnetic encoder to operate the synthesizers) or via a direct entry keypad on the front panel.

Automatic antenna tuning is provided as an option, and this was fitted on the review model. Another option, the YSK-900 Separation Kit, the remote control extension cable (with quick release clamp) was also supplied.

Receiver Facilities

Receiver facilities on the FT-900AT include: tuning steps of 2.5, 5 or 10Hz on c.w. or s.s.b. and 100Hz on a.m. and f.m. The coverage range on the receiving side is quoted as being from 100kHz to 30MHz.

However, I found that the l.f. coverage on the review model went far below the specified range...providing some interesting signals! Tuning on the general coverage receiver was continuous, and it re-awakened the broadcast bands listener in G3XFD (more about this later).

The receiver front-end on the transceiver employs parallel f.e.t.s in a constant-gain, grounded gate configuration r.f. amplifier.

It's Mo

The r.f. amplifier can be by-passed for direct feed to the mixing circuit, and there is a 12dB attenuation filter which can be selected as either switched in or out. (There's no r.f. gain control fitted to the FT-900AT).

Yaesu employ an interference rejection process on the FT-900AT which they claim is unique. It uses an 'up-down' conversion scheme and includes an i.f. shift and notch circuit. (The optional XF-110S crystal filter unit - for improved s.s.b. and a.m. narrow skirt selectivity - wasn't fitted on the model I had on loan).

Modern transceivers come with a host of very complex 'extra' features. This rig is no exception!

What the manufacturers refer to as 'flexible scanning' features are provided on the FT-900AT. The operator can (for example) scan all 100 memories or only those selected to be tuned and scanned. And, to be honest (although I had the transceiver for a month!) apart from trying them out...I didn't use them much.

Additionally, the scanning facilities provided on the transceiver include 10 'special' memories which allow the operator to limit the tuning/scanning range between their stored frequencies. Scan resume mode is selectable between timed or carrier delay, and scanning speed is also adjustable.

On The Air

Enough of the basic details...it's time to describe how I found the transceiver performed on the air. I'm not just a 'list' man...repeating the specification parrot-fashion, so I want to share my experience with you.

One of the very great problems that the amateur radio operator is faced with in the mid-1990s, is the ever growing complexity of professionally built transceivers. But, even though the number of 'unpack it and switch it on immediately' transceivers is dropping every year, the FT-900AT is an exception!

Despite the amazingly complex transceiver, fitted with a host of facilities...I unpacked it, connected up and switched on within moments. I was on the air within a minute or so - thanks to the design and layout of the rig.

Incidentally, Donna Vincent our News & Production Editor particularly wanted me to mention the packaging. Even this feature is very special - coming with clear, concise instructions so that you can use the packaging time and again!

Very impressive indeed...and that was just the packaging! However, you've got to remember nowadays that equipment is expensive, and the packaging which the equipment arrived in, is often retained for transportation. It also helps to retain the re-sale value of the rig itself!



The Yaesu FT-900 h.f. transceiver with the demountable front panel detached. The model reviewed by Rob Mannion G3XFD was supplied with the optional automatic a.t.u. unit (transceiver designation FT-900AT) and the optional 'quick release' mounting unit for the control, with associated remote control cable.

Once I had the rig switched on, I was most impressed with the l.c.d. tuning display. It was large, clear and very well thought out. Everything the operator needs is displayed.

While on the subject of the l.c.d. display for tuning, I should perhaps mention my thoughts on the mobile operations aspects. Initially, to be honest, I didn't think the display would cope with the low angle sunshine we get in the UK over the Christmas holiday period.

However, the display coped well and I used the rig mobile and was able to see the display very clearly, despite the bright sun. It's also ideal for night-time use (more about this later).

Once on the air I used the rig on 1.8, 3.5, 7, 14 and 21MHz. I didn't have much success on the WARC bands, and there didn't seem to be much activity either.

The automatic antenna tuning unit (a.a.t.u.) fitted on the FT-900AT was so quick and quiet that I forgot it was there for most of the time! It seemed to cope very well with my long wire antennas, my trapped dipole and the G-Whip mobile antennas with no bother at all.

My 'yardstick' is 7MHz, my favourite band, and the FT-900AT coped very well. Reports on the transmitted audio quality on s.s.b. were very good. Adjacent channel interference rejection was also more than adequate on this crowded and very busy band.

Personally (I've said this in many reviews) I regard the tuning knob 'feel' to be of paramount importance. Other operators may scoff at my opinion, but surely, if you're not happy with what is the main control of a receiver (bearing in mind how much you'll be using it)...something's wrong?

I felt perfectly comfortable with the tuning on the FT-900AT. It had a very good silky smooth action and I spent many hours listening. Personally, I feel that any contest operator would find the transceiver to be a great help during the long hours of contests.

Being a keen c.w. operator, I soon found

myself on the key. I had many c.w. QSOs and what a revelation the FT-900AT turned out to be! The 'break in' operation is so smooth and effortless the operator is led to believe that the transceiver is not switching from transmit to receive.

I tried the internal electronic keyer and found it to be good. However, I don't seem to work very well in conjunction with electronic keyers nowadays. So, for most of the time I was using my favourite Kent key. But having said that, I've no doubt the keyer would be a great boon to the contest operator.

The receiver coped extremely well on c.w., although I always feel that a transceiver of this type isn't complete without a selection of extra

crystal filters. However, the facilities provided by the notch adjustment and i.f. shift help tremendously. Despite that, I would fit the extra filters in any transceiver I owned.

General Coverage

The general coverage receiving provided by the FT-900AT adds to its versatility. And, I found that the extra long (6m) extension cable, enabled me to mount the detachable front control panel on my bedside table. (I do my operating from my office/study bedroom during the winter).

Unfortunately, I'm an insomniac and when I can't sleep I spend many hours listening to the broadcast bands during the night. So, you can imagine how pleased I was to be able to have a comprehensive receiver (the front panel is only the size of a school pencil-box) right next to my bed.

With my earphone plugged in (the main speaker is mounted on the transceiver body) the rig proved its versatility. Additionally, the tuning display illumination came into its own, proving it could cope with bright sun and darkness.

On the broadcast bands the receiver proved itself to be exceptional. The received bandwidth is just about right for broadcast use and I found myself tuning over the bands much more than I would normally, thoroughly enjoying myself.

Mobile Operations

A transceiver such as the FT-900AT just begs to be taken out on mobile operations. So, I got busy!

With the rig mounted temporarily in my estate car I transmitted on 7 and 14MHz during the day. And, although the controls had seemed rather small (the other Editorial team members thought I'd have trouble with them) I had no difficulty whatsoever.

Personally, I found the audio output on the

More Than A Mobile!

transceiver to be a little low in a mobile environment. But, as I prefer to use a headset/microphone unit in any case, this wasn't a problem. (The main transceiver unit was located between the front passenger and driver's seat in my car for the tests).

The controls were clear, and well laid out. Operating was also helped by the fact that the detachable front panel is so neat, it can go virtually anywhere in the cramped confines on modern cars.

My Next Rig

Well, I've got to be honest and say that my next rig is going to be a Yaesu FT-900AT. I've never been so impressed with a single item of equipment before now. Full marks to the designers!

Having said how much I like the transceiver, there are several points I'd like to comment on. Firstly, although Yaesu provide the operator with the facility to bypass the r.f. amplifier - there's no r.f. gain control.

Personally I think it's essential to be able to control the r.f. gain manually. I've criticised other manufacturers for omitting an r.f. gain control in the past, and I hope Yaesu incorporate a variable control before I buy my FT-900AT.

Secondly, I have doubts that the telephone-type plug and sockets for the microphone (unusually there are plugs and sockets at both end of the microphone cable) will stand up to frequent use. But I may be wrong, and it may just be my old fashioned hankering to heavy duty plugs and sockets.

Hopefully however, Yaesu may consider fitting heavier duty plug and sockets for the microphone leads. If they do, I've no doubt that many FT-900AT transceivers will still be providing good service in 25 years time, in the same way my old FT-75 is doing.

So, if you want an extremely effectively 'all-in-one' package transceiver (mobile, portable or fixed)...I think the FT-900AT will fit the bill. In the days when most of us can only ever afford one commercial transceiver for h.f., this must surely be the approach to adopt. Well done Yaesu, another classic design.

My thanks go to Yaesu UK Ltd. for the loan of the review FT900AT, which is available for £1549 r.r.p. from Yaesu dealers in the United Kingdom.

PW

Manufacturer's Specifications

General

Receiving frequency range	100kHz - 30MHz
Transmitting frequency ranges	1.8 to 30MHz amateur bands
Frequency stability	±10ppm (s.s.b., c.w., a.m.) from -10° - +50°C or ±2ppm from 0° - 50° C (s.s.b., c.w., a.m. w/TCXO-3 option)
Modes	u.s.b., l.s.b. (J3E), c.w. (A1A), a.m.(A3E), f.m. (F3E)
Frequency tuning steps	2.5Hz/5.0Hz/10Hz (c.w., s.s.b.) 100Hz (a.m., f.m.)
Antenna impedance	50Ω nominal (16.7 - 150Ω with optional automatic a.t.u.)
Operating temperature range	-10°C - +50°C
Supply voltage	13.5V d.c. ±10%, negative ground
Power consumption (approx)	1.5A receive (no signal) 20A transmit (100W)
Dimensions	238 x 93 x 253mm
Weight (approx)	5.3kg

Transmitter

Power output	Adjustable up to 100W (25W a.m. carrier)
Modulation types	s.s.b., balanced, and filtered carrier, a.m. low-level (early stage) , f.m. variable reactance
Maximum f.m. deviation	±2.5kHz
Harmonic radiation	50dB below peak output 40dB (10MHz, 18MHz) Spurious radiation 40dB below peak output
Carrier suppression (s.s.b.)	40dB
Undesired sideband suppression	At least 50dB below peak output at 1.5kHz modulation
Audio response (s.s.b.)	<6dB from 400 - 2600Hz
Third order IMD	-31dB (typical) @ 100W p.e.p., 14.2MHz
Microphone impedance	500 - 600Ω

Receiver

Circuit type	Double conversion superhet
Intermediate frequencies	1st: 70.455MHz, 2nd: 455kHz
Sensitivity	(for 10dB S/N, 0dBμ = 1μV IPO off)
Selectivity	(-6/-60dB)
Squelch sensitivity (IPO off)	1.8-30MHz (c.w., s.s.b., a.m.) <2.0μV 28-30MHz (f.m.) <0.32μV
Rejection (i.f.)	(1.8-30MHz) 70dB or better
Image rejection	(1.8-30MHz) 70dB or better
Shift range (i.f.)	±1.2kHz
Notch rejection (i.f.)	30dB or better
Clarifier tuning range/steps	±9.99kHz/2.5Hz, 5Hz or 10Hz
Maximum audio power output	at least 1.5W into 4Ω with <10% t.h.d.
Audio output impedance	4 to 8Ω

After seeing a copy of the G3XFD review Barry Cooper of Yaesu UK Ltd., sent us the following comments:

It is always pleasing to be given the chance to comment on a review before it is published. I am obviously delighted that Rob Mannion enjoyed using the equipment and found it so versatile - good to know that Yaesu achieved one of its fundamental design parameters for the FT-900.

Although the FT-900 achieves a unique first in h.f. equipment in providing a demountable front panel as the review points out, this belies the suitability of the equipment being used as a base station. Perhaps Yaesu's future advertisement copy should read 'A base station for occasional use as a mobile?'

Rob mentions low audio output for mobile use. It is envisaged

that mobile users would plug a headset or speaker microphone into the additional socket provided on the demountable head which should certainly improve matters in a noisy, mobile environment. Rob also queries the use of RJ-45 telephone plug sockets on the microphone and their long term durability. Yaesu along with other major manufacturers are moving to this new standard in its amateur equipment range, where it has been common practice for commercial products to use these connectors because of their durability and moisture resistance.

Barry Cooper



The Mobile Menace

The automobile has undergone a very rapid evolution in recent years. It's almost kept pace with developments in the field of the microprocessor-based electronics.

Microprocessors in vehicles control almost everything these days; braking, engine management and even suspension.

The introduction of all this technology has meant that car manufacturer's are now far more concerned about owners fitting and using their own telecommunications equipment.

The prospect of litigation, such as that seen in the USA has caused concern. The resultant awards, which in some cases runs into millions of dollars for injuries sustained from runaway vehicles upset by stray r.f. fields, has put manufacturers safety policies in the spotlight. As a result they have EMC high on their list of priorities.

Existing EMC vehicle specifications are fast becoming out of touch with technology and developments in telecommunications. So, in order to counter this, new specifications are currently being submitted to the EEC for approval.

The Definition

Firstly, let's take a look at the definition of Electromagnetic Compatibility or EMC. In layman's terms and for the scope of this article, the definition of EMC means that fitting and using a transceiver in a vehicle should not cause any malfunction or degradation in the overall operation of the vehicle and any of its subsystems.

For just one example of EMC, pressing the transceiver's p.t.t. switch should not suddenly cause the engine to overrun or stop. The prospect of either happening on a busy stretch of motorway doesn't bear thinking about!

On the other side of the coin, you don't really want to be straining to hear the other station on a mobile contact through a shower of electrically generated noise. Mobile operating is dangerous enough without throwing another problem into the arena.

Interference Generated

Electrical interference is generated by the rapid change or interruption of an electrical current. This process (unfortunately!) is found in the operation of almost all the electronic and electrical equipment fitted to the vehicle.

Electrical systems in vehicles can normally be divided into three easily identified categories; ignition (including engine management and other essential systems), power generation and accessories.

Each system and its associated wiring are capable of generating and distributing electrical noise. It's fair to say that unless you own a diesel vehicle, most of the trouble is likely to come from the ignition system, with the close runner-up being power generation.

Noise Propagated

Electrical noise is propagated throughout the vehicle to the affected radio equipment by one or more of the following routes:

RADIO ON The move

Richard Ayley G6AKG is a professional Engineer in the ever-expanding industry that's grown in parallel with the needs of Electromagnetic Compatibility. And, as EMC (or the lack of it!) can be a great problem for the mobile operator.... in part one of his article Richard passes on some useful advice to help minimise the 'menace'.

(a) Radiated emissions from the noise source being directly received via the antenna, (b) Conducted emissions on the vehicle supply wiring entering the receiver via its power leads and (c) Conducted emissions on the vehicle wiring being radiated and received via the antenna Radiated and conducted emissions being coupled into the mechanical structure of the vehicle and then being re-radiated and received via the antenna.

Transceiver Installation

Transceiver installation is one of the most important factors in beating EMC problems. You can help yourself by following some straightforward guidelines.

Start the process by running a low impedance (fused) supply to the rig, directly from the -Ve and +Ve of the battery. Where practical, keep the power cable, antenna feeder and antenna as far away as possible from any possible noise sources, ie the ignition system.

Also make sure that the antenna is well matched to the transmitter. Remember that most mobile antennas need their bases earthed to the vehicle chassis to provide a ground plane.

Bonding the antenna base to the vehicle chassis has a twofold effect. It increases antenna efficiency which reduces radiated fields off the feeder during Transmissions and decreases the chance of noise pick-up on the feeder during receive.

A good ground plane connection can always be achieved by running a short length of braid from the antenna mount to one of the tailgate or boot lid fixing points. Here the braid can be trapped under a bolt, making sure that at least one surface is clean and free from paint.

It's also important to stop the ingress of moisture. Water entering will lead to corrosion, and the cable joint should be smeared with petroleum jelly before assembly.

Table 1

Test Condition	Noise Received	Interference Source
Ignition off	Open squelch with possible tick	Clock
Ignition on	Intermittent tick or whine	Fuel pump
Engine ticking over	Loud cracking proportional to engine rpm	Ignition system
Increase Engine rpm	Whine varies in pitch with engine rpm	Alternator
Wash wipe operating	Whine in unison with wiper action	Wiper motor or wiper water pump
Heater on	Whine varies in pitch with fan setting	Heater motor
Increase engine rpm for extended period	Whine appears when engine temp climbs to above normal	Electric cooling fan on radiator

Noise Identification

In order to tackle any noise problem, you must first successfully identify the source. And to do this you'll have to choose a good site for the tests.

Park the vehicle well away from any likely sources of external noise ie, over head power lines, industrial processes and buildings with networked computer systems.

Then, with the transceiver squelch lightly set, monitor the band while putting the vehicle through each of the test conditions shown in **Table 1**.

Even the most severe ignition interference may not open the squelch on an f.m. receiver. If this happens, it can only be monitored by lifting the transceiver squelch with an external unmodulated carrier.

Squelch lifting may be achieved with a 'Dip Meter' oscillator tuned to the band required. It can be placed next to the transceiver, and used in the absence of a local signal.

Monitoring Noise

While monitoring the identified noise, I suggest you try removing the antenna plug. If the noise is still present, then this almost certainly shows the interference is entering the effected equipment via its power supply leads.

Circuit cross-coupling is often the cause of supply line noise. It's best tackled by trying to separate rig supply wiring from other cable looms, and/or suppressing the noise at the source.

If noise suppression at source is not possible, try running the power supply to the equipment in screened cable. In this case the cable screen should be bonded directly to the vehicle chassis near the battery.

Unfortunately, high current screened cable is difficult to find. However, it may be fabricated using suitably rated twin or single conductors run down the centre of a screen taken from a length of UR67 coaxial cable.

Toughest Nut

Perhaps I should start with the toughest nut to crack, the ignition system! And in almost every case it's best to stem the interference at source, to stop it propagating throughout the vehicle.

But before you start to add extra suppression components, be sure to check that the ignition system is in good order. Perished or damaged h.t. leads should be replaced with a good quality resistive type.

The distributor assembly should also be checked for worn or broken parts which need replacing. Another important factor is that the spark plug clearances should be checked for the correct setting.

Firstly, I suggest you try fitting a 1µF (100V d.c. working) capacitor between the SW, '+' or No. 15 terminal of the coil and the chassis of the vehicle. Make sure that there's a good earth connection for the capacitor.

On vehicles fitted with electronic ignition you should check with the manufacturer if the fitting of the 1µF capacitor is permissible. Some electronic ignition units already have a much higher voltage working capacitor installed.

If the addition of the capacitor fails to reduce the noise level try following the remedial actions shown in the fault flow chart in **Fig. 1**.

Tackling The Problems

In the second part of this article I'll be tackling the EMC problems associated with h.t. distribution. And I plan to discuss the many types of electric motors found on vehicles and their associated EMC difficulties.

The troubles associated with alternators and brake lights won't escape either! And the second part will also look into problems associated with transducers, clocks, static electricity problems and particular difficulties associated with older vehicles.

So, until next month...don't give up! We can work together to crack your particular EMC problem 'nut'!

PW

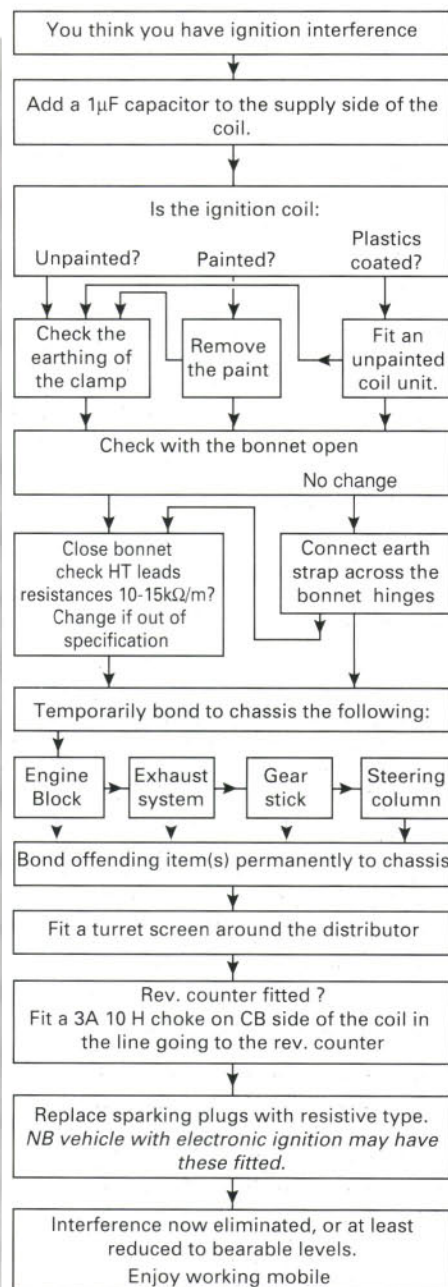
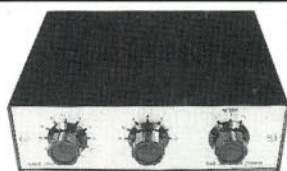


Fig. 1: Interference fault 'flow chart' (see text).

NEW! TU3 Antenna Tuner



- ★ Ideal for receivers with a long wire Antenna on the H.F. bands, 1-30MHz.
- ★ Versatile! The touch of a switch gives any one of 3 different arrangements.
- ★ Quality case - black with printed aluminium front & back facias. Measuring only 170-140-50mm.

★ Kit complete with ALL components and hardware including pre-punched case and panels.

Price £44 Plus £4.00 P & P

Ready made £54 Plus £4.00 P & P

Send SAE for details of our full range of kits or call **0115 938 2509**

LAKE ELECTRONICS

7 MIDDLETON CLOSE, NUTHALL, NOTTINGHAM NG16 1BX

(Callers by appointment only)



Please mention

practical Wireless

when replying to advertisements

Traffic Signs For The Radio Amateur

By James Glanville G3TZG



MAGNETO IGNITION
PROHIBITED



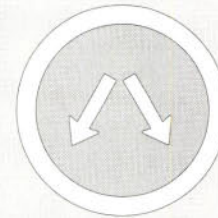
VK STATIONS PROHIBITED



ROYAL SIGNALS AMATEUR
RADIO CLUB MOBILE RALLY



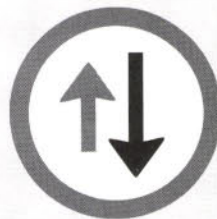
MINIMUM CW SPEED
WPM



VARIABLE SKIP DISTANCE



HOME-BREW INDUCTORS
LIMITED TO TWENTY
TURNS



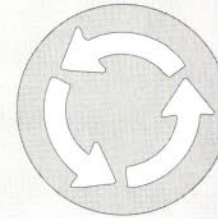
SLIGHT POSITIVE LEAKAGE
CURRENT



FREQUENCY MUST BE
STATED IN CYCLES. HERTZ
PROHIBITED



VEHICLES WITH BOTH
POSITIVE AND NEGATIVE
EARTHING SYSTEMS MAY
BE ENCOUNTERED



CIRCULAR POLARISATION
ALLOWED



OHM METERS IN USE



BALLOON OPERATORS
USING VHF



AUDIO TESTS USING TUNING
FORKS IN OPERATION



ANTENNA MAST GUYS
OVERTIGHTENED



MOBILE OPERATOR USING
HAND MIC



IONOSPHERIC CRITICAL
FREQUENCY TESTS UNDER
WAY



MOBILE 5/8 WHIPS MAY
BEND AT SPEEDS ABOVE
110 MPH



CONVENTIONAL FLOW AND
ELECTRON FLOW THEORIES
BOTH IN USE



OPERATORS USING
AMPLITUDE MODULATION
ON TOP BAND



DC WITH SLIGHT AC
RIPPLE



HEAVY QRN AHEAD



CAUTION G3s OPERATING



NOVICE BAND



10 GIGAHERTZ DISHES
MUST BE HORN FED



MARITIME MOBILE
OPERATION FROM
VEHICLES NOT ADVISED
BEYOND THIS POINT



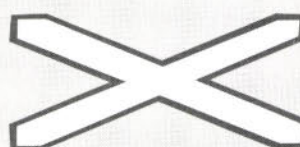
CAUTION. HERDS
OF WILD PACKET
OPERATORS MAY
APPEAR
SUDDENLY



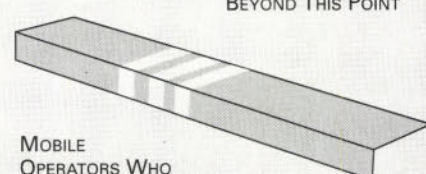
CALCULATIONS
INVOLVING ROOT
2 TAKING PLACE



SWR METERS
MUST BE USED



CROSSED DIPOLES ALLOWED



MOBILE
OPERATORS WHO
SCRUB TYRES ON KERB WILL
ENCOUNTER A RESISTANCE FORCE
OF 440 KILONEWTONS

THE 24 HOUR, 7 DAY A WEEK SHOPPING & INFO LINE IS

3 SPECIALS

*WHILST STOCKS LAST

YAESU	FT51R	AT £429*
YAESU	FT736R	AT £1429*
YAESU	FT990DC	AT £1659*

PLUS MORE "BARGAIN HUNTER PRICES"

HF EQUIPMENT

ICOM	IC707	LIST £895	ML PRICE £749
ICOM	IC738	LIST £1549	ML PRICE £1389
ICOM	IC736	LIST £1849	ML PRICE £1639

YAESU	FT840	LIST £899	ML PRICE £769
YAESU	FT900	LIST £1349	ML PRICE £1109
YAESU	FT900AT	LIST £1549	ML PRICE £1289
YAESU	FT900DC	LIST £1999	ML PRICE £1659
YAESU	FT990AC	LIST £2299	ML PRICE £1859*
YAESU	FT1000	LIST £3699	ML PRICE £2779*
YAESU	FRG100	LIST £559	ML PRICE £479*

KENWOOD	TS50S	LIST £999	ML PRICE £889
KENWOOD	TS450S	LIST £1399	ML PRICE £1220
KENWOOD	TS450SAT	LIST £1549	ML PRICE £1329
KENWOOD	TS850S	LIST £1699	ML PRICE £1495
KENWOOD	TS850SAT	LIST £1849	ML PRICE £1629
KENWOOD	TS950SDX	LIST £3799	ML PRICE £3199

VHF/UHF MOBILE, BASE & HANDIE

ICOM	IC281H	LIST £399	ML PRICE £359
ICOM	IC2340H	LIST £689	ML PRICE £619
ICOM	IC820H	LIST £1689	ML PRICE £1489

YAESU	FT11R	LIST £299	ML PRICE £259*
YAESU	FT41R	LIST £339	ML PRICE £279*
YAESU	FT23R	LIST £269	ML PRICE £199*
YAESU	FT530R	LIST £499	ML PRICE £369*
YAESU	FT51R	LIST £499	ML PRICE £429
YAESU	FT290R	LIST £539	ML PRICE £399*
YAESU	FT690R	LIST £539	ML PRICE £419*
YAESU	FT790R	LIST £639	ML PRICE £499*
YAESU	FT736R	LIST £1789	ML PRICE £1429*
YAESU	FT5200	LIST £679	ML PRICE £579
YAESU	FT5100	LIST £629	ML PRICE £529
YAESU	FT2500M	LIST £369	ML PRICE £329

KENWOOD	TS790E	LIST £1849	ML PRICE £1629
KENWOOD	TM255E	LIST £899	ML PRICE £799
KENWOOD	TM455E	LIST £999	ML PRICE £889
KENWOOD	TM742E	LIST £829	ML PRICE £739
KENWOOD	TM733E	LIST £739	ML PRICE £649
KENWOOD	TM251E	LIST £389	ML PRICE £349
KENWOOD	TM455E	LIST £429	ML PRICE £389
KENWOOD	TH79E	LIST £449	ML PRICE £399
KENWOOD	TH22E	LIST £239	ML PRICE £219
KENWOOD	TH42E	LIST £269	ML PRICE £239

REMEMBER! ANYTHING OVER £200 WE CAN FINANCE, EVEN HEAVILY DISCOUNTED PRICES, USUALLY AT ZERO APR! JUST CALL OR WRITE FOR DETAILED INFORMATION.

THIS MONTH ONLY !!

MFJ-259 ANALYSER
LIST PRICE £249.95,
SHOW PRICE **£215.00**



NEW PRODUCTS CORNER

ALINCO DR-610H DUAL BANDER

THE LATEST FROM THE ALINCO STABLE, THE DR-610H IS THE ONLY DUAL BANDER WITH ON LINE "CHANNEL SCOPE". 50W ON 2M & 35W ON 70CM, SEPARATE CONTROLS FOR BOTH BANDS AND HAS A FULLY "REMOTE" HEAD UNIT.



ALINCO DR-150H 2M FM 50W

ANOTHER ALINCO FIRST! 50 WATTS ON 2M FM, WITH A BUILT IN "CHANNEL SCOPE", ALLOWING YOU TO VIEW ACTIVITY EITHER SIDE OF YOUR OPERATING FREQUENCY.



ALINCO DJ-F32

BASED ON THE VERY POPULAR ALINCO DJ-580, THE NEW ALINCO DJ-F32 HAS BEEN UP-GRADED IN EVERY RESPECT. A LARGER, CLEARER KEYBOARD HAS BEEN FITTED ALONG WITH NUMEROUS OTHER OPERATOR IMPROVEMENTS.



PLUS!!!! DON'T FORGET THE ALL MODE, 500KHZ TO 55MHZ HF TRANSCEIVER - "DR-X95"

EXISTING ALINCO PRODUCTS

DJ-580E	DUALBAND	£369
DR130E	50W 2M FM	£279
DRM-06	25W 6M FM	£279
DJ180E	2M HANDIE	£189
DJ480E	70CM HANDIE	£229

NEW!!

ICOM IC-Z1 DUALBAND REMOTE HEAD - HANDIE!

WHILST THE OTHER MANUFACTURERS ARE OFFERING "REMOTE HEAD" MOBILES, ICOM HAVE LEAPT A-HEAD, (NO PUN INTENDED), AND ARE THE FIRST COMPANY TO OFFER A FULL FEATURE DUALBAND HANDIE, WITH A REMOVABLE FRONT PANEL! SEE IT FIRST AT THE PICKETTS LOCK SHOW!



DISCOUNTED DIGITAL FILTERS

STOP ME & BUY ONE!

TIMESWAVE DSP9+	£229.00
TIMESWAVE DSP9MK11	£179.00
TIMESWAVE DSP59	£279.00
JPS NTR1	£199.00
JPS NIR10	£399.00
MFJ 784	£239.00

CUSHCRAFT ANTENNAS

SUPER DISCOUNTS!

R7 VERTICAL	£349.00
R5 VERTICAL	£259.00
A4S 4ELE BEAM	£399.00
A3S 3ELE BEAM	£329.00
A3WS 18/24 BEAM	£265.00
D3WS 10/18/24	£169.00

PRO-AM ANTENNAS

IF YOU WANT TO BE HEARD RUNNING MOBILE "HF", THEN CHOOSE THE FAMOUS "PRO-AM" RANGE FROM VALOR, USA.

PHF-160 Enormous 160M Centre Loaded Whip	£54.95
PHF-80 Almost as big 80m Centre Loaded Whip	£24.95
PHF-40 The muts nuts on 40m, at a mere	£22.95
PHF-20 The way to DX, (safely) on 20m	£19.95
PHF-15 You guessed it, the same but on 15m	£19.95
PHF-10 I'll give you one guess	£19.95
AB-5 5 bander 10-80 in one antenna. It works!	£89.95
BB-2 Massive Spring mount for L.F. Whips	£49.95
116-NP gutter mount with 3/8 thread	£6.95
142-ADP Body mount with 3/8 to SO239	£9.95

AEA PRODUCTS

DIRECT USA FACTORY APPOINTED

PK-232MBX	RRP £329.95
Deposit £29.95, 12 x £25 plus FREE software worth £29.95!	
PK-900	RRP £479.95
Deposit £47.95, 12 x £36.00 plus FREE software worth £29.95!	
NEW!! PK-12	RRP £139.95
NEW!! PK-96	RRP £199.95
ISOLoop 10-30MHz	RRP £399.95
The very best LOOP ANTENNA! Deposit £39.95, 12 x £30.00.	
FREE CARRIAGE!	
IT-1 IsoTuner for ISOLoop	RRP £269.95
KK-1 Keyboard Keyer. The ultimate Morse Keyer.	RRP £229.95

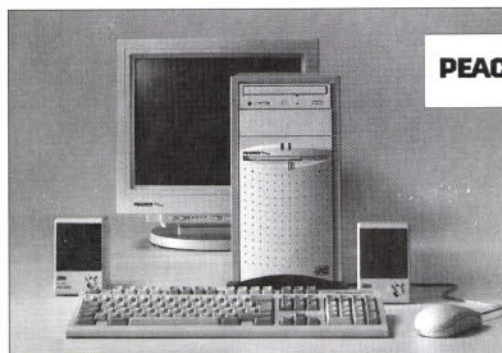
THIS MONTHS SPECIAL OFFER

ORDERS CAN BE PLACED FOR ANY OF THE ABOVE AT THE PICKETTS

EEK B.B.S. S NOW OPEN..

"RADIO READY PC's"

In January 1995, Peacock Computers appointed MARTIN LYNCH as their sole retailer of "RADIO READY" PC's for the Amateur Radio market. Buying a PEACOCK PC from Martin Lynch ensures that the system is configured for your application, making it simple to employ as an ever important accessory in the modern radio shack. If you have wanted to buy a P.C., but are bewildered at the market with lots of terminology that makes you feel like a beginner to Amateur Radio, then contact MARTIN LYNCH for advice on how and why you should have a PEACOCK P.C. in your shack - TODAY! All systems include a full TWO YEAR WARRANTY anywhere in the British Isles and are compatible with the entire range of AEA, KAM and other Packet and Data Decoding products.



All items are available on Low Cost Finance. Carriage extra at £20 per system. Please note: The 3 speed CD-Rom, 16-bit sound card and speakers shown in the photograph are optional extras costing £259.

Model Range:

CPU	486DX-40
Motherboard	VLB
Cache	256K
RAM	4MB
HDD	210MB
Controller	VLB
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
Monitor	14" SVGA Non-interlaced LD

Price Incl VAT, £995

CPU	486DX2-66
As 486-40, but 420MB Hard Disk.	
Price Incl. VAT, £1099	

CPU	PENTIUM 60
The ultimate in Home P.C's. As 486DX2-66, but 60MHz Processor, 540MB Hard Disk & 8MB RAM.	
Price Incl VAT, £1495	

STOP PRESS! MICROWAVE MODULES ARE BACK!

THE FAMOUS RANGE OF MICROWAVE MODULES UNITS ARE ONCE AGAIN IN PRODUCTION! KICKING OFF WITH THREE OF THEIR MOST POPULAR, THEIR ENTIRE RANGE, (ALONG WITH SOME EXCITING NEW IDEAS) WILL BE AVAILABLE FROM MARTIN LYNCH, THROUGHOUT '95

MML144/30/LS	1W OR 3 IN, 30 WATTS OUT RF SWITCHED LINEAR AMP	£98.95
MML144/100/LS	1W OR 3 IN, 100 WATTS OUT RF SWITCHED LINEAR AMP	£199.95
MML144/100/S	10W IN, 100 WATTS OUT RF SWITCHED LINEAR AMP	£179.95

RS - THE LOT!

LOCK SHOW, MARCH 18 and 19

Access the
Lynchline
B.B.S.



0181-566 0000

By dialling 0181 - 566 0000, via your computer and modem, listings of my NEW & USED stock are available to view. You can place orders, leave queries on a particular product or just "browse" at your leisure. There is no "log-on" fee, no monthly subscription, bar the telephone call made to the shop. As the months go by, Product Reviews will be added together with SPECIAL OFFERS that I am not allowed to print in this magazine! If you haven't got a PC (or a suitable modem), then call us about the new German made "Peacock" range of commercial grade "Radio Ready" P.C's. They are excellent value and are offered with a two year warranty!

MARTIN LYNCH

G4HKS

THE AMATEUR RADIO EXCHANGE CENTRE

0181-566 1120

140 - 142 NORTHFIELD AVENUE,
EALING, LONDON W13 9SB

FAX: 0181 - 566 1207



IF YOU DON'T WANT TO TAKE ADVANTAGE OF MY FREE FINANCE I'M ALWAYS HAPPY TO ACCEPT CASH, CHEQUE, CREDIT CARD OR TRADE-IN. JUST CALL 0181 - 566 1120 TODAY FOR EXPERT ADVICE. I promise you the best overall deal in the U.K. Get ringing, or you'll miss the bargains! *Please NOTE prices & monthly payments are based on 17.5% VAT & no more price increases! E&OE

Martin Lynch is a licensed credit broker.
Full written details are available on request.



Because of the high level of service and customer back up offered, Martin Lynch has been appointed "Master Dealer" by YAESU U.K.

I designed the PW Martlet as an alternative to the usual 'Throw a couple of rocks into it' which is the usual (crystal controlled) p.m.r. approach to getting on 70MHz. The transceiver is a fully synthesised unit, with separate voltage controlled oscillators (v.c.o.s) for transmit and receive, with the receive v.c.o. running above the signal frequency.

Frequency selection is by means of a diode matrix with six channels available on the prototype. You can of course extend the frequency coverage if necessary.

looking rig, which also performs very well on air.

I'll start off by providing a circuit description of the Martlet project. I've also provided a block diagram, **Fig. 1.1**, to show the complete project.

The first four p.c.b.s use double-sided boards. And in the case of the first three boards, the top is a low impedance groundplane.

receive, **Fig. 1.2**. These are virtually identical in design apart from the tuning capacitors.

Both v.c.o.s use dual gate m.o.s.f.e.t.s in a Colpitts configuration. They are tuned by varicap diodes D5 and 6, and each is followed by a buffer stage.

Taking the receiver section first, the output from the buffer stage Tr5 is split into two. One half feeds the pre-scaler amplifier, the other being amplified by Tr9 with a tuned circuit in its collector to the receive mixer Tr2, see **Fig. 1.3**, for the receiver circuit diagram.

The transmit section of the v.c.o., **Fig. 1.2**, is slightly different from the receive half. It has an additional varicap diode, D7, which directly modulates the oscillator to provide direct frequency modulation.

The output is again split to provide an output to the prescaler amplifier. It also goes to the transmit strip via R63 which gives a rudimentary but effective power output control.

Transmit audio is processed by the audio processing integrated circuit (i.c.), IC5, **Fig. 1.4**. The overall deviation is set by R63 and microphone gain by R28.

The synthesiser used in the Martlet is the Motorola MC145152 dual modulus type, **Fig. 1.2**, used in conjunction with a Plessey SP8793 prescaler. This is a 200MHz divide by 40/41 type. Signals to feed this are amplified by Tr16.

The MC145152 has an 'on chip' reference oscillator of 12.8MHz. This provides an accurate 12.5kHz channel spacing of the final frequency.

The frequency divide ratios are split between the 'N' and 'A' counters. And to help, later on I'll provide an easy reference table for all of the 70MHz f.m. channels. Diodes provide the necessary 'pull down' function to program the device. **Fig. 1.2a.**

The outputs of the phase detector remain essentially high when the reference frequency and the divided input frequency are in phase. These are then fed to the low pass filter



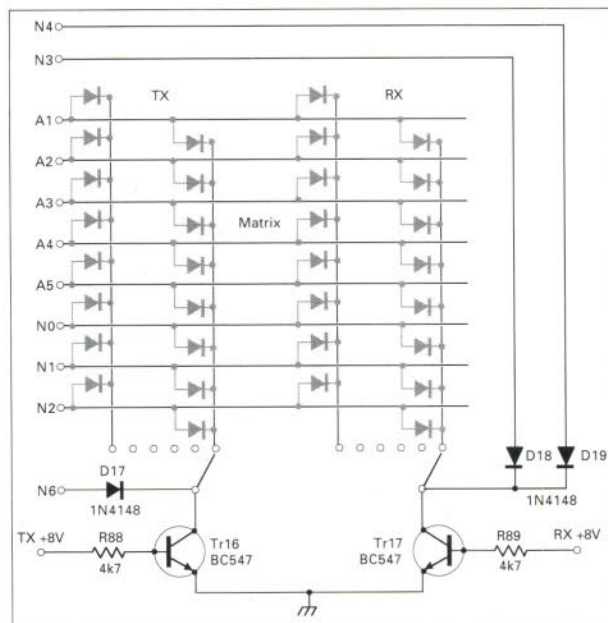
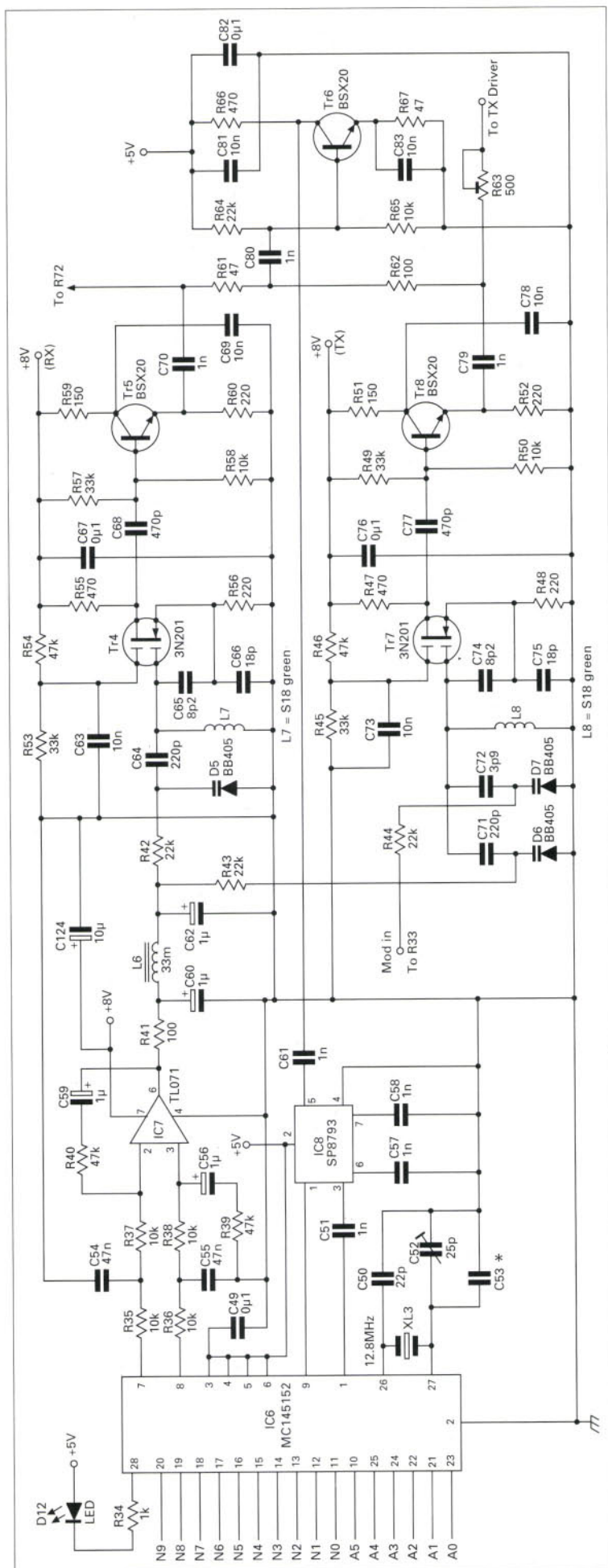


Fig. 1.2: (Left) Circuit diagram of the synthesiser and voltage controlled oscillators (v.c.o.s) used in the PW Martlet.

Fig. 1.2a: (Above) Diode matrix network used to provide channel selection in conjunction with the synthesiser (see text).

circuitry around IC7, the output of which is fed to both the transmit and receive v.c.o.s.

Should the Martlet synthesiser be out of lock, D12 lights to give a visual warning. Further information on the general design of synthesisers may be obtained from the Motorola technical guide ref: MC145151-2/D.

Power supplies for the synthesiser are as follows: 5V for the synthesiser and prescaler regulated from 13.8V, see Fig. 1.7, continuous 8V for the low pass filter regulated from 13.8V. And there's 8V provided for the receive v.c.o. from the RX+8V line, with 8V for the transmit v.c.o. from the +8V(TX) line.

Double Superhet

The Martlet receiver, Fig. 1.3, follows a conventional double superhet design with i.f.s of 10.7MHz and 455kHz. Input signals (F_s) are coupled by a low impedance link L1 and amplified by Tr1 (R3 suppresses any tendency to spurious oscillations).

Bandpass coupling comprising of L3/L4, to the mixer reduces any possibility of all but the very strongest of out of band signals being passed to the mixer Tr2.

The oscillator injection at signal frequency ($F_s + 10.7\text{MHz}$) into the source produces the 10.7MHz i.f. This is filtered by a two-pole crystal filter with a bandwidth of 15kHz, and amplified by Tr3 before being processed by the i.f. chip, IC1 an MC3357.

The MC3357 is the heart of the Martlet receiver. It provides the second oscillator, mixer, limiting i.f. amplifier (with an external 455kHz ceramic filter), discriminator and squelch.

The discriminator I've used with the project is a little unusual. To save a little work, I incorporated a ceramic resonator as the tuned element instead of the usual coil, giving one less adjustment.

Output from the squelch, which is high when a signal is received, drives Tr10. This causes the busy light to come on and also enable the audio power amplifier.

Should a weak signal fade, the squelch may be overridden by the mute defeat switch. This has the same effect as Tr10 conducting.

After filtering, the recovered audio from pin 9 of the MC3357 is fed to the volume control. It then subsequently proceeds to the power amplifier IC3 and loudspeaker.

Continued on page 35

Dates for your Diary!

Come out of hibernation
and pick up the *New
Seasons* best deals!

COUNTER SALES
at:
FRASER ELECTRONICS
42 Elm Grove, Southsea
Hampshire

G3TUX:

The QRP Component Company
PO Box 88 Haslemere Surrey GU27 2RF
Tel: (01428) 641771 Fax: (01428) 661794

RSGB VHF Convention
Sandown Park Race Course
Sunday 19th February



ALL THE WINNERS!

★ *Peter Jones Morse Keys* ★ *C M Howes
Kits* ★ *Wood & Douglas VHF/UHF Kits*
★ *Connectors* ★ *Oak Hills Research HF
QRP Kits* ★ *Cables Component and
surplus bargains*

London Amateur Radio and Computing Show
Lee Valley Leisure Centre
Picketts Lock Lane.

Saturday/Sunday
11th 12th March

Sail on down!



QSL COMMUNICATIONS

UNIT 6, WORLE INDUSTRIAL CENTRE, COKER ROAD,
WORLE, WESTON-SUPER-MARE BS22 0BX

TEL: (01934) 512757 (0850) 707257

FAX: (01934) 512757



KENWOOD TH22E
2M £239.95 + FREE
SM032 SPEAKER MIKE
WORTH £28.95



KENWOOD TH42E
70CMS £269.95 + FREE
SM032 SPEAKER MIKE
WORTH £28.95



KENWOOD TH79E
2M/70CMS £449.95
+ FREE SMC 32 SPEAKER MIKE
AND SC41 CASE WORTH £42.90



YAESU FT-11R
2M £299 + FREE
MH-18A2B SPEAKER MIKE
WORTH £25

YAESU FT-41R
700MS £339 + FREE
MH-18A2B SPEAKER MIKE
WORTH £25

YAESU FT-51R
2M/70CMS £499
+ FREE MH-12A2B SPEAKER
MIKE WORTH £31

EARTH RODS 4FT LONG, ADJUSTABLE BRASS FIXING
SOLID COPPER £10.99, COPPER PLATED STEEL £8.99, P&P £1.50



KENWOOD TS-450S HF TRANSCEIVER
£1399.95
+ FREE AT450 AUTO ATU WORTH £149.95



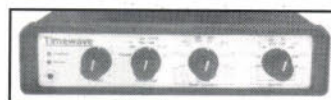
YAESU FT-840 HF TRANSCEIVER
£899
+ FREE FM UNIT WORTH £52



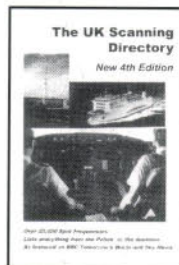
AKD
70 CMS £193
2M £193
4M £193
6M £193
FREE P&P ON AKD



AOR AR8000
SSB-NFM-WFM-AM
500kHz-1900MHz
£409



**TIMEWAVE DIGITAL
AUDIO FILTERS**
DSP-9 VER.2 £189
DSP-9 PLUS £239
DSP-59 PLUS £299



NEW 4TH EDITION
20,000 SPOT FREQUENCIES
25MHz-1.6GHz
£17.50 P&P UK FREE

QSL CARDS SEND LARGE S.A.E.
FOR SAMPLES AND PRICE LIST

WE STOCK A RANGE OF BASE AND MOBILE ANTENNAS ALONG WITH ANY CABLE AND PLUGS WHICH MAY BE NEEDED

The Transmitter

The transmitter side of the Martlet is conventional. In the circuit I've used, the f.m. signals from the v.c.o. are amplified in the transmitter driver stage, Fig. 1.5, which is constructed on a separate board from the p.a.

Both the transistors in the driver stage operate in class A with an output of about 500mW. This stage is supplied with 13.8v on transmit.

The p.a. stage itself, Fig. 1.6, uses a single transistor, Tr13, working in Class C, with a low pass filter on the output. The p.a. transistor is

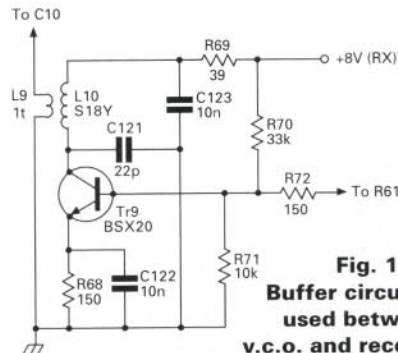


Fig. 1.3a:
Buffer circuitry
used between
v.c.o. and receive
(see text).

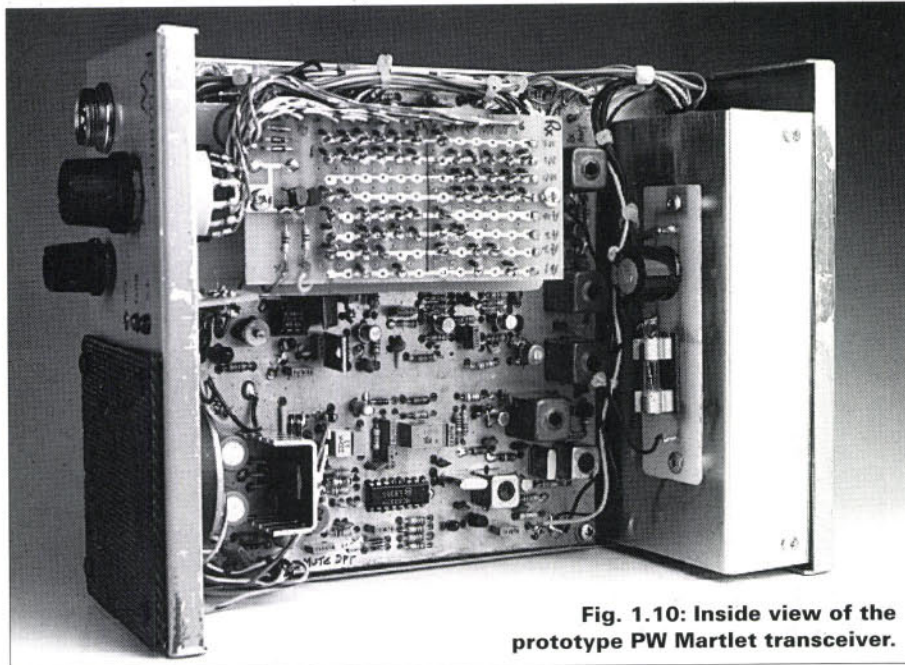
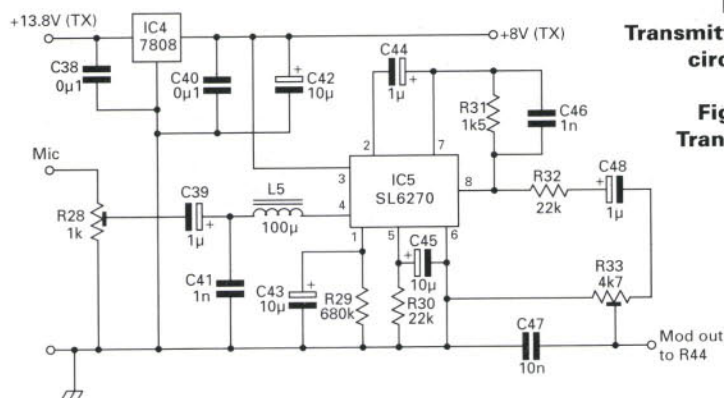


Fig. 1.10: Inside view of the
prototype PW Martlet transceiver.



Let Fly On Four (continued)

Fig. 1.6: Power amplifier stage circuit (see text).

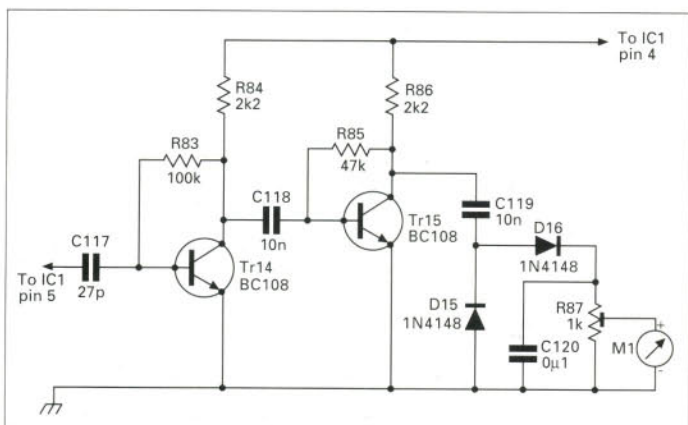
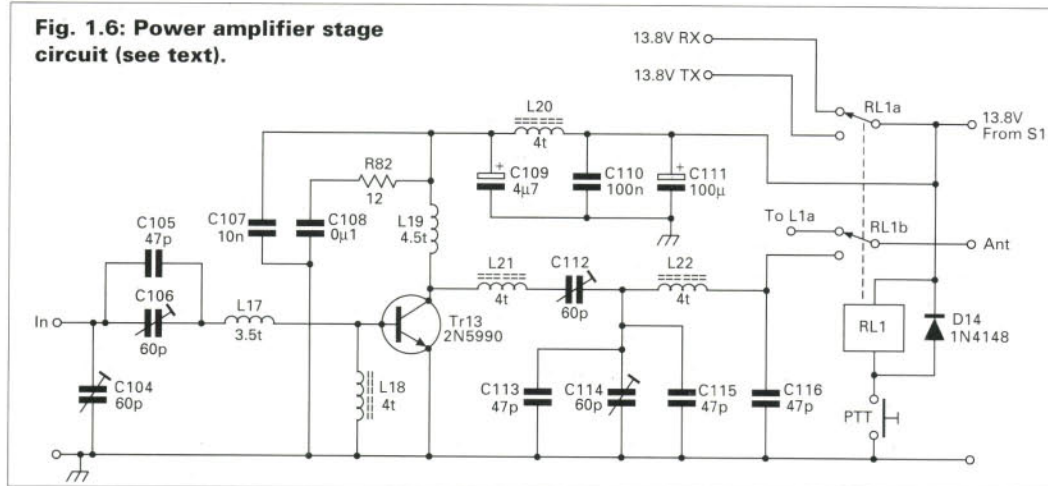


Fig. 1.9: (Left) Signal strength meter circuitry (to be described in Part 2).

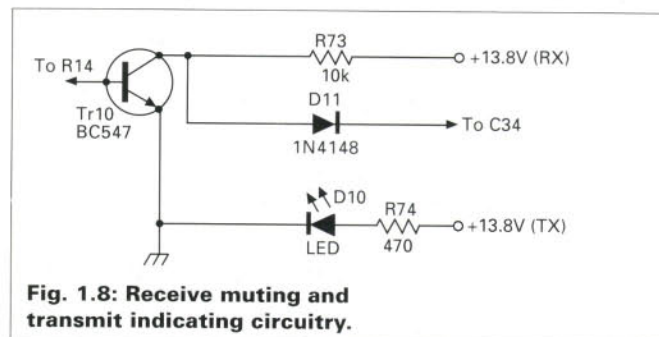
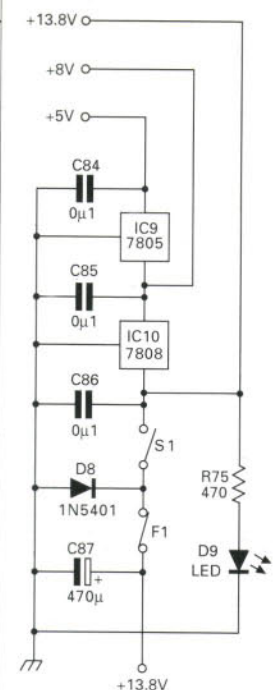


Fig. 1.8: Receive muting and transmit indicating circuitry.

Fig. 1.7: Stabilised power supply circuitry (see text).



supplied with d.c., directly from the on/off switch to avoid having to switch high currents through the relay.

As the p.a. stage is in class C, there's no current drawn until drive is applied. Tuning capacitors are provided on both the driver and p.a. boards.

The output from the p.a. stage passes to the antenna via a relay. This relay doubles up as a d.c. transmit/receive changeover, 13.8V from the on/off switch being applied to one half. I've also provided protection against reverse polarity and short circuits on the d.c. input.

That concludes the initial description of the

Martlet project. In Part 2 I'll describe the construction stage of the transceiver. I will also be providing a comprehensive shopping list, and of course, the PW PCB Service intends to have the p.c.b.s available. We'll soon have you 'up and running' on 70MHz!

PW



PW 2m Datacards Still Available

Did you miss December's issue, featuring our 2m Datacard?
If so, back issues are still available if you hurry.
No mobile operator would be without one!

Call
(01202) 659930
to order back issues
of December's PW
or any other month.

MARTIN LYNCH
G4HKS
THE AMATEUR RADIO EXCHANGE CENTRE
The 2m Datacard has been fully sponsored by Martin Lynch
G4HKS - The Amateur Radio Exchange Centre

NOW, TO WHET YOUR APPETITE, WE PRESENT SOME GOOD REASONS TO SEE YOU AT THE

Saturday March 11th
&
Sunday March 12th



LONDON AMATEUR RADIO & COMPUTER SHOW

Lee Valley Leisure Centre
Picketts Lock Lane
Edmonton, London N9

The Great Lowe Give-away!

That's right! We're giving away a free helical antenna (still in our price list at £7.95!) with every single purchase at Picketts Lock and we're also throwing in a multi-purpose universal handheld carry strap which we've previously sold for a fiver.

This offer valid only at Picketts Lock '95 while stocks last. Make sure you bring this coupon to qualify.
Only one voucher per transaction.

Coupon value 0.001p



Come and see the new FT-51R

DUAL-BAND FM HAND-HELD PAGING TRANSCEIVER

on the **YAESU** stand
RED HALL, STAND Q

WATERS & STANTON

BLUE HALL
STAND W

Got our latest catalogue?
Today even better prices!

Revex Yupiter MFJ ICOM Diamond
YAESU KENWOOD RSGB
Ten-Tec ADI Optoelectronics ALINCO
Hi-Mound Pro-Am Sagant Global Maspro
Microset Ramsey Adonis SONY Tonna
Index Laboratories Datong Mizuho

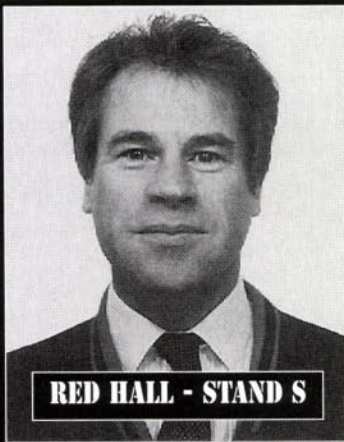
WOULD YOU BUY A RADIO FROM THIS MAN?

WE JOLLY WELL HOPE SO!

DENNIS AND THE REST OF THE
ICOM TEAM LOOK FORWARD
TO SEEING YOU AT:

**PICKETT'S LOCK
11~12th March
1995**

ICOM



RED HALL - STAND S

RadioSport Ltd accept no responsibility for the completeness, accuracy or availability of any offer presented on this page

Organised in co-operation with the Radio Society of Great Britain and Southgate Amateur Radio

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

WIN

**A FREE YAESU 2M HANDIE
WORTH £249**

Name & Callsign:

Address:

Daytime Tel. No.

MARTIN LYNCH
G4HKS
THE AMATEUR RADIO EXCHANGE CENTRE

Enter this Voucher
in person to the
**MARTIN LYNCH
STAND** at the show
on **Saturday or
Sunday**, and have a
chance to win a
new Yaesu 2m
handie worth **£249!!**

SMC

offer

a further £10 off

ON PRESENTATION OF THIS VOUCHER
AGAINST PURCHASES OF **£200 OR MORE**.
Valid until 31st March 1995.

Coupon value 0.001p
Only one voucher per transaction

NEVADA



£20

Voucher

Valid on any purchase (over £100 in value)
At the London Amateur Radio Show
Stand H - Red Hall

Coupon value 0.001p. Valid March 11th & 12th only
Only one voucher per transaction

Wireless

&

**short wave
magazine**

SPECIAL LONDON SHOW OFFER

ON PRODUCTION OF THIS COUPON
10% DISCOUNT OFF EVERYTHING
ON SALE ON OUR STAND
(RED HALL, BLOCK T)

NOT TO BE USED IN CONJUNCTION WITH ANY OTHER SPECIAL OFFER
Coupon value 0.0001p. Only one coupon per transaction

Your Guide to the London and Computer Show

BLUE HALL EXHIBITORS

AJP Communications	X
AKD	T
Aladdin Computers Ltd.	O
Alan Hooker	P
Arnold G C & Partners	R
Charles Covey	V
Computer Junk Shop	Y
Deecomm	F
Eastern Communications	P
Expo-Drills & Tools	K
Field Electronics	I
Haydon Communications	Z
Howes Communications	L
Kent R A	V
Keytronics	H
LCE Len Cooke Enterprises	Q
Loutronics	J
Mailtech	H
Mirage Designs	Q
P T V Electrical Services	N
Poole Logic	S
Proops	K
QRP Component Company	Z
R N Electronics	U
Radio Shack Ltd	G
Rowland A P	V
Silverthorn Radio Club	M
Strikalite	M
Suredata	M
Telford Electronics	M
Tennamast Scotland	U
Waters & Stanton	W
Wilson Valves	T
Woudstra M J	U

GREEN HALL EXHIBITORS

Algebra Computers	A
Bring & Buy	L
Discs Direct	L
Electrocomp	A
Emerald Business Systems	F
Fisher Products	A
GQRP Club	A
Henderson Computer Supply	B
Kanga Products	A
Keysolar Systems	A
No Nuts	L
Quill Marketing	F
R & D Electronics	A
Ripmax PLC	H
RSGB	G & K
S W Shareware	B
SGS	A
Southern Aerial Services	L
Squire V	B
Vector Computing	H
W E Software	M
Woodpecker	H

RED HALL EXHIBITORS

Agile Sales	P
AOR (UK) Ltd	X
Bill MacDonald	P
Bonex Ltd	C
Cheshunt & DARC	J
Coltec Electronics	O
Compelec	W
Display Electronics	L
Dosher J	P
Eagle Antenna Co	O
Garex Electronics	D
Ham Radio Products	W
Holderness R J	J
House of C D Rom	E
Icom (UK) Ltd	S
Linear Amp UK	G
Lowe Electronics Ltd	F
Martin Lynch	R
Nevada	H
Oasis Computer Systems	V
PW Publishing Ltd	T
Radio Research	P
RAYNET North London	W
Rich Electronics	K
Sandpiper	M
SEM	J
Semi Conductor Archives	L
Shacklog	P
Siskin Electronics	J
SMC	M
Syon Trading	B
Time Step Electronics	K
Trio Kenwood (UK) Ltd	N
UBM	A
Venus Electronics	U
Westlake W H	P
Yaesu (UK) Ltd	Q

SPECIAL INTEREST GROUPS

Air Training Corps	10/11
AMSAT UK	15-17
BARTG	5/6
Grafton ARS	9
Guide Dogs For The Blind	20-22
Hoddesdon Radio Club	8
RAOTA	24
Remote Imaging Group	1-3
RNARS	31/32
RSARS	12-14
Worked All Britain	7

Details correct at the time of going to press.

London Amateur Radio

London Show Lectures

Saturday March 11th

Lecture Instant Morse Lecturer Steve White G3ZVW

Sunday March 12th

Packet Radio Ruth Hull N0ULD,
Ken Baker KO0W
(a series of 4 lectures)

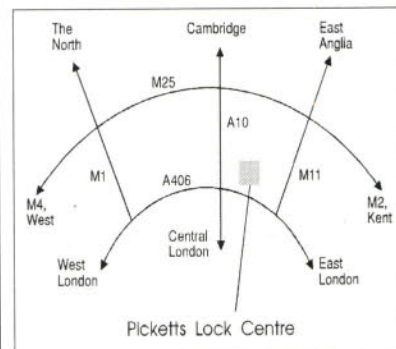
Both lectures start at 12 noon.



LONDON AMATEUR RADIO & COMPUTER SHOW

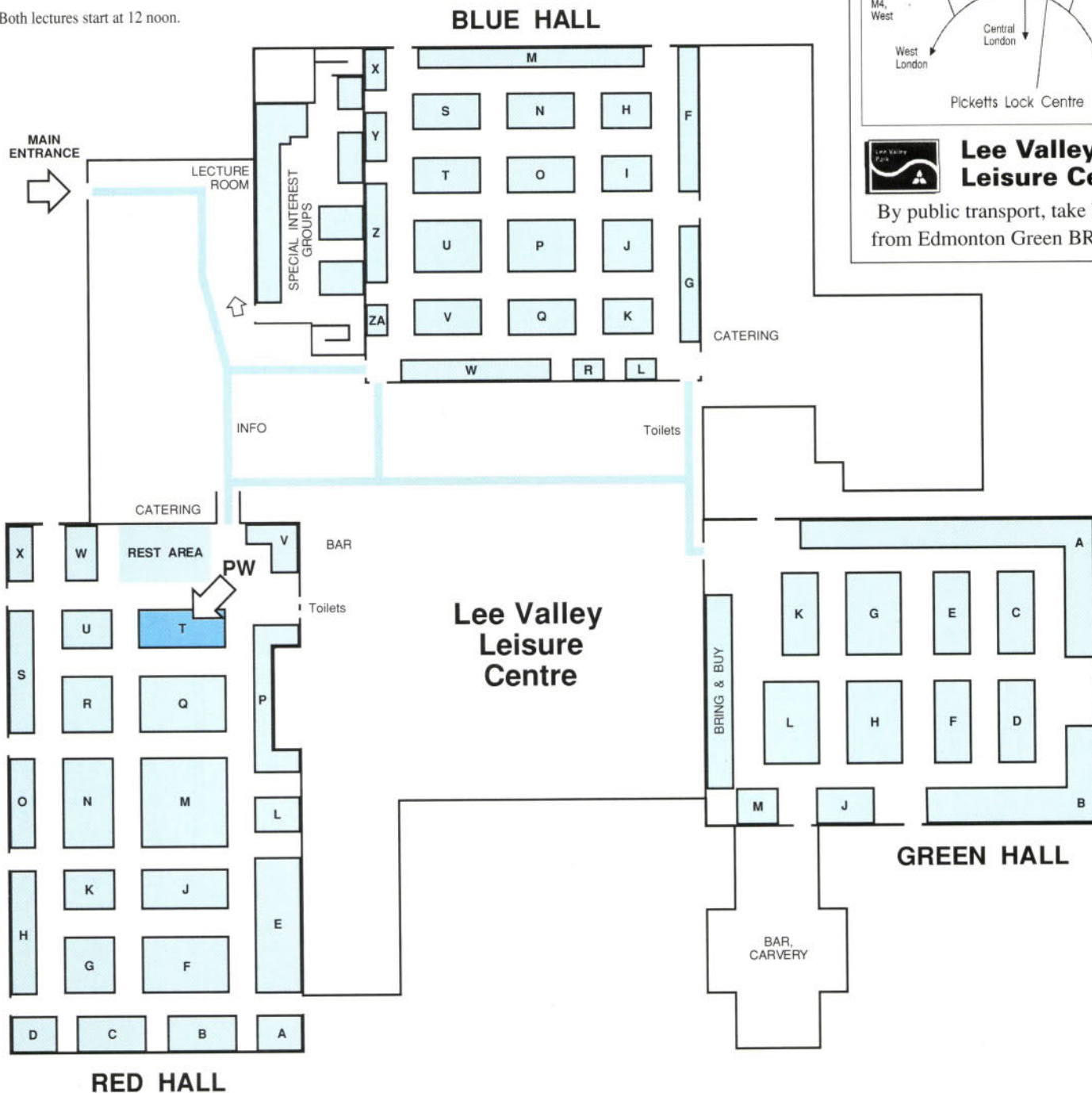
1995 Saturday March 11th
& Sunday March 12th 1995

THIS IS WHERE IT HAPPENS



Lee Valley Leisure Centre

By public transport, take bus W8
from Edmonton Green BR station.



LONDON SHOW

March 11 & 12
Lee Valley Leisure Centre

short wave ^{practical} wireless
magazine

**Satellite
Broadcasting
Guide 1994**
Normal Price
£17.95
SHOW OFFER
£6.00

**Ferrell's
Confidential
Frequency List**
Normal Price
£17.95
SHOW OFFER
£14.00

**The Red Hall
Stand T**

**Monitoring
Times**
is one of Americas'
leading listening
journals and
subscriptions are now
available in Britain.
Call at our stand for
more details

**Practical
Wireless
&
short wave
magazine**
*Call at the stand,
meet the
team and grab
a bargain!!*

**Satellite
Times**
is MT's sister
magazine and a
leading American
satellite journal.
British subscriptions
are now available.
- See us as the show


pw publishing ltd.

Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW
Telephone: (01202) 659910 Facsimile: (01202) 659950

Be Careful Using Your Whip

Having acquired a 144MHz hand-held mainly to use inside the house (the 'shack' being in the garage, and not too good for ageing bones), I thought that it would be a good idea to obtain a mobile magnetic mount. This was so I could use the 144MHz rig for occasional mobile use.

Rummaging through the inevitable old bits and pieces that all radio amateurs acquire, I found something suitable. It was an old CB magnetic mount plus a small base loading coil and a nice bit of flexible whip. If I remember correctly, this was acquired at a car boot sale for 20p!

The mechanical stability of the whole assembly was centred around the coil and base assembly. So, I decided in the first instance to short out the coil and use a piece of metal coat hanger to extend the length up to 483mm to make a 1/4 wave whip.

After carrying out the work to short out the coil, it was off for an upstairs search to find a coat hanger. Once I had found a suitable hanger I cut it to the right length before placing the new 'element' into the top of the coil. And of course I was expecting a very good s.w.r.

Ground Plane

The car was in the garage so, I didn't do the old trick of trying to resonate a mobile 1/4 wave without a proper ground plane. Well, if 5:1 is a good s.w.r. (it's not), then there you have it!

I then took off the shorted coil and substituted it with just a 19in length of coat hanger, (who cares if all the clothes are now on the floor!). I put the hanger in the base part, and was expecting a very reasonable s.w.r. and I didn't believe it when I got 5:1 again.

At this point I thought I'd found the answer and that the coaxial and/or PL259 was shorting. However, on checking with my meter,

discovered no shorts, so it was back to scratching the head and this time think for a bit longer.

Hidden Secret

The coil was not very big and was meant to resonate the whip on 27MHz and it had a hidden secret. I carefully took the whole thing to bits and found nothing there. However, when I looked more closely I did find it, very neatly hidden beneath the coaxial, a little black beast.

The hidden component was cleverly concealed. It was nicely sleeved in heat shrink sleeving, so that elderly short sighted radio amateurs, who are too mean to go out and buy a proper antenna, can't see it!

The source of the problem was a tubular capacitor, Fig. 1. I clipped it out, shorted out the coil with aluminium foil and managed a successful s.w.r. of 1:1.

The 1/4 wave whip certainly works as is to be expected. When using it, I find it's quite possible to work around the area and into my local repeater GB3PO 14 miles away using less than 500mW.

PW

RADIO ON The move

Jeff Harris G3LWM gets down to 'basic' construction and whips up a budget mobile antenna.

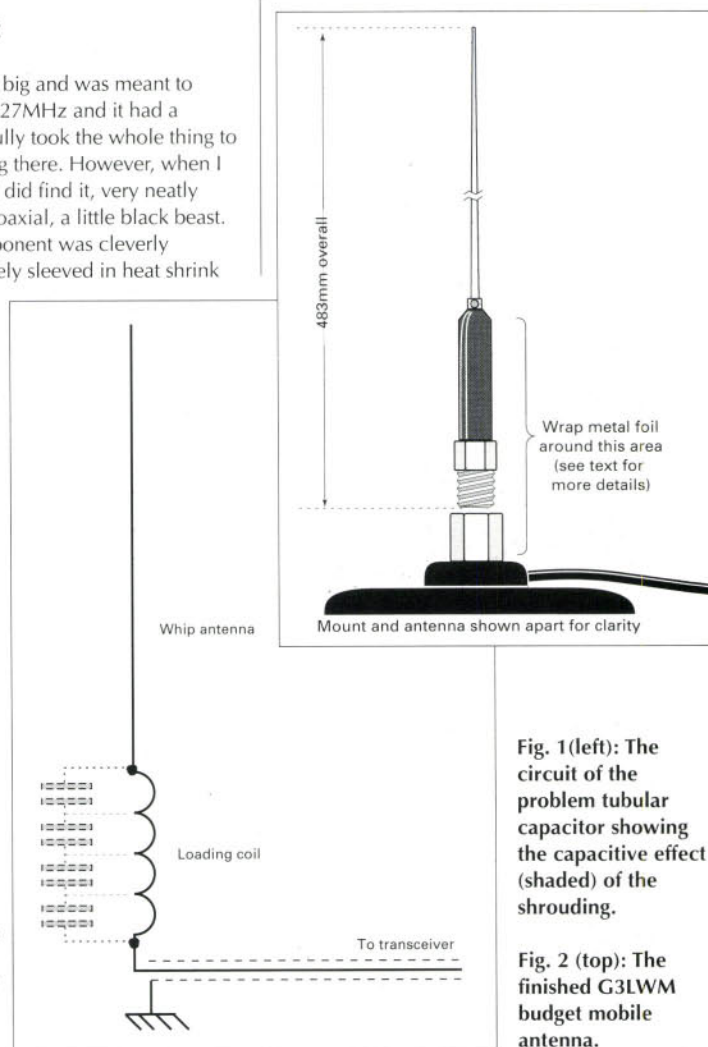


Fig. 1 (left): The circuit of the problem tubular capacitor showing the capacitive effect (shaded) of the shrouding.

Fig. 2 (top): The finished G3LWM budget mobile antenna.

FACT. NOT FICTION.

The ABC allows professional buyers and sellers of advertising space in national and regional newspapers and consumer magazines to buy and sell better. It does so by providing an independent, authoritative circulation audit that is the single most obvious indicator of a magazine's self esteem and a publisher's confidence in his title.

ABC
AUDIT BUREAU OF CIRCULATIONS

An ABC certificate is your guarantee of integrity. So, if your next schedule includes titles that aren't audited - ask why. For details of ABC's activities relating to the consumer press and the benefits of ABC membership contact Anthony Peacham, Consumer Press Manager, on 0442 870800.

Audit Bureau of Circulations Ltd., Black Prince Yard, 207-209 High Street, Bankhamstead, Herts., HP41 4AD. Tel: 0442 870800 Fax: 0442 877408

AFFORDABLE PACKET

COMMODORE 64/128...ATARI ST...IBM COMPATIBLE PC...SPECTRUM

It is now possible to use the above computers to run Packet Radio with an outlay of much less than £100!!

Commodore, PC and Spectrum systems allow HF and VHF working, while the Atari system only offers VHF. PMS facilities are available on the Commodore, and the Spectrum if a microdrive is fitted. Digipeating facilities are offered on all versions. The Spectrum modem can also be supplied with a centronics printer port. We supply a fully tested modem, with a free copy of suitable software.

Commodore 64, Atari ST and PC Modems£55.00
Baycom Agency

Spectrum Modem£75.00
Spectrum Modem with printer port£85.00

S.A.E. for details.

£4.50 Post & Packing

J.&P. ELECTRONICS LTD.



Unit 45, Meadowmill Estate, Dixon Street,
Kidderminster DY10 1HH Tel: (01562) 753893





**LOWEST
PRICES**

MAIL ORDER

**LOWEST
PRICES**

KENWOOD

HF Transceivers

TS-950SDX HF Transceiver with auto ATU, DSP, 150W	P.O.A.	E
TS-850SAT HF Transceiver with auto ATU	P.O.A.	D
TS-850S HF Transceiver without ATU	P.O.A.	D
TS-450SAT HF Transceiver with auto ATU	P.O.A.	D
TS-450S HF Transceiver without ATU	P.O.A.	D
TS-690S HF Transceiver with 6 metres (50W)	P.O.A.	D
TS-50S HF Mobile Transceiver, 100W	P.O.A.	D

HF Receivers

R-5000 HF High Performance Communications Receiver	P.O.A.	D
DCK-2 DC Kit for R-5000	P.O.A.	
VC-20 VHF Converter for R5000	P.O.A.	
VS-1 Speech Synthesizer for R5000	P.O.A.	

VHF/UHF Transceivers

TS-790E All Mode Triband Base Station, 2m/70cm fitted, 23cm option	P.O.A.	D
TM-255E All Mode 2m Mobile Transceiver, detachable front panel, 40W	P.O.A.	D
TM-455E All Mode 70cm Mobile Transceiver, detachable front panel, 35W	P.O.A.	D
TM-251E 2M FM Compact Mobile Transceiver, 70cm Receiver, Packet connector, 50W	P.O.A.	D
TM-451E 70cm FM Compact Mobile Transceiver, 2M Receiver, Packet connector, 35W	P.O.A.	D
TM-551E 23cm FM Compact Mobile Transceiver, 70cm Receiver, Packet connector, 10W	P.O.A.	D
TM-733E 2m/70cm FM Compact Dual Band Mobile Transceiver, dual receiver	P.O.A.	D
TM-742E FM Tri-Band Mobile 2m/70cm fitted, 10m/6m/23cm options	P.O.A.	D

VHF/UHF Hand Portable Transceivers

TH-28E 2m FM Hand Portable Transceiver with PB-13 Battery	P.O.A.	C
TH-48E 70cm FM Hand Portable Transceiver with PB-13 Battery	P.O.A.	C
TH-79E 2m/70cm Dual Band FM Hand Portable with PB-32 Battery	P.O.A.	C
TH-22E 2m FM Hand Portable, 5W output with 9.6V Nicad	P.O.A.	C
TH-42E 70cm FM Hand Portable, 5W output with 9.6V Nicad	P.O.A.	C

SECOND-HAND EQUIPMENT

Standard C78 70cms FM portable/mobile, c/w matching 10w linear	£218.00
Yaesu FT-23R 2m handheld c/w aerial & nicad	£158.00
Icom IC-251E 2m multimode base station	£515.00
Welz CH20A 2 way high quality coax switch	£20.00
Jil SX-200N base/mobile scanner	£122.00
Shure 444D desk mic. (Superb base mic)	£70.00
Astron 35A 12v power supply	£80.00

* Carriage free on all orders over £100. Please add £5 post and packing to orders under £100.

* 3 months warranty on all second-hand goods.

YAESU

FT-1000 200W HF All Mode Transceiver Built-in Automatic Antenna Tuner w/MH-1B8 Hand-held Microphone	P.O.A.	E
FT-990 100W HF All Mode Transceiver (AC) Built-in Automatic Antenna Tuner w/AC Power Supply w/MH-1B8 Hand-held Microphone	P.O.A.	E
FT-900 100W Compact HF Mobile Transceiver C/W Detachable Front Panel + Microphone	P.O.A.	D
FT-900AT As above with Built-In ATU	P.O.A.	D
FT-890AT 100W Compact HF All Mode Transceiver Built-in Automatic Antenna Tuner w/MH-1B8 Hand-held Microphone	P.O.A.	D
FT-840 100W Compact HF All Mode Transceiver w/MH-1B8 Hand-held Microphone *FM Unit Optional	P.O.A.	D
FT-290RII 144MHz 2.5W All Mode Transceiver w/FBA-8 Battery Case for 9 x "C" cells w/MH-10E8 Hand Microphone w/YHA-6 Telescopic Loaded Whip Antenna w/FTE-2 1750Hz Tone Burst Oscillator	P.O.A.	D
FT-2200 2m FM 50W Mobile C/W Hand Microphone, Mobile Mount + DTMF	P.O.A.	D
FT-7200 70cm FM 35W Mobile, Accs. as FT-2200	P.O.A.	D
FT-2500M 2m FM 50W Mobile C/W Hand Microphone + Mobile Mount	P.O.A.	D
FT-5100 2m 50W/70cm 35W Mobile, C/W Hand Microphone, Mobile Mount, DTMF and Built-In Duplexer	P.O.A.	D
FT-5200 2m 50W/70cm 35W Mobile, C/W Hand Microphone, Mobile Mount, Built-In Duplexer, Detachable Front Panel	P.O.A.	D
FT-736R 2m/70cm All Mode Transceiver, C/W Hand Microphone, 6m and 23cm Modules Optional	P.O.A.	D
FT-11R 2m Handheld C/W FNB-31, Nicad, NC-55 Charger and Belt Clip, Built-In DTMF Pager	P.O.A.	C
FT-41R 70cm handheld, Accs as above	P.O.A.	C
NEW FT-51R 2m/70cm handheld, C/W FNB-31, NC-55 Charger and Belt Clip, Spectrum Scope, DTMF and Message Paging and much more	P.O.A.	C
FRG-100 50kHz-30 MHz Communications Receiver (DC) w/o AC adaptor	P.O.A.	D

SGC SG-230

SMARTUNER HF ANTENNA COUPLER, SSB, AM, CW & DATA, FAST - INTELLIGENT - ACCURATE, OPERATES WITH ANY HF TRANSCEIVER

The Smartuner high technology coupler intelligently tunes any length antenna (8 to 80ft) in the HF band. The unit will operate with any HF transceiver within its specifications. The Smartuner switches 64 input and 32 output capacitance combinations plus 256 inductance combinations in a "pi" network resulting in over a half million different ways to ensure a perfect match for the transceiver; and, it remembers the frequency and the tuning values and will re-select these values in less than 10 ms next time you transmit on that frequency.

- MICROPROCESSOR CONTROLLED
- NON-VOLATILE MEMORY
- WATERPROOF
- B.I.T.E. INDICATOR
- 1.8 TO 30MHz RANGE
- 10 TO 150W INPUT POWER
- 10ms RETUNING TIME
- 8 TO 80ft ANTENNA (ALL Types)
- FOR MARINE, AVIATION, HAM AND PARA-MILITARY APPLICATIONS

ICOM

HF TRANSCEIVERS

IC-781 HF All Band, General Coverage Receiver, Built-in ATU and PSU, Spectrum Scope	P.O.A.	E
IC-765 HF All Band, General Coverage Receiver, Built-in ATU and PSU	P.O.A.	E
IC-728 HF All Band, General Coverage Rx, 12v	P.O.A.	D
IC-707 HF All Band, General Coverage Rx, 12v	P.O.A.	D
IC-738 HF All Band, General Coverage Receiver, built-in Auto ATU, 12V.	P.O.A.	E
IC-736 HF/6M All Band General Coverage Receiver, built-in Auto ATU and power supply.	P.O.A.	E

144MHz

IC-2SRE 2M FM Hand Portable + Wideband Receiver	P.O.A.	D
IC-2GXE 2M FM Hand Portable incl Nicad/Charger	P.O.A.	D
IC-2GXET 2m FM Hand Portable incl Nicad/Charger	P.O.A.	D
IC-T21E 2m FM Hand Portable incl Nicad/Charger	P.O.A.	D
IC-275H 2m Transceiver, SSB/FM/CW, 100W 12v	P.O.A.	D
IC-281H 2m FM mobile, 50W 84 memo 12V	P.O.A.	D

430MHz

IC-T41E 70cm FM Hand Portable incl Nicad/Charger	P.O.A.	D
IC-4SRE 70cm FM Hand Portable + Wideband Rx.	P.O.A.	D
IC-4GXE 70cm FM Hand Portable incl Nicad/Charger	P.O.A.	D
IC-4GXET 70cm FM Hand Portable incl Nicad/Charger	P.O.A.	D
IC-481H 70cm FM Mobile, 35W, 2840 Memo, 12v	P.O.A.	D
IC-475H 70cm Transceiver, SSB/FM/CW, 75W, 12v	P.O.A.	D

DUAL-BAND

IC-W21E 2m/70cm FM Hand Portable incl Nicad/Charger	P.O.A.	D
IC-W21ET 2m/70cm FM Hand Portable incl Nicad/Charger	P.O.A.	D
IC-X21ET 70/23cm FM Handportable incl Nicad/Charger	P.O.A.	D
IC-2700H 2m/70cm FM mobile 50W/35W 120 memo 12V	P.O.A.	D
IC-820H 2M/70cm all mode Transceiver 45W/35W 12V	P.O.A.	D
IC-2340H 2M/70cm FM mobile 45/35W 100 memo 12V	P.O.A.	D

RECEIVERS

IC-R9000 100 kHz - 2 GHz Receiver. CRT Display	P.O.A.	E
IC-R7100 25 - 2000 MHz Receiver	P.O.A.	D
IC-R100 Wideband Receiver	P.O.A.	D
IC-R72E General Coverage Receiver with Stand By Battery	P.O.A.	D
IC-R71E General Coverage Receiver	P.O.A.	D
IC-R1 Handportable Receiver	P.O.A.	C

MULTIBAND

IIC-Δ1E 2m/70cm/23cm FM Handportable incl Nicad/Charger	P.O.A.	C
---	--------	---



£370.00
carr £12.00

Special Offers subject to availability Carriage B=5.00 C=£7.50 D=12.50 E=16.50

AUTHORISED AGENTS FOR KENWOOD, ICOM, YAESU & ALINCO. FULL SERVICE FACILITIES AVAILABLE

SPEND UP TO £1,200 INSTANTLY WITH A PHOTO ACOUSTICS LTD. CREDIT CHARGE CARD

PART EXCHANGE WELCOME, ASK FOR KERRY G6IZF OR ANDY G4YOW

RETAIL SHOWROOM OPEN MONDAY - FRIDAY 9.30 - 5.30, Saturday 9.30 - 4.30

Goods normally despatched within 24 hours. Please allow 7 banking days for cheque clearance. Prices correct at time of going to press - E&OE



Three Canes In A Mounting

RADIO ON The move

Brian Shersby G0ISL, shows you how to make an antenna for 1.8MHz, using three canes and a short whip section. It could bring you luck in the form of DX!

There has been a resurgence of interest in 1.8MHz a.m. operation in recent years, particularly with the PW Chatterbox a few years ago, and now with the PW Top Band Tourer in July 1994's issue of PW.

And since I obtained my 'A' licence eight years ago, I have also had great fun with 'Top Band' a.m.

You can join the fun on 1.8MHz a.m. if you can string up some 30m or so of wire, end-fed antenna. With a simple antenna matching unit you shouldn't have much difficulty in putting out a good signal.

Even if you haven't got a good receiver, almost any Japanese medium wave portable can be pressed into service by carefully unscrewing the core of the local oscillator coil, so that top band is covered.

However, the difficulty with this band, is in going mobile or portable. This is because you need to have a fair amount of metal in the air to get anywhere.

For quite a few years, my wife and I and our two children have been enjoying motor cruising holidays on the Norfolk Broads and I like to have some radio gear with me, especially for the 1.8MHz band.

The difficulties I've faced have always been with the antenna. But this antenna idea helped me get over the problems and on the air.

Bamboo Canes

In the past I have had moderate success using a number of bamboo garden canes. These were tied, in unlikely places, to support about 10m of 24 gauge enamelled wire about four metres above the deck. However, this causes problems when negotiating low bridges.

So, after a little lateral thought I have now a more elegant solution, using a vertical helically wound antenna. This can quickly and easily be lowered for negotiating those low bridges found on canals and rivers.

The antenna consists of three six foot bamboo canes, wound with a total of approximately 26m of 24 gauge enamelled copper wire. The length is not too critical - I used a winding pitch of about 12mm. The exact length of wire depends on the thickness of the bamboo poles used.

The poles were joined together, fishing rod style, using ferrules made from lengths (about 150mm) of suitable copper, or aluminium tube.

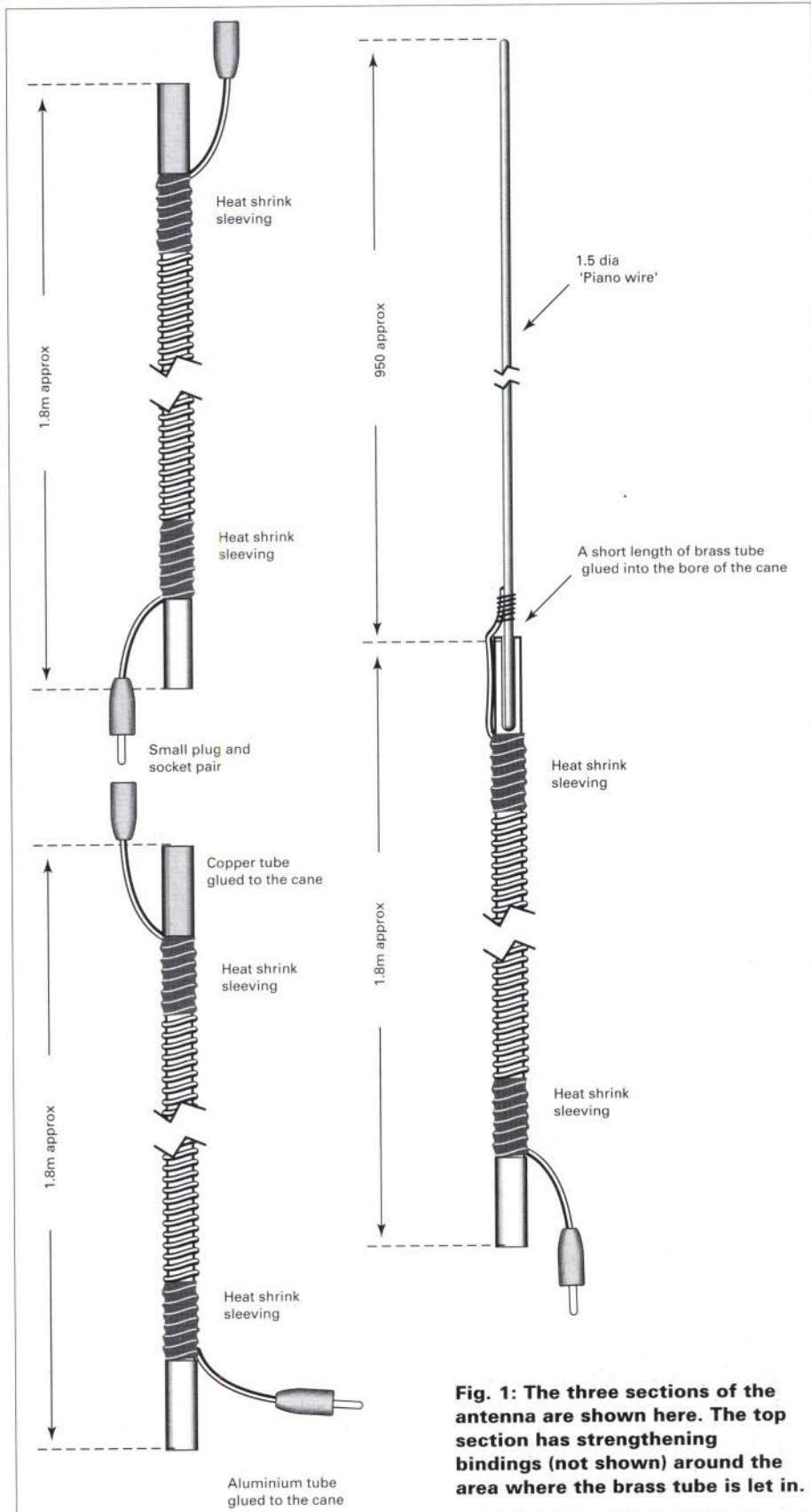


Fig. 1: The three sections of the antenna are shown here. The top section has strengthening bindings (not shown) around the area where the brass tube is let in.

I also fixed a one metre length of 16 gauge piano wire on the top section, both to add to the height of the antenna and to act as a capacity hat.

For simplicity, I used flexible wire with small plugs and sockets to connect the wire between the bamboo sections. See **Fig. 1** for more details. I used a standard aluminium clamp to mount the antenna, that was screwed to a small block of wood.

The block of wood was in turn, fixed, using coach bolts, to a 500mm square of plywood. This plywood plate with rubber cushion feet, can be attached to the roof of the boat using elasticated hooks to the grab rail on each side of the roof. The plate is shown in **Fig. 2**.

The clamp section I made easily separable from the plywood base, since when we pack to go away on holiday, space is at a premium in our car. A large sheet of plywood takes up virtually no space when the clamp is not attached.

Marine Mobile

As I write this, I haven't had the opportunity to try out the antenna on a boat (marine mobile), but I have tried it on my car in the driveway, with some very pleasing results. Using a home-brew 3W transmitter, I received a 5 and 9 report from G4RGN in Ashford, only about 15

miles as the crow flies, but with a lot of hills between.

For the sake of appearance as well as ease of winding the antenna sections, I filed down the knobs on the bamboo, using a coarse file. If the bamboo is not perfectly straight, it can be heated and corrected when hot.

When it comes to winding the wire onto the cane, anchor one end about 100mm from the end of the cane with insulating tape, and wind the wire as tightly as possible. I find the best way is to rotate the cane.

But have a piece of insulating tape at the ready to anchor the wire if you have to stop winding for any reason. My experience is that everyone waits until I begin this kind of operation before they ring my doorbell or telephone.

Should you be disturbed, if you let the wire go without anchoring it, it will just spring loose and then you will have to begin all over again.

Fig. 3: (Far Left) The centre joints of the antenna.

Fig. 4: (Left) The top joint of the antenna.

Fig. 5: (Below) The base of the author's antenna.

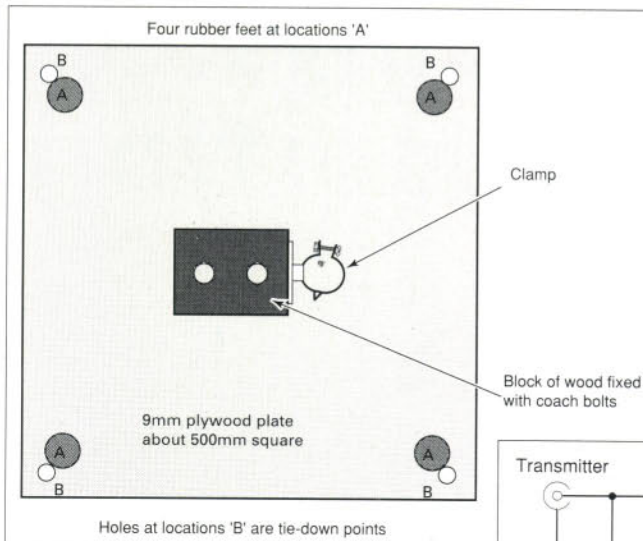
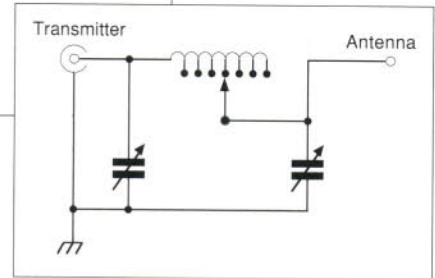


Fig. 2: The layout of the baseboard follows this general form. Compare this with the photograph of Fig. 5.

Fig. 5: Suggested antenna tuner unit.



Soldered Tails

Next I soldered tails of flexible wire to the windings at each end of the cane and anchored them securely using heat shrink sleeving. I also coated the cane and the wire with polyurethane varnish to stop the wire moving as well as give some protection from the elements.

Then I fixed 150mm lengths of 5/8in copper tubing to the top of two of the canes using tape and epoxy glue. The next stage meant carefully sanding the bottom of each cane to fit into the pipe.

Fortunately I found I could get a reasonable push fit after varnishing. I used a piece of thin brass tube glued, with epoxy resin glue into the bore of the bamboo, to take the 16 gauge wire on the top of the section. This section of the bamboo should have wire wrapped around it and soldered. This will give it more strength.

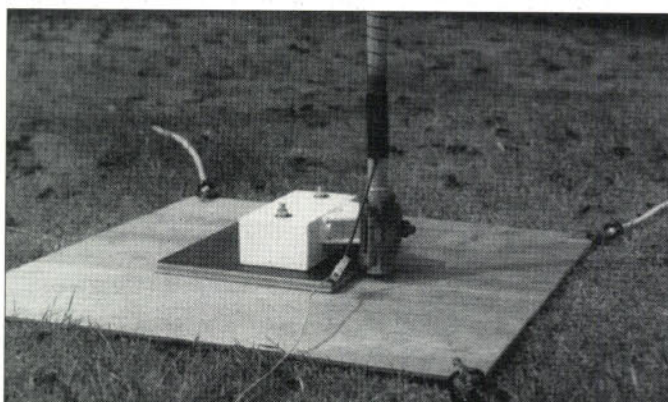
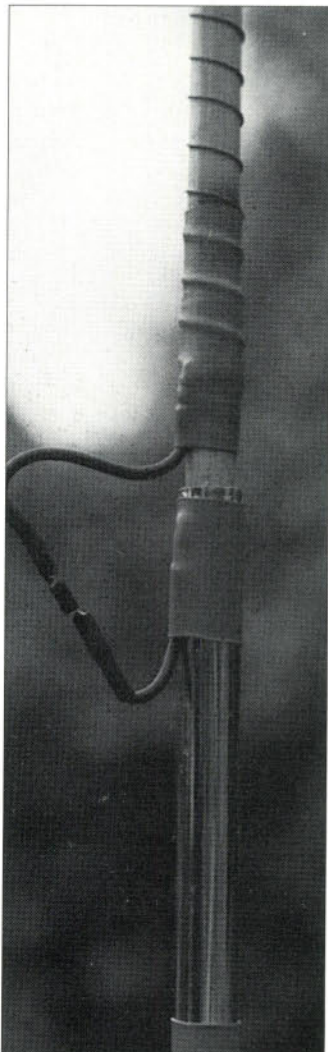
On air I feed the antenna from my transmitter using a small Pi-match tuning unit. This is fitted with a tapped coil and small receiving type polycon variable capacitors. I found that anything from 200-500pF should work satisfactorily.

The circuit of my a.t.u. is shown in **Fig. 5**. I use a field strength meter, and tune for maximum radiated signal.

The necessary earth connection won't actually be earth of course. On the boat I use the negative connection of the electrical system, which will be bonded to the majority of the large metal objects, such as the engine, in the boat anyway. And on the car, the earth connection goes to the bodywork.

The method of mounting the antenna seems surprisingly stable, I put it up on the car in quite a high wind without any problems. But don't try driving the car with this six-and-a-bit metre antenna attached!

PW



Push Start

It's an r.f. amplifier and docking system, in the shape of the NBC-50R, as supplied by Nevada Communications.



The term 'Mobile' conjures up a whole array of visions to the radio amateur. Nowadays it can be anything from a bicycle to vehicles looking like porcupines with antennas sprouting from numerous brackets and ill-fitting holes!

I've also no doubt you've seen some 'mobiles' holding some form of microphone, the spiral cable of which is wound several times around the steering column. Or perhaps what appears to be a driverless car, where the driver is actually ferreting around the floor to retrieve the wandering hand-held transceiver!

Most radio amateurs at one time or another venture into mobile operating. This can be h.f. or v.h.f./u.h.f. But, for this article I'm concentrating on v.h.f./u.h.f. mobile operation.

Many Suppliers

There are many amateur radio suppliers. They can provide the amateur with a wide range of accessories, mounts and antennas.

Looking at the glossy catalogues and publicity on mobile equipment can be confusing. So, to help you get mobile, I've had chance to test a reasonable selection of goodies for mobile use.

Mounting equipment within the vehicle can often be a very involved job task. So, I'll look at installing the standard mobile rig in another article. This time I shall concentrate on the hand-held transceiver and other equipment in the car and suggest some ideas for better safety.

Versatile Mount

To keep the small rig safe in your car, the JIM CH-A4 manufactured by Solid State Electronics of Southampton, is a versatile mount. It's useful for either a hand-held or scanner and can be slotted down the inside of the driver's window.

Placed inside the car window, you can hang your hand-held or scanner on the Jim CH-A4 against the driver's door and within easy reach. Or, with the aid of the separate plate supplied, fasten it to the dashboard or fascia.

Fastened to the driver's door I found the JIM CH-A4 very acceptable, as my headset was not dragging all over the place. The mount is very neat, well made and reasonably priced at £7.95, and is available from Nevada Communications.

Next, I tried another mount - the Multi Flex Handie Holder, from Southern Scanning and Shortwave. I used it with the removable rig cradle which is supplied as an optional extra.

The Multi Flex Handie Holder is a very heavy duty stand-off mount, made in plastics material. It has knuckle, elbow and swivel joints, making it a really useful piece of equipment.

The mount can be fixed to any position, it's handy not just in the car, but could also be useful in the shack. By utilising the various joints to the best advantage, your hand-held is secured firmly exactly where it's needed.

If, like myself, you wish to leave the belt clip in place, then the Spring Loaded Rig Cradle can be purchased as an extra. This in turn is mounted on the back plate with the aid of four screws supplied.

Your, hand-held or scanner can then simply be held in position by the cradle and the rig is firmly held by the rubber lined side grips. Removal couldn't be simpler - press a button and the rubber-lined side grips instantly release from holding the rig in place.

The Multi Flex Handie Holder itself is priced at £13.95 and the Spring Loaded Rig Cradle also at £13.95. Both units are available from Southern Scanning and Shortwave.

Mounting And Boosting

One method of mounting a hand-held and boosting the r.f. output power can be obtained with the aid of the NBC-50R. It's an r.f. amplifier and docking system, manufactured by Nietzsche Enterprise Company Ltd., and supplied by Nevada Communications.

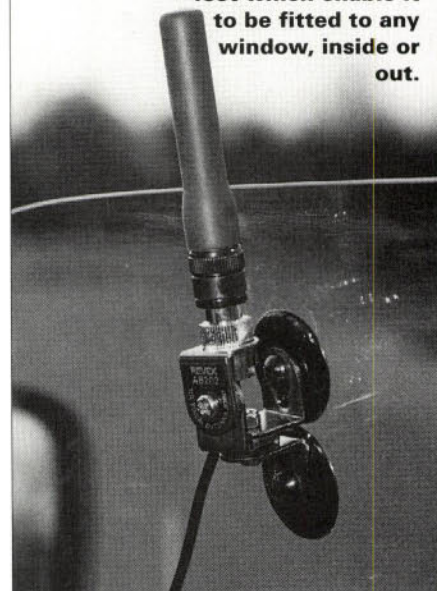
The NBC-50R allows a variety of hand-held transceivers to be mounted directly onto the unit. Your vehicle's 12V d.c. power is then taken through the base of the hand-held. This is done via a set of interchangeable base plates, each having different battery contacts, to match the make of hand-held being used.

RADIO

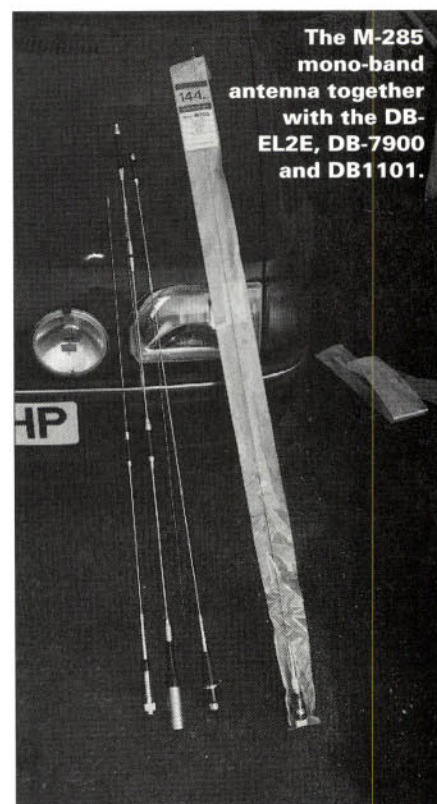
ON The move

John Goodall GOSKR is a keen mobile operator and he's provided a series of mini reviews to give you a helpful 'push start' to get you going with mobile amateur radio.

The AB202 antenna joint uses suction feet which enable it to be fitted to any window, inside or out.



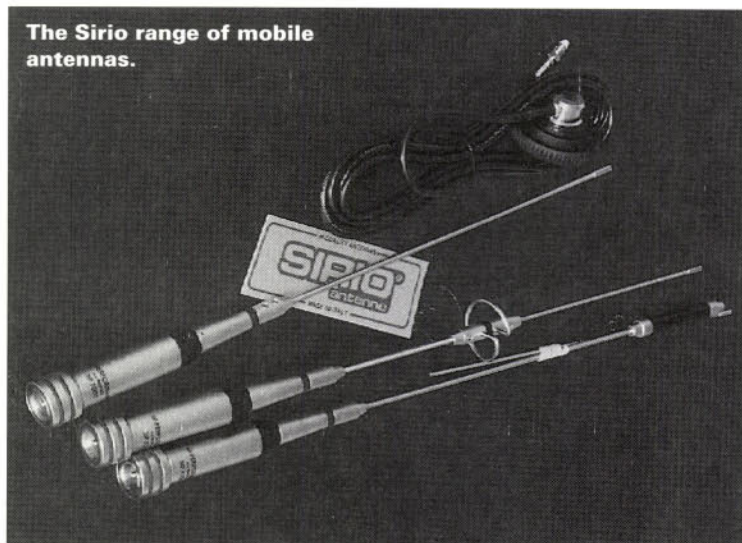
The M-285 mono-band antenna together with the DB-EL2E, DB-7900 and DB1101.





The very neat, well made and reasonably priced JIM CH-A4 mount.

The Sirio range of mobile antennas.



The NBC-50R Docking System, depending upon individual hand-held output power, will deliver up to 50W to the antenna. However, the power supply, from the vehicle or shack p.s.u., must be disconnected before attaching the hand-held to the unit. This prevents any possible short circuits and possible damage to the unit or hand-held, or both.

The NBC-50R is available for £99.95. I'm certain that it's very good value for money for both base and mobile use.

Also aimed at mobile use (but it could be equally used in the shack) from the same manufacturers is the **NB-30W**. This model was supplied by **Haydon Communications**.

The NB-30W is a linear amplifier giving up to 35W output to the antenna. This is dependent on the input power from the hand-held or mobile rig. It's small, measuring 125 x 60 x 45mm in depth, but packs a tidy punch from the output of a hand-held. The NB-30W is available for £44.95.

Hands Free

While still looking at equipment for mobile operation inside the car, I've taken a rather close look at a selection of 'Hands free' equipment. This is a change from the all-too-common 'Hands-off-the-wheel' approach!

We all know it's not safe to operate the hand-held microphone of a transceiver while driving. So, let's show everyone radio amateurs are a responsible breed when operating a transceiver when mobile.

The following items designed to aid 'Hands Free' operating are all from Revex and were supplied by **Nevada Communications**. They're compact but versatile, and are ideal accessories for operating the modern hand-held while driving.

Top of the range is the **Revex FM50** for £49.95. This is a complete headset with boom microphone and locking push to talk (p.t.t.) switch.

The FM50 unit is extremely light in weight and the connecting cables are made from miniature microphone screened lead. It can be firmly fixed to a separate clamp which in turn can be clamped around the gear lever or any other convenient place. (If you have a

Kenwood hand-held you should order the Revex FM 50K).

Next, again priced at £49.95, is the Revex FM80. This is a 'Hands Free' microphone with a lockable p.t.t. The boom microphone is attached to a spring clip, which, for easy use, can be attached to the sun visor. Kenwood users should ask for the Revex FM80K.

The Revex EM700-H at £39.95 is the next little item. This is an earpiece/microphone, again with lockable p.t.t. and has a small earpiece, similar to those on many personal stereos. It fits neatly inside the ear, and has a tiny (but sensitive) electret microphone on the end of a very neat 40mm long fixed boom.

Audio reproduction from the microphone is extremely good and I found this unit to be ideal. Again, for Kenwood users Revex have a separate model, the Revex EM700-KH also at £39.95.

Whilst still with the Revex range from Nevada, I must mention the EP300. This is a very sensible earpiece and fits snugly over the whole ear with the earpiece itself close inside the ear. It's supplied with a 3.5mm mono jack plug, suitable for most makes. The EP300 is priced at £13.95 and I have owned and used one for several years.

Antennas And Mounts

Now I'd like to look at antennas and antenna mounts. Firstly though, I've a couple of items within this category, which can be used **inside** the vehicle. Both have been manufactured for the hand-held user, and can be obtained from **Southern Scanning and Shortwave**.

The first unit is from the American company Pro-Am, and it's a window mount kit. This consists of almost two metres of RG58U coaxial cable terminated in a BNC plug.

There's also a clip-over bracket with a BNC socket attached. The bracket clips over any wind-up window, with the BNC socket on the outside for attaching the hand-held's rubber antenna or similar. It's available at £13.95 and I think it's very useful for the Novice Operator.

The second item is a more sophisticated antenna mount and cable harness. The AB202 Suctorial Antenna Joint (that's what it says on the packing!), is a compact mount with 2.5

metres of RG188A thin coaxial cable attached, terminating in a BNC plug.

The mount has two swivels and two black plastics suckers for attaching to **any** window, **inside or out**, mobile or in the home. It features a slot into which the flexible rubber antenna of the hand-held can be firmly kept in place. For those of us with limited funds it's priced at a sensible £11.95.

On to mounts now and at the very top of the price range of the mounts I tested, is the Diamond K400M, what I think could be the 'Rolls Royce' of antenna mounts/cable harness. I found it to be very versatile for mounting safely in many positions on my five door Ford Escort.

Directly fastened to the SO239 of the Diamond K400M was 370mm of RG188A (thin 50Ω coaxial cable). This in turn was (very professionally) connected to five metres of high quality low loss .5DSFA coaxial cable, terminated in a standard PL259 with gold plated centre pin.

The mount itself can be fixed to any hatch, boot or even a gutter if your vehicle has one. The K400M was certainly an impressive and quality mount/harness, easy to fit and costs £69.95.

From the same manufacturer I then tried the K10M at £49.95. This was again a mount/cable harness, but with the mount being solely gutter fitting. Finally from Diamond, there's also the DP-SPM magnetic mount/cable harness.

Safety Tests

As safety is of the utmost importance I carried out some tests on a disused airfield in the Midlands. I first mounted the Diamond NR-770S then the Diamond M285, on the DP-SPM magnetic mount/cable harness.

I tested each mount in turn at speeds up to (and well in excess of) the legal speed limit. I was very impressed to say the least with the results. Even with a strong cross wind the mount remained firmly centrally placed on the roof of the vehicle.

The Diamond NR-770S, is a dual-band, 144/430MHz antenna, 430mm in length. The price for this antenna is £32.95.

The Diamond M285 is a 144MHz monoband antenna. It's 1340mm in length

giving 5/8 wave and priced at £19.95. Incidentally, all the Diamond equipment was kindly loaned by **Waters and Stanton Electronics**.

Next, from the Taiwan Serene Company's (supplied by **Southern Scanning and Shortwave**) range, I tested several items. These included a budget priced universal hatch/boot mount, the TSA-5005, and separate cable harness, the TSA-5311, along with a couple of antennas.

The TSA-5005 at £16.95 is excellent value for money, as is the TSA-5311 also at £16.95. Incidentally, the TSA-5005 is made entirely of stainless steel and is almost identical to the Diamond K400M.

The TSA-5311 cable harness, is again similar to that of the Diamond K400M. It has 370mm of RG188A cable into four metres of 3.5D - FV low loss cable. This terminates in a standard PL259 plug which also has a gold plated centre pin.

I also tried two antennas from Taiwan Serene, and both were dual band models. The first was the TSM-1316 model, which is a 144/430MHz antenna, 445mm in length, a 1/4 wave on 144MHz and 5/8 wave on 430MHz.

The other model was the TSM-1309, 144/430MHz antenna, 930mm in length and providing 1/2 wave on 144 and 2 x 1/2 waves on 430MHz. The TSM-1316 costs £21.95 and the TSM 1309 is available for £29.95. Both antennas are in matt black making a welcome change from the usual shiny stainless steel.

I also had three mobile antennas to try out from **Haydon Communications**. They supplied the DB-EL2E, a mono-band 144MHz antenna, a 1700mm long 1/2 wave x 2 collinear.

The DB-EL2E is a very impressive antenna but is extremely heavy and needs a firmly fixed mount. I used it on the Taiwan Serene TSA-5-5 mount without any trouble.

The DB-7900 antenna is a dual-band version, 144/430 MHz antenna, which is a 1/2 wave x 2 at 144 and 5/8 wave x 2 at 430MHz. I found it to be an excellent antenna, giving very good performance. And despite its very heavy base, it's a very neat antenna at 1580mm in length.

The DB-1101 is a budget priced dual-band antenna, 144/ 430MHz. It's 900mm in length, giving 1/2 wave on 144 and 5/8 wave x 2 on 430MHz. The DB-EL2E is priced at £28.95, the DB-7900 at £49.95 and the DB-1101 at £24.95.

New Range

I also had the opportunity to try out a completely new range (to me anyway) of amateur mobile antennas, from the Sirio stables of Italy. These were supplied by **Nevada Communications**.

Although they're new to me, Sirio have been around for many years. Their experience shows by the extremely professional appearance, design and performance of this whole range of antennas.

The Sirio range consists of two mono-banders for 144MHz, two mono-banders for 430MHz and three dual-band 144/430MHz antennas.

The base of each antenna being identical throughout the range, and having a gold plated centre pin of the u.h.f. male connector. Also on

the base is a silicone rubber sealing gasket and 'O' ring for perfect weatherproofing. The whips of all seven antennas are from high quality, heavy duty stainless steel.

Starting with the mono-banders; the HP 2000 is priced £24.95, the HP 2000C is priced at £29.95. The HP 7000 covers 430MHz and is priced at £21.95. The last mono-bander is the HP 7000C, 730mm in length giving 1/2 wave x 2 collinear at 430 - 440MHz.

Giving excellent dual-band performance, firstly there's the HP 2070, 445mm in length giving 1/4 wave at 144 and 5/8 wave at 430MHz priced at £22.95.

At £31.95 the HP 2070H is the top of the range. It's 1050mm in length giving 1/2 wave x 2 at 144 and 5/8 wave x 2 collinear at 430MHz.

Finally there's the HP 2070R at £29.95, 980mm in length and giving 1/2 wave at 144 and 5/8 wave x 2 at 430MHz. Sirio also supply a connector and cable harness, the HP AC-U which is suitable for any mount.

Stand Out

During my tests, several items seemed to stand out from the crowd. Firstly, there was the Multi Flex Handie Holder supplied by **Southern Scanning and Shortwave**. I thought it was ideal for the keen mobile operator.

Next, there's the docking system r.f. amplifier and hand-held holder, the NBC 50R from **Nevada Communications**. I thought it was a very neat and versatile accessory.

Finally, there was the 'Rolls Royce' of mobile antenna mounts, the Diamond K400M from **Waters and Stanton Electronics**. It was used in conjunction with the DB-7900 dual band heavy duty antenna from **Haydon Communications**.

Final Advice

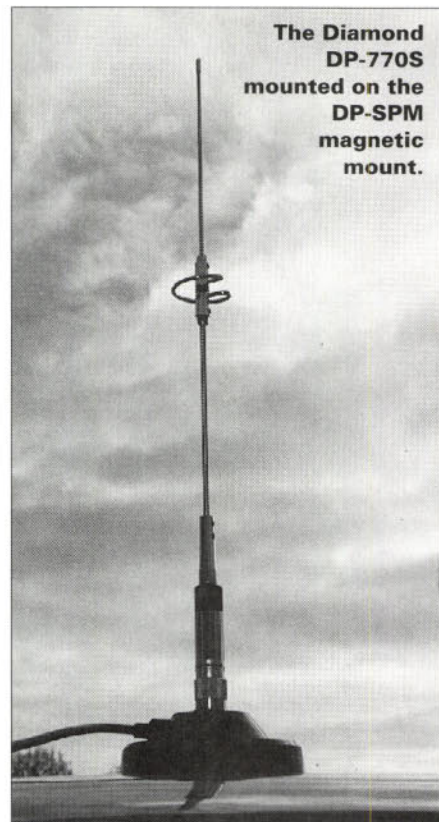
My final advice is...don't become a statistic! Wouldn't it be marvellous if all the mobile users of hand-held transceivers, had their rigs firmly fixed in a suitable, easy to reach position. It's food for thought isn't it?

To round off, I wish you all safe mobile working. I would also like to express my sincere thanks to everyone (listed below) who kindly loaned the review equipment. **PW**

The NB-30W supplied by Haydon Communications is a linear amplifier that provides up to 35W output to an antenna.



The Diamond DP-770S mounted on the DP-SPM magnetic mount.



A selection of items from the Revex range designed to make hands-free operation safer and easier.

Contact Addresses For Equipment Supplied In This Article

Haydon Communications, 132 High Street, Edgware, Middlesex HA8 7EL. Tel: 0181-951 5781/2.

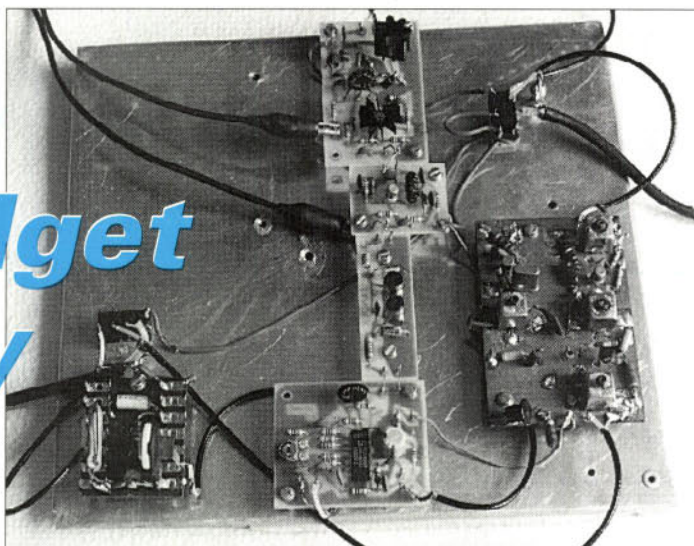
Nevada Communications, 189 London Road, North End, Portsmouth, Hampshire PO2 9AE. Tel: (01705) 662145.

Southern Scanning and Shortwave, PO Box 2126, Bournemouth BH11 9YH. Tel: (01202) 570779.

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

THE ROAD TO TOP BAND -

The Budget Way Part 1



As I had a spare 28MHz mobile rig, and I wanted to operate mobile on 1.8MHz, I thought the easiest solution would be to build a transverter. In this way I'd be able to fully utilise the existing transceiver.

The design that follows allows a 28MHz drive source (any 28MHz transceiver) to operate on 1.8MHz. This of course can be either from your home station or when operating mobile.

My project could in fact be used with some of the older amateur transceivers which don't cover 1.8MHz. It's also a very inexpensive way of getting onto 'Top Band'.

Initial Considerations

My initial considerations for the project were that it should cost as little as possible. I also intended that it would be easy to construct. I looked at the methods used with single units, such as the 'PW Meon' and the like, and decided that for ease of building this method was too complex.

With this in mind I looked through my amateur radio library to see if anything was already on offer, either ready-built or as a kit. I didn't find anything ready-made, but several firms offered kits. The kits found could either be modified or put together to do the job required.

In particular, the kits produced by Derek Pearson G3ZOM of Jandek, in the West Midlands were investigated. The kits on offer included separate units such as mixers, filters and amplifiers which go together in various combinations. (See note regarding Jandek Kits at end of article. *Editor*).

Various experiments showed that kits could be used to make a QRP 1.8MHz station suitable for base or mobile operation.

The results made me think that this could be a whole new area of interest to many amateurs.

Receive Converter

This time I'll show you how to build a receive converter. The circuit diagram of this unit is shown in **Fig. 1**. The transmit converter I'll deal with in a later article.

In the overall block diagram, **Fig. 2**, the box in the lower right hand side is the receiving section of the project. This converter uses a 3SK88 m.o.s.f.e.t. (though in my prototype I used a 40673 type) as an r.f. amplifier, a 2N3819 f.e.t. as the mixer and a BC109 as the oscillator.

I didn't have any reason for choosing the transistors I used... other than that they were in the junk box at the time of building! Any similar, or indeed better devices could be used depending on what you want to spend!

And, to save the bother of coil winding, I used Toko 10K series inductors. These coils made construction a little easier. In the circuit I've used two KANK3333R coils for the 1.8MHz tuned circuits, and two KANK3335R coils for the higher frequencies.

The incoming signal at 1.8-2MHz comes, via the changeover switching, from the antenna. Tuned circuits T1/C1 and T2/C5 form a filter centred on 1.9MHz (or any other area of interest).

The r.f. amp feeds its signal into the gate of Tr2, an 'ordinary' j.f.e.t. mixer. The other signal needed for the mixer is of course from Tr3, the crystal controlled local oscillator. Although this is shown with a 27MHz crystal (XL1) a suitable substitute is a 26.995MHz model control transmitter crystal.

Continued on Page 51

RADIO ON The move

Ben Nock G4BXD describes his neat idea 'Top Band' operation using a simple 28 to 1.8MHz transverter. Ben's project could be your 'limited budget' route to getting going on 1.8MHz.

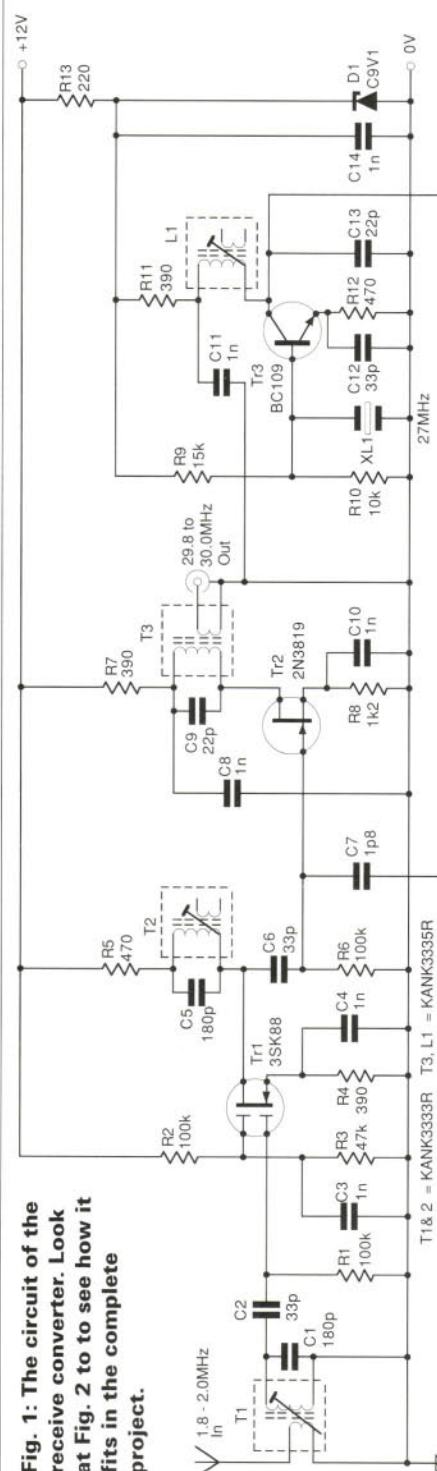


Fig. 1: The circuit of the receive converter. Look at Fig. 2 to see how it fits in the complete project.

C.M. HOWES COMMUNICATIONS

Mail Order to: Eydon, Daventry,
Northants. NN11 3PT
☎ 0327 260178

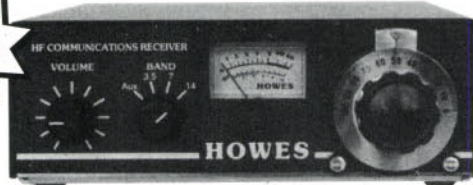


GREAT PROJECTS TO BUILD!

CLEAN UP YOUR RECEPTION with this DUAL BANDWIDTH AF FILTER for £29.80!

- Reduce noise and interference! • Sharp SSB/Speech filter with faster roll-off than IF crystal filters! • 300Hz bandwidth CW filter • Printed and punched front panel • All aluminium case
- Simply connects between radio and external 'speaker' or 'phones' • Suits all general coverage receivers and transceivers • ASL5 Kit plus HA50R hardware: £29.80 (plus P&P).

NEW!



MULTI-BAND SSB/CW RECEIVER

The new **DXR20** covers 20, 40 & 80M bands plus any other HF frequency with optional plug-in modules. The photo shows the receiver built with **DXR20** and **DCS2** ("S meter") kits and **HA20R** hardware pack (case etc.). It has some great technical features hidden inside! **DXR20** electronics kit: **£39.90**. **HA20R** hardware pack: **£28.90**

IS YOUR WINTER PROJECT HERE?

Please send an SAE for a catalogue/data sheet or give us a ring to discuss the details of the kits and optional hardware packs. Kits are also available as assembled and tested modules at extra cost. Not all kits are listed!

ACTIVE ANTENNA KITS

AA2	150kHz to 30MHz	£8.90
AA4	25 to 1300MHz Compact	£19.90
AB118	High Performance VHF Airband	£18.80
SPA4	Scanner Pre-amp, 4 to 1300MHz	£15.90

RECEIVER KITS

MW1	Medium Wave + 160M inc. H/W	£29.90
DXR10	10, 12 & 15M SSB/CW	£27.50
TRF3	5.7 to 17MHz TRF	£15.50

TRANSMITTER KITS

CTX40	40M QRP CW inc. crystal	£15.50
CTX80	80M QRP CW inc. crystal	£15.50
AT160	80 & 160M AM/DSB/CW	£39.90
MTX20	20M 10W CW inc. crystal	£29.90
HTX10	10 & 15M SSB Exciter 50mW	£49.90
HPA10	10 & 15M 10W Power Amp	£39.90

TX TYPE ATU KITS

CTU30	30W HF & 6M with balun	£39.90
CTU150	150W 1.8 to 30MHz	£49.90

ACCESSORY KITS

AP3	Auto Speech Processor	£16.80
MA4	Mic Amp with active filter	£6.20
CM2	Electret Mic with VOGAD	£13.50
CSL4	SSB & CW Filter for DcRx etc.	£10.50
CV100	HF Converter for VHF scanner	£27.50
DCS2	"S Meter" for DC receivers	£10.90
DFD4	Add-on Digital Readout	£49.90
DFD5	Digital Frequency Counter	£54.90
ST2	Side-tone/Practice Oscillator	£9.80
SWB30	SWR/Power indicator/load	£13.90
XM1	Crystal Calibrator LF to UHF	£16.90

HARDWARE PACKS

CA4M	Houses DFD4 and PMB4	£24.90
CA5M	Houses DFD5 and CBA2	£28.90
CA10M	10 & 15M Transceiver H/W	£34.90
CA30M	Houses CTU30/SWB30/ST2	£34.90
CA80M	Houses CW Transceiver	£34.90
HA10R	Houses DXR10 Receiver	£25.90
HA11R	Houses XM1 Crystal Calibrator	£11.90
HA12R	Houses ST2 Side-tone	£10.10
HA30R	Houses CTU30 ATU	£17.90
HA33R	Houses TRF3 SW Receiver	£25.90
HA150R	Houses CTU150 ATU	£16.90

GREAT VALUE ATU!



The new **HOWES CTU8** SWL ATU covers medium and shortwave bands (500kHz to 30MHz). Increases wanted signals by providing impedance matching, and at the same time reduces spurious signals and interference with "front end" selectivity for the receiver. Kit contains case and all parts. Top value general coverage receiving Antenna Tuning Unit.

Kit: £29.90 Fully assembled, ready to use: £49.90

PLEASE ADD £4.00 P&P, or £1.50 P&P for electronics only kits.

HOWES KITS contain good quality printed circuit boards with screen printed parts locations, full, clear instructions and all board mounted components. Sales, constructional and technical advice are available by phone during office hours. Please send an SAE for our **free** catalogue and specific product data sheets. Delivery is normally within seven days.

73 from Dave G4KQH, Technical Manager.

NARS A

Don't miss the **LARGEST** single day show in the U.K.

NORBRECK

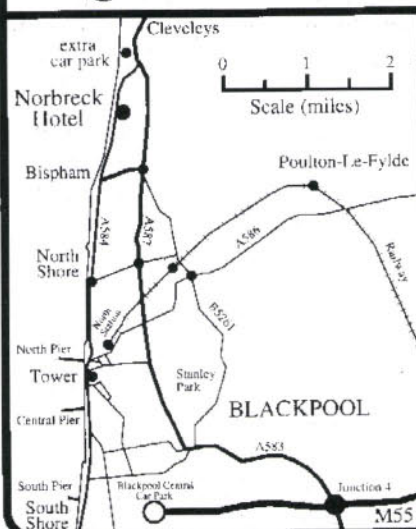
Radio, Electronics and Computing Exhibition

by the Northern Amateur Radio Societies Association at the

NORBRECK CASTLE HOTEL EXHIBITION CENTRE
QUEENS PROMENADE, NORTH SHORE, BLACKPOOL

on Sunday, March 19th, 1995

Doors open at 11 a.m.



- * Over 100 trade stands
- * Bring & Buy stand
- * RSGB stand and book stall
- * Organised by over 50 clubs
- * Free car parking (plus free bus service from extra car park)
- * Overnight accommodation at reduced rates (contact hotel directly)
- * Club stands
- * Amateur Computer stands
- * Construction competition
- * Facilities for the disabled

RADIO TALK-IN ON S22

Admission £1.50 (OAP's £1, under 14's free) by exhibition plan

Exhibition Manager : Peter Denton, G6CGF, 0151-630-5790

The output of the mixer unit may be either broad-band or tuned to a particular frequency. However, as I was contemplating multi-band use at a later date, the broad-band option was chosen.

Transmit Description

Before I get on with describing building the receive converter I'll give you a transmit conversion description. The numbers in brackets are the Jandek kit numbers for those of you lucky enough to have these available.

The raw output from the 28MHz transceiver is at far too high a level to be fed direct into the mixer board (Jandek mixer kit 023) and so I had to make a matched attenuator. The input to the mixer should be about 500mV to 1V of r.f. The local oscillator signal from Tr3 is from the (presently) unused secondary winding of coil L1.

The output of the transmit mixer unit is then passed to a filter unit (Filter, kit No 007). In this instance it's tuned to 1.9MHz but the kit was available for other frequencies. The circuit comprises a double-tuned configuration with 50Ω input and 500Ω output. The latter impedance needs altering to suit the interconnection impedance (50Ω) used throughout the transverter.

The output of the mixer is quite low in level so I used a broad-band amplifier (Amplifier kit No 028) following the filter. As this unit was designed as a broad-band unit, multi-band use would be possible without the need for other filtering.

Incidentally, the amplifier circuit has a gain of 13dB (20 times) and runs in Class A. Because it is a linear amplifier it's suitable for s.s.b. The output and the input are both designed to be 50Ω making interconnection of units easier.

Power Amplifier

When I started the project, I had not decided what sort of p.a. would be used. In my prototype I settled for the level of 1.5W p.a. stage. Although a larger p.a. stage could be fitted in place of the low power amplifier I used.

Circuit and Hands Electronics produce h.f. p.a. kits giving about 15-20W of r.f. Both kit designs produce between 15 to 20W of output. There's enough drive from the Jandek 028 kit for this to drive either of these amplifiers.

Prototype Board

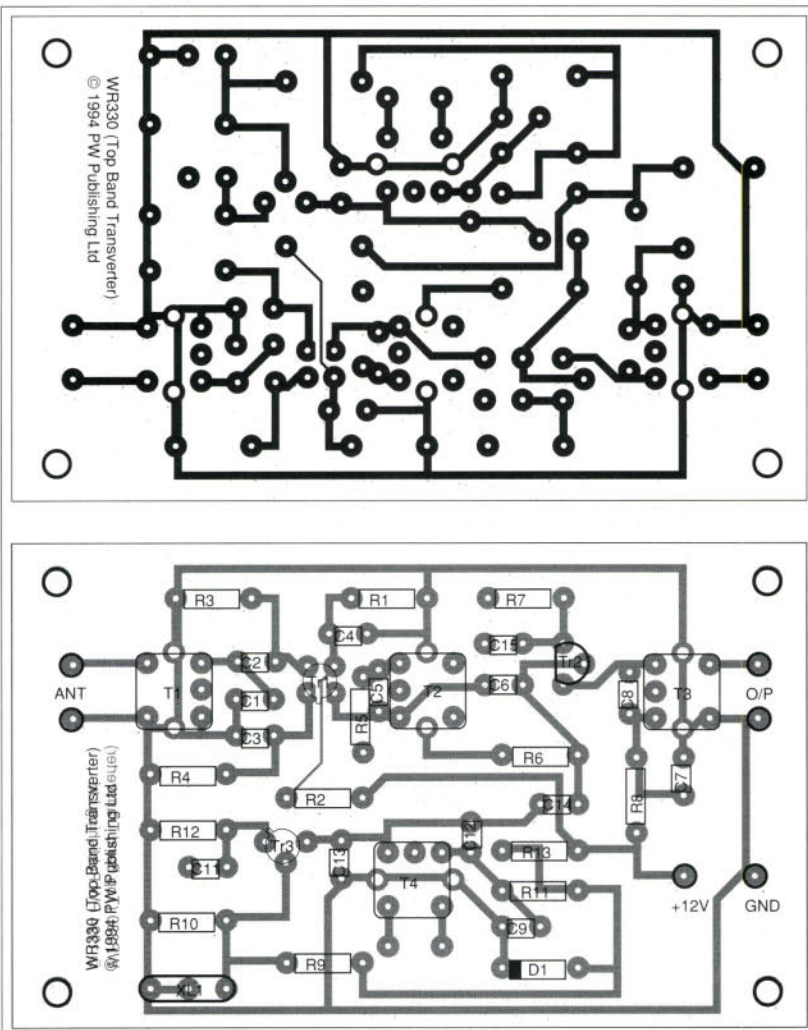
I built the prototype board using double-sided p.c.b. material with all the ground connections to the upper side. I find this approach simplifies the amount of tracks needed underneath the p.c.b.

You can of course make your own board, using a simple p.c.b. etch resist pen, and free hand drawing. Place the coils first and use them as templates to mark the pin positions. The associated component overlay, Fig. 3, will help in this respect.

Crystal Choices

Crystal choices will depend upon whether you intend to use one that's handy, or buy what you need. All that's needed to convert 28 to 1.8MHz, is a 26.2MHz crystal. To explain, I'll assume that the transceiver you're using, is capable of 28-30MHz coverage. If this is so, then any crystal between 26.2 and 28MHz could be used.

However, it may be that your 'Ten metre' rig does



Track pattern and overlay for WR330, the receive converter section of the project. Note the earth plane has been left off for clarity.

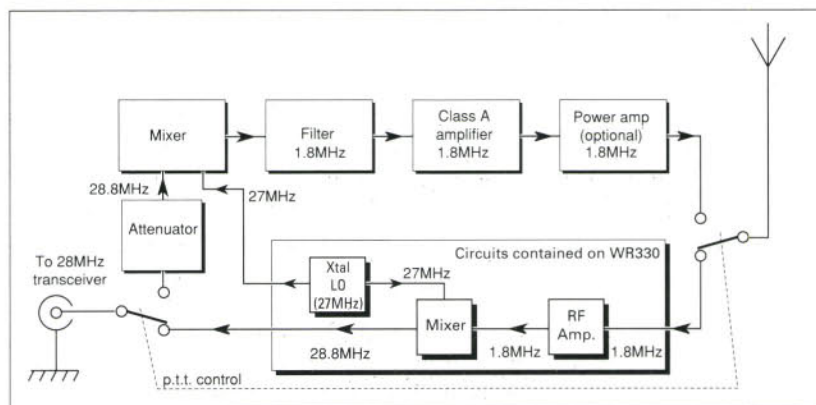


Fig. 2: Block diagram of the full project. The boxed section labelled as being on WR330 is the receive converter partly dealt in this issue.

not cover the whole of that band. But there's no real problem: the crystal frequency required is simply the 28MHz frequency you require finally minus 1.8MHz.

So, if a 27MHz crystal were used, then the kHz reading on your rig's dial would reflect the 1.8MHz frequency. In other words, 28.933MHz would be equal to 1.933MHz after transverting.

Tuning Up

After assembly the tuning up required is quite simple. You should connect the transverter to the 28MHz equipment and an antenna to the transverter, and then adjust the core of T3 for greatest noise. Then locate a signal on 1.8MHz

Continued on page 52

and adjust the cores of T1 and T2 for maximum signal.

On The Air

I tried my prototype on the air while it was still in the 'breadboard' state (see the heading picture). I used it in conjunction with the 2W power amplifier stage.

My tests on 1.8MHz started with a 40m long wire antenna with a commercial a.t.u. I received a 5/7 report from the south coast and a 5/5 from Wales along with many others. This proved (to my satisfaction!) that the simple design was working well and that QRP was indeed an interesting alternative to a more powerful transmitter.

Boxing Up

The final 'boxing up' will depend much upon what you want. As there are no user controls, then one solution could be a die cast aluminium box. You could use a box of approximately 110 x 70 x 50mm. The p.a. stage, if used, could be bolted to the outside of the lid to provide a good air flow.

Finally, I hope you will enjoy building and operating with this project. It provided me with a 'budget route' to 1.8MHz operation. Why don't you have a go and try it for yourself? I look forward to describing the next stage of the project in Part 2.

PW

This article was written before Jandek, operated by of Derek Pearson G3ZOM, ceased trading. That is why there are various references to his kits in this article. In spite of this we felt that you would like to read how Ben achieved getting on 'Top Band' cheaply.

Derek has gone back to university and has granted us permission to publish his designs (which will become PW copyright) mentioned in this article. They will be brought to you in future issues as soon as we can prepare them. So there is no need for these excellent designs to disappear.

- Ed.

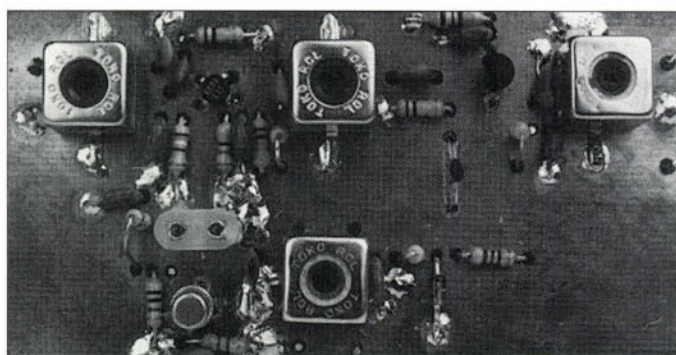


Fig. 4: The first PW Prototype, that is similar to the final design.

Shopping List

Resistors 0.25W 5%

220Ω	1	R13
390Ω	3	R4, 7, 11
470Ω	2	R5, 12
1.2kΩ	1	R8
10kΩ	1	R10
15kΩ	1	R9
47kΩ	1	R3
100kΩ	3	R1, 2, 6

Capacitors

Miniature disc ceramic

22pF	2	C9, 13
33pF	3	C2, 6, 12
180pF	2	C1, 5
1nF	6	C3, 4, 8, 10, 11, 14

C7 may be either a 1.8pF capacitor or it can be made from two short lengths of insulated copper wire twisted together.

Semiconductors

2N3819	1	Tr2
3SK88	1	Tr3 (or a 40673 or similar dual-gate m.o.s.f.e.t.)
BC109	1	Tr3
C9V1	1	D1 (any 9.1V Zener diode of more than 400mW)

Inductors

KANK3333R	2	T1, 2
KANK3335R	2	T3, L1

Miscellaneous

A third overtone crystal of 27MHz (or near frequency, see text). Then depending on the installation you will need a suitable box, mounting bolts nuts and washers, interconnecting coaxial cable and wire, two coaxial sockets, relays

DEAR NEWSAGENT

Please reserve/deliver my monthly copy of **Practical Wireless**

Name _____

Address _____

Distributed by Seymour

Take out a
subscription



or

Call (01202) 659930 for
mail order next day delivery



or

Reserve a regular copy
at your newsagent



or

Inform us of any availability
problems



PW Publishing Limited, Arrowsmith Court,
Station Approach, Broadstone,
Dorset BH18 8PW. Fax: (01202) 659950

**HAVING
DIFFICULTY
FINDING
PW?**

NEVADA

.....Everything For The Radio Enthusiast!

... This Month I'm pleased to announce our purchase of the DRAE brand name from Daytrend, and our re-introduction of their high quality British made Power supplies with huge price reductions. Take a look - you will be pleasantly surprised!

73

Mike Devereux G3SED



Pay By Three Post Dated Cheques - Interest Free!

Simply divide the price into 3 equal payments. Write 3 cheques dated in consecutive months starting with today's date. Write your TELEPHONE NUMBER, CHEQUE CARD NUMBER & EXPIRY DATE on the back of each cheque. Post them to us with your order remembering to include your full postal address. When we receive your order/cheques correctly completed - subject to status we will send the goods immediately.

.....The hardest part is deciding what to buy!

SIRIO ANTENNAS

A new range of super high quality VHF antennas reviewed in this issue. See review to understand why we feel these are such good antennas.

HP2000 2mtr Whip, 5.35 dBi, 75W	£24.95
HP2000C 2mtr Whip, 7.15 dBi, 150W	£29.95
HP2070 Dual Band, 5.35/2.15 dBi, 100W	£22.95
HP2070H Dual Band, 5.35/2.15 dBi, 100/150W	£31.95
HP7000 70cm Whip, 5.35 dBi, 100W	£21.95
HP7000C 70cm Whip, 7.15 dBi, 100W	£28.95
HP2070R Dual Band, 8.15/51.5 dBi, 100/150W	£29.95
HP AC/U Base Mount c/w cable	£15.95

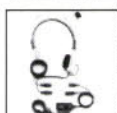
BE SMART - BE SAFE USE REVEX!

Just look at this superb selection of lightweight mobile microphones, designed and manufactured to a very high standard - easy to use and a must for safe mobile operations.

EP300
Deluxe clip on earphone - used by many public services.
Price **£13.95**



FM50
Headset mic + earphone with lockable PTT. Will suit many handsets.
Price **£49.95**



FM80
Mini boom mic. Clip to sun visor uses lockable PTT for hands free operation.
Price **£49.95**



EM700
Earpiece and mic combination. Audio has to be heard to be believed. Lockable PTT.
EM700 H (Icom) **£39.95**
EM700 K (Kenwood) **£39.95**



50 WATT DOCKING BOOSTER
For handheld transceivers 1-5 Watts input 50 Watts output max. Built in GaAs FET pre-amp. **£99.95**



SEE REVIEWS THIS MONTH ON ALL THE ABOVE ITEMS.

NEW!
British Made High Quality Products:-



DRAE POWER SUPPLIES

Classic Power Supplies from DRAE, British Made, Solid, reliable and fully protected.

- ★ Over Current protection
- ★ Over Voltage protection
- ★ Short Circuit protection
- ★ Over Temperature protection
- ★ Low ripple & noise
- ★ High Peak Surge current
- ★ Meets full UK safety specs.
- ★ Convection cooled
- ★ Voltage 13.8V ± 0.2V
- ★ 15 mins at full output
- ★ Why Gamble, Buy the Best!



24 Amp Power Supply.....	£139.95
12 Amp Power Supply.....	£109.95
4 Amp Power Supply.....	£29.95

DRAE ANTENNA PRODUCTS

LONGWIRE BALUN (DLB)

Matches end fed long wires to 50 ohm coaxial cable, helps on receive reduce noise and interference and allows transmit up to 100Watts. Fully moulded for full weather protection.



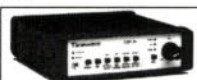
END FED WIRE (EFW)

The EFW is a complete 20mtr long short wave receive AND TRANSMIT end fed wire antenna. Balun fed to reduce noise and interference pick up. Uses high quality "Flex Weave" copper wire and handles up to 100 Watts RF (with ATU).

Covers 1 - 30 MHz **£59.95**

TIMEWAVE AUDIO FILTERS

Digital Signal Processing technology gives random noise reduction, elimination of heterodynes automatically and razor sharp CV reception without ringing. These filters really help you hear and work rare DX under marginal conditions.



DSP 9 MkII...Basic CW/SSB model..... **£189**
DSP 9 Plus...CW/SSB/DATA modes w/AGC **£239**
DSP 59 Plus...All modes 320 filter..... **£299**

AKD - TRANSCEIVERS

A range of British made low cost transceivers - that offer outstanding value for money. At these prices we just can't keep up with the demand!



2001 2mtr 25/5W FM.....	£193.95
4001 4mtr 25/5W FM.....	£193.95
6001 6mtr 25/5W FM.....	£193.95
7003 70cm 3W FM.....	£193.95

Quality Used Equipment

All Safety Tested & Guaranteed For 3 Months

SHORTWAVE RECEIVERS

AR2002 - Wide band base receiver.....	£225
JRC 515 - Excellent Receiver & Speaker.....	£495
JRC 525 - Excellent RX, Boxed, Rare.....	£725
Kenwood R1000 - Digital S/W Receiver.....	£350
Low HF 150 - Ex demo in mint cond.....	£315
Trio R2000 RX.....	£395
Yaesu FRG100 - Excellent S/Wave RX.....	£475
Yaesu FRG7700 + VHF Conv. - G.Con.....	£425
Yaesu FRG8800 + VHF Converter.....	£495
Yaesu FRG9600 - Basic Model.....	£325

HF TRANSCEIVERS

Icom IC701-701PSU Both Boxed.....	£495
Icom IC707 HF - Add FM if needed (1 only).....	£775
Icom IC728 - HF 100W Fitted AM/FM board.....	£750
Icom IC730 - 100W Mobile H.F.....	£499
Kenwood TS120S + VFO120S - Filtered.....	£495
Kenwood TS140S - Boxed Excellent Con.....	£695
Kenwood TS520SE - Good Faithful H.F.....	£385
Ten Tec Scout 555 - 1 Only New (Ex Demo).....	£475
Tokyo H.P. - 15m H.F. Mono Bander.....	£175
Trio TS530SP - Base H.F. Excellent Cond.....	£525
Trio TS900 - H.F. Cheap but works well!.....	£275
Yaesu FR70G - Military style HF transceiver 10W.....	£395
Yaesu FT77 - Nice condition, Good starter HF.....	£475
Yaesu FT102 - Complete H.F. Line Up.....	£945
Yaesu FT747GX - Fitted FM, A1 Condition.....	£545

HANDHELD

Icom IC-P4E - 2m Handie Boxed.....	£215
Icom IC 2SRE - 2m Handie Boxed.....	£195
Kenpro KT220 - 2m Handies, K.Pad+LCD.....	£165
Yaesu FT-209 - 2m Handie nice model.....	£140
Yaesu FT530 - Dual Handies. Last 1 as new.....	£375
Yaesu FT709 - 70cm Handie. Ideal for novice.....	£150
Yaesu FT709 - 70cm Handie, Good.....	£140

MOBILE/BASE TRANSCEIVERS

Alinco DR130 - 2m FM 45 Watts.....	£299
Alinco DR599E - Dual Band 50W Mobile.....	£495
Alinco DJ580 - Dual Band Handie, Boxed.....	£399
Icom IC-271E - 2m Base M/M + Mutek F.E.....	£625
Icom IC290 + 40W P.A. - 2m m/mode.....	£425
Kenwood TM255 - 2m m/mode (1 only).....	£775
Kenwood TM732 - Dual Band, 1 Only.....	£595
Trio 7200G - Cheap 2m Mobile - Bargain!.....	£75
Trio TS700S + VFO+Spk, Mutek F. End.....	£595
Yaesu CPU 2500 H.Pwr 2m Mobile.....	£165
Yaesu FT-290 MkI - Choice of 3 models From.....	£285
Yaesu FT290(Mk II) - Good 2m m/mode VGC.....	£395
Yaesu FT-690(Mk II) - 6m m/mode. Boxed VGC.....	£395

STATION ACCESSORIES

ERA Microreader - V4.2.....	£125
Tokyo HP HX640 - 6m to HF Transverter.....	£225
Vectronics VC300DIP - Bargain A.T.U.....	£95

Wanted For Cash - We buy and sell all makes of Amateur Radio equipment. Not had any response to the "Members Free Ads" then call us for an instant quote. Why not Part Exchange your old gear and pay in three easy instalments at no extra cost!

HOTLINE:- (01705) 613900

Use Your Credit Card For Same Day Despatch

NEVADA COMMUNICATIONS. 189 London Road, Portsmouth, PO2 9AE.

Antenna Work

Much has been written about antennas in amateur radio literature over the years. Arguments for, and against, the superiority of beams (both close and wide-spaced), cubical quads and loops of all sorts have appeared month after month and year after year. The quest for antenna knowledge and experimental know-how seems to be unending.

In the amateur radio press, not much appears about indoor antennas, although some of us, either by choice or by necessity, have been using them for a long time. For some 30 years I have used only indoor antennas.

And yet, I've still managed QSOs with over 180 countries. Although I admit that most of my QSOs are using c.w. they've been successful.

My successful QSOs are not intended as a bit of personal trumpet-blowing. They're simply to show that amateur radio is still possible without the aid of large outdoor antenna systems.

I must admit that in the competition of a DX pile-up it is difficult. It's only when the 'big boys' have had their contacts that it's possible to work the rare DX station (and sometimes not even then!).

Even so, using quite humble bits of wire in the attic I still get a thrill and sense of achievement. Especially when a VK station comes back to my call.

But what types of antenna can produce these results? In this occasional series of indoor antennas 'Antenna Workshop', I'll endeavour to describe a few that I have used with reasonable results.

Attic Antenna

One simple attic antenna, the W8JK, is a two element system with both elements directly fed. However, they're fed with signals that are 180° out of phase with each other.

The W8JK antenna may be mounted with both elements at the same height, or with one element above the other. In the version to be described the

elements are mounted horizontally at the same height. In this mode the maximum radiation, like a simple dipole, is (or should be) at right angles to the elements.

Much has been said about the fact that W8JK isn't very effective unless it's erected in the clear, away from trees and buildings. The reason given for not using it as an indoor antenna is that very high voltages exist at the element ends. These high voltages result in high losses by absorption by timber, brickwork, tiles, etc.

I've also seen it stated that, as the impedance at the centre of each element is very low, when the two elements are connected in parallel, the impedance for the whole antenna is half the value of the already low element impedances. This is supposed to make it difficult to match.

In spite of the rather gloomy introduction, I've used a W8JK antenna in the attic space of my house for some 20 years. I've made frequent 14MHz DX contacts with Australia, New Zealand and the west coast of America, admittedly mostly using c.w. but some were on s.s.b.

By tuning and matching with an antenna tuning unit (a.t.u.), the 7, 21 and 28MHz bands have also been used quite successfully. The W8JK antenna was chosen because, at that time, I wasn't aware that it shouldn't work very well!

It may be that my antenna operates satisfactorily because my version has folded dipoles for both elements. Using folded elements has the effect of increasing the terminal impedance making it easier to match.

Inspect Attic

Inspect your attic to ensure the ease of erecting any sort of antenna before you start construction! Installation in a 'typical' attic is normally fairly easy but there must be space to move around in.

Some modern attics are all joists and wooden bracers. You can put the antenna up, but you will need

the agility of an eel to move around!

If the attic timbers don't run horizontally end to end of the roof space (making fitting comparatively easy) it's still possible to fit such an antenna. This is then carried out by pinning the elements to the sloping woodwork inside the attic. These sloping beams are the support for the tiles on the outside.

The antenna and its feeders are made up from 300Ω flat twin cable. Around 25m will ensure that there is sufficient to make the antenna itself.

However, the length between the a.t.u. and antenna will depend on individual requirements. In fact, the length between the a.t.u. and antenna doesn't seem to matter, unless it's so long that the resistive losses of the cable absorb a lot of the transmitter power!

But, **here's a most important point.** An effective antenna tuner **must** be used to transform the impedance of the complete antenna and feeder system to match the transmitter output at the shack end.

Now for the complete construction programme. Steps one to seven can be done in the comfort of the shack!

Step 1

Cut the 300Ω feeder into lengths as detailed in **Table 1**. Measure the shortest practicable run for the feeder (part 5) between the expected centre of the antenna (points X-X in **Fig. 3**) and the a.t.u. in the shack).

Remember to allow for the vertical drop recommended in Step 13 and then add another metre or so. This is just to be sure the feeder will reach the a.t.u. in the shack! (It's most frustrating to have to add an extra bit of feeder just because it's a little too short!

Step 2

In the exact centre of both elements, cut through **one wire only** of the 300Ω feeder. Then remove polythene insulation from both wire ends and bend each bare wire at right angles as shown in **Fig. 1**.

Table 1

Antenna Part	Cut Length
1	9.145m
2	9.145m
3	1.65m
4	1.65m
5	*

The length of part 5 is chosen to suit each installation.

Step 3

Strip insulation from the ends of all eight wires on both parts 1 and 2 for about 20mm as in **Fig. 2**.

Step 4

Twist together the bare wires at the free ends of each element, and solder. There are eight instances of two wires to be soldered together (points Y in **Fig. 3**) and two instances of three wires to be connected together (points X in **Fig. 3**).

Step 5

On parts 3 and 4 shown in **Fig. 2**, bare the wires for about 20mm at each end, similarly to step 3.

Step 6

To form the centre joint, twist the wire ends of parts 3 and 4 together. But do not solder them together just yet.

Step 7

Bare the wires for 20-25mm at one end of part 5.

Step 8

Take the whole antenna system into the attic.

Step 9

Fix the antenna elements to the attic timbers. I use very small nails, or panel pins, and nail the elements with a nail about every two metres along the centre line of the elements (shown dotted in **Fig. 3**).

The nails should pierce the centre of the polythene insulation but **not** near the wires. If the elements are too long for the attic, make certain that the **centres** of the elements (i.e., where they join to sections 3 and 4, see **Fig. 5**) are in the centre of the attic space available and just

Workshop

Rafter Special

Ray Fautley G3ASG, operates exclusively with indoor antennas. He aims to encourage you to get up into the loft space to erect an antenna capable of operating on several bands.

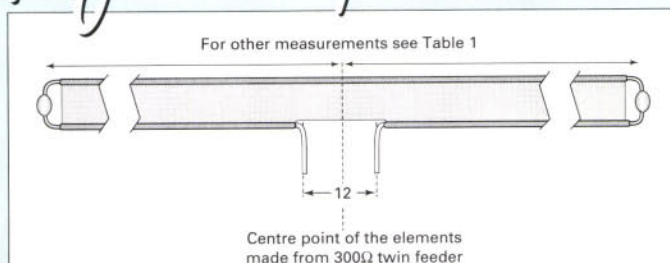


Fig. 1: Details of the centre and ends of the elements (parts 1 & 2 in Fig. 3).

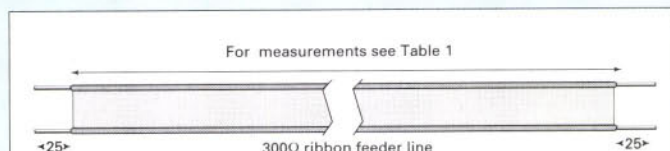


Fig. 2: Details of the ends of the phasing lines (parts 3 & 4 in Fig. 3).

let each free end dangle unsupported.

Step 10

Twist the joins of parts 2 and part 4, then then solder them together. Lay the parts out ensuring that part 4 is flat and not twisted.

Step 11

Turn the free end of the phasing section (part 3) over through 180° (half turn). Then twist together and solder the free ends of part 3 to part 1.

Step 12

Twist prepared wire ends of part 5 to junction of parts 3 and 4. (It doesn't matter which way round part 5 is connected) Then solder both twisted wire connections (marked with an X in Fig. 3).

Step 13

Try to get the feeder (part 5) to drop vertically from its junction with parts 3 and 4 as far as possible and then, anchor it to the floor of the attic. Lay the remainder of part 5 along the floor

of the attic and then to the shack.

One method I've used is to fit a length of about 25mm diameter PVC tubing from the attic, down inside the exterior wall cavity. This tubing reaches to just above a hole in the shack wall positioned near the a.t.u.

Using this simple piece of PVC tubing made it quite easy to get the 300Ω cable from the attic to the shack. Merely push the feeder into the tube at the top and gravity does the work! The end of the feeder is then just pulled through the lower hole.

To make the installation look neat, a metal light-switch box may be fitted into the hole and capped with a white plastics plate. You'll probably find this, domestically at least, much more acceptable!

Step 14

Take the free end of the feeder, bare the insulation back for about 25mm, and connect it to the balanced output of the a.t.u.

Step 15

Switch on the transmitter and tune the a.t.u. for zero reflected power. Whichever band you intend to use **always use an a.t.u.** to tune and match the antenna system to the impedance necessary (usually 50Ω) for the correct operation of the transmitter.

You could operate, by using the complete feeder/antenna system as a vertical (with capacity hat) antenna by joining the two feeder wires together at the shack end. Secure both together to one of the a.t.u. terminals and connect as good an earth connection as possible to the other.

Using the antenna in the vertical mode may produce better results on 7MHz. It may even make 3.5MHz operation possible. When used on the 14MHz band the maximum radiation should, like a dipole, be at right angles to the antenna elements.

However, some distortion of the radiation pattern is to be expected because of the proximity of the bits usually to be found in attic area. These bits include house wiring, water tanks and the like.

The New Bands

You may even find it possible to operate on the new WARC bands of 10.1, 18 and 24MHz, **as long as** - (I expect you've already guessed what's coming) **the antenna system is tuned and matched with a good a.t.u.**

Good indoor DX hunting!

PW

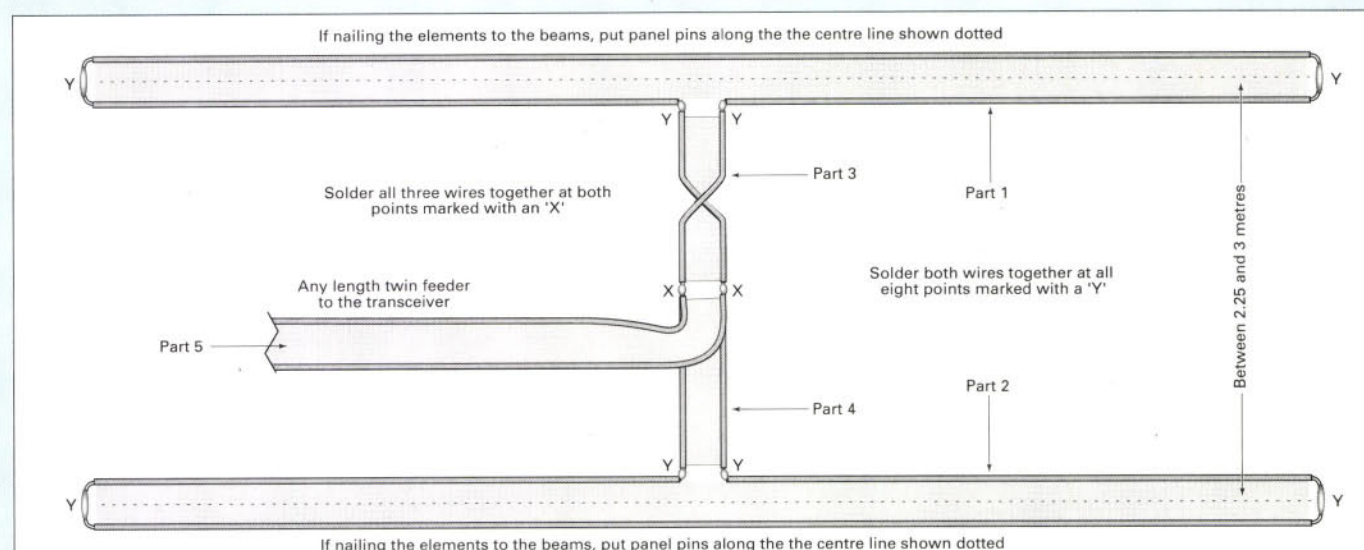


Fig. 3: The overall layout of Ray Fautley's version of the W8JK antenna. It may be mounted either as shown with the elements above one another, or with the elements at the same height.

KENWOOD - YAESU - ICOM - **HUSTLER** - ALINCO - DAIWA - COMET - TS

You decide - we deliver!

FT51R RRP £499  10% Deposit @ £49.00 Then 9 months I/Free @ £50.00	TH79E RRP £449.95  10% Deposit @ £44.95 Then 9 months I/Free @ £45.00	IC-W21E RRP £439  10% Deposit @ £43.00 Then 9 months I/Free @ £44.00	FT11R RRP £299  10% Deposit @ £29.00 Then 9 months I/Free @ £30.00	TH22E RRP £239  N/A on finance
FT5200 RRP £679  10% Deposit @ £68.00 Then 12 months I/Free @ £50.91	TM251E RRP £389.95  10% Deposit @ £38.95 Then 9 months I/Free @ £39.00	IC-2340H RRP £689  10% Deposit @ £65.00 Then 12 months I/Free @ £52.00	FT2200 RRP £379  10% Deposit @ £38.00 Then 9 months I/Free @ £37.88	TM733E RRP £729.95  10% Deposit @ £72.95 Then 12 months I/Free @ £54.75
FT900 RRP £1349  10% Deposit @ £135.00 Then 18 months I/Free @ £67.44	TS850S RRP £1699.95  10% Deposit @ £169.95 Then 18 months I/Free @ £85.00	IC-738 RRP £1549  10% Deposit @ £154.00 Then 18 months I/Free @ £77.50	FT990AC RRP £2299  10% Deposit @ £230.00 Then 24 months I/Free @ £86.20	TS450SAT RRP £1549.95  10% Deposit @ £154.95 Then 18 months I/Free @ £77.50
FRG100 RRP £559  10% Deposit @ £55.00 Then 12 months I/Free @ £42.00	R5000 RRP £999.95  10% Deposit @ £100.00 Then 18 months I/Free @ £49.99	IC-7100E RRP £1395  10% Deposit @ £140.00 Then 24 months I/Free @ £52.29	FRG9600 RRP £599  10% Deposit @ £59.00 Then 12 months I/Free @ £45.00	NEW ALINCO DR-M065X RRP £299 10% Deposit @ £29.00 Then 9 months I/Free @ £30.00

HUSTLER VERTICAL ANTENNAS

6BTV - 10, 15, 20, 30, 40, BOM **£179.95** **4BTV** - 10, 15, 20, 40M **£142.95**
5BTV - 10, 15, 20, 40, BOM **£160.95** All rated at 1.5kW. Full written details available on request

Our retailing experience shows that the average amateur knows he won't get something for nothing! That's why at Coastal, we treat you with respect, like offering you interest free finance on the RRP, or extra accessories free on top of your purchase. We can't simply just discount the RRP every time, it's not practical for us or you in the long run. What you will get free though, is our fast friendly efficient service, backed up by 25 years of collective retailing experience & authorised dealerships with all the companies you might like to purchase from. What ever you want, from where ever you want it . . . call Coastal & enjoy the benefits of traditional English retailing at no extra cost:

Coastal . . . We're on your frequency!



CALL COASTAL
01255 474292

COASTAL COMMUNICATIONS
19 Cambridge Road, Clacton-on-Sea, Essex CO15 3QJ

Specifications

- The Mysteries Explained

Ian Poole G3YWX delves into the mysteries surrounding one of the specification aspects associated with handling strong signals.

Last month I took a look at some of the problems which can arise when strong signals are present on a band. This month I am going to take a look at one of the specifications associated with strong signal handling and see how it gives an indication of the receiver's performance.

One of the problems that occurs with amplifiers and mixers is that when very strong signals are applied, unwanted spurious signals start to appear. And one of these major problems is associated with the third order products that I looked at last month.

In view of the difficulty an important specification is the third order intercept point. This gives a measure of the ability of a set to cope with close in strong signals and reject their effects.

Third Orders

Third order effects are those which are generated when a harmonic of one signal mixes with a second signal, i.e. $2f_1 \pm f_2$. (Fifth order ones are those where the third harmonic of the first signal mixes with the second harmonic of the second, i.e. $3f_1 \pm 2f_2$).

To give an example of how signals may affect reception, I'll take the example of when two strong signals appear on the 144MHz band, one at 145 and the other at 145.50MHz.

If any third order effects are produced, the second harmonic of the first signal will appear at 290MHz, and when it mixes with the second at 145.5MHz it will produce another signal at 144.5MHz. Again, the second harmonic of 145.5MHz will appear at 191MHz and mix with the signal at 145MHz to give a third order product at 146MHz and it's quite possible that either of these signals could mask out a weak wanted station.

In most instances, the third order signals are well below the

noise level and have no effect on reception. However, as signal levels rise, so do the third order effects.

In fact, third order effects rise at a much faster rate than the wanted signals. An increase of only 1dB in the wanted signal will give a 3dB increase in third order effects, and a 5dB increase in fifth order effects.

As the third and higher order effects are normally so far down in the noise, it's only when large signals are present that they start to appear above the noise level. When they do start to appear above the noise they quickly become a major problem.

Unwanted Signals

In view of the fact that unwanted spurious signals rise so quickly it's very important not to overload the front-end. If this occurs then new signals will appear in many places up and down the band.

Reducing the input level to the receiver, even by a comparatively small amount in some cases, can make the spurious signals inaudible. This emphasises the importance of not having too much front-end gain.

I once had a contact with a station on 144MHz who said I was appearing at several points on the band. He also let slip that he was using two (yes two!) pre-amplifiers. Removing one of them cured the problem, and he could still hear me very well!

Alternatively, just rotating a beam antenna to reduce the level of the offending strong signal can do the trick. For h.f. operation some sets have front-end attenuators which can be used to prevent overloading.

Front-end attenuators can be very useful when amateur stations are being sought close to very strong broadcast stations. This used to be a particular problem on 7MHz where many broadcast stations occupied frequencies down to 7MHz even though their band

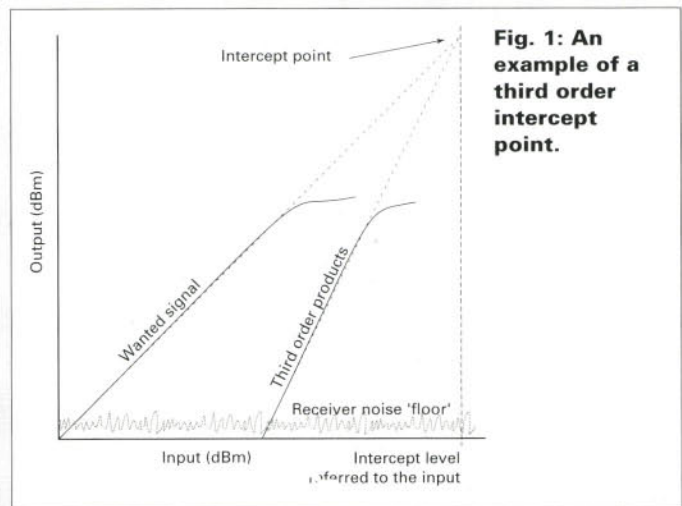


Fig. 1: An example of a third order intercept point.

allocation stopped at 7.1MHz as it does today. This meant that receivers had to be able to pick-up very weak amateur signals with enormous broadcast signals from 100kW transmitters just a few kHz away.

Intercept Point

The third order intercept point uses the fact that the third order signals rise much faster than the wanted ones as input levels increase. A plot can be made of the output level for varying input levels.

As the input signal level is increased the output will rise in line with it. Initially no third order products are seen as they are masked by the noise, but they soon start to appear as shown in Fig. 1. As the input to the amplifier is raised, it eventually limits when it cannot handle the output power.

If the curves for the input signals and third order products are continued they cross or intercept. This is an imaginary figure known as the third order intercept.

The third order intercept gives a very good indication of the strong signal handling capability of the front-end. The higher the intercept point, the better the set. As an example, a typical amateur set may have a third order intercept point of around 15dBm, i.e. 15dB above

1mW or just over 30mW.

For complete receivers this figure usually refers to the level of the signals at the input to the set. In the cases of pre-amplifiers or mixers the power level may be that at the input or output and this should be specified.

Obviously the output intercept point will be higher than the input by the gain of the devices. An amplifier with an intercept point at the input of 10dBm and a gain of 10dB will have an output intercept point of 20dBm.

That's all for this month. Don't forget if there are any specification mysteries you'd like explained drop me a line via the PW Editorial Offices and I'll try to answer your queries on this page.



DATING
ELECTRONICS LIMITED

Clayton Wood Close
West Park
Leeds LS16 6QE
Tel: 0532 744822
Fax: 0532 742872

For products you can rely upon to give amazing results

For information on **Active Antennas, RF Amplifiers, Converters, Audio Filters, the Morse Tutor and Speech Processors** send or telephone for a free catalogue and selective data sheets as required.

All our products are designed and made in Britain.

Orders can be despatched within 48 hours subject to availability.



— VISA AND ACCESS WELCOME —



RST LANGREX SUPPLIES LTD RST
PHONE 0181 684 1166 FAX 0181 684 3056
DISTRIBUTORS OF ELECTRONIC VALVES
TUBES AND SEMICONDUCTORS AND I.C.S.
1 MAYO ROAD • CROYDON • SURREY CR0 2QP
24 HOUR EXPRESS MAIL ORDER SERVICE ON STOCK ITEMS

A231	5.00	EL91	3.00	PY500A	4.00	6BA7	5.00	6SK7	3.00
CL33	10.00	EL95	2.00	PY800	1.50	6BE6	1.50	6SL7GT	4.50
DY86/7	1.50	EL509	10.00	QV02-6	12.00	6BH6	2.50	6SN7GT	4.50
EB8CC Mull	8.50	EM34	15.00	QV03-10	5.00	6BJ6	2.25	6SS7	3.00
E180F	3.50	EM81	4.00	QV03-10 Mull	15.00	6BN6	2.00	6UBA	1.50
E810F	22.00	EM84	4.00	QV03-20A	15.00	6BR7	3.50	6V6GT	4.25
EABC80	1.95	EM87	4.00	QV06-40A Mull	30.00	6BR8A	4.00	6X4	3.00
EB91	1.50	EN91 Mull	7.50	QV03-12	8.00	6BS7	6.00	6X5GT	2.50
EBF80	1.50	EY51	2.50	U19	10.00	6BW6	4.50	6Y12	15.00
EBF89	1.50	EY86	1.75	UABC80	1.50	6BW7	1.50	12AX7	3.50
EBL31	15.00	EY88	1.75	UBF89	1.50	6BZ6	2.50	12AX7A GE.	7.00
ECC33	7.50	EZ80	3.50	UCH42	4.00	6C4	1.95	12BA6	2.50
ECC35	7.50	EZ81	3.50	UCH81	2.50	6C6	5.00	12BE6	2.50
ECC81	3.00	GY901	3.00	UCL82	2.00	6CB8A	3.00	12BH7A GE	6.50
ECC82	3.00	GZ32 Mull	8.50	UCL83	3.00	6CDBGA	5.00	12BH7A GE	7.00
ECC83	3.50	GZ33	6.00	UF89	4.00	6CL6	3.75	12E1	15.00
ECC85	3.50	GZ34 GE	7.50	UL41	12.00	6CG7	7.50	12HG7 12GN7	6.50
ECC88 Mull	6.00	GZ37	6.00	UL84	3.50	6CH6	5.00	30FL1/2	1.50
ECC91	2.00	KT61	10.00	UY41	4.00	6CW4	8.00	30P19	2.50
ECF80	1.50	KT66 China	10.00	UY85	2.25	6D6	5.00	300B(PR)	110.00
ECF85	3.50	KT88 China	12.00	VR105/30	2.50	6D05 GE	17.50	5728	70.00
ECF87	3.50	KT88	9.00	VR150/30	2.50	6D06B	12.50	802A	50.00
ECF88	3.00	OA2	2.70	Z759	25.00	6EA8	3.50	807	5.75
ECL80	1.50	OB2	2.70	Z803U	25.00	6EH5	1.85	811A	18.50
ECL82	3.00	OC3	2.50	2D21	3.50	6F6	3.50	812A	65.00
ECL83	3.50	OD3	2.50	3B28	20.00	6FQ7	7.50	813	27.50
ECL86 Mull	3.50	PCF80	2.00	4CX250B STC	55.00	6GK6	4.00	833A	85.00
ECLL800	25.00	PCF82	1.50	5R4GY	6.00	6H6	3.00	866A	25.00
EF37A	3.50	PCF86	2.50	5U4G	5.75	6HS6	4.95	872A	20.00
EF39	2.75	PCF801	2.50	5V4G	6.00	6J5	3.00	931A	25.00
EF40	5.00	PCF802	2.50	5Y3GT	2.50	6J6	3.00	2050A GE	10.00
EF41	3.50	PCL82	2.00	5Z3	4.00	6J7	4.00	5751	6.00
EF42	4.50	PCL83	3.00	5Z4GT	2.50	6J86A GE	19.00	5763	10.00
EF80	1.50	PCL84	2.00	6AH6	4.00	6JEC	20.00	5814A	5.00
EF85	1.50	PCL85	2.50	6AK5	1.50	6JSC GE	17.50	5842	12.00
EF86	7.50	PCL86	2.50	6AL5	3.00	6K5GT	3.00	6080	7.50
EF91	2.00	PCL805	2.50	6AM6	2.00	6K7	4.00	6146B GE	15.00
EF92	2.00	PD500	6.00	6AN5	5.00	6K8	4.00	6550A GE	17.50
EF183	2.00	PL36	2.50	6AN8A	4.50	6L6G	8.50	6883B GE	16.00
EF184	2.00	PL81	1.75	6AQ5	3.25	6L6GCSYL	12.50	7025 GE	7.00
EL32	2.50	PL82	1.50	6AR5	25.00	6L6GC Siemens	7.50	7027A GE	17.50
EL33	10.00	PL83	2.50	6AS6	3.00	6L6GC GE	12.50	7199	12.00
EL34 Siemens	8.00	PL84	2.00	6ASTG	9.50	6L7	3.50	7360	25.00
EL36	4.00	PL504	2.50	6AT6	2.00	6L06/6JE6C	20.00	7581A	15.00
ELL80	25.00	PL508	5.50	6AUSGT	5.00	607	4.00	7586	15.00
EL41	3.50	PL509	6.00	6AU6	2.50	6RHH8/6KN8	12.00	7587	23.00
EL81	3.00	PL519	6.00	6AW8A	4.00	6SA7	3.00	7668	15.00
EL84	2.25	PL802	4.00	6B7	4.00	6SC7	3.00	8417GE	20.00
EL94 Mull	6.00	PY81	1.50	6B8	4.00	6SG7	2.50		
EL86	2.75	PY88	2.00	6BA6	1.50	6SJ7	3.00		

Prices correct when going to press

OPEN TO CALLERS MON-FRI 9AM - 4PM. CLOSED SATURDAY
QUOTATIONS FOR ANY TYPES NOT LISTED.
OVER 6000 TYPES AVAILABLE FROM STOCK.
OBSOLETE ITEMS A SPECIALITY.
TERMS C W O / VISA / ACCESS
P&P 1-3 VALVES £2.00, 4-6 VALVES £3.00 ADD 17.5% VAT TO TOTAL INC P+P

SPECTRUM COMMUNICATIONS
Factory and Shop at Unit 6b Poundbury West Estate, Dorchester, Dorset DT1 2PG. Phone and Fax 0305 262250
Opening times: 9-1 2-5 Tue-Fri, 9-1 Sat. Closed Sun & Mon.

A WIDE RANGE OF QUALITY KITS & READY BUILT MODULES

TRANSVERTERS		Boxed kit	Boxed built
25W output, >15dB RX gain			
28MHz 10-500mW drive version,			
TRC2-10L, TRC4-10L, TRC6-10L	£138.00		£187.50
0.1-10mW drive version. TRC2-10bL, etc.	£145.75		£203.50
144MHz 2.5W drive version,			
TRC6-2iL, TRC4-2iL available built only,	£145.75		£203.50
50MHz 2.5W drive version,			
TRC2-6iL, TRC4-6iL,	£145.75		£203.50
LINEAR AMPLIFIERS			
3W in 24W out, RF switched			
50MHz TA6S1, 144MHz TA2S1	£56.25		£70.50
As above plus preamp TARP6S, TARP2S	£72.75		£98.25
SPEECH PROCESSOR			
Amplitude and frequency processor SP444E	£26.25		£40.00
RECEIVE PREAMPS			
20dB gain, 100W handling			
RP2S, RP4S, RP6S, RP10S	£28.50		£39.00
Masthead versions RP2SM, RP6SM	£39.50		£49.00
TRANSMIT TONES		PCB kit	PCB built
1750Hz repeater toneburst, AT1750	£5.00		£7.50
Piptone, like APOLLO beep, PT1000S	£7.00		£10.50
Keytone, morse dah-di-dah, KT1000	£10.25		£17.50
COMMUNITY BROADCAST EQUIPMENT			
87.50-108MHz synthesized 0.8W transmitter CTX100V	£185.00		
0.5W in, 25W out broadcast amplifier TA100C3	£110.00		
87.50-108MHz 'Slim Jim' style aerial	£30.00		
48.475MHz 1W link transmitter LTX48	£180.00		
48.476MHz link receiver LRX48	£150.00		
0.5W in, 25W out link amplifier TA50C3	£110.00		
199.7MHz 800mW link transmitter LTX200	£200.00		
199.7MHz link receiver LRX200	£150.00		

PLUS MANY OTHER KITS FOR AMATEUR AND CB RADIO
VAT & P&P inclusive prices. Send SAE for free Full Catalogue.

26 Clarendon Court • Winwick Quay Warrington • WA2-8QP
Tel (01925) 573118

For years the Microreader has been one of the most successful and widely used decoders in Britain and has opened up the world of utility decoding for thousands of listeners and hams. With the Microreader you don't need computers, monitors or any special equipment simply plug into your speaker socket and turn on. What could be simpler? But don't be fooled by its small size and low price, the Microreader is powerful and can match the performance of other big box units. The built in tutor has helped hundreds to learn to read and send CW perfectly. The latest version 4.2 firmware is the result of listening to what people want and expect from a decoder and combines ease of use with the highest ever level of performance. When you buy a Microreader not only do you get a full two years guarantee you get access to help assistance from a company committed to 100 percent customer satisfaction. The Microreader comes complete with leads, easy to read instructions, frequency list and you want to display the decoded messages on a computer screen. Please call or write for more information as space limits a full description.

SYNOPTIC DECODER

This is the easy way to translate the five figure code groups from the many meteo weather stations around the world into plain and readable English. No more books and tables, reports from aircraft, ships and land station are translated instantly and in full detail. How thick is the fog on the Tyne? What is the cloud type in New York? Transmissions from Bracknell are intended for the M.O.D. but you can decode them together with similar data from around the world. Works in conjunction with the Microreader or with any other decoder equipped with a serial RS232 output. Decoded messages can be displayed on home PC, dumb terminal or printed using a serial printer. Write or ring today for more information together with example print-outs.

MkII Microreader £199.50
Synoptic Decoder £99.50
Computer Terminal Program £10.00
Upgrade old MkII Microreader £20.00

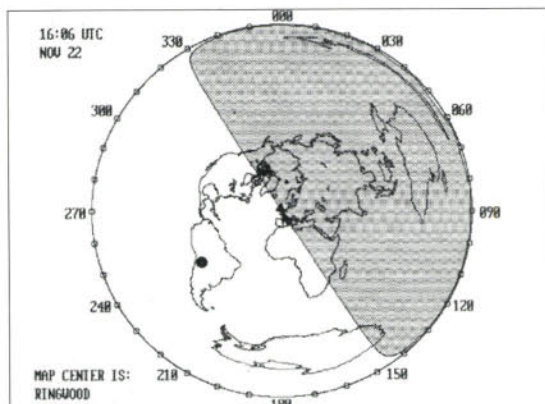
MkII (V4.2) MICROREADER £199.50

£99.50

ALL PRODUCTS GUARANTEED FOR 2 YEARS & PRICE INCLUDES VAT & DELIVERY
UPGRADES £20.00 | TERMINAL PROG £10.00 |

This month Mike Richards G4WNC takes a look at a selection of new programs.

Fig.1: This clearly shows the Grey line DX opportunities for any time of the year.



Peter Oldfield from Quebec has sent me the latest version of his DXAID program. The program contains a set of utilities designed to make life easier for the DX enthusiast and is likely to be of interest to both amateurs and short wave listeners.

The hardware requirements for DXAID are fairly basic. It needs just an IBM compatible PC with a VGA (640 x 480 16 colour) video system, 640k RAM and a hard disk. Once the files were copied from the single floppy disk, the SET-UP routine completed the installation and expanded the files to occupy a total of just over 1Mb of space on the hard disk.

The final part of the installation is to configure the program for your QTH. Once the home location had been entered, all the calculations and map projections were centred on this point.

A good example can be seen with the sunrise/sunset shown in Fig. 1. In addition to being able to show these maps based on the home location, you also have the option to select alternative points.

Although the DXAID program uses mainly Great Circle maps, you can choose to have the data displayed on a Mercator map if you prefer.

To use DXAID to produce propagation predictions, you need to set the remote target area. For this you can either enter a specific location by typing the full latitude and longitude co-ordinates or alternatively you can select the nearest site from the built-in databases.

The review copy featured one database pre-programmed with major cities, and a second one that carried short wave broadcast station information. As you use the program you can either create your own custom database or edit the ones supplied.

The basic solar data

calculation provided a range of information. This included declination latitude, sunrise and set azimuth, sunrise and set times for any specified day and location.

You can also use DXAID to provide bearing and distance information to anywhere in the world. This can either be done by entering the co-ordinates or by just clicking on the required destination using the mouse. In the latter case, the bearing and distance are shown at the top right of the screen.

As you can see, DXAID is a very useful collection of utilities for anyone interested in working DX. If you'd like a copy, it's available direct from P. Oldfield, 251 Chemin Beauvine, Piedmont, Quebec J0R 1K0 on a single 3.5in disk for £15 post paid. My thanks to Peter for supplying the review copy.

Internet Update

Lowe Electronics are now on the Internet with a number of facilities for amateurs and listeners alike. The mailboxes available are: info@lowe.demon.co.uk and Orders@lowe.demon.co.uk

While Lowe are happy to deal with requests for information, they do need your street address as some of the material is best posted.

If you are an HF-150 user you may be interested in Lowe's user mailing list. To join, just E-mail a request to hf150-request@batcomfs.Eng.Sun.Com.

New Interfaces

If you've developed an interest in the data modes, you may be looking for an interface that can be used for transmit as well as receive.

While the popular interface unit from Pervisell makes an excellent receive unit, it doesn't include the extra circuitry needed to

switch the transmitter and feed the tones to the microphone socket of the transceiver. I've recently tried out two units that provide all these facilities.

The first from GOLOV/G4LUE comes in kit form or ready-built whilst the other one from Venus is supplied ready-built only.

The GOLOV/G4LUE version, HAMFAX, was supplied in a plastics video box and comprised a 3.5in disk with HAMCOMM and JVFX software, kit of parts and a five-page, A4 leaflet with assembly instructions.

The assembly instructions were well set-out and should be adequate for those with little constructional experience. The only problems I encountered was with the p.c.b. mounted 5-pin DIN socket.

The holes in the p.c.b. were too small and had to be drilled-out. Hardly a major problem, but it was nevertheless very annoying, especially if you don't have a suitably sized drill to hand.

The final assembly measured 84 x 50mm and could be mounted in box of your choice. The software supplied was HAMCOMM v2.1 and JVFX v7.0 with a special set-up routine to transfer all the files to your hard disk. As HAMCOMM is now at version 3.0 you will need to make sure you are supplied with the latest version.

The HAMFAX is available in kit form from J. Bailey, 8 Hild Avenue, Cudworth, Barnsley, South Yorkshire S72 8RN for £19 or ready-built for £23 both plus £1.50 P&P.

The ready-built offering from Venus Electronics was neater with all the

electronics housed in the 25-way D connector. A good point about this unit was the provision of an in-line 5-pin DIN socket with connections set-out to match that used by the most of the Packet radio TNC systems. If you already have a Packet set-up all you have to do is move the plug, to changeover to the other data modes.

The Venus software comprised of three disks, the first two of which contained JVFX 7.0 and HAMCOMM 3.0. The final disk contained 15 GIF files that could be used for SSTV. Installation of all the files was handled by custom installation routines.

The Venus DataPack costs £49 plus £3 P&P and is available from **Venus Electronics, 26 Pevensey Way, Frimley Green, Camberley, Surrey GU16 5YD. Tel: (01252) 837860.**

My main disappointment with both packages was the lack of acknowledgement for the software authors. Wilhelm Schroeder and Eberhard Backeshoff have put in a considerable effort to make these programs excellent performers. If you do purchase either of these packages, please make sure you register the software with the authors and send a contribution to support further development.

That's all for this month, keep those letters coming to me, Mike Richards, 'Bits & Bytes', PO Box 1863, Ringwood, Hants BH24 3XD. CompuServe 100411,344 or Internet on Mike@decode.demon.co.uk

E N D

Paul Essery GW3KFE devotes this month's column to hints, tips and advice.

Report HF BANDS

This month's column is being written before the incoming mail arrives, for two very simple reasons. One, I forgot about Christmas and two some postal problems!

Now for this month's tip. Remember that if an expedition is operating from some rare spot, they'll most likely be operating round the clock. Hence, there's no reason to be calling them outside the 'best' times.

Listen to the pile-up. If you are in say G-land, and they are not working anyone in Europe, they either have no intention of working us at that time, or, more likely, they just aren't hearing us under the barrage of bigger signals they are dealing with. Thus, to call them is merely to create more QRM.

The Grapevine

The grapevine is something you need to be connected to. The RSGB *DX-News Sheet* comes out weekly, edited by G4DYD. Details and rates from RSGB, Tel: (01707) 659015.

Another weekly possibility is *The DX Bulletin*, at PO Box 50, Fulton CA 95439-0050, USA, and *The DX Magazine* from the same source. If you have packet gear, the Packet-Cluster network is useful if you can get in.

If you and a friend are both interested in chasing the rare ones, hunting in pairs with a landline or v.h.f. link is useful. One of you can be listening to the DX transmit frequency, while the other is 'spotting' the frequencies they're listening on. One snaps the DX station up, and the two roles are then reversed.

Band Conditions

Band conditions, as ever, are up-and-down. But check with your pal up the road sometimes, as 'bad conditions' have been known to arise from an antenna or equipment failure!

All the bands have shown signs of life, some obviously, more than most. Other than its true-blue addicts chasing DX most of us just cannot hear, activity here is distressingly low.

On 3.5MHz, activity seems to pick up late in the evening and go on through the night. There's sometimes a gap just before dawn which I believe to be more lack of activity than anything. During the day and evening of course, there is general activity as this is the 'natter band' par excellence.

The 7MHz band is often unjustly abused, but those who have the 'know-how' can run up massive country scores. It does however, seem to take some specialisation to get the best from 7MHz though.

It's often said that 10MHz partakes of more than a little of both 7 and 14MHz. But since it has been heavily invaded by the sidebanders, the old pleasantness has gone for ever. On the other hand, like 18 and 24MHz, the 10MHz band is a haven from contests.

The 14MHz Band

The 14MHz band of course is where the world's DX business is mainly transacted, whatever the mode. At the top of the sunspot cycle it has been known to open right through the night. At the present low ebb we can only expect daylight to be much use.

The 18, 21, 24 and 28MHz band should always be checked. You may just find something interesting and a CQ on a 'dead' band may scare up something quite interesting.

If no-one is operating, everyone assumes the band is dead. You have the comic vision of thousands of ears carefully listening to an open but totally unpopulated band - and one which the commercial lobbies would love to steal from us. 'Use or lose' is a good motto.

Since starting this month's report there has



Paul Essery reminds us that DXpeditions (like this trip to Scotland) often work 24 hours round the clock.

been a passable imitation of a gale in my part of Wales. It leads to an instant proof of the proposition above - my I.f. band antenna is now mostly below one metre in height!

Cable TV

On a totally different tack, throughout the country we have been seeing gangs of men installing cable TV systems. Many of us who have 'had some' will have been appalled at some of the engineering techniques being used.

I know of one example for instance where the work is to be completed before Christmas. And I can guarantee TVI from the 'rusty bolt effect' within one year or less of the system going in to service - and fully expect TVI from Day One due to the leakage of signals into their unscreened electronics.

As for 'piped TV' systems I have one locally which distributes its S4C channel (the Channel 4 in Wales) in a chunk of spectrum which includes 70MHz. Luckily no-one locally watches S4C!

Next Month

So, in the absence of the mail, the column must go to post. All mail coming in will be taken into next month's offering of course.

Meanwhile, my thanks to all of you - too many to answer individually - who so kindly sent me greetings and Christmas cards. And, until next Christmas we're back again to the old routine.

Send your letters please to PO Box 4, Newtown, Powys SY16 1ZZ to reach me by the middle of the month. Now - to get that antenna back up before I suffer withdrawal symptoms!

E N D



LONDON

AMATEUR RADIO & COMPUTER SHOW

11/12 March 1995

Visit the RSGB Stand and get...

■ SPECIAL OFFERS

Discounts on selected books.

■ SPECIALIST ADVICE

RSGB Council Members and HQ Staff on hand to help you and to hear your views.

■ SUBSCRIPTIONS

Join the Society at the Show and get all the previous six issues of *RadCom* **ABSOLUTELY FREE!** Renew your subscription on the stand. If you change your subscription to Direct Debit payment you get a free Book Voucher to the value of £5.*

■ BOOKS

Why pay postage - come and save your money with us.

■ RSGB NEWSLETTERS

See sample newsletters at the show - *DX News Sheet*, *D-i-Y Radio*, *Microwave Newsletter*, and find out what you are missing!

■ NOVICE INFORMATION

Find out where the nearest Novice RAE course is being held, or become an instructor yourself.

... PLUS A FEW SURPRISES!

* This offer only applies to those taking out a Direct Debit subscription.

COME AND SEE WHAT YOUR SOCIETY IS DOING FOR YOU!



RSGB (Dept PW395)

Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JE

This month David Butler G4ASR has details about tropo openings on the v.h.f. and microwave bands, reports about conditions during the recent e.m.e. contest, and news about winter propagation on the 50MHz band.

Report

Last month I mentioned the good tropo conditions which occur during the autumn. And it seems that the months of October and November were particularly good.

During an opening on November 28 and 29 an area of high pressure was centred over the British Isles and extended into central Europe. From my QTH (IO81) QSOs on the 144MHz band could be made with stations over a considerable area of Europe.

I contacted many stations in the eastern part of Germany in locator squares JO60, 61 and 71. These contacts, on s.s.b., were in excess of 1100km.

By moving the antennas further to the east I was able to work stations located in the Czech Republic. Contacts were made with OK1IAS at 1135km, OK1AGE at 1138km, OK1BMX at 1230km and OK2PLB at 1230km. All of these incidentally were worked between 2005 to 2015 UTC.

The tropo duct also extended into Hungary with HA/DL1MAJ (JN87) being the prize catch of the evening. He was 53 with me over a distance of 1520km.

The 144MHz band was also open to Switzerland and southern France. I completed QSOs on s.s.b. with HB9RDE, F10WN (JN25) and F6IRF (JN35).

Good Conditions

The station of **Vince Shirley G0ORC** (IO93) was also active during the good conditions on November 28. He first noted that propagation was up at 1525UTC when he heard the HB9HB beacon on 144.865MHz.

Later in the evening, from 2230UTC, Vince contacted OK1IAS (JO60) and OK1VMS/P (JO70) on the 144MHz band. He also worked OM3CQF (JN88) who was heard calling CQ on c.w.

Vince was also one of the fortunate stations to make a QSO with HA/DL1MAJ. He had to use c.w. for this contact as signals were quite weak. Further Morse QSOs

were made with OK1XN (JO70) and OK3PNN (JN89).

The 430MHz Band

Conditions on the 430MHz band were also very good. **Reg Wooley GW8VHI** operating from the RAF club station G6RAF (IO92) made a number of excellent contacts.

The stations worked by Reg included HB9AMH/P (JN37), OE2UKL (JN67) and OE5VRL/5 (JN78). Reg said he had to resort to c.w. to work HA/DL1MAJ for his 25th DXCC country on the band.

On 1.2GHz

A number of operators on the 1.2GHz band reported contacts with stations located deep into Germany. The station of **G0JDL** (JO02) worked DB6NT/A (JO52) and DG9NCX (JN59) around 2300UTC on November 28. Earlier in the day, at 1625UTC, he contacted HB9AMH/P.

John Quarmby G3XDY, also located in JO02, made s.s.b. QSOs with DL3IAS (JN49) and DK9MN (JN58). The band was still in good shape on November 29 when John exchanged 59 reports with DJ6JJ (JO31) at 2220UTC.

The husband and wife team **Charlie G3WDG** and **Petra Suckling G4KGC** (IO92) made the grade by working DG4YFK, DG9NCX, DB6NT/A and OE5VRL/5 on the 1.2GHz band. They were only running 1W output!

Even better results were made on the 10GHz band. Both G3WDG and G4KGC worked DB6NT/A (JO52) over a distance of 872km.

The Suckling's best DX of the evening however was an s.s.b. QSO with OE5VRL/5 at a distance of 1135km. It's really amazing what can be worked on this microwave band with low power!

United States

Interestingly it wasn't only Europe that enjoyed the enhanced conditions during November, as over in the United States propagation was equally as good. A new

tropospheric ducting continental distance record was recorded on the 144MHz band.

On November 5 **Rene Shaw WB4MJE** in Florida contacted **Serge Szpilfogel VE1KG** in Halifax, Nova Scotia over a 2715km path. The previous record was 2362km set in October 1968. The station of WB4MJE was ideally located at the southern tip of the Florida Keys.

A new USA overland distance record was also established on the 5.7GHz band during the autumn. On November 11 **Al Ward WB5LUA** contacted **Ron Stefanski W9ZIH** on the 430MHz band over a 1188km path.

Signals between WB5LUA and W9ZIH were S9 both ways. The two then attempted unsuccessfully to work each other on the 5.7GHz band. They tried that night and the following morning.

Finally at 1652UTC on November 12 the 1188km record was established. The previous overland record was held by N6CA and XE2/N6XQ over a path length of 988km.

Enhanced Tropo Returns

Now it's back to the UK again where the enhanced tropo conditions returned on a few occasions during December. Stations in central England reported working into localised areas of France and Switzerland during the evening of December 1.

The club station G6RAF, again operated by GW8VHI, were apparently located at one end of a tropo duct. Operating on both the 144 and 430MHz band he only worked stations in locator squares JN38 and JN39.

The duct type of propagation is quite common in the autumn. Radio waves can be trapped within channels bounded by sharp changes in the refractive index of the troposphere.

In effect the duct resembles an optical fibre or a microwave waveguide. The attenuation at ranges up to

1000km or more can be comparable with the free-space value. Consequently ducted signals are often extremely strong.

The down side of ducting is that propagation is generally limited to a very small geographical area. Albeit a long way away!

Another period of enhanced tropo occurred on December 11. **Lee Adams G4RKV** (JO01) worked HB9DFG, HB9DFP, HB9HLI and HB9RLM on the 144MHz band. All stations incidentally, were located in JN37. He also contacted F5SVQ in JN38.

Towards Switzerland

Although conditions were good towards Switzerland, there was also an opening to southern France and Spain. The station of **GW7SMV** (IO81) heard the EA1VHF beacon at 2200UTC on November 11.

On December 12 G6RAF operating on the 144MHz band contacted F1SQ (JN05), F6DJB (JN03), F6GPT (IN94) and F9HS (JN03). A QSO was also made with EA1NV located on the north coast of Spain.

Reg GW8VHI the station operator at G6RAF also worked F5FLN (JN93) on the 430MHz band. Regrettably Reg reports that due to rationalisation RAF Luffenham will close down in 1995.

Unfortunately therefore, the club station G6RAF will disappear. However, knowing Reg's enthusiasm for the v.h.f. bands, I'm sure he'll pop up from somewhere else in the not too distant future.

Moonbounce Contest

During the ARRL moonbounce (e.m.e.) contest held in October and November 1994 it was planned that a 46m diameter parabolic dish would be activated. The Toronto VHF Society, VE3ONT, were going to use the huge 960-ton radio telescope on the 50, 144, 430MHz and 1.2GHz bands.

Unfortunately, the proposed operation by VE3ONT in October was cancelled. The dish was needed for an international supernova observation scheduled for the same period.

Fortunately, the 46m dish was available during the November leg of the moonbounce contest, but only on the 144MHz band.

According to **Michael Owen W9IP**, the e.m.e. conditions were the worst experienced in nine years of operation. There were times when they could hardly hear their own echoes, even running 1.5kW to a 46m dish!

However, a total of 299 stations in all continents except South America were contacted by VE3ONT. Many stations not in the e.m.e. database were worked suggesting that they were first-timers.

If you were one of the fortunate stations to make a QSO with VE3ONT, send your QSL card to: **Dennis Mungham VE3ASO, RR3, Mountain, Ontario, K0E 1S0, Canada**. Alternatively, stations in Europe can send the QSL to: **Rainer DF6NA** who has the VE3ONT logs for 1993 and 1994. Please include an IRC and s.a.e.

Ralph Sachs G2CZS (JO01) reports that he listened for e.m.e. signals on the 144MHz band during the contest on October 29. He uses an FT-290 and a 13-element Cushcraft Yagi antenna.

Signals were heard by from K5GW and W5UN by G2CZS but no contact was made. Ralph mentions that fading of the signals and QRM from other local stations made copy very difficult.

Ralph is thinking that a digital signal processing (d.s.p.) filter will be a good investment. It could be used not only for e.m.e. work but for v.h.f. and h.f. in general.

Problems On Antenna

At my QTH I ended up with problems on the antenna elevation drive during the e.m.e. contest. This meant that I could only operate during moonrise and moonset.

I used an array of 4 x 17-element Yagis, **Fig. 1**, an MFG1802 low noise amplifier. My transceiver was an FT-221 with filtering down to 100Hz bandwidth.

During moonrise on October 29 I heard DL8DAT, HB9CRQ, I2FAK, IK3MAC, SM5BSZ, SV1AAF and S51WV. Contacts were made on c.w. with LZ2US, PA0JMV

and SM5FRH.

Moonset, from 1230UTC, was fraught with problems because of auroral activity. Stations heard were K5GW and W6HBT with QSOs being made with K2GAL and W5UN.

Conditions during moonset on the following day, October 30, were not particularly good either. The magnetic K index was still high causing attenuation of received signals. Stations heard were I5JUX, LA8YB, KB8RQ, K9MRI and W90EH with K5GW and K7CA being worked.

Started Well

John Regnault G4SWX (JO02) reports that the contest in October started well but went rapidly downhill. With signs of massive absorption, it was no surprise to note a K-index of 5 at 1200 UTC on October 29.

At times, John says it was difficult to hear the mega-stations like K5GW or W5UN. And when John could hear stations, the fading was so bad that letters were getting chopped up and it was very difficult to read call signs. However, on the 144MHz band G4SWX heard 27 stations, working 11 of them.

November Contest

The November leg of the contest wasn't particularly good either. The problem being that it was 27 days after the auroral activity in October. And, as the sun takes approximately 27 days to rotate, similar geomagnetic activity was encountered!

New stations that I heard at moonset on November 26-27 were EA6VQ, WB5LBT and S57TW. The station of KL7FB in Alaska was heard peaking 549 on c.w. for 10 minutes but the pile-up was too much! Contact were made however with WA1JXN/7 and VE3ONT.

The station of **Doug Mallett G3HUL** (JO02) was active on the 430MHz band during the second leg of the e.m.e. contest. Along with co-operator **Pat Gowen G3IOR** they worked 20 stations, 11 in Europe and 9 in North America.

The vast majority of the contacts worked by G3HUL and G3IOR were before dawn. They noticed that as the path became illuminated by the sun, the European stations became badly attenuated.

The station of **DL9KR** who is normally S7 off the moon was deep in the noise for hours at a time. Faraday rotation of received signals seemed stuck at 90° causing severe loss of signals.

Incidentally, Faraday

rotation means that horizontally polarised signals were being twisted around into vertical polarisation. But this doesn't cause a major problem if you have a dish antenna with a rotatable feed. The feed can simply be rotated to match the received polarisation.

Alternatively, some stations have a fixed vertical and horizontal driven element at the focus of the dish. It's then only a matter of selecting the one which gives the strongest receive signal.

However, if you're using a conventional linear Yagi array it's virtually impossible to mechanically rotate it into another polarisation plane. You therefore have to wait maybe for hours at a time before the correct polarisation matches up. Unfortunately though, you often run out of moon time in the process!

Winter Propagation

Some of you may be surprised to hear that there was some winter Sp-E propagation recently on the v.h.f. bands. You probably thought that it only occurred in the summer time.

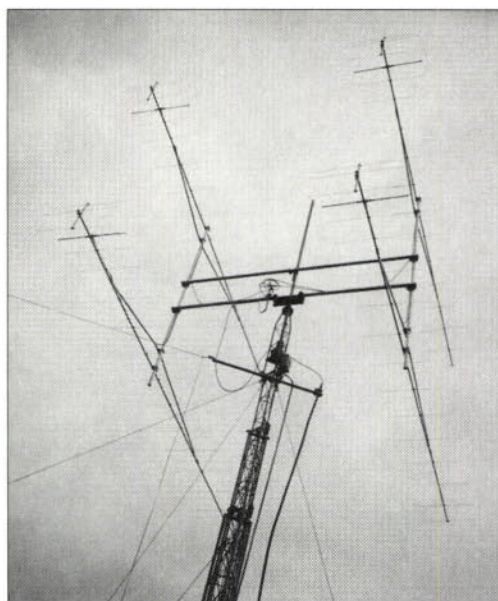
However, there is also a short period of Sp-E activity during the winter. It's not so intense as the summer season but nevertheless it can occasionally throw up some pleasant surprises.

During December and early January, the Maximum Useable Frequency (m.u.f.) sometimes reached the 70MHz band and on one afternoon even reached 90MHz. The consequence of this was that the 50MHz band was open for DX on a number of days during the period.

On Boxing Day (the day after Christmas Day for those of you who aren't sure of British Holidays!) the band opened up briefly between 1230 to 1300UTC. Contacts were made into Estonia (ES) and Denmark by stations located in northwest England.

Sp-E propagation was noted on December 28 at 1015UTC by **Dave Ackrill G0DJA** (IO93) when he heard the OH1SIX beacon. The opening then continued through to 1230UTC with stations in DL, ES, LA, OE, OH, OZ, SM and SP being worked from central and northern England.

The Sp-E conditions returned at 1500UTC and continued for approximately four hours. It allowed operators all over the UK to make contacts with stations up to 2000km away.



Recently Active

Gavin Stirling GM7LVJ (IO85) has only recently become active on the 50MHz band. Using a Kenwood TS-690S and a 14MHz dipole (!) he heard the beacon OH9SIX (KP36), at 1972km, peaking 529 during the opening on December 28.

Encouraged by the success of the 14MHz antenna on 50MHz, Gavin then quickly constructed a simple dipole. He made one out of twin-core electricity cable and heard signals from ES, OZ and SM.

Not bad for a 5-minute d.i.y. antenna! Gavin also reports that GM4IPK in Shetland noticed interference to an 87MHz link to the North Sea oil rigs at the same time.

Further Sp-E openings occurred on December 29 and January 1, both from 1800 to 1930UTC and on January 2 from 1600 to 1715UTC. On January 6 there were two events, 1230 to 1345UTC and 1545 to 1600UTC. Countries worked during these openings included DL, ES, F, I, OK, OM, OZ, SM, SP, YL, YU and S5. Not a bad start to 1995!

Deadline Time

Well, I've run out of space and it's deadline time again, and as usual send them to me at: **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) 87679.

E N D

Fig. 1: The four 17-element 144MHz Yagi array used by David Butler G4ASR.

PACKET

In this session Roger Cooke G3LDI welcomes Thetford, Norfolk onto the packet network.

The featured user group this month is the Thetford Data Group. The group was formed in 1989.

Thetford, in Norfolk, is almost the dead end of the world for v.h.f. communications. It is situated 28 miles from the nearest repeater, so activity was limited to local working.

However, Packet has managed to link it to the outside world, and with the increasing interest in the mode, the town now has GB7TDG as its own BBS. At least a callsign like that is easy to understand!

The East Anglian Data Group meets regularly in Thetford, and it was **Ron G0DVI**, who was instrumental in providing the meeting place. This was at his place of work, and it was indeed a very comfortable and convenient place to meet, and quite

inexpensive.

Ron attended most of the meetings and it was this which helped kindle some of his interest in packet. Together with **Steve G7LVA**, they originally set up GB7LVA, but unfortunately Steve had to curtail his activities due to pressure of work, so **John G4VEL** joined in and they set up GB7TDG.

Forwarding paths have been set up to GB7OPC and GB7TLH and other links, including a proposed high-speed link, are in the pipeline. The co-sponsors of GB7TDG are **John G4VEL** and **Phil G0CLT**.

The group consists of approximately 14 local amateurs, meetings are held on Wednesdays evenings and a weekly newsletter is produced by **John G4VEL**. John also runs a node, G4VEL-8, which helps access the BBS for remote stations.

The photograph, **Fig. 1**, shows **John G4VEL** in his shack. It looks highly technical **John**. The photograph, **Fig. 2**, shows **Ron G0DVI**, at the operating position of GB7TDG and this is more spartan.

Rose Switch

In the March 1994 issue of *PW*, I described the Rose Switch as an 'odddity'. It was a slip of the pen for me to describe it as such. I've been taken to task by several amateurs since then, including a couple from the USA.

Dave ZR5GQ, wrote to me, and gave me more information about 'Rose'. Then I visited Australia and experienced the Rose Network for myself. The Rose network has not really been used in the UK, so I had assumed it was a rare

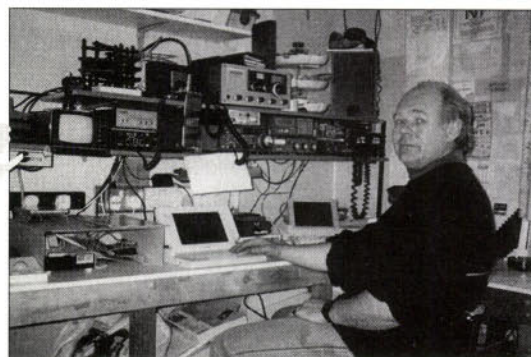


Fig. 1: John G4VEL seated at the command console.

Table 1

1	70.3250Mhz	Tait T500	1/2 antenna
2	144.625Mhz	Pye Westminster	3/4 antenna
3	432.675Mhz	Tait T500	Colinear antenna
4	WICK><LINK	Alinco ALR72E	9-el Beam antenna
5	TCP/IP	Test port only	

Breed.

I can only send my apologies to all users of **Rose**. I will try to obtain some information on the system and present it in a future issue.

Address Wanted

I had a request from **ON7SF** for an address of RF Engineering Ltd., who were based in Sherborne, Gloucestershire. They are stockists of Barker and Williamson products.

Apparently RF Engineering have moved, and despite requests to directory enquiries and packet messages, nothing has been forthcoming. If you have any information, could you please pass it on to **Andre ON7SF @ ON6AR.#AN.BEL.EU**

Writtle Node

The CHELM1 Node, run by **Dave G60QJ**, was first started, during 1986, from

Writtle near Chelmsford. The original equipment was a Commodore 64 running 'Digicom' and a home built modem using a TCM3105 i.c.

After moving location to North Springfield, a KPC2 KA-Node and PMS was added, then a change to a Tiny-2 with the call ESSX-2:G60QJ as the first 24hr TheNet Node in Essex.

The configuration has changed somewhat and is currently running on a PC with two serial ports, a Thor RLC-100 4-port 1200Baud modem card. There are five ports, and they're as shown in **Table 1**.

The main links of Chelm1 are to GB7NNA, G6DWB-4/LY4, G1IBP-1/CHELM4, G6FCL/GB7DUG, and G0RTD-1/WICK1.

That's just about all the space for now, so until the next time, happy packeting de Roger, G3LDI, @GB7LDI, QTHR. Tel: (01508) 570278.

E N D

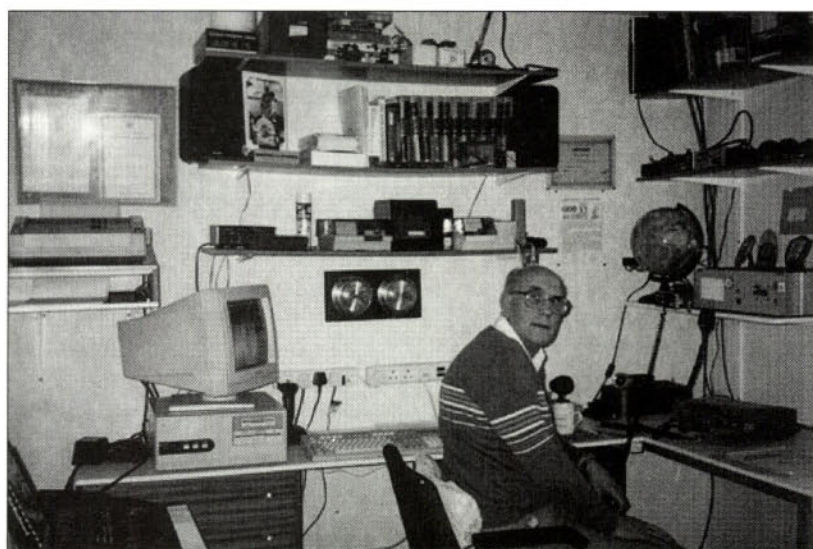


Fig. 2: Ron G0DVI seated at his side of GB7TDG.

USED EQUIPMENT SALE

TEL: 01708 374043

SX400 SCANNER
FT102 HF TCVR
FT101ZD MkII/Mk3
FT290R MUTEK
MUTEK HF/Z TVR
TOKYO HX 240
LAR 100 WATT ATU

BNOS 2M LIN
FTV707 TVR
GDO COMPLETE
30 AMP PSU
AOR2800 KENT PADDLE
TRIO TS 700G
YAESU FT225 RD MUTEK

YAESU FV101DM
ICOM ICR71E HF RX
ALTAI BASE MIC
ICOM ICW21E
FDK 2M FM MOBILE
LOTS MORE PHONE
ME!!

DAVID COLE G3RCQ • 3 MONTHS WARRANTY

ELECTRONICS VALVES & SEMICONDUCTORS

We are one of the largest stockists of valves etc, in the U.K.

COLOMOR (ELECTRONICS) LTD.

Phone for a
most courteous quotation

081-743 0899
Fax: 081-749 3934

170 GOLDHAWK ROAD
LONDON W12 8HJ

This month Peter Shore has news of a reactivated short wave station to listen out for as well as details on where to tune to catch your favourite stations.

This month there could be the chance to log a short wave station that hasn't been heard since the late 1980s. This follows the installation of new transmitters at a place called Guinea Fowl. No, it's not as the name might suggest Papua New Guinea, but Zimbabwe!

Guinea Fowl is a southern African country, with one of the most highly developed f.m. transmission networks in the continent. It has been decided to reinstate short wave broadcasting across the country and into neighbouring areas.

The Zimbabwe Broadcasting Corporation's (ZBC) Radio 2 is on the air on 6.045MHz during the day, and on 7.285MHz after dark. Their Radio 4 is on 3.306MHz during daylight hours and 4.828MHz at night.

The reason for the re-emergence of short wave is the fact that despite major investment in f.m. during the time of the Smith government in the former Rhodesia (as a way of stopping people tuning to stations from abroad), only around 70% of the country was adequately covered. Despite the lesser quality of short wave, greater areas can be covered using the high frequency bands. Eventually, say ZBC, all four national networks will be available on short wave.

Commercial Station

Closer to home, a new commercial short wave station is now operational in the Czech Republic beaming world-wide. Radio Metropolis in Prague is a private station which has broadcast on f.m. in the Czech capital, and has been granted permission to broadcast on short wave in addition to the programmes of state-run Radio Prague.

The station is currently transmitting in English, Russian, German and Czech

at these times: 0700-0755 on 9.455 to Europe; 0800-0855 on 5.905 to Europe; 0900-1055 on 9.47 to Europe (including the UK); 1100-1255 on 5.905 to Europe; 1300-1400 on 5.905 to Europe; 1600-1755 on 5.94 to Europe; 1800-1955 on 7.25 to North Africa and the Middle East; 2000-2255 on 7.305 to North America; 2300-0100 on 6.20MHz to North America.

The Czech station is seeking reception reports which can be sent to **Jeseniova 38, 13000 Prague 3, Czech Republic.** Let *PW* know if you manage to log this station.

Rumours

Hot on the heels of the closure of the Voice of America's short wave transmitting station at Bethany in Ohio comes a rumour that Deutsche Welle plans to stop using its Julich station in north-west Germany and at the Koenigs Wusterhausen site in the former East Germany.

Apparently the German Telekom, which operates all transmitters in Germany, plans to install new equipment at another former East German site at Nauen, on the outskirts of Berlin. The new 500kW transmitters will be installed there, coupled to a new state-of-the-art rotatable antenna. More details soon in *PW*.

Broadcast Schedules

There are short English-language news bulletins from Croatian Radio in Zagreb. These are broadcast on short wave at 0703 (not Sunday), 0803 (Sunday only) and 1003 (Sunday only) on 13.83, 9.83, 7.37 and 5.92MHz; at 1303 daily on 13.83, 13.64, 9.83 and 5.92MHz and at 2203 on 13.83, 9.83, 7.37, 5.92 and 5.895MHz.

More German language international programmes

appear on Astra audio subcarriers. Trans World Radio Europe has leased a subcarrier on Astra 1C at 11.038GHz (QVC home shopping channel) and you can hear the station on the 7.38MHz audio. Although presently in German, other language services of this religious station are expected to be added soon.

Spanish Foreign Radio has English to Europe for an hour at 2100 on 6.125MHz, to the Americas at 0000 for two hours on 9.54 and at 0500 for 60 minutes on 9.54MHz. An African service broadcasts at 1900 on 9.675MHz.

I mentioned in last month's column that the Voice of Israel's future looked uncertain, but during December came news that its future was assured at least for the whole of 1995 after additional funding was secured.

The Sri Lanka Broadcasting Corporation's External Service has discontinued transmissions to North America, preferring to concentrate its efforts on Asia and Australasia, as signals were rarely received in the US and Canada. Two frequencies can be heard at 1030 for the hour-long English service, these are: 11.835 and 17.85MHz.

English to Europe from China Radio International can be heard direct from the People's Republic at: 2000-2100 on 9.92, 8.26 and 4.13; 2100-2200 on 9.92, 8.26, 6.95 and 4.13MHz and via relays from Swiss Radio International transmitters at: 2200-2230 on 3.985MHz.

Radio Ulan Bator is on the air to Europe with English at 1930 on 13.65 and 7.29MHz. There are also transmissions to Asia in English - not all daily, though - at 0910-0940 on 12.0 and 7.29; 1200-1230 on 12.0 and 7.29 and 1445-1515 on 12.0 and 7.29MHz.

There are traces of jamming in the 16 metre band around frequencies used by Radio Moldova International which

broadcasts in Romanian to Romania. Frequencies of 17.815 and 17.735MHz, on the air at around 1100UTC, suffer from apparent jamming.

You can tune to Tehran and programmes on the Voice of the Islamic Republic of Iran in English at 1930 to 2030 on 9.022MHz. That transmission is directed towards Europe, but the same channel carries the North American English service at 0030, along with parallel 7.10MHz. There are daytime English services to the Middle East at 1130 to 1230 on 11.93 and 11.79 and to Asia on 11.79 and 9.575MHz at 1530UTC.

The Quito based station, HCJB has made some frequency alterations. English is on the air to Europe at: 0700-0830 on 9.42 and 6.205; 1700-2000 on 15.49MHz. The station runs a 24-hour single sideband channel (s.s.b.) on 21.455MHz, upper side band (u.s.b.) (on which English programmes can be heard), and a second channel on 17.49MHz with other languages.

Radio Tashkent with English has been noted at 1200 for 30 minutes on new 13.785, although the station announces both 6.025 and 9.715MHz.

Radio Thailand, making use of its new high-powered transmitter at Udorn, is on the air with English to Europe at 1900 for an hour on 11.855 and at 2000-2115 on 11.835MHz with English at 2030.

Finally this month, Radio Dnestria International is on the air daily at 2130 for 30 minutes of English on 9.62MHz.

Don't forget to let me have any interesting logs to tell fellow *PW* readers about. Until next month, good listening! Please send your letters to me via the *PW* Editorial Offices.

E N D



SureData

PC SALES, SPARES, TRAINING

Tel/Fax (24 hours)
0181 905 7488

Second User 386 SX PCs



- ♦ 2 Mb Ram ♦ 1.44 Mb Floppy ♦ 40 Mb hard drive
- ♦ Colour VGA display ♦ 3 month RTB warranty

♦ £399 inc. vat

- ♦ Free delivery ♦ Windows 3.1 £49
- ♦ 12 month RTB warranty extension £30
- ♦ New systems and upgrades available to your specification.

0181 905 7488

AMSTRAD SPARES, PHONE FOR DETAILS

PO Box 314, Edgware, Middx HA8 6ED
73 John G3TLU



J. BIRKETT

SUPPLIERS OF ELECTRONIC COMPONENTS

SURPLUS HOUSE MARKED R.F. POWER TRANSISTORS look like 10

Watt, 175MHz devices @ £8.95 matched pair.

SILVER PLATED BALL BEARING 1/4" spindle each end Air Spaced Variable

Capacitors 100pf @ £4.95, 100+100pf @ £5.95.

EX-EQUIPMENT VALVES ECC81, ECC82, 6BA6, @ £1 each, 6AL5, 6AS6, @ 50p each, EF91 @ 6 for £1.50.

GREEN SATIN INDICATOR UNIT as used in VBombers @ £25.00 (P&P £10), Artificial Horizon MK2

@ £18.00 (P&P £5.00)

FETS 2N3819 @ 35p, MPF102 @ 45p, J304 @ 25p, J230 @ 20p, 2N4869A @ 25p, 2N5486 @ 45p. Dual

Gate mos fets like 40673 @ 80p, BF981 @ 4 for £1.20.

R.F. POWER FETS MRF136 @ £14 matched pair, BLF244 @ £7.00.

VHF/UHF LOW NOISE FET J309 @ 55p each.

R.F. POWER TRANSISTORS BLY89A (2N6082) 25 watt, 12 volt, 175MHz @ £8.95, £16 pair.

R.F. POWER AMPLIFIER PRINTED CIRCUIT BOARD for 2 BLY96 with most components No. information @

£4.

2 HOLE FERRITE BLOCK @ 25p, 6 Hole Ferrite Bead @ 3 for 50p, Sub-Min Ferrite Beads @ 12 for 50p.

50 ASSORTED DIL RELAYS 6 to 48 volt fit in 16 Pin DIL Socket for £5.

R.F. POWER TRANSISTORS BLY89a (2N6082) 25 watt, 175MHz 12 volt @ £8.95, £16 pair, BLY97 @ £3.

BFR64 @ £2.50.

AIRSPACED VARIABLE CAPACITORS 15+15pf @ £3.50, 15+15+15pf @ £3.50, 10+10+20pf @ £2.50,

200+300pf @ £3.50, 365+365pf @ £4.95, 365+365+365pf @ £4.95.

SCREW TERMINAL ELECTROLYTICS 10,000uf 25v.w. @ 60p, 15,000uf 40v.w. @ £1, 15,000uf 63v.w.

@ £1.30.

AIR SPACED VARIABLE CAPACITORS 3 Hole Fixing Screws supplied 1/4" Spindle @ £3.50.

ACCESS, SWITCH and BARCLAY CARDS accepted. P&P £1 under £10. Over Free, unless otherwise stated.

C.M. HOWES KITS. Available by post and for callers.



25 The Strait
Lincoln LN2 1JF
Tel: 520767

Partners J.H. Birkett

J.L. Birkett

ALTRON TOWERS AND MASTS QUALITY AT A GOOD PRICE



- ★ Telescopic, tiltover
- ★ Fixed
- ★ Static, mobile
- ★ 4.5m and 3m section modules for low retracted height
- ★ Fully galvanised to BS729

Over 50 models available from 3m – 30m telescopic and 60m fixed including the popular and proven SM30 and CM35 masts. Design windloads based on CP3 CHAP V pt 11 1972 (38 m/s minimum 85 mph) and BS8100 1986.

Used by such professional bodies as: BT; Home Office; DTI; British Aerospace; British Gas; the Police; Hutchinson Telecommunication; Motorola and Marconi.

Also available are the highly anti-corrosive, precision manufactured strong, portable ALI masts and towers.

AQ6-20 'SPACE SAVER'

compact 4 bander with 2, 3 or 4 elements. 6, 10, 15 & 20m.

- Unique fully sealed coils • Hi 'Q' close coupled capacity hat loaded yagi with optimised performance
- Ideal for small spaces • Full specification sheet available.

- 2 Ele £161 • 3 Ele £236
- 4 Ele £310

ALTRON COMMUNICATIONS EQUIPMENT LTD

Send large SAE for full details or phone for quote.

UNIT 1, PLOT 20, CROSS HANDS
BUSINESS PARK, CROSS HANDS
DYFED, S. WALES, SA14 6RE
Tel. 0269 831431 Fax 0269 845348



SERVICE MANUALS

We have what is probably the largest range of Service Information available anywhere. From the Earliest Valve Wireless to the Latest Video Recorders, Colour Televisions, Test Gear, Audio, Computers, Amateur Radio in fact practically anything. Write, Fax or Phone for immediate Quote. Originals or Photostats as available.

Also available. Our FREE catalogue detailing Hundreds of Technical Books and Repair Guides available.

STOP PRESS

Now Available. Our Service Manuals Index on P.C. Disc (3.5") for use on your Computer. Just £3.50 with FREE everlasting Updates. Order MP-285.

MAURITRON TECHNICAL SERVICES PW

8 Cherry Tree Close, Chinnor, Oxford OX9 4QY

Tel:- (01844) 351694 Fax:- (01844) 352554

Please forward your latest catalogue for which I enclose 2 x 1st Class Stamps or £3.50 for the Technical Books Catalogue plus Manuals Index on PC Disc(s).

NAME _____

ADDRESS _____

POSTCODE _____

Photocopy this coupon if you do not wish to cut the magazine

Adapt-A-Mast

- Lifts to 25ft • Wall mounting
- Complete with all brackets, cable and winch
- Accepts 2in stub mast • Adaptable to tilt-over
- Available bare steel or hot dip galvanised BS729
- Simple four bolt installation

Call (01505) 503824

or write to

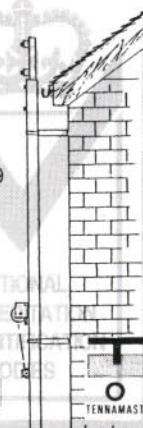
TENNAMAST SCOTLAND

81 MAINS ROAD

BEITH, Ayrshire KA15 2HT



Also Eurocard



QUARTZ CRYSTALS

MADE TO ORDER CRYSTALS

FUNDAMENTALS	PRICE	MODE	OVERTONES	PRICE
FREQUENCY RANGE			FREQUENCY RANGE	
1.5 TO 2.0 MHz	£8.60	3rd OVT	21.00 TO 60 MHz	£6.50
2.0 TO 4.0 MHz	£8.10	3rd OVT	60.00 TO 75 MHz	£7.75
4.0 TO 6.0 MHz	£7.75	5th OVT	60 TO 110 MHz	£7.75
6.0 TO 22 MHz	£6.50	5th OVT	110.00 TO 126 MHz	£9.00
22 TO 26 MHz	£7.75	7th OVT	125.00 TO 175 MHz	£12.50
DELIVERY: Approx. 2 weeks		9th OVT	170.00 TO 225 MHz	£12.75

Unless otherwise requested fundamentals will be supplied for 30 pf load capacities and overtones for series resonant operation. CRYSTALS SOCKETS HC25 £0.40 each MINIMUM ORDER CHARGE FOR SOCKETS £2.00 unless ordered with crystals.

Where applicable please state the make and model number of the equipment the crystals are to be used in.

HOLDERS - Availability as follows: HC6/U & HC33/U 1.5-225 MHz. HC18/U & HC25/U 2.0-225 MHz. HC45/U, HC49M, HC50M (9mm Can) 12.0-225 MHz add £5.00 per crystal. HC18/T, HC25/T (11mm can) 10.0-225 MHz add £1.00 per crystal. HC17/U (fits FT243 socket) 1.5-225 MHz add £1.00 per crystal. Unless otherwise specified crystals above 2 MHz will be supplied in HC25/U (HC50/U holders). COMMERCIAL CRYSTALS: Available on fast delivery and at competitive prices. EXPRESS SERVICE: Add 50% to the cost of made-to-order crystals for 5-day service.

TERMS: Cash with order post inc. to UK & Northern Ireland. Cheques & PO's to QSL LTD.

Please allow up to 14 days delivery. PRICES INCLUDE P&P AND VAT

QuartSlab MARKETING LTD

P.O. Box 19 Erith Kent DA8 1LH

Tel: 0322 330830 Fax: 0322 334904 Full list available on request, please send S.A.E. with all enquiries

ARCADE

The PW Shopping Arcade

Welcome to the *Practical Wireless* 'Arcade'. In this section of the magazine, you'll be able to find all those important services 'under one roof' - just like the shopping arcades you see in the High Street.

Let your eyes 'stroll through' the Arcade every month and you'll find all departments open for business including: The Book Service, Binders and details of other *PW* Services. Make a regular habit of 'visiting' the Arcade, because in future, you'll have the chance of seeing special book offers and other bargains. And don't forget, this Arcade is open wherever you're reading *PW*!

Services

Queries:

Practical Wireless,
PW Publishing Ltd., Arrowsmith Court,
Station Approach,
Broadstone, Dorset BH18 8PW.

We will always try to help readers having difficulties with *Practical Wireless* projects, but please note the following simple rules:

- 1: We **cannot** deal with technical queries over the telephone.
- 2: We **cannot** give advice on modifications either to our designs, to commercial radio, TV or electronic equipment.
- 3: All letters asking for advice **must** be accompanied by a stamped self-addressed envelope (or envelope plus IRCs for overseas readers).
- 4: Make sure you describe the problem adequately, with as much detail as you can possibly supply.
- 5: Only one problem per letter please.

Back Numbers

Limited stocks of many issues of *PW* for past years are available at £2.00 each including post and packing. If the issue you want is not available, we can photocopy a specific article at a cost of £1.50 per article or part of article. Over the years, *PW* has reviewed many items of radio related equipment. A list of all the available reviews and their cost can be obtained from the Editorial Offices at Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW for a large stamped self-addressed envelope.

Binders

PW can provide a choice of binders for readers' use. Plain blue binders are available, each holding 12 issues of any similar A4 format magazine. Alternatively, blue binders embossed with the *PW* logo in silver can be supplied. The price for either type of binder is £5.50 each (£1 P&P for one, £2 for two or more).

Send all orders to PW Publishing Ltd., FREEPOST, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW.

Constructional Projects

Components for *PW* projects are usually readily available from component suppliers. For unusual or specialised components, a source or sources will be quoted.

Each constructional project is given a rating to guide readers as to the complexity.

Beginner: A project that can be tackled by a beginner who is able to identify components and handle a soldering iron.

Intermediate: A fair degree of experience of building radio or electronic projects is assumed, but only basic test equipment will be needed to complete any tests and adjustments.

Advanced: A project likely to appeal to the experienced constructor. Access to workshop facilities and test equipment will often be required. Definitely not for the beginner to attempt without assistance.

Mail Order

All items from *PW* are available Mail Order, either by post or using the 24hr Mail Order Hotline (01202) 659930. Payment should be by cheque, postal order, money order or credit card (Mastercard and Visa only). All payments **must** be in sterling and overseas orders **must** be drawn on a London Clearing Bank.

Practical Wireless, March 1995

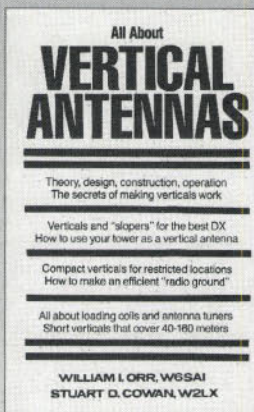
PW SUBS CLUB

Be sure of your copy of *Practical Wireless* every month and qualify for our **Subscribers' Club** as well. Special offers and discounts are normally available to members, including those abroad.

There can't be many radio amateurs who have not seen or read one of the many books written by William I. Orr W6SAI and Stuart D. Cowan W2LX. They are both prolific authors, and adopt an attractive, relaxed, but informative style. I've got quite a few of their books on my bookshelves, and I can personally recommend many of them to *PW* readers.

This month's *PW* Subs Club offer is a book I've personally found to be very helpful. And *All About Vertical Antennas* is typical of the work published by W6SAI and W2LX. It's packed with practical projects, hints, tips and theory (in an easy-to-read form), accompanied by the theory you need to know on the operation of vertical antennas. Of particular interest for operators with small gardens, is the section dealing with vertical antennas for restricted locations.

Rob Mannion G3XFD



You can get your copy of *All About Vertical Antennas* (and get *PW* delivered direct to your door!) for just **£7** including P&P UK (normal price £8.50 including P&P) or **£7.75** including P&P (overseas).

Offer open until March 10 1995 (UK), March 24 1995 (overseas).

To take advantage of this offer just fill in the details on the order form on **page 68** of this issue. Alternatively call our **Credit Card Hotline** on **(01202) 659930** to place your order.

NEW WAY TO SUBSCRIBE AND SAVE MONEY

Practical Wireless is pleased to announce a new Cardcharge service for Subscribers. This new service will save Subscribers a lot of hassle when it comes to paying for a subscription, using their credit card, as using this

service makes renewal automatic. To take advantage of this service just use the order form in this magazine.

Isn't it time you became a member of the *Practical Wireless* Subscribers' Club and had your favourite magazine delivered direct to your door?

Subscription Rates:

1 Year	£22 (UK)
	£25 (Europe)
	£27 (Rest of World)
	\$45 (USA)

If you complete the Cardcharge authority now you can save **£2** on the current subscription price. If you are an existing subscriber, just fill in the details on the form and we'll hold onto it until the time of your renewal when you'll be charged the subscription price at that time, **less £2**.

ORDER FORM

FOR ALL MAIL ORDER PURCHASES IN PRACTICAL WIRELESS

SUBSCRIPTIONS

PRACTICAL WIRELESS - 1 YEAR

☐ £22.00 (UK) ☐ £25.00 (Europe) ☐ \$45* (USA) ☐ £27.00 (Rest of World)

SPECIAL JOINT SUBSCRIPTION WITH SHORT WAVE MAGAZINE (1 YEAR)

☐ £39.00 (UK) ☐ £42.00 (Europe) ☐ \$75* (USA) ☐ £45.00 (Rest of World)

* \$ cheques only please.

Please start my subscription with the issue.

SUBSCRIBERS' CLUB OFFER Page 67

☐ Please send me copy(s) of *All About Vertical Antennas* @ £7 inc. P&P (UK). £

☐ Please send me copy(s) of *All About Vertical Antennas* @ £7.75 inc. P&P (overseas). £

My Subscriber Number is.....

SPECIAL OFFERS Page 20

☐ Please send me DB7900 Antenna(s) with FREE ☐ Magmount or ☐ Trunkmount @ £56.45 inc. P&P (UK and Irish Republic). £

☐ Please send me DB1101 Antenna(s) with FREE ☐ Magmount or ☐ Trunkmount @ £33.45 inc. P&P (UK and Irish Republic). £

☐ Please send me NB-30W Amplifier(s) @ £42.95 inc. P&P (UK and Irish Republic). £

Overseas P&P on the above available on application.

BINDERS

☐ Please send me SWM Binder(s) @ £5.50 each. £

Postal charges: £1 for one, £2 for two or more (UK & overseas surface).

BOOKS

☐ Please send me the following book/s,

..... £
..... £
..... £
..... £
..... £

Postal charges.

UK: £1 for one, £2 for two or more. £

Overseas:

£1.75 for one, £3.50 for two or more. £

NEW FASTER NEXT DAY SERVICE (UK)

(For orders received am) £3.75 £

GRAND TOTAL

£

We have re-designed our Order Form to accommodate the new Cardcharge service for Subscribers. This enables Subscribers to save a lot of hassle by using their credit card to pay for their subscription on an automatic annual renewal basis. To take advantage of this service complete the special Cardcharge form at the foot of this page and we will take care of the rest.

CREDIT CARD ORDERS TAKEN ON (01202) 659930

between the hours of 8.30 a.m. - 4.30 p.m. Outside these hours your order will be recorded on an answering machine.

FAX ORDERS TAKEN ON (01202) 659950

Or please fill in the details ticking the relevant boxes, a photocopy will be acceptable to save you cutting your beloved copy!

To: PW Publishing Ltd., FREEPOST, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW.

PAYMENT DETAILS

Name

Address

.....Postcode

Telephone No.

I enclose cheque/PO (Payable to PW Publishing Ltd.) £ \$

Or
Charge to my Access/Visa Card the amount of £ \$

Card No.

Valid fromto.....

SignatureTel:.....

Orders are normally despatched by return of post but please allow 28 days for delivery. Prices correct at time of going to press. **Please note:** all payments must be made in Sterling.

CREDIT CARD ORDERS TAKEN ON (01202) 659930

FAX ORDERS TAKEN ON (01202) 659950

Use this part of the Order form **only** if you want to use Cardcharge to pay for your subscription. If you want to take out a subscription, or order other items and want to pay by conventional methods, please use the main part of the Order Form.

CARDCHARGE AUTHORITY (for subscriptions only)

To

I authorise you, until further notice in writing, to charge mycard unspecified amounts in respect of.....(yearly magazine subscription)

as and when they become due

Visa/MasterCard account number

Expiry date

Name (as on credit card).....

Full Address.....

.....

.....

.....Postcode.....

Merchant reference: 6940936

Signature

Date

This authority may be cancelled by writing to PW Publishing Ltd. at any time.

BARGAIN BASEMENT

Write your advertisement clearly in BLOCK CAPITALS - up to a maximum of 30 words plus 12 words for your address - and send it together with your payment of £3.00 (cheques payable to PW Publishing Ltd.), or subscriber despatch label and corner flash to: **Zoë Shortland, PW Bargain Basement, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW.**

Subscribers must include the despatch label bearing their address and subscription number to qualify for their free advert.

Adverts published on a first-come, first-served basis, all queries to Zoë Shortland on (01202) 659910.

Advertisements from traders, or for equipment that is illegal to possess, use or which cannot be licensed in the UK, will not be accepted. No responsibility will be taken for errors.

For Sale

1.8MHz band traps. 1kW SMC spacesavers, fully encapsulated, as new with instructions, £20. MFJ-207 h.f. s.w.r. analyser, new and boxed with instructions, £75. 6146B/12B47A valves, ex./new Govt. equipment, £8 pair. No offers please, plus postage. G2FZU, QTHR. Tel: (01636) 813847.

Amstrad PC1512 computer, mono monitor, 20Mb hardcard, twin floppy drives, Brother HR20 printer, includes software, discs cables and manuals, lightly used, excellent condition, £100 or swap for 144MHz hand-held. Richard, Bicester. Tel: (01869) 324659.

Amstrad PC1512 HD20, colour monitor, DMP3000 printer, Ham software, £150. Yaesu FT470 v.h.f./u.h.f. hand-held. Extended receive, 130-180, 430-500 MHz c.t.c.s.s., d.t.m.f., FNB-11 batteries, PA6-d.c., 12V, MH12-AB spkr./mic., manuals, case, boxes, £275. Mick GONBB, QTHR. Tel: (01227) 266460.

FRG8800, very good condition with manual and box, £350 o.n.o. FRG9600, very good condition with manual and box, £350 o.n.o. Simon, Berks. Tel: (01635) 200865 evenings.

Hallicrafters SX16 Super Skyriider, excellent condition, reasonable offer. Tel: Essex (01702) 522929.

Hammerlund HQ170 receiver, 80-10 plus 50MHz classic refurbishment, ideal s.w.l., perfect, £85. KW Viceroy antique, stable, used daily with HQ170, g.w.o., c.w., s.s.b., a.m., mic., manual, buyer inspects, collects, £95. Ken G4ZLX, QTHR. Tel: Reading (01734) 225019 daytime or (01258) 455507 weekends.

Heavy duty 30/35 amp power supply, variable 11/25V output, £80. Multi-mode transceiver for 28MHz, £75. Buyer inspects and collects. PSU too heavy to send. Tel: South Glamorgan (01222) 512959.

Hustler h.f. mobile antenna (M02), see Aug '94 PW, c/w 80 through 10 (400W) resonators, includes HD double wound base spring, centre spring, quick release unit and 2:1 step down balun, £90. N. Cooper G3LMO, Ramwood, Lanvean, St Mawgan, Cornwall TR8 4EY.

JRC JST135 transceiver, 150 watts p.e.p. with matching JRC p.s.u., excellent condition, original purchaser, boxed, £850. Tel: Cornwall (01736) 757721.

Kenwood TS241E 144MHz mobile, 5/10/50W, boxed, as new, £260. Yaesu G400 rotator, £140. Malcom G0HOG, Ruislip. Tel: (01895) 676919.

Kenwood TS430S h.f. gen C, MC43S mic., p.s.u., PS430 and matching auto tuner, AT250 (brand new), d.c. and remote leads, boxed, manuals, v.g.c., £800 o.n.o. Please write to: J. Curtis, 21 Aillsaints Road, Wyke Regis, Weymouth, Dorset DT4 9EZ.

Kingshill 155c modular power unit, 50 amp 0-15V, £55. Z88 notebook computer, OK for portable packet, many extras, ring for details, £75 or exchange anything useful. Brian Body, Truro. Tel: (01872) 78020.

Microwave modules transverter MMT 432/28S, ideal satellite, £95 with handbook. 10W BNOS LPM 432 10/50 linear amp with pre-amp, £165, both v.g.c. Mike, Middlesex. Tel: (01956) 506101 evenings.

Microwave Modules MML 144/100S 144MHz linear/pre-amp, £60 o.n.o. Suitable p.s.u. available if required. KW2000B p.s.u./spkr. circuits, £60. Collins mechanical filter, 455kHz, 500Hz bandwidth. Offers. Don, Devon. Tel: (01626) 888889 anytime.

Navy B40C receiver in good working order, £50. Buyer to collect. C. M. Hale, 22 Pacific Court, Riverside, Shoreham Beach, Shoreham, Sussex BN43 5RW.

PA valves, new, boxed, guaranteed, QQV06/40A, £15. QQV03/20A, £10. 6146B, £10. 6KD6, £12. 4CX250B, £30. 12AT7, £1.50. 12AX7, £2. U52, £3. 6870, £2, include £1.50 P&P. Cheques to A. K. Whillock, 74 Chetell Way, Blandford St. Mary, Dorset DT11 9PH. Tel: (01258) 455507.

Philips PCR (PW Jan '95), beautifully complete, vintage clearout, 1934 Philips superinductance, fully restored DX200, boxed, horn speaker, early transistor novelty radios, books, magazines from 1920 onwards. Sale due to recent house move. Tel: Dorset (01425) 476790.

R5000, 100kHz to 30MHz in mint condition with internal VC20, 108 to 174MHz converter and manual, has all modes as standard, a.m., f.m., u.s.b., i.s.b., f.s.k., £675. No offers. Scott, Scotland. Tel: (01592) 264255.

Racal RA17 in steel cabinet, excellent condition, £175 includes manual and set of valves. Francis, Southampton. Tel: (01703) 845295.

Tagra AH-03 Yagi 3-element beam, 500W, gain 8dBd, 10.15dBi, still in box as received, never taken out and assembled, gift at, £70. Tel/FAX: Kettering (01536) 522007.

Test gear: Oscilloscopes, telequipment D83/V4/S2A, Philips OM3240, both 50MHz dual trace delayed timebase, signal generators, Marconi TF1066B/I, TF2002/TF2170, AVO LF120, bench p.s.u.s, Farnell L30 30V/0.5A metered. Reasonable offers, anytime to: Rodger, North Kent. Tel: (01634) 220747.

Trio TR-751E 144MHz multimode transceiver, little used, boxed, as new condition, £450 o.n.o. Looking for scanner, AOR A3000, may be interested in exchange. G1TRT, South Lincs. Tel: (01778) 424510.

Trio TS-430S, 0-30MHz RX/TX, f.m. unit fitted, mic., etc., £430. Star SR-550 dual conversion receiver, 1.8-50-MHz, a.m., s.s.b., c.w., £65. VHF RX 30-260MHz a.m., f.m., s.s.b., £65. Yaesu FTV-250 28-144MHz transverter, £75. Ben. (01562) 743253.

TS930S auto a.t.u., c.w. filter, Kenwood MC80 mic., Kenwood LF30A low pass filter, manual, original box, as new. Tel: Lymington (01590) 644788.

Yaesu FRG9600 MkII receiver scanner. Raycom extended coverage, 60 to 960MHz, a.m., s.s.b., c.w., f.m.w., f.m.n., mint condition, boxed with handbook, £310 o.n.o. Tel: Birmingham 0121-474 6601.

Yaesu FT-212RM 144MHz full, £260. Icom 24ET 144/430MHz hand-held, two spare batteries, packs, d.c./d.c. converter, soft case, speaker mic., £275. Hygain 28MHz mobile, DTI ATY Spectrum conversion, £100. Kenwood TM702 with Welz meter, HB desk mic., £425. G4OHJ, Warks. Tel: (01789) 773286.

Yaesu FT-221R multi-mode 144MHz transceiver, original specification, mint condition with hand book, £285. Postage at cost. Also connexions satellite RX, manual tune, band width filter, all polarisers, £45. Oliver Rogers G1FXD, Cornwall. Tel: (01637) 880404.

Yaesu twins, FLDX400 TX, FRDX400 RX, immaculate condition, 120W TX, RX covers 1.8 to 28MHz, including f.m. board, £250 or Exc 50MHz TX/RX. PA board for FT-747, cost £140, accept £50 o.n.o. Derek, Warks. Tel: (01789) 297158.

Wanted

430MHz linear amplifier, 100W o/p minimum with pre-amp. Also SMC Polarphaser MkII for 430MHz. Michael GONBB, QTHR. Tel: (01277) 266460.

American Walkie Talkie BC611, WWII, also canvas cover for same. Tel: Leicester 0116-288 0068 evenings.

Command RX which includes 3.5MHz for MWARS member J. H. Duncan, Rugby. Tel: (01788) 811295.

Early l.e.d. pocket calculators, especially those made by Sinclair, Texas Instruments, Bowmar, Sony, Rockwell, Sharp, Canon, Craig, Sanyo, Casio, Lloyds, Panasonic, Toshiba, Commodore, etc. Non workers accepted, distance no object. Enrico Tedeschi, 54 Easthill Drive, Brighton BN41 2FD. Tel/FAX: (01273) 410749 or (0850) 104725.

Eddystone EC10, EC10 MkII, 960, EB35, EB37, 888A, etc. Diecast speaker 'S' meter, any Clarke and Smith school radio, £10 offered for non workers. Collection possible. Cash waiting! Peter Lepino, Surrey. Tel: (01374) 128170 or FAX: (01372) 454381 anytime.

Ferrite rod antennas, must be half inch in diameter, no more or less. Must be six inches long or more. Peter Tankard, Sheffield. Tel: 0114-234 3030 anytime.

FT225RD 144MHz all mode base station transceiver, must be in very good condition and g.w.o., or any 144MHz all mode base station. Peter G00MH, Orpington. Tel: (01689) 890227.

HRO500 receiver, working or not, compete if possible, may be able to collect. Hanson, 42 Oak Avenue, Newport, Shropshire TF10 7EF. Tel: (01952) 419666.

National NC-77X circuit diagram, also any other manual or information. Beg, borrow, buy or copy, expenses reimbursed. It's a valued general coverage set. Godfrey G4GLM, 63 The Drive, Edgware, Middlesex HA8 8PS. Tel: 0181-958 5113.

Pre-war Marconi sets and accessories like V2, NB2, sterling horns, Marconi-Reitz microphone detectors tuner, crystal 'A' crystal tuner, crystal baby any condition. Will collect and pay cash, distance no object. Enrico Tedeschi, 54 Easthill Drive, Portslade, Brighton BN41 2FD. Tel/FAX: (01273) 410749 anytime.

R5, R7 verticals, good order. G3AOS, Cheshire. Tel: (01260) 252287.

SSTV software for BBC computer, tape or disc, also colour monitor for BBC. Interface cartridge wanted for Citizen 120-D printer or cheap printer. Tel: Rochdale (01706) 373339.

Wireless World, Vol. 31 (July to December 1932) and Vol. 46 (1940). Terry Brown G4TZB, Manchester. Tel: 0161-643 6116.

Exchange

TS530S WARC excellent condition plus ERA Microreader MkII 4.1, exchange for FT757GX or other TX/RX plus GC, will cover post from my end (no sale, exchange only). Tel: Isle of Lewis (01851) 810899.

Classified Ads

To advertise on this page see booking form below.

Educational

COURSE FOR CITY AND GUILDS Radio Amateurs Examination. Pass this important examination and obtain your licence, with an RRC Home Study Course. For details of this and other courses (GCSE, career and professional examinations, etc) write or phone - THE RAPID RESULTS COLLEGE, DEPT JX116, Tuition House, London SW19 4DS. Tel: 0181-947 7272 (9am-5pm) or use our 24hr Recordacall service 0181-946 1102 quoting JX116.

HEATHKIT EDUCATIONAL PRODUCTS/UK DISTRIBUTOR Spares and Service Centre. Cedar Electronics. 12 Isbourne Way, Broadway Road, Winchcombe, Cheltenham. Glos. GL54 5NS. Tel: (01242) 602402.

Wanted

WANTED FOR CASH Valve or solid state communication receivers Pre-1980. Preferably working and in good condition. Non working sets considered also domestic valve radios. Items of Government surplus wireless equipment and obsolete test equipment. Pre-1965 wireless and audio components and accessories. Pre-1975 wireless and TV books and magazines. Also, most valves wanted for cash. Must be unused and boxed. CBS, 157 Dickson Road, Blackpool, FY1 2EU. Tel: (01253) 751858 or Fax: (01253) 302979.

Service Sheets

TECHNICAL MANUALS, AR88, CR100, R210, HRO, £5 each. Cirkits only. 150 pence, plus S.A.E., lists thousands. Bentley, 27 De Vere Gardens, Ilford Essex IG1 3EB. Phone: 0181 554 6631

SCIENTIFIC SHAREWARE

Discover the true wealth of PD and shareware for the PC. Since 1982 PSDL have supplied the best and latest programs covering all interests. Business, Leisure, Engineering, CAD, DTP, Maths, Stats, Chemistry, Education, Electronics, Ham Radio, Esoteric, Medical, Raytracing, Programming & languages, Tools, Utilities, WP, Editors, Comms, Special applications, Esoteric, Novelty, Astronomy & hundreds more. All software can be provided on floppy disc or CD ROM. Whatever your interest in we probably have. Send today for our PC Shareware reference guide. It runs to more than 250,000 words and is probably the most comprehensive catalogue currently available.

Send £2.50 (voucher provided refundable on first order) or Phone/FAX using Access/Visa/MC to:

PSDL, Winscombe House, Beacon Road, Crowborough, East Sussex TN61UL Tel: (01892) 663298 FAX: (01892) 667473

For Sale

VINTAGE SERVICE DATA, circuits & manuals - for: HiFi, Military, Radio, Television & car radio up to the 1060's. Free brochure. Savoy Hill Publications, "Seven Ash Cottage", Seven Ash, Combe Martin, North Devon, EX34 0PA. Tel: (01271) 882665.

SAMSON ETM-9COG super memory EL-Keyer, (logikey specification) £108. ETM-9C, (integral paddles) £150. ETM-5C, (integral paddles) £90. Twin paddle key, £45. G5BM QTHR. Tel: (0531) 820960.

LANDHEHR VHF/UHF masthead preamplifiers 2 metre 145MAS £147 and 70cm 435MA £152 P&P. £4. Write or phone for leaflet. Qualitas Radio 23 Dark Lane, Hollywood, Birmingham B47 5BS. Tel: 0121-430 7267.

MORSE DECODER (with display)

Picks up morse as audio from radio speaker, so no connection to radio necessary. Built in microphone an alphanumeric display. Fully tested and ready to use.

£29.95. SAE for full details.

SMB (Dept PW) PO Box 38, Inverness IV1 1GA.

Computer Software & Hardware

ULTIMATE MORSE TUTOR for PC's and ATARI £30 from BOSCAD Ltd, 16 Aytoun Grove, Balldridgeburn, Dunfermline, Fife KY12 9TA or Tel: 01383 729584, evenings for detailed information.

Valves

VALVES GALORE Most valves available from stock. Otherwise obtained quickly. Please send SAE stating requirements or telephone. **VALVE & ELECTRONIC SUPPLIES** Chevet Books, 157 Dickson Road, Blackpool FY1 2EU.

Tel: (01253) 751858 or Fax: (01253) 302979.

WANTED, VALVES GZ34, KT66, K688, PX4, PX25 and all West European/USA manufactured audio valves. Please post list of what you have available for prompt reply. We also wholesale audio tubes, valves and CRTs. Minimum order £100. Billington Export, 1E Gillmans Ind Est, Billingshurst RH14 9EZ. Phone: 01403 784961 Fax: 01403 783519. Callers strictly by appointment only please.

DISCLAIMER

Some of the products offered for sale in advertisements in this magazine may have been obtained from abroad or from unauthorised sources. *Practical Wireless* advises readers contemplating mail order to enquire whether the products are suitable for use in the UK and have full after-sales back-up available.

The publishers of *Practical Wireless* wish to point out that it is the responsibility of readers to ascertain the legality or otherwise of items offered for sale by advertisers in this magazine.

Receivers

B.F.O. KITS Resolves single side-band on almost any radio, £16.49. H. CORRIGAN, 7 York Street, Ayr KA8 8AR.

TRANSCIEVER P.R.C. 316 HF, AM, CW, 4watts output with speaker/mic and manual last few left £105.00. Megger crank handle type 500V £45.00. All prices include P&P. send large S.A.E. for list. C.P. Surplus 56A Worcester Street, Wolverhampton WV2 4LL.

Miscellaneous

DIY INEXPENSIVE RADIO PROJECTS. Easy to make, SAE, RYLANDS, 39 Parkside Avenue, Southampton SO1 9AF.

P & M THACKER

Buyers of Surplus Electronic Valves, Transistors and Test Equipment Etc.
11 Park Street ·
Cheslyn Hay
Walsall · WS4 7EF
Telephone:
(0922) 412165

MORRITT LICENSED HOTEL,
Blackpool
(100 yards from Norbreck)

BOOK NOW for RADIO RALLY

En-suite rooms available
All rooms TV
326 Queens Promenade
Ring
Shelagh 0253 351016

TOP PRICES PAID

for all your valves, tubes, semi-conductors and ICs.

Langrex Supplies Ltd.,
1 Mayo Road, Croydon,
Surrey CR0 2RP.

TEL: 0181-684 1166. FAX: 0181-684 3056.

ORDER FORM FOR CLASSIFIED ADS PLEASE WRITE IN BLOCK CAPITALS

The prepaid rate for classified advertisements is 42 pence per word (minimum 12 words), box number 70p extra. Semi-display setting £13.90 per single column centimetre (minimum 2.5cm). Please add 17.5% VAT to the total. All cheques, postal orders, etc., to be made payable to the PW Publishing. Treasury notes should always be sent by registered post. Advertisements, together with remittance should be sent to the Classified Advertisement Dept., Practical Wireless, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW. Tel: (01202) 659920, Fax: (01202) 659950

Please insert this advertisement in the issue of Practical Wireless (if you do not specify an issue we will insert it in the next available issue of PW) for insertion/s. I enclose Cheque/P.O. for £..... (42p per word, 12 minimum, please add 17.5% VAT to total).

Name:

Address:

Telephone No.:

Box Number @ 70p: Tick if appropriate. ☐

Category heading:

G6XBH G1RAS G8UUS

VISIT YOUR LOCAL EMPORIUM
Large selection of New/Used Equipment on Show

AGENTS FOR:
YAESU • ICOM • KENWOOD • ALINCO
Accessories, Welz Range, Adonis, Mics, Mutek Pre-Amps
Barenco Mast Supports, DRAE Products, BNOS Linears & PSUs
* ERA Microreader & BPS4 Filter, SEM Products *
* Full range of Scanning Receivers *

AERIALS, Tonna, Full Range of Mobile Ants
BRING YOUR S/H EQUIPMENT IN FOR SALE
JUST GIVE US A RING

Radio Amateur Supplies
3 Farndon Green, Wollaton Park, Nottingham NG8 1DU
Off Ring Rd., between A52 (Derby Road) & A609 (Ilkeston Road)
Monday: CLOSED. Tuesday-Friday 10.00am to 5.00pm. Saturday 9am to 4pm

R.A.S. (Nottingham) **R.A.S. (Nottingham)**

G6XBH G1RAS G8UUS Tel: 0115-928 0267

AERIAL ROTOR FOR ONLY £49.95!
LATEST CATALOGUE

AR300XL Aerial Rotor, Control Unit and Optional Alignment Bearing

Rotor unit type AR300XL and control consol. Continuous indication of beam heading. Clamps to 2in (52mm) max. mast and takes 1½in (38mm) max. stub mast. 'Offset' type mounting. Vertical load carrying 45kg. Special offer £49.95 plus £4.95 p&p.

AR1201 alignment (support) bearing. Allows greater/higher head loads. Fitted above rotor. £18.95.

Plus full range of Revco Discones, air/marine antennas, rotators. * Multi-standard TVs & VCRs * Satellite Equipment * Signal Strength Meters * TV DXing Equipment * Masthead Amplifiers * Filters * Accessories

11 Kent Road, Parkstone, Poole, Dorset BH12 2EH.
Tel 01202 738232
Fax: 01202 716951

AERIAL TECHNIQUES

Please mention
practical
Wireless
when replying to
advertisements

YAESU, ICOM, AOR etc.

SALES & SERVICE Holdings of Blackburn Ltd. Inc. 1952, Yaesu Agents since 1972. G3LL 40+years in electronics. Best prices for callers (try us with cheque or 'real money' if you want to bargain) only xyl and self to pay so we can afford to give good prices - valves and CW filters for old Yaesu eg. Phone, normally open Tues, Wed, Fri and Sat. Lunch 12.00-1.30 but phone first we enjoy a few holidays!

G3LL HOLDINGS, AMATEUR ELECTRONICS
45 JOHNSTON STREET, BLACKBURN, BB2 1EF
(0254) 59595

NEW! TU3 Antenna Tuner

* Ideal for receivers with a long wire Antenna on the H.F. bands, 1-30MHz.
* Versatile! The touch of a switch gives any one of 3 different arrangements.
* Quality case - black with printed aluminium front & back facias. Measuring only 170-140-50mm.

* Kit complete with ALL components and hardware including pre-punched case and panels.

Price £44 Plus £4.00 P & P
Ready made £54 Plus £4.00 P & P

Send SAE for details of our full range of kits or call **0115 938 2509**

LAKE ELECTRONICS
7 MIDDLETON CLOSE, NUTHALL, NOTTINGHAM NG16 1BX
(Callers by appointment only)

SHORT WAVE MAGAZINE
THE UK'S ONLY MAGAZINE FOR THE RADIO LISTENER

REVIEWED IN THIS ISSUE

- ☆ PK-232MBX MULTI-MODE DATA CONTROLLER
- ☆ LAKE TU3 ANTENNA TUNER

FEATURES

- ☆ BUILD A VLF LOOP ANTENNA
- ☆ HAWAII CALLS

PLUS REGULARS EACH MONTH

- ☆ SOMETHING FOR EVERY LISTENER ☆ AIRBAND
- ☆ SCANNING ☆ JUNIOR LISTENER
- ☆ PROPAGATION ☆ SATELLITE TV REPORTS
- ☆ SSB UTILITY LISTENING
- ☆ REGULAR REPORTS ON THE LONG, MEDIUM & SHORT WAVES ☆ PRODUCT NEWS & MUCH MORE!

SUBSCRIPTION RATES HELD

Subscribe NOW and receive your copy of SWM at the old price for a year

You may have noticed that the cover price of SWM has risen to £2.25. Subscribe now, beat the increase, be sure of your copy of Short Wave Magazine every month and quality for the Subscribers' Club as well. Special offers and discounts are normally available to members, including those abroad.

Subscription rates will only be held at the old price until March 31 1995.

Also available is a cardcharge authority, which saves you even more money!

Special Cheaper Rate If You Take A Joint Subscription With Practical Wireless

DON'T MISS IT!

short wave magazin

NEW THIS MONTH
PK-232MBX Multi-Mode Data Controller
Lake TU3 Antenna Tuner
Build A VLF Loop Antenna
Hawaii Calls

FEB ISSUE ON SALE NOW

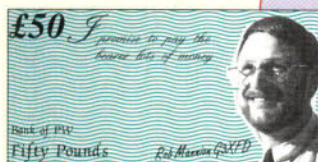
Coming Next Month

Free What Scanner Magazine

Win a PRO-2039 Base Scanner
Special Offers:
Sangean Portable Short Wave Receiver
Yupiteru Scanner package

Review - MFJ 2m Receiver Kit
Review - Velleman CW Decoder Kit
Plastic Welder Interference
Angling the Ether
Improving CW on the R1155A
Radio Secrets of the War Pt.1
Solid State Damp Finger
Optoelectronics Scout - Review

BOOK SERVICE



£50 PRIZE DRAW

For every book order received between February 9 1995 and March 8 1995 the name and address of the customer will be entered into our prize draw. On March 9 one name will be pulled from the sack. The lucky person will win a £50 note (a real one!) So why not place an order for that book that you've been thinking about buying and you may be the lucky recipient of £50.

The books listed have been selected as being of special interest to our readers. They are supplied direct to your door. Some titles are overseas in origin.

TO ORDER:

PLEASE USE THE ORDER FORM ON PAGE 68 OR TELEPHONE THE CREDIT CARD HOTLINE ON (01202) 659930.

LISTENING GUIDES

CALLSIGN 95

The Civil & Military Aviation Callsign Directory

Intended for the aircraft and radio enthusiast to use as a stand alone reference, or as a partner to *Airwaves 94*.

Over 5300 military and 3000 civil callsigns are covered in detail. 108 pages. £7.95



AIRWAVES 94

The Complete HF/VHF/UHF Aviation Frequency Directory

88 pages. £7.95

AIR BAND RADIO HANDBOOK

5th Edition

David J. Smith

Air band radio listening enables you to listen-in on the conversations between aircraft and those on the ground who control them, and is an increasingly popular and fascinating hobby. A new chapter on military air band has been added. The author, an air traffic controller, explains more about this listening hobby.

190 pages. £8.99

THE COMPLETE SHORT WAVE LISTENER'S HANDBOOK 4th Edition

Hank Bennett, Harry Helms & David Hardy

This book is a comprehensive guide to the basics of short wave listening. Everything you need to get started as an s.w.l. is explained in a clear and easily understood manner. Receivers, antennas, frequencies, propagation, Q-codes, etc. are all covered.

321 pages. £17.95

DIAL SEARCH 1992/94

George Wilcox

The listener's check list and guide to European radio broadcasting. Covers m.w., l.w., v.h.f. & s.w., including two special fold-out maps. Also includes a full list of British stations, a select list of European stations, broadcasts in English and 'Making the Most of Your Portable'. 46 pages. £4.25

FERRELL'S CONFIDENTIAL FREQUENCY LIST 9th Edition

Compiled by Geoff Halligey

Spirally bound, this easy-to-use reference book covers 1.6 - 28MHz in great depth, all modes and utility services, with new reverse frequency listing showing every known frequency against each callsign, who's using what frequency and mode, what's that callsign?

544 pages. £17.95

FLIGHT ROUTINGS 1994

Compiled by T.T. & S.J. Williams

This guide was produced with the sole aim of assisting airband listeners to quickly find details of a flight, once they have identified an aircraft's callsign. Identifies the flights of airlines, schedule, charter, cargo and mail, to and from the UK and Eire and overflights between Europe and America.

122 pages. 0/P

GUIDE TO FAX RADIO STATIONS

14th Edition

Joerg Klingenfuss

The new edition of this super reference book covers the world's facsimile stations, their frequencies and methods of working. There is a section covering the equipment needed to receive FAX over the radio. To give you an idea of what is available there are many pages of off-air received FAX pictures.

392 pages. £20.00

GUIDE TO UTILITY STATIONS

13th Edition

Joerg Klingenfuss

This book covers the complete short wave range from 3 to 30MHz together with the adjacent frequency bands from 0 to 150kHz and from 1.6 to 3MHz. It includes details on all types of utility stations including FAX and RTTY. There are 19549 entries in the frequency list and 3590 in the alphabetical call sign list plus press services and meteorological stations. Included are RTTY & FAX press and meteo schedules. There are 11800 changes since the 10th edition.

534 pages. £30.00

INTERNATIONAL RADIO STATIONS GUIDE

BP255

Peter Shore

As in 'Broadcast Round-up', his column in *PW*, Peter Shore has laid this book out in world areas, providing the listener with a reference work designed to guide around the ever-more complex radio bands. There are sections covering English language transmissions, programmes for DXers and s.w.l.s. Along with sections on European medium wave and UK f.m. stations.

266 pages. £5.95

INTERNATIONAL VHF FM GUIDE

7th Edition

Julian Baldwin G3UHK & Kris Partridge G8AUU

70 pages. £2.85

POCKET GUIDE TO RTTY AND FAX STATIONS

Bill Laver

A handy reference book listing RTTY and FAX stations, together with modes and other essential information. The listing is in ascending frequency order, from 1.6 to 26.8MHz. 57 pages. £3.95

RADIO LISTENERS GUIDE 1995

Clive Woodyear

This is the third edition of this radio

listener's guide.

Simple-to-use maps and charts show the frequencies for radio stations in the UK. Organised so that the various station types are listed separately, the maps are useful for the travelling listener. Articles included in the guide discuss v.h.f. aerials, RDS, the Radio Authority and developments from Blaupunkt. 68 pages. £3.45

SHORT WAVE INTERNATIONAL FREQUENCY GUIDE

This book contains a comprehensive frequency listing covering 400kHz - 30MHz and is packed with everything from the basics of short wave listening to explaining FAX and RTTY. In this updated version there are many new broadcast and utility stations listed. 188 pages. £12.95

UK SCANNING DIRECTORY

4th Edition

This spiral bound book lists over 20000 UK spot frequencies from 25MHz to 1.6GHz. Articles on scanning in the UK.

335 pages. £17.50

VHF/UHF SCANNING FREQUENCY GUIDE

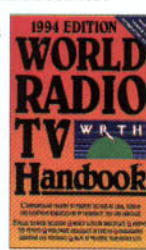
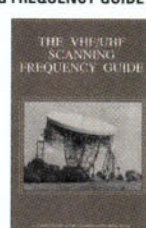
This book gives details of frequencies from 26MHz to 12GHz with no gaps and who uses what. Completely revised and enlarged (February 1993), there are chapters on equipment requirements as well as antennas, the aeronautical bands, and the legal aspects of listening using a scanner.

156 pages. £9.95

WORLD RADIO TV HANDBOOK 1994

Country-by-country listing of l.w., m.w. & s.w. broadcast and TV stations. Receiver test reports, English language broadcasts. The s.w.l.'s 'bible'.

£15.95



SATELLITES

NEWNES GUIDE TO SATELLITE TV

Derek Stephenson

This book, the 3rd edition, is a hard bound volume, printed on high quality paper. The author is a satellite repair and installation engineer and the book covers all information needed by the installation engineer, the hobbyist and the service engineer to understand the theoretical and practical aspects of satellite reception with dish installation and how to trouble-shoot when picture quality is not up to anticipated reception. Mathematics has been kept to a minimum.

371 pages. £18.95

SATELLITE BOOK - A Complete Guide to Satellite TV Theory and Practice

John Breeds

This book deals almost exclusively with television broadcast satellites and is a comprehensive collection of chapters on topics, each written by an expert in that field. It appears to be aimed at the professional satellite system installer, for whom it is invaluable, but it will be appreciated by a much wider audience - anyone interested in satellite technology.

280 pages. £32.00

SATELLITE EXPERIMENTER'S HANDBOOK

2nd Edition

Martin Davidoff K2UBC

The book is divided into four main sections - History, Getting Started, Technical Topics and Appendices. It provides information on spacecraft built by, and for, radio amateurs. In addition, it discusses weather, TV-broadcast and other satellites of interest to amateurs.

313 pages. £14.50

SATELLITE TELEVISION

A layman's guide

Peter Pearson

Pictures from space, that's what satellite television is all about. Orbiting satellites, 35000km high, receive TV signals from stations on the earth and re-transmit them back again. This book explains all you need to know to set up your own satellite TV terminal at home, dish and accessories, cable and tuner.

73 pages. £1.00

SATELLITE TELEVISION INSTALLATION GUIDE

5th Edition

John Breeds

A practical guide to satellite television. Detailed guide-lines on installing and aligning dishes based on practical experience.

76 pages. £15.00

WEATHER SATELLITE HANDBOOK

5th Edition

Dr Ralph E. Taggart WB8DQT

This book explains all about weather satellites, how they work and how you can receive and decode their signals to provide the fascinating pictures of the world's weather. Plenty of circuit diagrams and satellite predicting programs.

192 pages. £14.50

WRTH SATELLITE BROADCASTING GUIDE

1994 Edition

Bart Kuperus

This brand new publication, written by one of the experts from the respected World Radio TV Handbook, will be a great help to everyone interested in the world of satellite radio and television. Featuring over 300 pictures and graphics. All the information you need to know about installing your own satellite system. 366 pages. £15.95

AMATEUR RADIO

ALL ABOUT VHF AMATEUR RADIO

W. I. Orr W6SAI

Written in non-technical language, this book provides information covering important aspects of v.h.f. radio and tells you where you can find additional data. If you have a scanner, you'll find a lot of interesting signals in the huge span of frequencies covered, 100-300MHz & 40, 420, 902 & 1250MHz bands. 163 pages. £9.50

AMATEUR RADIO CALLBOOK & INFORMATION DIRECTORY (RSGB)

Latest Edition

The first 124 pages provide a useful information directory with details of specialised clubs, county lists, repeater details, band plans and reference material. Then follows the callbook itself with over 60 000 callsigns including EI and Novice stations. A new section has been added towards the back of the book giving lists of surnames and initials of listed radio amateurs followed by callsigns and the same under post-code areas. 508 pages. £10.00

AMATEUR RADIO FOR BEGINNERS RSGB

Victor Brand G3JNB

An ideal book for the absolute beginner to the amateur radio hobby. Well illustrated and an interesting read. 65 Pages. £3.50

AMATEUR RADIO LOGBOOK

Published by RSGB

This standard spirally bound amateur radio log book has 100 pages and is marked out with the format required in the UK. There are columns for date, time (UTC), frequency, power (in dBW), station worked/called, reports, QSL information and remarks. £2.99

AMATEUR RADIO TECHNIQUES RSGB

Pat Hawker G3VA

Anyone who enjoys Pat Hawker's 'Technical Topics' in *Radio Communications* will enjoy this book. An amateur radio manual itself, this paperback book, the 7th edition, can only be bettered by a new edition. A truly excellent reference source with a practical bias. 368 pages. £9.50

ANTENNAS AND TECHNIQUES FOR LOW-BAND DXING (ARRL)

John Devoldere ON4UN

This unusual book will be of particular interest to 1.8, 3.5 and 7MHz operators as it's packed with information on antennas and operating tips for 'Top Band to Forty' fans. There are chapters on low band propagation, operating techniques, equipment and for the computer minded there's a chapter on newly-available low band software. 393 pages. £14.50

ARRL HANDBOOK FOR RADIO AMATEURS 1995

This is the 72nd edition of this handbook and contains the best information from previous issues. New for this edition is some information on feedback-loop design for power supplies, a new gel-cell charger project, updates on antenna systems and new coverage of baluns, propagation programs are compared and colour SSTV and telephone FAX machines are also covered. Finally there's a new section on 'the workbench' with new projects for the reader to build. 1214 pages. £19.95

ARRL OPERATING MANUAL

Another very useful

ARRL book. Although

written for the

American amateur,

this book will also be

of use and interest to

the UK amateur.

Topics covered range

from short wave

listening through

operating awards to

repeaters, operating

and satellites. 684

pages. £12.95

ARRL SATELLITE ANTHOLOGY

The best from the Amateur Satellite News column and articles out of 31 issues of *QST* have been gathered together in this book. The latest information on OSCARs 9 through 13 as well as the RS satellites is included. Operation on Phase 3 satellites (OSCAR 10 and 13) is covered in detail. 97 pages. £5.95

ARRL UHF/MICROWAVE EXPERIMENTER'S MANUAL

Various Authors

A truly excellent manual for the keen microwave enthusiast and for the budding 'microwaver'. With contributions from over 20 specialist authors. Chapters covering techniques, theory, projects, methods and mathematics. 446 pages. £14.50

THE BRIGHT SPARKS OF WIRELESS RSGB

G. R. Jessop G6JP

This hardback book is well illustrated with some excellent photographs. It pays tribute to and takes a good look at the personalities behind the early days of amateur radio and the equipment they used. A good read. 90 pages. £12.50

COMPLETE DX'ER

Bob Locher

This book covers equipment and operating techniques for the DX chaser, from beginner to advanced. Every significant aspect of DXing is covered, from learning how to really listen, how to snatch the rare ones out of the pile-ups and how to secure that elusive QSL card. 204 pages. £7.95

HINTS AND KINKS FOR THE RADIO AMATEUR

Edited by Charles L. Hutchinson and David Newkirk

A collection of practical ideas gleaned from the pages of *QST* magazine. Plenty of projects to build, hints and tips on interference, c.w. and operating and snippets of information from amateurs who've tried and tested the idea. 129 pages. £4.95

HOW TO PASS THE RADIO AMATEURS' EXAMINATION (RSGB)

Clive Smith G4FZH and George Benbow G3HB

The background to multiple choice exams and how to study for them with sample RAE paper for practice plus maths revision and how to study for the exam. The majority of this book is given to sample examination papers so that candidates can familiarise themselves with the examination and assess their ability. 88 pages. £7.99

INTRODUCTION TO AMATEUR COMMUNICATIONS SATELLITES

BP290. A. Pickard

This book describes several currently available systems, their connection to an appropriate computer and how they can be operated with suitable software. The results of decoding signals containing such information as telemetry data and weather pictures are demonstrated. 102 pages. £3.95

INTRODUCTION TO AMATEUR RADIO BP257

I. D. Poole

This book gives the newcomer a comprehensive and easy to understand guide through amateur radio. Topics include operating procedures, jargon, propagation and setting up a station. 150 pages. £3.50

INTRODUCTION TO RADIO WAVE PROPAGATION

BP293

J. G. Lee

How does the sun and sunspots affect the propagation of the radio waves which are the basis of our hobby? They affect the ionosphere, but differing frequencies are treated differently. Find out how to use charts to predict frequencies that will be the most profitable. What effect will noise have on the signal? Find out with this book. 116 pages. £3.95

INTRODUCTION TO VHF/UHF FOR RADIO AMATEURS BP281

I. D. Poole

An excellent book to go with the new Novice or full callsign. Nine chapters and an appendix deal with all aspects and frequencies from 50 to 1300MHz. Topics include propagation, descriptions of the bands, antennas, receivers, transmitters and a special chapter on scanners. 102 pages. £3.50

LOW PROFILE AMATEUR RADIO - OPERATING A HAM STATION FROM ALMOST ANYWHERE

Jim Kearman KR1S

This book delves into the techniques of being a 'hidden Ham'. There are chapters on specialised equipment, operating techniques and antennas to name but a few. If you have a fascination for spy type radio equipment or like the idea of having a complete h.f. or v.h.f. rig built in a suitcase, then this little American book is for you. 124 pages. £5.95

MICROWAVE HANDBOOK RSGB

Volumes 1, 2 and 3

Edited By M. W. Dixon G3PFR

Approximately 350 pages (each volume). Vol. 1 costs £9.99, Vol. 2 and 3 cost £14.99 each.

PRACTICAL GUIDE TO PACKET OPERATION IN THE UK

Mike Mansfield G6AWD

Introduces the concept of packet radio to the beginner. Problem areas are discussed and suggestions made for solutions to minimise them. Deals with the technical aspects of packet taking the reader through setting up and provides a comprehensive guide to essential reference material. 220 pages. £9.95

QRP CLASSICS

Edited by Bob Schetgen

Operating QRP is fun. The equipment is generally simple and easy to build, but often performs like more sophisticated commercial equipment. Some QRP Field Day stations operate a full 27 hours on a car battery - it's the perfect equipment for emergency communication when the power fails. Extracts from *QST* and the *ARRL Handbook*. 274 pages. £9.95

RADIO AMATEUR CALLBOOK INTERNATIONAL LISTINGS 1994

72nd Edition

The only publication listing licensed radio amateurs throughout the world. Also includes DXCC Countries list, standard time chart, beacon lists and much more. Over 1400 pages. £19.50

RADIO AMATEUR CALLBOOK NORTH AMERICAN LISTINGS 1994

72nd Edition

Listings of US amateurs (including Hawaii). Also contains standard time chart, census of amateur licences of the world, world-wide QSL bureau, etc. Over 1400 pages. £19.50

THE RADIO AMATEUR'S GUIDE TO EMC RSGB

Robin Page-Jones G3JWI

This paperback book provides essential information and reading for anyone who has an EMC (interference) problem. With the help of the well-illustrated text and techniques, much of the mystery from the troublesome world of electromagnetic compatibility is removed. 117 pages. £7.99

RADIO COMMUNICATION HANDBOOK (RSGB)

6th Edition

Dick Biddulph G8PDS

This long awaited new edition has been extensively up-dated and is full of diagrams and photographs. This book is a complete handbook/reference work and project book all rolled into one. The final innovation is that the necessary p.c.b. templates for the featured projects are provided at the end of the book making them much easier to work from when making your own p.c.b.s. 750 pages. £20.00.

RAE MANUAL RSGB

G.L. Benbow G3HB

The latest edition of the standard aid to studying for the Radio Amateurs' Examination. Updated to cover the latest revisions to the syllabus. Takes the candidate step-by-step through the course. 127 pages. £7.99

RAE REVISION NOTES

George Benbow G3HB

If you're studying for the Radio Amateur's Examination, this book could be useful. It's a summary of the salient points of the *Radio Amateurs' Examination Manual*, the standard textbook for the exam. It's A5 size and therefore can be carried with you wherever you go. Easy-to-read, it's divided into 13 chapters with topics like receivers, power supplies, measurements, operating procedures, licence conditions and a summary of the formulae all dealt with. 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. 60 pages. £5.00

RECEIVING STATION LOG BOOK

Published by RSGB

£3.50

SPACE RADIO HANDBOOK RSGB

John Branagan GM4IHJ

236 pages. £12.50

THE NOVICE LICENCE STUDENT'S

NOTEBOOK

John Case GW4HWR

This is the recommended course book for anyone taking the Novice Licence. Covering all aspects of amateur radio and electronics it would be useful to anyone starting out in amateur radio. Every left hand page is for your own notes of explanation. 124 pages. £5.99

TRAINING FOR THE NOVICE LICENCE RSGB

John Case GW4HWR

Aimed at the Novice licence instructor this manual provides the syllabus and an excellent framework textbook to help novice, instructor and beginner alike. An excellent basic reference work. 101 pages. £6.50

VHF/UHF DX BOOK

Edited Ian White

G3SEK

An all round

source of

inspiration for the

v.h.f./u.h.f.

enthusiast. Written

by acknowledged

experts this book

covers just about

everything you

need to know

about the

technicalities of

v.h.f./u.h.f.

operating. 270

pages. £18.00

VHF UHF MANUAL RSGB

G. R. Jessop G6JP

The 4th edition of this well known book is in paperback form. Packed with information for the world of radio above 30MHz. It covers everything from v.h.f./u.h.f. radio history and theory and

propagation to projects and techniques. An

excellent reference source.

Approximately 1000 pages. £10.50

W1FB'S DESIGN NOTEBOOK

Doug DeMaw W1FB

This book is aimed at the non-technical amateur who wants to build simple projects and obtain a basic understanding of amateur electronics. Your workshop does not need to be equipped like an engineering lab to be successful as an experimenter. Don't let a lack of test equipment keep you from enjoying the thrills of experimentation. 195 pages. £8.50

W1FB'S HELP FOR NEW HAMS

Doug DeMaw W1FB

This book covers everything from getting acquainted with new equipment to constructing antennas, station layout, interference and operating problems to on-the-air conduct and procedures. 155 pages. £8.95

W1FB'S QRP NOTEBOOK

2nd Edition. Doug De Maw W1FB

The new improved and updated 2nd edition of this book, covers the introduction to QRP, construction methods, receivers and transmitters for QRP. This workshop-notebook style publication, which is packed with new designs for the keen QRP operator, also covers techniques, accessories and has a small technical reference section. 175 pages. £7.95

WORLD AT THEIR FINGERTIPS RSGB

John Clarricoats G6CL

307 pages. £6.00

YOUR GATEWAY TO PACKET RADIO

Stan Horzepa WA1LOU

What is packet radio good for and what uses does it have for the 'average' amateur? What are protocols? where, why, when? Lots of the most asked questions are answered in this useful book. It included details of networking and space communications using packet. 278 pages. £8.95

YOUR PACKET COMPANION

Steve Ford WB8IMY

This American book goes to considerable lengths to explain in simple terms how the radio amateur can get going on packet, how it works and what the various systems are. There are chapters dealing with assembling a packet station, sending and receiving packet mail and exploring advanced networking systems. *Your Packet Companion* goes a long way to explain some of the mysteries of packet radio. 170 pages. £5.95

BASIC PACKET RADIO

Joe Kasser W3/G3CZC

363 pages. £19.95

DATA REFERENCE

NEWNES AUDIO & HI-FI ENGINEER'S POCKET BOOK

BOOK

Vivian Capel

190 pages. Hardback. £10.95

NEWNES COMPUTER ENGINEER'S POCKET BOOK

BOOK

255 pages. Hardback. £12.95

POWER SELECTOR GUIDE BP235

J. C. J. Van de Ven

160 pages. £4.95

NEWNES ELECTRONICS ENGINEER'S POCKET BOOK

1st Edition

Keith Brindley

This fact-filled pocket book will prove useful for any electronics engineer. Its comprehensive coverage includes literally everything from electronic physics to abbreviations, information on integrated circuits, applications, component data, circuits and systems. In effect this book provides a very useful portable electronics reference source. 305 pages. £12.95

A REFERENCE GUIDE TO BASIC ELECTRONICS TERMS BP286

F. A. Wilson

Covering everything from Amplitude Modulation to Zener Diodes, this excellent guide is a manual, dictionary and revision book all rolled into one. With concise explanations, clear diagrams and easy to follow examples, this is an essential addition to the library of anyone contemplating taking the RAE. 474 pages. £5.95

A REFERENCE GUIDE TO PRACTICAL ELECTRONICS TERMS BP287

F. A. Wilson

This is a well written clearly illustrated reference guide which, when used on its own, is perhaps of more use to those interested in the constructional side of amateur radio. However, it is of particular benefit to those taking the RAE especially if used in conjunction with *A Reference Guide to Basic Electronics Terms*. 442 pages. £5.95

INTERNATIONAL TRANSISTOR EQUIVALENTS GUIDE BP85

Adrian Michaels

300 pages. £3.95

THEORY

CIRCUIT SOURCE BOOK 1 - BP321

R.A. Penfold

Written to help you create and experiment with your own electronic designs by combining and using the various standard 'building block' circuits provided. Deals with filters, amplifiers, voltage comparators, etc. 182 pages. £4.95

CIRCUIT SOURCE BOOK 2 - BP322

R.A. Penfold

Complimentary to *Circuit Source Book 1*, helps you create and experiment with your own electronic designs by combining and using the various standard 'building block' circuits provided. Covers signal generation, power supplies and digital electronics, etc. 214 pages. £4.95

ARRL ELECTRONICS DATA BOOK

Doug DeMaw W1FB

Back by popular demand, completely revised and expanded, this is a handy reference book for the r.f. designer, technician, amateur and experimenter. Topics include components and materials, inductors and transformers, networks & filters, digital basics and antennas and transmission lines. 260 pages. £8.95

AUDIO

Elements of Electronics - Book 6 BP111

F.A. Wilson

This book studies sound and hearing, and examines the operation of microphones, loudspeakers, amplifiers, oscillators, and both disk and magnetic recording. Intended to give the reader a good understanding of the subject without getting involved in the more complicated theory and mathematics. 308 pages. £3.95

BEGINNERS GUIDE TO MODERN ELECTRONIC COMPONENTS BP285

R.A. Penfold

This book covers a wide range of modern components. The basic functions of the components are described, but this is not a book on electronic theory and does not assume the reader has an in-depth knowledge of electronics. It is concerned with practicalities such as colour codes, deciphering code numbers and suitability. 166 pages. £3.95

EVERYDAY ELECTRONICS DATA BOOK

Mike Tooley BA. 250 pages. £8.95

FILTER HANDBOOK

A Practical Design Guide

Stefan Niewiadomski

A practical book, describing the design process as applied to filters of all types. Includes practical examples and BASIC programs. Topics include passive and active filters, worked examples of filter design, switched capacitor and switched resistor filters and includes a comprehensive catalogue of pre-calculated tables. 195 pages. £30.00

GUIDE TO CREATIVE CIRCUIT DESIGN

Robert Grossblatt

A book that takes you through all stages of design and building of (mainly) digital circuits, though many of the principles apply to all forms of design and building. One nugget from the book, 'if you can't replace it - don't use it'. 235 pages. £17.95

FURTHER PRACTICAL ELECTRONICS CALCULATIONS & FORMULAE BP144

F.A. Wilson. 450 pages. £4.95

AN INTRODUCTION TO THE ELECTROMAGNETIC WAVE BP315

F.A. Wilson

This little book deals effectively with a difficult abstract subject - the invisible electromagnetic wave. Aimed at the beginner, the book with its basic approach to electromagnetics, antennas, waves, propagation and constraints is a good starting point, complete very simple but clear diagrams and the minimum of mathematics. 122 pages. £4.95

NEWNES PRACTICAL RF HANDBOOK

Ian Hickman

This book provides an easy-to-read introduction to modern r.f. circuit design. It's aimed at those learning to design r.f. circuitry and users of r.f. equipment such as signal generators and sweepers, spectrum and network analysers. 320 pages. £16.95

THE ARRL SPREAD SPECTRUM SOURCEBOOK

Many readers thought an article about spread spectrum communications in the April 1993 *PWA* spoof, but this book shows the reality of the technique. The ten chapters contain descriptions of the basic theory, the designs, and the techniques involved, and there are basic transceiver building blocks for your experimentation. 360+ pages. £14.50

PRACTICAL ELECTRONICS CALCULATIONS AND FORMULAE

BP53. F.A. Wilson

Written as a workshop manual for the electronics enthusiast, there is a strong practical bias and higher mathematics have been avoided where possible. 249 pages. £3.95

REFLECTIONS

Transmission Lines & Antennas

M. Walter Maxwell W2DU

This will help dispel the half-truths and outright myths that many people believe are true about transmission lines, standing waves, antenna matching, reflected power and antenna tuners. 323 pages. £14.50

SOLID STATE DESIGN FOR THE RADIO

AMATEUR

Les Hayward W7OI & Doug DeMaw W1FB

Back in print by popular demand! A revised and corrected edition of this useful reference book covering all aspects of solid-state design. Topics include transmitter design, power amplifiers and matching networks, receiver design, test equipment and portable gear. 256 pages. £10.95

TRANSMISSION LINE TRANSFORMERS

Jerry Sevick W2FMI

This is the second edition of this book, which covers a most intriguing and confusing area of the hobby. It should enable anyone with a modicum of skill to make a balun, etc. Topics include analysis, characterisation, transformer parameters, baluns, multistage transformers and simple test equipment. 270 pages. £13.50

CONSTRUCTION

CIRCUIT SOURCE BOOK 2 BP322

R.A. Penfold 214 pages. £4.95

COIL DESIGN AND CONSTRUCTION MANUAL

BP160

B.B. Babani 106 pages. £2.50

G-QRP CLUB CIRCUIT HANDBOOK

Edited by Rev. G. Dobbs G3RJV

This paperback book has been compiled from circuits published in the G-QRP Club journal *Spratt* from the years 1974 to 1982. Essentially it's a collection of circuits and projects covering everything from receivers, transmitters, antennas and accessories together with sed QRP test equipment. This book is aimed at the keen constructor and provides all the information required to build the host of projects described. 96 pages. £8.50

HOW TO DESIGN AND MAKE YOUR OWN PCBs

BP121 R.A. Penfold

The purpose of this book is to familiarise the reader with both simple and more sophisticated methods of producing p.c.b.s. The emphasis of the book is very much on the practical aspects of p.c.b. design and construction. 86 pages. £2.50

MORE ADVANCED POWER SUPPLY PROJECTS

BP192 R.A. Penfold

The practical and theoretical aspects of the circuits are covered in some detail. Topics include switched mode power supplies, precision regulators, dual tracking regulators and computer controlled power supplies, etc. 92 pages. £2.95

PROJECTS FOR RADIO AMATEURS AND SWLS

BP304 R.A. Penfold

This small book covers the construction and use of radio frequency and intermediate frequency

projects, and audio frequency projects. Under the first heading ideas include a crystal calibrator, an antenna tuning unit, a wave trap, a b.f.o. and other useful projects. On the audio side projects include a bandpass filter, a by-pass switch, a c.w./RTTY decoder and many other practical ideas and suggestions for the home constructor. 92 pages. £3.95

POWER SUPPLY PROJECTS BP76

R.A. Penfold

This book gives a number of power supply designs including simple unregulated types, fixed voltage regulated types and variable voltage stabilised designs. 89 pages. £2.50

SHORT WAVE SUPERHET RECEIVER

CONSTRUCTION BP276

R.A. Penfold

A general purpose receiver to build, from antenna to audio, described in understandable English. 80 pages. £2.95

TEST EQUIPMENT CONSTRUCTION

BP248 R.A. Penfold

Describes, in detail, how to construct some simple and inexpensive, but extremely useful, pieces of test equipment. Stripboard layouts are provided for all designs, together with wiring diagrams where appropriate, plus notes on their construction and use. 104 pages. £2.95

50 (FET) FIELD EFFECT TRANSISTOR PROJECTS

BP339

F.G. Rayer

50 circuits for the s.w.l., radio amateur, experimenter or audio enthusiast using f.e.t.s. Projects include r.f. amplifiers and converters, test equipment and receiver aids, tuners, receivers, mixers and tone controls. 104 pages. £2.95

COMPUTING

BUILD YOUR OWN IBM COMPATIBLE

(SECOND EDITION)

Aubrey Pilgrim

If you're considering building, or upgrading an IBM compatible computer, this book could prove ideal. Chapters deal with the Motherboards, video cards, input/output boards and floppy and hard disks. Fancy adding an image scanner? This and much more information may be found here. 244 pages. £17.95

INTERFACING PCs AND COMPATIBLES BP272

R.A. Penfold.

86 pages. £3.95

ELECTRONIC PROJECTS FOR YOUR PC BP320

R.A. Penfold.

102 pages. £3.95

INTRODUCTION TO COMPUTER

COMMUNICATIONS (AN) BP177

R.A. Penfold

Details of various types of modem and their applications, plus how to interconnect computers, modems and the telephone system. Also networking systems and RTTY. 72 pages. £2.95

NEWNES AMATEUR RADIO COMPUTING

HAND BOOK

Joe Pritchard G1UQW

Shows how radio amateurs and listeners can 'listen' to signals by reading text on a computer screen. This book also covers the application of computers to radio 'housekeeping' such as log-keeping, QSL cards, satellite predictions and antenna design as well as showing how to control a radio with a computer. 363 pages. 0/P

PCs MADE EASY. Second Edition

James L. Turley

A friendly, comprehensive introduction to every personal computer - including Macs! This book is packed with valuable tips on every aspect of computer technology available today and will help you to get comfortable with your computer - fast. 438 pages. £14.95

UPGRADE OR REPAIR YOUR PC

Aubrey Pilgrim

Aimed at the owners of the IBM compatible computer, this book provides a very straightforward and easy to read guide on upgrading. The author has adopted a friendly and informative style and there are many excellent illustrations. Typically American in approach and style, the book provides much information and an excellent read.

RADIO

THE WORLDWIDE AERONAUTICAL COMMUNICATIONS FREQUENCY DIRECTORY 2nd Edition

Robert E. Evans

This book covers aeronautical radio communications, voice and digital, within the range of h.f. and v.h.f./u.h.f. frequency bands. Commercial, military and para-military operations are included. Divided into logical sections, it provides useful information and frequencies on almost anything and everything airband. 260 pages. £19.95



UNDERSTANDING ACARS 2nd Edition

Aircraft Communications Addressing and Reporting System

Ed Flynn

Here is the information you need to understand and decode the Aircraft Communications Addressing and Reporting System, otherwise known as ACARS. Deals with the equipment needed as well as message format and type. 80 pages. £9.95

AIR & METEO CODE MANUAL 14th Edition.

Joerg Klingenfuss

Detailed descriptions of the World Meteorological Organisation Global Telecommunication System operating FAX and RTTY meteo stations, and its message format with decoding examples. Also detailed description of the Aeronautical Fixed Telecommunication Network amongst others. 358 pages. £20.00

HIGH POWER WIRELESS EQUIPMENT

Articles from Practical Electricity 1910 - 1911

Edited by Henry Walter Young

305 pages. £7.70

LATEST INTELLIGENCE

James E. Tunnell, edited by Helen L. Sanders

A directory and dictionary of terms used in communications. The terms are laid out alphabetically making it easy to decipher those obscure terms that you hear. More than 35 000 codes, terms acronyms and slang in use around the globe. 305 pages. £16.95

MARINE SSB OPERATION

J. Michael Gale

How do you stay in touch when you sail off over the horizon and into the blue? What you need is a single sideband radio, a marine s.s.b. This book explains how the system works, how to choose and install your set and how to get the best out of it. There is also a chapter on amateur radio with the emphasis on the increasingly important maritime mobile nets. 96 pages. £10.95

MARINE VHF OPERATION

J. Michael Gale

A v.h.f. radiotelephone is essential equipment for any sea-going boat, but what can you do with it? Who can you call, and how do you make contact? Which channel do you use, and why? What is the procedure for calling another boat, calling the

family through the telephone system, or making a distress call? This book will tell you. 47 pages. £7.95

PASSPORT TO WORLD BAND RADIO 1995

This book gives you the information to explore and enjoy the world of broadcast band listening. It includes features on different international radio stations, receiver reviews and advice as well as the hours and language of broadcast stations by frequency. The 'blue pages' provide a channel-to-channel guide to world band schedules. 416 pages. £14.50

RADIOTELETYPE CODE MANUAL 12th Edition

Joerg Klingenfuss

This book gives detailed descriptions of the characteristics of telegraph transmission on short waves, with all commercial modulation types including voice frequency telegraphy and comprehensive information on all RTTY systems and c.w. alphabets. 96 pages. £11.00

AN INTRODUCTION TO SCANNERS AND

SCANNING BP311

I. D. Poole

This book is ideal for anyone wanting to know what scanning is, and how it works. There are also chapters on radio in general, covering antennas, radio waves and how they travel, types of transmissions, broadcasting and amateur radio. All in all a superb starter book. 152 pages. £4.95

SCANNERS 2

Peter Rouse GU1DKD

The companion to *Scanners*, this provides even more information on the use of the v.h.f. and u.h.f. communications band and gives constructional details for accessories to improve the performance of scanning equipment. 261 pages. £9.95

SCANNERS 3 PUTTING SCANNERS INTO

PRACTICE. New Edition 4th Revision

Peter Rouse

The title *Scanners 3* has been chosen to avoid confusion, as the book has undergone a virtual rewrite since *Scanners 3rd Edition* was published. Although written by the late Peter Rouse, Chris Lorek G4HCL has edited and 'finished off' this, the latest in the *Scanners* series. Including frequency lists, and for the first time, a section on the h.f. bands. Also listed are full British bandplans from 25 to 2000MHz, as well as a section on scanner and accessory details. 271 pages. £9.95

SHORT WAVE COMMUNICATIONS

Peter Rouse GU1DKD

Covers a very wide area and so provides an ideal introduction to the hobby of radio comms. International frequency listings for aviation, marine, military, space launches, search and rescue, etc. Chapters on basic radio propagation, how to work your radio and what the controls do, antennas and band plans. 187 pages. £8.95

WORLDWIDE HF RADIO HANDBOOK

Martyn R. Cooke. 124 pages. £6.95

1934 OFFICIAL SHORT WAVE RADIO MANUAL

Edited by Hugo Gernsback

A fascinating reprint from a bygone age with a directory of all the 1934 s.w. receivers, servicing information, constructional projects, circuits and ideas on building vintage radio sets with modern parts. 260 pages. £11.60

MORSE

INTRODUCING MORSE

Collected Articles from PW 1982-1985

48 pages. £1.25

SECRET OF LEARNING MORSE CODE

Mark Francis

Updates for the Novice Licence. Designed to make you proficient in Morse code in the shortest possible time, this book points out many of the pitfalls that beset the student. 84 pages. £4.95

BEGINNERS

ELECTRONICS SIMPLIFIED - CRYSTAL SET CONSTRUCTION

BP92 F.A. Wilson

Especially written for those who wish to take part in basic radio building. All the sets in the book are old designs updated with modern components. It is designed for all ages upwards from the day when one can read intelligently and handle simple tools. 72 pages. £1.75

ANTENNAS (AERIALS)

AERIAL PROJECTS BP105

Practical designs including active, loop and ferrite antennas plus accessory units. 96 pages. £2.50

ALL ABOUT VERTICAL ANTENNAS

W. I. Orr W6SAI & S. D. Cowan W2LX
Covers the theory, design and construction operation of vertical antennas. How to use your tower as a vertical antenna and compact vertical designs for restricted locations. All about loading coils and a.t.u.s. 192 pages. £7.50

ANTENNA EXPERIMENTER'S GUIDE

Peter Dodd G3LDO
Although written for radio amateurs, this book will be of interest to anyone who enjoys experimenting with antennas. You only need a very basic knowledge of radio & electronics to get the most from this book. Chapters include details on measuring resonance, impedance, field strength and performance, mats and materials and experimental antennas. 200 pages. £8.90

ANTENNA IMPEDANCE

MATCHING
Wilfred N. Caron
Proper impedance matching of an antenna to a transmission line is of concern to antenna engineers and to every radio amateur. A properly matched antenna as the termination for a line minimises feed-line losses. Power can be fed to such a line without the need for a matching network at the line input. There is no mystique involved in designing even the most complex multi-element networks for broadband coverage. 195 pages. £14.50

ANTENNAS FOR VHF AND UHF BP301

I. D. Poole
Antennas are a very important part of any receiver or transmitter and in this book the author gives a general background to antenna operation as well as describing antennas that are suitable for v.h.f. and u.h.f. operation. Chapters include Basic Concepts, Feeders, The Dipole, Aerial Measurements and Practical Aspects. There is something of use for everyone with an interest in antennas in this book. 104 pages. £4.95

ARRL ANTENNA BOOK

17th Edition
This volume now in its 17th edition contains essential information regarding propagation and constructional details of just about every type of antenna known to man. Included is a 3.5" diskette contain in PC programs for Yagi analysis, propagation forecasting, transmission line analysis and other. A definite must. 732 pages. £19.95

ARRL ANTENNA COMPENDIUM

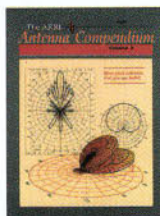
Volume One
Fascinating and hitherto unpublished material. Among the topics discussed are quads and loops, log periodic arrays, beam and multi-band antennas, verticals and reduced size antennas. 175 pages. £9.50

ARRL ANTENNA COMPENDIUM

Volume Two
Because antennas are a topic of great interest among radio amateurs, ARRL HQ continues to receive many more papers on the subject than can possibly be published in QST. Those papers are collected in this volume. 208 pages. £9.50

ARRL ANTENNA COMPENDIUM

Volume Three
Edited by Jerry Hall K1TD
As the title suggests, this book is the third in the continuing series on practical antennas, theory and accessories produced by the ARRL. The book reflects the tremendous interest and activity in antenna



work, and provides a further selection of antennas and related projects you can build. 236 pages. £9.50

BEAM ANTENNA HANDBOOK

W. I. Orr W6SAI & S. D. Cowan W2LX
Design, construction, adjustment and installation of h.f. beam antennas. The information this book contains has been compiled from the data obtained in experiments conducted by the authors, and from information provided by scientists and engineers working on commercial and military antenna ranges. 268 pages. £7.50

HF ANTENNA COLLECTION (RSGB)

Edited by Erwin David G4LQI
This book contains a collection of useful, and interesting h.f. antenna articles, first published in the RSGB's *Radio Communication* magazine, between 1968 and 1989, along with other useful information on ancillary topics such as feeders, tuners, baluns, testing and mechanics for the antenna builder. 233 pages. £10.99

HF ANTENNAS FOR ALL LOCATIONS RSGB

Les Moxon G6XN
This book provides a reference source for all h.f. antenna work, whether it be for fixed, mobile or using test equipment. In effect it is a manual on antenna work, with useful tips, projects and ideas. 322 pages. £13.99

INTRODUCTION TO ANTENNA THEORY

BP198
H. C. Wright
This book deals with the basic concepts relevant to receiving and transmitting antennas, with emphasis on the mechanics and minimal use of mathematics. Lots of diagrams help with the understanding of the subjects dealt with. Chapters include information on efficiency, impedance, parasitic elements and a variety of different antennas. 86 pages. £2.95

PRACTICAL ANTENNAS FOR NOVICES

John Heys G3BDQ
In this guide, written especially for newly qualified holders of the UK novice licence, John Heys describes in detail how to build simple but efficient antennas for each of the Novice bands up to 434MHz, as well as useful ancillary equipment to ensure that they are working correctly. A complete chapter is devoted to the safety and common-sense aspects of installing and using a transmitting antenna. This book will be invaluable not only to Novices, but also to any beginning amateur looking for easy-to-build antenna systems that really work. 52 pages. £5.99



PRACTICAL ANTENNA HANDBOOK

2nd Edition
Joseph J. Carr
As the name suggests, this book offers a practical guide at everything to do with antennas, from h.f. to microwaves. It also has sections on propagation, transmission lines, antenna fundamentals and a helpful introduction to radio broadcasting and communication. The book neatly balances a practical approach with the minimum of mathematics, good diagrams and a lively text. 437 pages. £23.95

PRACTICAL WIRE ANTENNAS RSGB

John Heys G3BDQ
Many radio enthusiasts have to be content with wire antennas. John Heys' practical approach to wire antennas provides plenty of ideas and projects to help get the best out of a simple system. A helpful book, and good reference source. 100 pages. £8.50

G-QRP CLUB ANTENNA HANDBOOK
Compiled and edited by P. Linsley G3PDL & T. Nicholson KA9WRI/GWOLNQ.

This book is a collection of antenna and related circuits taken from *Spratt*, the G-QRP Club's journal. Although most of the circuits are aimed at the low-power fraternity, many of the interesting projects are also useful for general use. Not intended as a text book, but offers practical and proven circuits. 155 pages. £5.00

RADIO AMATEUR ANTENNA

HANDBOOK
W. I. Orr W6SAI & S. D. Cowan W2LX
Yagi, Quad, Quagi and LPY beam antennas as well as vertical, horizontal and sloper antennas are covered in this useful book. How to judge the best location, DX antenna height, ground loss and radials. 188 pages. £7.50

RECEIVING ANTENNA HANDBOOK

Joe Carr
Your receiver is only as good as your antenna. This book is a complete guide to high performance receiving antennas. It is a comprehensive examination of antennas intended specifically for receiving purposes. An essential addition to your technical library, the listeners antenna bible. 189 pages. £17.50

SIMPLE, LOW-COST WIRE ANTENNAS FOR

RADIO AMATEURS
W. I. Orr W6SAI & S. D. Cowan W2LX
Efficient antennas for Top Band to 2m, including 'invisible' antennas for difficult station locations. Clear explanations of resonance, radiation resistance, impedance, s.w.r., balanced and unbalanced antennas are also included. 188 pages. £7.50

W1FB'S ANTENNA NOTEBOOK

Doug DeMaw W1FB
This book provides lots of designs, in simple and easy to read terms, for simple wire and tubing antennas. All drawings are large and clear making construction much easier. There is no high-level mathematics in this book, just simple equations only when necessary to calculate the length of an antenna element or its matching section. 123 pages. £6.95

YAGI ANTENNA DESIGN

Dr James. L. Lawson W2PV
This book is a polished and expanded version of a series of articles first published in *Ham Radio* following on from a series of lectures by the author, who was well-known as the expert on Yagi design. Chapters include simple Yagi antennas, loop antennas, effect of ground, stacking and practical antenna design. 210 pages. £10.95

25 SIMPLE AMATEUR BAND AERIALS

BP125
E. M. Noll
63 pages. £1.95

25 SIMPLE INDOOR AND WINDOW

AERIALS BP136E
E. M. Noll
50 pages. £1.75

25 SIMPLE SHORT WAVE BROADCAST

BAND AERIALS BP132
E. M. Noll
63 pages. £1.95

25 SIMPLE TROPICAL AND MW BAND

AERIALS BP145.
E. M. Noll
54 pages. 0/P

£50 PRIZE DRAW

If you are ordering a book don't forget you'll be entered into our prize draw. See the top of page 72 for full details.

FAULT FINDING

GETTING THE MOST FROM YOUR MULTIMETER

BP239
R. A. Penfold
This book is primarily aimed at beginners. It covers both analogue and digital multi-meters and their respective limitations. All kinds of testing is explained too. No previous knowledge is required or assumed. 102 pages. £2.95

HOW TO USE OSCILLOSCOPES & OTHER TEST

EQUIPMENT BP267
R. A. Penfold
Hints and ideas on how to use the test equipment you have, to check out, or fault find on electronic circuits. Many diagrams of typical waveforms and circuits, including descriptions of what waveform to expect with particular faults, or distortion in audio amplifiers. 104 pages. £3.50

MORE ADVANCED TEST EQUIPMENT

CONSTRUCTION BP249
R. A. Penfold
A follow on from *Test Equipment Construction (BP248)* this book looks at digital methods of measuring resistance, voltage, current, capacitance and frequency. Also covered is testing semi-conductors, along with test gear for general radio related topics. 102 pages. £3.50

TROUBLESHOOTING WITH YOUR TRIGGERED-SWEEP OSCILLOSCOPE

Robert L. Goodman
This book steers you through the various features - old and new - that scope technology provides and is an invaluable guide to getting the best out of your scope. An overview of available scopes will help you choose the one that best suits your needs. Areas covered include spectrum analysis, test applications, multiple-trace displays, waveform analysis, triggering, magnified sweep displays, analogue and digital scopes, etc. 309 pages. £17.50

MORE ADVANCED USES OF THE MULTIMETER

BP265
R. A. Penfold
This book is primarily intended as a follow-up to *BP239, Getting the most from your Multi-meter*. By using the techniques described in this book you can test and analyse the performance of a range of components with just a multi-meter (plus a very few inexpensive components in some cases). The simple add-ons described extend the capabilities of a multi-meter to make it even more useful. 96 pages. £2.95

OSCILLOSCOPES, HOW TO USE THEM, HOW THEY

WORK. 3rd Edition
Ian Hickman
248 pages. £15.95

TELEVISION

ATV COMPENDIUM

Mike Wooding G6IQM
This book is for those interested in amateur television, particularly the home construction aspect. There isn't a 70cm section as the author felt this was covered in other books. Other fields such as 3cm TV, are covered in depth. A must for the practical ATV enthusiast. 104 pages. £3.00

GUIDE TO WORLD-WIDE TELEVISION TEST

CARDS. Edition 3
Keith Hamer & Garry Smith. 60 pages. £4.95

INTERFERENCE

INTERFERENCE HANDBOOK (USA)

William R. Nelson WA6FQG
How to locate & cure r.f.i. for radio amateurs, CBers, TV & stereo owners. Types of interference covered are spark discharge, electrostatic, power line many 'cures' are suggested. 250 pages. £9.50

MAPS

NORTH ATLANTIC ROUTE CHART
This is a five-colour chart designed for the ATC in monitoring transatlantic flights. Supplied folded. 740 x 520mm. £6.50

RADIO AMATEURS MAP OF THE WORLD
This is a brightly coloured map clearly showing callsign prefixes for the world and is up-to-date with recent European boundary changes. Supplied folded in a clear plastic wallet. 980 x 680mm. £5.95

QTH LOCATOR MAP OF EUROPE

Traxel DK5PZ
Radio Map Service
This comprehensive map of the European callsign area has now been updated and enhanced. This well thought out, coloured map covers from N. Africa to Iceland and from Portugal in the west to Iran in the east. Folds to fit into the 145 x 240mm clear envelope. 1080 x 680mm. £5.95

YOUR LOCAL DEALERS

SURREY

Chris Rees
G3TUX

The QRP Component Company

PO Box 88 Haslemere Surrey GU27 2RF

Tel: (01428) 641771

Fax: (01428) 661794

Stockists of:

✓ Howes Kits ✓ Jones Keys

✓ Vargarda Aerials

✓ Bits n' pieces! ✓ Lists

SOUTHAMPTON

SMC Ltd

Main Dealer for: Yaesu,
Kenwood, Icom AOR &
Cushcraft

SM House, School Close, Chandlers

Ford Industrial Estate, Eastleigh,

Hampshire SO5 3BY

Tel: (01703) 255111

Fax: (01703) 263507

PORTSMOUTH

**Nevada
Communications**

Visit our showrooms for Icom, Kenwood, amateur
radio products and a large range of scanning
receivers. New and part exchange welcome.

189 London Road,

North End, Portsmouth,

Hants, PO2 9AE

Tel: (01705) 662145

LONDON

MARTIN LYNCH
G4HKS

For all your amateur radio needs

140-142 Northfield Avenue
Ealing London W13 9SB

Tel:

0181-566 1120

Fax:

0181-566 1207

HERNE BAY

ICOM

ICOM (UK) LIMITED

The Official Icom Importer

Unit 8, Sea Street

Herne Bay, Kent CT6 8LD

Tel: (01227) 741741

Fax: (01227) 741742

Open Tuesday-Friday 9-17.30, Saturday 9-17.00

SCOTLAND

**JAYCEE
ELECTRONICS LTD**

20 Woodside Way, Glenrothes, Fife KY7 5DF

Tel: (01592) 756962 (Day or Night)

Fax No. (01592) 610451

Open: Tues-Fri 9-5; Sat 9-4

KENWOOD, YAESU & ICOM APPROVED DEALERS

CLOSED FOR HOLIDAYS 16th JULY TO 2nd August

A good stock of new and secondhand

equipment always in stock

KENT

KANGA PRODUCTS

For QRP kits

A variety of kits for RECEIVERS,
TRANSMITTERS & TEST GEAR.

Send an A5 SAE for a free copy
of our catalogue

Seaview House, Crete Road East, Folkestone, CT18 7EG
Tel/Fax (01303) 891106 0900 - 1900 Only

DEVON

Reg. Ward & Co. Ltd.

The South-West's largest amateur radio
stockist. Approved dealer for Kenwood,
Yaesu and Icom

1 Western Parade,

West Street, Axminster,

Devon, EX13 5NY

Tel: (01297) 34918

(Closed 1.00-2.00 and all day Monday)

BUCKINGHAMSHIRE

Photo-Acoustics Ltd.

Approved Kenwood, Yaesu and
Icom dealer (part exchange
always welcome)

58 High Street, Newport Pagnell,

Buckinghamshire MK16 8AQ

Tel: (01908) 610625

(Mon-Fri 9.30-5.30, Sat 9.30-4.30)

C.B. RADIO

RETAIL

SEND LARGE STAMPED ADDRESSED

ENVELOPE FOR INFORMATION

OR £2.99 FOR CATALOGUE

TRADE

MANUFACTURERS/IMPORTERS OF

ALL MOONRAKER PRODUCTS

TRADE ENQUIRIES WELCOME MOONRAKER

MOONRAKER (UK) LTD, UNIT 12

CRANFIELD ROAD UNITS, CRANFIELD ROAD,

WOBBURN SANDS, BEDFORDSHIRE MK17 8QR

TEL (01908) 281705 FAX (01908) 281706

AVON/SOMERSET

**QSL
COMMUNICATIONS**

We stock all makes of equipment
for the Amateur and Listener.

Part Exchange Welcome

Unit 6 Worle Industrial Centre, Coker Road,
Worle, Western-Super-Mare BS22 0BX

Tel/Fax: (01934) 512757

YORKSHIRE

YAESU

ICOM

Kenwood

**Alan Hooker
Radio Communications**

42, Netherhall Road, Doncaster

Tel: (01302) 325690

Open Mon-Sat 10-5 pm

Closed Thursdays

LONDON

**Locate
Communications Ltd**

23 BOUSFIELD ROAD, NEW CROSS,

LONDON SE14 5TP

Independent Radio Engineers

We can maintain any of the following systems:- ama-

teur radio equipment, mobile radio systems and IBM

PC/Clone computers

Tel: 0171-732 8319

Fax: 0171-652 5796

MID GLAMORGAN

**SANDPIPER
COMMUNICATIONS**

Unit 5, Enterprise House, Cwmbach

Industrial Estate, Aberdare,

Mid Glamorgan CF44 0AE

Tel: (01685) 870425

Fax: (01685) 876104

A full range of transmitting & receiving
antennas available for the amateur
commercial market.

DERBYSHIRE

WORLD RADIO CENTRE

Shortwave, VHF & UHF receivers
from AOR, YUPITERU, DRAKE,
ICOM, LOWE...

ADAM BEDE HIGH TECH CENTRE

DERBY ROAD

WIRKSWORTH

DERBYSHIRE DE4 4BG

TEL: (01629) 825926

(MONDAY - FRIDAY 9.30AM - 5.00PM)

SCOTLAND

TENNAMAST

SCOTLAND

Masts from 25ft - 40ft

Adapt-A-Mast

(01505) 503824

81 Mains Road, Beith, Ayrshire. KA15 2HT

Index to Advertisers

Aerial Techniques	71	J Birkett.....	66	QSL Comms	34
AH Supplies	50	J & P Electronics	41	Quartslab	66
Altron Comms	66	Kenwood	5	Radiosport	37
Chevet Books	50	Lake Electronics	71	RAS Nottingham	71
Coastal Comms	56	Langrex Supplies	58	RSGB	61
Colomor Electronics	64	Lowe Electronics	14/15	Short Wave Magazine	71
Datong Electronics	58	Maplin Electronics	cover iv	Siskin Electronics	50
ERA	58	Martin Lynch	30/31	SMC Ltd.....	2/3/4
Essex Amateur Radio Sevices	50	Mauritron Technology	66	Spectrum Comms	58
G3RCQ	64	Nevada Comms	53	Suredata	66
Haydon Comms	22/23	Northern ARS	49	Telford Electronics	50
Hesing Technology	50	Photo Acoustics	42	Tennamast	66
Holdings Amateur Electronics	71	P & M Thacker	70	Waters & Stanton	6/7
Howes, CM	49	PW Publishing	40	Yaesu UK	cover ii
Icom	8, cover iii	QRP Component Company	34		

IC-820H

I may not be as big as you... but just try me!

Not really a threat, just a positive way of attracting your attention to the fact that the IC-820H 2M/70cm transceiver may be small (we prefer to use the word compact) but the capabilities of this all-mode, dual-bander leave some much larger transceivers standing, feast your eyes on these features:

- Compact enough to enable mobile and field operations.
- New design DDS (Direct Digital Synthesizer) for super-fine tuning in 1Hz steps.
- Great satellite communications with normal and reverse tracking, separate VFO and memories.
- Independent controls and display on both bands.
- Sub-tuning function assignable to RIT or SHIFT control allows auto-tuning at variable speeds.
- 9600 bps PACKET operation with modulation limiter.
- Optional tone scan.
- Noise blanker to eliminate pulse noise and much more!



ICOM manufacture a full range of base-stations, mobiles and handheld transceivers and receivers to cover all popular Ham frequencies... and beyond. No matter what your requirements, ICOM have the radio for you. For the full picture and details of your local authorised Icom dealer contact:
Icom (UK) Ltd. Sea Street Herne Bay Kent CT6 8LD.
General Operator: 01227 743000. Sales & Service: 01227 741741. Fax: 01227 741742.

NEW

FULL COLOUR GUIDE TO ELECTRONIC PRODUCTS

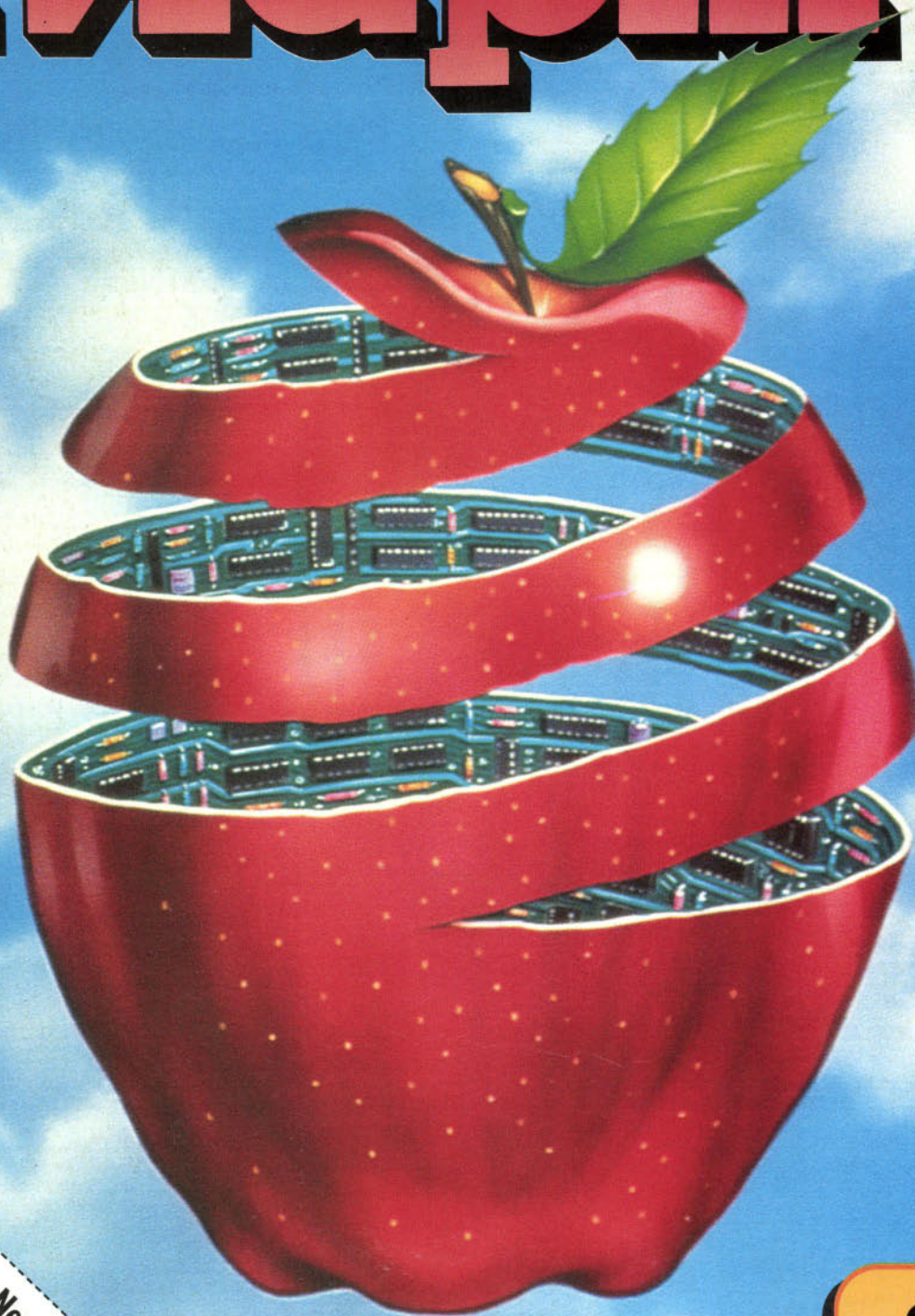
Sept 1994–Aug 1995

Maplin



BS 5750
Part 2 1987

Level B:
Quality Assurance
RS12750



Order your copy of the New MAPLIN Catalogue on sale NOW!

Pick up a copy from any branch of WHSMITH, branches of John Menzies in Scotland ONLY, Eason & Son in N. Ireland ONLY, and Maplin stores nationwide for just £3.45 inc. p&p. If you live outside the U.K. send £7.30 or 18 IRCs to receive your copy for just £3.95 inc. p&p. If you live outside the U.K. send £7.30 or 18 IRCs for Airmail in Europe (including Republic of Ireland); £6.50 or 16 IRCs for surface mail outside Europe; or £12.30 or 30 IRCs for Airmail outside Europe. I enclose £3.95/£7.30/£6.50/£12.30 (delete as applicable).

Name

Address

Post Code

Send to Maplin Electronics,
P.O. Box 3, Rayleigh,
Essex, England
SS6 8LR
rws

Over 800 colour packed pages
with hundreds of Brand New
Products at Super Low Prices.

**OUT
NOW
ONLY
£3.45**

Available from all branches of WHSMITH, John Menzies in Scotland ONLY, Eason & Son in N. Ireland ONLY, and Maplin stores nationwide. The Maplin Electronics 1995 Catalogue – **OUT OF THIS WORLD!**