Lasers
Leading Lights in Communications

Radio
Discover The Basics
Bargain Basement
Busby’s Box Goes Stateside
Bits & Bytes
& all your regular favourites!

8 pages of antennas in action
Reviewed
Tackling TVI With Semaht
Electronics Workbench EDA Software

FREE READERS’ ADS

MAY 1997 £2.20

MFJ-490 Memory Keyer

THE UK’S BEST SELLING MAGAZINE FOR AMATEUR RADIO ENTHUSIASTS

8 pages of antennas in action
Reviewed
Tackling TVI With Semaht
Electronics Workbench EDA Software

FREE READERS’ ADS

MAY 1997 £2.20

MFJ-490 Memory Keyer

THE UK’S BEST SELLING MAGAZINE FOR AMATEUR RADIO ENTHUSIASTS

8 pages of antennas in action
Reviewed
Tackling TVI With Semaht
Electronics Workbench EDA Software

FREE READERS’ ADS

MAY 1997 £2.20

MFJ-490 Memory Keyer

THE UK’S BEST SELLING MAGAZINE FOR AMATEUR RADIO ENTHUSIASTS

8 pages of antennas in action
Reviewed
Tackling TVI With Semaht
Electronics Workbench EDA Software

FREE READERS’ ADS

MAY 1997 £2.20

MFJ-490 Memory Keyer

THE UK’S BEST SELLING MAGAZINE FOR AMATEUR RADIO ENTHUSIASTS

8 pages of antennas in action
Reviewed
Tackling TVI With Semaht
Electronics Workbench EDA Software

FREE READERS’ ADS

MAY 1997 £2.20

MFJ-490 Memory Keyer

THE UK’S BEST SELLING MAGAZINE FOR AMATEUR RADIO ENTHUSIASTS

8 pages of antennas in action
Reviewed
Tackling TVI With Semaht
Electronics Workbench EDA Software

FREE READERS’ ADS

MAY 1997 £2.20

MFJ-490 Memory Keyer

THE UK’S BEST SELLING MAGAZINE FOR AMATEUR RADIO ENTHUSIASTS

8 pages of antennas in action
Reviewed
Tackling TVI With Semaht
Electronics Workbench EDA Software

FREE READERS’ ADS

MAY 1997 £2.20

MFJ-490 Memory Keyer

THE UK’S BEST SELLING MAGAZINE FOR AMATEUR RADIO ENTHUSIASTS

8 pages of antennas in action
Reviewed
Tackling TVI With Semaht
Electronics Workbench EDA Software

FREE READERS’ ADS

MAY 1997 £2.20

MFJ-490 Memory Keyer

THE UK’S BEST SELLING MAGAZINE FOR AMATEUR RADIO ENTHUSIASTS

8 pages of antennas in action
Reviewed
Tackling TVI With Semaht
Electronics Workbench EDA Software

FREE READERS’ ADS

MAY 1997 £2.20

MFJ-490 Memory Keyer

THE UK’S BEST SELLING MAGAZINE FOR AMATEUR RADIO ENTHUSIASTS

8 pages of antennas in action
Reviewed
Tackling TVI With Semaht
Electronics Workbench EDA Software

FREE READERS’ ADS

MAY 1997 £2.20

MFJ-490 Memory Keyer

THE UK’S BEST SELLING MAGAZINE FOR AMATEUR RADIO ENTHUSIASTS

8 pages of antennas in action
Reviewed
Tackling TVI With Semaht
Electronics Workbench EDA Software

FREE READERS’ ADS

MAY 1997 £2.20

MFJ-490 Memory Keyer

THE UK’S BEST SELLING MAGAZINE FOR AMATEUR RADIO ENTHUSIASTS

8 pages of antennas in action
Reviewed
Tackling TVI With Semaht
Electronics Workbench EDA Software

FREE READERS’ ADS

MAY 1997 £2.20

MFJ-490 Memory Keyer

THE UK’S BEST SELLING MAGAZINE FOR AMATEUR RADIO ENTHUSIASTS

8 pages of antennas in action
Reviewed
Tackling TVI With Semaht
Electronics Workbench EDA Software

FREE READERS’ ADS

MAY 1997 £2.20

MFJ-490 Memory Keyer

THE UK’S BEST SELLING MAGAZINE FOR AMATEUR RADIO ENTHUSIASTS

8 pages of antennas in action
Reviewed
Tackling TVI With Semaht
Electronics Workbench EDA Software

FREE READERS’ ADS

MAY 1997 £2.20

MFJ-490 Memory Keyer

THE UK’S BEST SELLING MAGAZINE FOR AMATEUR RADIO ENTHUSIASTS

8 pages of antennas in action
Reviewed
Tackling TVI With Semaht
Electronics Workbench EDA Software

FREE READERS’ ADS

MAY 1997 £2.20

MFJ-490 Memory Keyer

THE UK’S BEST SELLING MAGAZINE FOR AMATEUR RADIO ENTHUSIASTS

8 pages of antennas in action
Reviewed
Tackling TVI With Semaht
Electronics Workbench EDA Software

FREE READERS’ ADS

MAY 1997 £2.20

MFJ-490 Memory Keyer

THE UK’S BEST SELLING MAGAZINE FOR AMATEUR RADIO ENTHUSIASTS

8 pages of antennas in action
Reviewed
Tackling TVI With Semaht
Electronics Workbench EDA Software

FREE READERS’ ADS
Waters & Stanton
22, Main Road, Hockley, Essex. SS5 4QS

Price Match - and 10-Day Approval!

We Promise to try and match or beat our competitors’ prices. Most of our staff are licensed either class A or B - so we understand your needs. G3OJV / G0PEP

Free-Phone Order Line
0500 711111

Tr Price Match and 10-Day Approval!

Free-Phone Order Line
0500 711111

Tr Price Match and 10-Day Approval!

Free-Phone Order Line
0500 711111

Tr Price Match and 10-Day Approval!

Free-Phone Order Line
0500 711111

Tr Price Match and 10-Day Approval!
DJ-S41 70cms
- 430-440MHz
- 340mW output
- CTCSS
- 1750Hz tone
- 20 memories
- 6 Steps
- 3 x AA cells

Price Match
W&S £119

CF-128 Counter
1MHz - 2.8GHz
- CTSS Code
- Time out feature
- Wideband Rx
- Inc. Mic and kit

W&S £119

Allinco DJ-180 2m Handy
Lowest UK Price!
- 2m 2W (SW on 2v)
- 10 Memories with scanning
- Low battery indicator
- Rotary frequency control
- Programmable steps
- 1750Hz tone
- Auto power off
- Ni-cad pack
- AC Mains charger

W&S £119

Alinco DR-430 70cm Mobile
- 430 - 440MHz
- 20 Memories
- 25W output
- 20 Memories

Clearance Price
W&S £199

WASHINGTON

FC-128 Counter
1MHz - 2.8GHz
This model has a wide frequency range and is powered by internal ni-cads. The BNC socket is provided with aerial makes it very sensitive.

AC Mains charger

W&S £69.95

Base Mic. WM-308
- Built-in buffer amplifier provides matching. Modern rigs will power it direct from mic socket - otherwise use 2 x AA cells.

W&S £59.95

Fibre Glass Base Antennas
Pre-tuned, solid construction and completely weatherproof

FREE Carriage
During May

W-2000 6, 2, 70cm 2,8/28.4dB £99.95
W-300 2m/70cm 6.5/9.8dB £69.95
W-50 2m/70cm 4.5/7.8dB £54.95
W-50 3/m70cm 3.8/8dB £39.95

Mobile Whips - High Quality
W-285 2m 5/8th long whip £15.95
W-770BS 2/70cm whip 1.9m long £24.95

Half the price of identical units of other brands!

W&S £39.95

Diamond VSWR Meters
- 1.8-200 MHz
- 5W, 20W, 200W
- Case 155 x 63 x 103mm
- Weight 540g

NEW PRICE DOWN
W&S £69.95

NEW PRICE DOWN
W&S £79.95

NEW PRICE DOWN £129.95

NEW PRICE DOWN £140.95

NEW PRICE DOWN £179.95

Garmin GPS-45XL
The Best!
- Position indicator
- Forward speed
- Moving map and road
- Destination ETA
- Compass & Altitude
- 250 waypoints
- Build your own map
- 20 hours from 4 AA cells
- Built-in antenna
- External BNC socket
- NMEA interface

W&S £225

NEW

Books
"Secret of Learning Morse Code"
Back in stock
£6.95

YAESU PRICES DOWN
We’ve smashed Yaesu Prices until end of May!

NEW FT-920 HF Transceiver
Just Arriving!

Our Price £1596 - £1395

The new FT-920 has been released and offers some great features at a great price. 1.8MHz to 5MHz plus wideband receive, 33 MPS Digital signal processor, Digital IF shift, Auto notch filter, Dual VFOs, 100 Memories, Band Stacking VFO system, Break-in CW with electronic keyer, TNC interfacing, Digital voice recorder, 13.8v DC operation.

FT-1000MP £2849
FT-1000MPC £2599
FT-900AT £1949
FT-840 £959
FT-3000 £479

FT-1000MPCD £2599
FT-900AT £1299
FT-840 £959
FT-3000 £479

KENWOOD HF RIGS

NEW TS-570 RRP £1490 but PHONE!
It’s causing a lot of excitement, and rightly so. A lovely clear display with full DSP built-in. This is a serious rig.

TS-870 RRP £1949

This is the big “daddy” of Kenwood’s latest offering. It’s got so many features that you first need the brochure and then you need a demonstration.

WATSON

WMM-1 Modem
Review last month
W&S £69.95

PART EXCHANGE WELCOME - Phone for a Deal
MFJ
Ham Radio
Accessories

ORDERS
ONLY ON:
FREEPHONE
0500 73 73 88

MFJ-784B Filter
Price Down! £239
- Works with any rx. or txv.
- DSP filter, fully programmable
- Plugs directly into audio out
- Drives speaker or headset
- Requires 12V at approx 500mA

MFJ-1278DSPX Data Unit
Price Down! £399
- Multi-mode
- Packet
- Amtor
- Pactor
- Colour SSTV
- 10 Modes total
- DSP filtering
- Tuning scope
- Simple to use
- Software

Windows Software
NEW
Price Down! £36.95
- Just arrived, the latest Windows Software for MFJ TCNs and Multimode moderns.
- Now you can operate in a familiar environment with much improved software.
- MFJ-1268W TNC software
- MFJ-1296W Multimode software
- All supplied on 3.5" size discs.

MFJ-949 HF ATU
Price Down! £149
- 160 to 10m 300W PEP 150W CW
- Wire, coax or balanced feed
- Built-in Dummy Load
- 160 to 10m ATU
- 300W power meter - PEP / RMS
- Antenna selector, by-pass etc.

MFJ-9406 6M Trancvr.
Price Down! £249
- 50 - 50.3MHz 10W SSB
- RF speech processing
- 10MHz stall filter
- Super performance
- Ideal way to 6M DXing

MFJ-941 Auto Match
Price Down! £59.95
- Auto-Tuner Extender
- Connect between auto tuner and transceiver
- No more problems with G5RVs and all those difficult antennas - 160 to 10 metres
- Total enclosed
- Essential item

MFJ-259 HF Analyser
Price Down! £229
- 1.8MHz - 170MHz
- Digital Readout
- Resonance VSRR
- Impedance
- AA batteries or 12V external
- Connect to aerial or coax and adjust it in seconds. Turns hours into minutes and ideas into antennas

MFJ-906 VSWR / ATU
Price Down! £79.95
- 50MHz - 54MHz
- ATU and VSWR power meter
- Matches all coax systems
- 100W CW/PM 200W SSB
- Tuner by-pass - SO-239 sockets
- Size 203 x 63 x 76cm

Ameritron 811 1kW
The only currently available HF linear to have passed a full lab. CE test
- 1 kW linear 9dB Gain
- Like a 5 element Monobander
- Uses low cost S11A tubes
- Built-in rugged AC Supply
- Instant by pass switch
- PA VIA meter + Grid meter
- Over rated variable capacitors
- Fan cooled for long life
- Very efficient - 600W output
- Easy to tune and connect
- Size 16" x 13.6" x 6"

MFJ-441 Keyer
Price Down! £59.95
- 2 - 65 WPM - suits all transceivers
- Adjustable tone, volume and weight
- Semi-auto, auto and lambic
- 32 character memory
- Use AA cells or external 12v
- 105 x 88 x 39mm approx

MFJ-969 HF+6m ATU
Price Down! £179.95
- Complete 12V distribution system
- 5 Output terminals - RF by-passed
- Built-in 0 - 250 Volt meter
- Fused input and outputs
- Master switch and LED indicator
- Heavy gauge DC input cable
- Max current 35 Amps

Windows Software
NEW
Price Down! £63.95
- Just arrived, the latest Windows Software for MFJ TCNs and Multimode moderns.
- Now you can operate in a familiar environment with much improved software.
- MFJ-1268W TNC software
- MFJ-1296W Multimode software
- All supplied on 3.5" size discs.

MFJ-840 Handy Meter
Price Down! £23
- 50MHz - 54MHz
- ATU and VSWR power meter
- Matches all coax systems
- 100W CW/PM 200W SSB
- Tuner by-pass - SO-239 sockets
- Size 203 x 63 x 76cm

MFJ-941E Atu
Price Down! £109
- 160m to 10m ATU - 300W
- Wire, Coax and Balanced Feed
- Cross Needle VSWR & Power
- 3-Way antenna selector
- By-pass position
- Dummy load socket
- Internal Balun - 30 or 300W position
- 260 x 180 x 70mm

MFJ-250X 1kW load
Price Down! £34.95
- 1kW Dummy Load
- Oil cooled design
- SO-239 socket
- Ideal for linears
- 10MHz to 400MHz
- Oil not supplied

MFJ-260C 300W
Price Down! £35.95
- Dummy Load
- 50 Ohm
- 300W
- OK to 450MHz
- Air cooled
- SO-299
- Totally enclosed
- Essential item

MFJ-219 70cm Meter
- Price Down! £19.99
- Fitted with roller inductor
- 1.8MHz - 50MHz 300W ATU
- 4 Mode by-pass switch
- Dummy load socket
- 2 - 120 WPM - suits all transceivers
- Super heavy gauge DC input cable
- Max current 35 Amps

MFJ-260 1kW load
Price Down! £35.95
- Dummy Load
- 50 Ohm
- 300W
- OK to 450MHz
- Air cooled
- SO-299
- Totally enclosed
- Essential item

MFJ-702 LPF Filter
Price Down! £19.99
- Low pass filter 1.8MHz - 50MHz
- 200 W pep - 60dB down at 5MHz
- Loss less than 0.5dB
- SO-239 size 160 x 25 x 36cm approx

160 to 10M of DX-Getting Power Perfectly matches all 100W rigs
- 160 to 10m 300W PEP 150W CW
- Wire, coax or balanced line
- Balun included for best match
- 30 / 300W power meter - PEP / RMS
- Antenna selector, by-pass etc.

Waters & Stanton
Enquiries: Tel. 01702 206835 / 204965
Fax. 01702 205843
22, Main Road, Hockley, Essex SS5 4QS
EDITOR'S KEYLINES
Rob Mannion G3XFD's viewpoint on the Amateur Radio world.

RECEIVING YOU

SPECIAL OFFER
Pick-up a direct conversion receiver for under £59!

NEWS 1997
Amateur radio news and views.

RADIO - DISCOVER THE BASICS
This time Rob G3XFD solves an education problem and saves you money!

REVIEW - THE SEMAHT DIGITAL FIELD STRENGTH METER
Gordon King G4VFV tackles TV the Semahth way.

SUBSCRIPTION OFFER
Try PW and SWM for six months for just £20!

BUSBY'S BOX GOES STATESIDE
A group of radio amateurs from Norfolk send a British telephone box 'across the pond'.

IN SEARCH OF BETTER SIGNALS
Terry Brown G0TSA brings a military feel to the Amateur Radio world.

Rob Mannion G3XFD's viewpoint on the Amateur Radio world.

ANTENNAS IN ACTION
John Goodall COUR tries out a menu driven Morse keyer from the MFJ stables.

IN SEARCH OF BETTER SIGNALS
Terry Brown G0TSA tells how he achieved better signals with an Adapt-A-Mast.

REVIEW - THE MFJ-490 MEMORY KEYER
John Goodall G0TSA tries out a menu driven Morse keyer from the MFJ stables.

REVIEW - ELECTRONICS WORKBENCH EDA SOFTWARE
Tex Swann G1TEX looks at a comprehensive piece of design software.

DIP METERS - DUTCH STYLE!
Wim De Ruyter PAO PWH presents a piece of design software.

PACKET PANORAMA
Roger Cooke takes his bimonthly look at the packet radio scene.

Come next month
Look at what's coming in PW & SWM next month.

SUBSCRIPTION OFFER
Try PW and SWM for six months for just £20!

BUSBY'S BOX GOES STATESIDE
A group of radio amateurs from Norfolk send a British telephone box 'across the pond'.

IN SEARCH OF BETTER SIGNALS
Terry Brown G0TSA brings a military feel to the Amateur Radio world.

Rob Mannion G3XFD's viewpoint on the Amateur Radio world.

ANTENNAS IN ACTION
John Goodall COUR tries out a menu driven Morse keyer from the MFJ stables.

IN SEARCH OF BETTER SIGNALS
Terry Brown G0TSA tells how he achieved better signals with an Adapt-A-Mast.

REVIEW - THE MFJ-490 MEMORY KEYER
John Goodall G0TSA tries out a menu driven Morse keyer from the MFJ stables.

REVIEW - ELECTRONICS WORKBENCH EDA SOFTWARE
Tex Swann G1TEX looks at a comprehensive piece of design software.

DIP METERS - DUTCH STYLE!
Wim De Ruyter PAO PWH presents a piece of design software.

PACKET PANORAMA
Roger Cooke takes his bimonthly look at the packet radio scene.

Come next month
Look at what's coming in PW & SWM next month.
Cushcraft Antennas are one of the best range currently available. They offer superb performance, innovative design, excellent build quality and outstanding value for money.

**VHF Antennas**
- AR-201 210 Dual Band Vertical 1.13m long £69.00
- AR-270 210 Dual Band Vertical 2.5m long £69.00

**HF Antennas**
- R6 10/15/20/17/20 vertical £295.00
- R7000 10 thru to 40m vertical £363.00
- R80 Radial kit for R7000 £125.00
- AV-3 14-21-28MHz vertical 4.3m long £98.00
- AV-5 3-5-7-14-21-28MHz vertical 7.4m long £169.00
- APF6 8 Band Vertical £229.00
- APF18A Radial Kit £54.50
- 40-2CD 2-ele 40m Yagi £499.00
- A3S 14-21-28MHz Yagi £380.00
- A3WS 12/17 m 3-ele Yagi £229.00
- A103 30m Extension A3WS £119.00
- 2K1CD 4-ele 20m Yagi £99.00
- 15A4D 4-ele 15m Yagi £59.00
- D4 Dipole 10/15/20/40m £259.00
- D3WV Dipole 12/17/20m £199.00
- A4S 4-ele Yagi 16/15/20m £449.00

**VHF Antennas**
- AR-201 210 Dual Band Vertical 1.13m long £69.00
- AR-270 210 Dual Band Vertical 2.5m long £69.00
- AR2 2m Vertical 1.2m long £35.00
- AR8 6m Vertical 3.1m long £56.00
- 144-105N 2m 10-ele Yagi 13.2 db £89.00
- A144-26T 2m 10-ele Cross Yagi 12.2 db £105.00
- 138BN 10-13 ele Yagi £135.00
- 1782 17-ele 2m Yagi £199.00
- A50-3S 3-ele 6m Yagi £39.00
- A55-5S 5-ele 6m Yagi £49.00
- A56-6S 6-ele 6m Yagi £69.00
- 22X8 2m 22-ele Yagi c/w polarization switching £229.00
- 738X8 70cm 36-ele Yagi c/w polarization switching £219.00
- 719B 19-80cm Yagi £109.00
- 728B 25-70cm Yagi £163.00

**Antenna Rotators**
- AR803 Light duty £49.95
- G-450XL New medium duty motor £269.00
- G-455XL New H/G version of G-450XL £369.00

**Antenna Masts**
- 50° Deluxe model £425.00
- 450° Deluxe model £425.00
- 600° Deluxe model £425.00
- Heavy duty £329.00
- Medium duty £290.00
- Light duty £190.00

**Antenna TNCs**
- £749
- £449

**Antenna Rotators**
- £749
- £449

**Mobile Antennas**
- TSM-1005 2m 7/8 1.99m £29.50
- TSM-2005 2m 7/8 1.89m £22.50
- TSM-1312 2m 7/8 0.89m £23.00
- TSM-1309 2m 7/8 0.93m £25.00
- TSM-1306 2m 7/8 1.06m £25.00
- TSM-1304 2m 7/8 1.16m £16.00
- TSM-3301 2m 7/8 Fibre 3.18m £68.00
- TSM-3302 2m 7/8 Fibre 1.75m £59.50
- TSB-3203 2m 7/8 Fibre 1.15m £42.50
- TSB-3603 2m 7/8 Fibre 2.05m £89.00
- TSB-600C Duplexer 2/70 'N'/PL, N, N £25.00
- TSB-600D Duplexer 2/70 'N'-N, PL £25.00
- G-400SE £25.00
- G-500SE £25.00
- G-600SE £25.00

**Handheld Scanners**
- TSC2601 BNC Whip 144/430/900MHz £18.95
- TSC2602 BNC Whip 144/430/900MHz 2/355c £21.50
- TSC2603 BNC Whip 144/430/900MHz 2/455c £22.50

**Compact Transceivers**
- Yaesu FT-10R/A06 2m ultra handi £179.00
- Yaesu FT-5100 2m/70cm mobile transceiver £399.00

**New GDX30 Discone 100-1500MHz c/w 10M RG58U £59.95**

All discounts are based on RRP. CARRIAGE: ROTATORS/PSUs £13.50 BASE ANTENNAS £9.50 TNCs £8.50 MOBIL Showroom/Mail Order 9.30-5pm, 9-1pm Sat Tel. (01703) 251549 Service Dept Tel. 0113-235 0606 9-5 Mon-Fri. SMC Siachi SMC Ltd HQ Southampton: S M House, School Close Chandlers Ford Ind Estate, Eastleigh. ARE Communications: 6 Royal Parade Hanger Lane, Ealing, London W5A 1RT. Tel. 0181-997 4476 9.30am - 5.30pm Monday-Friday 9.30am - 1.00pm. SMC (Northern): Nenway Lane Ind. Estate, Nenway Lane Leeds. Tel. (0113) 4680944.
COM WARE LTD

OMMUNICATIONS LTD

DATA PRODUCTS

We now have the widest range of data products in the UK, and with our specialist knowledge of the products we must be by far the number one choice for packet equipment.

PacComm

Tiny 2 1200 baud TNC £139
PicoPacket 12 baud portable TNC £119
Spirit 2 9600 baud TNC £219

Kantronics

KPC3 1200 baud TNC £139
KPC8612 1200-9600 dual port TNC £275
Kan+ Multimode data modem £395

AEA

PK12 1200 baud TNC £129
PK22/23/MX Multimode data modem £319
*DSP232 Multimode data modem £479
*PK800 Multimode data modem £479
*Free Pack - Win software

Symek

TNC2H 9600 baud TNC £179

BayCom Modems

USCC 4 port plug in card W/D Modems £107
Modems

1200 baud Plug in for USCC £39
HF Plug in for USCC £59
9600 baud Plug in for USCC £79
Mini-Pak 1200 baud 9 pin 'D' plug £99.95

Custom-made leads available for most leading brands of transceivers. £14.95. Only £7.50 if purchased with a TNC.

Siskin Multi Cat

Computer interface suitable for most HF & VHF Transceivers with CAT interface socket. £6.95

(Techny Sales) 33-21 235 0606 9.30am - 5.00pm Monday - Friday 9.00am - 1.00pm Saturday

COMET NEW PRODUCTS

CA-HV HF/VHF Mobile Whip J-74-21-28-50-144 £89.00
* IDEAL FOR IC-706/M £39.00

COMET ANTENNA ACCESSORIES

RS20 Mini Gutter Clip £19.50
RS21 Mini Hatchback mount £19.50
CK-3MB Mini Cable Assembly £26.50
WS-1M Window Mount & Cable £39.00

COMET STATION ACCESSORIES

CBL-30 1.1/2 Bajen 11PEW £23.50
CBL-200 1.1/2 Bajen 26PEW £29.50
CF-50MR HF Low Pass Filter 1KW PEP £43.95
CF-50MR 6M Low Pass Filter 1KW PEP £43.95
CF-30H HF Low Pass Filter 2KW PEP £69.00
CF-30S HF Low Pass Filter 150P W £25.00
CF-60S 6M Low Pass Filter 150P W £25.00
CF-89R 2W Band Pass Filter 150P W £49.95
CD-160H PWR 16.0KHZ 20/200/2000 £99.00
CMX-2 1.8 200MHZ 20/200/2000 £119.00

COMET ANTENNAS

HR-7 7MHz Mobile Whip £46.00
CA-14HR 14MHz Mobile Whip £46.00
HR-21 21MHz Mobile Whip £46.00
CA-28HR 28MHz Mobile Whip £46.00
CH25S 2M/27CM Whip BNC £18.50
CH15S 1.5MHZ Mobile Whip £18.00
CH600MX 270/270CM Whip £29.50
HR 50 6MHZ Mobile Whip £46.00
CA-58HR 50MHz Mobile Whip £46.00
CAXX4K 270/270CM Mobile Whip £49.00
Z4 2M/70CM Whip with locking collar £35.00
B-10 2M/70CM Mobile Whip £21.50
B-22M 2M/70CM Mobile Whip £44.95
CHL21J 2M/70CM Mobile Whip £18.00
CHL26J 2M/70CM Mobile Whip 0.28 £21.50
CA-258 2m 6/5Mobile Whip £29.00
CA-350dB 6M/10MM Base Collinear £149.00
ABC23 3 X 4 Base Collinear £55.00
GP9N 2M/12CM Base Collinear £135.00
FP9N 6M/12CM Base Collinear £39.00
FP9S 6M/22CM Base Collinear £119.00

COMET DUPLEXERS

CF-30S HF/VHF Duplexer £25.00
CF-30A HF/VHF Duplexer £37.00
CFX-514 6M/27CM Triplexer £49.00
CFX-431 2M/27CM/23CM Triplexer £49.00
CF-520 2M/6M Duplexer £29.00

TELEX HY-GAIN

HF ANTENNAS

12AVGS 10-15-20M vertical, 4.1m £109 C
14AVWS/10 15-20-40M vertical, 5.5m £159 C
DX88 10-60m vertical £315 C
DX77 2M-40m vertical £369 C

ROTATORS

Medium duty meter controller £315 D
HAM IV Medium duty with break £449 D
HAM V HAM IV with digital controller £749 D

SPECIAL OFFER LIST

(while stocks last)

9533 Channel Master bearing £12.50
CBB156 Universal Handi Belt Clip £7.50
TNC24 Multimode TNC £199.00
NF32 2m Mobile TTV £39.00
NDH518 JRC Mic Unit NRD515 £59.00
FC767 FT767 auto ATU £99.00
FF5 RX low pass filter £2.50
FS21D HF/VHF power meter £25.00
FS220L HF/VHF power meter £25.00
FS711C 10m SWR meter £15.00
FS711H HF power SWR meter £25.00
FS711V VHF power/SSWR meter £25.00
FMU7301 FM unit FT701/902 £10.00
PL14PL Patch lead £1.00
PL52PL Patch lead £1.00
XFR8GA AM filter FT901/1010/1Z £5.00
XH495C CW filter FT102 £10.00
XH495CN CVHF filter FT102 £10.00
XH495U11 CW filter FT600 £20.00
XH495U13 CW filter FT600 £20.00
D00025J NB mod kit FTONE £10.00
HRRMB Headset/mic £10.00
FRWRWF Wide FM mod FR8800 £10.00
DGR8800 DC kit FR8800 £15.00
SB4 Yeasu switch box £2.50
YM48 Yeasu DTMF exc 6 pin £19.00
AN3 Coaxial switch RX £3.50
YM39 DTMF mic 6 pin £12.00
YM2500L Mic CP2500 £16.00
MM1 Mobile MiT Mobile FT1 etc £5.00
AMUT77 AM unit FT77 £3.50
DVS1 Voice mem unit FT212/72 £18.90
MH148A 8 pin mic Yaesu mobiles £15.90
NC27C Yeasu charge 7.2V £2.50
MH2652 Hand mic FT510/520 £25.00
CD160H HF-6m SWL/power meter £95.00
YM22 DTMF mic £15.00
12/6A BN05 6 amp PSU £39.00
FC700 Yeasu ATU £129.95
CS28 Case FT200 + FB3 £5.00
CSC7 Case FT203 + FB4 £5.00
CSC10 Case FT209 + FB3 £5.00
CSC17 Case FT272 + FB4 £5.00
CSC22 Case FT223 + FB17 £5.00
CSC11 Case FT228 + FB11 £15.90
CSC35 Case FT411 + FB17 £7.00
CSC37 Case FT411 + FB12 £7.00
CSC34 Case FT404 + FB17 £5.00
CSC44 Case FT407 + FB11 £15.90
CSC46 Case FT407 + FB11 £12.50
CSC50 Case FT415 + FB25 £7.00
CSC55 Case FT415 + FB26 £7.00
FV05 Case FT206/70R £7.00

ANTENNA  BARGAINS

BBF 2m 8/8 mobile whip £13.50
12SE 12m mobile whip £13.50
15SE 15m mobile Whip £12.50
H5 7m mobile whip £12.50
GP23 2m base collinear £35.00
SD144 2m Swiss Quad £35.00
Cushcraft save £2.50 £59.00
Cushcraft save £7.00 £31.90

--

Please mention Practical Wireless when replying to advertisements
The RD500 is a new kind of high specification receiver. It can hold station names and information on every signal it encounters, and takes station identification and scanning into a new era.

The RD500 can store an entire scanning directory with room to spare, it has 512K of RAM as standard or 2 megabytes which gives 57,000 20 character records. Type in a clue and the receiver finds the stations for you.

CW signals are spread into a panorama of sound, so that individual signals can easily be focused upon. It has a variable notching and peak filter, digital sound sampling, noise blanker, cassette control, tuning metering, S-meter (60 levels), tuning meter, AVC (to smooth out audio level variations), selectable AGC speed, and pass band tuning. All modes are supported including spec-calling and PM and it is upgradeable to stereo WBFM and video. It has a real time clock which can be set to any time zone by city name, and it has 4 programmable timers and a sleep timer.

The receiver’s frequency agility is second to none, with step sizes from 5 Hz to 5MHz including 9kHz for broadcast bands, 99 bands, 26 F0s and a number of scan modes and auto tuning. It has a 45 key alphanumeric remote and supports PC keyboards and RS232, and comes complete with a Windows software package. Download a database from your PC then switch it off and listen to the DX again!

Price: £799 Inc postage

---

**Electromail**

Electromail has always provided an outstanding range backed by the highest levels of service. Over 70,000 products from electronic components, electrical equipment to mechanical parts and tools, each one quality selected and available over the phone for next working day delivery.

You could say that’s a service hard to beat, but that’s just what we’ve done. The new Electromail CD-ROM catalogue makes a technological breakthrough by providing full information about our complete range, with colour photographs and technical illustrations. There are powerful search functions by product type and word number - it’s the fastest and easiest way ever to select and order the product you need. There’s a special new products review section to keep you informed of new range additions and it contains the full RS library of Data Sheets as an added bonus.

But the best news is you can get all that for just £5 - send for your copy, and get in the fast lane to finding the components you need.

Electromail, P.O. Box 33, Corby, Northants, NN17 9EL
Tel: 01536 204555 Fax: 01536 405555

---

**AT LAST A CATALOGUE AS ADVANCED AS YOUR THINKING**

The most powerful source of reference for technical products and you can get it for £5.00

---

**CREDIT CARD ORDER HOTLINE : 01536 204555**

Please send me [ ] copies of the ELECTROMAIL CD-ROM catalogue at £5.00 each inc. VAT and P & P. Total value of order £

Name:
Address:
Postcode:
Tel:
Customer Ref. No.:
[ ] Please debit my Visa/Mastercard/American Express (please delete)
Card No.:
Signed:
Expiry Date:

Please send a cheque for £ to cover all items ordered.

Ref: 234-4829/MTPW
As I'm writing this edition of 'Keylines' in mid-March, the PW & Short Wave Magazine teams are just back from the Picketts Lock Show in London. And as usual the 'London Show' was extremely busy, very crowded and enjoyable...with one or two exceptions!

As the very successful London Show grows from strength-to-strength, it's good to see the increasing number of visitors from all over the UK and abroad. The Channel Tunnel seems to have made a difference there! And one day perhaps we`ll even see Ponders End station (a short distance from Picketts Lock) open at the weekends to the benefit of travellers - specially those coming in from Stansted Airport.

Additionally, the Radiocommunicaions Agency's (RA) stand at the show was always busy. The RA's staff were accompanied by representatives from Subscription Services Ltd. (SSL) in Bristol who handle our licences. So, I've no doubt that they were kept busy answering questions...and they certainly seemed to be on the occasions I passed the stand.

For myself, the show was very busy indeed. The queue of readers waiting to talk to me, pass on their ideas, suggestions, etc., almost broke the 'Leicester Record'. At one point I had 28 readers waiting to talk to me, the 'record' (and I apologised to those readers who gave up waiting to talk to me and for keeping them waiting) stands at 32 for a Leicester show!

I appreciate that for many of you, the London show might be the only opportunity to meet the PW team and myself. Because of that I do my best to find time for all of you and unfortunately this means there's a queue sometimes. But please bear with me and don't give up because I really do want to meet and talk with you.

And in closing on this topic I must say a special 'thank you' to the two kind gentleman who insisted on bringing me extra refreshments! One supplied two cups of fresh tea and another a welcome cold drink. The gesture was much appreciated!

Conditions Improving

Over the years (We've been attending from the very first show) conditions have been improving at Picketts Lock. Toilets and wash room facilities - always a problem at major shows - are now excellent and very clean. And now the organisers have only got to solve the ventilation problems caused by large numbers of people attending and the very small number of people who continue to smoke within the building (despite the ban on smoking in the main halls).

I spoke at length to Bernie Godfrey G4AOG of Radiosport Ltd. (the organisers) on the thorny subject of people smoking in the main exhibition halls during the show. I did this not only because I found the smoky atmosphere uncomfortable on both days myself - particularly on the Saturday - because readers waiting to chat to me in my little 'Editor's Corner' were also finding the cigarette, pipe and (would you believe it...people smoking cigars in such conditions!) cigar smoke very objectionable.

(Even two of my colleagues - both regular smokers - thought it unmentionable for people to smoke in the main halls). So, on behalf of the many people who complained directly to me, and to my own discomfort, I asked Bernie Godfrey if the "no smoking" rule (there are no smoking notices throughout the main halls) could be enforced. And fortunately, I'm pleased to say that I have the personal assurance of Bernie Godfrey that the "no smoking" rule will be enforced in 1998...mainly because of another rather unfortunate incident.

It's an "ill wind that blows nobody any good" and it's because of the second major overnight theft from the Picketts Lock management to allow a private security firm to operate during the period of the show.

Bernie Godfrey states that up until the latest overnight theft from the Picketts Lock centre during the show, they could not get an agreement regarding the provision of a security company. This is all now overcome and from the next Radiosport Ltd. event at Picketts Lock...security will be ensured overnight and during the day by a private security service.

So, it's good to know that in future Radiosport Ltd. along with checking to see that we've all paid to get into the show, will also be taking extra care to look after our well-being once we are within the Picketts Lock Centre. I'm sure their kind attention will be appreciated by the majority and the extra care shown to their "customers" will lead to this very popular event becoming even more popular in years to come.

Club Spotlight Magazine Competition 1997

Have you sent in your club's entry for the Practical Wireless Club Spotlight Magazine Competition yet? Sponsored jointly by PW and Kenwood UK, the 'Club Spotlight' cup was presented for the first time in 1996 and was won by the Hoddesdon Club in Hertfordshire.

Dave Wilkins G3HY of Kenwood UK presented the beautiful trophy to the Hoddesdon team at the Leicester show. This year we're hoping that many more clubs will be entering...so why not send your club magazine in for consideration?

You don't have to be a local club to enter. There are many specialist "national" clubs throughout the UK and these include the RAIBC, BARTG, WAB, BATC to name just a few. The 'Club Spotlight' trophy has been introduced to reflect on the importance of the club magazine. If you enter...there's a chance some of that reflection will be from your proud club! (Please contact Zoe Crabb for further details or see 'Club Spotlight' for information).

The closing date is Friday 25 July 1997.

Get Well Soon

I've recently written a personal 'Get well soon' greeting to one of the longest 'serving' contributors to PW's h.f. bands column - Don MacLean G3N0F. Unfortunately, Don has been unwell since well before Christmas 1996.

Along with contributing his usual report on his h.f. activity, Don also provides a generalised propagation summary. Everyone on PW misses his input and support very much. So, we hope you recover quickly Don and we look forward to hearing from you on the bands. Get better soon!

Leicester Show 1997

I've no doubt that many readers, along with myself, will be very pleased to hear that the Leicester Show 1997 dates have been fixed for Friday 17 and Saturday 18th October. Frank Elliot G4PDZ from the organising committee brought the news to everyone attending the London Show.

Frank informed me that the 1997 Leicester event will be certainly be the last at the Granby Halls venue. Long past their own 'sell by' date the Halls are to be demolished very soon after the Leicester Show.

And although I always enjoy the Leicester Show (I've only missed two since they started) I'm sure that with a new venue in the vicinity, the Leicester show will - like the south's London Show - get even better. We look forward to seeing you there for our last meeting at the Granby Halls venue in October.

Rob Mannion

Practical Wireless, May 1997
Dear Sir

In reply to Richard Pigg G4NIW's plea for help (PW - February '97 issue) with regard to Morse code, for what it is worth, here follows my 'words of wisdom'.

Before I impart these thoughts, I must confess that when I first contemplated jumping in on the dubious landscape of h.f. communications I too was amazed at how some people could copy c.w. at 25 w.p.m. plus! But not only that, how long did it take to achieve such an amazing ability?

What is even more amazing is that I subsequently found out later that many of these c.w. speed freaks (allowing for the odd person who appeared to have been given the gift of a natural talent for the receiving and sending of Morse code) had trodden the route that I was about to embark on - progressive learning techniques.

Yes, you probably know what I mean, start out at 5 w.p.m. and work your way up the ladder until you reach 12 w.p.m., then say a prayer and take the Morse test. I was lucky, I passed first time. Unfortunately, many people don't.

However, although I said I was lucky, this statement is slightly untrue. Because in the 'nick' of time I discovered a sure-fire way to almost guarantee the ability to copy c.w. at whatever speed one desires. Yes, even 30 w.p.m. And what's more, if I can do it anyone can because at the time I hated c.w., but as a consequence of my serendipitous discovery, I've mellowed in my feelings towards it.

So, Richard, here is the good news. First forget the notion that 'some lucky people can, within a year of taking a 12 w.p.m. test, rattled away at 25 w.p.m. or more'. Because if it had taken them a year of struggle to reach 12 w.p.m., they're certainly NOT doing it far from it. Indeed, if you're determined to clear your mind of all the misconceptions put about by so-called c.w. gurus, you will be copying at any speed you wish within a month!

I must say though, before I reveal the sure-fire method, that I was totally 'gobsmacked' to read that Richard had performed years of practice to reach 20 w.p.m. He must be dedicated to the point of self-inflicted masochism. I salute him for his dogged enthusiasm.

What be, and many others have given into and what keeps them from achieving high c.w. speeds is the inculcated learning methods (inculcate: to instil by frequent admonition or reproof) they willingly embraced when first introduced to practice the art of c.w. It unerringly poisons their progress.

Throw away most of the books as nearly all of them teach the progressive learning technique in one way or the other. Here is the instruction: start learning at the speed you want to become proficient at. Simple, eh?

Forget the 10 w.p.m. 'plateau'. It's self-inflicted. At first, forget about writing it down, just listen! I know you're going to hate this, I was copying 25 w.p.m. in a week using this system. So can you!

Put it this way, so far as writing it down is concerned, when we've engaged in a conversation, do we write down what the other person says? Of course not. Yeah, it's all in the head. Writing it all down will impede your progress - terminally. If you have access to a Morse tutor, turn the wick to 25 w.p.m. and concentrate - you can do it!

Ray J. Howes G4OWY

Dorset

Amateur Radio Not Cheap

Dear Sir

On reading Matthew Lawrance's letter in 'Receiving You' (PW March 1997), I find myself in agreement with the points he makes. Amateur radio is not a cheap hobby, and seems even more expensive for those on a modest budget or youngsters setting up for the first time.

Home construction can go a long way to help reduce equipment costs, but unless there is a local 'Elmer' nearby, those interested in home construction can easily be put off with jargon and construction technique. While I will admit that in the past there has been a number of very good articles in PW dealing with the basics of home construction, there appears to be a gap between simple and more advanced projects.

As a PW reader of long standing, it may well be in the interests of new readers to obtain back copies of some of the excellent projects that have been published in the past. Or for the Editorial Team to trawl back issues for suitable items and re-publish them.

Colin Topping GM6HW

File

Editor's comment: The PW team strive to keep a 'balance' in project complexity and the wishes of readers (expressed via surveys) Colin. However, I hope to introduce suitable simple projects in my new 'Radio - Discover The Basics' series.
Non Linear Scales

Dear Sir

I read with amazement the article 'Non Linear Scales' in the March 1997 issue of PW. I have successfully rescaled several meters without resort to a computer or trigonometry or the skills of a draughtsman. A few years ago I made a QRP 50Q dummy load and power meter, requiring the voltage developed across the load to be rectified to move a d.c. meter. Simple calculation converted sixteen power levels between 50W and 7W to d.c. volts. The meter (1.5in square) was opened up and the scale removed and a piece of blank paper stuck on. The needle length was measured with a ruler and an arc was drawn on a slightly larger radius. The blank scale was then replaced. As the calculated voltages were applied, a pencil dot was made at the end of the pointer, these later to be marked and labelled in black ink. For more details one is referred to pages 505/1 of the G-GRP Club Circuit Handbook: 'RF Wattmeter' by Ade Weiss, K8EEG.

Final comment: KISS! Walter Farrar, G3ESP, W. Yorkshire

Morse Surplus?

Dear Sir

Having followed the argument for and against the abolition of the Morse code in the RAE, I was appalled to hear on the television that it is proposed to do away with the Morse code altogether. It is argued that modern technology makes the Morse surplus to requirements. As Shakespeare once said 'Parting is such sweet sorrow'. During the Second World War I spent many a weary hour learning the Morse code in preparation to becoming a Wireless Operator. The monotony of hours and dashes and dots must admit. I never touched a super-dooper radio that not only selects the stations for you, but probably cooks your dinner and turns down our bed sheets at night! There's nothing more exciting than handling the components, inserting them into a p.c.b. or an 'ugly' style circuit and soldering them in place, hooking up a battery and switching on. There are so many people today who have no idea what Amateur Radio is all about and excitement of amateur radio. Fighting through the atmospherics and interfering stations were the Morse code surplus to requirements. It is argued that modern technology makes the Morse surplus to requirements.

Despite my success, I must admit I never touched another Morse key after 'demob'. The 'sweet sorrow' part is probably the nostalgia brought back whenever I listen to Morse. I find myself thinking 'He's a good operator' or 'He needs a bit more practice'. And the memories are brought back, of incidents and people I knew, now far distant. My humble opinion is, for what it's worth, that to do away with the Morse code would be reckless indeed. I have a feeling that those who are against the Morse code being included in the RAE are those who find it difficult to cope with. It's not easy, that is a certainty.

Quite a few of us during the war blanked out at periods between twelve words a minute and sixteen and were relegated to the next class below, but I can't recall anyone failing completely. The Morse code is a very useful thing to have under your belt and though a little rusty, I can still understand the majority of what I listen to. I dread to think what my sending would be like after these years. So, I say keep it! You never know what dire emergency might occur when it will come in handy. With the Morse code you can send messages on so many different things, lights and audible means. These modem satellites are taking away all the joy and excitement of amateur radio. Fighting through the atmospherics and interfering stations were the Morse code surplus to requirements. It is argued that modern technology makes the Morse surplus to requirements. With the Morse code you can send messages on so many different things, lights and audible means. These modem satellites are taking away all the joy and excitement of amateur radio. Fighting through the atmospherics and interfering stations were the Morse code surplus to requirements. It is argued that modern technology makes the Morse surplus to requirements. With the Morse code you can send messages on so many different things, lights and audible means. These modem satellites are taking away all the joy and excitement of amateur radio. Fighting through the atmospherics and interfering stations were the Morse code surplus to requirements. It is argued that modern technology makes the Morse surplus to requirements. With the Morse code you can send messages on so many different things, lights and audible means. These modem satellites are taking away all the joy and excitement of amateur radio. Fighting through the atmospherics and interfering stations were the Morse code surplus to requirements. It is argued that modern technology makes the Morse surplus to requirements. With the Morse code you can send messages on so many different things, lights and audible means. These modem satellites are taking away all the joy and excitement of amateur radio. Fighting through the atmospherics and interfering stations were the Morse code surplus to requirements. It is argued that modern technology makes the Morse surplus to requirements. With the Morse code you can send messages on so many different things, lights and audible means. These modem satellites are taking away all the joy and excitement of amateur radio. Fighting through the atmospherics and interfering stations were the Morse code surplus to requirements. It is argued that modern technology makes the Morse surplus to requirements. With the Morse code you can send messages on so many different things, lights and audible means. These modem satellites are taking away all the joy and excitement of amateur radio. Fighting through the atmospherics and interfering stations were the Morse code surplus to requirements. It is argued that modern technology makes the Morse surplus to requirements. With the Morse code you can send messages on so many different things, lights and audible means. These modem satellites are taking away all the joy and excitement of amateur radio. Fighting through the atmospherics and interfering stations were the Morse code surplus to requirements. It is argued that modern technology makes the Morse surplus to requirements. With the Morse code you can send messages on so many different things, lights and audible means. These modem satellites are taking away all the joy and excitement of amateur radio. Fighting through the atmospherics and interfering stations were the Morse code surplus to requirements. It is argued that modern technology makes the Morse surplus to requirements. With the Morse code you can send messages on so many different things, lights and audible means. These modem satellites are taking away all the joy and excitement of amateur radio. Fighting through the atmospherics and interfering stations were the Morse code surplus to requirements. It is argued that modern technology makes the Morse surplus to requirements. With the Morse code you can send messages on so many different things, lights and audible means. These modem satellites are taking away all the joy and excitement of amateur radio. Fighting through the atmospherics and interfering stations were the Morse code surplus to requirements. It is argued that modern technology makes the Morse surplus to requirements. With the Morse code you can send messages on so many different things, lights and audible means. These modem satellites are taking away all the joy and excitement of amateur radio. Fighting through the atmospherics and interfering stations were the Morse code surplus to requirements. It is argued that modern technology makes the Morse surplus to requirements. With the Morse code you can send messages on so many different things, lights and audible means. These modem satellites are taking away all the joy and excitement of amateur radio. Fighting through the atmospherics and interfering stations were the Morse code surplus to requirements. It is argued that modern technology makes the Morse surplus to requirements. With the Morse code you can send messages on so many different things, lights and audible means. These modem satellites are taking away all the joy and excitement of amateur radio. Fighting through the atmospherics and interfering stations were the Morse code surplus to requirements. It is argued that modern technology makes the Morse surplus to requirements. With the Morse code you can send messages on so many different things, lights and audible means. These modem satellites are taking away all the joy and excitement of amateur radio. Fighting through the atmospherics and interfering stations were the Morse code surplus to requirements. It is argued that modern technology makes the Morse surplus to requirements. With the Morse code you can send messages on so many different things, lights and audible means. These modem satellites are taking away all the joy and excitement of amateur radio. Fighting through the atmospherics and interfering stations were the Morse code surplus to requirements. It is argued that modern technology makes the Morse surplus to requirements. With the Morse code you can send messages on so many different things, lights and audible means. These modem satellites are taking away all the joy and excitement of amateur radio. Fighting through the atmospherics and interfering stations were the Morse code surplus to requirements. It is argued that modern technology makes the Morse surplus to requirements. With the Morse code you can send messages on so many different things, lights and audible means. These modem satellites are taking away all the joy and excitement of amateur radio. Fighting through the atmospherics and interfering stations were the Morse code surplus to requirements. It is argued that modern technology makes the Morse surplus to requirements. With the Morse code you can send messages on so many different things, lights and audible means. These modem satellites are taking away all the joy and excitement of amateur radio. Fighting through the atmospherics and interfering stations were the Morse code surplus to requirements. It is argued that modern technology makes the Morse surplus to requirements. With the Morse code you can send messages on so many different things, lights and audible means. These modem satellites are taking away all the joy and excitement of amateur radio. Fighting through the atmospherics and interfering stations were the Morse code surplus to requirements.

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

R.E.A. On Demand - City & Guilds

Dear Sir

In reply to Paul Collins' letter and your comments with regard to the Radio Amateurs Examination 'On Demand' in the February 1997 edition of Practical Wireless I would like to clarify for readers the current situation and future changes surrounding the RAE administered by City & Guilds.

The City & Guilds RAE is an internationally recognised licensing examination, which has been used as a model by many countries all over the world. Its high standards and quality are respected worldwide.

City & Guilds ensures an effective quality control over the RAE, which is available twice every year by means of an Examination Committee which includes representation from the Radio Society of Great Britain. It is important to note that all questions are written by active Radio Amateurs and that all examination papers and results are closely scrutinised and monitored by the committee, which entirely consists of Radio Amateurs.

A City & Guilds RAE 'On Demand' would not be able to receive the necessary time and attention resulting in a marked lowering of standards and overall credibility. It would also raise costs.

City & Guilds is however conscious of criticism in terms of RAE availability, cost and speed of releasing results. In response, the RAE is available every May and December at a wider number of centres (over 400) throughout the UK and results for their examinations are now more speedily released for candidates by the end of June and January respectively.

A revised RAE consisting of a single multiple choice paper of 80 questions will be introduced in May 1998. This will not only facilitate access and bring down costs from £38.80 to approx £25 for candidates, but will also reflect an increasingly realistic and modernistic approach whilst maintaining present high standards. The decision to introduce the revised examination has been agreed by the Radio Communications Agency, Dept. of Trade & Industry, in consultation with the Radio Society of Great Britain (RSGB) and City & Guilds.

Roger Bone
Administrator RAE & NRAE
City & Guilds of London Institute
1 Gipsy Court, London EC1A 9DD.

Editor's comment: The letter from Roger Bone arrived too late for inclusion in the April issue of PW (this fact was mentioned in the 'Editor's comment' at the end of the original letter from Chris Edmonson, VK3CE who was also replying to Paul Collins)
Club Name Change

The GPT Amateur Radio Club based in Beeton, Nottingham, has now changed its name to the Siemens Amateur Radio Club. The change of name has come about as a result of the formation of a new joint venture company between GEC of England and Siemens of Germany. The new company will be a world class force in business communications systems for both the UK and in certain international markets. The change in name will not affect the radio club’s programme of events and new members are always welcome.

The club will continue to meet on Thursday nights at 7.30pm and Sunday mornings at 10am. The first event under the new name was the inter-club quiz night in the Siemens Social Club back on the 5th February with teams from the Amateur Radio Club of Nottingham (ARCON), Lace Web, Loughborough and Siemens Radio Clubs competing. The winning team was ARCON.

New members are always welcome to join the club and further information can be obtained from the club secretary Chris G4VFK on 0115-922 6321 or E-mail on 0115-922 6321 at g4vfk@conserve.com

Keighley’s New Secretary

As of Thursday 30 January 1997, the new Secretary of the Keighley Amateur Radio Society (KARS) is Jack Birse, G4ZVD, 178 Long Lee Lane, Keighley, West Yorkshire BD21 4TT. E-mail: jack.birse@legend.co.uk. The previous Secretary, Kath Conlon G0RLO held the position for 11 years, but due to work commitments had to give up. Kath did a tremendous job whilst holding the Secretary’s position and will be missed, though the club did manage to get her to accept a committee position!

New Officers For Spalding

At Spalding & District Amateur Radio Society’s recent AGM, the following new officers were elected. Chairman: Mick Pell G1APV. (01775) 840521. Secretary: John Flowers G0LFL. (01775) 840445 (evenings and weekends only) and Treasurer: Dennis Houl G4OO. (01775) 750383. The club meets every Friday at 7.30pm for a natter/activity night at its clubroom, which is at The Old Firestation, Double Street, Spalding. Refurbishment of the club facilities is currently taking place to improve antenna systems, equipment and workshop facilities available to club members. Speakers, meetings and special events are planned every third Friday of the month. New members and visitors are always welcome. Membership costs £7.50 per year. The club will be holding Novice and RAE classes later in the year. Please contact one of the committee listed above for further information.

Special Events

It’s getting to that time of year again when many clubs are getting ready to commemorate the centenary of Marconi’s first ever transmission across water. Read on and find out what’s happening where and when!

‘Club Spotlight’ has recently heard from Glyn Jones GWO6ANA who has sent in information of two special event stations that the Barry Amateur Radio Society will be putting on in May 1997. The Society will be running the first GB100 Marconi stations to commemorate the centenary of Marconi’s first ever transmission across water on 13 May 1997.

The two stations being set-up are GB100LP at Lavernock Point, South Glamorgan. This station will be active on all bands from May 10 until May 17, 24hrs a day. The Barry Amateur Radio Club welcome all amateurs to attend the site and take part in the operation and be part of radio history. On May 13, members of the club will be in period costume to re-enact Marconi’s successful transmission across the ocean.

From May 12 until the 16th, GB100FI from Flatholm Island will be operating again on all bands, s.s.b., c.w. and the data bands RTTY, AMTOR, PACTOR and to include SSTV. There will be 20 operators on Flatholm Island, which includes four from Germany and hopefully a member returning from VK ex GW4CBK, now K94CB. The very special double event is the first to have two GB100 calls and it commemorates the first IOTA, this being Flatholm Island (EU124), the first DXpedition as Marconi was an Italian and he came to Wales for this experimentation. The QSL route for both stations is via GWO6ANA. Chairman, Barry Amateur Radio Society, QTHR. Tel: (01446) 774522.

PS: A reminder to all amateurs, if you want to call in at Lavernock point to operate, call Station Manager Jim GW3PYX on (01222) 708403 to arrange operating times.

The Weston-Super-Mare Radio Society meet twice a month, usually on the first and third Monday at the Woodspring Inn, High Street, Worle. Weston-Super-Mare. The first meeting in the month includes a talk or other activity and the second is normally a ‘Workshop’ discussion evening.

A course for the RAE is run in association with the Society. Assistance can be also be given with learning the Morse Code.

On May 17/18th, the Society are celebrating the centenary of Marconi’s wireless communications across the Bristol Channel by operating a special event station GB100BD on Brean Down, near Weston-Super-Mare. A station is also being set-up between the 12 and 25th of May at ‘The Time Machine’, Weston’s museum, which will be using the club calls G4WSSM and G8WBSM. The issue of special certificates is being co-ordinated with the Barry Society, see above. For further details, contact Graham Finder GWAR on (01934) 415700.

Conlon G0RLO held the position for 11 years, but due to work commitments had to give up. Kath did a tremendous job whilst holding the Secretary’s position and will be missed, though the club did manage to get her to accept a committee position!

The Weston-Super-Mare Radio Society meet twice a month, usually on the first and third Monday at the Woodspring Inn, High Street, Worle, Weston-Super-Mare. The first meeting in the month includes a talk or other activity and the second is normally a ‘Workshop’ discussion evening.

A course for the RAE is run in association with the Society. Assistance can be also be given with learning the Morse Code.

On May 17/18th, the Society are celebrating the centenary of Marconi’s wireless communications across the Bristol Channel by operating a special event station GB100BD on Brean Down, near Weston-Super-Mare. A station is also being set-up between the 12 and 25th of May at ‘The Time Machine’, Weston’s museum, which will be using the club calls G4WSSM and G8WBSM. The issue of special certificates is being co-ordinated with the Barry Society, see above. For further details, contact Graham Finder GWAR on (01934) 415700.

However, membership now stands at 223 members, quite a difference from 50 years ago!

Part of Torbay’s celebrations is an award scheme, where anyone submitting a list of TARS Member Stations Worked/Heard between 1 January and 31 December 1997 with any TARS Member, Society stations or Special Anniversary Station GB5OTR, which will be active throughout the year from various

Torbay’s 50th Anniversary

The year 1997 is the 50th anniversary of the Torbay Amateur Radio Society which was founded back on the 22 February 1947 at the local YMCA in Torquay. Holding monthly meetings, with a membership of about 25, in 1965, a more permanent HQ was found. The new HQ, (just a radio shack), was made and G3NJA became the society’s callsign. Then, in 1985, the society moved to Newton Abbot. This is the society’s present location, and the club is located at the English China Clay Social Club.

Both G3NJA and G0LFL are active from HQ on a Friday ‘Club Nite’.

Dennis Houl G4OO.

Keighley’s New Secretary

As of Thursday 30 January 1997, the new Secretary of the Keighley Amateur Radio Society (KARS) is Jack Birse, G4ZVD, 178 Long Lee Lane, Keighley, West Yorkshire BD21 4TT. E-mail: jack.birse@legend.co.uk. The previous Secretary, Kath Conlon G0RLO held the position for 11 years, but due to work commitments had to give up. Kath did a tremendous job whilst holding the Secretary’s position and will be missed, though the club did manage to get her to accept a committee position!

New Officers For Spalding

At Spalding & District Amateur Radio Society’s recent AGM, the following new officers were elected. Chairman: Mick Pell G1APV. (01775) 840521. Secretary: John Flowers G0LFL. (01775) 840445 (evenings and weekends only) and Treasurer: Dennis Houl G4OO. (01775) 750383. The club meets every Friday at 7.30pm for a natter/activity night at its clubroom, which is at The Old Firestation, Double Street, Spalding. Refurbishment of the club facilities is currently taking place to improve antenna systems, equipment and workshop facilities available to club members.

Speakers, meetings and special events are planned every third Friday of the month. New members and visitors are always welcome. Membership costs £7.50 per year. The club will be holding Novice and RAE classes later in the year. Please contact one of the committee listed above for further information.

The Weston-Super-Mare Radio Society meet twice a month, usually on the first and third Monday at the Woodspring Inn, High Street, Worle, Weston-Super-Mare. The first meeting in the month includes a talk or other activity and the second is normally a ‘Workshop’ discussion evening.

A course for the RAE is run in association with the Society. Assistance can be also be given with learning the Morse Code.

On May 17/18th, the Society are celebrating the centenary of Marconi’s wireless communications across the Bristol Channel by operating a special event station GB100BD on Brean Down, near Weston-Super-Mare. A station is also being set-up between the 12 and 25th of May at ‘The Time Machine’, Weston’s museum, which will be using the club calls G4WSSM and G8WBSM. The issue of special certificates is being co-ordinated with the Barry Society, see above. For further details, contact Graham Finder GWAR on (01934) 415700.

However, membership now stands at 223 members, quite a difference from 50 years ago!

Part of Torbay’s celebrations is an award scheme, where anyone submitting a list of TARS Member Stations Worked/Heard between 1 January and 31 December 1997 with any TARS Member, Society stations or Special Anniversary Station GB5OTR, which will be active throughout the year from various

Torbay’s 50th Anniversary

The year 1997 is the 50th anniversary of the Torbay Amateur Radio Society which was founded back on the 22 February 1947 at the local YMCA in Torquay. Holding monthly meetings, with a membership of about 25, in 1965, a more permanent HQ was found. The new HQ, (just a radio shack), was made and G3NJA became the society’s callsign. Then, in 1985, the society moved to Newton Abbot. This is the society’s present location, and the club is located at the English China Clay Social Club.

Both G3NJA and G0LFL are active from HQ on a Friday ‘Club Nite’.

Dennis Houl G4OO.
The Mexbrough club has around 250 members and is very active in all aspects of the hobby. Members can either sit in or join any of the courses of instruction currently in progress. It is possible to join at a low cost and to progress within the club beyond examination standard and by joining the current construction project. Students can even obtain equipment at reasonable cost.

The RAE class is well supported with 22 students and the club also run the examination which is open to external candidates. About ten students sit the December exam. Novice and Morse classes are also well supported. There is a Morse Net on 144kHZ. As well as the usual field days NFD/JOTA, the club also do school visits. More information from Roy Oxley on (01977) 645691.

**Pontefract & DARS**

Members of the Pontefract & District Amateur Radio Society meet every Thursday at the Carlton Community Centre, Carlton Road, Pontefract at 7.30pm, when members meet to discuss and work on their current construction projects. The club rooms are open to members at any time so that they may use any of the club’s facilities.

Novice and Morse tuition is held and the society join the usual annual events such as JOTA/Thinking day on the air. Each year, the society hold an Annual Component Fair, which this year is at a new venue with better disabled parking and lots of space to spread out for seating, food, licensed bar and... last but not least, the traders!

The new venue is at Carlton High School, Carlton Road, Pontefract, which was the overflow car parking area for the old venue. The Components Fair will be held on Sunday 23 March 1997. More details from Roy Oxley G0FYM on (01977) 645691.

**Yeovil’s 13th QRP Convention Funrun**

In May of each year, the Yeovil Amateur Radio Club hold a QRP Convention. Prior to the Convention, the club hold a small contest known as ‘CW QRP Fannin’ in which QRP operators take part.

The event runs for four evenings after the May Bank Holiday on 3.5 and 7MHz. However, it is not meant to be a serious contest, just a bit of fun before the QRP Convention on Sunday 18 May 1997, hence it’s name!

**Funnun Bonus**

GB2LOW from G3ICO in Yeovil on 3.558 and 7.028MHz ± 2kHz

GW3JSV near Weshpool, Powys on 3.563 and 7.023MHz ± 2kHz

GD0LQE in Laxey, Isle of Man on 3.553 and 7.033kHz ± 2kHz

**Rules**

- **When:**
  - Tuesday 6 May to Friday 9 May 1997
  - 8pm to 10pm UK clock time each evening

- **Frequencies:**
  - 3.560 and 7.030MHz both ± 10kHz

- **Contacts:**
  - Contacts must be between QRP stations, maximum 5W output

  *All stations may be worked once each evening on each band*

  Funrun Bonus Stations will be operating each evening randomly for one hour on each band

- **Call:**
  - ‘CQ FR’

- **Scoring:**
  - Each QSO with another QRP Station scores 10 points
  - Each QSO with a Funrun Bonus Station (inc. GB2LOW) scores 25 points

  *All duplicates must be marked and no points claimed. Points will be deducted for unmarked duplicates at twice that particular QSO score*

- **Exchange:**
  - RST, Serial Number (see below), Output, Power and Name

- **Serial Number:**
  - The three figure serial number must start at any random number of your choosing, not less than 100 and must then be incremented by one for each QSO throughout the whole of the contest. However, the Funrun Bonus Stations listed above will all commence at 001

- **Entry Sheets:**
  - Separate log sheets for each band, with sub-totals for each evening, preferably in the RSGB format. A separate signed RSGB style cover sheet stating the Rig, Power Output and Aerial. Entries should be sent to Eric H Godfrey G3GC, Dorset Reach, 60 Chilton Grove, Yeovil, Somerset BA21 4AW to arrive no later than Thursday 15 May 1997

- **Awards:**
  - Certificates will be awarded for the highest score for any three evenings out of the four on each band and also for the highest total overall score for any three evenings on both bands. These evenings do not necessarily have to be the same on 3.5MHz as 7MHz.
  - A certificate will also be awarded to the station consistently using the lowest power.
  - All four certificates will be presented at the Convention on 18 May 1997 immediately after the lunch break

- **SW Listeners:**
  - Listener reports will be appreciated and a certificate will be awarded to the listener who submits the most comprehensive report.

Apart from the club’s GB2LOW Funrun Bonus Station, this year like last year the other Funrun Bonus Stations have been selected from amongst last year’s contrasts. This provides not only variety, but also allows a geographical spread of their locations.

This year, to try to sustain interest over the whole period of the contest, all stations may work all other stations again every evening. Further information from G3GC on (01935) 475533.

Don’t forget to send in two of your most recent club magazines to me, to be entered into the Spotlight Club Magazine Competition. Closing date is 25 July 1997, so you’d better get a move on!
Please mention Practical Wireless when replying to advertisements

NOW AVAILABLE: AKD 2001 TRANSCEIVER
WITH 12.5kHz SPACING

£193.74
incl VAT
(Add £6 P&P)

2001 MODIFICATION
AKD are now offering to modify existing
AKD 2001 transceivers from 25kHz
spacing to the new 12.5kHz.

The MODIFICATION includes:
- New crystal
- New PROM
- LED mounted in front panel to signal
  IF in 12.5kHz or 25kHz spacing
- Narrower filter

Check your serial number with us to see
if your 2001 transceiver can be modified
£48 incl

HF3 £195.95 incl
(add £6 P&P)

- Fully synthesised employing a
  phase lock loop VCO to ensure
  stable & accurate signal recep-
  tion
- Frequency range 30kHz-30MHz
- CE approved
- 1kHz steps with clarifier
- Audio output 2 watts
- Headphone socket
- PSU & wire aerial

HF3M £209.95 incl
(add £6 P&P)

- **PHONE FOR DETAILS OF
  HF3M AVAILABLE JUNE 1997

HF3 £195.95 incl
(add £6 P&P)

- Fully synthesised employing a
  phase lock loop VCO to ensure
  stable & accurate signal recep-
  tion
- Frequency range 30kHz-30MHz
- CE approved
- 1kHz steps with clarifier
- Audio output 2 watts
- Headphone socket
- PSU & wire aerial

HF3M £209.95 incl
(add £6 P&P)

- **PHONE FOR DETAILS OF
  HF3M AVAILABLE JUNE 1997

Telephone: 01438 351710
Fax: 01438 357591

HF3 & HF3M RECEIVERS

C.M. HOWES
COMMUNICATIONS

Mail Order to: Eydon, Daventry,
Northants. NN11 3PT
Tel: 01327 260178

A Great QRP Station: £99.90!

TX2000 Transmitter Kit
5W CW/RT output (adjoinable) on 160 to 20m bands, about 1W on 10M. Operates
on a single band at a time with plug-in band filters. 13.8V DC.
HA22R hardware pack (pictured to left): £15.90.

DC2000 Receiver Kit
Great for the beginner as well as the experienced QRPer. 1.2W AF.
DC2000 Kit: £22.90 (with one band module). Optional band module kits: £8.90 each.
HA22R hardware pack (pictured to left): £18.90.

LM2000 Linking Module
Plugs into TX2000 transmitter. Side-tone, tuning, RT, CW filter Kit: £16.90
Total for all standard items above: £99.90 - that’s QRP!

Top Value Receiving ATUS

CTU8. Covers 500kHz to 30MHz. Matches antenna impedance and helps reduce spurious
signals and interference with extra front-end filtering for the receiver. 50239 sockets.
Factory Built: £49.90. Kit (including case and all hardware): £29.90.

CTU9. As CTU8 plus balun, bypass switch and terminal posts. The fully featured Rx ATU!
Factory Built: £69.90. CTU9 Kit (including case and all hardware): £39.90.

Please add £4.00 P&P or £1.50 P&P for electronics kits without hardware.

HOWES KITS contain good quality printed circuit boards with screened 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.
This month we’ve teamed up with Howes Communications to bring you a VERY special offer on the Howes DC2000 s.s.b./c.w. receiver kit.

The DC2000 is a direct conversion receiver kit, which, when built gives you an Amateur radio receiver covering all the short wave bands by using plug-in modules. Dave Howes G4KQH describes the DC2000 as a great little receiver ideal for both the first time builder and for those wanting a receiver for portable or holiday use. It can also be interlinked with many of the other kits in the Howes range and can be expanded into a complete transceiver by using the LM2000 and TX2000 kits. Normally the DC2000 receiver kit would be supplied with just one band module (normally 3.5MHz) at a cost of £22.90, the hardware pack at £18.90 and extra band modules at £7.90 each. However, with our offer you get two modules (of your choice!), the kit and hardware all for the special price of £45.80! (UK only, overseas readers please apply for postage rates). That means you are in effect saving £7.90 and getting the second module completely free!

To take advantage of this great offer just fill in the form provided or call the Credit Card hotline on (01202) 659930. Don’t forget when ordering to state which band modules you would like.

### DC2000 SPECIFICATIONS

<table>
<thead>
<tr>
<th>Frequency Coverage</th>
<th>Modes</th>
<th>Sensitivity</th>
<th>Audio Output</th>
<th>Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.8 - 30MHz (determined by band module in use)</td>
<td>s.s.b./c.w.</td>
<td>-118dBm (0.3µV) for 11dB S/N</td>
<td>1.2W in to 8Ω</td>
<td>10 - 15V d.c. at 200mA, 22mA quiescent</td>
</tr>
</tbody>
</table>

### Tools Needed
- Small 25W electric soldering iron
- Resin cored solder
- Small side cutters
- Wire strippers
- Long nosed pliers
- Trimming tool for oscillator coils

### DC2000 Frequency Coverage

<table>
<thead>
<tr>
<th>Band</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>160m</td>
<td>1.8MHz</td>
</tr>
<tr>
<td>80m</td>
<td>3.5MHz</td>
</tr>
<tr>
<td>40m</td>
<td>7MHz</td>
</tr>
<tr>
<td>30m</td>
<td>10MHz</td>
</tr>
<tr>
<td>20m</td>
<td>14MHz</td>
</tr>
<tr>
<td>15m</td>
<td>21MHz</td>
</tr>
<tr>
<td>10m</td>
<td>28MHz</td>
</tr>
</tbody>
</table>

### Special Offer Form

- Please send me …… DC2000 kit(s) at the special offer price of £45.80 including P&P (UK only).
- I would like my DC2000 kit to be supplied with the following two modules (please tick as appropriate):
  - 160m (1.8MHz)
  - 80m (3.5MHz)
  - 40m (7MHz)
  - 30m (10MHz)
  - 20m (14MHz)
  - 15m (21MHz)
  - 10m (28MHz)

- Name: ………… Address: …………
- Postcode: …………
- Tel: …………
- I enclose a Cheque/Postal Order (Payable to PW Publishing) for £………
- [ ] Please charge my Access/Visa card the sum of £………
- Card No: …………
- Valid from: ………… to: …………
- Signature: …………

OFFER OPEN UNTIL FRIDAY 30 MAY 1997.
Equipment Recovered

Worcester police have recently recovered a Kenwood amateur radio hand-held transceiver which they believe to have been stolen. Anyone claiming the transceiver should contact DC Griffiths at Worcester Police Station on (01905) 723888 Ext. 4938 stating the model and serial number of the transceiver so that arrangements can be made to return the radio.

Rugged Radio

New from Kenwood and available in the early Spring is the TH-235E v.h.f. f.m. hand-held transceiver which is specifically aimed at the 'rugged' end of the market.

Main features of the TH-235E for the Amateur Radio market include:
- 60 non-volatile memory channels.
- The transceiver comes fitted with a built-in CTCSS encoder. The TH-235E is also fitted with Dual-tone squelch system (DTSS).
- Set-up for Amateur Radio use (p.m.r. use is also possible) the transceiver covers 144-146MHz and requires a power supply in the range of 7.5 to 16V. Maximum power output is 5W at 13.8V. Weighing in at 365g approximately the new hand-held costs £199.95 from approved Kenwood Dealers.
- Further information on the TH-235E can be obtained from Kenwood (UK) Ltd., Kenwood House, Dwight Road, Watford, Hertfordshire WD1 8EB. Tel: (01923) 816444, FAX: (01923) 212477.

Pickett's Loss

Waters & Stanton Electronics were the unfortunate victims of a burglary which took place on Saturday 9 March at the Picketts Lock Amateur Radio Show. Goods worth £7000 were stolen and included a Yaesu FT-10000MP transceiver, 20 Yupiteru scanners.

Marconi & Martin

On International Marconi Day on Saturday 19 April 1997 Martin Lynch is holding a 'Sale Day' to mark the momentous occasion. After all as Martin says without Mr Marconi we wouldn't have Amateur Radio would we?

Martin and his 'Mob' will be opening the doors to the Amateur Radio Exchange Centre at 9am and will be offering discounts and deals across their full range of equipment. Also on offer will be the chance to get your own equipment 'health checked', free Martin Lynch & Son special edition T-shirts with every order over £200 and the opportunity to take a Northfields Pleasure Trip in the company's own Reliant 3-wheeler!

In addition to all this Barry Cooper from Yaesu UK will be on hand to demonstrate the latest Yaesu products and free refreshments will be available throughout the day. So, why not make a date in your diary to visit 140-142 Northfield Avenue, Ealing, London W13 9SB and get yourself a bargain?

Alinco Addition

The Alinco DX-701 is an h.f. s.s.b. transceiver which has very recently been introduced to the commercial h.f. market. The DX-701 offers 100W output, is an all-band radio with general coverage receive an therefore suitable for both home or mobile use.

Features of the DX-701 include 100 memories, microphone speech compressor, detachable front panel, noise blanker and RF pre-amp and attenuator. There is also the facility for having c.w. operation as an optional extra.

Global Trotting G3LHM - Silent Key

News of the passing of Andy Whetstone G3LHM - a professional sound recordist latterly working in outside broadcasting, has reached 'Newsdesk'. Andy, who was still working professionally at the age of 70 was always on 'stand-by' for that urgent call to fly to South Africa and other parts of the news-world at a moment's notice - died on Christmas Day 1996. A keen Radio Amateur, he was actually enjoying a brief spell at home in his 'shack' when he died.

Never quite knowing where he would end up for recording interviews - perhaps it would be 10 Downing Street or in America, Andy often recounted his early days from the time his Army radio experience led him through a friend - to a career in sound recording/broadcasting from studios in New Bond Street and then into outside broadcasting.

A qualified light aircraft pilot he achieved much. Andy said he would never retire and never did. And only days before he died he was working with his friend and former colleague Denis White on the 'Evita' premier. A keen Radio Amateur who was also a professional Andy leaves a proud family and many friends. Our belated sympathies and wishes from his Amateur Radio and professional broadcasting friends throughout the world go to his wife Jean and family.

Leicester 1997

The dates for the Leicester show for this year have finally been fixed for Friday and Saturday 17/18th October. Frank Elliot G4PDZ has informed PW that despite uncertainty as to the venue for the show it will again be taking place at the Granby Halls. However, this really will be for the last time as the Halls are to be demolished very soon after the Leicester Show.

Stop Press!

Just as this issue of PW was going to press we received details of a new Yaesu radio. The new addition is the FT-920 which is an h.f. and 50MHz transceiver which will be available in the UK during April. A full news report on the FT-920 will appear in June issue.
A Collection Of Catalogues

It seems to be the time of year for new catalogues to be published as several have landed on the 'newsdesk' in the past month. Here is a taste of three from well known manufacturers.

Kanga Products celebrate their tenth year in business this year. Kanga have been supplying kits to Radio Amateur QRP enthusiasts since February 1987 when Dick Pascoe G9BPS set up the business after retiring from the Kent Fire Brigade.

The new Spring Kanga Catalogue features the complete range, together with new kits which include a Termination Wattmeter, Medium Wave Radio and an Active Antenna that fits inside a film canister!

To get your copy of the Kanga Products Spring 1997 Catalogue contact Seaview House, Crete Road East, Folkestone, Kent CT18 7EG. Tel: (01303) 891106.

Mike Devereux G3SED and the Nevada team have just published a general catalogue featuring selected products from their vast range of amateur radio equipment, short wave receivers, software, accessories, books and much more. This A4 sized 24-page catalogue not only contains details on products and accessories but also provides a little background information on the Nevada set-up and mini profiles on the key team members.

If you'd like a copy of the Nevada 1997 General Catalogue please send an A4 s.a.e. to 189 London Road, North End, Portsmouth, Hants PO2 9AE.

The 1997 Radio Kit Catalogue from C.M. Howes Communications contains within its pages the full range of Howes products including short wave receivers, a.m.s. Morse kits, accessories and antennas to name a few. Also featured are the new easy-to-build Horsec '2000' range of kits which, with all with kits in the range, offer a challenge as well as giving great satisfaction and pleasure to use when built. Copies of the 1997 Radio Kit Catalogue are available by contacting Dave or Chris Howes at Eyden, Daventry, Northants NN11 3PT. Tel: (01372) 260178.

Richard Diamond G4CVI - Silent Key

Richard Diamond G4CVI died in tragic circumstances on January 24th 1997. Well known in the 'Amateur Radio Trade' DX and 'moonbounce' circles he was the proud owner of a majestic looking 'lantern farm' that was featured on the Nevada Catalogue and was clearly visible from the M27 motorway in Hampshire. Here Mike Devereux G3SED pays tribute to his friend:

Richard was born in Liverpool on 29th July 1934. He studied Radio and Electronics at Southampton College before joining the BP tanker fleet as a Radio Officer. Later he left to become Sales Director of South Midlands Communications in Southampton. During his many years with SMC, Richard was involved in both the Amateur and commercial Radio divisions of the company. He travelled the world extensively and was well known throughout the Radio Communications industry. It was whilst he was at SMC that I first met Richard some 18 years ago. We shared a common hobby, Amateur Radio and were both involved in the radio business. Over the years we became close friends and I came to know him very well indeed, admiring his many talents both in business and electronics. He was a thoroughly selfless person, ready willing and able to offer help and assistance whenever it was required. Richard always wanted to be the best at what he did and he very often was. He set his mind on becoming a Helicopter pilot and did. He was a qualified sub-aqua diver, a lover of fast motorcycles and had a passion for Jaguar cars, particularly his E-type!

Richard built one of the most sophisticated Amateur Radio Stations in the world. He had 'moonbounce' capability on at least three v.h.f./u.h.f. bands with a special high power permit. He had huge antenna arrays for the h.f. bands, including a full size four element beam for 7MHz at 80ft above ground. He was never satisfied and would spend hours planting and working to further improve his station. Richard's skills that had him regularly travelling the world overseeing major communications projects. He was responsible for a number of 50MHz amateur beacons, obtaining the necessary permissions and installing the equipment whilst working in Malaysia and Belize.

During the past five years I was privileged to work alongside him, providing global communications for the Camel Trophy expeditions. We travelled together through the jungles of Sabah Malaysia, Central and South America, up over the Andes mountains and through the Atacama desert of northern Chile. He showed outstanding skill when working under pressure in difficult conditions. I cannot really express my sorrow over the loss of one of my closest friends - the help and encouragement he gave me over the years is beyond measure. I'm sure that Richard's many friends in the Amateur world will wish to join me in expressing our sympathy and condolences to his son Michael, mother and father, Winifred and James.

Mike Devereux G3SED
Managing Director
Nevada Communications

Increased Challenge

Linear Amp UK have up-graded their Challenger h.f. linear amplifier along with their Explorer and Hunter models. Changes to the Challenger include a new softer grey front panel which now features flush mounted backlight meters.

In addition, the band switch now has nine positions so each band has its own individual setting. The manufacturers say this provides better and easier tuning on 28, 24, 21 and 18MHz. The mains cable is now directly wired into the amplifier allowing heavier duty cable to be used. Other changes to the Challenger include refinements to the circuitry giving better operation. The Challenger costs £2999 and is available direct from Linear Amp UK, Field Head, Leconfield, Beverley, East Yorks HU17 1LU. Tel/FAX: (01964) 549921. Why not give Gwen or Peter G3ZRS a call for more information on the full Linear Amp range?
The Radio Receiver Trainer contains nine receiver building blocks and a comprehensive training manual.

Simply connect the building blocks to build AM, SW, Superhet and Direct Conversion receivers. Decode SSB, CW and FM. Use proven building blocks to develop and test your own designs.

Pricing:
- Complete: £129.00
- Kit: £89.00
  (Kit excludes case & headphones)

P&P is £5 (UK), £8 (EC), £12 (World)
Add 17.5% VAT to Total Price

Building Blocks:
- RF Input Tuner
- RF Oscillator
- Mixer
- IF Filter
- IF Amplifier
- AM Detector
- Beat Frequency Oscillator
- Audio Filter
- Audio Amplifier

Mail Order To: Pyramid Electronics LTD.
204 Ferndale Road, Brixton, London SW9 8AG
Phone (0171) 738 4044 Fax (0171) 274 7997
(Out of office hours ordering by answering machine)

Come to the Frontier of
Global Communications

Subscribe to Monitoring Times and Satellite Times Magazines

Do you own a radio, a shortwave receiver, a scanning receiver, or a ham radio? Then Monitoring Times is your magazine! Each monthly issue of MT offers 20 pages of worldwide, English language, shortwave broadcast schedules: departments on aero, military, government, public safety communications; broadcast band, satellite television, long-wave coverage: reviews of new products and radio-related software; technical articles and projects for the hobbyist; feature articles, and much, much more.

If it’s on the radio, it’s in Monitoring Times!

Satellite Times is the world’s first and only full-spectrum satellite monitoring magazine, exploring all aspects of satellite communications. including commercial, military, broadcasting, scientific, governmental and personal communications as well as private satellite systems. The satellite industry’s most respected experts contribute to every bi-monthly issue of Satellite Times, addressing both amateurs and experts alike.

If it’s in orbit, Satellite Times covers it!

MAIL this subscription form to:
PW Publishing Ltd., Freepost,
Arrowsmith Ct. Station Approach,
Broadstone, Dorset BH18 8PW.

Subscription rates include speedy Air Mail Service!

- 1 year Monitoring Times - £38 (12 issues)
- 1 year Satellite Times - £32 (6 issues)

Name ________________________________
Address ________________________________
Postcode ________________________________
Telephone ________________________________

I enclose cheque/PO (Payable to PW Publishing Ltd.) £

Or charge to my Access/Visa Card the amount of £
Card # ________________________________
Valid From ___________ Thru ___________
Signature ________________________________
Tel ________________________________

Credit Card Orders taken on (01202) 659930
FAX orders taken on (01202) 659930

PLEASE VISIT OUR SITE ON THE WORLD WIDE WEB:
www.grove.net
Because of positive reader response to his new series aimed at the beginner, Rob Mannion G3XFD breaks off (for this month only!) for a little while to pass on several items of good news. One news item solves an education problem and the other can save beginners a lot of money!

Although I enjoy writing and researching ‘Radio - Discover The Basics’ I must admit I’ve been completely overwhelmed by the response from readers. Although I knew there was a need for the new column I just did not expect you all to be so keen!

Thank you for all your letters, e-mail, personal telephone calls and comments passed on at club visits and the London Show. And in return...I’ve several items of really good news for you and the first solves a very great problem for beginners and myself.

What comes over most strongly in your letters and comments is ‘practical’ approach to the theory side of our hobby. And many readers have also said they look forward to ‘doing things’ later in the series. I promise you that aspect will not be overlooked!

As I have said in the column, the idea is to provide simple explanations and analogies which you can then ‘back up’ with further reading. And if you’ve been one of the readers looking for the book recommended in the ‘further reading’ list published in the magazine - and also seen in for the expanded list.

I had a real problem in recommending really good titles with the right approach to support ‘Radio Discover The Basics’ introduction to the subject.

Ideal Books

In my mind the (no longer published) ‘Common Core’ books Basic Electricity, Basic Electronics, etc., were ideal books for the beginner and the instructor to work through together. The problem was that they’re out of print and unless you were able to get them from a library or get a second-hand set, you’d be out of luck.

In the meantime I was struggling hard to find a replacement ‘recommendation’. Fortunately, the ARRL have come to the rescue with a brand new book - Understanding Basic Electronics.

The new book - only just available - is in my opinion absolutely superb. It’s ideal for the beginner and more experienced reader who wishes to reinforce their learning.

And also I’m very pleased that the ARRL obviously think along the same lines as myself because the new book is very similar in concept to the old ‘Common Core’ books and uses the same techniques (including helpful cartoons and ‘bite size’ chapters and sections) covering all the topics needed.

The other benefit of course is that the solid state theory and techniques (including digital) are right up to date.

What a marvellous job the ARRL have done! My congratulations go to their editorial team for providing the ideal ‘entry level book for anyone interested in starting off in radio, electronics and even a career. And to help readers who obtain a copy, I’ll provide direct references for ‘further reading’ from the book as the series progresses.

Learning & Building

Once you have laid your foundation and started learning, the building starts. And in the case of our particular interest this means building simple projects and circuits.

However, as anyone who has bought individual components, to build a circuit ‘from scratch’ knows - they can be enormously expensive compared to buying something ‘ready made’. Fortunately, good fortune has come our way and I’m pleased to announce an excellent source of ‘bargain goody bags’ of components.

‘Bargain Bags’ of electronic components have been available for many years - especially at radio rallies. I was (and still am) a keen buyer of components sold in this form, and can honestly say that I’ve never been disappointed.

The bags of components, Fig. 1, contain a good mix of either resistors or capacitors - to start you off by post. Unfortunately, good fortune has come our way and I’m pleased to announce an excellent source of ‘bargain goody bags’ of components.

‘Bargain Bags’ of electronic components have been available for many years - especially at radio rallies. I was (and still am) a keen buyer of components sold in this form, and can honestly say that I’ve never been disappointed.

The bags of components, Fig. 1, contain a good mix of either resistors or capacitors of many different sizes and values. And on checking them I’ve discovered that amongst many other useful type and values you’ll probably find the they contain ONE capacitor - which when bought new from a catalogue - would cost you more than the cost of the whole bag!

It’s the same with the bag of resistors. This also contains an excellent selection and variety of value, sizes and types. And although no ‘bargain bag’ can ever promise to provide you with all the components you need for a project...I know from experience they do provide really excellent value for money.

The bags are available from Bob Kent G4POY on the Kent Keys stand at the major rallies and shows for a just £1! However, even if you can’t get to a rally or show this year you can still get the components to start you off by post. Yes...there is the penalty of postage to pay...but even then they still offer superb value for money.

First Come First Served

Bob Kent has a ‘lorry load’ of the surplus components but he says they’re selling well so it’s a case of ‘first come first served’! Bob also points out that the bags of resistors and bags of capacitors are not sold by weight, so individual bags will vary a little depending on the mixture of components. But - as I can assure you - they still offer excellent value for money.

By mail-order a bag of mixed resistors (average weight in the strong polythene bag) is 700g (approximately 1.5lb) and the total including postage is £2.95.

The corresponding bag of mixed value (and types) of capacitors weighs 1kg (approximately 2.2lb). Cost of this package including postage is £4.25.

However, if you buy a bag of resistors and a bag of capacitors the two together with postage are available for £6.20 (a saving of £1 in postage).

Orders and enquiries should go direct to R. A. Kent (Engineers Ltd.) 243 Carr Lane, Tarleton, Preston, Lancashire PR4 6BY Tel: (01772) 814998, Fax: (01772) 815437.

So there you are, some components to get your ‘tack’ going...I hope you enjoy sorting them out and look forward to continuing ‘back on course’ next time! Cheerio for now.
Tackling TVI With Semaht

By Gordon King G4VFV

Gordon King G4VFV looks at a commercial portable TV & Radio field strength meter as an interference tracing aid for Radio Amateurs. Gordon thinks that it should prove useful to a club... ready to help trace those TVI and BCI problems.

Recently I've been enjoying testing the portable Semaht u.h.f./v.h.f. digital field strength meter. It's a British made device marketed by Aerial Techniques of Poole in Dorset.

Although intended primarily for domestic antenna 'rigging' operations in the u.h.f. TV Bands IV and V and the FM radio Band II, the instrument can be of assistance in these days of electromagnetic compatibility (EMC) for tracing the cause of radio and television interference in the above mentioned bands.

**Frequency Coverage**

So, let's take a look at the frequencies the instrument covers. The actual coverage is 460 to 860 and 88-108MHz with a press-switch changing between the u.h.f. and v.h.f. There's a main tuning control knob and a second knob for fine tuning, while the frequency tuned is displayed on a four-digit liquid crystal display (l.c.d.)

The strength of the signal tuned into is indicated in Decibels (dB) relative to a microvolt (µV) on a 55mm width meter whose scale can be illuminated by operating a switch. The scale has five indicating points at zero, 35, 40, 45 and 50dB, with a separate battery test mark, thereby providing a basic measuring range from zero to 316.2pV of input signal (see later).

Fortunately, the basic range can be extended by 10 or 25dB by push buttons, allowing the range full scale to go to either 60 or 75dBµV, corresponding to 1mV or 5.6mV respectively.

The front panel is finished in bright blue. The complete instruments measures 245 by 88mm with an overall depth of some 24mm.

**Internal Battery**

Powering is by an internal NiCad battery pack retained to capacity by an integral charger connected to the mains supply by a side socket and cable. Maximum capacity is 0.7Ah and since the consumption is around 50mA, a fully charged pack will run the instrument for in excess of four hours.

A full charge from scratch takes eight to ten hours while the pack's life span is given as 300 to 400 charging/discharge cycles. A useful feature is an in-built detector, audio section and loudspeaker, allowing possible identification of the signal under measurement.

Although demodulation is a.m., it is also possible to resolve f.m. signals merely detuning slightly and adopting the so-called 'slope detection'.

The signal being tested is fed to an ordinary television type antenna socket on the top panel. This also includes a volume control, Battery Test button, On/Off button, a low battery indicator, instrument-on indicator and a yellow instrument-on indicator, a prescaler and logic counter board.

A standard envelope detector, which is slightly forward-biased for low level linearity, drives the meter movement and feeds the audio section. A pin diode attenuator circuit is employed for extending the range of measurement.

For convenience of field use, the instrument comes complete with a handy carrying case and shoulder strap. This includes a handy side pocket for storing related accessories, such as extra plug-in attenuators.

**Practical Paces**

Before putting the Semaht through its more practical paces, I thought it would be a good idea first to subject it to one or two lab tests. The aim was to assess the accuracy of frequency read-out and signal measurement.

**Frequency Coverage**

The signal strength meter's (f.s.m.) design is based on a standard Mullard u.h.f./v.h.f. varactor TV tuner and 39.5MHz r.f. channel. The digital display is driven by a prescaler and logic counter board.

A standard envelope detector, which is slightly forward-biased for low level linearity, drives the meter movement and feeds the audio section. A pin diode attenuator circuit is employed for extending the range of measurement.

For convenience of field use, the instrument comes complete with a handy carrying case and shoulder strap. This includes a handy side pocket for storing related accessories, such as extra plug-in attenuators.

The signal strength meter's (f.s.m.) design is based on a standard Mullard u.h.f./v.h.f. varactor TV tuner and 39.5MHz r.f. channel. The digital display is driven by a prescaler and logic counter board.

A standard envelope detector, which is slightly forward-biased for low level linearity, drives the meter movement and feeds the audio section. A pin diode attenuator circuit is employed for extending the range of measurement.

For convenience of field use, the instrument comes complete with a handy carrying case and shoulder strap. This includes a handy side pocket for storing related accessories, such as extra plug-in attenuators.

**Standard Tuner**

The field strength meter's (f.s.m.) design is based on a standard Mullard u.h.f./v.h.f. varactor TV tuner and 39.5MHz r.f. channel. The digital display is driven by a prescaler and logic counter board.

A standard envelope detector, which is slightly forward-biased for low level linearity, drives the meter movement and feeds the audio section. A pin diode attenuator circuit is employed for extending the range of measurement.

For convenience of field use, the instrument comes complete with a handy carrying case and shoulder strap. This includes a handy side pocket for storing related accessories, such as extra plug-in attenuators.

The source electromotive force (e.m.f.), with respect to an un terminated antenna, for example, would be twice the p.d. value. Consider a 100µV (40dBµV) e.m.f. in series with 75Ω, then with a high impedance voltmeter the reading would also be close to 100µV (the so called open circuit voltage).

However, when any such source is loaded externally, the voltage across the coupling interface will fall. When the
loading exactly matches the 75Ω source, the voltage to decrease to half the e.m.f. This is commonly referred to as the p.d. across the load, which of course, is 50V or 34dBV in this example.

The input impedance of the Semaht is said to be 75Ω, and the results given in Table 1 are based upon this assumption. A slight variation from the 75Ω of the Marconi matching pad would not change the results much.

Based on the initial 35dB calibration of the meter movement and the final one at 50Ω and taking account of the 10dB and 25dB attenuator buttons, the instrument has a dynamic range of 40dB (100 times voltage and 10,000 times power). The Table shows the minimum indication as 45V, but there is some deflection of the meter (though uncalibrated) at a smaller voltage than this.

**Randy Instrument**

It's handy having an instrument like the Semaht available in the shack or radio club. It's capable of responding to and checking the feeder is properly terminated at the antenna.

For example, a 'DNT f.m. CB transceiver (converted to the 28MHz f.m. section of the hand) was causing a remarkably high level of interference (i.e. 'breakthrough' at the BBC 'Radio Two' end of the Band II f.m. band (around 88MHz)).

The instrument identified the problem as the third-harmonic of the 28MHz operating frequency. It was still vaguely audible with the p.a. removed, but no way was it possible to employ the p.a. without the interference. This one had a happy ending because I found that the p.a. was devoid of any sign of low-pass filtering.

As is now fairly well known by some of the operators I've worked on the bands, the antennas at G4FV and V0FV are all located in the roof space of my house, including those for f.m. radio and TV. Despite the nearness of these to my h.f. and v.h.f. transmitting antennas (the distance between them only a couple of metres or so), the distant side receivers remain totally free from r.f. interference up to a transmitter e.r.p. of around 50W.

Using the meter to find your trouble spot is a very simple procedure, and can cause high signal attenuation which can be worsened by a poorly connected feeder...a very common problem which is discussed in 'Up The Ladder' by Allan Editor.

**Using The Meter**

Using the Semaht meter, I can now understand why I am so frequently disposed. The vision carriers of my local u.h.f. TV transmitter (Beacon Hill Station No. 136.8,1), which is located above and slightly inland from Torbay, transmitting on Band V channels 53, 57, 60 and 63 at present with an e.r.p. of 10kW is providing me a feeder signal no less than 80dBuV (p.d.), corresponding to 10,000µV (p.d.) or 20,000µV (e.m.f.).

In order to measure the high signal level, it was necessary for me to include an in-line attenuator of 12dB in addition to the instrument's switched 25dB attenuator. Perhaps this is the reason for the side pocket on the carrying case - to handle without extra in-line attenuation.

The instrument would certainly bring a bonus it provides definitive assistance for finding the unwanted one on the same frequency the interference is completely overcome in practice. This is known as 'the capture effect', which is diminished as the bandwidth is decreased. For the same result on a.m., the wanted signal needs to be getting on at 28dB stronger!

**More Signal**

With a reasonable signal strength meter such as the Semaht, it shouldn't be impossible to squeeze in more signal...at least an extra 6dB from the antenna. This would double the signal voltage and quadruple the signal power and hence cut the interference proportionally - or more!

**Six Metre Problems**

There can be problems on 'Six' metres as the second harmonic of the 50MHz band falls over the range 100 to 104MHz and is another potential source of Band II interference. This corresponds to that section of the band carrying local radio programmes and 'Classic FM'.

The instrument would certainly bring any 50MHz problems to light. As a bonus it provides definitive assistance for identifying (or re-siting) your Band II antenna for the best possible wanted-to-unwanted signal ratio.

A distinct attribute of the wideband broadcast f.m. system is that provided the wanted signal is a little more than 6dB stronger than the unwanted one the interference is completely overcome in practice. This is known as 'the capture effect', which is diminished as the bandwidth is decreased. For the same result on a.m., the wanted signal needs to be getting on for 28dB stronger!

**Two Metre Problems**

The 'Two' metre band at 144MHz also has the potential to cause problems when amateur signals create interference patterns on TV pictures coming from

<table>
<thead>
<tr>
<th>Reading (dB)</th>
<th>Error (dB)</th>
<th>Signal Generator dBPV (p.d.)</th>
<th>Signal Generator µPV (p.d.)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>35</td>
<td>+2</td>
<td>33</td>
<td>45</td>
</tr>
<tr>
<td>40</td>
<td>+3</td>
<td>37</td>
<td>71</td>
</tr>
<tr>
<td>45</td>
<td>+2</td>
<td>43</td>
<td>141</td>
</tr>
<tr>
<td>50</td>
<td>+1</td>
<td>49</td>
<td>282</td>
</tr>
<tr>
<td>With +1-dB button on</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>45</td>
<td>+1</td>
<td>44</td>
<td>158</td>
</tr>
<tr>
<td>50</td>
<td>+1</td>
<td>49</td>
<td>281</td>
</tr>
<tr>
<td>55</td>
<td>+1</td>
<td>54</td>
<td>501</td>
</tr>
<tr>
<td>60</td>
<td>+2</td>
<td>58</td>
<td>794</td>
</tr>
<tr>
<td>With +25dB button on</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>60</td>
<td>+2</td>
<td>58</td>
<td>794</td>
</tr>
<tr>
<td>65</td>
<td>+3</td>
<td>62</td>
<td>1258</td>
</tr>
<tr>
<td>70</td>
<td>+1</td>
<td>69</td>
<td>2818</td>
</tr>
<tr>
<td>75</td>
<td>+2</td>
<td>73</td>
<td>4467</td>
</tr>
</tbody>
</table>

Table 1: Signal measuring test results of Semaht u.h.f./v.h.f. signal strength meter at 90MHz input frequency. They refer to signal voltage (p.d) across the signal (aenna) input socket of the instrument when correctly loaded with the 75Ω matching pad of the Marconi signal generator. The average error over the entire dynamic range is only 1.75dB.

Continued on page 20

---

Practical Wireless, May 1997
Tackling TVI With Semaht

Continued from page 19

Transmitters operating on channels towards the top end of Band IV. This is especially likely to occur in locations where the TV signal is somewhat screened and hence rather weak, or where the TV set is working from an indoor antenna, which is beaming in the direction of the Amateur station operating on 144MHz.

Interference is more likely to occur when the transmission causing the interference lies at the low end of the 144MHz band. It normally results from the transmission's fourth harmonic and is exacerbated by an external linear amplifier being driven rather hard - to full power or more!

The problem harmonic can be detected by the signal strength meter provided it is not totally swamped by the TV signal itself (bearing in mind the overall 8MHz bandwidth of a u.h.f. TV channel). Indeed, it may help to remember that the CCIR System I used in the UK has an a.m. video bandwidth of 5.5MHz and that the fm. (inter-carrier signal) sound carrier is 6MHz above the nominal vision carrier.

(This corresponds to the simple expression of 8n + 303.25. where n is the channel number. The instrument permits a precise measurement of the interfering signal strength when the affected TV station goes off the air).

Another possibility of TVI is the fifth harmonic at the low end of 144MHz. This falls around 720MHz and might well affect Channel 52 (718-726MHz).

The test sample meter turned to below Band IV (to 436MHz) and above Band V (to 873MHz) so it was possible to detect spurious falling a little outside the u.h.f. TV bands. This could prove useful because a strong signal, although removed somewhat from a TV channel, could still affect reception by a desensitising effect, manifesting as a decrease in contrast (and also, perhaps, sound volume) and increase in picture grain (noise), impaired synchronising or even colour 'suckout' (where a colour picture suddenly changes to monochrome!).

Installation Engineers

Perhaps a trifle outside radio amateur interest, the Semaht will be of particular value to antenna installation engineers. with the coming of the 5th TV channel related to the consequential shift of,perhaps, video and satellite receiver conversion channels there are potential frequency clashing problems!

The Semaht has a price tag of £349 including VAT and is available from: Aerial Techniques, 11 Kent Road, Parkstone, Poole, Dorset. Tel: (01202) 736233, FAX: (01202) 716951. Another model handled by the firm is TC402D. which covers 45-170, 170-450, 450-862MHz and measures from 2011V to 10mV in seven ranges. The TC402D is more expensive at £399.

My thanks go to Aerial Techniques for the loan of the review field strength meter and I think that both the Semaht and the TC402D would be an interesting and very useful purchase for a radio club. You never know when TVI or BO will surface to cause problems and an f.s.m. could prove very useful indeed!
Please mention Practical Wireless when replying to advertisements

COMMUNICATIONS

The accessories specialists

SERENE BASE ANTENNAS

REVIEW OF CHEAP COPIES. Serene are now one of the largest international manufacturers of W/R/HF base antennas made specifically for the UK and Europe. They also manufacture antennas for computers such as Windows. When quality is important, buy Serene.

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSB-3001</td>
<td>300m. 2m/70cm (2.0m)</td>
<td>£29.95</td>
</tr>
<tr>
<td>TSB-3002</td>
<td>300m. 2m/70cm (2.0m)</td>
<td>£12.95</td>
</tr>
<tr>
<td>TSB-3001F</td>
<td>300m. 2m/70cm (2.0m)</td>
<td>£69.95</td>
</tr>
<tr>
<td>TSB-3002F</td>
<td>300m. 2m/70cm (2.0m)</td>
<td>£54.95</td>
</tr>
<tr>
<td>TSB-3303</td>
<td>330m. 2m/70cm (1.7m)</td>
<td>£59.95</td>
</tr>
<tr>
<td>TSB-3315</td>
<td>330m. 2m/70cm (1.7m)</td>
<td>£149.95</td>
</tr>
<tr>
<td>TSB-5000</td>
<td>500m. 2m/70cm (1.7m)</td>
<td>£69.95</td>
</tr>
<tr>
<td>GP/15N</td>
<td>Connet 60cm/90cm 3.26-8.026/dm</td>
<td>£124.95</td>
</tr>
</tbody>
</table>

MOBILE ANTENNAS

HIGH QUALITY NISSEI MOBILE ANTENNAS

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>DB-7900</td>
<td>790m. 70cm/80cm</td>
<td>£49.99</td>
</tr>
<tr>
<td>DB-1398</td>
<td>1398m. 80cm/90cm</td>
<td>£19.95</td>
</tr>
<tr>
<td>DB-285</td>
<td>285m. 90cm/100cm</td>
<td>£19.95</td>
</tr>
</tbody>
</table>

HOME ANTENNAS

HF ANTENNAS

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>R5/12</td>
<td>121cm. Vertical</td>
<td>£49.95</td>
</tr>
<tr>
<td>R7000</td>
<td>120m. 70cm</td>
<td>£49.99</td>
</tr>
<tr>
<td>AV-3</td>
<td>31cm. 70cm</td>
<td>£59.95</td>
</tr>
<tr>
<td>AV-5</td>
<td>51cm. 70cm</td>
<td>£69.95</td>
</tr>
<tr>
<td>AV-8</td>
<td>81cm. 70cm</td>
<td>£99.95</td>
</tr>
<tr>
<td>AV-10</td>
<td>101cm. Vertical</td>
<td>£129.95</td>
</tr>
<tr>
<td>HAWAII</td>
<td>121cm. Vertical</td>
<td>£129.95</td>
</tr>
<tr>
<td>CFB-045</td>
<td>121cm. Vertical</td>
<td>£19.95</td>
</tr>
<tr>
<td>CFB-080</td>
<td>81cm. Vertical</td>
<td>£24.95</td>
</tr>
</tbody>
</table>

SECTIONAL MASTS

<table>
<thead>
<tr>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>10' dia.</td>
<td>£19.95</td>
</tr>
<tr>
<td>15' dia.</td>
<td>£29.95</td>
</tr>
<tr>
<td>20' dia.</td>
<td>£35.95</td>
</tr>
<tr>
<td>25' dia.</td>
<td>£45.95</td>
</tr>
</tbody>
</table>

HANDHELD ANTENNAS

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-2602</td>
<td>2m/70cm/23cm 2/3/50kHz Flexible antenna with wideband receive (14&quot; long BNC)</td>
<td>£22.95</td>
</tr>
</tbody>
</table>

TELESCOPIC MASTS

QUALITY PRODUCTS AT AFFORDABLE PRICES

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSA-6661</td>
<td>6661m. 141 kHz pocket SWR meter</td>
<td>£34.95</td>
</tr>
<tr>
<td>TSA-6660</td>
<td>6660m. 141 kHz pocket SWR meter</td>
<td>£229.00</td>
</tr>
</tbody>
</table>

ACCESSORIES

<table>
<thead>
<tr>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCESSORIES</td>
<td>£42.95</td>
</tr>
<tr>
<td>ACCESSORIES</td>
<td>£19.95</td>
</tr>
<tr>
<td>COAX SWITCHES</td>
<td>£49.95</td>
</tr>
<tr>
<td>COAX SWITCHES</td>
<td>£18.95</td>
</tr>
<tr>
<td>COAX SWITCHES</td>
<td>£28.95</td>
</tr>
</tbody>
</table>

DELUXE G5RV

Multistranded plastic coated heavy duty antenna wire. All parts reusable. Stainless steel and galvanised fittings.

<table>
<thead>
<tr>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full size</td>
<td>£39.95</td>
</tr>
<tr>
<td>Half size</td>
<td>£29.95</td>
</tr>
</tbody>
</table>

GET THE ACCESSORY CATALOGUE

Send £1 in stamps refundable against any purchase. Full with mast, brackets, frames and accessories. EVERYTHING NEEDED FOR THE RADIO A/AMATEUR.

HAYDON COMMUNICATIONS

LONDON SHOWROOM & MAIL ORDER: 0181-951 5781/2
Address: 132 High St. Edgware, Middx HA8 7EL

Delivery where not indicated £10/24hr
HF TRANSCEIVERS

ALINCO DX-701

100W HF transceiver. Its
never been cheaper to get on HF. If you don’t want
on then this is the rig for you. Why risk good money
on a second radio when a brand new one is even
cheaper.

RRP £599.00

(Kennedy free 01 Family
Phone for details)

DX-701 HF + 6m transceiver

£695

DX-701 HF + 6m transceiver high power

£775

KENWOOD SPECIAL OFFERS

TS-870S RRP £2999 OUR PRICE £799.95

TS-770D RRP £1999 OUR PRICE £1199.95

TS-950SDX RRP £9999 OUR PRICE £2999.95

TM-295E 2M ALL MODE OUR PRICE £699.95

TM-155E 10cm all mode OUR PRICE £349.95

TH-79E 2M + 10cm OUR PRICE £329.95

ALL MODE TRANSCEIVERS

YAESU FT-736R

Here is your chance to buy a Quad band base station at a
giveaway price. We have a
small quantity available with 24 + 70 fitted as standard.

SPECIAL OFFER

"Hurry limited stocks"

INTRO PRICE £1399.95

Limited stock available

VHF/UHF MOBILES

ALINCO

DR-430 £259.95

Dream all mode dual

receiver. RRP £1499.95

OUR PRICE £1999

ORDER YOURS TODAY AND CLAIM A FREE

9-2512 POWER SUPPLY WORTH £90

FT-1000MP (AC) RRP £299 OUR PRICE £1999

FT-1000MP (DC) RRP £299 OUR PRICE £1999

ICOM IC-756

New HF + 6m transceiver

with general coverage

OUR PRICE £1895.95

ICOM IC-706 SPECIAL OFFER

£795.00

1 month only

MA-399

Mobile holder. Special size dashboards for all

handsets. Will also hold front panel of DX-70 or 70x

RRP £9.99 P&P £2.00

VHF/UHF HANDHELDs

ALINCO DJ-180

Rugged built 2m PA transceiver.

RRP £599.95

7 GET TO

£139.95

2m PA transceiver

As 190 + keypad £179.95

All the above Alinco handsets include

nicads & charger

NB-30W 2m FM handheld

25 watt input, 50W output

for 5W up. Turn your handheld

into a mobile for under £50

RRP £49.95 P&P £2

ALINCO DJ-65

Dual band handheld transceiver. Includes

twin band Rx (wideband Rx) – full duplex +

band scope and much more. RRP £499.95

OUR PRICE £299.95

YAESU FT-50R

New ultra compact dual band transceiver

with wideband Rx

76-590kHz AM (AM, FM, FM-N)

RRP £699.95

ICOM IC-77E

RX available

108-182/405-500/850-950MHz

Compact dual band handheld. Incredibly, everything you

would possibly want isn’t CTCSS fitted as standard along with high power nicad +

charger. RRP £499.95

OUR PRICE £285.00

Nissee EP-300T

Over the ear earpiece with lapel mic & PTT. Fits

Kenwood, Alinco, Yaesu & low

£22.95 P&P £4.00

NEW WP-2

Weatherproof your handle!

Waterproof case for all handhelds. Come complete

with shoulder strap

RRP £18.95 P&P £8.50

LONDON SHOWROOM & MAIL ORDER:- TEL: 0181-951 5781/2

COMMUNICATIONS
POWER SUPPLIES

P-2512 'M'
25-30amp power supply with variable volts (3-15V). Dual meters (Volts + Amps). The UKs best selling power supply.

Most of our competitors are selling the 20A versions for the same price.

RRP £59.95 OUR PRICE £89.95

PORTABLE 12V POWER STATION

The ideal rig companion. Charges from AC mains or trickle charge from c/e lighter using lead supplied (Capacity - 12AH)

RRP £59.95 OUR PRICE £46.95

DIGITAL AUDIO FILTERS

TIMEWAVE DSP-9 PLUS

Award winning digital audio filter. RRP £229.95

SALE PRICE £149.95

DSP 9B + DSP 992X MF7-81B

RRP £59.95 OUR PRICE £329.95

RRP £29.95 OUR PRICE £239.95

AEA PRODUCTS

PK-232MBX

RRP £99.95

SALE PRICE £299.95

PK-401 PK-12

RRP £219.95 OUR PRICE £199.95

QP-129.95 OUR PRICE £199.95

DSP-232

The latest all mode DSP driven TNC from AEA. RRP £299.95

SALE PRICE £399.95

SCANNERS

YUPITERU MVT-9000

The ultimate handheld scanner on the market. Covers 305kHz-209MHz (all mode). Outperforms any other handheld on the market. RRP £469.95

OUR PRICE £395.00

MVT-100EX

OUR PRICE £259.95

AR-8000

Wideband handheld scanner covers 500kHz-1900MHz (all mode).

SPECIAL OFFER £299.00

NEW Icom IC-R10

OUR PRICE £339.95

ICOM IC-R10

Wideband scanner receiver covers 0.5MHz-1300MHz (all mode). Full computer access capability. RRP £499.95

OUR PRICE £339.95

POLICE STYLE HOLSTER HHC-2

Matches all hand helds. Can be worn on the belt or attached to the quick release body holder.

£19.95 +P&P £1

EP-300 Deluxe over the ear earpiece.

£9.95 + P&P £1

QS-200 Autoclick holder for all hand helds. Fits into正宗.

£9.95 P&P £2

AR-3000A

Communication receiver (10kHz,25.50MHz all mode).

RRP £499.95

OUR PRICE £699.95

QUALITY USED EQUIPMENT

PT-596AT VGC £1199.95

TS-596AT VGC £899.95

TS-496AT VGC £999.95

TS-898S HF + 6m £699.95

TS-870S As new £1199.95

TS-410S VGC £699.95

FT-790R 2 + 70 all mode base £1049.95

IC-471 70cm all mode base £609.95

IC-729 HF + 6m base £609.95

IC-751 VGC £799.95

FT-790R 8 + 49 £499.95

EX-790R £499.95

FT-290R 2m all mode £209.95

R-5900 £599.95

HF-150 £599.95

PGK-7200 £599.95

PGK-8800 £599.95

IC-7100 £599.95

COMMUNICATION RECEIVERS

ICOM IC-R8500

The ultimate all mode base receiver. 1060kHz 2k5. Part ex your old receiver and move into the 21st century.

RRP £499.95

OUR PRICE £1439

Target HF-3

Communication receiver covers 3kHz-305MHz.

Complete with power supply and long wire aerial.

RRP £159.95

ORDER YOURS TODAY AND CLAIM FREE P&P

AOR AR-7030

Brilliant new all mode short wave receiver with synchronous AM + Digital auto tuning.

RRP £695.00

OPTOELECTRONICS

NEW OPTO CUB

From 90MHz-2GHz. The Cub has maximised sensitivity for detecting RF in the near field and displaying the frequency detected. The cub features a digital filter that reduces false alarms and random noise, digital auto capture that acts like an intelligent hold button allowing any frequency captured to remain displayed as long as needed.

RRP £139.00

Opto-Scout

A universal interface.

RRP £129.95

Opto-Xplorer

RRP £249.95

DB-32

Microwave antenna £39.95

MUNICATIONS
This is the story of the Big Red British Telephone Box and how it managed to journey to Seattle, Washington, with the help of some English radio amateurs.

Sounds like a typical children's fantasy? Well, it started out as a fantasy, or a joke maybe, but luckily for the Vintage Telephone Equipment Museum (VTEM) in Seattle, it's reality. They now have a British Telecom (BT) Red Telephone Box as a working exhibit, taking pride of place among their countless other exhibits.

It all started when I took a holiday in Seattle with Bev and Dick Bendicksen N7ZL, during May of 1995. Dick spends time at the Vintage Telephone Equipment Museum every week, cleaning, repairing, and maintaining all the equipment. The VTEM is essentially a working exhibit museum and visitors are encouraged to use the equipment, all of which is in working condition. Bearing in mind that some of the gear dates back to the early 1900s, it's a credit to the people who donate their time every week, and is a wonderful place to spend time.

I jokingly said it would be good to see a BT red phone box in the museum and Dick agreed it would be wonderful. That's how it all began.

When I arrived back in the UK after my holiday I spoke to a couple of local amateurs, Steve Chamberlin G4UYA and Martin Galea G7PDO. Both Steve and Martin work for BT and during the course of our conversation I asked about the possibility of obtaining a telephone box.

I was very surprised at the curt reply I received stating that they were not available for transporting equipment of the non-military variety. They indicated that they were not a charitable organisation and this surprised me, especially when the Telephone Box was intended for the benefit of the American public!

Prime Minister

In jest, Paul suggested that I write to the Prime Minister, John Major. Nothing ventured, nothing gained. I decided to do just that, the first time in my life I have ever written a letter to 10 Downing St! In the meantime, I received a letter back from the museum which I duly sent on to BT. Time passed and one day a vehicle with a 'Hub' crane on it appeared outside Paul Tumham's home in Norwich. A telephone box was then deposited on Paul's front lawn, causing somewhat of a stir in the neighbourhood! A cardboard box containing the telephone and coin-box were also delivered.

To my surprise, one morning the post brought a letter from Downing St. It stated that my original letter had been passed to the Foreign Office for attention and I would be hearing from them in due course. Another first for me, a letter from Downing St!

A few days later, I received a 'phone call from a Mr. Wayne Trummer from Rolls Royce Aerog Engine in Derby. He explained that The Foreign Office in London had contacted the British Consulate in Seattle, to ascertain if any heavy-lift transport was due into Seattle at all.

The British Consulate in Seattle contacted Boeing and they were satisfied that there was a shipment of aer engines due into Seattle very shortly. Then TV and Radio Norfolk, and BBC local TV for that day. The telephone box was duly hoisted from Paul's front garden onto the back of the transporter and strapped down securely ready for the journey up to Derby. The transporter was driven by Cpl. Julia Scraft accompanied by the crane operator, Cpl. Paul Edwards.

Bill Gray of the Boeing Company in Seattle was the point of contact for Rolls Royce. He contacted Don Ostrand from the Museum to check on the documentation.

Arrangements were frantically made following several telephone calls, and Don had to complete a 'Power of Attorney' form. This was duly completed and at last the flight took off at 1800UTC London time with an estimated time of arrival in Seattle of around 1500UTC on Thursday 7 September.

Radio & TV Help

We contacted the local radio station, Radio Norfolk, and BBC local TV for help and told them of our predicament. Crews from both appeared that morning and did a story on the Big Red Telephone box. These stories were broadcast on both radio and TV that day. The RAF at Natisshead came to the rescue, offering us free transport to Derby on the Wednesday morning.

Radio Norfolk's David Atkinson and John Tumham arrived in Seattle with Bev Bendicksen that very week, so Paul was going to be the lucky guy to see the telephone box's arrival!

Holiday Arrival

By coincidence, Paul and Pearl Tumham had arranged to stay on holiday with Dick and Bev Bendicksen that very week, so Paul was going to be the lucky guy to see the telephone box's arrival! Members of the Museum crew were contacted and told
of the arrival, as were the local TV station. A film crew duly arrived along with several members of the Museum and they went out to meet with Bill Gray from Boeing. Upon arrival at the field, they found the plane had already landed so they went out to see it.

The rear cargo doors opened up and a Rolls Royce engine bigger than anybody could imagine was all that was visible. The Rolls Royce components were unloaded first and the "lowboy rig", a tractor and trailer unit to transport the engines, looked like a toy beside the Antanov. Numerous photographs were taken along with lots of video.

The telephone box was finally unloaded and put onto a truck with sling straps holding it in place. The final journey to the museum was all of a few hundred yards from the Antanov. On arrival, it was obvious that the telephone box would have to go in via the second floor door. This was duly opened and a crew waited for the box to be slid in. Bill Murphy, the driver of the truck, slowly raised the effortfully awarted box to the second floor equipment door. Once at that level, it was grabbed and slowly pulled into the second floor.

It was at this point that a near catastrophe struck. The sling strap at the inboard end came in contact with the building above the door preventing the box from being pulled fully into the building. The strap came off and the pallet started to break. That was the only momentum needed and the box fell off the second floor into space, doing a sort of crazy dive toward the ground!

After 8000 miles and all that effort, was it going to end up as a pile of scrap iron? As luck would have it, the second sling and the winch line were still attached and "lassoed" the call box by the slight flair of the base. A substantial glancing blow to the first floor door helped to break the fall of the box and it ended up looking like the end of a "bungee" jump about two feet from the ground!

Another attempt was more successful and the box finally made it into the museum. The next day, it was hoisted into the second floor of the Antanov building. The strap came off and the pallet was unseated by the slight flair of the base. A substantial glancing blow to the first floor door helped to break the fall of the box and it ended up looking like the end of a "bungee" jump about two feet from the ground!

Another attempt was more successful and the box finally made it into the museum. The next day, it was hoisted into the second floor of the Antanov building. The strap came off and the pallet was unseated by the slight flair of the base. A substantial glancing blow to the first floor door helped to break the fall of the box and it ended up looking like the end of a "bungee" jump about two feet from the ground!

With brief words from Mike Upton, and a toast, in Champagne no less, Frances Tomlinson removed the British flag that had been draped over the booth and the entire Museum crew officially welcomed the Big Red Telephone Box.

More chatter and photo opportunities and lots of video followed. Paul, Roger, Mike and Dick were all present with TPA key chains and Chapter pins as souvenirs. The museum crew had all aged about ten years after watching the telephone box do its "bungee jump", but aside from that all were unscathed!

On the following Tuesday, work continued on the installation. A fire out of the office was connected into the telephone and calls were able to be placed on the internal network. The final resting place for the telephone box is shown in Fig. 2, with Dick N7ZL on the phone and Paul G4VLS. So, if ever you are in Seattle and you visit the museum, you too will know the story of the Big Red Telephone box.

**In Search Of Better Signals**

**By Terry Brown G0NSA**

Terry Brown G0NSA had enjoyed success with his "trusty" G5RV...but he thought it was 'time for a change' and set off searching for those better signals. The result has a certain 'Scottish Flavour'.

The idea for a better antenna system came at the same time as plans were drawn up for an extension at the rear of my garden QTH. I'd tried various methods over the years to get the best out of my trusty G5RV, but I felt that the time had come for a more competitive antenna for my station. During the building of an extension to the house, I asked the builder to incorporate extra strengthening within the rear wall to support a wind-up mast. He also used more beams than normal in the flat roof to give a firm base to work on when maintaining the mast and antenna.

I had decided at an early stage that a beam of any sort wouldn't fit into what was left of my garden. As the antenna would encroach over neighbouring properties as it was rotated, I decided that the mast should support only a Quad/W6 antenna. An enquiry to Tennamast up in Scotland confirmed that one of their Adapt-A-Mast range would be suitable for my site and antenna idea. The order was sent off and whilst awaiting delivery, I assembled the hardware needed to fix everything together.

Continued on page 26
In Search of Better Signals

Continued from page 25

Fig. 2(right): For safety, GilNSA secures the winch handle up in everyday use.

Two Brackets
Two brackets hold the mast to the wall and M10 ‘Rawlbolts’ fix the brackets to the building. Never having had much to do with Rawlbolts, I was very surprised how big they were. The drill needed to make the required holes in the wall was an even bigger shock. (Not only its size, but the price!)

I found that it was an easy task to fix the brackets to the wall once the holes were drilled for the bolts. It is as well to remember that the holes for the Rawlbolts must be drilled into the brick of the wall, not the mortar joint. (Fig. 1) Also you must remember not to over tighten the bolts or the brick will split.

Powerful things these Rawlbolts.

A reference to the mast’s weight had come in a telephone call from Tennamast to advise of its delivery date. They advised that due to its size and weight (50kg) it would be preferable if help was at hand on delivery.

The mast arrived a few days later on a lorry driven by a young man, who with the best will in the world, couldn’t shift it out of the back on his own. But living in a small cul-de-sac meant that the delivery had been observed and I found that willing hands soon turned up to see what I was up to.

With help, the mast was deposited on the back building site (once an immaculate lawn!). By means of ropes pulled from the flat roof extension, and guiding the mast from the ground, it was soon up and presented to the brackets.

The ‘U’ bolts to hold the mast to the brackets were put in place and the winch attached to the mast. Everything was tightened up and made secure ready for the next part of the job, putting the antenna up in the air.

The same willing hands made light work of mounting the antenna on the mast. After a short rest, the antenna was wound up to its full height of 12m and found to be rock steady in all but the worst winds.

When fully closed the Tennamast is about three and a half metres high. Standing on the flat roof gave easy access to the securing rings that hold a stub mast to the base mast.

The 37m (one and a half inch) diameter 3m pole stub mast was one I had to hand. But to give added strength a wooden insert was pushed fitted inside the metal tube together with a nylon rope.

In time, the wooden insert swelled to trap the nylon rope securely inside the pole, if the pole should snap it will at least stay in the air and not come crashing down, as it’s held aloft by rope. The top of the pole is sealed with a plastic cap.

The 3m stub mast has a collar half way between the mast and antenna to which guy lines are attached. These are secured to various structures at the boundary of the property. I’d found that in the wind and without guy ropes, the top section of the mast rattled inside the bottom section.

The photograph of Fig. 2 shows the method I use to secure the winch handle in everyday use. On a cautionary note, the winch supplied by Tennamast does not have any means of braking when the mast is being lowered.

Great care is needed during lowering of the system to avoid serious injury. Should you let go of the handle, while lowering the mast, it will spin out of control, possibly leading to serious damage.

In conclusion, the mast, constructed of square section galvanised steel, certainly gave the impression of a quality item. And in recent gales the structure has withstood 60kt (100+kph) winds and showed no signs of undue movement or damage.

At the time of writing the short Adapt-A-Mast costs £228, carriage £25. A longer version is available, along with a friction brake if this is required.

Tennamast Scotland Ltd may be contacted at: 81 Mains Road, Beith, Ayrshire KA15 2HT. Tel: (01505) 503824.

For details of the price and availability of the CobWebb antenna contact Steve Webb G3TPW of SRW Communications Ltd., The Green, Swinton, Malton, North Yorkshire Y017 0SY. Tel: (01653) 697513.
Memory Morse Keyer -
The MFJ-490

By John Goodall G0SKR

Morse enthusiast John Goodall G0SKR assesses a menu driven Morse keyer and it's obvious he enjoyed the job!

Among the many Morse keyers I've had the pleasure of assessing, some I liked and some I didn't. And the MFJ-490 Menu Driven Memory Keyer/Bencher Paddle assembly was a keyer I really liked.

The MFJ-490 is a combined memory keyer built onto a Bencher paddle. The final of the unit is not much larger than the Bencher paddle itself. Measurements, excluding the protrusions of the volume, speed knobs and paddles, are 105 x 112 x 75mm.

The housing containing the keyer unit and controls, sits comfortably on top of the Bencher paddle's base. The front of the unit rests against the pivot ring assembly of the paddles.

The MFJ-490 is a combined memory keyer built onto a Bencher paddle. The final of the unit is not much larger than the Bencher paddle itself. Measurements, excluding the protrusions of the volume, speed knobs and paddles, are 105 x 112 x 75mm.

The housing containing the keyer unit and controls, sits comfortably on top of the Bencher paddle's base. The front of the unit rests against the pivot ring assembly of the paddles.

The push On/Off power switch, and two rotary controls. One controls the volume of the unit and the other the keying speed.

And on the top surface of the unit you'll find six push-to-make switches along with three red and one green l.e.d.s. These control the Menu driven Memory Unit.

At the rear of the unit is where the external d.c. power connection, along with the keyer output is mounted. The d.c. connection is of the standard 2.1mm type of coaxial plug, and the output from the keyer is the familiar phono socket.

The external d.c. voltage supply requires a minimum of 250mA at 12-15V. However, it can be powered from a standard 9V PP3 battery mounted internally (this isn't supplied).

Host Of Features

I think the MFJ-490 is compact and 'tidy' and the unit has a host of features available to the operator. These include four dedicated memories, each allowing a total of 48 characters and a built-in Morse Code Tutor.

The tutor provides random letters, words, numbers and procedural signals. (The random words are up to and including eight characters in length).

Other features provided on the MFJ-490 include: Auto-increment serial numbers along with adjustable sidetone frequency and volume controls. There's also an Output tune mode, to allow for the tuning up of the transmitter and positive or negative keying can be selected.

The operator can also select Enable/disable active output from the keyer. This is to allow practice with the unit still coupled up to the transceiver.

Adjustable parameters include the sending speed. This is variable from 5-100 w.p.m. (that's knocking on a bit folks) with weighting adjustable from 5 to 95%.

The MFJ-490 keyer can be used with modern solid state transceivers, and also with the older bottle fed (valved) variety. The simple moving of an internal jumper is the only modification needed to enable the unit to be used with the latter.

Sophisticated Simplicity

Even for such a sophisticated piece of technology, the MFJ-490 is simplicity in itself to operate. On the top surface of the unit are situated the single row of push-to-make switches. These function buttons are marked F1 - F5, with a sixth marked Menu.

In a row above the Menu button are four l.e.d.s. marked A, B, C and D. The A l.e.d. being green and the others being red.

Pressing the Menu button one or more times, activates one of the l.e.d.s. To the left of each l.e.d.s are five items that can be selected, simply by depressing one of the function buttons.

For example, with l.e.d. B illuminated and pressing button F4, allows you to pre-set the frequency of the sidetone. All the functions clearly listed on the top of the unit be similarly set or adjusted.

Continued on page 28
Four messages of up to 48 characters in length can be stored in the MFJ-490. When Menu A is illuminated, Functions F1 - F4 can be used for storing and replaying messages.

Pressing and holding briefly one of the F1 - F4 buttons prompts the unit to send 'GO' to you in code. The MFJ-490 is then ready to accept your message.

Whilst sending your message with the paddles, the unit recognises spacing between words. It then sends 'W' to you, indicating such a space. Upon completion of your message, simply press (briefly) the relevant function button, and the job is complete. The unit responds by sending the end of message character AR barred.

If a mistake is made while entering the message, simply enter the correction character (8 dits) and the unit corrects the error. If the message is too long, the unit responds by interrupting with the end of message character.

**Keyer & Tutor**

The MFJ-490 is not just a memory keyer, but also a Morse tutor. By simply entering the Random Code mode, F5 'D', the unit becomes a tutor.

Random letters, numbers, punctuation and procedural characters, words, can all be sent from this unit. Even the Farnsworth mode can be used. (This method sends the characters at a set speed and only the gap between characters is lengthened or shortened).

The MFJ-490 also has the ability to send random selected characters, selected from groups of six letters, numbers, punctuation or procedural. The following list is a selection of some of the items that the MFJ-490 allows the operator to vary: (see list in panel on the right).

**Joy To Use**

I found operation of the MFJ-490 unit to be exceedingly easy and a joy to use on air. The whole unit is nice and heavy it weighs in at over 700gm (approaching 21b), so there's no need for any Blu-Tac or other such medium to keep the paddles from wandering all over the shack!

I've a birthday coming up shortly, and have deliberately left the MFJ-490 lying around the shack, kitchen and lounge to drop subtle hints to the 'station manager'. I was highly impressed with this unit and feel it would be an asset to any well equipped shack.

The MFJ-490 Menu Driven Memory Keyer Paddle is available from Waters & Stanton of 22 Main Road, Hockley, Essex. Tel: (01702) 206835, FAX: (01702) 205843 and I thank them for the loan of the review model. The MFJ-490 is priced at £169 plus £5 P&P (there is also a version available without the paddle key in the form of the MFJ-409X for £109 plus P&P) and in my opinion is well worth every penny.

PW
Pump-Up The Volume

The very popular Antenna Compendium series from the ARRL has now reached volume 5. Editor Dean Straw N6BV and his assistant editor Rich Roznoy KA1OF have managed to find more antennas and techniques to publish in the ongoing series of antenna books. The ARRL Antenna Compendium Vol 5.

There are eight sections in this 200-page A4 sized book as well as a 3.5in IBM PC (or compatible) disk with antenna data and programs. The sections are '80 and 160-Meter Antennas', 'VHF/UHF Antennas', 'Antenna Modelling,' 'Multiband Antennas', 'Propagation and Ground Effects', 'Measurements and Computations', 'Special Antennas' and 'Antennas Tuners, Baluns and Transmission Lines'.

There are many new designs of antenna appearing in this, the latest in the series, book. Find out how to build the 'Hemienna' a new 'miracle' wire antenna from JF6DEA, a full sized discone for h.f. working or a trapped delta loop for 3.5, 7 and 10MHz working. These antennas and many more may be found in this new addition to the 'Antenna Compendium' series.

The ARRL Antenna Compendium Vol 5 is available for £16.50 +£1 P&P from the PW Book Store on (01202) 253758, or fax on (01202) 253458.

Handbag Mobile

Sandpiper Communications can now supply a 'handbag' sized portable antenna that can be used to cover all bands from 3.5 - 144MHz with just the one antenna. The new Sandpiper Mobile - Portable Base antenna now has a telescopic top section and a wider, but shorter, base loading coil.

The new antenna would make an ideal holiday antenna with the addition of a clamp to fit on an Hotel balcony. The 'Handbag-sized' portable antenna costs £65 and is available from Sandpiper Communications at Units 5/6 Enterprise House, Cumnor Industrial Estate, Canal Road, Abberdare, Mid-Glamorgan CF44 0AE or Tel: (01685) 870245.

Hiyo Silver!

A new silver plated brass PL259 is now available from Westlake Electronics. Manufactured in high quality silver plated brass, the PL259 plug is made to accept all 10mm diameter coaxial cables. To counter the problem of poor insulation materials found on many cheaper PL259 plugs, the gold-plated centre contact pin is set into a pefr insulator. The new pefr insulator withstands the heat of repeated soldering very well, and doesn't absorb water if used outside.

As some of the larger diameter coaxial cable may be difficult to wire up, the gold-plated centre contact pin has a slightly larger hole through it, making it much easier to assemble and solder up. Suitable for coaxial cable such as: RG8U, RG213U, RG214U, URM67 and Westflex 103, the plugs are available from Westlake Electronics, West Park, Claverton, Holsworthy, Devon EX22 6QN at a cost of £1.50 each plus £0.75p P&P for any quantity. Or you can telephone them on (01409) 253758, or fax on (01409) 253458.

Silver and gold make a good contact in a PL259 Plug.
FLYING ANTENNAS GET YOUR SIGNAL ON & HIGH IN THE AIR

high as a kite

The first thing to consider, when thinking about using a kite to haul an antenna up, is the frequency band, or bands, which are to be worked. A single band antenna is the simplest but requires changing if a band change is required. When using kites to haul the elements into the air, weight becomes the greater problem.

With a kite as a support, no end insulators are required, and even the centre insulator at the feeder termination need only be basic and lightweight. The centre insulator I’ve used over the past years is the standard small ‘choc block’ type. This type of connector is also useful when making quick repairs. The next problem is wire type. With my system I use aluminium wire of approximately 1.5mm (16-18s.w.g.). Soft wire is possibly the best, but can stretch, but there is a hard drawn aluminium wire readily available in the form of metal-inert gas (MIG) welding wire.

By and large the greatest weight problem is the antenna feeder. I’ve seen 1.1R67 being used to feed kite lifted antennas, needless to say it wasn’t very successful, a large expensive kite had to be used. I usually use slotted ribbon feeder which is both lightweight and has a low wind resistance reducing drag. I decided to construct a windsion antenna requiring a 300Ω feeder with a 6:1 balun between feeder and coaxial cable feeder the overall idea is shown in Fig. 1. But let’s start with the antenna and lifting line. Select a braided line of 50-75 kg breaking strain, and about 2mm diameter. Fold back the wire for a length of about 300mm and press the fold to the width of approximately 2mm. This gives a rounded end to act as bobbin to prevent snags.

Kites are a superb method of erecting temporary antennas of various types, Alec Adams G3Y0A get to grips with hoisting the antenna by kite.

Tied end of the wire. Push a further 14m of wire into the braided line, then bring the wire out again. Now the wire can be clipped off at the original entry point, leaving just the wire in the braided line.

To re-tension the line to bring out any slack which may have occurred, tie the kite end to a convenient post and with a gentle tension on the whole line, work any slack and wrinkles out. Once this is done the line is then pulled to pre-stretch back to the original shape, this is needed mainly when soft alloy wire is used to prevent further stretching in use. Any change in length changes the resonant frequency. At last, when this is done, the antenna tuning can start.

Tuning the antenna really just means cut to the correct length measuring from the centre point. Measure in both directions the required length for the antenna as shown in Fig. 1. At these points mark the line with pen and prising the braid apart, find and cut the wire and remove the surplus. The braid is then pulled over the cut end. These steps are then repeated at the other end.

The centre is simply cut and the loose ends fed into a choc block right through both screws and then croppped off. The choc block can be tied to the braid between the two wires to take the strain off the feeder, Fig. 2.
Fig. 3: The 1:6 balun consists of three windings.

**Make A Balun**

Now we need to make a balun because we're using a 300Ω twin line, fed from a 50Ω coaxial cable. The impedance step-up requires a 6:1 balun, although often a 4:1 is used. Here's a good design for a 6:1 balun, shown in Fig. 3, using two 37mm toroids (the type used in r.f.i. filtering). These are bound together with either four layers of glass fibre transformer tape or two layers of tightly wound insulation tape. The windings require three lengths of 1.6mm 16s.w.g.) enamelled copper wire.

Each winding is put on separately and covers approximately 3/4 of the core. First, six turns of wire spaced evenly, then the second winding is put close, approximately 1 wire thickness away from the first and then the third winding is put on starting from one end and finishing approximately in the centre. After making sure the windings are equidistant from each other and the tails are shaped to come off the centre of the edge of the toroid, Fig. 4.

The joints should be cleaned and whipped using thin copper wire and then soldered, making a neater joint. After checking the balun dip it into varnish, given three coats to prevent moisture affecting the coils. I found that my prototype had a very low s.w.r. over the 1.8-30MHz range.

The final assembly can now be carried out, the balun should be put in a box or container. The ideal box is the type used for potting assemblies. But I've found that a box made from old plastic conduit with plywood ends works well, Fig. 5. Two holes are made in the lid for 300Ω feed. The box could be sealed using mastic tape sealer. Be careful not to get any of the sealant on the copper wire as some contain acetic acid that could etch away the copper.

Fig. 4: The windings are arranged like this on the cores. (Shown exaggerated for clarity).

**Fig. 5: A suitable box to contain the balun in use. It should be sealed completely against moisture.**

**Make A Kite**

Now let's make a kite, which is easy to construct and fairly stable in flight. I've found that the best overall capability is the Delta. The Delta is made basically from a square piece of Ripstop nylon, (from sailmakers). It is cut diagonally giving two equal triangles as shown in Fig. 6. The outline and dimensions given include seams and hems.

The leading and trailing edges are sewn first, making sure that the two wings are mirror images, eg. the two seams are facing upwards when they are laid out flat, side by side in their final positions. Next, three strips of Ripstop cut 100x40mm make the 'D' ring anchors and tail anchor, Figs 7 & 8. The strips are folded four times and sewn along each side and finally giving a re-enforced strip 100x10mm.

The leading edges are folded over making a pocket 20mm wide for spars through the whole length of the leading edge, also sewing across the end of the pocket to seal it and preventing the spar from falling out. Two cuts, one on each side are made in the pocket 165cm from the trailing edge to allow the spars to be fitted or replaced if broken at a later date.

The cross spar loops are then sewn in position being careful to have the measurements the same on each side. The loops are placed either side of the pocket and sewn along the previous seam and then a box where the 'D' ring strip meets the kite, see Fig. 2, but don't forget to fit 'D' ring first!

The keel is next, a piece of spare Ripstop is sewn using zig-zag stitch onto the area where the towing eyelets are fitted, this gives strength, Fig. 9. The next step is to hem the two leading edges, also folding the extra reinforcing.

The three towing eyelets are fitted, the holes are made using a soldering iron, this method reinforces round the hole and prevents fraying. The two wing sections and the keel are...
Fig. 6: The kite wings are made from a square of Ripstop Nylon cloth. The hems are shown dotted.

Fig. 7: The 'D' rings are fitted onto the wings like this. Make sure it's a mirror image on the other wing.

Placed on top of each other with the keel in the centre and the wing hems facing inwards, the three sections are then sewn together, pins may be used to hold them together as Ripstop is fairly slippery.

The wings are then folded back so they lay on top of each other with the keel in the opposite direction. A second seam is now sewn 20mm from the first seam, remembering to insert the third strip of Ripstop into the trailing edge end of the pocket before sealing up the pocket by sewing across the seam, see Fig. 4 and Fig. 5.

The two leading edge spars are now fitted to the wings and the spine down the centre pocket from the front point of the kite. The end is now sewn across to prevent the spine from coming out in flight. The cross spar is now measured for a good fit between the 'D' rings and is cut 20mm longer with a 10mm cut in each end for the 'D' rings to fit in. The ends just below the cut are whipped with thread to prevent the cross spar from splitting. It is then coated in varnish for protection. The three anchor eyelets are to be used in different wind strengths, this gives extra stability. A tail can also be fitted for stability to the extra loop on the centre of the trailing edge and a tail can consist of a strip of Ripstop 50mm wide and approximately 10 times the length of the spine.

Another type of tail can be made of strips of Ripstop 150x50mm tied onto a length of braided nylon, this looks like the traditional bow tie and this is also approximately 10 times the length of the spine. The illustration of Fig. 10 should give you an idea of what the kit should look like in flight.

Remembering once again that, without CAA clearance, a kite may be flown at a maximum height of 60m (200') above ground. Do not fly near overhead wires or fly over public roads and also make sure that if the kite should land on its own there is sufficient room to do so.

So, get flying on the bands!
The Complete Collection
from Datong Electronics.

For further details on the items below please call us for a catalogue and data sheet:

AD370 Indoor Active Antenna (includes PSU) £70.44
AD370 Outdoor Active Antenna (includes PSU) £93.94
VLF Converter (10kHz - 500kHz) £86.94
VHF Converter (144MHz - 146MHz) £55.17
RFA Low Noise Amplifier (5MHz - 900MHz) £50.47
D70 Morse Tutor £76.32
F3 Audio Filter £158.69
ASP Speech Processor (specify type of rig when ordering) £7174.44

The above prices include VAT at 17.5% and shipping within the UK Mainland.

Payment can be made by Visa, Mastercard, Switch, Cheque, Postal Order and cash (but don't send that in the post).

You are advised to call us before ordering to ensure we have the good.

For Converters, Filters and Active Antennas call now for a catalogue.

Datong Electronics Ltd
Clayton Wood Close, West Park, Leeds LS16 6OE
Tel: 0113-274 4822 Fax: 0113-274 2872

Practical Wireless, May 1997
YOUR GUIDE TO SECOND-HAND EQUIPMENT

WATERS & STANTON

PLEASE VIEW OUR SHOWROOM/SALE ROOM WITH FULL 3 MONTHS PANTS & LABOUR GUARANTEE. FOR MORE INFORMATION PHONE 01702 206835. VAT REG 291537274.

HI-FI TRANSDUCERS

ICON IC 738 HF transceiver with fift £125
ICON IC 735 HF transceiver £105
JST135 HF Transceiver £125
Kenwood TS830S HF Transceiver £155
Kenwood TS2000 HF Transceiver £189
YAESU FT990 HF Transceiver £125

Datadomes

Kotronics KAM Multimode TNC £185
Kotronics KAM PLUS Multimode TNC £299

VHF/UHF TRANSCIEVERS

Alinco DX9000SE Dual Band Handset £140
Alinco D560 Dual Band Handset £105
Alinco D599 Dual Band Mobile £162
Icom IC 245T Dual Band Handset £169
Icom IC505 6m Portable SSB Only £250
ICOM IC2E2 Dual Band Handset £249
Kenwood TH90EV 2m Handset £159
Kenwood TH718E 2m Dual Band Handset £290

Transmitters

YAESU FT790R 2m Dual Band Handset £209
YAESU TH790E Dual Band Handset £295

HF RECEIVERS

Icom IC171E HF Receiver £550
Kenwood R1000 HF Receiver £250
Kenwood R3000 HF Receiver with VHF £295
YAESU FT-990 £495
Kenworth R5000 HF Receiver with VHF £250
Loewe HF25 HF Receiver with all accessories £435
Low £225 Europa HF Receiver £450
Sanyo ICFSW55 World Band Portable £925
YAESU FT890 £125

Scanners

AOR AR1000 Handheld £160
AOR AR2003 Base Scanner without PSU £159
AOR AR2700 Handheld Scanner £160
AOR AR2808 Base Scanner with SSB £195
Icom IC7000 Base Scanner £650
Icom IC11 Handheld Scanner £199
Yuppie MTV5500 Handheld Scanner £169
Yuppie VT220 Airband Scanner £195

Items are held at various branches, please contact our Cambridge branch for further details on 01223 311 320

LOWE ELECTRONICS

0117-931 5263

MULTICOMM 2000

01480 406770

NEVADA

01705 662145

YAESU FT-290 + NIDACDS £235
YAESU IC-1000 £255
YAESU IC-K100 £125
YAESU IC-255E £125
KN MATCH £29
YAESU FES-9600 + 1HF £729
AOR AR-300 £399
AOR AR-300A £250
MALL 144A £40
AEA 11SP-232 £289
KANTRONICS KAM £225
YAESU 707 £290
ERA MICROREADER £89
GRUNDIG YB-650 £350
ICON DRX-2KL £99
DRAKE V-150 £120
YAESU FT-7670 £669
YAESU FT-7360 £915
YAESU FT-7570 £525
YAESU FT-7470 £425
RACAL RA-177 £250
YAESU FT-750A £380
YAESU FT-101Z £350

YAESU FT-101E £200
YAESU FT-790 £169
YAESU FT-101E £100
YAESU FT-101E £250
YAESU FT-790 £200
YAESU FT-2000 £199
YAESU FT-2000 £150
YAESU FT-2000 £179
YAESU FT-2000 £825
YAESU FT-2000 £120
YAESU FT-2000 £79
YAESU FT-2000 £59
YAESU FT-2000 £90
YAESU FT-2000 £50
YAESU FT-2000 £39
YAESU FT-2000 £189
YAESU FT-2000 £140
YAESU FT-2000 £125
YAESU FT-2000 £110
YAESU FT-2000 £99
YAESU FT-2000 £59

PLEASE MENTION TRADERS' TABLE WHEN ENQUIRING ABOUT ANY ITEMS ON THESE PAGES!
HF TRANSCEIVERS
- Yaesu FT-9000AT £690
- Yaesu FT-840 boxed
  - VC-200D LP £575
- 2 x Icom IC-765 + speaker...from £1500
- JRC JST-1251 IP deluxe + PSU (opt. $8000)
- Yaesu FT-102 £475
- Yaesu FT-102 + PV-102 DM + PC-102 £799
- Yaesu FT-727GX + FMCW filtered + FT-777GX...Tel
- Kenwood TS-440S + w/shop manuals £950
- Kenwood TS-330S £1900

MOBILE/BASE VHF/UHF TRANSCEIVERS
- Kenwood TS-711E + mic...£757
- Kenwood TS-700 boxed...Tel
- Kenwood TS-705S £450
- Kenwood TK-751E boxed...Tel
- Icom IC-726 boxed...£250
- Yaesu FT-5908 Mk1 + accessories £235
- Narco AMV-1000S £140
- Kenwood TM-742 + 10m module as new...£62
- Icom IC-229 boxed £225
- Icom IC-290D £300
- Yaesu FT-5940 Mk1 £350
- Kenwood TW-4000 boxed £250

RECEIVERS
- Icom IC-7000 + voice synth...£750
- Kenwood R-9000 boxed £699
- Yaesu FRG-1000 VC £599
- AR-7500 £599
- Drake R-1E £599
- Lowe HF-225 £951
- Triel R-600 £250
- NRD-553 £599

HANDHELD
- Icom IC-M5 £150
- Allino Ti-109 £150
- Kenwood TH-230 £40
- Icom IC-X53T + earphone...Tel

MISCELLANEOUS
- MFJ-1579c + software £11.75
- MFJ-1766 loop antenna...Tel
- PX-223 boxed £150
- AT-220 £175
- 2 x BP64 filters £30 each
- Tokyo HI-377V linear...£45
- Microwave modules 2m 100W linear...£90

PHOTO ACOUSTICS
- 01908 610625

SHORTWAVE SHOP
- 01202 490099

DISCLAIMER
Advertisements from traders for equipment that is illegal to possess, use or which cannot be licensed in the U.K. will not be accepted. The publishers will give whatever assistance they can to readers or buyers having complaints. Under no circumstance will the magazine accept liability for non-receipt of goods ordered, late delivery or faults in manufacture.

YOUR GUIDE TO SECOND-HAND EQUIPMENT

PLEASE MENTION TRADERS' TABLE WHEN ENQUIRING ABOUT ANY ITEMS ON THESE PAGES!
Please mention Practical Wireless when replying to advertisements

ALAN
01268 752522
4 NORTHERN AVENUE
BENFLEET
ESSEX SS7 5SN
7 DAYS A WEEK THE SMALL DEALER

ICOM
IC-781
IC-736 + 6m
IC-737A
IC-706
IC-2KL linear
IC-725
IC-735

YAESU
FT-990AC
FT-890AT
FT-757
FT-ONE
FT-102 + ATU + SP
FT-77
FT-7B + F/Counter

KENWOOD
TM-455E 70m m/mode
TM-V7E 2/70
TR-751E 2m m/mode
TM-733E 2/70
TM-701E 2/70
TH-79E
TH-78E
TH-77E

YAESU
FT-2901
FT-2901II
FT-790I
FT-690II
FL-6020
FL-2025
FT-530 2/70
FT-11R
FT-10R
FT-23R
FT-8500 2/70

PLUS LOTS MORE
SSB PRODUCTS 23cm from 2m
TRANSV + VALVE LINEAR

WE NEED YOUR PRE-ENJOYED EQUIPMENT. TOP PRICES PAID. HF, VHF, UHF AND ACCESSORIES RECEIVERS, SCANNERS. COLLECTION AND DELIVERY ARRANGED. WHY PART EXCHANGE HAVE CASH. YOU KNOW IT'S BEST.

LINEARS ATU
DIWA AUTO 2Kw 2002
Vectronics VC-3000DLP
AT-50 auto
IC-180 auto 706
IC-2KL + PSU
Ameritron AL-80B
FL-2100Z
MM 6m 10in 100
MM 2m 1-in + more
AKD-2001
AKD-6001
ADI-200 h/helds
MC-60A base mics
MC-58 base mics
SM-5 base mics
SM-8 base mics
MD-1 base mics

SPEAKERS
SP-950 speaker
SP-102 speaker
SP-8 speaker
SP-55 speaker
Yupiteru 125 air band
Index QRP
Yupiteru 7100 + 7000
Tokyo 40 metre SSB CW only
Kenwood R-600

36 Practical Wireless, May 1997
I'M SORRY THAT THAT ONE GOT PAST G4GLM FOR LETTING ME KNOW OF THE MISTAKE, AND THANK GODFREY MANNING PW - ANTENNAS IN ACTION, MAY 1997 FOR LETTING ME KNOW OF THE ERROR. (I'M SORRY THAT THAT ONE GOT PAST G4GLM FOR LETTING ME KNOW OF THE MISTAKE, AND THANK GODFREY MANNING PW - ANTENNAS IN ACTION, MAY 1997 FOR LETTING ME KNOW OF THE ERROR.)

Ook at the circuit diagram of Fig. 1 on this page, the two highlighted diodes are shown the correct way round. I apologise to everyone for the mistake, and thank Godfrey Manning G4GLM for letting me know of the error. (I'm sorry that that one got past me. Ed.)

In the last issue (March 1997) of A-I-A, Glen Ross GB6MR showed us how to make a T2FD antenna, a broadband antenna covering 7-29.9MHz on h.f., with a low standing wave ratio (s.w.r.) over all the bands. In response to the article we've had letters from three readers asking for further details about the antenna. The letters from Jan Rijkman PA3GTW, Ray Dix, and Michael Troy El6HA are so similar, or have questions that touch on common points, I'll deal with them in reverse order Jan of twin feeder used in the design? Let there a maximum or a minimum length cable and the 300E1 twin feeder and, is there a minimum or a maximum length twin feeder used in the design? Let me deal with them in reverse order Jan. There is no real limitation on the length of 300Ω twin as the feedpoint of the antenna is a nominal 300Ω (let by the spacing and the 300Ω terminating resistor). To match perfectly to a 50Ω coaxial cable a 6:1 impedance ratio balun would be needed.

**A Degree Of Mismatch**

When using a 1:4 balun, in the system described this would give a 200Ω impedance when using 50Ω coaxial cable. A degree of mis-match will occur, but to give a better match into 300Ω twin feeder with a 1:4 balun, the feedpoint coaxial cable should be 75Ω. To find the amount of mis-match divide the 75Ω (refered impedance) by 50Ω (actual coaxial cable impedance) and you end up with a figure of 1.5:1.

As the antenna system, as described, has a mismatch of 1.5:1 as well I'm not sure of the combined overall effect. Depending on the various lengths of cable involved, there may be bands with a low s.w.r. and others with a higher s.w.r. Or you may need an a.t.u. that consists of a coil and a resistor. To make the whole system useable on all bands. But I see no problem in any case in setting the system up as you suggest, but use an a.t.u. to keep the s.w.r. at the rig end within acceptable limits.

My reply to Jan answers that one of your questions Ray? The other questions asked by Ray was, can he use an a.t.u. that consists of a coil and two variable capacitors and could the antenna be fed using coaxial cable completely? I'm unable to answer the first one easily Ray, but I wouldn't recommend using coaxial cable throughout, as it's likely to make the antenna less useful overall. I've shown two possible balanced a.t.u.s in Fig. 2 and Fig. 3 for you to look at Ray. They appeared on the Antenna Reference Chart given away with the May 1996 issue of PW (Try to get one if you haven't already got one Ray).
JOHN HEYS G3BDQ WRITES ABOUT AN INVERTED ‘U’ LOW NOISE RECEIVING ONLY ANTENNA FOR ‘TOP BAND’ DXING

antenna workshop

MY best efforts in ‘Top Band’ DXing have often been bedevilled on the 1.8MHz band by QRM from strong European stations to the east of my QTH. Couple this with a poor signal-to-noise ratio and you can imagine the problems I’ve experienced when straining to copy weaker North American signals.

In an effort to improve the signal-to-noise ratio I even tried a 1.5m square tuned loop antenna (made from coaxial cable) mounted in my loft. Whilst this loop antenna had a fairly good signal-to-noise ratio it did however, have a very low signal output and needed a low noise pre-amplifier between it and the transceiver.

When looking for ideas to improve the situation, I came across an article, written by WA2WVL, in the February 1995 issue of QST. The idea appealed to me, so I decided to try out his design for a low noise but small receiving antenna for the I.F. bands. In the original article in QST the antenna was called a ‘EWE’, but it is really an inverted ‘U’ (rather than a female sheep!). Some ‘Top Band’ DXers are unfortunate in having enough land available to run out a decent low band antenna. Take for instance the Beverage antenna, a long low wire which should be at least two wavelengths long to be really effective. Two wavelengths at 1.8MHz would mean a straight wire run of 320m (and then of course the house/shack has to go somewhere at the end).

Most Gardens

By contrast the inverted ‘U’ antenna will fit into most gardens, its only 10m long. No high masts are needed either. The only supports are just a couple of non-metallic poles a little over 3m long. Or you could just use the end of the house and a tree, as these should suffice for supports.

Making The Antenna

When setting about making the antenna, first decide which direction you would like to have the maximum signal strengths. My inverted ‘U’ runs NW to SE with the output feeder end at the NW end. This is fine at my Sussex location for the reception of North American stations and additionally at the optimum value, the front-to-back ratio will be about 20dB. The antenna's small physical size means that there is no antenna gain and about 25dB must be made up by the receiver. In practice I've found that my transceiver has plenty of gain in hand on both 1.8 and 3.5MHz, and no additional amplification is needed.

The horizontal part of the antenna has a sensitivity some 20dB below the vertical element gain and picks-up signals which arrive at high angles at right angles on both sides of the wire run. The useful vertical sections have their maximum pick-up at an elevation angle of 30°, which is fine for DX working on 1.8MHz.

Maximum signal pick-up is therefore towards the feed point. The antenna front/back ratio is determined by the resistance R, Fig. 1. When its value has been set at:

Maximum signal strength
Minimum signal strength

9.15m

Fig. 1: The Inverted ‘U’ Antenna with wire length details. See the text for details of the transformer and resistor details.

Maximum signal strength
Minimum signal strength

9.15m

When setting about making the antenna, first decide which direction you would like to have the maximum signal strengths. My inverted ‘U’ runs NW to SE with the output feeder end at the NW end. This is fine at my Sussex location for the reception of North American stations and additionally...
UK stations to the Northwest and North.

For the two vertical sides and the top run of the antenna a length of tinned multi-strand insulated wire is needed. And as shown it must be supported by non-metallic poles. You could use long garden canes lashed together with bracing lines at the top as a cheap option. A more expensive but more robust solution to the support poles is to use glass reinforced plastic (g.r.p. or fibre-glass) sections.

The terminating resistor shown in Fig. 1, must be non-inductive and have a value of 1000Ω. Having a resistor connected to ground at the bottom end of the antenna makes the antenna broad band and it works well over a frequency range of 1.8 to 4MHz. Use either a single component or you could make one up to the correct ohmic value (within 1%) by having a series or parallel combination of similar values.

The resistor (or resistors), which must be well protected from the weather, should connect to the antenna element and to a copper earth rod that has been driven down to a depth of about a metre. And as shown the top run of the antenna a length of tinned multi-strand insulated wire is needed. And as shown it must be supported by non-metallic poles. You could use long garden canes lashed together with bracing lines at the top as a cheap option. A more expensive but more robust solution to the support poles is to use glass reinforced plastic (g.r.p. or fibre-glass) sections.

The terminating resistor shown in Fig. 1, must be non-inductive and have a value of 1000Ω. Having a resistor connected to ground at the bottom end of the antenna makes the antenna broad band and it works well over a frequency range of 1.8 to 4MHz. Use either a single component or you could make one up to the correct ohmic value (within 1%) by having a series or parallel combination of similar values.

The resistor (or resistors), which must be well protected from the weather, should connect to the antenna element and to a copper earth rod that has been driven down to a depth of about a metre (preferably more if possible). The earth rod is connected to a similar rod at the feeder end of the antenna. The interconnecting wire is best buried just below the surface and will be more effective if bare copper wire is used. Hard drawn copper wire has better corrosion resistance than the normal multi-strand wire used in electrical wiring.

The antenna feed impedance of 450Ω has to be transformed by a factor of nine to allow the use of a 50Ω impedance coaxial cable feed line. A simple 3:1 step-down transformer, Fig. 2, can be made using a ferrite ring. The transformer shown was wound on the ferrite rings sold by the RSGB to make up EMC filters. In spite of the fact its design was a little empirical, the finished transformer worked well.

These rings I used for the transformer are a type described as "FAIR-RITE" made from a "type 43" ferrite material*. I'm fairly sure that almost any ferrite ring about 25mm diameter and designed to be effective between 1.4 and 4MHz will be suitable. The transformer windings were made using single conductor pvc insulated wire.

The inverted 'U' antenna's low noise characteristics allowed 1.8MHz c.w. contacts with many stations in the W7 and W6 call areas. I've noted that the antenna seems to have a cardioid, or heart shaped, horizontal polar diagram. A plus point is that it also remains useful when receiving stations that are at right angles to the run of the antenna.

Like the terminating resistor, the transformer should also be housed in a weatherproof plastic box. Where the various wires and coaxial cable goes through the box wall should be sealed with silicone rubber or similar waterproof material.

The Results

As to the results of using the inverted 'U' as a reception antenna. Well all I can say is that for a few months in late 1996 I was testing another antenna and had to take down my inverted 'U'. I soon noticed that my reception of 1.8MHz was degraded, so much so, that I was very pleased when I had the opportunity to put the inverted 'U' antenna back into operation.

The invered 'U' antenna's low noise characteristics allowed 1.8MHz c.w. contacts with many stations in the W7 and W6 call areas. I've noted that the antenna seems to have a cardioid, or heart shaped, horizontal polar diagram. A plus point is that it also remains useful when receiving stations that are at right angles to the run of the antenna.

Listening tests should be carried out while one of you adjusts a temporary variable non-inductive resistor, at the far end of the loop. When you are happy with the adjustment, measure the value of the variable resistor and this can be replaced by a fixed component (or combination of components).

A word of warning though. The antenna is designed for reception only, do not transmit into the antenna. Should you do so (even inadvertently) you will almost certainly destroy its terminating resistor. However, if the resistor has a dissipation rating of several watts, a momentary blast of r.f. power should do no lasting damage.

Why don't you try out an inverted 'U'?

*Suitable Toroidal Core (25mm Diameter and 'Type 43' Material or Similar) are Available From:

Cirkit Distribution Ltd.
Park Lane
Bronxbourne
Herts EN10 7NQ
Tel: (01992) 448899
FAX: (01992) 471314
E-mail: mailorder@cirkit.co.uk

OR FROM:
Ferromagnetics
PO Box 577
Mold
Clwyd CH7 1AH
antenna exactly as described by Glen Ross. Use a length of 300Ω twin fed to a convenient point, then into a 4:1 balun for h.f. At the coaxial side of the 4:1 balun the 300Ω feed impedance of the twin now appears to be 75Ω. Now this is a coaxial cable that may be bought easily and cheaply. I'd recommend that you use the type with 100% screen cover designed for satellite TV downlead. Use this 75Ω coaxial cable to connect to the a.t.u. which now is doing the proper job of transforming the 75Ω of the coaxial cable to the 50Ω input of the rig. The advantage is that the 75Ω coaxial cable is operating into its correct impedance and will screen the signal properly.

From Ireland, Michael Troy asks about the resistor and what dissipation should it be for a 100W transmitter? In the original article Glen G8MWR suggested that the terminating resistor (390Ω) should be capable of dissipating 35Ω on c.w. but if you were using s.s.b. then perhaps only 25Ω dissipation would be adequate.

I'll be honest Michael, I'd go for the 35Ω, or 35W, dissipation if possible every time. Now the problem is how to use many resistors in parallel. And I'd pad with minimal inductance we can get an ideal, we have to make a terminating pad so we can find a 390Ω one it's ideal. But I'd like the baton used in a relay race. If there is a coaxial cable used in an application where there are several relays, then the resistors could be used. But each made up of 12 x 1.5kΩ (5% resistors (36 in total) in parallel. By paralleling the resistors, the individual inductance is reduced by a factor of the number of resistors. When the terminating pad is made up it should be placed in a sealed weatherproof non-conducting box to minimise any change due to rain and moisture. The mismatch from using 375Ω instead of 390Ω is very low and may, for all practical purposes, be ignored.

As to the best angle for the antenna, and to its radiation pattern and direction Michael, the answers I've come up with are that the radiation pattern is almost circular, but with a slightly better sensitivity towards the 'low' end. As to the angle, the information I have is that anywhere between 20 and 40° will do, and that this will change the matching and radiation pattern slightly.

Finally, on the subject of the T2FD antenna, Jan asks "why, if the antenna has a 4dB advantage over a Marconi antenna, is it not a popular one?" He failed to find any information at all in his, or his club's library on the T2FD. My honest answer (Jan has to be: I don't know - but maybe some of our readers could throw a light on the subject. Over to you readers!

**Impedance Matching**

I touched briefly on using coaxial cable as a method of impedance matching for stacked or bayed Yagi antennas in the last issue of A-i-A. Reader Stuart Newsham G7KKC said in a letter "according to my maths a centre impedance of 11.2.5Ω (56.25Ω) is produced (when using 75Ω coaxial cable) and in reality 70.7Ω coaxial cable should be used (if it were available for the sections)".

Stuart went on to say "This is a mismatch of over 12% - does it matter? Also how would this mismatch affect performance of the suggested phasing and matching switch for a crossed Yagi using 1/4 sections of 50 and 75Ω coaxial cable?" My answer to Stuart's question, has to be that yes, it does matter, but in mitigation, a 12.5% mismatch is far better than the original mismatch. I think that in the real world that most of us have to live, it should offer an improvement over other options.

When building a power splitter 'T' matching system as described slight differences in the lengths of the coaxial cable, or variations in the velocity factor from the specification will also create mismatches. What mismatch will exist on any one system, I'm afraid I couldn't say as each system is going to be different. The chances are that the s.w.r. of the overall system would increase, but with the slight increase in antenna gain some improvement should still be seen.

If the same power splitter 'T' matching system were applied to crossed Yagi antennas, then the same arguments would hold, although the radiation pattern would change somewhat depending on the positioning of the two antennas in relation to the incoming signal. The system suggested as a power splitter, was a method of trying out an idea with minimal cost. Then, if the idea worked, a properly designed and built power splitter could be bought or made.

**Those Plugs Again**

On the subject of the 'is it a 50 or a 75Ω BNC socket or plug'? in the last two issues of A-i-A, Stephen Harding G4JG sent me a long E-mail on the subject. In the missive Stephen mentions that any good-quality 'Tee' connector will have the impedance marked on it. I agree Stephen, but those plugs and sockets I obtained from both Farnell and RS Components were devoid of any impedance information!

Stephen also says "One of the easiest ways of recognising 50Ω connectors is that they are more ruggedly constructed than 75Ω items that are usually used in the video world where the maximum voltage is 1V swing and the current carried is relatively low. So in spite of the temptations about being able to buy connectors cheaply at rallies, my general advice would be: don't unless they come in the manufacturers bags clearly stating what value they are."

"The problem is further compounded by the fact that there are thousands, even millions of 50Ω connectors around which were designed for computer networks using 50Ω coaxial cable. They are low power connectors and not suitable for anything other than QRP use limited at five watts power transfer".

I think Stephen's final comment is a good one he says "The damage that can be done to rigs, especially those with a solid state p.a., is by the use of the wrong impedance connectors is generally expensive. My rig is worth much more than the few pence saved on an unknown connector".

Thank you for all those readers that have taken the time to contact me with comments about coaxial plugs and sockets, I hereby declare the subject closed - unless you know different of course!

That's all I have time for this session. See you all in the next issue of A-i-A.
BACK ISSUES SALE

There are limited numbers of back issues available. This could be your LAST CHANCE TO ENSURE your collection is complete.

£1 EACH inc P&P!

ORDER NOW!

January 1992
February 1992
March 1992
April 1992
May 1992
June 1992
July 1992
August 1992
September 1992
October 1992
November 1992
December 1992

January 1993
February 1993
March 1993
April 1993
May 1993
June 1993
July 1993
August 1993
September 1993
October 1993
November 1993
December 1993

January 1994
February 1994
March 1994
April 1994
May 1994
June 1994
July 1994
August 1994
September 1994
October 1994
November 1994
December 1994

Please use the order form in this issue
VAUXFORD 208

RPP: £299
ML Price: £229
Deposit £49, 26 payments of £66.12, Cost of loan £540.32

FT-1-1000AT

RPP: £1299, ML Price: £1049
Deposit £149, 12 payments of £82.65, Cost of loan £91.87

FT 840

RPP: £999, ML Price: £749
Deposit £99, 12 payments of £59.69, Cost of loan £60.35

FT-9500

RPP: £2399, ML Price: £1999
Deposit £399, 24 payments of £80.16, Cost of loan £323.84

F1/11-1000PM

RPP: £2999, ML Price: £2299
Deposit £299, 24 payments of £72.64, Cost of loan £446.42

FT-9900

RPP: £1699
Deposit £49, 24 payments of £72.64, Cost of loan £52.67, Cost of loan £446.42

FT-1000MP

RPP: £2599, ML Price: £1999
Deposit £299, 24 payments of £80.16, Cost of loan £523.79

FT-1000MP/DC

RPP: £1899
Deposit £49, 24 payments of £72.64, Cost of loan £52.67, Cost of loan £446.42

FT-1000DP

Deposit only £10 P&P

WEB SITE: http://www.martin-lynch.co.uk

THE AMATEUR RADIO EXCHANGE CENTRE
140-142 NORTHFIELD AVENUE, EALING, LONDON W13 9SB

Martin Lynch can also offer finance terms up to 36 months. Deposit from £100.00, 36 equal monthly payments are available. Single monthly instalments are also available. APR: 18.9% Payment protection is also available. All products are sale or return and sold on full manufacturers’ warranty. All prices quoted for cash/debit or credit cards. Finance on all products is also available. Subject to status.
NEW IC-706mkII

Now in stock, the new IC-706mkII boasts additional features that enhance user operation.

- 20W on 2 metres
- Enhances 0.03 - 200MHz broadband RX
- Ability to fit both CW & SSB N Filters
- Individual band change key
- Crossband Split
- Large Speaker
- Better TX Audio
- Quieter cooling fan

RRP: £1195. ML PRICE £1049
Deposit £149, 12 payments of £82.65, cost of loan £91.87 or 24 payments of £45.09, cost of loan £182.16, or 36 payments of £32.98, cost of loan £277.09.

Got an IC-706mkI?
Want to 'upgrade' your existing set to DXmkII?
We can now offer an after fit 'upgrade' to your existing IC-706. Look at these features:

- Replace existing SSB filter with 1.9kHz Narrow
- Fit 500Hz CW filter
- Fit muTek board to enhance 2m RX performance
- Replace mic insert with HEIL HCS5 for better TX audio

Get yourself a DXmkII for only £269!
Carriage £10

All equipment listed is brand new and boxed, offered with full manufacturers warranty.
A FIVE YEAR warranty including ACCIDENTAL DAMAGE is available on any of these products for minimal cost.

E-MAIL: sales@martin-lynch.co.uk
0181-566 1120

CALL TODAY FOR THE LARGEST SELECTION OF NEW & USED EQUIPMENT IN EUROPE.
TEL: 0181 - 566 1120
FAX: 0181 - 566 1207
CUSTOMER CARE: 0181 - 566 9566

OPENING TIMES MON - SAT: 9.30 - 6.00 LATE NIGHT THURSDAY BY APPOINTMENT
Lasers

Leading Lights In Communications

By Brian Dance

Brian Dance regularly wrote for PW in the 1960s and 1970s when he was a Physics lecturer, but nowadays specialises in 'high technology' journalism including lasers and associated fields. Here Brian sheds a little light on this fascinating subject.

Laser Operation

To help you understand laser operation I’ll start from the basics. This is best achieved by looking at the energy of a single electron.

The energy of each electron in an atom can move between various definite energy levels determined by quantum theory. No electron can have an energy in between these levels, so it can gain or lose only certain definite amounts of energy.

Energy is lost if a photon of electromagnetic (e.m.) radiation is emitted. The energy of this photon is equal to the difference between two energy levels of the atom and to \( \hbar \nu \) where \( \hbar \) is Plank’s constant (6.6 x 10\(^{-34}\) J.s) and \( \nu \) is the frequency of the emitted radiation. The frequency of e.m. radiation, and therefore the photon energy, decreases from X-rays through ultra-violet (UV), blue, green, yellow, orange, red, infra-red (IR), and microwave radiation to radio waves.

An atom may emit at more than one specific frequency, since it has various permissible electron energy levels. However, this explains why light from yellow sodium street lamps is of a different colour from that of blue-green mercury lamps or red neon lamps.

Emission of this type is known as spontaneous emission. The resulting atom can absorb radiation of the same frequency to raise its energy back to the previous level.

In 1917 Einstein realised that if a photon with an energy equal to the difference in the energy levels of the atom strikes an excited atom in the upper energy level, it could stimulate the atom to emit an additional photon of the same energy as the incident photon.

The process of stimulated emission occurs in an extremely short time. Both photons have the same frequency and travel in the same direction and their waves have the same plane of polarisation, so the beam is highly ‘coherent’.

Each of the photons can, in turn, cause stimulated emission from other excited atoms so that the number of identical photons is further amplified. This is the basic principle of the Laser which is an acronym for ‘light amplification by the stimulated emission of radiation’. It followed on from ‘MASER’ or ‘Microwave Amplification by Stimulated Emission of Radiation’.

Energy Levels

Electrons in the diagram, Fig. 1 show that laser material can have three energy levels. Stimulated amplification can occur from \( E_2 \) to the ‘ground state’ \( E_1 \), but atoms in the \( E_1 \) level can absorb photons of the same energy and are raised to the \( E_2 \) level.

Stimulated amplification is only obtained if the probability of stimulated emission exceeds that of absorption. In other words if there are more atoms in the \( E_2 \) level able to emit than absorbing atoms in the \( E_1 \) level.

Thus the level \( E_2 \) must be more densely ‘populated’ with atoms than the level \( E_1 \) to achieve laser action.

In nature you never get anything for nothing! So energy must be put into the system to obtain an output laser beam. This energy is used to make the \( E_2 \) level more heavily populated than \( E_1 \).

Hearing the laser material does not help either! This is because heating always leaves a higher energy state less densely populated than any state below it (for the technically minded, this follows from the Maxwell-Boltzman theory of energy distribution). The required ‘inversion of the population’ is achieved not by sending everyone to the antipodes, but by suitably ‘pumping’ the laser material with energy so that there are more atoms in the upper state than in the lower state.

In Fig. 1, the pumping must raise atoms from the ‘ground’ state \( E_1 \) to the \( E_2 \) level, perhaps by directing a beam of e.m. radiation of frequency \( (E_3 - E_2)/\hbar \) at the laser material. Atoms in the \( E_3 \) state almost immediately lose energy, falling into the \( E_2 \) state. This is
Pump Power

The 'pump power' is comparable to the power supply of an electronic oscillator. Pumping is often inefficient and takes place in various ways in different laser types. (Most lasers have a more complex system of energy levels than those of Fig. 1).

The photon gain (per cm) in a gas can be very small. Because of this the material is normally placed between two mirrors that form a 'laser cavity' with a Q factor like that of a tuned circuit. The photons pass back and forth many times between the mirrors, increasing in numbers as they do so.

The mirrors act just like a feedback system of an electronic oscillator. This feedback is positive if the path length between the two mirrors is an integral number of half-wavelengths - so a minute movement of a mirror changes the frequency - the basis of a potential sensor.

If the path/cm is small, the reflectivity of the mirrors must be extremely high at the lasing frequency concerned. One mirror allows a small fraction of the light to pass through it to form the output beam. This coherent beam has the advantage of having low divergence and has an extremely narrow frequency spread.

First Laser

The first laser, made in 1960, was a ruby laser. It's one type of 'doped crystal laser'.

Nowadays, instead of a ruby crystal, a rod of Nd:YAG (neodymium in yttrium aluminium garnet) or a rod of Nd:glass (glass doped with neodymium) is more commonly used, as the efficiency can be higher.

Carbon dioxide lasers can give very high power (up to tens of kW) at the mid-infra red wavelength of 10.6µm, but radiation of this wavelength cannot be conveyed to the workpiece by optical fibres. A complex system of mirror arms must therefore be used for the heavy welding and cutting of thick metal by such means.

Traditionally lasers (CVLs) emit at high pulse rates in the green and yellow spectral regions. They can be used in such diverse applications as cutting metal or drilling minute holes in a silicon wafer. The firm Oxford Lasers specialises in this type of laser and has also been involved with gold vapour lasers.

Excimer (excited dimer) lasers emit pulsed ultra-violet radiation. The wavelength depends on the gas filling which contains an inert gas that can form an excited dimer.

Explanatory Note: Dinner - A Diner is a molecule formed from two parts, in this case two atoms, in the same way that organic molecules form the plastics. Editor. The Titania KrF (krypton fluoride) laser (wavelength 247nm) at the Rutherford Appleton Laboratory (RAL, Oxfordshire) is the most powerful ultra-violet laser in the world.

Demand For Lithography

As the demand for ever finer patterns on semiconductor chips increases, even shorter wavelengths are used for lithography. Experimental work with ArF (argon fluoride) lasers emitting at 193nm in the deep ultra-violet has started. As wavelengths become shorter, a fluorine excimer laser can be considered.

Carbon dioxide lasers can give very high power (up to tens of kW) at the mid-infra red wavelength of 10.6µm, but radiation of this wavelength cannot be conveyed to the workpiece by optical fibres. A complex system of mirror arms must therefore be used for the heavy welding and cutting of thick metal by such means.

Excimer (excited dimer) lasers emit pulsed ultra-violet radiation. The wavelength depends on the gas filling which contains an inert gas that can form an excited dimer.

Explanatory Note: Dinner - A Diner is a molecule formed from two parts, in this case two atoms, in the same way that organic molecules form the plastics. Editor. The Titania KrF (krypton fluoride) laser (wavelength 247nm) at the Rutherford Appleton Laboratory (RAL, Oxfordshire) is the most powerful ultra-violet laser in the world.

Demand For Lithography

As the demand for ever finer patterns on semiconductor chips increases, even shorter wavelengths are used for lithography. Experimental work with ArF (argon fluoride) lasers emitting at 193nm in the deep ultra-violet has started.

As wavelengths become shorter, a fluorine excimer laser can be considered. But established quartz optics will then have to be abandoned for calcium fluoride optical components.

At the RAL in Oxfordshire, Edmund Turcu has developed a 'soft' X-ray source. This uses picosecond excimer laser pulses which are focused to a 10µm spot on the back of a moving magnetic audio tape to produce an extremely high power density.

A plasma is formed above the tape which is extremely hot (about 5 million °C) and emits X-rays with a wavelength of about 1nm. These 'soft' X-ray pulses have been used for many purposes, such as investigating the repair of X-ray damaged DNA by a Birmingham University group.

Turcu's soft X-ray source is being used for semiconductor lithography. In collaboration with Edinburgh University, field effect transistors have been produced with 200nm...
**HF Transceivers**

**DX-701 HF SSB Transceiver**

The World's smallest all band HF SSB transceiver

- **TX**: 1.6 - 30MHz, RX: 0.5 - 30MHz
- 101 memory channels
- 100W output
- Super stability 2ppm with TCXO
- SSB, AM and optional CW
- TX speech compressor included
- Removable front panel
- Freq. or channel display on LCD
- Noise blanker and squelch included
- PC programmable by ERE-5 cable

£599.00

**DX-70T 100W HF + 10W 6 m Transceiver**

Alinco's 10W on 6mtr version of the DX-70 TH below. Narrow receive filters and CTCSS fitted as standard.

Unbeatable value for money!

£775.00

**DX-70 TH High Power 100W 6 m + 100W HF Transceiver**

A superb compact, all mode 100W transceiver covering all HF bands plus 6 metres. Excellent receiver with narrow filters fitted as standard.

- All HF Bands 100W output
- 500Hz 100W output
- General coverage receiver
- Removable front panel
- Receiver pre-amp
- Filters fitted as standard
- Superb TX audio and RX
- Good RX sensitivity
- Full break in on CW
- Speech compressor
- 100 memory channels
- All modes: USB, LSB, CW, AM, FM
- All mode squelch
- Noise blanker
- Scan facilities
- Quick offset for DXP uplinks
- BF shift control
- Separate antenna sockets for HF + 6 Meters

£895.00

**144MHz Mobiles**

**DR-140 2 Meter Mobile**

A no nonsense rugged 50W 144MHz mobile transceiver that's easy to use on the move and comes with CTCSS as standard.

- 51 memories
- Programmable Time Out
- Alpha numeric display
- 50W FM output
- CTCSS encoder
- Electronic squelch

£695.00

**DR-150 2 Meter Mobile**

A full featured 50W 144MHz FM mobile radio that's crammed full of extras. The DR-150 takes mobile radios into the 21st century.

- Optional extended receive
- AM/PM 145-174MHz
- 400-480MHz
- 108-137MHz
- 800-950MHz
- TX: 1.6 - 30MHz
- RX: 0.5 - 30MHz
- Channel Scope - view activity either side of your channel
- 1200 and 9600 bps packet
- Channel or Frequency display
- Programmable timer

£799.95

**70cm Mobile**

**DR-430 70cs Mobile**

A 70cm version of the DR-140 above. 35W RF output and optional extended coverage available.

- 70 memories (expandable to 100)
- Programmable Time Out
- Alpha numeric display
- 35W FM output
- CTCSS encoder
- Electronic squelch

£259.95

**6 Meter Mobile**

**DR-M06 6 Meter Mobile**

6M FM mobile - 50-54MHz, low output - nice to use!

- 100 memory channels
- CTCSS encoder (50 tones), decoder as an option
- Time out timer
- Output 10W
- Modifiable to cover 45-60MHz

£249.95

---

**ALINCO Star dealers**

---

**The dealers listed in the advert have the full support and backup of the Alinco factory for spares and after sales service.**
Our Star Dealer Network promises

Dual Band Mobiles

DR-610 Twin Band Mobile
- Range: 136-174/420 - 470MHz FM. Optional extended coverage with Airband, AM etc.
- Channel Scope
- Full Duplex between VHF and UHF
- CTCSS encoder standard.
- VHF 50W/UHF 35W max
- Removable front panel
- 120 memory channels (expandable)

DR-605 Dual Band Mobile
- Easy to use twin hand mobile transceiver that delivers performance with user friendly features.
- Band channel Lock out
- Full Duplex between VHF and UHF
- Channelised mode
- Time-out timer and penalty
- 20 memories
- 3400X output option
- Battery save Function
- Scan function
- Time out timer setting
- 100 memories

Accessories for handsets

EDC-81 Rapid Charger for DJ-G5 and DJ-190
- $78.95

EDC-37 12V cable for handhelds
- $14.95

ESC-29 Soft case
- $14.95

EDN-16 Dry cell case
- $12.95

EBP-3GN NiCad Battery pack
- $59.95

EDX-1 HF Antenna Tuner
- The EDX-1 is a coaxial tuner with built-in Power and SWR meters. The ATU is rated at 120W and covers 160-10 meters including WARC bands

EDX-2 Automatic Random Wire Antenna Tuner
- Quickly matches random wire antennas, mobile whips, verticals inverted. Wired for DX70 - but can be used with most HF Transceivers.

DJ-G5 Dual Band Handheld
- A brilliant twin band handheld that does everything including spectrum display of adjacent channels. The receiver has a superb front end and does not suffer with breakthrough use other handsets and has CTCSS/DTMF built in as standard.
- Spectrum channel display
- Optional extended receive including Airband
- 108-173.95MHz
- 400-999.95MHz
- Full VHF/UHF Duplex
- Over air cloning
- Cross band repeat
- Up to 5W RF output
- 100 memories

DJ-190E Low Cost Handheld
- A powerful super slim 2m handheld with a huge easy to read display.
- Up to 5W RF output
- (with optional EBP-36N battery pack)
- 40 memories channels
- Cloning capable
- CTCSS encoder
- Battery save function
- Scan function
- Time out timer setting
- £149.95

DJ-191 2 Meter Handheld
- A new slim line 2 meter handheld that’s easy to use and has an enormous clear display.
- Up to 5W output
- (with optional EBP-36N battery pack)
- 40 memories channels
- Cloning capable
- CTCSS encoder
- Battery save function
- Scan function
- Time out timer
- £169.95

Antenna Tuners

EDX-11C 144MHz VHF Handheld
- $99.95

DJ-541C 70cms UHF Handheld
- £129.95

NEW micro sized handhelds

DJ-511C 144MHz VHF Handheld
- £69.95

DJ-541C 70cms UHF Handheld
- £129.95

Accessories:

EBP-3GN NiCad Battery Pack
- $59.95

EDN-16 Dry cell case
- $12.95

ESC-29 Soft case
- $14.95

EDC-81 Rapid Charger for DJ-G5 and DJ-190
- $78.95

EDC-37 12V cable for handhelds
- $14.95

FREE HEADPHONE

F.O.B. London

(£25.05)

£299.95

If in doubt call NEVADA for details of your nearest ALINCO AUTHORISED DEALER
Laser transformation hardening of a vehicle camshaft.

(Photo courtesy of The Welding Institute (TWI).)

Laser cutting of thick section steel with an AFS laser.

(Photo courtesy of TWI.)

Ultra Fine Resolution

It seems that X-ray lithography may offer the best way of obtaining the ultra-fine resolution required to produce future 1 Gbit and 4 Gbit DRAM devices, etc. But synchrotrons that can be used as X-ray sources have price tags of some $10 million. Such synchrotrons typically offer some 20 beam lines, each of which may be suitable for the high volume production of ultra-fine devices.

However, economical laser-plasma bench-top sources should find a place in small scale production and in pilot lines at large facilities so that R&D does not take up costly synchrotron time.

Semiconductor Lasers

The first semiconductor laser was made in GaAs (gallium arsenide) in 1962. Basically it's a p.n. junction with two opposite edges of the junction region highly polished to form a very narrow laser cavity.

Free electrons from the n-type material pass into the junction where they combine with (or fall into!) holes, when some of their energy is converted into photons. This is the 'pumping' process.

Laser action occurs if the current density is above a threshold value at which a photon stimulates further photon production. The GaAs type emits in the IR, but GaAlAs red emitting laser diodes are convenient for amateur experiments, as the visible light intensity can be modulated by varying the current.

The world record maximum power from a semiconductor laser is 11W from an SDL (San Jose, California) AlGaAs/GaAs heterojunction device.

The rapidly falling cost of international telephone calls is partly due to the availability of sub-oceanic fibre optic cables.

Photographs of a He:Ne laser scanning vibrometer installation being used to investigate the vibration pattern of a violin, and the resultant pattern.

(Photograph courtesy of Lambda Photometrics Ltd.)

Having read this far, you'll now realise lasers offer a very efficient, albeit costly, way of delivering high power at a well-defined chosen wavelength to an accurately defined area. Thus they have a wide range of industrial applications, surgery and other medical applications, as well as having an important role in optical fibre telecommunication systems. The ability of a laser to deliver high power means its radiation is hazardous, especially to the eye. So suitable spectacles must be worn if there is any doubt about safety.

How things have changed since the discovery of the laser when it was said to be an invention in search of an application. Humorists even suggested that 'laser' was an acronym for 'Lolley Acquisition Scheme for Expensive Research'!

Sub-oceanic erbium-doped fibre optical amplifier relays directly amplify the infra red signal without converting it into an electrical signal, as in the past. These amplifiers are like a laser, but without the mirrors that provide feedback for laser oscillation.

The relays offer the major advantage that the fibre system is 'transparent'. So that if (for example) a wider bandwidth is to be transmitted for bandwidth multiplexing, it's unnecessary to raise the cable from the ocean bed to modify the optical amplifiers.

Very Efficient

Having read this far, you'll now realise lasers offer a very efficient, albeit costly, way of delivering high power at a well-defined chosen wavelength to an accurately defined area. Thus they have a wide range of industrial applications, surgery and other medical applications, as well as having an important role in optical fibre telecommunication systems. The ability of a laser to deliver high power means its radiation is hazardous, especially to the eye. So suitable spectacles must be worn if there is any doubt about safety.

How things have changed since the discovery of the laser when it was said to be an invention in search of an application. Humorists even suggested that 'laser' was an acronym for 'Lolley Acquisition Scheme for Expensive Research'!
Virtual Electronics
A review of Electronic Workbench Version 5

By Tex Swann G1TEX

Looking for a use for that new computer you've got sitting in the corner? Look no further, 'Tex' Swann G1TEX, our technical sub-editor, has found something that might be more than entertaining!

We are now well within the era of the computer, as we learn of computers being able to do all sorts of tasks. And I think I've found a task for which the computer is admirably suited and of great use to all involved in electronics.

I've been involved with computers for over 20 years now and during that period I've seen ideas appear and disappear. But as the computer is in essence only an expensive calculator I've felt their use was limited, although they have fascinated me all along. Then several years ago along came Electronics Workbench (EWB) and I felt at least a use had been found for the computer.

I was offered an opportunity to try out a new version of Electronics Workbench Version 5 and so this review is based on a late 'beta' version of it. For those new to computing, a 'beta' test version is software that is almost ready for sale, but has been found a task for which the computer is admirably suited.

But EWB isn't just a very good 'tool' for electronics, it's a useful in real life!

But let me take you through a simple and yet typical task that we may all find useful. In Gordon King's review, on page 18 of this issue, of the Semaht Field Strength meter, he shows a typical low-pass filter, employed by radio amateurs world-wide as a means of reducing radio and TV interfering signals from their transmotions.

The circuit is shown ready to analyse in Fig. 1. In the middle of the shot is the filter circuit itself. On the left is a virtual signal generator with a 50Ω resistor (its output impedance) feeding into the filter then into a 'Bode Plotter'.

The frequency response of the filter can be seen in the lower left hand corner of Fig. 1. The vertical line represents the -3dB point which is at almost 40MHz. Note the gradual falloff response of this simple filter. In an effort to 'steepen' the skirts of the low-pass filter I started adding small capacitances across each of the three inductances.

The results of the new pass-band shape are shown in Fig. 2. It would have taken many hours to have achieved the same results with conventional methods. So EWB can save time in this case. It has also probably saved the filter because I would only place the small capacitors into circuit once to verify what EWB had shown me. I have to think of how many times I would have burned myself swapping capacitors the old way.

But as the Bode Plotter is an instrument that does not exist in real life, let's sum to some that do! And a very special instrument that I find extremely useful in real life is an oscilloscope. Shown in Fig. 3 is a small LC oscillator circuit with the virtual 'scope in place on the output. High on the right in the screen is the virtual 'scope. The lowest part of the trace is the mouse pointer poised over the 'Go' switch with the helpful pop-up legend 'Activate Simulation'.

On setting the simulation in motion the screen of the virtual 'scope remains with a steady trace for several virtual microseconds. Then a faint 'twitch' appears on the trace leading to the sustained trace shown in Fig. 4. (I've enlarged the screen of the trace so that the trace occupies almost half of the PC's screen).

Storage Oscilloscope

Then I discovered that the oscilloscope was a virtual storage unit, but with special capabilities. The display screen has a scrollbar at the bottom and on pulling it to the left (with the mouse pointer of course) the screen displayed the trace that had occurred earlier. In fact I could scroll all the way back to the moment that the oscillations started to build up. Wow! How I'd like that in real life!

But to get back to the circuit building side I looked at the various types of circuit elements that were contained in the many drop down menus. You could combine some of the several hundred individual components into sub circuits into your own circuit elements, to be used in further circuits.

I've shown a 2kHz band-pass filter (b.p.f.) element in Fig. 5. Simply draw the circuit, simulate it, to check that it did what it should and selected all the items. Then you just tell EWB to make a sub-circuit from the items and a small box appears in the 'Favourites' menu. Now any time you want this in the circuit drag it from the favourites and pop it into place.

Each of the 14 drop-down menus,
Virtual Electronics

Electronics Workbench EDA

including 'Favourites' has many more 'drag-and-drop' choices available from selection boxes (Fig. 6). The hundreds of circuit elements may be either DIN or ANSI (or BS) standard types and come in a bewildering array.

There are many transistors and f.e.t.s by the manufacturer's part number. There are v.f.e.t.s by the same method. There seemed to be several hundred 7400 series logic gates. In fact there's so many that they're broken into five sub-groups 0-99, 100-199, 200-299, 300-399 and over 400. The 4000 series c.m.o.s items are also in there too, along with the theoretical logical symbols in profusion.

Faults Built-in
Each of the individual circuit elements is not only synthesised but may have a fault built into it. What a wonderful way of training technicians in the intricacies of fault-finding! A virtual fault (that can even be due to a virtual temperature rise) can be programmed into one or more components.

I remember the hours that were needed to 'doctor' components for the students training, when I worked at a school of electronics many years ago. What would I have given for that ability then! There was a lump in my throat when I spotted that, under 'Miscellaneous', even valves had been catered for. But it was a shame that only triodes were in evidence in the copy I had. Oh for a few 807s and PL500s just to create the days of my youth, the smell of a hot glass envelope, with the crackle of high voltage arcing over to say 'move that knuckle'!

On the 'sources' drop-down there are a.c. and d.c. sources as well as frequency sources, a.m. signals, f.m. signals f.s.k. sources, sine, square and triangular wave generators. All of the various signals that I knew would be needed to test out a circuit were there, including one or two I hadn't come across before.

So far I haven't even touched (other than briefly) on EWB's ability with digital signals. But it works quite happily with those as well. They may be developed as easily as analogue signals circuits. In fact, in this version digital and analogue signal analyses may be carried out on the same circuit, no longer are the two separate programs.

The circuit shown in Fig. 7 is one of the sample digital circuits and illustrates a stepper motor driver. The indicators (circular items on the right hand side) indicate the logical state of the outputs and may be attached anywhere to show logic states, just like little i.e.d. indicators. Wonderful!

A list of the facilities within this new version of Electronic Workbench would take up most of the space I have to describe the whole program. Even after a month of evaluating EWB I feel there are some 'dark' corners - I've not even seen, let alone explored so extensive are EWB's facilities and capabilities.

But there has to be a down side to the equation. And what might that be? You may ask. Well the program's so powerful it really needs a brute of a processor to do its best. Although, I've tried it on the equivalent of a 33MHz '486 machine running Windows 3.11 it was a little sluggish. Running Windows 95 on this machine helped the overall speed a little.

But put EWB on a Pentium class machine with 16 or more megabytes of memory (mine has 32Mb) running Windows 95 and it becomes almost instantaneous. Change a component during a simulation and the 'scope display, or the Bode Plotter changes almost before you're aware of it. (Now it was showing what it could do).

I found that with the ability to simulate 'what-if' changes to circuits made me want to try many more changes to try to improve the circuit under test. And with this ease and ability there is a danger that you could make many changes just 'out of interest'. But you would not be wasting time as the first unit you build would probably perform as it should.

Electronic Workbench will interact with many other development programs from 'SPACE' simulator to p.c.b. layout programs. The Electronic Workbench Version 5 program is destined to become part of an integrated electronic development environment.

For professional designers, EWB has a 'big brother' in the form of EWB EDA with 14 more analyses available. Being aimed at the professional market it does however, cost more.

Whether a doubt either version (v5 or EDA) EWB is a remarkable tool for anyone interested in electronic development, either as a student or as a professional designer. I can imagine that for colleges and even radio clubs, EWB would quickly become an indispensable teaching aid.

My thanks got to Robinson Marshall (Europe) PLC, Nadella Building, Leofric Business Park, Progress Close, Coventry CV3 2TF for supplying the review copy of Electronic Workbench Version 5 which costs £199+P&P and VAT. The 'big brother' version, Electronics Workbench EDA costs £795+P&P and VAT.

PW
Dip Meters - Dutch Style!

By Wim de Ruyter PA0PRW

Dutch reader Wim de Ruyter PA0PRW knows that PW readers like old 'favourite' ideas brought up-to-date. Wim thinks his 'Dip meter' suggestions are in this category and will be of interest to everyone who uses this most versatile instrument.

As a keen supporter of the useful 'dip meter' - whether valved or transistorised - I thought PW readers might be interested in some of my ideas.

My interest in taking advantage of the 'dip' meter or 'dip' oscillator (call it what you will...it's known under many a different name!) started after I'd read an interesting article in The 1948 ARRL Handbook. It was here that I realised that the author of so long ago had really emphasised how useful the 'dip' meter could be.

In the 1948 ARRL Book I found a series of really fascinating articles on using the 'dip' meter. Bearing in mind how few Radio Amateurs in those days had easy access to test equipment I'm sure that what I read was truly 'state of the art' for the Radio Amateur of almost 50 years ago.

Obviously, the circuits used in the original article used valves and my ideas use transistors. But despite the fact I have used semiconductors - valved 'dip' meters are still very useful tools. There's no doubt in my mind that many of you still have a valved 'dipper' in the shack...they tend to be very long lived instruments!

So, having described where I got my first inspiration here go...describing my 'Odd Job Man' oscillator...a most versatile instrument. My ideas are laid out as a series of suggestions rather than one single article in the hope that you will use the ideas of interest to you, and placing the others to one side.

The simple instrument I'm describing can serve as an audio generator, r.f. generator, 'gate dipper', comparative 'Q' meter or an absorption meter covering from about 200kHz to about 80MHz.

Basic Circuit

The heart of the basic circuit behind my 'universal dipper' arrangement, Fig. 1, is a matched pair of 2N3819 field effect transistors (f.e.t.s). The 'pinch off' of the individual 2N3819s must lie between 1.5 to 2V. This is necessary for use on a 9V supply and a high impedance load for Tr1 is provided the constant current source Tr2.

I included the 2N3820 device (Tr2) to overcome difficulties with poor phase noise properties of bi-polar transistors. I originally used an AF239 transistor in this location, but the f.e.t. used in its place cured the problems of poor phase noise performance I encountered.

The Vp of a device used in the location of Tr2 must be about 1V. And the typical value of a stock quantity of 10 2N3820s in my workshop had turned out to be surprisingly low...at 1.4V! However, in most cases I feel sure you'll only have to buy five or so (they're not very expensive fortunately!) to find the right device for the job.

A further improvement comes from the symmetrical 'soft' clamping of the signal which is achieved by the

Continued on page 52
Dip Meters - Dutch Style

Continued from page 51

Fig. 2: Circuit used by PA/DWP to measure individual 'pinch off' voltage of 2N3819 devices to provide 'matched pairs' (see text).

The adjustment is critical and it will need to be readjusted as the battery voltage drops during its working lifetime.

It's important to bear in mind that - in my opinion - a dip oscillator must oscillate weakly. The weak oscillation ensures that you'll get the most pronounced 'dip' when energy is absorbed by the absorbing circuit.

Really Versatile

The basic instrument is, as I've already stressed, really versatile and to emphasise the point I will; (with no coil connected) act as a sawtooth generator, and it can be used to identify small (unknown value) capacitors and in conjunction with a frequency counter you'll have a very useful combination.

And if you don't have a good sensitive meter movement available to use to indicate the 'dip' don't despair! You can use a large external meter movement (an AVO type would be ideal). Additionally, if you take this idea up you can use the external meter in a bridge type circuit so it can be 'zeroed' (this is necessary when you're using the dB scale).

Using the 'dip' meter as a field strength meter you'll be able to measure front-to-back ratios of beam antennas. If you have incorporated a bridge circuit as I've suggested, you'll be able to use the dB scale directly to compare the front-to-back ratios in dBs.

Incidentally, if you don't have access to a frequency counter you can either build the very popular P&W 'Robin' frequency counter project, or build the very useful kit from Howes Communications (The DFD 5).

Capacity Measurement

To measure capacitance using the dip meter you use the detuning effect of the unknown capacitor. Look at the diagram, Fig. 3, where the capacity measuring interface is shown. A patient assistant will also prove very useful indeed!

The particular core I used came from Philips and was coloured purple, but almost any low frequency toroidal core of 20-30mm diameter should work.

The hysteresis and saturation effects will change with the level of oscillation and with the frequency as well. But in general terms it will allow measurements to be taken within ± 1.5% up to 1000pF and within ± 3% up to 0.1µF.

To measure a capacitance value the resonant frequency of the unit without the capacitor is measured, then the Cx is added and the new resonant frequency is measured. Following these two frequency measurements, a simple calculation is all that's needed to find the unknown capacitance value.

The two frequencies of oscillation are $F_n$ the normal frequency, and $F_s$ the frequency of oscillation with the unknown capacitor $C_x$ in parallel.

$$F_n = \frac{1}{2\pi\sqrt{LC_x}}$$

$$F_s = \frac{1}{2\pi\sqrt{L(\frac{1}{C_x} + \frac{1}{C})}}$$

Continued on page 57
NEW!

Electronics Workbench Version 5.0

Electronics Workbench Version 5 with analog, digital and mixed A/D SPICE simulation, a full suite of analyses and over 4,000 devices. Still the standard for power and ease of use. Now ten times faster. Still the same low price.

Join over 75,000 customers and find out why more engineers and hobbyists buy Electronics Workbench than any other SPICE simulator. You’ll be working productively in 20 minutes, and creating better designs faster. We guarantee it!

£199

SALE

SAME GREAT PRICE!

High-End Features

<table>
<thead>
<tr>
<th>Feature</th>
<th>Included</th>
</tr>
</thead>
<tbody>
<tr>
<td>True Mixed Analog/Digital</td>
<td>YES</td>
</tr>
<tr>
<td>Fully Interactive Simulation</td>
<td>YES</td>
</tr>
<tr>
<td>Analog Engine SPICE 3F5, 32-BIT</td>
<td>YES</td>
</tr>
<tr>
<td>Digital Engine Native 32-BIT</td>
<td>YES</td>
</tr>
<tr>
<td>Temperature Control</td>
<td>EACH DEVICE</td>
</tr>
<tr>
<td>Pro Schematic Editor</td>
<td>YES</td>
</tr>
<tr>
<td>Hierarchical Circuits</td>
<td>YES</td>
</tr>
<tr>
<td>Virtual Instruments</td>
<td>YES</td>
</tr>
<tr>
<td>On-Screen Graphs</td>
<td>YES</td>
</tr>
<tr>
<td>Analog Components</td>
<td>OVER 100</td>
</tr>
<tr>
<td>Digital Components</td>
<td>OVER 200</td>
</tr>
<tr>
<td>Device Models</td>
<td>OVER 4,000</td>
</tr>
<tr>
<td>Money-Back Guarantee</td>
<td>30-DAY</td>
</tr>
<tr>
<td>Technical Support</td>
<td>FREE</td>
</tr>
</tbody>
</table>

Powerful Analyses

- DC Operating Point: YES
- AC Frequency: YES
- Transient: YES
- Fourier: YES
- Noise: YES
- Distortion: YES

30-Day Money-Back Guarantee

Version 5.0 for Windows 95/NT/3.1

FEATURES OF ELECTRONICS WORKBENCH VERSION 5

WHAT'S NEW

- 30 Day trials: Have 30 days magic power, Video and full device models. Never know how many failures, experience great new analysis. Have another Powerhouse Model and Design. 25 new components including vacuum tubes, foldover transistors, 30 volt ICs, improved accuracy, improved network solver with zoom and slow power, Instrument panel, improved tests, improved markers. Enhanced waveforms and high quality.

GENERAL

- New Transistor field, fully integrates various elements: EDA, Space simulation and graphics package and analysis. Features: 2D simulation front panel, analogue and digital working, SPICE simulation, support for other simulation tools. Supplies multiple types of high resolution, high speed, SPICE projects for better performance. No linear field for circuit simulation.

Simulator Engine: SPICE 2G3, SMART-SPICE 3.3, 
Reduces the circuit complexity of the circuit component. Circuit model through circuit component. 

Simulation Engine: SPICE 2G3, SMART-SPICE 3.3, 
Reduces the circuit complexity of the circuit component. Circuit model through circuit component. 

Components

- SPICE Engine: SPICE 3F5, 32-bit 
- Analog Engine: Native 32-bit 
- Digital Engine: Native 32-bit 
- Temperature Control: User-defined 
- Hierarchical Circuits: YES 
- Virtual Instruments: YES 
- On-Screen Graphs: YES 
- Analog Components: OVER 100 
- Digital Components: OVER 200 
- Device Models: OVER 4,000 
- Money-Back Guarantee: 30-DAY 
- Technical Support: FREE

30-Day Money-Back Guarantee

Version 5.0 for Windows 95/NT/3.1.

Exclusive Distributor

Robinson Marshall (Europe) Ltd
Coventry, UK CV1 2TF.
Shipping Charges UK £7.99. All prices are plus VAT. Electronics Workbench is a trademark of Interactive Image Technologies Ltd, Toronto, Canada. All other trademarks are the property of their respective owners.

44 (0)1203 233 216

Fax: 44 (0)1203 233 210 | E-mail: sales@rme.co.uk

INTERACTIVE
Ham Radio Made Easy

If you’ve ever seen a copy of the (very popular and it ran to many editions) RSGB’s A Guide To Amateur Radio by Pat Hawker G3VA, you’ll realise that this book is a modern American version of the same idea. And although it is very American in approach, any new Radio Amateur will find the book of interest.

Steve Ford WB2IMY, the author, provides a useful ‘overview’ of the hobby and procedures which will help new operators and experienced types who want to catch up on new techniques! And at just £12.50 it won’t break the bank to add Ham Radio Made Easy to your collection.

ARRL Antenna Compendium Vol 5

The very popular Antenna Compendium series from the ARRL has now reached volume 5. Editor Dean Straw N6BV and his Assistant Editor Rich Roznay K10OF have managed to find more antennas and techniques to publish in the ongoing series of antenna books.


There are many new designs of antenna appearing in this, the latest in the series, book. Find out how to build the ‘Hentenna’ a new ‘miracle’ wire antenna from JF6DEA, a full sized discone for h.f. working or a trapped delta loop for 3.5/7/10MHz working. These antennas and many more may be found in this new addition to the ‘Antenna Compendium’ series.

The ARRL Antenna Compendium Vol 5 is available for £16.50.

ARRL Handbook CD Version 1.0

Over the years several generations of Radio Amateurs as well as engineers, technicians and students have enjoyed and found The ARRL Handbook to be an indispensable reference guide. And now for the first time ever it’s available on CDROM. Contained on the CDROM is the complete text and illustrations from the printed handbook.

Also included is a powerful search facility that allows the user to find information quickly by simply entering key words or phrases, as well as audio clips to illustrate a variety of modes and activities. You can ‘zoom’ in to enlarge or reduce text and illustrations and well as pasting text and illustrations into other Windows applications.

The minimum system requirements to run the CDROM of the ARRL Handbook are a 386, ‘486 or Pentium IBM PC with 4Mb RAM. Microsoft Windows 3.1.

A copy of the ARRL Handbook on CDROM costs £30 and is available now!
The ARRL Spread Spectrum Sourcebook

When PW published an article on Spread Spectrum a few years back quite a few readers thought it was an elaborate practical joke! However, if you are interested in the fascinating new world of spread spectrum operation...this book will help you find out much more.

All the 'secrets', possible techniques and methods used in this highly complex mode are covered and if it becomes an option for all Radio Amateurs in the UK...you'll be ready and at least understand it's far from being a joke! The ARRL Spread Spectrum Sourcebook costs £15.50.

Antenna Impedance Matching

Proper impedance matching of an antenna to a transmission line is a concern of every radio amateur and antenna engineers alike. 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 mystery involved in designing even the most complex multi-element networks for broad band coverage and the author of Antenna Impedance Matching, Wilfred Caron sets out to prove that within the 195 pages of this comprehensive book.

A copy of Antenna Impedance Matching will cost you just £14.50.

Understanding Basic Electronics

Anyone who remembers the excellent 'Common Core' series of books entitled Basic Electronics, Basic Electricity, Basic Radar, etc., will be interested in this new book from the ARRL. They have aimed at producing a book which is a first text book rather than an introduction to Amateur Radio.

Packed with relatively short (some single pages and some with two pages) 'bite size' sections covering the whole aspect of basic electronics...this book is an absolutely superb buy for the beginner and instructor alike.

Profusely illustrated with diagrams and excellent cartoons, Understanding Basic Electronics is both readable and instructive. I'm adding it to my 'Recommended Reading List' for the new 'Radio - Discover The Basics' column.

Well done ARRL! Understanding Basic Electronics comes Very highly recommended at £16.50.

Rob Mansion G3XFD

CALL NOW!

TELEPHONE MICHAEL HURST ON (01202) 659930
Allinco (New low prices)

From 1.8-50MHz

DX-70 mobile or base 1.8MHz SSB, CW, FM, AM 100W of engineering brilliance.

£695 cash FREE
Deposit £70, 24 payments of £33.
Cost of loan, £167.

£975.00 cash FREE
Deposit £99, 24 payments of £46.25.
Cost of loan, £234.

Package 2. Price for DX-70 complete with SG-230 Smartuner and 25 amp PSU.
£1267.95 cash FREE
Deposit £150.95, 24 payments of £56.98. Cost of loan, £298.52.

Also available the DX-70TH. High power version, 100W on 6m.

£775.00 cash FREE
Deposit £79, 24 payments of £36.75.
Cost of loan, £186.

IC-706 PACKAGE DEALS

Package 1. IC-706 c/w SG-230 Smartuner auto ATU.
£1178.00 cash FREE
Deposit £150, 24 payments of £54.28.
Cost of loan, £274.72.

Package 2. IC-706 c/w Comet CAHV HF, 6m and 2m mobile antenna.
£948.00 cash FREE
Deposit £99, 24 payments of £44.83. Cost of loan, £226.92.

Package 3. IC-706 c/w SG-230 Smartuner and 25 amp PSU.
£1267.95 cash FREE
Deposit £150.95, 24 payments of £56.98. Cost of loan, £298.52.

Also available the IC-706TH. High power version, 100W on 6m.

£775.00 cash FREE
Deposit £79, 24 payments of £36.75.
Cost of loan, £186.

SG-230 Smartuner®

Antenna Coupler SSB, AM, CW & DATA
£349.00

You can't buy a smarter tuner than this. An automatic antenna coupler so intelligent it precisely tunes any length antenna - 8 to 80ft - in the HF band.

The Smartuner® automatically evaluates and switches 64 input and 32 output capacitance combinations, plus 256 inductance combinations in a "pi" network. The amazing result is over a half-million different ways to ensure a perfect match for your transceiver. And the most intelligent feature of all is that the Smartuner® remembers the chosen frequency and tuning values, and will automatically reselect those values - in less than 10ms, each time you transmit on that frequency.

The SG-230 Smartuner®, Buy Smart.

NEW FROM SGC...

SG-231 100W, 1.8-50MHz Smartuner.
We are still awaiting final information on this unit at the time of going to press, however the SG-231 is smaller than the SG-230 but will be capable of tuning any long wire or whip antenna from 1.8-50MHz. Ideal for the IC-706 and the Alinco DX-70.
Projected price is £499.00

POWERCLEAR™

Add on DSP
- Built in audio amp.
- Speaker mounting bracket
- Use with ANY Radio, Transceiver, voice or Data Link, even noisy telephone lines.
- Ideal for vehicle mounting
- Noise reduction
- Notch filter
- Variable band pass filter

£329.00

KENWOOD TS-570D

Setting the standard in performance

£1495.00

Our price £1270.00

KENWOOD

★ 16 bit DSP AF signal processing
★ CW auto tune
★ 5W QRP setting
★ Built-in auto ATU
★ Electronic keyer

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

SPEND UP TO £1200 INSTANTLY WITH A PHOTO ACOUSTICS LTD. CREDIT CHARGE CARD

PART EXCHANGE WELCOME. ASK FOR KERRY G6IZF, Jon or JANE.

RETAIL SHOWROOM OPEN MON - FRI 9.30 - 5.30, (Thursday 9.30 - 12.30) 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
Dip Meters - Dutch Style

Continued from page 52

The ratio between the two frequencies is related to Cx by the following formula:

\[ \frac{C_x}{C_0} = \frac{\left( \frac{f_2}{f_1} \right)^2 - 1}{\left( \frac{f_1}{f_2} \right)^2} \]

But before you can use this formula it’s necessary to calibrate the unit, to make \( C_x = C_0 \) equal to 1000 pf. This is quite simple to do, but you’ll need a 100 pf 1% capacitor to become the temporary \( C_x \). When the capacitor \( C_x \) is 100 pf and the \( C_x = C_0 \) then the ratio of \( F_x \) over \( F_0 \) is the square root of \( (1/1) \), which is \( 0.95346 \). So when \( F_x \) becomes \( (F_0 \times 0.95346) \) the dip is calibrated.

You should carry out the calibration at the working temperature and with the coil fitted into the die-cast aluminium box.

The unit is now ready to use, all you need now is the calculator. But if the counter has a “counter output” facility the whole thing could be made automatic.

If an inductor is placed in parallel then the frequency shift is negative. You can calculate the value a negative capacitance and then calculate it back to microfones. But as this would depend on the exact frequencies I won’t go into details.

In Your Shack

I hope you find my ideas of interest and that you’ll now discover a useful (and perhaps neglected?) instrument in your shack. And if you don’t have a ‘dip’ meter perhaps you’ll be encouraged to build one for yourself.

So, I suggest you get busy and follow my example and although you won’t do yours ‘Dutch style’...you will make one to suit your requirements. They really are that versatile!

Editor

April 13: The 16th Mobile Rally of the Lough Erne Amateur Radio Club will be held at the Killynaboy Hotel, Enniskillen, Northern Ireland. Doors open at 12 noon. Tyrone Amateur Electronics, Toms, Yasses, Waters & Stanton will be there as well as many other traders. For further details contact 0 (043) 369333 or 0 (0365) 327733 (evenings).

April 13: International Marathon Day exhibition at the Wireless Museum in Puckpool Park, Seaview, Isle of Wight. There will be a display of early Marconi gear and working short wave transmitting station. Free entry and free car parking plus refreshments. Doubles EXP on (0963) 576945.

April 13: SAMS ST Computer & Electronics Show Rally will take place at Bingley Hall, Staffordshire Showground, Worwell Road, Stafford ST18 1AF. Staffordshire University Road, sliced from junction 14 on M6, bus shuttle from Stafford Railway Station. Doors open 10am to 6pm. Admission is £2.50 for adults, children under 16, 50p, concessions. DAPS, RSGB members, student card, £1.00. Advance tickets £1.50 plus p/a. This is the 9th consecutive year for A15 at Bingley Hall. Lady year show saw just under 1000 visitors, covering the computing spectrum, including PC, Amstrad, Amiga, Acorn/3 and Atari/8-bit, along with accessories, software, books, components and much more. There will be lots of free parking, a licensed bar from 11am, refreshments, meals, entertainment. More information from Sharon Atwood on (0978) 419293 or FAX (01784) 742181.

April 27: The BAC Rally ’97 is being held at the Sports Connexion, Coventry. Doors open at 11am (10.30am for disabled visitors). Entrance is £1.50 for OAPs and under 14s. There will be all the usual features of BAC rallies, over 200 trading tables, Bring & Buy, large outdoor flea market, specialist radio television displays, ex broadcasting vehicles, etc. 084547 talk-in on S22 and G83C (FRA). There are full refreshment facilities and a licensed bar. Mike Waddington (G83M) on (01784) 396013, FAX (01784) 396163. For more information email bacl weekend@btinternet.com

May 3: The Dartmoor Radio Rally are holding their rally at the Yeovilton Memorial Wargle Hall, Heavy Lane, Yelverton, Devon. There is parking for 500 cars, access for disabled visitors, playground for children, trade stands, Bring & Buy, etc., refreshments. Doors open at 10.30am. Talk-in on S22. Run GTL6 on (01172) 955296.

May 3: The Mid-Cheshire Amateur Radio Society are holding their rally at Winsford Civic Hall, Town Centre, Winsford. Doors open at 11am (10.30am for disabled visitors). Admission is £1, under 16s free with adults. Talk-in on 2m. There will be a simple parking, a bar and catering services, too. All the usual traders will be there, there will also be a Bring & Buy stand. The rally is fully sign-posted. More details from David G4AVY. DTHR on (01606) 778787.

May 11: The Midland Amateur Radio Society (MARKS) are holding their Spring Rally at Drayton Manor Park, Tamworth. Staffs. Doors open 10am to 4pm. There will be trading tables, Bring & Buy, Flea Market, local clubs, children’s entertainment, sideshow a licensed bar and a zoo, etc. A day out for everyone. For more information phone Peter Raynor (G3R/N) on (024) 443 1191 or Mike Nyan (G3M/P) on 021246 1164.

May 14/17/18: The Dayton Hamvention, the largest amateur radio show in the world, is taking place at the Nasa Convention Centre in Ohio, USA. Doors open at 2pm on the 14th, and the event runs until early afternoon on the 18th. For the early risers, the Fair Market is open from 9am on the 14th. You will be able to visit many trade stands, attend lectures and meet amateurs from all over the world.

May 15: You will be able to see the 12th CRP Convention at Digby Hall, round St., Sherborne, Dorset, Doors open 0900 to 1700. There will be lectures, trade stands, refreshments, talk-in on S22. Entry is £2, which includes prize draw ticket. Peter G3CR, DTHR on (0302) 830504


May 25: The Plymouth Radio Club is holding its rally at the College of Further Education, Kings Road, Devonport, Plymouth. Admission is £1. Doors open at 10am for disabled visitors and 10.30am for others. Anyone wanting further information, contact Stephen Reynolds G7US on (01752) 365075 during office hours between 09am and 5pm on (01752) 771719.

If you would like to have your Rally featured in Radio Diary, all you have to do is send in as much information about the Rally as possible, ie. date, location, time, who to contact, etc., to Zoe Crab at the PW Editorial Office.

Fig. 5: Suggested technique for applying simple modulation to a ‘dip’ meter.

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 organisations and is published in good faith as a service to readers.

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

May 16: The Mid-Ulster Amateur Radio Club are holding their Annual Radio Rally and Bring & Buy at the Silverwood Hotel, Lurgan (1/2 mile from M1 motorway). Doors open from 12 noon. There will be a buffet, bar and car parking facilities available in the Hotel. Contact Mr R. Todd GS1TS on (01752) 324383.

May 25: The Plymouth Radio Club is holding its rally at the College of Further Education, Kings Road, Devonport, Plymouth. Admission is £1. Doors open at 10am for disabled visitors and 10.30am for others. Anyone wanting further information, contact Stephen Reynolds G7US on (01752) 365075 during office hours between 09am and 5pm on (01752) 771719.

May 25: The 21st East Suffolk Wireless Revival, (poswic, is to held at Stuke High School, SSE main rail station, map ref TM44055. Radio & Computer Rally open from 10am (10.30am for disabled visitors) until 4pm. Talk-in on S22. Dave Johnson G7XRM on (01934) 295651 during office hours of 09am to 5pm.

June 21: The Royal Navy Amateur Radio Society are holding their Annual Mobile Rally at HMS Collingwood, Fareham, in conjunction with the Royal Navy Berthicknet ROT Gen Competition and HMS Collingwood Open Day. This year’s rally will have a similar format to last year, plenty of action for all the family including the Free Fall Parachute team and the Hampshire Police Motor Cycle Team, plus all the usual Amateur Radio content for the remainder. (01973) 365956.

Radio Diary

Compiled by Zoe Crabb 997

If you wish to have your Rally featured in Radio Diary, all you have to do is send in as much information about the Rally as possible, ie. date, location, time, who to contact, etc., to Zoe Crab at the PW Editorial Office.
Stand by your desks and pay attention! It's Ben Nock G4BXD's turn to look after the vintage 'Wireless Shop'...and judging by the fact he's in uniform there must be a 'military flavour' this month!

Here I am once more, on the subject of 'Valve and Vintage', with a 'military flavour' and amongst other things, a few readers enquiries to put forward. And to start off, Mr A. Guibert, from Canada, E-mailed to ask what I knew about the OSSRWS!

Now the initials stand for (apparently) Out Station Sound Ranging Wireless Set. Phew!

As it was, I knew nothing, but Mr Guibert kindly sent me the few sheets he had on the system. It looks like a No. 22 set, the p.s.u. is very similar, and the 'blurb' states that it's for recording the sound of the guns in a field battery, going BANG. Why, I do not know, but there we are!

Anyway, suffice it to say, if anyone out there knows about the OSSRW system or has a circuit diagram or other information, do let me know and I'll pass it on.

Another enquiry, and this time it comes from Ray K5FKT. 'Picked up an Admiralty '5G' set from VK-land. Uses a 5Z3 rectifier, a 6V6 crystal oscillator and an 807 in the final. It is a c.w. transmitter operating in 3 bands, from 3 to 24 MHz, using plug-in coils. Cute little thing. Any idea where I can get a schematic or other information on the beast?'. Well, if anyone can help Ray, get in touch with me and again I'll pass it on.

Admiralty Pattern

Another enquiry has come from Jack G4IZM, who would like information on an Admiralty Pattern Receiver API00335. This is a medium and high frequency set, covering 60kHz to 30MHz.

The receiver is quite large and heavy, as with all Navy things, and it's used in conjunction with an API100333 transmitter. Jack needs a decent circuit diagram for the receiver and transmitter and any alignment notes that may be out there. Can you help?

Arms Fairs

Though in the main a place for armour, medals and uniforms, you can find the odd radio related item at various Arms fairs.

One event is held on a regular basis at the National Motorcycle Museum. This is at Junction 6, on the M42. The next meetings there are on 15 June, 21 September and 23 November 1997. The contact number is (0115) 9474137.

Specialised Societies

Brian Williamson, from Surrey, wrote in to ask me if there were any specialised societies for collecting valved equipment. And in answer Brian, I know of the Eddystone Users Group (EUG), mentioned in my last column, and then there is the Military Wireless Amateur Radio Society (MWARS).

Contact for the Society is John Taylor-Cram, who can be telephoned on (01705) 250463.

Picture Gallery

First in the picture gallery this time is an old favourite, the R1155 and T1154 as shown in Fig. 1 are Eric G3LPS's sets. Slightly modified as far as the plugs and sockets go, they are in use on the bands at odd times. So, if you hear a 'chirpy' c.w. note, it might be Eric.

Next I've heard from Mr Loustau, near Paris in France. He has sent pictures of the R-103 Mark I Canadian. This Seven Loctal valved set, covered 1.5 to 16MHz in three ranges and is powered from a 6V d.c. source.

There is a British R-103 but it's slightly different in appearance. The photograph Fig. 2, shows the front of the Canadian version, while the photograph Fig. 3, shows the inside layout. I believe the set was fitted into vehicles as some sort of monitor. Again, information is required.

Now we're privileged to have a
The photograph in Fig. 4 is of a 'Le Recepteur Saram 0-12', a 5-band, 4-valved set which covers Long waves up to 7MHz.

The set is a tuned radio frequency (t.r.f.) receiver. In other words, it's a 'straight set' with no intermediate frequency hence no local oscillator.

There are just three sets of tuned circuits running at the received frequency followed by a detector stage. The receiver was designed around 1935/36 and used by the French Air Force. (The version on the left was 'captured'

by the Germans and has been replated with German lettering).

**My Shelves**

Now a couple of sets off my shelves and I'll start with the receiver No R-109 and its matching transmitter, Sender No 76, as seen in Fig. 5. These battery powered sets were used together to form a fairly high powered station. The transmitter is crystal controlled, six crystals being fitted inside the set and selected from a front panel switch.

The receiver, tuneable from 2 to 12MHz, is powered from a 6V source while the transmitter needs 12V. The receiver has a vibrator power supply built in and the transmitter uses the familiar rotary generator. Two 6V batteries would have been used, wired in series with a take-off at the junction for the receiver, the two powering the transmitter.

The photograph is missing its front 'kick' grill, as fitted to the 76 Set).

With reference to 'kick' grills, many of the war time sets had these metal protection grills. The 19, 62, 22, etc., had them to protect the equipment controls from the heavy hooved feet of the 'Squaddies'. They have, in the main now they're in the hands of amateurs and collectors, been removed for ease of operation.

**Tender Loving Care**

Finding a poor old 18 Set transmitter in a cardboard box at a rally the other day I took it home for some 'tender loving care'. After inspection showed it to be complete and free from attacks from the dreaded 'modifyfuntanythings' animal.

Applying heater volts produced the faint glow in the valves. With appropriate h.t. provided, the set produced pleasing squeals, squeaks and whistles from the monitoring receiver. All the bias seemed to work so action was taken to see if the 18 would still transmit.

The 18 Set still had the original 5-pin power supply plug.

Orientation of this is straightforward: looking at the pins (with the body of the plug pointing down) the bottom two pins are the heaters (3V) top pin is 12V positive, left pin is h.t. positive (170V) and the right pin is 12V and h.t. negative. All supplies are of course d.c.

The 4-pin microphone plug at the front of the transmitter needs to have pin 2 and 4 linked to apply volts to the transmitter unit. (Looking at the set that's the upper right pin to the lower left pin).

**Carrier Jumpy**

With power applied to the 18 Set I found the carrier was very 'jumpy' and unstable. So I proceeded to remove the valve, clean the pins and re-soldered all the joints.

Next I added a couple of new decouplers (0.01µF), to the h.t. side of things. I finished off by tightening up all the screws, nuts and bolts.

Then I tried it on air again, the actions seemed to have helped but the drift was quite high and the chirp quite pronounced. Adding extra electrolytics to the h.t. only seemed to increase the chirp so they were left out of circuit.

To try and reduce the voltage change on the v.f.o. when the p.a. was keyed, I added a 3.3kΩ resistor in series with the v.f.o. feed. Decoupled by a 1µF 250V capacitor. I also added a 0.01µF to the screen grid of the p.a., to ground. This being the pin that's keyed for c.w. use.

The overall effect was to calm things down quite a bit. The chirp was less, but still there, and the drift was still evident.

As there's no provision for crystal control on the 18 set I tried soldering a 7MHz crystal across the grid resistor of the v.f.o. This looked the v.f.o. quite nicely and now, with this addition, I tried it on the air.

I worked an SP9 (Poland) who gave me 579 and a DJ8 (Germany) who gave me 569 (that's 250mW into the 135 ft long wire aerial used at my station. Considering it's a 50-year-old, flea-powered set, I think that's quite good going and a remarkable testimonial to the original designers of the 18 set. I would imagine the crystal addition would work on the 68 set on 3.5MHz just as well.

**Different QRP**

I realise the 18 Set is not every QRPers ideal set but it's certainly a little different from the fairly bland little sets sometimes used.

Well that's all for now. In closing I would like to point out that, contrary to comments made to me, I have no connection, privately or business wise, with any other contributors to this column or magazine (other than contact with the PW Editor). Any comments to other 'Valve & Vintage' contributors should be addressed directly to them.

Finally, thanks to G.A. Taylor G8AKN, and James Farquhar who sent information following my last column's mention of the Trophy 6 set.

As always, I can be contacted directly at: 'The Radio Room', 62 Cobden St, Kidderminster, Worcestershire DY11 6RP, via the PW offices or by E-mail at 106312.1035@compuserve.com or @ GB7TCM.

---

**Fig. 4:** The 'Saram' 0-12 set. The set on the left has German markings and the version on the right is in the original French (see text).

**Fig. 5:** The R-109 (left) with Sender No. 76 on the right. The centre plate mounted on the 76 set provides tuning settings for various lengths of wire aerial.

**Fig. 6:** A pair of Wireless sets No. 18. The separate (removable for servicing) receiver unit is on top, with the separate (linked by an inter-unit plug and socket arrangement) at the bottom. The large combined h.t., bias and i.f. 'all dry' battery is housed inside the bottom unit, under the transmitter.

**Cheerio from Ben, see you in August.**
This month the Rev. George Dobbs G3RJV describes an 'add-on' external b.f.o. unit enabling reception of c.w. and s.s.b. on broadcast band receivers not fitted with such 'luxuries'!

One of my favourite amateur radio station photographs is that of Binu VU2NGB's station in India. The whole station is home-made from what is at hand. His transmitter is a collection of circuit boards loose on the table and the receiver is an a.m. 'all-wave' transistor radio.

Binu's receiver uses an external beat frequency oscillator (b.f.o.) to resolve s.s.b. and c.w. stations. With this set-up, Binu has over 60 countries confirmed on 7MHz.

The VU2NGB set up is a fine example of running an amateur radio station in difficult circumstances. It also looks a little like my first amateur radio station at the beginning of the 1960s!

This month's little project is designed to help an a.m. broadcast receiver, with short wave ranges, resolve s.s.b. and c.w. signals. Almost all such receivers use 455kHz as an intermediate frequency and injecting a 455kHz signal will provide the needed beat note.

The b.f.o. unit could also be used as a 455kHz source for a receiver project with that frequency used as an intermediate frequency. Suitable crystals for these frequencies are very expensive.

The Circuit

The b.f.o. circuit is shown in Fig. 1. It's a Colpitts oscillator based around an MPF102 field effect transistor (f.e.t.).

In this application the oscillator is tuned to frequency with an i.f. transformer inductor from the Toko range. These inductors have an internal capacitor and additional parallel capacitance is added to enable the oscillator to tune across the i.f. pass-band, and this tuning is provided by a varactor diode type BB212.

Varactors require a 'tuning voltage' and this comes from a potential divider circuit with a 10kΩ linear potentiometer, R2. The r.f. output is taken from the source of the transistor.

The source resistor is a preset which is used to adjust the output voltage. Any stable supply in the 9 to 12V range will power the b.f.o. A PP3 battery would be ideal. (For effective operation from a mains powered supply a smoothed stabilised supply is required).

Small Board

For convenience, you can build the b.f.o. on a small 60 x 30mm, perfboard circuit board. The layout is shown in Fig. 2. It would be simple to translate the layout as illustrated onto Perboard. (This is the circuit board material with an 0.1in matrix of holes).

The circuit would also lend itself to 'ugly' construction. And in fact, my first prototype was built 'ugly fashion on a piece of blank p.c.b. some 50mm square.

Construction of the b.f.o. is a simple half-hour job. Apart from taking care with the pin placements on Tr1, the constructor needs to watch the placement of the BB212 varactor. This is a double varactor diode, with two anodes and a common cathode. (Both sections are used with the centre pin being the common cathode).

Stability at a low r.f. frequency such as 455kHz should not be a problem. However, I would advise good quality capacitors for C4, 5, 6.

Fig. 1: Circuit of the simple varactor tuned beat frequency oscillator (b.f.o.) project described by G3RJV.
EASTCOMM

Europe's Largest Amateur Radio Showroom

Open Monday - Friday 9.00 - 5.30, Saturday 9.00 - 4.00

PERSONALISED CALLSIGN CLOCKS
£39.95

FREE DELIVERY

VIBROPLEX

BRASS RACER IAMBIC
£159 P&P 7.95

STRAIGHT KEY DELUXE £199 STANDARD £169 P&P 7.95

IAMBIC STANDARD £169 DELUXE £199 P&P 7.95

SINGLE PADDLE STANDARD £159 DELUXE £199 P&P 7.95

USED EQUIPMENT

HF EQUIPMENT
YAESU FT101E from £259
YAESU FT747
YAESU FT757GK from £479
YAESU FC757 AUTO ATU from £249
YAESU FT152S from £765
ICOM IC-728 from £165
ICOM IC-PS55 PSU from £269
ICOM IC-AT160 from £269
ICOM IC-AT500 AUTO ATU £465
ICOM IC-2KL LINEAR + PSU from £1465
TEN TEC CENTURY 22 + PSU £346
TEN TEC PARAGON 565 + PSU from £895
AMERITRON AT15 1.5W ATU £425
TRIO TS220GE from £279
TRIO JR930 HF Ham Rx £69
KENWOOD TS850SAT from £1990
KENWOOD DRS-2 Voice Recorder £29
DRAKE TV330LP 30m Hz LP Filter £35
SHIWMA 1005 30m Hz LP Filter £35

VHF/UHF EQUIPMENT
ICOM IC-R100 0.1-1856Mhz £375
ICOM IC-440 70cm Mobile from £299
YAESU FT252 2m/70cm Basefrom £943
YAESU FT203 2m H/Held from £35
YAESU FT750 MKI from £325
YAESU FT290 MKI from £279
YAESU FT350 2m/70cm H/Held £239
NOS LPM423-10-50 Linear from £165

ACCESSORIES
TONO 9000E Comms Transmitter £349
KENT Electronic Keyer £46
VIBROPLEX EX1 Brass Racer £199
Diamond S920 1.6GHz Swr Meter £69
W705 2m/70cm Swr Meter £129
TOYO T430 2m/70cm Swr Meter £69
WESTERN PM2000 SWR Meter £89
DIAMOND DL100 Dummy Load £145
Cushcraft ARHS 1217TM 6el NEW £189
Hen 20/15/10 Trap Dipole NEW £79
D144 2M Deviation Meter NEW £179
Vtronique Marine Collinear NEW £69
ICOM EX1/EX2 Ext Acc Term's £10
Mosley 1217m Wire Trap ANT £69

PLEASE PHONE FOR AVAILABILITY

SIGMA RECEIVING DIPOLE
SRD 46' long £49.95 4.95 P&P

SIGMA TRAPPED WIRE DIPOLE ANTENNAS*

SD-32 20/15/10m 2 Trap 27' long £83.95 5.95 P&P
SD-34 20/15/10m 4 Trap 24' long £142.95 7.95
SD-42 40/20/15/10m 2 Trap 55' long £89.95 5.95
SD-44 40/20/15/10m 4 Trap 47' long £147.95 7.95
SD-62 80/40/20/15/10m 2 Trap 109' long £103.95 7.95
SD-64 80/40/20/15/10m 4 Trap 97' long £191.95 7.95
SD-66 80/40/20/15/10m 6 Trap 82' long £219.95 9.00
SD-68 160/80/40/20/15/10m 8 Trap 154' long £297.95 10.00
SD-610 160/80/40/20/15/10m 10 Trap 146' long £367.95 10.00
SD-162 160/80m 2 Trap 208' long £126.95 7.95

*All these antennas have a 3kW Current Balun option for only £18 extra.

MOSLEY USA BEAMS & VERTICALS

TA32.JRM 10/15/20M 2 EL £299 P&P £10
TA31M# 10/15/20M 1 EL £229 £9
TA32M WARM 10/12117/20M 2 EL £339 £11
TA53M WARM 10/12117/20M 4 EL £569 £13
CL33M 10/15/20M 3 EL £619 £13
CL33M WARM 10/12117/20M 4 EL £729 £14
CL36M 10/15/201A £685 £15
# TA30KR 40M UPGRADE £189 £8
# TA30KR 30M UPGRADE £189 £8
TV/33 12/17/30M 3 EL £729 £14
MV2W 12/17/TM Vertical £139 £8
RV/4C 10/15/20/40M Vertical £269 £9
RV/6C WARC 10/12117/20/30/40M Vertical £359 £10

FOR EASTCOMM CATALOGUE SEND £2 STAMPS

AUTEK RF ANTENNA ANALYSERS

RF5 VHF/UHF £289.95 P&P £10.00
RF1 HF £159.5 P&P 7.95

Protective Case £14.95 P&P 2.75

KENWOOD - YAESU - ICOM PRICE MATCH

We match/better competitors advertised prices on current UK equipment - and our customer service is the best. Phone us last for the best deal.

WE NEED YOUR QUALITY, USED AMATEUR RADIO EQUIPMENT

BUY IN, TRADE IN, OR COMMISSION SALES.

BEST PRICES PAID. COLLECTION ARRANGED

SUMMATION

The world's largest range of wire antennas. See our catalogue for over 150 different antennas and parts

SIGMA SHORTENED DIPOLE ANTENNAS*

SLS-40K 40m 38' long £66.95 5.95 P&P
SLS-40K 80m 69' long £77.95 5.95
SLS-160K 160m 100' £83.95 5.95

SIGMA TRAPPED SLOPER ANTENNAS*

SVS-31 20/15/10m 1 Trap 14' long £49.95 4.95 P&P
SVS-32 20/15/10m 2 Trap 13' long £79.95 5.95
SVS-41 40/20/15/10m 1 Trap 28' long £52.95 5.95
SVS-42 40/20/15/10m 2 Trap 24' long £81.95 5.95
SVS-81 80/40/20/15/10m 1 Trap 53' long £99.95 5.95
SVS-82 80/40/20/15/10m 2 Trap 49' long £206.95 8.95
SVS-83 80/40/20/15/10m 3 Trap 42' long £319.95 7.95
SVS-65 160/80/40/20/15/10m 4 Trap 77' long £156.95 7.95
SVS-66 160/80/40/20/15/10m 5 Trap 73' £189.95 7.95
SVS-161 160/80m 1 Trap 105' £70.95 5.95

Eastern Communications, Cavendish House, Hapnissburg, Norfolk. NR12 0RU
VISA - ACCESS - AMEX

01692 - 650077

RSGB - DELTA - SWITCH

Please add 2.5% to total for credit card orders
**SUNRISE ELECTRONICS**  
**CENTRAL LONDON'S ONE-STOP COMMUNICATIONS CENTRE**  
229 TOTTENHAM COURT ROAD, LONDON W1P 9AE

MAIL ORDER HOTLINE  
Fax: 0171 - 637 3728

**Free case + training video**

---

**MAGELLAN GPS**

- GPS-2000 XL £159.00
- GPS-3000 (save £70) £159.00
- GPS-3000 XL £210.00
- MERIDIAN XL £210.00
- TRAILBLAZER £279.00
- NAV DLX10 £479.00
- SKYBLAZER £POA

Full range of Magellan GPS in stock (new only).

- Discount for Scouts
- Discount for clubs & institutes

---

**GARMIN GPS**

- GPS-38 £140.00
- GPS-45XL £229.00
- GPS-12XL £219.00
- GPS-II £199.00
- GPS-75 £399.00
- GPS-89 £330.00
- GPS-90 £450.00
- GPS-120 £354.00
- GPS-MAP 130 £619.00
- GPS-MAP 175 £619.00
- GPS-MAP 210 £884.00
- GPS-MAP 220 £1188.00

---

**ALL ACCESSORIES FOR MAGELLAN & GARMIN GPS IN STOCK**

- Power data cable
- PC kits
- Marine antenna
- Mounting brackets
- Training video
- Car adaptor
- Extension antennas
- Car antennas
- Software for PC available

---

**SCANNERS/TRANSCEivers**

- AOR-8000 £300
  All mode scanner
  500kHz-1900MHz
  PC compatible.

- YUPITERU MVT-7100 £250
  0.1kHz-1850MHz
  One of the best.

- WELZ WS-1000E £300
  Smallest scanner
  In stock. 500kHz-1300MHz.

- YUPITERU VT-125 £169
  168MHz - 142MHz

- YUPITERU VT-225 £230
  Air - Sea - Land.

---

**NIGHTVISION**

**Prices from £199.00**

- Moonlight NV-100
  with illuminator. Tremendous night vision performance at an economical price.
  £319.00

- Moonlight Mini
  Sleek, miniaturised design – only 5.5" long.
  £269.00

---

**SECOND GENERATION**

**Prices from £699.00**

- ITT QUEST 100 £699.00
- ITT QUEST 150 £899.00
- ITT QUEST 250 £1699.00

**NEW**

- ITT QUEST 300 £POA
  (video camera adaptable)

---

Next day delivery available. Quantity discounts available. Export enquiries welcome. Trade customers call for best prices. All prices shown include VAT.

---

Price match promise  
We will match any other genuine advertised price!
Carrying on the Practical Way

Continued from page 60

and 7. Polystyrene capacitor types are more temperature stable and are worth the extra few pence for added frequency stability. All the other capacitors are small disk ceramics for decoupling.

Getting Going

Getting the project going is straightforward. After checking out the parts placement and soldering apply 9 to 12V to the b.f.o., and if a frequency counter is available, you should connect it to C5 to monitor the output.

Even without the use of a frequency counter, the setting-up is still very easy. Turn R6 to maximum (towards the source of Tr1) and connect about half a metre of wire to CS. (This will act as a small antenna). Place the wire around, or inside, an a.m. radio with an i.f. frequency of 455kHz.

Set the tuning control, R2, at about mid travel. Then adjust the core of L1 until the oscillator is heard on the receiver. (If the receiver is not tuned to a station, the b.f.o. signal will appear as a 'rushing' sound). The ideal method to tune in a medium to low strength a.m. (medium wave) station for maximum signal strength. You should then adjust the core of L1.

As the oscillator sweeps over the centre of the i.f. frequency, it will appear as a high pitched signal on one side, go down in tone to zero beat and then higher again as the b.f.o. is tuned through the other side of the i.f. frequency. Next, set the core of L1 on the zero beat position. With a frequency counter adjust the core of L1 until the frequency is 455kHz with R2 at mid travel.

Adequate Coverage

My prototype b.f.o. tunes from around 441 to 448kHz (an adequate coverage range for the job of resolving c.w. and s.s.b. signals). The range can be adjusted by playing with the values of R1 and R3.

In practice there should be no need to make an electrical connection between the oscillator and the receiver. A length of wire on the output as described above will usually provide enough injection for a b.f.o.

The wire can be placed inside or around the outside of the receiver. Some experimentation will be required for the best injection level. So now you can turn that cheap a.m. short wave band equipped radio into a receiver that will resolve c.w. and s.s.b! Then you've only got to build a companion transmitter and you're on the air in true home-brew fashion!

Next time George goes hunting for the truly simple transceiver. DON'T MISS IT!
David Butler G4ASR takes a look at recent band conditions, your activity reports, and has details of new amateur satellites and a meeting for microwaves enthusiasts.

I was 'batten down the hatches' during February whilst the UK was battered by weeks of storms, driving rain and very high winds. Those fortunate to own tilt-over towers could at least get the metalwork out of harm's way but others weren't so lucky. Hopefully your antennas stood up to the battering.

Two propagation modes not affected by the weather are Sporadic-E and Aurora and both of these occurred during February. On the 50MHz band a Sp-E opening occurred briefly on February 26 between 1115-1215UTC.

Contacts were being made from northern England to stations located in DL, I, OE and SS. Unlike previous years there has been only a minimal peak in Sp-E this winter season.

During the period December - January the aurora was being recorded from which only one week, on January 20, was notable. This compares to 19 openings during the same three month period in the previous winter.

A total of four small auroral openings were recorded on February 1, 8, 10 and 27. In the opening on February 9 Nick Peckett G4KUX (1094) reports making some Sp-E openings but only able to work G4XUM and GD4GNH. GM3WOJ when unfortunately they had not.

The DXCC award was achieved from North of Scotland. This achievement should encourage all GM stations that it is possible to work DX on the 50MHz band from anywhere in Scotland.

Gerry School G15SWH (1085) reports that he is now particularly active on the u.h.f. bands. On the 432MHz band he is running a Trio TS-781 transceiver driving a K21W amplifier (2 x 4X25) to 400W output. Gerry's antenna system consists of 2 x 21-element Yagis at 23m above the ground. On receive he uses an SSB electronics mast-head low noise amplifier.

On the 1296MHz band Gerry uses an Icom IC-1271E transceiver driving a K21W amplifier. The only problem was that after 45 minutes of operation there came a loud knock on his cabin door, and we all know what that means!

Unfortunately, he was causing interference to some weather sensing equipment and GW0K/2/MM had to cease operation.

However, Andy was not deterred and intends to move the antenna position to a more favourable location on the R.R.S. Charles Darwin in readiness for the next o.m.e. activity weekend (which took place on March 22-23). Although only running 400W into a single 13-element Yagi he expects to pick up a few dBs of ground (sea) gain due to his uncluttered horizon.

I've received a letter from A. Warne G3YXJ mentioning that the Mid-Cornwall Beacon Repeater Group took over the running of the five GB3MBC beacons some years ago. However, after many years of service the 432/90MHz beacon is now QRT due to a corroded antenna.

The 1296MHz band unit also requires a new antenna and the beacon electronics are faulty. The money for repairs to these beacons only comes from subscriptions to the Cornish repeaters GB3NC and GB3HB.

Over the years the group have received a total of six reception reports and G3YXJ suspects that other beacon keepers experience the same apathy from their users. He makes a plea for reception reports to be sent.
has been using with good results. The receiving element is an aluminium tube 15ft 10in long, cut in the centre to accommodate either 50 or 75Ω feeder and no balun used.

The tube is fixed to a backing piece of square timber, pivoted around an upright support and the receiving element is set at 30° (producing an angle of 60° to the ground). This appears to be the optimum setting to provide the lowest angle of radiation (compensating for loss in the tube) whilst providing adequate signal when the satellite is at high angles of elevation.

Shortly after erecting the sloper, John tried the antenna out on RS-10. Running 26W on the 145MHz uplink he made contact with K1FX in Connecticut, receiving a 55 report. John heard K1FX better than he had ever done with a horizontal dipole and with this antenna he can copy RS-10 down to about 1° elevation from his QTH which has a clear view to the north-west.

**Phase-3D Satellite**

Now I’ll turn to news of the Phase-3D Satellite. The latest information is that the launch window is now between July 8-14 and the contact is expected to be nothing within the AMSAT International programme to delay the launch date.

The Phase-3D satellite (to be renamed AO-31 after launch) promises to be an excellent development. One reason for this is that the transponders are high power and it will be very easy to receive the satellite with small antennas.

The downlink powers will be 250W peak envelope power (p.e.p.) on the 29MHz band and 200W p.e.p. on the 145 and 432MHz bands. A 10W p.e.p. amplifier will be used on the 5.8GHz downlink as well as a 60W travelling wave tube amplifier (t.w.t.a.) on the 106Hz band. Finally, a 1W p.e.p. amplifier will be used on the 24GHz band.

The Phase-3D satellite will carry receivers for the 21, 435, 452 and 106Hz bands. The 452Hz band powers will be 500W and the 106Hz band will be 1W. The 29MHz band will have a 1W amplifier and the 145MHz band will have a 10W amplifier. The 432MHz band will have a 10W amplifier and the 5.8GHz band will have a 500W amplifier.

**Spread Spectrum**

Spread spectrum, if you’re wondering, is a transmission system where the energy of the transmitted signal is distributed among several narrow-band frequencies within a band. This is unlike conventional FM transmission where a signal is normally situated on a discrete frequency. (Editorial note: For further reading see ‘Spreading The Spectrum’ by Phil Cadman G4JCP PW April 1993.) At the other end of the link the received spread spectrum signals are reassembled to form the original modulation used. This technique reduces power density and duration of a transmission on a particular frequency. The advantage is that it lets transmissions to (almost) invisibly share the same spectrum with users of other narrow-band modes.

Spread spectrum also provides for improved communication under poor signal-to-noise conditions and in selective fading and multipath environments. It also allows more communication channels to operate simultaneously in the same spectrum.

**Teledata Group**

Are you interested in AMTOR, FAX, Packet radio, RTTY or other forms of data communications? If so then you should find out more about the British Amateur Radio Teledata Group (BARTG), the national specialist group for data enthusiasts.

The BARTG offers a quarterly journal Datacom and also publishes a range of useful technical books. They also organise contests, run award schemes and provide a member service. There’s also an annual rally, the year called DataStream ‘97 at Sandown Park on Sunday 14 September.

For further details you should contact their newly appointed Membership Secretary Bill McGill G0XDB at 14 Farquhar Road, Malty, Rotherham, South Yorkshire S66 7PD. You can also telephone G0XDB on (01709) 840410, but please don’t do it after 2100 local time. Alternatively turn your web browser to www.bartg.demon.co.uk to find out the latest details.

**Deadlines**

That’s it again for another month. Don’t forget to send me your list of locator squares, counties and countries worked for the year 1997. Forward any news, views, questions or corrections to reach me no later than Saturday 26 April.

Send them to me at Yew Tree Cottage, Lower Meescoed, Herefordshire HR2 0HP. You can also contact me via Packet radio @ GB7MAD, the UK DX Cluster @ GB7DXC or E-mail via daveb@mdlhr1.adw.bt.co.uk Alternatively you can telephone me on (01873) 860769.

---

Practical Wireless, May 1997
As I'm writing the column late in the month, I'm thinking what a lucky column this is, it has been weatherwise! Another heavy storm has brought down countless antennas including my own long wire (again!).

The loss of my antenna which has prompted me to rig up a means of lowering the wire during storms by way of a pulley system. However, 'HF Far & Wide' reporters say that propagation conditions have fared a little better than the prevailing weather conditions, I'm glad to hear!

The recent Prefix Contest certainly showed that despite rather mediocre conditions, there was plenty to work. Even if it was just a brief report. In fact, contests, whether you love 'em or hate 'em are a good way to build up your 'country worked' list, particularly for the Novice and new licensees. After all, it seems to me that contest operators have the most acute hearing I've ever come across!

I've lost count of the times, during contests, that I've cracked a new DXCC country, running just 3W or so into a poor antenna, despite trying unsuccessfully to work that country for months beforehand! Seems to me that when there's a contest on, they actually want you to work, regardless of your weak signals, and that's the time to get that new country you've been after for a while...

So, whether you like them or not, contests are one way which amateurs can 'complete' within the hobby. And many amateurs consider contesting the best part of amateur radio.

One thing to sure, if you have a very long wire, a very many a rare country has been activated specifically for a contest. This gives us non-contesters the opportunity to increase our country scores, while giving the other chap a point or two!

What do you think of contests? Do you enjoy them or do you think they are a waste of time? Let's hear your views!

**Favourite Band?**

The question of favourite bands was raised by Steve Lecke GW4USL in the March column regarding 3.5MHz (this favourite). For myself however, I've always considered 1.8MHz to be my favourite.

As you'll already have guessed, most of my on-air time is spent 'chewing the rag' rather than DX operating. And 'Top Band' is one band which is ideally suited to local and semi-local working.

However, let's not let new readers run away with the idea that 1.8MHz is merely a 'chat band! One look at the reports for this band in his month's column will surely dispel that thought!

Because I work QRP (5W c.w. and 10W s.s.b.), I consider almost anything I work on 1.8MHz to be 'DX'! I've worked 44 countries and three continents so far on the band with QRP, but as with any band but maybe more so with 1.8MHz...it's the antenna that's the key!

For DX, a vertical with good low angle radiation is by far the best bet, although many amateurs use long wires of all types and descriptions for DX working. I use a 60m long wire with a loading coil at the far end, which, and although it's no DX antenna, the antenna still works well enough and serves the purpose.

The reason I enjoy using 1.8MHz is that it's possible to work reasonably low power DX at the lower end of the band. While the upper part of the band is used by many UK stations for more general conversations, and regular nets.

Another attraction, and probably the main reason why I use the band more than any other is that it comes to me in the evenings, and that's when I get home from work! Come to think of it, that's probably the only reason why I use it so much.

**Special Events Stations**

Brian Brown GW1WUP will be operating a historical special events station GB0MPA in April, commemorating the role of the SS Carpathia in the rescue of 703 survivors from the RMS Titanic in 1912. The Carpathia's call sign was MPA, and Brian will be operating the station throughout the month of April. (QSL via home call).

The Barry Amateur Radio Society will be running two special event stations in mid-May, namely GB100RI and GB100LP to celebrate Marconi's first contact across water around the south coast of Wales. They will be operating s.s.b./c.w./RTTY/FACTOR/AMTOR and SSTV on all bands. (QSL via GW0IAN).

**Curious About QRP?**

For those readers who are curious about QRP (low power) transmissions, Dick Pascoe G0BPS's book, *Introducing QRP* is for you.

Written firmly with the newcomer in mind, Dick's book is an easy-to-read style, and consists of 10 chapters, from the history of QRP in the UK through to operating skills, antennas, simple rigs and construction techniques.

Of course, G0BPS is well known in amateur radio circles for his articles in *Practical Wireless*, as well as his work for the G-GRP Club. The book will be very useful for the newcomer, as well as amateurs who use low power as a sideline to their normal high power DXing. It costs £6.95 plus £1 P&P (UK), £2 P&P (overseas) and is available from the PWB Book Service.

**Latest DX News**

It's time for the latest DX news gathered from the RSRB's DX Newsheet. Here I've read that RA0FA in Asiatic Russia (zone 19) is active daily at 2000 on 1.83MHz, while also on 'Top Band', UA0FA is operational as 3WSM in Vietnam between 2300 and 2330UTC also on 1.83MHz looking specifically for European stations.

Meanwhile in Sri Lanka, Mario HB9BM is active on 40m with a G5RV and worked LYTDS (UK) at 0817UTC using a vertical. Merely a 'chat band'! One look at the reports for the band in this month's RSRB DX Newsheet will surely dispel that thought!

From the Philippines, JG0HEZ/3DU will be operating from Lumbang Island, the Philippines between the 13th and 26th of April, and NWPU/VE7 will be active 25/28th of July from Queen Charlotte Island.

The Mel Island operation by PY5AA (s.s.b. and PSL [c.w.]) has been rearranged for the 17th to 22nd of April. Finally, I've received a letter from Mathieu Roche F5SHO who says that he is now operational from Guernsey with the callsign MUSASP, the first MU call on the island. Mathieu says he's active on all bands (GSL to F5SHO).

**The 1.8MHz Band**

I'm starting off your reports with 1.8MHz news from Mike Devereux G3JED who reported working 3W5FM (Vietnam), a staggering number of Japanese stations (26 in all) and a Malaysian station on s.s.b. all at around 2130UTC using a vertical antenna on the band. Well done Mike!

Ted Trowell G2HUK on the Isle of Sheppey in Kent says that conditions have been rather poor lately. But nevertheless Ted managed to get on to 'Top Band' and lists his c.w. contacts with DYSJ (Faroise Islands) at 0700, W2GD (USA) at 2100, and OZL/DJ1RGF (Aaland Island) at 2300UTC. Ted's antenae include a G5RV dipole, HF vertical, and MFJ loop antenna.

Yours truly GWOLBI is back on 1.8MHz QRP and worked LY1DS (Lithuania) at 0346, 41N7Z2 (Serbia) at 0346, DL2ZU (Germany) at 2128UTC with 5W c.w. My 10W s.s.b. accounted for contacts with E9UC (Republic of Ireland) at 2154, and G4YU/MM on the Norwegian coast at 0500UTC.

**The 3.5MHz Band**

For the 3.5MHz band reports it's down to Skewen in West Glamorgan and Carl Mason GW4WOW. He uses around 100W output and a simple dipole antenna. Carl used c.w. to hook up with OY1G (Faroise Islands) at 1951, L2INJ (Budapest) at 0600, and V36BU (Lithuania) at 0656UTC. Using s.s.b. he provided Carl a ragchew with ON5WA (Belgium) at 1804UTC.

Here at GWOLBI yours truly worked K3JLJ (USA) with 5W c.w. at 0943 during a contest, while Ted G2HUK offers a single contact with OYQON (Faroise Islands) on c.w. at 2000UTC.

**The 7MHz Band**

It seems that the 7MHz band is where it's at these days for Sean Gilbert G4UCJ in Milton Keynes. He's has worked most parts of the world over the past month on '40 with c.w. using 50W and a half - sized 5GVR dipole mounted at seven metres above ground.

Sean says that 'early propagation favours stations to the West at his location, with Caribbean and South American stations coming in all around 0800UTC before fading out. From about 06 to 0900UTC, he is often heard on the Far East and Australia/New Zealand and are apparent on the band'. Sean says his log is more 'quality than quantity' this month, and he's well pleased to be working such
Summer '97 Catalogue

Includes 40 page full colour
Computer Equipment Catalogue

The Summer '97 Edition brings you:

- Even further additions to the Computer section extending our range of PC components and accessories at unbeatable prices.
- **WIN!** a 15" CTX SVGA Monitor in our easy to enter competition.
- A full range of Aver Multimedia products for PC and Mac.
- £25 worth discount vouchers.
- 232 Page main Catalogue, plus 40 Page full Colour Computer Catalogue, incorporating 24 Sections and over 4000 Products from some of the Worlds Finest Manufacturers.
- Available at WH Smith, John Menzies and most large newsagents, or directly from Cirkit.
- Get your copy today!

**Cirkit Distribution Ltd**
Park Lane - Broxbourne - Hertfordshire - EN10 7NQ
Tel: 01992 448899 - Fax: 01992 471314
Email: mailorder@cirkit.co.uk

---

**Lasers**

**Pen and Pointer in One**
- Four times brighter
- Mont Blanc™ style pen
- One year warranty

This laser pointer functions as a fine writing instrument and laser pointer all in one. The push-button activated 650nm laser in this pointer appears four times brighter than standard laser pointers. Output power: 3.5 to 4.5 milliwatts. Includes batteries and gift box. Cat. No. LPPEN

**FREE CATALOGUE**

- Helium-Neon
- Ruby
- Argon
- Scanners
- Semiconductor
- Lightshow equipment

**Midwest Laser Products**
P.O. Box 262, Frankfort, IL 60423
Phone: (815) 464-085. Fax: (815) 464-0767
E-mail: mlp@nlenx.com http://www.midwest-laser.com

Please include $7.50 S & H within US. IL res. add 7.75% sales tax. VISA/ MC accepted

---

**Distance Learning Courses in:**

- Analogue and Digital Electronic Circuits, Fibres & Opto-Electronics
- Programmable Logic Controllers
- Mechanics and Mechanisms

- Courses to suit **beginners** and those wishing to **update** their knowledge and practical skills
- Courses are delivered to the student as self-contained kits
- No travelling or college attendance is required
- Learning is at your own pace

For information contact:
NCT Enterprises
Barnfield Technology Centre
Enterprise Way, Luton LU3 4BU
Telephone 01582 569757 • Fax 01582 402028

---

Please mention Practical Wireless when replying to advertisements
The 'new' GWOLBI! Leighton Smart now has the benefit of a Yaesu FT-747 in the shack (it's the rig next to his left elbow) and of course it's properly modified for 'official' QRP operation!

juicy DX! Who can blame him eh?
The list from Sean this month includes (all c.w.) contacts with FSJ/E2YRD (French St. Martin Island) at 1119UTC (USA) via 5W0K (Kenya), C2/M3KUD (Flores Island, Azores) at 2334, SV5VBYR (Rhodes Island) at 0755, and DXVHOR (Market Reef) at 0843UTC.

Other early morning DX worked by G4UCJ included XT2DB (Burkina Faso) at 0649, T544F (Ivory Coast) at 0721, DK6K (Nigeria) at 0749UTC. Sean also logged 8U6Q (California) at 0823, EZ6AI (Turkmenistan) at 0900, UK3BIZ (Uzbekistan) at 0943, along with FG5HR (Guadeloupe) at 1211, COBY (Cuba) at 1227, and finally ZL4FC (New Zealand) at 1300UTC.

On the listening side is Charlie Blake MAUL also in Milton Keynes, who says that his local QRM has finally disappeared and the band is now quiet. Peace at last eh Charlie?

Charlie lists s.s.b. reception of YS1SK in contact with 6G4AF in France at 0832, ZL1P8 (New Zealand) working CN1PK (Morocco) at 0750UTC. Also logged were JAE1AI (Japan) in contact with PT7FM in Brazil at 0800, as well as VK4MJ (Australia) working EU6MB in Austria at 0835UTC. Also listed was ZS6P (South Africa) working VK4AF in Australia at 0943UTC, with the ZS station listening out on band at 0733UTC.

Charlie did have a small number of contacts himself however! The MAUL log includes a 7MHz s.s.b. contact with special event station 5X7THE in Thessaloniki, Greece, (QSL via SV27SD)

Carl GW0WSF has been busy here too, he reports all - c.w. contacts with 7X4A/1 (Ageria) at 1333, 9A/400D (Ireland special call) at 2022, ECSAHG7X4AN (Algeria) at 1932, and 9A5OD (Tunisia) too! He reports all - c.w. contacts with Thessaloniki, Greece, (QSL via SV2TSL).

The 10MHz Band
The 10MHz c.w. only band, although being just 50kHz wide seems to be a favourite for many c.w. operators. It certainly throws up a few gems that's for sure!

Carl GW0WSF reports contacts with TNSX (Congo) at 1507 (OSL via DL6QG), C4K1J (Uruguay) at 1936, VE3XH (Canada) at 1826, and KB1BVW (USA) at 1205UTC.

Ted G2KHU reports a single contact on the band with 9H1AL (Malta GO) at 1900UTC.

The 14MHz Band
Starting off the 14MHz band reports the big news for John Heys G3BDQ in Essex this month that he's worked VK9RX on Heard Island no less than eight times on 5.5 - 21MHz! That's good going John!

Other 14MHz DX for G3BDQ includes s.s.b. contacts with Z7JD (St. Helena Island), HSOUKMMR (Thailand), SAI/A (Layla), JY9HB (Jordan), and AP2 JBZ (Pakistan), c.w. c.w.

John finishes by saying that the past year has been so lacking in sunspots that it compares with the great minimum which lasted 80 years in the 17th and early 18th centuries! Let's hope they return soon! (Hear, hear! to that John!)

Now it's back to Carl GW0WSF, who hooked up with VE1MT (Canada) at 1623, SV73SPA (Mount Amos) at 1615, and VN7NS (Nevis Island) at 1125UTC.

Ted G2KHU on the other hand offers contacts with ZS4JX (South Africa) at 1437, ZS6G (South Africa) at 1437, and 5Z6XO (Barbados).

The 18MHz Band
John G3BDQ spent some time on the 18MHz '17 metre' band this month, and his list includes s.s.b. contacts with XT20D (Vietnam), AF3TN (Pakistan) as well as 6G3BD (Bangladesh).

Carl GW0WSF used c.w. to hook up with KF2AT (USA) at 1612, 3BB6G (Mauritius) at 1459, 9H1AL (Malta) at 1437, P77W4 (Brazil) at 1215, KP4/K4WA (Patio Rico) at 1735, and 8P9DX (Barbados) at 1305UTC (OSL via VE3CIR). Carl's only c.w. contact on 18MHz was with TA1/RW5W (USA) all at around 1600UTC.

The 21MHz Band
There are signs of life on the band with 9H1AL (Malta) at 1907UTC.

John G3BDQ lists contacts with JY9A (Jordan), F6HDB (Mayotte Island) and V21P (Antigua), all on s.s.b.

Signing-Off
Well that's it for this months folks, I must be signing-off! Thanks to all

---

END
SM&M has been specially created to help you take your business into the next millennium.

Our service includes:
- Advertisement design
- Specialist marketing and advertising
- Corporate hospitality
- Exhibitions and conferences
- Professional CV service
- Letterheads and business cards

We allow you to concentrate on your business whilst we help you increase your share of the market!

Arrowsmith Court
Station Approach
Broadstone
Dorset BH18 8PW
Tel: (01202) 659920
Fax: (01202) 659950

RADCOM ON CD-ROM - 1996 EDITION
To meet the requests of many radio amateurs we have produced this first CD-ROM which includes the editorial pages from every RadCom published in 1996 and, as a bonus, we have also included all the 1996 issues of D-i-Y Radio as well! No longer will you have to rummage through all your back numbers to find that elusive piece of information - with our easy search operation you can find it easily and quickly.

Price £18.81* plus P&P

THE PMR CONVERSION HANDBOOK
BY CHRIS LOREK, G4HCL
Once private mobile radio (PMR) equipment used by commerce and the emergency services is replaced by more advanced systems, it can be acquired very cheaply at rallies. Often it can be converted to amateur band usage quite easily and without expensive test equipment, giving high performance at a fraction of the cost of purpose-designed amateur gear. This handy book clearly shows you how to identify, choose and buy those PMR sets which are suitable for conversion and it gives step-by-step conversion instructions to help you all the way. Don't be without it at a rally!

Price £15.28* plus P&P

YOUR FIRST PACKET STATION
BY STEVE JELLY, G6UJR
First of the brand new RSGB Pocket Guide Series of books, this explains in simple, easy to understand language, how to set up a packet radio network. For those of you who have often wondered how to expand their use of amateur radio to the world of data communications - then this simple guide will show you.

Price £5.74* plus P&P

(*RSGB Members' prices available on request)

To place your credit card order, telephone Julia or Emma on the RSGB Sales Hotline 01707 660888, or send your cheque/postal order to:

Radio Society of Great Britain
Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JE 01707 659015
<table>
<thead>
<tr>
<th>Brand</th>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Icom</td>
<td>IC-756</td>
<td>£1839</td>
</tr>
<tr>
<td>Kenwood</td>
<td>TS-870D</td>
<td>£1675</td>
</tr>
<tr>
<td>Kenwood</td>
<td>TS-570</td>
<td>£1215</td>
</tr>
<tr>
<td>Yaesu</td>
<td>FT-1000MP</td>
<td>£1925</td>
</tr>
<tr>
<td>Alinco</td>
<td>DX-70TH</td>
<td>£689</td>
</tr>
<tr>
<td>Icom</td>
<td>IC-706</td>
<td>£825</td>
</tr>
<tr>
<td>Icom</td>
<td>IC-2350</td>
<td>£415</td>
</tr>
<tr>
<td>Alinco</td>
<td>DR-610</td>
<td>£410</td>
</tr>
<tr>
<td>Icom</td>
<td>IC-7E</td>
<td>£265</td>
</tr>
<tr>
<td>Yaesu</td>
<td>FT-50R</td>
<td>£258</td>
</tr>
<tr>
<td>Kenwood</td>
<td>TH-79E</td>
<td>£349</td>
</tr>
<tr>
<td>Icom</td>
<td>ICT-7E</td>
<td>£265</td>
</tr>
<tr>
<td>TIME WAVE</td>
<td>DSP-599ZX</td>
<td>£325</td>
</tr>
<tr>
<td>SAMLEX</td>
<td>PSU's 20/25A</td>
<td>£75.00</td>
</tr>
<tr>
<td>SAMLEX</td>
<td>PSU's 12/15A</td>
<td>£59.00</td>
</tr>
<tr>
<td>SAMLEX</td>
<td>PSU's 8/10A</td>
<td>£39.00</td>
</tr>
<tr>
<td>SAMLEX</td>
<td>PSU's WATSON 30A</td>
<td>£110</td>
</tr>
<tr>
<td>AOR</td>
<td>AR8000</td>
<td>£289.00</td>
</tr>
<tr>
<td>AOR</td>
<td>AR7030</td>
<td>£689.00</td>
</tr>
<tr>
<td>AOR</td>
<td>AR5000</td>
<td>£1299.00</td>
</tr>
<tr>
<td>AOR</td>
<td>AR3030</td>
<td>£499.00</td>
</tr>
<tr>
<td>AOR</td>
<td>AR3000A</td>
<td>£699.00</td>
</tr>
<tr>
<td>REALISTIC</td>
<td>DX-394</td>
<td>£225.00</td>
</tr>
<tr>
<td>BEARCAT</td>
<td>9000XLT</td>
<td>£269.00</td>
</tr>
<tr>
<td>ICOM</td>
<td>IC-R8500</td>
<td>£1445.00</td>
</tr>
<tr>
<td>JRC</td>
<td>NRD-535</td>
<td>£1525.00</td>
</tr>
<tr>
<td>AOR</td>
<td>AR1000</td>
<td>£925.00</td>
</tr>
<tr>
<td>YUPITERU</td>
<td>MVT-1000</td>
<td>£250.00</td>
</tr>
<tr>
<td>YUPITERU</td>
<td>MVT-7200EX</td>
<td>£345.00</td>
</tr>
<tr>
<td>YUPITERU</td>
<td>MVT-8000EX</td>
<td>£325.00</td>
</tr>
<tr>
<td>YUPITERU</td>
<td>MVT-7000EX</td>
<td>£235.00</td>
</tr>
<tr>
<td>YUPITERU</td>
<td>MEI-784B</td>
<td>£235</td>
</tr>
<tr>
<td>WATSON</td>
<td>SWR W-220</td>
<td>£56.00</td>
</tr>
<tr>
<td>WATSON</td>
<td>SWR W-420</td>
<td>£56.00</td>
</tr>
<tr>
<td>WATSON</td>
<td>SWR W-620</td>
<td>£135</td>
</tr>
<tr>
<td>YAESU</td>
<td>FRG-100</td>
<td>£459.00</td>
</tr>
<tr>
<td>ICOM</td>
<td>ICR-10</td>
<td>£315.00</td>
</tr>
<tr>
<td>AOR</td>
<td>AR5000</td>
<td>£879.00</td>
</tr>
<tr>
<td>SONY</td>
<td>SW-77</td>
<td>£359.00</td>
</tr>
<tr>
<td>SONY</td>
<td>SW-55</td>
<td>£269.00</td>
</tr>
<tr>
<td>SONY</td>
<td>SW-100</td>
<td>£199.00</td>
</tr>
<tr>
<td>SONY</td>
<td>SW-7600</td>
<td>£169.00</td>
</tr>
<tr>
<td>WELZ</td>
<td>WS-1000</td>
<td>£249.00</td>
</tr>
<tr>
<td>KENWOOD</td>
<td>R-5000</td>
<td>£879.00</td>
</tr>
<tr>
<td>WELZ</td>
<td>WS-1000</td>
<td>£249.00</td>
</tr>
</tbody>
</table>

AOR AR8000: £289.00
AOR AR7030: £689.00
AOR AR5000: £1299.00
AOR AR3030: £499.00
AOR AR3000A: £699.00

 TIMES WAVE DSP-599ZX: £325
 TIME WAVE DSP-599ZX: £325
 SAMLEX PSU's 20/25A: £75.00
 SAMLEX PSU's 12/15A: £59.00
 SAMLEX PSU's 8/10A: £39.00

WATSON SWR W-220: £65
WATSON SWR W-420: £65
WATSON SWR W-620: £135
<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALINCO DR-605E</td>
<td>2m/70cms FM dual band transceiver</td>
<td>£399.95</td>
</tr>
<tr>
<td>ALINCO DR-130E</td>
<td>2m FM 50 watt mobile transceiver</td>
<td>£249.95</td>
</tr>
<tr>
<td>ALINCO DR-150E</td>
<td>2m FM 50 watt mobile transceiver with AM air band Rx</td>
<td>£249.95</td>
</tr>
<tr>
<td>ALINCO DR-430E</td>
<td>70cms FM 35 watt mobile transceiver</td>
<td>£249.95</td>
</tr>
<tr>
<td>ALINCO DRM-06T</td>
<td>6m 10 watt FM mobile transceiver</td>
<td>£299.95</td>
</tr>
<tr>
<td>ALINCO DX-70HP</td>
<td>(100 watt continuous) HF and 6m transceiver</td>
<td>£299.95</td>
</tr>
<tr>
<td>ALINCO DJ-180</td>
<td>2m FM hand held transceiver with nicad and charger</td>
<td>£124.49</td>
</tr>
<tr>
<td>ALINCO DJS-41C</td>
<td>UHF mini hand held transceiver</td>
<td>£124.49</td>
</tr>
</tbody>
</table>

All transceivers modified for extended coverage.
Mike Richards G4WNC looks at software for the Amiga computer, the Internet Radio Guide and has details of the BARTG rally.

I you’re into computing or the data modes in general, then there’s one rally in the season that you really should make a point of visiting. The British Amateur Radio Teledata Group (BARTG) has been around for a long time now and has evolved from the days of electromechanical teleprinters and now deals with a wide range of data oriented transmissions systems.

The BARTG members have been running an annual rally around September time for many years and this now attracts not only a wide range of communications enthusiasts, but a complementary group of traders specialising in products that are of particular interest to the data community. Consequently, the BARTG rally is always well worth a visit.

As an added bonus for this year, BARTG are introducing what they have called DataStream ’97. This is a series of lectures covering various aspects of datacomms in amateur radio. DataStream ’97 looks set to be very interesting and the provisional list of topics includes: Datacomms for Beginners; Radio Data Comms; Advanced Data Comms and a Q & A session. If I’ve convinced you to go, the date to note is Sunday September 14 at Sandown Park Racecourse, Esher, Surrey. I don’t yet have the start time but it’s usually around 10am if you have Internet access you can find out more at BARTG’s Web site which is at: http://www.bartg.demon.co.uk

Amiga Software

I often get requests to provide details of where readers can get software for computers other than the common PC. And, this month it’s the turn of the Amiga. This is because I’ve just received details of a whole range of radio related software from Jim Prestoe of Priory Software in Hangerford. Jim offers a range of 32 programs for the Amiga OS2 or above, but PAL only. Among these are 11 radio related packages, many of which are specialist database applications covering such areas as aircraft callsigns, observations, selcalcs, radio log book, scanner frequencies and a QSL database.

For the data enthusiast there’s a RTTY data processor and a Weather decoder. The latter program takes the ASCII output of a stand-alone decoder such as the PK-232 series and converts coded weather broadcasts into plain language. This can provide valuable data on the likely propagation conditions and is particularly handy for spotting v.h.f./u.h.f. lifts in the summer months.

If you have an Amiga and would like more details on the products from Priory, I suggest you send an s.a.e. to Jim at 7 The Priory, 137 Priory Road, Hungerford, Berks RG17 0AP.

Internet Radio Guide

The latest book to arrive on my doorstep is the 1997 edition of the Klingenfuss Internet Radio Guide. This 488 page book provides a host of valuable information for any radio enthusiast who has Internet access. In this age of ‘paperless’ communication with the Web, offering the answer to all your information needs, you may be wondering why anyone should want a book to navigate the Internet! However, once you’ve acquired some experience of using the Web, you will soon discover that using the Web based search engines to find specialist information is something of a black art.

All too often you’re faced with having to scroll through screen after screen of irrelevant information just to find the odd gem. This whole process becomes unworkable if the server has a slow response. The answer is to revert to the technology we know and love and get the book!

The Klingenfuss book is really very comprehensive and covers all aspects of radio and related services. Rather than just provide the URL for the site, the guide is packed with screen dumps of various home pages. While this considerably increases the size of the book, it does make it infinitely more useful as you can make a much better judgement as to whether or not the site is likely to be of interest. To give you an example of the coverage, the Amateur Radio section was approximately 41 pages and covered businesses, clubs in general and finally special interest groups. Within this there were sample pages from over 36 different countries!

In addition to providing good amateur radio coverage there were sections covering Aviation, Radio equipment, Geography, Intelligence, Navigation, Press, Radio Clubs, Radio stations, Satellites and Solar/Geophysical data to name but a few. I must admit I’ve found the guide to be very useful as it can save a lot of on-line time when you’re trying to locate specialist information.

The 1997 Internet Radio Guide costs £21 plus P&P and is available from the PV Book Service. My thanks to Joerg Klingenfuss for supplying the review copy.

New Propagation Tool

I’m always on the look-out for new and unusual radio related programs and the latest to come my way is a very neat short-range r.f. propagation tool. The program is Windows based and operates comfortably on a Windows 3.1 based PC.

The program makes excellent use of graphics to show exactly what has been taken into account with the various calculations. Although the program has been primarily designed for dealing with low power short-range links, it looks as though it could be useful for v.h.f. and u.h.f. links.

The program comes without a manual, but there is a very good use of graphics to show exactly what has been taken into account with the various calculations. Although the program has been primarily designed for dealing with low power short-range links, it looks as though it could be useful for v.h.f. and u.h.f. links.

The program comes without a manual, but there is a very good Windows help file that takes you through the various adjustable parameters. To get your copy from the Internet you need to visit one of the many simtelnet mirrors - a specific example being sunsite.doc.ic.ac.uk/Mirrors/simtelnet/win3/ham/rfr ap.zip please!

I'm afraid that's all I've got room for this month, so until next time happy computing and keep your letters coming to me Mike Richards G4WNC at PO Box 1863, Ringwood, Hants BH24 2DD or E-mail me at mike.richards@dial.pipex.com Don't forget you can also visit my Web site at http://dialspace.dial.pipex.com/mike.richards/
**SEMANTH VHF/UHF DIGITAL SIGNAL STRENGTH METER**

- Coverage 470-862MHz, 15-110MHz
- Optional coverage 450-900MHz to order
- Powers masters amplifiers 12V @ 75mA
- Automatic short circuit detection
- Three ranges 0-30V DC (10V/500mV/5mV)
- 30VDC - 1mV/600mV/1mV - 5mV
- (75mV/DIV)

£349.00

- Internal needle charging system with integral charger
- Low battery warning circuit
- Illuminated meter movement
- Internal audio speaker
- AM/FM sound monitoring
- Complete with carrying case

**AERIAL TECHNIQUES**

105-50 MANUALLY TUNED SATELLITE RECEIVER

Full communications facilities such as variable E/S bandwidth from 300kHz down to a very narrow 100kHz variable audio switching for D/L band, 16/13 LSB options.

£19.90 inclusive of VAT.

DELIUE MODEL, fitted with Threshold Antennas SRCS (1K), allows tuning to between 3-4K, variable and adjustable, a must for very weak signals, fixed AVI/125Hz etc.

£29.95 inclusive of VAT.

**G6XBH G1RAS G8UUS**

VISIT YOUR LOCAL EMPORIUM

Large selection of New/Used Equipment on Show

AGENTS FOR: YAESU • ICOM • KENWOOD • ALINCO Accessories, ReVex/Diamond range of SWR/PWL, Adorison Mics, Mutek products, Scorence equipment, MFJ products.

**SPECIAL OFFER IN ALL TYPES OF MASTS**

- £150 Microreceiver & BIT/S Filter, SEM Products •
- Full range of Scanning Receivers •
- AERIALS, Tonna, Mapro, plus full range of base/mobile antennas

BRING YOUR S/H EQUIPMENT IN FOR SALE

J.B. BIRKETT

SUPPLIERS OF ELECTRONIC COMPONENTS

AIRSPACED VARIABLE CAPACITORS

3" variable 100-300pF £2.50
2.2mF 5% Tolerance £3.50
10nF £3.75 (if ordered in packs)
220pF £1.75
PERMANENT TRANSFORMERS

500v 100VA £25.00
300v 30VA £20.00
100v 15VA £15.00
100v 10VA £10.00
BATTERY CHARGERS

12V-24V 1.5A £20.00
12V-24V 2A £25.00
12V-24V 2.5A £30.00
24V-48V 1.5A £40.00
24V-48V 2A £45.00
24V-48V 2.5A £50.00
120V-220V 1.5A £55.00
120V-220V 2A £60.00
120V-220V 2.5A £65.00
BATTERY CRAMPS

12V-24V 1A £20.00
24V-48V 1A £25.00
24V-48V 2A £30.00
500-600W 5A £35.00
500-600W 8A £55.00
500-600W 10A £70.00
100-120V 1A £25.00
100-120V 2A £40.00
100-120V 3A £55.00
Power Supplies for Shop or Home

**COMPREHENSIVE CATALOGUE**

Features all the usual popular specialist products, together with many new items, Satellite, Satellite-S, TV's, VCR's, Converters, Decoders, Amplifiers and Aerials.

**AERIAL TECHNIQUES**

11 Kent Road, Parkstone, Poole, Dorset BH12 2EH

Tel: 01202-738232 Fax: 01202-716951

**DEMODULATORS FOR JVFAX HAMCOMM**

PKTMON12 DL4SAW SSTV & POCSAG

THE ORIGINAL RECEIVE ONLY with 25 way 'D' type £16.99

POCSAG RECEIVE version (as above, with variable hysteresis) £19.99

TRANSMIT version (Pocsag Rx + Fax/SSTV/HamCOMM)

PKTMON12 DL4SAW SSTV & POCSAG

£41.16

- Adjustable, a must for very weak
- Switching for C/Ku band. 14}18v

- NB to a very narrow 12M92. Variable audio
- Switchable I.F. bandwidth from 2664Hz down
- 500µV - 1mV (300Hz BW, 500µV)
- 5mA Automatic short circuit detection
- Powers masthead amplifiers 12V @ 75mA
- Complete with carrying case

**R.A.S. NOTTINGHAM**

£27.50 12.75

- Send SAE for CATALOGUE of AMATEUR KITS and BUILT UNITS

**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 to our own projects, including building televisions, radios or electronic equipment.
3. All letters asking for advice must be accompanied by a stamped self-addressed envelope (or envelope plus E10 for returns)
4. Make sure you describe the problem adequately, with as much detail as you possibly can
5. Only one problem per letter please.

**BACK NUMBERS**

Limited stocks of many issues of PW for past years are available at £2.50 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 designs, to commercial radio. Information, specifications and their cost can be obtained from the Editorial Offices at Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW.

BENDERS

PW can provide a choice of bendings for readers' use. Plain blue bendings are available, each holding 12 issues of any similar A format magazine.

Alternatively, we can provide bendings embossed with the PW logo in silver can be supplied. The price for either type of bending is £2.50 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.

**MAIL ORDER**

All items from PW are available Mail Order, either by post or using the 24hr Mail Order Hotline (01202) 650950.

Payments should be by cheque, postal order, or money order or credit card (Mastercard and Visa only). All payments must be in sterling and cheques must be drawn on a London Clearing Bank.
**Please use a Form from a previous issue to send your ad in or write it neatly on a postcard.**

Looking for Johns modules x2 (14x4MHz), 17x140MHz, 17x140, x25 (mixer, demod etc.), 50x (Yagis, antennas), any info is very welcome. Jean Pierre Verbo, MA 01514, USA. Tel: 01 (301) 202 0255.

Motorine hand-held transceiver, John GBY Yorke, Netley. Tel: 01263 643228/82.

Owner's handbook for manual to Yanke FRG-7, also needs orpen for same. Tel: Mrs. Potte, Preston. 01706 246655.

Please Keylog D type 706 PMT, also includes service manual and QSL cards. Also MM512 and any additions to my collection, by write only. Tel: Mr. Allister, Knighton. 01767 432965.

reserved twin-axle trailer. Some spare parts of call a machine with proven results, 7 inch quad type speaker. 350W large speaker. Other offers, personal acquaintance considered.

Phone contact Bob 605027/FW for pay.

Service transceiver diagram for PMT evolution model now type 140MHz bug in box set. Canafax Electronics, Bilston, Westmid. Tel: 01384 202740.

**Please use a Form from a previous issue to send your ad in or write it neatly on a postcard.**

Sprinter M300 (pod) and power supply, 665W, battery, adapter. Tuxedo key with matching morse and all original packaging, please look for its lost in engrave. Many thanks. Post Office. Barry. 01246 723012. Tel: 0151 945 7852.

**Please use a Form from a previous issue to send your ad in or write it neatly on a postcard.**

TRIO FRD-BW59 transmitter for spares or spares and soldering iron. £50 Croydon. Tel: 0181 248 3262.

**Please use a Form from a previous issue to send your ad in or write it neatly on a postcard.**

WANTED

- 6M (NH10) converter FT-200X to Yaesu FT-2600.
- PA model MA06 (ex Arica 201) to Nippon ICOM IC-751.
- Two watt linear. Tel: 01371 631748.

**Please use a Form from a previous issue to send your ad in or write it neatly on a postcard.**

YMM 14W in or write.

**Please use a Form from a previous issue to send your ad in or write it neatly on a postcard.**

WANTED

- 6M (NH10) converter FT-200X to Yaesu FT-2600. Paul MA06. Wimborne. Tel: 01305 331340 evenings please.
- 454ab 4.12 tent, Kobata 4555 10K. Tel: 01 (70) 331340 evenings please.
- 454ab 4.12 tent, Kobata 4555 10K. Tel: 01 (70) 331340 evenings please.
- Sometimes SW key. £228. Ben, TS RI. 05. BE201. Offer. GRC-9 PM. £221. Tel: 0181-923 58145.
- Pans, key, transceiver for FT-225 in or write. £350. Tel: 01.81-54 2612.
- Motorised dish LNB and cable. etcetera value. Tel: 01901567665.
- Phase cured Ruh 03XFD PW.
The British Amateur Radio Teledata Group (BARTG) have recently announced details of their 1997 Rally. The rally will be held on Sandown Racecourse, Esher, Surrey.

The BARTG 1997 rally will follow the proven and popular format of previous BARTG rallies and will have one major difference. This is the addition of DataStream '97. DataStream '97 is a series of lectures covering various aspects of digital systems in Amateur Radio. The provisional list of topics includes; DataComms for beginners, Satellite DataComms, Advanced DataComms and a Question and Answer session. Further details on the BARTG 1997 rally can be obtained from the newly appointed Membership Secretary Bill McGill GODXB at 14 Farquahar Road, Maltby, Rotherham, South Yorkshire S6 7PD.

Receiving You

Some of you may have read in recent issues of PWin 'Receiving You', letters from Mr. Charlton GM0DF, regarding password access to the BBS, and several related subjects. Without wishing to revive any correspondence again, I received a telephone call from an amateur who enlightened me on one particular item.

It was stated in the correspondence from Mr Charlton that a certain BBS was demanding payment before allowing access. This is not a correct thing to do, and in fact the Radiocommunications Agency could take action over this. This is not a correct thing to do, and that a certain BBS was demanding and donations, if offered, are consuming and expensive thing to do if this is indeed the case.

In the last year we have seen a number of changes in the packet world. The Gloucestershire Gloucester Repeater Group newsletter giving updates for all Gloucestershire Gloucester Repeater Group and money.

Gloucestershire Repeater Group

An example of successful repeater group dedication comes from the Gloucestershire Repeater Group. They issue a quarterly newsletter giving updates for all their repeaters, voice and packet.

Contrary to my previous 'gloom and doom', the Gloucestershire group have continued to increase membership throughout the year, resulting in a significant increase in income. This will allow a continuing program of improvement to links and new links where needed. All this is going to need a lot of co-operation, and money.

Bandplan Changes

Changes in the 144MHz band plan will be announced soon. This will mean a change for most, not just for a few amateurs. The way things have moved and other changes will also take place.

Concern has already been expressed by RAYNET, in that ORM might be inadvisable unless something is sorted before the actual date. Obviously these changes will take time to accomplish and new crystals will have to be purchased.

Packet co-operation will be necessary in order to make the change as smooth as possible. The following is an excerpt from a letter received from Alan G8HIG. Alan says: "I am an ordinary packet user and ordinary RAYNET member. Through the RAYNET channels I am advised that they will need to change frequency and that a new local national plan will be needed to avoid adjacent groups having the same channel."

"All seems sensible until it says that this will take some time and will be implemented some time after July 97. Whilst RAYNET do not have prior right of access to any channel, i.e. essentially first come first served, groups are not to look to QSY willy-nilly. Should a non-emergency wish to use .800, .825 or .850 arise when the channel happens to be busy (voice) then we ask. If rejected we will go elsewhere between .775 and .850. With Packet in .800 up that is potentially 3/4 of the groups affected. In practical terms they do not have a clear patch to QSY to at that time. I foresee a period of time of confusion and irritation".

Thanks for your comments Andy and I too hope that common sense will prevail and this will take place amicably.

Well that's all for this time and don't forget keep your news and pictures coming in for this section. News can be sent to me via Internet at mtyler@uk.mdis.com or you can telephone me on (01508) 570728 or send things to QTHR.
What’s the future of Radio Australia? Are audience figures up for the BBC World Service? Read on and Peter Shore will explain all.

As this edition of Practical Wireless goes to press, Albania is gripped by what could prove to be the start of a fresh revolution, or worse still, civil war. The government has cut the Albanian peoples’ easy access to news and information on radio by switching off the f.m. relays of both the BBC World Service and Voice of America.

In response, transmissions in Albanian have been stepped up on other bands by both broadcasters in an effort to maintain the information flow. The BBC World Service is now transmitting on short wave at 1415UTC (previously only on f.m.) as well as 0630 and 1800. The evening broadcast now lasts 45 minutes instead of 30 minutes.

Voice of America has put its two half-hour Albanian programmes at 0800 and 1700UTC on to its medium wave transmitter at Kavala, Greece which operates on 792kHz.

First-Hand Knowledge

Listeners wanting to get first-hand knowledge of events in the troubled country can try tuning to Radio Tirana, but it’s going to be a censored, one-sided story since the station is, as I write this, still in the hands of the Berisha government. English from the Albanian station can be heard in Europe daily at 1715 to 1730UTC on 6.185 and 7.155MHz.

Also, there is a 30-minute transmission at 1930UTC on 6.27 and 7.27MHz short wave, plus 1458kHz medium wave. If you want to try and contact the station, the telephone number is +355 42 23239 and the FAX is +355 42 27745.

Radio Australia

In Australia, the government Foreign Affairs, Defence and Trade References Committee is due to report by 14 May its findings into the future of Radio Australia. The Committee has been charged with looking at, amongst other areas, what contribution the Australian international radio station makes to Australia’s foreign policy and trade interests.

We will bring you the details of the Committee’s report in this column. Watch this space!

Stopped Satellites

Radio Korea International has stopped using World Radio Network’s satellite services to reach listeners. It is now using short wave only. Tune in Europe at: 0800-0930 on 7.55 and 13.87, 1830-1900 on 3.995; 1900-2000 on 5.975 and 7.275, 1930-2000 on 3.97 and 2100-2200 on 6.48 and 15.575MHz.

North Korea is becoming difficult to hear as some of its transmissions from Radio Pyongyang just don’t come on the air. Some reports suggest this is because of acute power shortages in the country, but there is no firm evidence to support this theory.


New Service

There is a new service on WRN. The station CANA Radio, part of the Caribbean News Agency, has a 15-minute programme weekdays at 1700UTC on WRN’s European service which is carried via Astra. It brings a round-up of news from the censored and, unless you are lucky enough to catch a medium wave signal from the region, is likely to be the only way of hearing news from the Caribbean.

West Coast Radio in Ireland has moved its European broadcast from Thursday to Saturday. Listeners can tune in at 1500UTC for an hour-long programme on 5.975MHz via the Deutsche Telekom transmitters.

Audience Figures Up

The BBC World Service has announced that its latest compilation of audience research gives it a regular weekly audience of 143 million people. Of that, some 26 million listen to the English World Service (with a remarkable 1.3 million weekly audience reach in the UK), and the balance tune to the other 44 languages which are broadcast from Bush House in central London.

For the first time the BBC’s figures include parts of China, previously a closed book for BBC researchers. Ten cities covering an adult population of 29 million were surveyed for the first time last year.

Diverting Funds

As part of its ongoing restructuring, NHK World is diverting funds from its international radio service to television. This means less resources for programmes on the global radio service, and some shows are being axed, including the weekly Media Round-up programme.

Brunei Going International?

You may have seen the advertisements for the Royal Brunei airline, soon there may be a chance to hear Brunei radio after an absence of many years. A report by Glenn Hauser’s World of Radio programme says that an international short wave service is planned.

It could be some time before the tiny Asian country gets back on the air, as transmitters are needed. We’ll keep you posted.

Station News

Monitor Radio International, the short wave broadcasting arm of the Christian Science Monitor newspaper, broadcasts in English to Europe: 0400-1000 on 7.555, 0600-

0900 on 15.665; 1600-1800 on 15.715; 1800-2200 on 13.77 and 15.665 and 2200-2400 on 13.77MHz.

Radio Norway International’s weekly English-language programme is heard on Sundays at: 0600 on 7.17, 7.295, 9.59 and 13.805; 0700 on 15.245; 0800 on 15.17; 0900 on 13.80 and 15.17; 1200 on 9.59, 13.80, 13.805 and 15.605; 1500 on 9.98 and 11.84, 1800 on 7.485, 9.59 and 15.22MHz plus 1314kHz medium wave 2260 on 8.405MHz.

The Norwegian short wave station at Fredrikstad is being dismantled, which means all programmes now come from the 50kW transmitters at Sveio and Kvitsoy. The NRK had hoped to be able to hire out the Fredrikstad short wave transmitters to broadcasters, but had no response.

Travel north-east from Fredrikstad and you’ll come to Iceland. But wherever you are you can hear news from the northern island nation on short wave.

Tune in at 1215-1300 or 1410-1440 on 13.86 and 11.102MHz, both upper sideband, and then at 1855-1930 on 9.275 and 7.735MHz (also u.s.b.), and finally at 2300-2335 on 11.402 and 9.275MHz (again in u.s.b.).

Strange Transmissions

If you have heard strange transmissions in the middle of the European night, it might well come from the HAARP atmospheric and propagation research centre in Alaska. HAARP has been testing at 0430 on 6.95MHz and at 0450 on 3.30MHz with a plain carrier signal and then five minutes of Morse code.

The station welcomes reports at HAARP Test, PO Box 271, Gakona, Alaska 99753, USA.

That's all I have for you this month. Keep listening to the world’s broadcasters, and let me know of any interesting discoveries you make.

END
**For Sale**

**TECHNICAL MANUALS**
SSE list, Benley, 27 De Vere Gardens, Ilford, Essex IG1 3EB. Tel: 0181-554 6631.

**RF-8000 24 BAND RECEIVER**
reasonable offer accepted. Quartz crystals large range £1.00 each. Collection quartz V. bars. Also Valves. List available. Electronic Design Associates 0181-391 0545 Fax 0181-391 5258.

**THE UK'S LARGEST SOURCE FOR Vintage Service data, circuits and manuals from 1900 to 1997.**
Free brochure from Tudor Gillvilliam-Rees, Savoy Hill Publications, 50 Maddon St, Bledford, The Little White Town, North Devon, EX39 2EO. Tel: 01237 422480.
E-mail: tudor.gillvilliam-rees@virgin.net

**INTERESTED in vintage Radio?** Send SSE for latest list of books and components. Old Time Supplies, PO Box 209, Banbury, Oxon OX16 7GR.

**Miscellaneous**

**VALVE ENTHUSIASTS:** Capacitors and other parts at attractive prices! Ring for free list. Geoff Davies (Radio), Tel: 01778 574774.

**Receivers**

**B.F.O. KITS**
Resolves single side-band on almost any radio, £16.49. H. CORRIGAN, 7 York Street, Ayr KA8 8AR.

**Holidays**

**NORTH WALES HOLIDAYS**
Caravan - houseboat - camping. Elevated rural site, two miles from beach, use of shack and antennas. Open all year. Tynrhos, Mynytho, Pwllheli.

**CRETE HOLIDAYS**
7 studios 20m from beach. Use of shack and antennas. Open from 14/4/97 to 31/10/97. Please contact: SV9 ANJ (ORA Manos), PO Box 1272, 71110 Iraklion, Crete, Greece. Tel: 0030 81 761288/762000 Fax: 0030 81 761382. E-mail: pelamar@her.forthnet.gr.

**Classified Ads**

To advertise on this page see booking form below.

**Valves**

**VALVES GALORE**
Most valves available from stock. Otherwise obtained quickly. Please send SSE stating requirements or telephone. VALVE & ELECTRONIC SUPPLIES Chevet Books, 157 Dickson Road, Blackpool FY1 2EU.
Tel: (01253) 751658 or Fax: (01253) 302979.

**VALVES WANTED for cash:**
K788 £48; PX4, PX5 £50; DA100 £90; EL34 £10; EL37 £9; CV4004 £5; ECC83 £3. Valves must be Mullard/GEC. West European to achieve the price. Ask for our free wanted list. Prompt and courteous service. Visitors by appointment only (we are a very busy Export Warehouse).
Billington Export Ltd, Billingshurst, West Sussex RH14 5EC.
Tel: (01403) 786961. Fax: (01403) 783519.

**VALVES:**
OVER 5000 STOCKED Ham. Vintage, Military, Audio. SSE for FREE list to: Wilson Valves, Ulm Fish G4MHI, 28 Banks Ave., Golcar, Huddersfield, West Yorks HD7 4LZ.
Tel: 01484 654659. Fax: 01484 655699. Visa etc. Fast & personal service.

**TOP PRICES PAID**
for all your valves, tubes, semi-conductors and ICs.

Langrex Supplies Ltd.
1 Mayo Road, Crownin
Surrey CR0 2GP.
Tel: 0181-684 1166. Fax: 0181-684 3056.

**Situations Vacant**

**BBC MONITORING**
Caversham Park
Technical Operator, Resources Department.
Starting salary c. £14,000 pa
+ additional payments for shift working.

BBC Monitoring, which is part of the World Service, provides news and information from the world's media to BBC journalists as well as official and commercial customers.

Technical Operations is the Resources section responsible for the research and reception of all voice, radio telegraphy and satellite transmissions of interest to us, and the provision of operational services to the BBC documentary and World Services.

The successful applicant must have substantial previous experience in the operation of receiving equipment, gained either in a professional or advanced amateur capacity. You should be fully conversant with modern receiver techniques, antenna configurations and propagation modes, including those allocated to satellite transmissions.

This is a shift-working job, including nights and weekends.

For further information and an application form, please telephone Julie Richards, Personnel Assistant, on 01189 469212, during office hours.

Completed application forms to be returned by 17th April 1997.

BBC Monitoring is committed to implementing the Corporation's policy on Equal Opportunities, including Fair Selection.

**Computer Software & Hardware**

**HARD TO FIND SPECIALISED AND UNUSUAL PC SOFTWARE**
We have the largest range of specialised technical, scientific and rare programs for DOS and Windows in Europe, on CD ROM or floppy disk.
100s of programs in 26+ categories including Electronics, Radio, Audio, Maths, Chemistry, Music, Education, Engineering etc.

SEND SAE TO: FREE PRINTED CATALOGUE OF 4000+ ITEMS.

FSDL Dept F/1, Windmill House, Station Rd, Crowborough, Sussex, TN6 1UL.
Tel: 01892 663298 Fax: 01892 667473.

**JVFAX/STSV, HAMCOMM, PKTMON**
9FD/25FD Tw2Tx interface, programs, manuals, pictures, £29.95. Other SSTV/packet services.
9FD/25FD Tx/Rx interface, programs, manuals, £169 + PP + VAT.

**INSTRUCTOR MORSO PROFESSIONAL**
The complete Morse Code software training package for beginners and advanced users. As used by the US Military, Canadian Military and the British Military! Price £169 + PP + VAT. Tel: 01526 830042.
E-mail: lmorse@adesign.demon.co.uk

**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.

Whilst prices of goods shown in advertisements are correct at the time of going to press, readers are advised to check both prices and availability of goods with the advertiser before ordering from non-current issues of the magazine.

Please mention Practical Wireless when replying to advertisements.
**ORDER FORM FOR CLASSIFIED ADS**

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 3cm). Please add 17.5% VAT to the total. All cheques, postal orders, etc., to be made payable to PW Publishing Ltd. 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... Please photocopy this form if you prefer

**THE VINTAGE WIRELESS LISTING**

New published every three months containing 100's of out of print old and collectable wireless and 10 books and magazines and now incorporating "The Vintage Hardware list" that contains for sale - vintage domestic radioins, communications receivers, audio equipment, valves, vintage components etc. Send six first class stamps for hot 06.10 or 45 for next four catalogues.

**NEW BOOKS**

Valve Communications Receiver Handbook. Contains circuits and technical information for valve communications receivers both commercial and of military origins. 1948 - 1960, incorporates a complete commercial cross-referenced valve guide. Large format. Approx 300 pages. £15.50 plus 5% VAT to total.

**VINTAGE WIRELESS COMPONENTS**

2 gang 0.0005uF tuning caps. Standard size, made by Jacksons. £3.95 each, (dip, 42p).

1 watt Carbon Resistors. Useful value. Pack of 50 worth £2.50. Also £1.50 per 50.

**LAKE ELECTRONICS**

For Complete Kits with All the Bits! Transmitters, Receivers, Test Equipment.

7 Middleton Close, Nuthall, Nottingham NG16 1BX
Tel/Fax: 0115-938 2509
E-mail: 100775.2300@compuserve.com

**YAESU, ICOM, AOR etc.**

SALE & SERVICE Holdings of Made in Ltd. etc. 1972. Home office and sales agents since 1972. QSL always in electronics. Best prices for callers (try us with cheque or "pay money" if you want to bargain) only cash and we will pay you so we can add the best to our good prices - various and MF keys for all Hamming.

GILL HOMERIG, AUTOMAT ELECTRONICS
43 JOHNSTON STREET, BLACKBURN, BB1 3T
01254 59595

**MARTIN LYNCH & Son**

THE AMATEUR RADIOD EXCHANGE CENTRE

NewsFlash

International Marconi Day

At the shop 9am - 5pm 19th April

Be there!
# Subscription Rates

**PRACTICAL WIRELESS – 1 YEAR**
- £25.00 (UK)
- £30.00 (Europe 1st class)
- £32 (Rest of World Airsaver)
- £37 (Rest of World Airmail)

**SPECIAL JOINT SUBSCRIPTION PAGE 20**
- Practical Wireless & Short Wave Magazine 6 MONTH TRIAL
  - £20 (UK)
  - £21 (Europe Airmail)
  - £29 (Rest of World Airsaver)
  - £35 (Rest of World Airmail)

Please start my subscription with the [issue].

**For Books**
- [Please send me] [copy(ies) of The Radio Amateurs’ Question & Answer Manual for £13.95 Inc. P&P (UK only), £15.95 Inc P&P (overseas).]

**Postal Charges:**
- £1 for one, £2 for two or more (UK).
- £2 per book or £10 for five books or more (overseas surface).
- £2 per binder (overseas surface).

**NEW FASTER NEXT DAY SERVICE (UK MAINLAND ONLY)**
- £4 per parcel (orders must be placed by 12 noon)

**Grand Total**

Now fill in your name and address.

---

**Last Minute Revision?**

*The Radio Amateurs’ Question & Answer Reference Manual*

With the May Radio Amateur Examinations looming you may well be looking for a book to help you with that last minute revision, so we have just the thing. The Radio Amateurs’ Question & Answer Reference Manual by Ray Perri GOAT although specifically aimed at students taking the City & Guilds ‘Radio Amateurs’ Examinations also contains material suitable for C&G ‘Electronics Servicing’ and BTEC ‘Radio N’ and ‘Electrical and Electronics Principles N’. Within its 388 or so pages this book contains a wealth of information which includes over 1240 multiple choice questions. Also included are a number of useful radio data charts.

So, whether you are about to sit your radio amateur’s exam or are involved in technical study or just need a good reference book, the Radio Amateurs’ Question & Answer Reference Manual is a must for your bookshelf. If you order this month you will save on the postage costs as we’re offering the Radio Amateurs’ Question & Answer Reference Manual at the special price of £13.95 including P&P (UK only, overseas readers please add £2 for P&P).

**Offer open until 9 May 1997**

To order your copy of this essential reference book please use the order form above or call the Credit Card Hotline on (01202) 659930 and quote PW5.
SPECIAL FEATURE!
- On board the semi-submersible
  Beringia Dolphin with G4VPH

REVIEWED!
- NRD-345 Aerial Antenna Tuner
  Extender
- Kenwood TH-236E V.H.F. Hand-
  Held Transceiver
- Alins DX-701 Commercial V.H.
  F. Transceiver

CONTEST RULES!
- The 15th PW 144 MHz QRP
  Contest Rules

BUILD!
- A Spectrum Wave meter

COMPETITIONS!
- Win Tickets to the Royal
  International Air Tattoo
- Win The MyBe Multi-trap
  Antenna as reviewed by
  G3RBC in PW Dec '96

CAN YOU AFFORD TO MISS IT? - ON SALE 8 MAY 1997 - PLACE YOUR ORDER TODAY!

APRIL Airband Special
Joe Carr K4PV builds a VLF
Receiver - Part 1.
The CE Mark, confused? - John
Wilson explains all.
Godfrey Manning looks at
Airband Meteorology.
Gander Air Radio.
G3HEM's Helicopter Emergency
Service.

COMING UP IN MAY'S ISSUE
On Sale April 24
Exclusive: JRC's New NRD-345
under the microscope with
John Wilson.
Joe Carr has the second part
of the VLF Receiver.
ICOM IC-R10 - Reviewed by
Alan Gardener.
Magnetic Loop Antennas -
some theory with C.G.
Bennett.
Tom Read tells all about his
School DX Club.
Radio Secrets of the War -
U-Boat Tracking

PLUS REGULAR COLUMNS COVERING:
Frequency Exchange, Utility and Data Modes
Listening, WXSATs, Scanning,
Broadcast News and Logs and much much more....
**Index to Advertisers**

| A H Supplies | ... | ... | Howes, C, M | ... | ... | ... | Photo Acoustics | ... | ... | ... | ... |
| Aerial Techniques | ... | ... | Jem, UK | ... | ... | ... | Pyramid Electronics | ... | ... | ... | ... |
| AKD | ... | ... | J Birke | ... | ... | ... | RAS Notts | ... | ... | ... | ... |
| Chevet Supplies | ... | ... | Lake Electronics | ... | ... | ... | Robinson Marshall | ... | ... | ... | ... |
| Cirkit Distribution | ... | ... | Langrex Supplies | ... | ... | ... | RSGB | ... | ... | ... | ... |
| Datong Electronics | ... | ... | Martin Lynch & Son | ... | ... | ... | Short Wave Magazine | ... | ... | ... | ... |
| Eastern Communications | ... | ... | Mid West Lasers | ... | ... | ... | SMC | ... | ... | ... | ... |
| Electronuill | ... | ... | Monitoring Times | ... | ... | ... | Spectrum Communications | ... | ... | ... | ... |
| Essex Amateur Radio Society | ... | ... | Multicomm 2000 | ... | ... | ... | Sunrise Electronics | ... | ... | ... | ... |
| Fairhaven Electronics | ... | ... | NCT Enterprises | ... | ... | ... | Waters & Stanton | ... | ... | ... | ... |
| Hately Antennas | ... | ... | Nevada Communications | ... | ... | ... | Yaesu | ... | ... | ... | ... |
| Haydon Communication 21, 22/23 | ... | ... | P W Services | ... | ... | ... | ... | ... | ... | ... | ... |
| Holdings Amateur Radio | ... | ... | Pervisell | ... | ... | ... | ... | ... | ... | ... | ... |
To satisfy the world-wide demand for dual-band transceivers, ICOM have developed the IC-207H. This new style of transceiver avoids the high prices and difficult operative procedures that can be associated with dual-banders. The IC-207H is designed with selected dual-band features but at a single-band price.

Functions and features include; simple operation, detachable front panel for adaptable installation and improved security, tone-squelch fitted as standard, data terminal for PACKET operation, 180 memories, cloning (with CS-207 software), selectable output power and optional wireless mic. The IC-207H is a welcome addition to the ICOM range and will entice new users into the swelling ranks of dual-band operators.

WANT TO KNOW MORE? CONTACT YOUR LOCAL DEALER TODAY!

ICOM... manufacturers of top performing base-stations, mobiles, handheld transceivers and receivers. Icom (UK) Ltd. Sea Street Herne Bay Kent CT6 8LD. Telephone: 01227 741741. Fax: 01227 741742. INTERNET: http://www.icomuk.co.uk/ E-MAIL: icomsales@icomuk.co.uk.

Count on us!
Ultra Compact Dual Band Handheld FT-50R

One tough little dual bander!

Features

- Frequency Coverage
  - Wide Band Receive
  - RX: 76-200 MHz, 300-540 MHz, 590-999 MHz
  - TX: 144-146 MHz, 430-450 MHz
- AM Aircraft Receive
- MIL-STD 810 Rating
- Digital Coded Squelch (DCS)
- 128 Memory Channels
- 12V DC Direct Input
- High Speed Scanning
- Alphanumeric Display
- CTCSS Encode (Decode w/FT-72)
- Auto Range Transpond System™ (ARTS™)
- Dual Watch
- Direct FM
- High Audio Output
- ADMS-1C Windows™ Programmable
- Four Battery Savers:
  - Automatic Power-Off (APO)
  - Receive Battery Saver (RBS)
  - Selectable Power Output (SPO)
  - Transmit Battery Saver (TBS)
- Time Out Timer (TOT)
- 2.5 and 5 Watt Versions
- Available
- Optional Digital Voice Recording System (DVRS)
- Full line of accessories

Battery Voltage displays current operating battery voltage. Digital Coded Squelch (DCS) silently monitors busy channels. Auto Range Transpond System™ (ARTS™) uses DCS to allow two radios to track one another. And, the FT-50R is ADMS-1C Windows™ PC programming compatible, too. To round out the FT-50R, it has four battery savers, and super loud audio—remarkable in an HT this size.

A reliable companion wherever you go, the FT-50R is one tough little dual bander with all the features you want!

For the latest Yaesu news, hottest products, visit us on the Internet! http://www.yaesu.com

Yaesu FT-10/40R Ultra Compact Handhelds
VHF or UHF. Similar to FT-50R including MIL-STD 810, and other exclusive features.