TENNA TOURER SPECIAL OFFER

ICOM IC-706 MkIIIG
PUT TO THE TEST

OUT & ABOUT WITH
THE MFJ-9402

September 1999 £2.50
For The Very Latest Deals

www.waters-and-stanton.co.uk
Check our end of lines, special offers, secondhand list etc. Our Web Customers SAVE MONEY!!

**YAESU FT-1000MP**

*160 - 10m All Mode*

Super Discount Phone!

The radio that has stood the test of time and used by the worlds top DXers and Operators. Its excellent receiver combined with its superior transmitted signal makes this a natural choice for the HF enthusiasts. AC and DC versions in stock.

**IC-706IIIG**

*160 - 70cm All Mode*

Now available from stock, this rig is now the smallest all-band rig available. We have used it extensively and it is absolutely great. Read Radcom's in-depth review and then come to us for the best deal around.

**KENWOOD TS-570DG**

*160 - 10m All Mode*

Linear Amp UK “Ranger” HF Linear

160 - 10m 800W Output.

We are now stocking the full range of Linear Amp UK models, illustrated is the popular 811H 800Watt model covering 160-10m. Using low cost 811A tubes, it is economical to maintain, up to 9dB of gain is available to you! (Subject to UK 400W licence limit). This desktop model is a great investment and can immediately be switched in and out of circuit as required.
The IC-R75 has received rave reviews in the Amateur Radio Press. It's a very serious short wave receiver with coverage right up to 6m. What is more, the price is quite amazing compared to the competition. We have never sold so many SW receivers in quite a while!
Number ONE in Amateur Radio
Waters & Stanton

RF Metering
Avair AV-600 1.8 - 525MHz 400W
VSWR and power meter. Reads RMS and PEP. The ideal all-band VSWR meter. Reads up to 400W (3 ranges)
AV-20 / AV-40 Cross Needle
Cross needle meters at a very attractive price. The AV-20 covers 1.8 - 150MHz and the AV-40 covers 140 - 525MHz. Both units have switched power levels of 0.15 / 0.150W.

Watson VSWR / Power Meters.
Measure VSWR and RMS or PEP power. Large easy to read meter, 3 ranges, 2W, 20W and 200W.
W-220 1.8 - 200MHz £49.95
W-420 115 - 530MHz £49.95
W-620 1.8 - 525MHz £89.95

Audio Products
W-184 HF DX Headset
Selected by users as a great value headset for HF base operation. Comprises 8 Ohm dual headset unit with dynamic microphone. You just need to terminate the mic cable to a suitable connector. If you don't want to use MOX we can supply PTT box module complete for £42.95

WEP-501 Earpiece with adjustable boom
Now extensively used in the professional market. The boom is fully adjustable with rotation hinge that permits left or right fitting. Fits neatly over the ear. Fittings available for popular handhelds. Models available for Yaesu, Kenwood, Motorola.

HF Mobile Antenna
Texas Bugcatcher 80m - 10m 1.5kW 6dB of Gain!
From USA
We measured over 6dB of gain on 60m and 40m compared to a standard helical whip. The worst in the 3" diameter high "Q" air spaced loading coil. Measuring a little over 2m tall, it covers all HF bands using col tap positions. Standard 3/8" base fits all popular 3/8" mounts. Optional base matcher guarantees 1:1 VSWR whilst optional kit adds 6m coverage. Probably the most popular antenna in the USA "I was so impressed I installed one myself as illustrated - G3OJVM"

Base Station Fibre Glass
VU-2100 2m/70cm 2.5W 1.09m £28.95
W-30 2m/70cm 36dB 1.15m £35.95
W-50 2m/70cm 4.5/2.6dB 1.8m £45.95
W-300 2m/70cm 6.5/5dB 3.1m £59.95
W-5000 6m/50cm 75mm £89.95

Mobile Antennas PL-259 base
W-285 2m 5/8th folded over base £14.95
W-77LS 2m/70cm 0.35m low profile £15.95
W-77HLS 2m/70cm 1.1m/3.5dB £24.95
W-7906 2m/70cm 5.68dB 1.5m £32.95
W-627 6m/270cm 1.8m £34.95

Mounts
W-3HM Hatch / Boot Mount £14.95
W-3CK 5m low loss cable kit £15.95
VH-UCH 8-10m/58 standard cable £18.95
WM&M Magnetic mount £10.95
WM&M 2N50 BNC window mount £12.95

Duplex / Triplexers
WD-25 HF/2m / 70cms designed for masthead mounting, SO-239 £24.95
WD-24 As above but for indoor use and fitted with common SO-239 and dual PL-259 £22.95
WD-24M As above but one output £24.95
MX-62 1.8 - 54/144-470MHz £39.95
MX-72 1.8 - 150-440MHz £32.95
MX-72W As above but with one "N" plug £35.95
VX-3000 6m / 2m/70cm Triplex £59.95
MC-3500 2m / 70cm/23cm Triplex £54.95

Motorola Talkabout 200
Licence FREE PMR-446
446MHz 500mA Handy
8 Channels
36 CTCSS Tones
3 x AA Cells Req'd.
Now you can use a 446MHz handheld without a licence. Ideal for a wide range of uses. The package provides everything you need for personal communications. Just add 3 x AA cells and you are on the air.

Motorola Super Searcher
10Hz - 3GHz
The Super Searcher is a frequency counter covering 10Hz - 3GHz with the ability to auto tune most AM/FM and loom handheld receivers. Supplied with internal ni-cad pack and AC charger.

Order Details on ins de Front Cover

(£ unless otherwise stated)

Peter Dodd, G3LDO says - "I could work all the DX I could hear" - "I had many contacts on 7MHz and 3.5MHz" - "The OT2 is an ideal antenna for someone who has a restricted size location" All quotes from Radio Today, July 1999 Copy of full review available.

This antenna is manufactured by a company who specialise in military designs. We stumbled across it by accident and were amazed at its performance. The response is flatish across the spectrum. Element length 6m, Boom 2m, weight 8.5Kg, Power 1kW PEP, (600W VHF)

Motorola Talkabout 200
Licence FREE PMR-446
446MHz 500mA Handy
8 Channels
36 CTCSS Tones
3 x AA Cells Req'd.
Now you can use a 446MHz handheld without a licence. Ideal for a wide range of uses. The package provides everything you need for personal communications. Just add 3 x AA cells and you are on the air.

Order Details on ins de Front Cover

(£ unless otherwise stated)
SEPTEMBER 1999 CONTENTS

14 READER'S DEALERS
Don't miss your chance to tell us all about that local dealer who you just couldn't do without! Practical Wireless are hoping to recruit readers to help locate all those dealers who provide them.

16 RADIO BASICS
This month Rob G3XFD describes and demonstrates how you can build yourself a very useful little multivibrator signal injector project - ideal for testing from audio frequency right up to high radio frequencies.

20 MFI-9402X REVIEW
Rob Manion G3XFD reviews the MFI-9402X 144MHz s.s.b. transceiver courtesy of Waters & Stanton and lets you inside a little secret with the PW Transmitting Tenna-Tourer - a mobile antenna mounting system.

25 LOOKING AT
This month Gordon King G4VFL takes a look at the frequency synthesizer which he has now employed in a high proportion of Amateur Radio equipment.

27 MODULATION & RIPPLE LEVEL METER
James Bent G4TFP describes how he built a 'Modulation & Ripple Level Meter' which he says will help you to make many measurements in Amateur Radio and general electronic design work.

30 RAE COURSE LISTING
It's that time of year again and the team here at Practical Wireless have done their best to bring you news of RAE, Novice RAE and Morse courses across the country. So, hook out those RAE textbooks which you bought all those months ago and not used, and get studying!

32 THE ICOM IC-706 MkIIIG REVIEW
Richard Newton 6L0195 takes a look at the IC-706 MkIIIG and says he likes its appearance and layout but wonders what he thought about its operation!

36 COUNTING UP FROM THE MILLENNIUM
The continuation of Rob Manion G3XFD's series. But don't forget that the New Year is right around the corner, and the laws and values of 1999 will be in place for the next 12 months.

38 I SPY WITH MY LITTLE SET
Ben Rock G4RXX writes about the 'Spy Set' - a set which, he claims, has been a fascination with many a collector and radio enthusiast for years.

44 THE PRACTICAL WAY
This month the Rev. George Dobbs 63111V describes what he says is a "Reliable and stable variable frequency oscillator".

49 ANTENNAS-IN-ACTION
This month Steve Hunt (Art Director) presents pages of antenna related news and views for you as well as some of your letters.

54 VALVE & VINTAGE
It's Phil Cadman G4JCP in charge of the 'Valve & Vintage' this month - and, resplendent in the shopkeeper's traditional sandy brown dustcoat, is a 1940s based valve he's holding in his hand!

58 RED SPRIDTES & BLUE JETS
Patrick Allery G83WE investigates the theory of Sporadic-E, the 'E-layers and the part played by 'Red Sprites' and 'Blue Jets'.

63 HOW TO CONTACT PW
If you ever wondered who you should contact with a particular query, think no longer! 'How To Contact PW' will have the answers.

REGULARS

7 KEYLINES

8 LETTERS

10 NEWS

46 BOOK PROFILES

59 COMING NEXT MONTH IN PW

62 BARGAIN BASEMENT

65 COMING NEXT MONTH IN SW

66 RADIO SCENE

80 BOOK STORE

83 SUBSCRIBE TO PW

66 Radioscape

Due to his moving house and the preparation of his own magazine, Chris Edmondson VK3CE was unable to prepare an 'Aussie Oracle' this month.

Multi-vibrator signal injector project...Page 16

Modulation and ripple level meter project...Page 27
TELEPHONE
SALES ON:
01
922
41
47
96
Ask for Dave
(G1LBE)
Open Mon-Fri
9.30-6.00pm.
Sat 9.30-4.00pm
WEB SITE
http://www.radioworld.com
E-mail
radio.world@virgin.net

There is NO CHARGE for using credit cards

WANTED
USED
EQUIPMENT
PX WELCOME
BEST PRICES PAID!

Please mention Practical Wireless when replying to advertisements

RADiOWORLD
(WEST MIDLANDS)
42 BROOK LANE
GREAT WYRLEY, WALSALL
WEST MIDLANDS WS6 6BQ
WE ARE 5 MINS AWAY FROM J11 M6

Main dealers for Alinco, Icom, Yaesu & Kenwood
Manufacturers warranty on all new equipment

TELEPHONE
SALES ON:
01
922
41
47
96
Ask for Dave
(G1LBE)
Open Mon-Fri
9.30 - 6.00pm.
Sat 9.30 - 4.00pm
WEB SITE
http://www.radioworld.com
E-mail
radio.world@virgin.net

There is NO CHARGE for using credit cards

WANTED
USED
EQUIPMENT
PX WELCOME
BEST PRICES PAID!

Please mention Practical Wireless when replying to advertisements

ICOM

Most of the Icom range will carry substantial discounts, ask for details.

IC-706G
HF 6m, 2m, 70cm
£999

IC-746
HF, 6m, 2m 100W, 100W, 100W with tuner built in.
£1395

IC-T8E
Triple banded, 5W output.
Military spec.
£299

IC-T22E
2m handie 5W.
£185

YAESU

FT-920AF
HF & 6m built-in tuner with FM & FREE AM/FM Filter.
£1199

FT-1000MP AC
Dual Receiver. Digital 100W Competition radio.
£2199

FT-VX 1R
VHF/UHF Handie. Micro small.
£POA

FT-847
The new mobile-base, DSP HF 2m-70cm 50MHz.
£499

FT-100
HF 6m/2m/70cm extra small mobile.
Information to follow.

KENWOOD

TS-780N
Still the only true DSP radio with TX/EQ N/R.
£1499

TS-570DG
Dedicated HF mobile-base DSP with built-in tuner.
£899

TM-G707
The new mobile package with features: High visibility display, 5-in-1 programme memory, memory name function, multiscan facility & built-in CTCSS.
£299

ALINCO

DX-70TH
HF/6M
£599

DR-M06
6M MOBILE 20W
£215

DR-140
2M Mobile 50W
£220

DR-430
Mobile 70cm
£220

DJ-G5
2M/70CM handie
£237

PRICE MATCH
Up to 5% extra discount may be available on selected items.

WE STOCK ALL ACCESSORIES FOR THE MAIN BRANDS DISCOUNTED BY 10%

Microphones - Icom
SM6 ohm, 8 pin, desk mic
£59

SM5 1.3/600 ohm selectable, 8 pin desk mic
£100

SM400 600ohm, 8 pin, deluxe desk mic
£180

Speakers - Icom
SP20 base station loudspeaker with audio filter
£125

SP1 base station loudspeaker
£65

Microphones - Kenwood
C-56A dual impedance desk mic internal preamp
£106

MC-80 electret desk mic with preamp
£65

MC-85 electret desk mic with preamp & compressor
£125

MC-90 desk mic for DSP transceivers
£169

Speakers - Kenwood
SP-23 station loudspeaker for TS-450/490/590
£162

SP-42 station loudspeaker for TS-950/990
£74.50

Yaesu FT-847 options

ATS-100 active tuning ant system
£224

FC-20 automatic ant tuner
£197

MD-100 A8X desk top mic
£99

YF-155C 455kHz/500Hz Collins Mechanical filter
£99

YF-1513 2.7kHz SSB filter Collins Mechanical
£99

We also stock all makes of antennas:- Cushcraft, Diamond, Sirio, Watson, Pro-Am, etc.

Practical Wireless, September 1999
<table>
<thead>
<tr>
<th>MAKE</th>
<th>MODEL</th>
<th>PRICE</th>
<th>MAKE</th>
<th>MODEL</th>
<th>PRICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>AEA</td>
<td>PIC 232 MEX TERMINAL</td>
<td>£160.00</td>
<td>KENWOOD</td>
<td>TS-950SDX 2 YEARS AS NEW</td>
<td>£2,250.00</td>
</tr>
<tr>
<td>ALINCO</td>
<td>DR-140 2M FM</td>
<td>£150.00</td>
<td>MFJ</td>
<td>784B DSP FILTER</td>
<td>£140.00</td>
</tr>
<tr>
<td>ALINCO</td>
<td>DR-M06 5X 6M FM</td>
<td>£150.00</td>
<td>MFJ</td>
<td>784 TUNABLE DSP FILTER</td>
<td>£150.00</td>
</tr>
<tr>
<td>ALINCO</td>
<td>DR-M06 6M</td>
<td>£150.00</td>
<td>NETSET</td>
<td>PRO-2032 BASE SCANNER</td>
<td>£95.00</td>
</tr>
<tr>
<td>ALINCO</td>
<td>DX-70T 6M HF</td>
<td>£150.00</td>
<td>REALISTIC</td>
<td>DX 394 AS NEW HF</td>
<td>£90.00</td>
</tr>
<tr>
<td>AOR</td>
<td>AR-3000 BASE SCANNER</td>
<td>£200.00</td>
<td>REALISTIC</td>
<td>PRO-2045 BASE SCANNER</td>
<td>£120.00</td>
</tr>
<tr>
<td>DRAKE</td>
<td>SW8 RECEIVER WORLD BAND</td>
<td>£250.00</td>
<td>SGIC</td>
<td>230 SMART TUNER</td>
<td>£200.00</td>
</tr>
<tr>
<td>ICOM</td>
<td>PS-15 PSU 20 amp</td>
<td>£275.00</td>
<td>SGIC</td>
<td>2020 10W MULTI MODE HF</td>
<td>£225.00</td>
</tr>
<tr>
<td>ICOM</td>
<td>AT-190 AUTO ATU FOR THE IC-735</td>
<td>£325.00</td>
<td>UNIVERSAL</td>
<td>M-8000 TERMINAL</td>
<td>£500.00</td>
</tr>
<tr>
<td>ICOM</td>
<td>IC-X21ET DUAL BANDER 23/70CM HANDIE</td>
<td>£390.00</td>
<td>WELZ</td>
<td>SD 400 SWR METER</td>
<td>£49.95</td>
</tr>
<tr>
<td>ICOM</td>
<td>IC-T8E 2 m 70m &amp; 6m HANDIE</td>
<td>£150.00</td>
<td>YAESU</td>
<td>SP-8 SPEAKER for 1000MP etc</td>
<td>£50.00</td>
</tr>
<tr>
<td>ICOM</td>
<td>POR-1000 PLUS DSP</td>
<td>£200.00</td>
<td>YAESU</td>
<td>FT-10 HANDIE 2M</td>
<td>£100.00</td>
</tr>
<tr>
<td>ICOM</td>
<td>AT-500 ATU</td>
<td>£200.00</td>
<td>YAESU</td>
<td>FT-11 HANDIE 2M</td>
<td>£100.00</td>
</tr>
<tr>
<td>ICOM</td>
<td>IC-735 General Coverage</td>
<td>£225.00</td>
<td>YAESU</td>
<td>FT-10 2M HANDIE</td>
<td>£125.00</td>
</tr>
<tr>
<td>ICOM</td>
<td>IC-725 TRANSEIVER PLUS FM</td>
<td>£250.00</td>
<td>YAESU</td>
<td>FT-11 2M HANDIE</td>
<td>£140.00</td>
</tr>
<tr>
<td>ICOM</td>
<td>IC-735 TRANSEIVER</td>
<td>£250.00</td>
<td>YAESU</td>
<td>FC-20 ATU FOR FT-847</td>
<td>£175.00</td>
</tr>
<tr>
<td>ICOM</td>
<td>IC-275E 25W MULTI/MODE</td>
<td>£250.00</td>
<td>YAESU</td>
<td>FC-75T AUTO ATU</td>
<td>£175.00</td>
</tr>
<tr>
<td>ICOM</td>
<td>IC-706 MkI</td>
<td>£250.00</td>
<td>YAESU</td>
<td>FT-2700R DUAL BAND TRANSCEIVER</td>
<td>£175.00</td>
</tr>
<tr>
<td>ICOM</td>
<td>IC-706 BASE TRANS, INC TUNER 0-30MHz</td>
<td>£275.00</td>
<td>YAESU</td>
<td>FT-280R 2m Multi Mode</td>
<td>£195.00</td>
</tr>
<tr>
<td>ICOM</td>
<td>IC-275H 100W 2M MULTI MODE</td>
<td>£275.00</td>
<td>YAESU</td>
<td>FT-790R 70CM TRANSCEIVER</td>
<td>£200.00</td>
</tr>
<tr>
<td>ICOM</td>
<td>IC-706MK 11 DSP TRANSCEIVER</td>
<td>£275.00</td>
<td>YAESU</td>
<td>FT-3000M 2 METER 70W</td>
<td>£200.00</td>
</tr>
<tr>
<td>ICOM</td>
<td>IC-421 DUAL BAND BASE</td>
<td>£275.00</td>
<td>YAESU</td>
<td>FT-8000R DUAL BANDER</td>
<td>£225.00</td>
</tr>
<tr>
<td>ICOM</td>
<td>IC-2KL AMP + PSU 0-30MHz SOLID STATE</td>
<td>£275.00</td>
<td>YAESU</td>
<td>FT-61 R DUAL BAND HANDIE</td>
<td>£245.00</td>
</tr>
<tr>
<td>ICOM</td>
<td>IC-746 HF/VHF</td>
<td>£275.00</td>
<td>YAESU</td>
<td>FT-8100 R DUAL BANDER</td>
<td>£250.00</td>
</tr>
<tr>
<td>ICOM</td>
<td>IC-870M P/P WIDE RECEIVE 900MHZ</td>
<td>£275.00</td>
<td>YAESU</td>
<td>FT-8100 USED</td>
<td>£275.00</td>
</tr>
<tr>
<td>KANTRONICS</td>
<td>KPC-4 DUAL PORT TNC</td>
<td>£275.00</td>
<td>YAESU</td>
<td>FT-6200 DUAL BANDER 23/70 CM</td>
<td>£295.00</td>
</tr>
<tr>
<td>KANTRONICS</td>
<td>KAM PLUS TNC</td>
<td>£295.00</td>
<td>YAESU</td>
<td>G-1000SDK ROTATOR</td>
<td>£295.00</td>
</tr>
<tr>
<td>KENWOOD</td>
<td>TH-771 LATEST DUAL BAND HANDIE</td>
<td>£295.00</td>
<td>YAESU</td>
<td>FT-29R MK11 INC AMPLIFIER 25WATTS</td>
<td>£325.00</td>
</tr>
<tr>
<td>KENWOOD</td>
<td>TH-771 LATEST DUAL BAND HANDIE</td>
<td>£295.00</td>
<td>YAESU</td>
<td>FT-8500 Dual Band</td>
<td>£325.00</td>
</tr>
<tr>
<td>KENWOOD</td>
<td>TH-771 LATEST DUAL BAND HANDIE</td>
<td>£295.00</td>
<td>YAESU</td>
<td>FRG-100 MINT CONDITION WITH PSU</td>
<td>£350.00</td>
</tr>
<tr>
<td>KENWOOD</td>
<td>V7E DUAL BANDER</td>
<td>£295.00</td>
<td>YAESU</td>
<td>FRG-100 FM KEY PAD</td>
<td>£350.00</td>
</tr>
<tr>
<td>KENWOOD</td>
<td>TS-111E TRANSEIVER 70cm BASE / AC</td>
<td>£325.00</td>
<td>YAESU</td>
<td>FT-747 TRANSCEIVER</td>
<td>£350.00</td>
</tr>
<tr>
<td>KENWOOD</td>
<td>TS-1405 HF-0/30MHz TRANSEIVER</td>
<td>£325.00</td>
<td>YAESU</td>
<td>FT-757GX Mk11 TRANSCEIVER</td>
<td>£450.00</td>
</tr>
<tr>
<td>KENWOOD</td>
<td>TS-255E 2M MULTI MODE</td>
<td>£325.00</td>
<td>YAESU</td>
<td>FT-840 0-30MHz TRANSCEIVER</td>
<td>£495.00</td>
</tr>
<tr>
<td>KENWOOD</td>
<td>TS-450 SAT TRANSEIVER</td>
<td>£325.00</td>
<td>YAESU</td>
<td>FT-840 0-30MHz TRANSCEIVER</td>
<td>£495.00</td>
</tr>
<tr>
<td>KENWOOD</td>
<td>TS-950SAT TRANSEIVER HF +50MHz</td>
<td>£325.00</td>
<td>YAESU</td>
<td>FT-840 0-30MHz TRANSCEIVER</td>
<td>£495.00</td>
</tr>
<tr>
<td>KENWOOD</td>
<td>TS-450SAT TRANSEIVER HF +50MHz</td>
<td>£325.00</td>
<td>YAESU</td>
<td>FT-840 0-30MHz TRANSCEIVER</td>
<td>£495.00</td>
</tr>
<tr>
<td>KENWOOD</td>
<td>TS-950SAT TRANSEIVER HF +50MHz</td>
<td>£325.00</td>
<td>YAESU</td>
<td>FT-9004C</td>
<td>£995.00</td>
</tr>
<tr>
<td>KENWOOD</td>
<td>TS-450SAT TRANSEIVER HF +50MHz</td>
<td>£325.00</td>
<td>YAESU</td>
<td>FT-920 AF TRANSCEIVER</td>
<td>£995.00</td>
</tr>
<tr>
<td>KENWOOD</td>
<td>TS-900 BASE DUAL BAND</td>
<td>£325.00</td>
<td>YAESU</td>
<td>FT-1000 MP DC AS NEW</td>
<td>£1,400.00</td>
</tr>
<tr>
<td>KENWOOD</td>
<td>TS-870 BASE 0-30 DSP</td>
<td>£325.00</td>
<td>YUPITERU</td>
<td>MTV-9000 4MP/4MP/USB/LB/CW SCANNER</td>
<td>£245.00</td>
</tr>
</tbody>
</table>
FIRST THERE WAS LAKESIDE: THEN THERE WAS BLUEWATER!

OPENS SATURDAY SEPTEMBER 11th, 1999

A 2000 SQ FT MEGASTORE DEDICATED TO RADIO AND ANTENNA EQUIPMENT.

HAYDON COMMUNICATIONS

FRIDAY SEPTEMBER 10th OUR EDGWARE SHOP SHUTS AND RELOCATES.

2000 sq ft showroom
Located 5 minutes from Lakeside & 15 minutes from Bluewater
Easy access from London & the M25
Private parking
Opening offers at below trade prices

SEND A LARGE STAMPED ADDRESS ENVELOPE FOR YOUR FREE INVITATION TO OUR MASSIVE RELOCATION SALE AND DETAILED MAP ON HOW TO FIND US. WITH THIS INVITATION YOU'LL BE GIVEN VOUCHERS ALLOWING YOU TO BUY MANY PRODUCTS WELL BELOW TRADE PRICE. (VOUCHERS VALID ON SATURDAY SEPTEMBER 11th ONLY).

Our NEW address (from 11th Sept) is:-
UNIT 1
THURROCK COMMERCIAL PARK
PURFLEET INDUSTRIAL ESTATE
LONDON ROAD, AVELEY
ESSEX RM15 4YD
TEL: 01708 862524 FAX: 01708 868441
Open Monday to Friday 8am - 4.30pm
Saturday 8am - 1.00pm

WE ARE HERE
(Unit 1)

A1306 to (Wennington)
A13 to London
A1306 (Wennington)
A13 to London
Magnum Serv Drive
Purfleet Ind. Park
M25 from South (Dartford river crossing)
J30
J30
Fresh North M25

OUR WEST MIDLANDS BRANCH IS OPEN AS NORMAL

Send a large s.a.e. to:

HAYDON COMMUNICATIONS
132 High Street, Edgware
Middx HA8 7EL
Tel: 0181-951-5781/2
Fax: 0181-951 5782
The pure common sense behind the saying "Never put off what can be done today until tomorrow" was sadly brought home to me recently when John Newton G8EAM became a 'Silent Key' on 15th July 1999. The common sense behind the origins of the saying came to mind because it was purely by chance that John, his sons Richard GORSN (our stalwart mobile and 'hand-held' specialist author) and William G7GMZ and their mum, Ailsa (she took the photograph) and I met at Longleat with a camera to hand.

John, despite being very ill with heart problems and advanced cancer was determined to visit the Longleat Rally. Ailsa and family were very concerned that he did so but as you can tell from the photograph, John (on the right) was very pleased. It was an opportunity not to be missed. William G7GMZ (left), myself and Richard GORSN (to my left) will always have fond memories of the occasion. And as it was the last occasion I was able to talk to John - I'll remember it well.

John GREAM frequently 'got a mention' in PW through Richard's activities - and was an ambassador for Amateur Radio, his birthplace (Minehead) and for all of the many activities he was involved in.

An idea of the esteem felt for John GREAM can be drawn from the fact I counted well over 370 people attending the funeral service at St. Michael's Church in Minehead, Somerset on Thursday 22nd July. As John was active in virtually every sphere of community activity - there were large contingents from the RNLI, St. Johns Ambulance Brigade, and many more.

The day of the funeral was beautiful and, although it was a sad occasion - it was also a wonderful tribute to someone we, as Radio Amateurs, should be proud of. It was a privilege to know you John and to continue to work with your family. My best wishes go to all the Newton family and I ask you all to never let any possible photographic occasion go unrecorded. You was, as you'll realise, totally out of our hands. However, it's good to know that once readers understood what had caused the problem - those affected were very understanding. Thank you everyone - you're a marvellous bunch of friends!

Multimodes Seized

The letter from Graham Galbraith M0ADR ('Letters' page - under the heading 'Multimode CB Seizures' again draws attention to lost opportunities by the Radiocommunications Agency in keeping illegal CB transceivers off the market. Lost Opportunities? Yes, I mean just that because despite my pleas to the RA over many years they just don't realise (or seem to understand) that by allowing legitimate Radio Amateurs to obtain and convert these transceivers, they could save themselves much money, time and effort.

Of course, by attending the Elvaston Castle Rally specifically to look for illegal multimode CB transceivers the RA staff have achieved something - and that's publicity for their actions. But unless the RA have got hundreds of staff and much time (which they haven't) the illegal equipment will continue to be on sale, and in use, for many years to come.

I say this because unless the RA staff can attend every car boot and jumble sale in the land - they're bound to miss equipment which is being offered for sale.

So, how about it RA? Is it not about time that you reconsidered the 'blanket ban' on the possession and conversion of multimode CB transceivers? If you did reconsider there would be a veritable army of keen Radio Amateurs who could ensure that the sets disappeared from general sale very quickly. Just think - even if I had (and I don't!) a multimode in my possession at the moment which I'd like to strip down just for the s.s.b. generator unit - I would be breaking the law. But you could change that couldn't you?

Subscription Problems

I'm sorry to say that some of our valued - subscribers did not get their August copies of PW 'delivered to their door' last month. This was due to a mistake at the postal agency which we use to despatch the subscription copies. The wrong labels were attached and some non PW readers got a surprise! This led to some of the magazines going to readers who decided to keep them - further adding to the shortage!

You can imagine how upset and distressed I became on hearing that our valued readers had been let down! The PW team did everything possible to alleviate the problem (for a while, as I've mentioned, there were not enough magazines to go round) but eventually with the help of Kathy, Shelagh and Michael of the Subscription Department we sorted it all out.

Please accept my most sincere apologies for the problem which never know if it's to be the last chance you'll get for that special memory. Thank you to Ailsa for being 'behind the camera' - out of shot but not out of mind!

Walk By

At the moment I have to walk by the table containing a selection of CB transceivers, knowing full well that even though I, as a legitimate Radio Amateur, can't buy it - a possible clandestine operator can! I'm also having to write (on a regular basis) to readers who plan to advertise what may be illegal equipment for sale in 'Bargain Basement'.

In my letter to the intending advertiser I warn them it's not possible to (legally) possess, advertise, sell or obtain the equipment. Most reply thanking me for the advice - but what happens to the equipment is anyone's guess!

So, as it's not likely that the RA can ever recruit - or even spare - enough enforcement officers to even slightly scratch the surface of this problem - let's hope they see sense. As I've suggested before, RA - we can work together, but you must be prepared to be flexible. It is possible to change your decision without losing face because it is the right thing to do in this case!

Rob G3XFD
Thank You SRP Trading

Dear Sir

As a regular reader of PW I thought that I would put pen to paper in appreciation of your advertisers, namely SRP Trading In Birmingham. Contemplating purchasing the Realistic DX-394 communications receiver, I phoned SRP Trading and spoke to a pleasant gentleman who openly told me the plus and minus sides of the receiver, i.e. filters/selectivity, etc.

At the price of £99.99 I thought this a bargain price. I posted a cheque on the Tuesday morning and by midday Thursday, the receiver was delivered on the doorstep. First class service from SRP!

As an afterthought, would it possible for PW to publish a review of the DX-394 in a future publication? I read with interest your review of the Roberts BC-828 sometime ago. I bought the Roberts BC-828 based on the review by Peter Shore in Short Wave Magazine as stated in your article - very good value for money, for this type of receiver.

I think it was in PW a short while ago, the Codor PR30 preselector was mentioned with respect to many years ago of Amateur Radio. My PR30 and Codor RQ10 ‘Q’ multiplier both sit on top of my Trio JR5006 receiver (bought late 1989) an excellent receiver, and Sommerkamp FRDX600 receiver, both used for many years.

D R Varley

Nottingham

The Realistic DX-394 was reviewed in our sister publication, SWM, in the April 1998 issue. Please contact Michael on (01202) 659930 to order a back issue.

New Path Into Amateur Radio?

Dear Sir

How can the RSGB and the RA think that the new changes to the licence will provide a new path into Amateur Radio. Having just failed the RAE and as a result, many will fall because nothing at all has been done to help ‘Joe Public’ get in to the hobby.

The May exam was very hard, not just for myself but for many who took it. I spoke to a tutor who has been teaching the course for many years and had many 100% passes. He was very shocked by this year’s paper. He told me that he knew that all his students would fail because the paper was very hard. He also told me that he would have great difficulty himself and so would a number of G4s that he showed the paper to. I hope that I can pass in December.

Bob Clements

A Bargain...After Import Duty?

Dear Sir

I write to you in order that others may learn from my experience. After looking through the excellent pages of the July edition of PW, my eyes fixed on the first ‘Bargain Basement’ page. There, my interest was taken by an advert for a four year old Yaesu transceiver from a reader in the Channel Islands. I then telephoned the chap in Jersey and after some discussion, we agreed the price. I then sent off the cheque.

Can you imagine my shock when the parcel arrived, a week later? The Customs and Excise Parcels Post Depot in Southampton had affixed a duty charge statement to the parcel requiring me to pay £297.47 before being allowed possession. Queen Victoria could not have been less amused!

I have now lodged an appeal with the Customs & Excise. My fingers will remain crossed. The gentleman in Jersey has been very kind and has offered to cover the duty charge, if my appeal fails. Does this import duty only apply to the Channel Islands?

I wonder about the current trend towards increasing sales over the Internet? Has any other PW reader had a similar experience?

Bill Strickland M1BBR

London

Editor’s comment: I telephoned the Customs & Excise Dept, in Southampton and they confirmed that Bill had to pay Duty as the equipment had been imported (even though it had been bought secondhand from the UK by the Jersey resident selling it from outside of the European Community (EC). As the Channel Islands are not in the EC, the same applies if you buy anything from the USA - as many Amateurs do of course.

I now have the relevant information which the C&E kindly FAXed me - and it appears that the ruling only applies to the Channel Isles (Jersey, Guernsey, Alderney and dependent Islands) as the Isle of Man is within the EU for import/export purposes. We will let you know the outcome of Bill’s appeal.

Silent Key Sales

Dear Sir

The purpose of a ‘Silent Key’ sale is to generate capital for the estate of the deceased. The participants are usually generous and both helpful and co-operative. After reading PW Keylines, July, my morale is shattered. The ‘Silent Key’ sale has now become a little too vibrant. I hope Rob’s (G3XFD) unpleasant experience has not become the norm at such sales.

I recall a ‘Silent Key’ sale at a QRP Rally where a Ten-Tec Paragon was on offer. I anticipated a reserve price and made an initial bid at that price of £200. Having made the bid, I recall an enthusiastic bystander telling me that the set was ‘duly mine’ (in law). I argued the case to the vendor that I regarded the ‘Silent Key’ sale as sacrosanct and wasn’t going to be involved in an auction. I argued the case in favour of the widow of the deceased; should the stakes be raised. I would gladly retire from the fray. My loss was the widow’s gain.

I am aware that certain ploys and tactics adopted at such sales are far from congenial and can be upsetting to the organiser even though Rob G3XFD’s unpleasanent experience has not become the norm at such sales.

I recall a ‘Silent Key’ sale at a QRP Rally where a Ten-Tec Paragon was on offer. I anticipated a reserve price and made an initial bid at that price of £200. Having made the bid, I recall an enthusiastic bystander telling me that the set was ‘duly mine’ (in law). I argued the case to the vendor that I regarded the ‘Silent Key’ sale as sacrosanct and wasn’t going to be involved in an auction. I argued the case in favour of the widow of the deceased; should the stakes be raised. I would gladly retire from the fray. My loss was the widow’s gain. I wasn’t being generous, just co-operative.

I am aware that certain ploys and tactics adopted at such sales are far from congenial and can be upsetting to the organiser even though Rob G3XFD’s unpleasanent experience has not become the norm at such sales.
Wartime Utility Sets

Dear Sir

I remember, after the war, converting many of the wartime utility sets to long wave, also I still have one unconverted in good condition.

It was made by Cossor, the service sheet states a release date of June 1944 and the price was £12 3s 4d, including purchasing tax - a.c. model m.w. only.

Altogether 42 different firms made these radios. Makers had a unique code, i.e. US was A C Cossor Ltd. We could, however, tell some of the makers by the type of knobs they used. The only problems, apart from valves failing, was the speaker transformer going open circuit and faulty electrolytic capacitors. Otherwise they were very good receivers.

John Tye
Norton

Multimode CB Seizures

Dear Sir

Hi, I thought you might like to hear about something I saw at the Elvaston Castle Rally on June 13. On the first walk around I spotted a whole box of 'historically interesting' CB radios dating from around the late 1970s. I had a look through and some of them were in fairly nice cosmetic condition, maybe even collector's items. Nonetheless, I moved on and on the next time around, was fairly bemused to see a gentleman squatting on the ground, flanked by two bored looking uniformed policemen and filling in a form. The Radiocommunications Agency (RA) pad headed 'Notice of Seizure'. Needless to say, the radios were no longer in the box.

At the same time, there were hundreds of ex-PMR radios on show, most undoubtedly still crystallized for frequencies that their owners could not legally use them on, but these did not appear to excite any interest whatsoever. I don't understand the logic behind the turn of the decade decision to completely outlaw non-UK 11m radios even for the legitimate, converted users on 10m. If people are caught using them on 11m, then fair enough, treat them as you would any other CB user. But if I see someone using a v.h.f. PMR transceiver for unlicensed (or unrunnable) operation. I see no problem with a set sitting in a box waiting to be converted, or simply not being used.

I think that the decision was made because the RA didn't want to spend any more time certifying converted radios. The fact that they should never have been required to do that in the first place. It should have been left up to us to ensure compliance and to demonstrate it ourselves, as it is with all other kit that we move from other bands to our frequencies.

The ironic thing is that the multi-mode sets, in particular, are much easier to convert to 28MHz by virtue of their having unrestricted p.i. i.e. - and much more useful to us by virtue of the fact that they are multi-modes. And if we were still allowed to use them, there would be a lot more of them taken out of circulation from 27MHz and put to legitimate use on 28MHz. The first amateur h.f. set I ever owned was a converted UK 2m CB operating on 28MHz and it got me my first h.f. contact (with HB9IAM, I have the card on my wall in front of me) but, oh, how much better it would have been if it had been a multi-mode.

Graham M0ADH

Morse Debate - A View from Ireland

Dear Sir

On reading the letters on the 'Great Morse Debate' down through the years in your magazine, I never had the urge, before now, to write to you on this subject, even though there is a history attached to my learning Morse.

In short, last autumn, after many years of struggling on my own, I joined a club in order to have another go at mastering the code. After the Christmas recess, the class was down to one other person and yours truly. We did the test at Limerick Radio Club's rally in March, the outcome of which was a pass for the other person and a fail for yours truly. I was not surprised, but a little disappointed at the result.

However, the best part was that my tutor stayed with me and we persevered at the practice and did the test again six weeks later in May, this time successfully. To my tutor I go my heartfelt thanks for all his time, patience tuition and encouragement, which, in the end, crowned me with success. Other members of the club also encouraged me to stay and to them I also say thank you.

An aspect of the Morse debate which has not surfaced is the difficulty which some people have in learning Morse. A recent statistic published here is that 25% of all the students sitting their exams this year have some degree of specific learning disability in reading, writing, spelling, etc. For them, any form of examination can be a nightmare, for any number of reasons. I do not recall too many letters (if any) from these people, complaining about having to learn Morse. To me, Morse is a mode of communication like the others in radio. Historically, it was the only mode available and in those days it was part and parcel of the licence. The introduction of the 'P' Licence was to encourage people into Amateur Radio, not to start a war over c.w. The big void is the lack of Morse on the v.h.f. band and the short range simplex channels. The analogy that always comes to mind is that of a driving licence. Driving for me is only for pleasure, but you still have to do a driving test for various categories of the licence, e.g. motor cycle, car, vehicle with up to eight passengers, etc., even though I never use it commercially. I hope people who complain about Morse would apply their minds to learning the code, rather than creating for themselves a psychological barrier before ever attempting to learn it, then they would find that they could master it in a matter of a few weeks. It took me and others to succeed. If they have a problem like we have then they can still succeed with the help of others and I am sure there are plenty of individuals who would be glad to help.

I do not know whether I will ever be great at Morse but I am going to try and with the help of fellow amateurs on the air, master the art and would hope to hear all you reluctant people on c.w.

Michael Kingston, E96AXB
Limerick
Ireland.

Crowborough Reaps Benefits For Novices!

Dear Sir

I'm writing with reference to 'Short Straw for the Novices' - apropos the letter (PW July 1999) with the above heading. Crowborough & District ARS (C&DARS) put out a weekly cordial welcome to all licensed amateurs to join them in their weekly "matter" night on 2m (144.774MHz) on Mondays at 2000UTC. Callsign: GOCRWP.

Charles GT0DL
Crowborough

Radio Communications Afloat

Dear Sir

I've just spent ten days as crew, sailing from Oban to Lerwick on a well equipped 44 foot boat. During that time, the v.h.f. transceiver was kept on the listening and calling channel 16 and other channels as required for local weather and harbour information.

It was an education in how radio should be used. Everyone on air from cruise liners to small fishing boats were polite, helpful and used proper procedure. Compared with the garbage and sloppy procedure to be found daily on the amateur bands, I can only conclude that Amateur Radio is becoming a club for misfits and the foul-mouthed.

Incidentally, Rob Mannion G3XFD's comments on his experience in organizing a 'Silent Key' ("Keylines" July PW) sale tend to confirm the view that there are a great many amateurs who have no scruples in getting what they want at the lowest possible price. My advice to anyone faced with selling 'Silent Key' gear is: take it slowly and get advice on the value and ensure that the success in the outcome of which was a pass for the other person. I also say thank you.

An aspect of the Morse debate which has not surfaced is the difficulty which some people have in learning Morse. A recent statistic published here is that 25% of all the students sitting their exams this year have some degree of specific learning disability in reading, writing, spelling, etc. For them, any form of examination can be a nightmare, for any number of reasons. I do not recall too many letters (if any) from these people, complaining about having to learn Morse. To me, Morse is a mode of communication like the others in radio. Historically, it was the only mode available and in those days it was part and parcel of the licence. The introduction of the 'P' Licence was to encourage people into Amateur Radio, not to start a war over c.w. The big void is the lack of Morse on the v.h.f. band and the short range simplex channels. The analogy that always comes to mind is that of a driving licence. Driving for me is only for pleasure, but you still have to do a driving test for various categories of the licence, e.g. motor cycle, car, vehicle with up to eight passengers, etc., even though I never use it commercially. I hope people who complain about Morse would apply their minds to learning the code, rather than creating for themselves a psychological barrier before ever attempting to learn it, then they would find that they could master it in a matter of a few weeks. It took me and others to succeed. If they have a problem like we have then they can still succeed with the help of others and I am sure there are plenty of individuals who would be glad to help.

I do not know whether I will ever be great at Morse but I am going to try and with the help of fellow amateurs on the air, master the art and would hope to hear all you reluctant people on c.w.

Michael Kingston, E96AXB
Limerick
Ireland.

Editor's reply: As winners of the PW 'Club Spotlight' Magazine Competition in 1998 with their magazine Crowstalk I'm not surprised that the C&DARS radiates such a welcome. More power to your collective elbows and to any other clubs that do the same.

Editor's reply: Benefits For Novices!...
**NEWS**

**COMPiled BY JOAnne WIlLiAMS**

---

**Miniature 'Micro Commander'!**

The Practical Wireless news desk received these pictures of the Yaesu FT-90R and the FT-8000M, along with their specifications, from Yaesu UK Ltd. in Japan. These brand new rigs are, as yet (as this issue of PW goes to press), not available in the UK and were launched, by Yaesu, at the Friedrichshaven 'Hamfest' in June.

The FT-90R v.h.f./u.h.f. dual-band transceiver carries the sub-title of 'Micro Commander' and Yaesu say that it's the 'World's smallest high-power dual-band mobile!" They also state that they feel they've made a "technological breakthrough" with the development of the Yaesu FT-90R which provides "50W of 144MHz power output (480MHz 35W) from a package consisting of just 100mm x 30mm x 138mm and weighing just 644g."

The FT-90R's diecast aluminium chassis doubles as the heat-sink. Yaesu says, for the M6779IL (144MHz) and M67796MR (480MHz) power modules, with a microprocessor-controlled cooling fan providing extra ventilation when needed.


Now, on to the FT-2600M which, Yaesu say, is a heavy-duty v.h.f./f.m. transceiver and is "...the most ruggedly built 2m (144MHz) amateur transceiver ever." They say it provides "60W of power along with Yaesu's renowned "bullet-proof" receiver front end. Direct keypad frequency entry, Alpha-numeric Memory System, the high output, front-mounted speaker and unsurpassed ergonomics."

Built to the requirements of both the commercial radio industry as well as the US military's MIL-STD 810, Yaesu tell us that the FT-2600M is also constructed "using an aluminium diecast chassis/heatsink assembly, providing outstanding mechanical and thermal stability for the internal components".


For more information on these two products, please contact Yaesu UK Ltd on Tel: 0196-256 6607. Unit 12, Sun Valley Business Park, Wimnall Trading Estate, Winchester SO23 6EJ. Or why not take a look at their Web site: http://www.yaesu.co.uk

---

**Roxburgh Subsidiary Acquires Cirkit**

Deltron Electronics PLC (through its Roxburgh Electronics Ltd UK distribution arm) acquired the Cirkit Distribution business from Bulgin PLC, so Practical Wireless discovered this month. After contacting Cirkit, PW received a press release which stated that the acquisition took place on May 17 1999 and that it enables Roxburgh to "expand its ranges of electromechanical products by the addition of new suppliers thus further reinforcing its already substantial UK business."

Christopher Sawyer, Group CEO, said that "Cirkit is an established UK electromechanical component distributor with a number of leading brand suppliers entirely complimentary to our own and, by combining these with our existing market leading agencies and brands from around the world, we will be able to offer both our existing customers and new customers a more comprehensive range and service."

Cirkit will relocate to Roxburgh's modern, purpose-built distribution centre in Scunthorpe, North Lincolnshire. For further information, please contact Roxburgh Electronics Ltd, Roxburgh House, Foxhills Industrial Park, Scunthorpe, N Lincs LN15 8QJ. Tel: (01724) 281770. Or visit their Web site at: www.roxburgh.co.uk

---

**Nevada's New Deal**

Nevada have been in contact with Practical Wireless to tell us all about a new distribution agreement which they have signed with Grundig for their range of portable and short wave radios. John Norton, Grundig's Director of Sales, said "We are just about to launch an exciting range of short wave and portable radios, Nevada will ensure these are readily available through their Independent Dealer Network."

John said that the new Grundig radios or the DJ-105 please contact Nevada, 189 London Rd, North End, Portsmouth PO2 8AE. Tel: (02392) 655145 or FAX: (02392) 690626.

---

**International HF & IOTA Convention**

The RSGB have been in contact with Practical Wireless to tell us all about this year's RSGB International HF & IOTA Convention which will be taking place from 8, 9 and 10 October 1999 at the Beaumont Conference Centre, Old Windsor, Berkshire.

The RSGB tell us that there is an "excellent programme of lectures planned" which they say will appeal to "all active radio operators" including lectures on IOTA, The CQWW and CQ12M Pacific DXpedition, SD Masterclass. Winning QWW From West Africa.

---

The first short wave portable to be introduced is the Grundig YB400 which covers 140kHz-30MHz and 87.5-108MHz v.h.f., with s.s.b., a.m. and f.m. receive capability and will sell for £120.

Also available from Nevada is the new Alinco DJ-195 v.h.f. f.m. handheld transceiver. It has a full 5W output, CTCSS encode and decode, DCS, repeater tone burst, alphanumeric display for frequency or channel display and even a unique theft alarm which sounds when the hand-held is disconnected from an external power source!

The Alinco DJ-195 will cost £149 and is available from Nevada now. For more information on either the new Grundig radios or the DJ-195 please contact Nevada, 189 London Rd, North End, Portsmouth PO2 8AE. Tel: (02392) 655145 or FAX: (02392) 690626.

---

Fig. 1: Pictured from left to right: John Norton, Grundig Director of Sales; Debbie Stansfield, Grundig Regional Account Manager and Mike Devereux, Nevada Managing Director.
The LF Scene in the US, Amplifiers, Solar Eclipse 1999

Morse Letter Competition which
There will also be a varied
Yaesu have donated the main raffle
Convention again this year and
Yaesu UK Ltd are sponsors of the
and much more.

Practical Wireless.

Winners of the
Morse Letter Competition which
and much more.

Vann Draper have contacted Practical Wireless with news of two new frequency counters, the UZ 2400 and the UZ 2500 which have just been added to their general purpose instrument range, extending and complimenting Grundig’s Digimesse line up.

The UZ 2500 (see picture) provides three counting channels with a basic sensitivity of 25 nV, Vann Draper state. A fully adjustable front panel trigger level control is available as is a selectable ×10×10 input divider. Signal input is via BNC terminals with 50Ω impedance and alternating voltage input coupling. The measurement functions include: Frequency channel A; Frequency channel B; Frequency channel C; Frequency response range A & B or A & C; Period measurement over A & B; Time interval channel A & B plus Pulse count A & B, Vann Draper say. The UZ 2500 also incorporates a microprocessor which monitors and controls all functions including an automatic self-test at switch on.

The UZ 2400 is a two channel version of the UZ 2500: having channels A & C offering a similar frequency range but with only one low input band. For further information on these two counters, please contact Vann Draper Electronics Ltd, Unit 5, Premier Works, Canal Street, West Wigston, Leicester LE18 2FL. Tel: 0116-277 1400. FAX: 0116-277 2845.

Haydon Upheaval
Mike Haydon at Haydon Communications has been in touch with Practical Wireless to tell us about their moving plans. They would like PW readers to know that their London Showroom and Mail Order Department will be moving in September 1999 in order to accommodate their expansion requirements.

Mike says that the decision to move was due to a combination of issues, including lack of space and also parking restrictions recently imposed at their Edgware shop. The London address will remain in

Radio Solutions ‘99?
The Low Power Radio Association have been in contact with Practical Wireless to tell us all about the Radio Solutions ‘99 Conference which will be taking place on 20 October 1999. It will be opened by none other than Trevor Bayliss, the famous inventor of the clockwork radio. He will also be giving a “keynote speech” which will be entitled “Batteries Not Included”. Radio Solutions is the annual exhibition and conference of the Low Power Radio Association and it is to be held at the National Motorcycle Museum in Birmingham. Other topics which will be covered at Radio Solutions will include: the future of low power radio in Europe; TETRA; the R&TTE Directive; receiver performance; 868MHz transmitters; microwave Doppler radar modules; frequencies, power levels & applications for RFID and radio LANs.

New this year, the Low Power
EDWIN "STREET - 402" ISKE

The Practical Wireless news desk
recently received an interesting press for one of
its kind the STD-402 can be operated manually like any other
transceiver, but its microcontroller is
programmed with an auto-mode which provides both an automatic link
function and an encoding/decoding function.

Low Power Solution!

Low Power Radio Solutions have a
brand new low power radio transceiver
with an onboard micro-controller which makes it the "personnel-in-use"
device of its type. The STD-402 can
be operated manually like any other
transceiver, but its micro-controller is
programmed with an auto-mode which provides both an automatic link
function and an encoding/decoding function.

Interactive
Internet Ordering

The Practical Wireless news desk
recently received an interesting press release from Maplin Electronics
this month regarding the launch of their
new "fully interactive Internet ordering system" - an extension, they
state, of their paper-based CDROM
catalogue.

Maplin tells PW that the site is
hosted on a secure server and
provides order authorisation which is flexible and reliable with
personised reference numbers".

They say that the reference number system facilitates order tracking by
sending an update E-mail
immediately. Nigel Fawcett, IT
Director at Maplin says: "This site encapsulates a brilliantly simple
concept that addresses all the major
concerns of speed, resilience and
security ...".

The site has some unique,
"first to market" features, Maplin
state, such as a live stock checking facility - so customers know
immediately, price and availability -
it can also create a back-order if
an item is out of stock and despatch
as soon as it is in stock, David
O'Reilly states, adding that customers can actually create their
own orders while on-line providing a
number of unique benefits, primarily
reducing time and improving
efficiency of the internet visit.

For more information on this
interactive ordering system, why not
contact Maplin Electronics, PO
Box 777, Rayleigh, Essex SS6
8LU. Tel: (01702) 554000. FAX:
(01702) 554001. Or why not visit
the site for yourself:
http://www.maplin.co.uk

'Straight Keying'

Edgeware & District Radio
Society (E&DRS) have contacted
Practical Wireless to ask us if we would inform readers about their
18th annual 'Straight Key
Evening' (SKE) which will be
taking place on Friday 17
September 1999.

The evening is intended for all
amateurs in the UK and further
afield and "provides an event,
concentrated in both time and
frequency, to facilitate the getting
together of all those interested in
promoting the use of Morse and
specifically to promote the use of
the simplest sender of them all - the
good old Straight Key".

Primarily set for the evening on
3.5MHz (80m), the E&DRS hope
that activity will be able to
commence earlier on 7MHz (40m).
The callsign allocated for the event
is GB2SKE and will start from
1900. call 'CQ SKE'.

For further details please
contact John Bluff G3SJE, 52
Winchester Rd, Kenton, Harrow,
Middlesex HA3 9PE. Tel: 0181-
284 1034.

Conference Open To All

News now from the World
Association of Christian Radio
Amateurs & Listeners
(WACRAL) and Victor Brand
GS3NB tells Practical Wireless
about the 1999 WACRAL Annual
Conference. It's to be held over the
weekend of 8-10 October 1999 and
is an event open to all Christian
Radio Amateurs and their families, on
a daily basis or for the full residential
period.

The Conference organiser, Geoff
Peterson G4EZU, has arranged a
full programme of "Christian and
radio lectures, events and fellowship,
time on air and the, now traditional,
weekend "Construction Contest".
Visiting lecturers will include Anita
Edgar of the El-Shaddai orphanage
project in Goa, the Rev. issue Mac-Atram. Pastor
Evangelist of the United Urban
Ministries and Glynn Morgan of the
'All Age Christian Ministry'
and 'Millennium Gospel Crusade'
plus speakers on a variety of topical
radio subjects.

Full details are available from
Geoff Peterson G4EZU, 124
Darnley Rd, Gravesend, Kent
DA11 0SN. Tel/FAX: (01474)
533886. E-mail: geoff.peterson@setnet.co.uk

Lead-Up To Leicester

The Leicester Amateur Radio
Show Committee have been in
contact with Practical Wireless to tell
us all about the forthcoming 28th
Leicester Amateur Radio Show to
be held for a second time at
Donington Park, Castle
Donington on the 24/25 September

Manufactured in Japan by Circuit
design, the transceiver module
measures only 53 x 35 x 12mm and is
fully compliant with ETSI standard
EN100-220-1 for operation in the
harmonised European 433-434MHz
band. It incorporates a highly accurate
phase locked loop (PLL) synthesiser
circuit enabling both transmission and
reception on 64 preset channel
frequencies between 433 and 434MHz
and transmit and receive mode
settings can be fixed simply by using
DIL switches or jumpers without the
use of an external micro-computer.

For further information,
please contact Low Power Radio
Solutions, Two Rivers Industrial
Estate, Station Lane, Witney,
Oxon OX8 6BH. Tel: (01993)
706418. FAX: (01993) 708575.

1999.

The show will feature 150 stands
of Amateur Radio, Computer,
Electronics and related equipment.
There will also be a 'Clubland area' featuring both local and national
clubs including the RSGB.

There will also be a large Bring &
Buy as well as an outdoor flea
market, Morse tests on demand, QSL
corner, demonstration h.f. station and
talk-in station as well as rig testing
service and special event stations run
by the Royal Air Force Radio Society
and Melton Mowbray ARS.

The show is easy to get to by
road, rail and air. It's five minutes
from Junction 23A of the M1
motorway close to where the A42 and
A50 join the M1. It's three minutes
from the East Midlands Airport and
the free shuttle bus will once again
run from the airport to the convention
and show. The nearest railway
stations are Derby and Loughborough.
on the Midland Line - both are on a local bus route.

Admission to the show costs just £3 with reduced admission for Senior Citizens and under 16s (£2.50). Youngsters under the age of 14 will get in free if accompanied by an adult. There are free camping and caravan facilities on site and the Leicester Amateur Radio Show Web site has details of local hotels and guest houses as well as a floor plan of the show.

For further information please contact the organisers direct. Their Web site address is http://www.lars.org.uk. General enquiries to Geoff Dover G4AFJ Tel: (01455) 823344, FAX: (01455) 828273 or E-mail: g4afj@lars.org.uk. If you would like to book a table for the flea market please contact John Theoradan G4MTP without delay Tel/FAX: 0701-0701 300 or E-mail: g4mtp@lars.org.uk

**RAS Retirement**

Peter Owen G8UUS and Margaret Owen G8XIH of RAS (Nottingham) would like to inform all of their customers that they will be closing down the shop at 3 Farndon Green, due to retirement, after 18 years in the business on 2 October 1999.

Because of this, they will be holding a big Closing Down Sale in the last two weeks running up to the 2 October - ALL stock must go! Peter and Margaret would like to extend a big thank you to all of their clients who have supported them over the years.

If you would like to take a look at what's on offer then why not pop along to the shop at 3 Farndon Green, Wollaton Park, Nottingham NG8 1DU. Tel: 0115-9280267.

**Electro-Jumble!**

The fifth South Yorkshire Aircraft Museum Electro-Jumble is due to take place on Sunday 19 September 1999 and is open from 0930. The organisers tell PW that they've planned the event for constructors, restorers and collectors of electrical, radio and radar equipment up to the 1950s and 1960s (both commercial and military).

People will be able to buy, sell or swap, pieces of kit, transmitters, receivers, components, connectors, cables, handbooks, test gear and all those odds and ends that you've had for years and cannot use or do not know what they are for.

The Electro-Jumble will take place at Home Farm, Firbeck (near Maltby, Nottingham) off the A534. For more details please contact Mike Diprose 0143-363 1296.

**Another Cry For Help!**

Mr Eric Eastwood G1WQC needs information on Screwwormer III and Triumph/Adler Imperial S10. He needs a copy of the instruction manual and the two set-up disks for the Screwwormer III, manufactured in the UK. He also needs a copy of the instruction manual for the Triumph/Adler Imperial S10. If anyone can help please can you either write to Mr Eastwood at 50 The Mead, Freckleton, Preston, Lancashire PR4 1JB. Or telephone him (01772) 589760.

**Inflight Special Event?**

The Leicester Radio Society (LRS) in touch with Practical Wireless to tell us all about a Special Event which they are arranging in support of the Midlands Air Ambulance NHS Trust.

The Special Event Station GB2CAA will be operating a 24 hour Radio Marathon over the weekend of the 21 & 22 August 1999 - and LRS tell us that they will be trying to raise money for the CAA through off-air sponsorship.

The Special Event will be operated from the premises of LRS, they say, and it is planned that they will be active on h.f. on the 50/144 and 430MHz bands and a special QSL card (see picture) produced by a member of LRS, Ian M1BUJ, will be available for all confirmed contacts.

Further Information about the event is available from Andrew Hall M0BWU on (0961) 114623. E-mail: jackie_andy@virgin.net Or from Paul Crichton: paul@m1bpt.stayfree.co.uk

**Free Publicity!**

Please, please, please keep your news coming in to Joanna Williams, PW News & Production Editor, PW Publishing Ltd, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW.

Remember, any mention on these pages is COMPLETELY FREE and I would love to hear from anybody regarding new products or any Club News which you feel would be of interest to other readers! I look forward to hearing from you.

---

**Make Contact For Charity**

The Practical Wireless news desk received a letter from Tony Faulkner G0SKG regarding a Special Event which he has arranged in order to raise money for sufferers of Multiple Sclerosis (specifically on behalf of Helen Ley Care Centre, Leamington Spa) which will take place on the 4/5 September 1999.

Tony would like to remind readers about the Special Event which he organised in June 1996 when he had 12 stations participating, a raffle was run locally with various radio products supplied by numerous firms. The total raised back in 1996 was £3000 plus and went towards setting up a physiotherapy unit at Helen Ley which has been up and running for 18 months now to the benefit of many sufferers.

Tony is unable to arrange an event on such a scale again, but what he has planned for this year will follow along the lines of the 1996 event - if on a smaller scale. There will be four stations taking part: GB2MSR Multiple Sclerosis Rospita (Helen Ley Care Centre) with Tony G0SKG as the main operator; G02MSR Multiple Sclerosis Rospita (Stourbridge AHS); GBAMS Multiple Sclerosis Help (Willenhall & District ARC); GB2MSH Multiple Sclerosis Help (Sandwell ARC).

The stations will be using 3.5MHz (80m) in the main but they will also be using 7MHz (40m), conditions permitting. For local contacts use 144/430MHz (2m/70cm). There will be a gold award for anyone working all four stations, costing £10 (plus s.a.e.) and a certificate for £3.50 (plus s.a.e.). The certificate will be slightly different from 1998 (see picture) though well worth adding to the shack wall, Tony says.

For more information please contact Tony Faulkner G0SKG either by telephone on (01384) 820616 or by E-mail: tonymahmmd8@aol.com

---

**Web Watch**

Yaesu UK Ltd: http://www.yaesu.co.uk

Roxburgh Electronics Ltd: www.roxburgh.co.uk

RSGB: www.rsgb.org

Vann Draper Electronics Ltd: www.vanndraper.co.uk

Maplin Electronics Ordering System: http://www.maplin.co.uk

Poole Radio Society: http://www.paws.demon.co.uk/PRASprs-start.html

Leicester Amateur Radio Show http://www.lars.org.uk
You can help PW to complete a project for the forthcoming Millennium and it could help us to help you get the most from your radio hobby, says the Editor, Rob Mannion G3XFD. Rob says he's hoping to recruit readers to help locate all those 'difficult to get' components and the local dealers who provide them.

'Project 2000' is an idea which came directly from readers who have met me on the many 'club visits' I undertake through the year. On these occasions, readers - in the general 'chat sessions that often take place - tell me about their favourite local shop. Many of these truly local dealers have stocks of components, rare items and other help and advice that, if we don't support them, will soon disappear from the towns they serve.

Local stockists of components and specialists are becoming more difficult to find and more and more specialised dealers don't have room in their standard advertising to mention the complete range of services they offer. So, the PW team are planning a complete Directory of who and where the dealers are, what they do/supply or make and how to contact them. It will cover England, Ireland Scotland and Wales, Isle of Man, Channel Islands and we would be delighted to hear from readers abroad too!

All you need to do is fill out all the information on the local radio shops you use, on the form laid out here. (Any information given will be used in preparation of the Directory ONLY - you have Rob G3XFD's assurance on that). Provide all the details you know - we'll do the rest. You can be sure that we'll produce a directory to help the hobby forge its way into the Millennium. 'Project 2000' is already on its way - with your help!

### Form

<table>
<thead>
<tr>
<th>Name &amp; Address of Dealer</th>
<th>County/Country</th>
<th>Telephone/FAX number</th>
<th>Web site address (if available)</th>
<th>What specialities do they offer?</th>
<th>Is there a mail order service?</th>
<th>Do they publish a list/catalogue of components?</th>
<th>Do they publish a list of second-hand equipment?</th>
<th>What service which they offer do YOU think is their speciality?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Return the form (by Wednesday September 1) to:**

Editor Practical Wireless, Project 2000 'Freepost', Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW, United Kingdom. (The 'Freepost' facility is not available to addresses outside the UK, but we'll still be pleased to hear from you and would like to receive your information).

---

### CDS

CDS are a friendly, independent and progressive company with a strong reputation for field measurement services in the mobile telecommunications and digital broadcasting industry.

A NEW CAREER FOR RADIO ENGINEERS, ASSISTANT TECHNICIANS & DATA ANALYSTS

We have an immediate requirement for radio engineers, assistant technicians and data analysts with experience, or willing to be trained, to work throughout the UK and Europe.

CDS can offer a comprehensive training programme to give you a thorough understanding of cellular systems and technologies together with digital broadcasting technologies.

For the right people we can offer attractive, competitive salaries and an overall package commensurate with position and experience.

To find out more, please submit your detailed CV to:

David Pearson, Technical Director, Cellular Design Services Ltd, Graylands, Langhurstwood Road, Warnham, West Sussex RH12 4QD. FACSIMILE: 01403 248597

**Cellular Design Services Ltd.**

RADIO SOLUTIONS FOR THE WIRELESS WORLD
Antenna Rotator
AR-300XL
Max load 60kg (with support bearing). 360° deg rotation in approx 65 sec. (cable not supplied). Support bearing optional extra. £49.95 inc P&P.

Gold Peak 1300
1300mAh Nickel Metal Hydride (NiMH) AA size rechargeable cells. No memory effect. Over twice the capacity of Nicads. £3.00 inc P&P.

Syncron SX-144/430
2m/70cm cross needle direct reading SWR/1000W power meter. £39.95 inc P&P.

WM-918 Electronic Weather Station
allows the measurement and display of weather data. Displays indoor/outdoor temperature, relative humidity, dew point, wind speed, wind direction, wind chill, barometric pressure and daily & accumulated rainfall. Four weather symbols show you a weather forecast: sunny, partly cloudy, cloudy and rainy. Memory for highest/lowest temperature, relative humidity, dew point temperature, maximum wind speed, minimum wind chill, daily and accumulated rainfall. Weather alarm warns you of high and low temperature extremes, rate of rainfall, wind chill, wind speed and drops in pressure. £179.95 inc. P&P.

DC - AC Inverter
12V in, 1240V out 300W. Suitable for running laptop, computers, etc. £49.95 inc P&P.

MAYCOM AR-108
- Full civil airband
- Covers 108-136.975MHz (AM) & 136-180MHz (FM)
- 99 memory channels
- 5kHz, 10kHz, 15kHz, 25kHz & 1MHz steps
- Dual channel watch
- LCD display with signal meter
SPECIAL OFFER PRICE £69.95 + £5 P&P.

PRO-2037 Base Scanner
200 channels AM/FM (switchable) covers 66-1000MHz (with gaps).
£89.99 + P&P.

PRO-2042 Base Scanner
1000 channel AM/FM/WFM (switchable) scanner. Covers 25 to 520MHz and 760 to 1300MHz
£299.99 £149.99 + P&P.

We give you a better deal! Phone us last.
Building & Using the PW 'Basi-Probe'

This month Rob G3XFD describes and demonstrates how you can build yourself a very useful little multi-vibrator signal injector circuit - ideal for testing from audio frequency right up to high radio frequencies.

Preparing and building this month's project - a simple transistor multi-vibrator circuit - evoked many memories for me because it's approaching 40 years since I built my first circuit of this kind. The first circuit - from a Mullard transistor manual I think - worked well and continued to do so for many years with the original OC44 transistors which cost me so much pocket money!

Nowadays, transistors for this little project only cost around 10p each - so it won't break the bank! At the same time, you'll have something that can provide signals from around 2.7kHz well up into the v.h.f. range - at your finger tips.

Based on two BC182 transistors, which switch each other on and off and produce square wave pulses through doing so, the circuit is both simple and easy to build. Built in the way I suggest the project can also run from the same 9V supply for many years because power is only taken when you need to use the probe.

The Circuit

The circuit, Fig. 1, is simplicity itself and has been around for many years - in various forms. I think it originated as an idea by Mullard but it has appeared in so many magazines and books (with no reference to its origins) that it's fortunate I still have my original Mullard book from the 1950s as evidence!

The transistors operate in a free running multi-vibrator circuit and produce an 'approximate' (as already explained) square wave of just under 9V peak-to-peak at a frequency output of around 2.7kHz that's truly 'rich' in harmonics. So much so, I was able to detect the signal from the circuit up on 144MHz!

Many different types of transistors can be used but I recommend the BC182. However, as the BC182 can come in several differing 'pin outs', I suggest that you play safe by ordering the BC182 from the source provided at the end of this article. They'll be OK because that's where I got mine from too! (The BC182 transistor pin-out diagram is inset in Fig. 1).

Readers who have followed this series will know that I've concentrated on using synthetic resin paper board (SRPB) to make the projects to make things easier to build (as it can be done with so few tools) and to encourage you to have a go with the 'components on the same side as the track' p.c.b. method. Well, this project uses the same approach!

I cut my prototype boards from the stock I've got - which happens to be from sheets 255mm in width. If you bought yours from the supplier I recommended in the past then you can cut the board out just by measuring off the width of the project (I suggest 30mm) to accommodate a PP3 battery and a possible tube outer casing.

Waste not want not! That's my motto and by saving some of the material cut from the SRPB when you shape the probe to a spear-like point, you can make a simple switch. The switch element is made by carefully sanding the edges clean so there's no sharp copper laminate to cut your fingers - before the copper underside ends are 'tinned'.

Take care not to 'tin' the entire length of the 'switch' element otherwise it will lose the flexibility that's required in this application. Instead, just 'tin' enough of the element to provide enough solder to 'seat' the switch element on the large solder pad which you will prepare when you apply the etch resist to the p.c.b. (see Fig. 2).

When you've etched the board (make sure you let the resist dry first) assemble the board by following the annotated component photograph in Fig. 3. Take note of the wire link and transistor connections. The completed project shown in the top of the photograph in Fig. 2, was the prototype and, although there's only a very small difference in the etch resist track I prepared, I ask you to follow the close-up annotated photo in Fig. 3. (The two battery connection pads aren't in shot but they can be viewed in Fig. 2 or 4).

Soldering The Switch

Soldering the switch is simplicity itself and, as you can see from Fig. 4, the larger end of the element sits on the larger pad. Before soldering the switch element in position I suggest you tin the large pad next to the 470k resistor (R1) and form a pointed pad (to provide a contact) on the copper of the pointed end.

Next, melt the solder on the larger (+) pad with the (already tinned) copper face of the switch element resting on it. Let it cool and ensure that a good soldered joint is made between the pad and the switch element. Then you should place a match stick or something large enough to lift the sharpened end of the switch element clear (open circuit) of the pad next to R1 and then quickly apply more solder onto the (+) pad directly under the
radio basics

Fig. 2: Photograph of a completed ‘Basi-Probe’ (top) complete with probe tip (see text) and grounding lead complete with crocodile clip. The capacitor shown at the ‘probe’ end is C3, the coupling capacitor used to apply the test signal to the unit on test. The narrow (spear shaped) section of SRPB material forms the on-off switch (see text). The lower part of the photograph shows a ‘Basi-Probe’ before etching. The large etch resist covered area at the probe end will provide a secure mounting area for the probe itself (see text).

switch element on the opposite side to the (+) marker. (This provides ‘lift’ and a spring effect to ensure the unit is switched off until you require it to be ‘on’).

Probe & Uses

For the probe, I tried various pins and needles but found the best to be an old ‘Safety Pin’ as they’re (usually) made of plated brass. Cleaned with a file, they take solder very easily but, for safety, I recommend a sleeve of old coaxial inner core insulation be prepared. Better safe than sorry!

The PP3 battery on my prototype is attached on the underside (opposite side to copper cladding) and is held with adhesive. However, it can also be held with rubber bands or if you mount the unit inside a convenient plastic or cardboard tube - it can be held in place by the outer casing. Unless you have an oscilloscope, the best way to test the unit is to apply the probe (with the ground lead connected to the ‘chassis’ or ‘ground’) to the input of a small amplifier (any of the amplifiers used in the ‘Radio Basics’ series will suffice). You should then hear a high pitched ‘buzzing’ sound when you gently squeeze the p.c.b. ‘switch’ element, which should cease when pressure is eased on the switch.

The Basi-Probe can be used left or right-handed, with the battery helping to stabilise the device in the upright position. I suggest you try listening to the signal through an amplifier and with one of the simple receivers described in previous articles.

Next month I’ll go into detail on how you can use this helpful little device to find faults on projects and also describe another project that can also add to your workshop ‘armoury’ of simple test equipment. Cheerio until then.

Fig. 4: The completed project. The crocodile clipped ‘ground’ lead is soldered in position and the coupling capacitor (partly in view on the right) is shown soldered into place. Also shown is the simple push-to-operate switch made from a short length of SRPB off-cut material shown soldered to the positive (+) pad (see text). The battery is mounted on the underside (see text).
ICOM ICOM ICOM ICOM ICOM ICOM ICOM

IC-706MKII HF ALL BAND ALL MODE

**Great Radios**
Now with 2 Year UK Warranty
There is NO competition

*ICT-8E offer closes on 31st July or when stocks run out

IC-2800H VHF/UHF MOBILE

IC-746 160-2m BASE STATION

ICPCR-100 and ICPCR-100
COMPUTER BASED RECEIVERS

THE NEW ICR-75 COMMUNICATIONS RECEIVER

**Buy the Best From the Best**

**Great Deals**
We don't believe you can buy a better radio
at a better price -

**So Call Us Now** 023 8024 6222

Southampton

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>IC-706MKII</td>
<td>£1399</td>
</tr>
<tr>
<td>IC-746</td>
<td>£1505</td>
</tr>
<tr>
<td>IC-2800H</td>
<td>£599</td>
</tr>
<tr>
<td>IC-2100H</td>
<td>£289</td>
</tr>
<tr>
<td>IC-207H</td>
<td>£369</td>
</tr>
<tr>
<td>IC-T81E</td>
<td>£399</td>
</tr>
<tr>
<td>IC-Q7E</td>
<td>£199</td>
</tr>
<tr>
<td>ICR-75E</td>
<td>£689</td>
</tr>
<tr>
<td>IC-PCR100</td>
<td>£299</td>
</tr>
<tr>
<td>IC-PCR1000</td>
<td>£199</td>
</tr>
<tr>
<td>IC-M1EURO</td>
<td>£279</td>
</tr>
</tbody>
</table>
Order NOW
On our Special Hotline Phone Number
Please use this number only for placing orders.
For technical help and advice please use our usual numbers during shop opening times.

Order HOTLINE - 7 days a week from 10am - 10pm

This month’s special offers!

**New Yaesu Items to clear, most ½ price!**

<table>
<thead>
<tr>
<th>Item</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>DV81</td>
<td>£48.00</td>
</tr>
<tr>
<td>DV83</td>
<td>£48.00</td>
</tr>
<tr>
<td>FTS22</td>
<td>£49.99</td>
</tr>
<tr>
<td>YSK900</td>
<td>£30.00</td>
</tr>
<tr>
<td>FL7025</td>
<td>£99.00</td>
</tr>
<tr>
<td>FL2025</td>
<td>£99.00</td>
</tr>
<tr>
<td>MMB36</td>
<td>£15.00</td>
</tr>
<tr>
<td>MMB15</td>
<td>£12.00</td>
</tr>
<tr>
<td>MMB2</td>
<td>£16.00</td>
</tr>
<tr>
<td>MMB33</td>
<td>£8.00</td>
</tr>
<tr>
<td>MMB34</td>
<td>£9.00</td>
</tr>
<tr>
<td>MMB16</td>
<td>£15.00</td>
</tr>
<tr>
<td>AMUT77</td>
<td>£6.00</td>
</tr>
<tr>
<td>PA6</td>
<td>£12.00</td>
</tr>
<tr>
<td>FVS1A</td>
<td>£20.00</td>
</tr>
<tr>
<td>PA1</td>
<td>£12.00</td>
</tr>
<tr>
<td>FTS7</td>
<td>£23.00</td>
</tr>
<tr>
<td>TCX04</td>
<td>£29.00</td>
</tr>
<tr>
<td>TCX01</td>
<td>£29.00</td>
</tr>
</tbody>
</table>

**Speaker Mics**

<table>
<thead>
<tr>
<th>Item</th>
<th>Price</th>
</tr>
</thead>
</table>
| Yaesu VX1/VX5 MS109Y Speaker/Mic's ½ price now only £13.50

**Tokyo High Power Amplifiers.**

<table>
<thead>
<tr>
<th>Model</th>
<th>Input</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>HL130U 432MHz</td>
<td>3/10/25w</td>
<td>120w</td>
</tr>
<tr>
<td>was £489</td>
<td>now only £289.00</td>
<td></td>
</tr>
<tr>
<td>HL865 50MHz</td>
<td>10w</td>
<td>50w</td>
</tr>
<tr>
<td>was £189</td>
<td>now only £99.00</td>
<td></td>
</tr>
</tbody>
</table>

**HF Transverters for £99!**

<table>
<thead>
<tr>
<th>Model</th>
<th>Input</th>
<th>Output</th>
</tr>
</thead>
</table>
| HX640 Transverter, matches FT690, 50MHz input, 3.5/7/14/21/28, out 30 to 40w, was £289, now only £99.00
| HX240 Transverter, matches FT290, 144MHz input, 3.5/7/14/21/28, out 30 to 40w, was £289 now only £99.00 |

**HF Transceivers for £149!**

<table>
<thead>
<tr>
<th>Model</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tokyo High Power single band mobiles from £149.00 - Phone for details</td>
<td></td>
</tr>
</tbody>
</table>

**Quality Coax Switches.**

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
</table>
| CS201A 2 Way 1kw at 150MHz Max were £25.00, now £12.50
| Cx401N 4 Way “N” type 2.5kw 500MHz now ½ price £29.00 |

**Super High Gain Mobile Antenna Sale.**

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>SG7000 144/432, 100w 2.15/3.8db</td>
<td>£11.50</td>
</tr>
<tr>
<td>SG7200 144/432, 150w 3.2/5.7db</td>
<td>£15.50</td>
</tr>
<tr>
<td>SG7220 144/432, 150w 5/7 6db</td>
<td>£16.00</td>
</tr>
</tbody>
</table>

**New Battery Packs.**

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kenwood PB30 (TH22/42)</td>
<td>£25.00</td>
</tr>
<tr>
<td>Kenwood PB33 (TH22/42)</td>
<td>£35.00</td>
</tr>
<tr>
<td>Icom BP3</td>
<td>£32.00</td>
</tr>
<tr>
<td>Icom BP5A</td>
<td>£46.00</td>
</tr>
<tr>
<td>Icom BP8</td>
<td>£46.00</td>
</tr>
<tr>
<td>Icom BP173</td>
<td>£49.00</td>
</tr>
<tr>
<td>Icom BP180</td>
<td>£29.00</td>
</tr>
<tr>
<td>Icom BP197 (case)</td>
<td>£12.00</td>
</tr>
<tr>
<td>Icom BP200</td>
<td>£35.00</td>
</tr>
<tr>
<td>Yaesu FNB25</td>
<td>£17.00</td>
</tr>
<tr>
<td>Yaesu FNB27</td>
<td>£49.00</td>
</tr>
<tr>
<td>Yaesu FNB33</td>
<td>£39.00</td>
</tr>
<tr>
<td>Yaesu FNB38</td>
<td>£59.00</td>
</tr>
</tbody>
</table>

**Yaesu FILTERS, ½ price!**

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>YF100</td>
<td>£39.00</td>
</tr>
<tr>
<td>YF101</td>
<td>£39.00</td>
</tr>
<tr>
<td>YF110c</td>
<td>£49.00</td>
</tr>
<tr>
<td>XF455CN</td>
<td>£10.00</td>
</tr>
<tr>
<td>XF8.9GA</td>
<td>£10.00</td>
</tr>
</tbody>
</table>

**Ring Now for our Used Equipment List**

We have over £50,000 of used equipment at our Axminster and Southampton Shops or take a look at our web site for a full list


**NEW PHONE NUMBER**

This is the new number **023 8024 6222**

Once again they have changed the telephone code for Southampton, this time they have changed the number as well.

**More Satisfied Customers**

**Axminster**

01297 34918

**South Midlands Communications Ltd**
Rob Mannion G3XFD Joins In The Fun On... A Day to Remember!

Rob Mannion G3XFD joined in with the fun during the PW 144MHz QRP Contest, tried out the new PW 'Tenna-Tourer' portable mast base, a Maspro v.h.f. antenna and used the new Yaesu FT-100 and evaluated the MFJ-9402 144MHz s.s.b. transciever. And there's also a 'special offer' for readers!

he 'intro' for this article should also have included "He also flattened his car battery, learned a valuable (but embarrassing) lesson and brewed tea for the AA rescue service using a remarkable Irish invention". But in all honesty, Sunday June 20th was a truly remarkable day for me, starting off as it did with the flashes and bang of thunderstorms, heavy rain and ending up being a very beautiful (but exceptionally windy) summer's day.

The Sunday in question was the day of the PW 144MHz QRP Contest and I was looking forward to enjoying myself on the band. But in the end I was exhausted, although I would not have missed it for anything!

Regular readers will remember that I had mentioned in earlier issues of PW that I intended to operate as /P for the QRP Contest from the National Trust (NT) site at Win Green, not far from Shaftesbury in North Dorset. However, although being only a few miles from the famous hill-top town, the actual chosen site is (just) in Wiltshire. But it was not to be and I ended up operating from a site on private farmland approximately 750m from the main road between Shaftesbury and Blandford Forum.

The reason why I ended up on what's now become thanks to the kind farmer who has also had problems dealing with the National Trust) my regular /P site for both h.f. and v.h.f., is that although I allowed plenty of time for correspondence - the NT (despite telephone assurances from their regional office in Warminster, Wiltshire, that they "saw no problem") only confirmed that I was there with permission it was 'All smiles and good fellowship' until a few weeks later when I arrived on site just after I'd started operating on the Sunday.

Unfortunately, as I had written two 'follow up' letters to the NT after my original asking for formal permission to use the Win Green site on the Friday evening before the QRP Contest, I had assumed that I was not going to hear from them and accordingly arranged to use another site. Fortunately I (unusually for me!) had 'fallen on my feet' because the Farmer who arrived on the site just after I'd started operating on the Sunday was very friendly - after an initial 'difficult' meeting!

The Farm Manager who'd given me permission to operate on the site had forgotten to mention it to the owner. However, as I had been told to expect a possible visit from the Gamekeeper, so I wasn't surprised to see a Land Rover hurrying to investigate the strange vehicle with antenna mast on private farmland.

"Are you the Gamekeeper?" I asked - 'No...I'm the owner' he replied with a hint of anger! But, as soon as I explained I was there with permission it was 'All smiles' and I ended up with permission to use any of many possible sites on their farmland overlooking the beautiful Blackmore Vale - complete with superb views over towards Sherwood and Into Devon.

The moral of the story? Always ensure you do have permission - but be prepared for little "hiccups" from landowners and the NT.

In this case I was really fortunate in that my friendly Farmer knew that negotiations with the NT could be protracted - so he was extra helpful even though he'd be the last to know I'd be there!

On Site

I'd arrived on site just after a tremendous rain storm, complete with hail and strong winds. However, I don't think I'd have risked erecting the mast if there was lightning about!

After negotiating the farm track to the top of Sutton Hill, I was soon setting up the PW 'Tenna-Tourer' mast base. This is shown in Fig. 1 and, as can be clearly seen, it's simple to use. All that's needed is to place it so that a front wheel of the vehicle can be driven to the frame. Once the wheel is in place, the weight of the vehicle provides an extremely steady and reliable un-guyed mast base.

The base is made from heavy gauge industrial quality steel and all those made for readers are to be 'hot dipped' galvanised to BS 729. Each mast base will be equipped with four 14mm diameter holes in the bottom plates so that if necessary the assembly can be mounted on a (properly prepared and secure) concrete patio for use in a garden, etc. For this application, the base would have to be secured with expanding bolts or bolts anchored securely into the foundation.

Following trials with vehicles ranging in size from a heavy agricultural type truck to a Reliant three wheel car, PW's Technical Projects Sub-editor Tex G1TEx and I have decided, after discussions with Tennamast, decided that there will be two sizes of base available. The larger size - reference XFD - is suitable for vehicles such as the Peugeot 405 (which is equipped with 175/70 sized tyres), Peugeot 306, Volkswagen Golf and similar cars.

The XFD version will in fact suit most larger cars and it has fitted very well under the wheel of all the vehicles that have tried it on. These include (with the permission and help of the owners) vehicles such as: Ford Galaxy, VW Sharan, and other 'People Mover' types, and larger vans, four wheel 'off road' vehicles including several 'Japanese Jeepy' types, Range Rovers and Land Rovers.

For smaller vehicles another version - reference TEX - is available. This size will be suitable for smaller vehicles.
such as the Reliant, Mini, Nissan Micra and many other cars with smaller wheels.

Copes With Slopes

In practice, I've found that even if there's a slight slope to the ground (in other words the site doesn't have to be like a bowling green!) the mast stands up very straight indeed and copes well with slopes. The hinged socket at the bottom of the assembly accepts a standard 47mm outside diameter (OD) scaffold pole and I find it exceptionally easy to 'walk up' my aluminium alloy 8m high pole assembly (5.5m scaffold pole with a separate extender section making a total mast height of approximately 8m) with antenna and cable.

I don't normally like to draw attention to my disabilities because, quite frankly, I think they're trivial compared to those suffered by others. However, I think in this instance it will be helpful for those who don't realise I use a stick to help my walking and also have an artificial arm - that I still find it very easy to install and erect the mast system.

When not in use, the mast base fits very snugly into the rear of my estate car, Fig. 4, and tos G1TEX finds that the version he uses also fits well into his Reliant three-wheel car. The photographs in Figs. 5 and 6 show the prototype TEX version in use on the beautiful Purbeck Hills here in Dorset.

Sunny But Windy

The day of the QRP contest turned out to be a gloriously sunny, but very windy, day. In fact, using my Royal Navy experience I estimated the wind to be blowing at Force 4 for most of the times with gusts approaching (and exceeding at times) Force 6 to 7. In fact, the wind force (it was a north-easterly) was such that I couldn't open my car door easily without applying a lot of my own force to overcome the wind pressure (next year I'm hoping to have a remote controlled rotator!).

Although the wind was a nuisance - I'm also hoping to take a wind-driven generator next year - it provided an excellent test for the mast base. Other v.h.f. operators told me that the wind was so strong in their area that they'd not been able to erect their masts to full height or use the full size antenna planned for. So, I wasn't alone in this respect and ended up feeling very confident that the 'Tenna-Tourer' base would be very reliable in windy conditions - after all I'd had first hand experience!

The Maspro 8-element

144MHz beam antenna (kindly loaned to us by the Shortwave Shop) had already proved to be an excellent performer, and was also incredibly lightweight - but surprisingly robust - and it has proved very quick to assemble. It's very neatly designed and as it breaks down into two sections (very easy and exceptionally neat) which is ideal because I can then carry it in the back of the car, with minimal assembly time on site.

Bearing in mind I have an artificial arm, I still found the Maspro beam easy to assemble and transport - that's why I've decided to keep it (see details at end of text). The antenna has a very good 'front-to-back' ratio and the forward gain it proved enabled me to work stations much farther away than I'd expected with the prevailing 'troupe' conditions prevailing that day.

On The Air

I was on the air from 0900 'clock time' until around 1630 when my car battery went flat, but more about that later! In the meantime I had very many enjoyable QSOs, trying to assist as many contestants to increase their 'score'.

The Yaesu FT-100 which I'd originally had on review was loaned once again by Yaesu UK especially for the contest. In this respect it worked extremely well and I found that working the many EI and Cornish stations pleading with me to "turn the beam towards the west Rob" was remarkably easy from my site with its clear take off. And even though signal levels were often such that my Irish and Cornish friends were right down in the noise - the FT-100's sensitive 144MHz receiver coped well.

However, I ended up in trouble and even though I'm terribly embarrassed at being 'caught out' following many years of portable h.f. and v.h.f operating I've got to admit I well and truly 'flattened' my heavy duty h.f. car battery. Yes - I was stuck and I only noticed it when the cooling fans on the FT-100 were obviously running very slowly and the audio output was dropping.

The reason for the 'flat' battery? Well - in answer I have to say that in the same way Richard Newton G0BSN comments on his review of the Icom IC-706 Mk IIG (page 34, under the heading 'Gruesome Test'), I agree that when using one of the multiband 'state of the art' transceivers you must be aware that current consumption can be far higher than imagined when you're operating at low output power levels.

On investigation at home I found that when the FT-100 was running on transmit at 3W output level (with no speech into the microphone) it was consuming around 5A. On speaking into the microphone current consumption peaked at over 8A. So, my findings agree to a large extent with Richard's on the IC-706 MkIIG.

The moral must be: bear in mind that the transmitter might only be running at 3W output but the equipment as a whole unit will almost
Practical Wireless, September 1999

The 'secret' of the 'Kelly's Kettle' is the remarkably large heating surface area. It will boil your water very quickly and you can soon be back on the air!

Kelly's Kettle

I'm mentioning 'Kelly's Kettle' (KK), Fig. 8, because I think it's an essential item for anyone interested in camping, going for picnics and portable Amateur Radio operations. The version in the photograph was presented to me by our friends in County Mayo (thanks lads...every cup reminds me of you) in Ireland. It's made from very sturdy aluminium and in effect is a kettle with a built-in central fluid which provides a very large heating surface.

I bought my first 'KK' in County Kerry over 30 years ago when I was on holiday in the South West of Ireland. It was fabricated from standard tinplate and was made for me while I watched by (you've guessed it) a genuine 'Tinker' called Kelly. The 'Tinkers' were renowned then for their work with pots, pan kettles. Unfortunately after many years of use mine literally disintegrated. A replacement came my way after I mentioned the kettle to the Mayo lads...little did I know that they were to provide me with a modern version!

In use, the Kelly's Kettle sits on top of its ventilated base, on the right in Fig. 8, and shown here 'upside down' (ready to accept the top section for carrying). The base provides a good air flow for the solid fuel block (which I prefer) or the grass, twigs or paper preferred by the Irish fisherman who favour the 'KK' for their riverside soups.

Despite the appearance of just being a tapered flue (left in Fig. 9), the 'KC has a water 'jacket' that contains approximately one pint (Ireland still uses pints so I'll not translate to metric!) of water. With one solid fuel tablet this will boil in less than four minutes - so you never need to be without hot tea or coffee. (See end panel for details on how you can get your own 'Kelly's Kettle'.)

The MFJ-9402 Transceiver

As I was operating in the QRP Contest I took the opportunity to try out the MFJ-9402 144MHz s.s.b. transceiver I had on loan from Waters & Stanton. I'd asked Jeff Stanton for this unit, Fig. 10, to try because it seemed very interesting, with possible uses for the QRP or lightweight /P operators and maybe other uses for the local enthusiasts. I had reason to be grateful that I'd registered as a disabled member!

Locally based AA Patrolman Keiran Collier arrived in less than 20 minutes from his home in Blandford Forum. And despite my site being well away from the road - the largest 'Fir tree (clearly visible in the heading photograph) played its part in two ways. It helped as it's now a famous landmark and the fact it's a cell-phone antenna mast and my call for help passed through its 'branches'. (I'd only realised it was a mast that very day when I saw the electronics at the mast's end - even though I'd driven by it many times. An excellent 'disguise' job and much appreciated by the local birds too!)

As the cell-phone antenna mast 'tree' has featured in the AA staff magazine and Keiran lived locally, I only had to guide him past it and onto the farm track to find me. It was a relief to see the AA vehicle approaching down the farm track!

It only took a few seconds to start the diesel engine on my car, Fig. 7. Keiran said that if it had been a petrol engine I'd have probably started it - this was because the 'glo-plugs' had been removed from the 'edge off the almost 'flat' battery. His special battery pack did the trick and it was left in place for a few minutes so that the alternator on my car did not have to overwork and cause more problems.

However, while my car was 'ticking over' and re-charging the battery Keiran kindly offered to take the mast and antenna down and help me pack the station up. Charging the battery Keiran kindly offered to take the mast and antenna down and help me pack the station up. Power was provided by the vehicle battery.

For the 'on the air' tests from my car at various v.h.f. sites high on the Dorset 'downs' - including my PW Contest site - I used the MFJ-9402 in conjunction with the previously mentioned 8-element Maspro lightweight 144MHz beam, my 6 metre mast and the 'Tenna-Tourer' mast base. Power was provided by the vehicle battery.

I quickly found that - as MFJ claim - that the receiver is certainly sensitive as I was able to hear weak signals. Although not as sensitive as the Yaesu FT-100 I had on loan, or the much older Trio 9000 I've got - the receiver proved able to 'winkle out weak stations satisfactorily although it was fairly noisy*, even when compared to the Trio.

Swann G1TEX discovered that indicated accuracy varied within 5 and 10kHz.

For the 'on air' tests from my car at various v.h.f. sites high on the Dorset 'downs' - including my PW Contest site - I used the MFJ-9402 in conjunction with the previously mentioned 8-element Maspro lightweight 144MHz beam, my 6 metre mast and the 'Tenna-Tourer' mast base. Power was provided by the vehicle battery.

I quickly found that - as MFJ claim - that the receiver is certainly sensitive as I was able to hear weak signals. Although not as sensitive as the Yaesu FT-100 I had on loan, or the much older Trio 9000 I've got - the receiver proved able to 'winkle out weak stations satisfactorily although it was fairly noisy*, even when compared to the Trio.

See comment in paragraph below starting "Audio output level..."

However, selectivity on the MFJ-9402 is another matter! The single conversion receiver is adequate for normal 'hill topping' activities but I think you can forget it for when there's a contest or increased activity on the band. I can comment on the receiver's performance because my experience during the PW QRP Contest proved that the single-conversion receiver (despite the 2.3kHz ladder filter) just could not cope even with the relatively low level signals obviously associated with a QRP Contest. And yes, I am taking into account antenna gain at the transmitting end which can lead to quite potent effective radiated power (e.r.p!) levels.

Comments on the transmitted audio quality were good. The single conversion receiver is adequate for normal 'hill topping' activities but I think you can forget it for when there's a contest or increased activity on the band. I can comment on the receiver's performance because my experience during the PW QRP Contest proved that the single-conversion receiver (despite the 2.3kHz ladder filter) just could not cope even with the relatively low level signals obviously associated with a QRP Contest. And yes, I am taking into account antenna gain at the transmitting end which can lead to quite potent effective radiated power (e.r.p!) levels.

Comments on the transmitted audio quality were good, and several stations commented that they immediately

Comments on the transmitted audio quality were good, and several stations commented that they immediately...
recognised my voice. I had several QSOs during the
contest, but most of the activity - for the reasons already
mentioned - were during normal 'hill-topping' days.
Audio output level was adequate for operation in the
car but for outdoor use I would say that headphones, via
the rear panel mounted socket, would be essential.
Incidentally, I've already commented on the receiver noise
- and its apparent sensitivity - and on reflection (not having
had the opportunity to dismantle the receiver) I think most
of the noise originates from the audio stages. A check with
my workshop oscilloscope and suitable probes backed me
up in this thinking, as the noise ('hisss') seems to be
associated mostly with the audio output stages.

Simple & Lightweight
The neat little MFJ-9402 is simple to operate and very
lightweight. In my opinion it would be ideal for QRP level
operation when equipment has to be carried to remote
operating sites. (What I would have done to have had
access to such equipment years ago!)

In summary, I've got to say that this little rig is a 'fun'
transceiver which could easily be taken on camping
holidays. For this reason I've no doubt that it will appeal to
some operators and with the c.w. option added, the
versatility could be increased.

Personally, I feel that if MFJ were to consider making
this transceiver considerably cheaper as a kit for home
assembly, it could end up being popular as a 'first entry'
project for s.s.b. and c.w. on 144MHz. Otherwise, I think it
is rather expensive for what you get at the moment. So,
perhaps MFJ might take up my
suggestion? (Further details,
price, etc., at end of article).

Great Fun
So, there you are - I hope I've conveyed
some of the enjoyment I get from
operating /P, whether it's on h.f.
or v.h.f.

The idea behind this article
has been to demonstrate how
much more enjoyment we can get from our
hobby, and to introduce the PW 'Tenna-Tourer'
mast base to you at the same time. It's been developed and
built from my basic ideas and suggestions by Norrie
Brown GM4VHZ of Tennamast, ably assisted of course by
his wife Rose GM4NHH.

If you decide to invest in a PW 'Tenna-Tourer' mast base
I'm sure you'll enjoy using it as much as I've done. So, good
luck with your /P operations and I look forward to meeting
you on v.h.f. and h.f. some time!

My thanks go to Yaesu UK Ltd., at Unit 12, Sun Valley Business
Park, Winnall Trading Estate, Winchester, Hampshire S023
6JL. Tel. (01962) 899067 for the loan of the Yaesu FT-100. (see full
review in the July issue of PW).

The Maspro 8-element 144MHz folding lightweight beam antenna was kindly provided
by The Short Wave Shop, 18 Fairmile Road, Christchurch, Dorset BH23 2LJ.
Tel. (01202) 306835 for the loan of the MFJ-9402
144MHz s.s.b. transceiver. It's available for
£200.95 with free P&P.

The Kelly's Kettle is available here in the UK
from: The Kelly Kettle Co. Ltd., Woolaway,
Chesterton Field Farm, Foss Way,
Leamington Spa, Warwickshire CV33 9JY,
Tel: (01926) 651460. The 1 pint version costs
£16 plus £3.50 P&P, the 2.5 pint version costs £35 plus £5.50
P&P. (Cooking accessories are available for the larger version).

Try out our SPECIAL OFFER!

Please send me ... Tenna-Tourer 'XP1' at £84.95 plus £6.50 P&P. (UK only, overseas prices on request).

Please send me ... Tenna-Tourer 'TEX' at £84.95 plus £6.50 P&P. (UK only, overseas prices on request).

Name:
Address:
Telephone:
I enclose a Cheque/Postal Order (payable to PW Publishing Ltd) for £
Please charge my Access/Visa card the sum of £
Card No.
Valid From... To...
Signature...

OFFER CLOSES ON 31ST OF OCTOBER 1999
LEICESTER AMATEUR RADIO SHOW COMMITTEE PRESENTS

28th LEICESTER AMATEUR RADIO SHOW

at THE INTERNATIONAL EXHIBITION CENTRE, DONINGTON PARK, N. W. LEICESTERSHIRE

on Friday 24th & Saturday 25th September, 1999

All these great features:-
- 150 stands all major radio dealers, RSGB, PW, SWM, Radio Today
- Clubland - special interest groups meetings and stands
- All on one level - disabled parking right outside
- Bring & Buy
- Convention
- Flea Market
- Cafeteria, snack bar, licensed bar & restaurant
- Free camping and caravanning on site
- Free shuttle bus from East Midlands Airport to convention, show and around the park
- Meeting room (booking essential - contact organisers)
- QSL corner (bring your QSL card) - meet your friends
- Free parking immediately outside hall
- Free show and convention guide
- Morse tests
- Prize draws & raffles
- Rig testing
- Demonstration HF station
- Talk-in on 145.55 & 433.55MHz
- Discount admission to British Superbikes and The Donington Collection

Convention programme:-
Friday: Internet and Amateur Radio, Getting Started on LF and Progressive Licensing.

Stands as well as Flea Market spaces are going fast so for availability contact asap
John Theodorson, G4MTP.
Tel/fax: 0701 0701 330.
E-mail: g4mtp@lars.org.uk

Other queries including advance tickets contact
Geoff Dover, G4AFJ, QTHR.
Tel: (01455) 823344. Fax: (01455) 828273
E-mail g4afj@argonet.co.uk

For the latest information on the show and details of how to get there and accommodation in the area see our web site: http://www.lars.org.uk

ADMISSION PRICES
One day ticket: £3.00. Two day ticket: £5.00
Advance tickets £2.50 and £4.00
Senior Citizens (OAP) and under 16: £2.50
Advance tickets £2.00
Under 14 free when accompanied by an adult. Half price admission on production of last year’s programme or ticket. Advance party bookings £2.00 each (12 minimum)
The Frequency Synthesiser

In his ‘Looking At …’ page this month, Gordon King G4VFV will be taking a look at the frequency synthesiser which is now employed in a high proportion of Amateur Radio equipment - from receivers and transceivers to test equipment and more.

The frequency synthesiser, used in many receivers today, fits well into the digital age and, like CD's, there are those who hold it in high esteem and others who still prefer the old way! It's a scheme whereby the frequency of an oscillator can be locked to a stable and accurate reference over a wide range of discrete frequencies.

Not only does it allow both the local oscillator (l.o.) of a receiver and the r.f. output of a transmitter to be of high stability and accuracy, often down to a few Hertz (Hz), commonly aided by a digital display, but it also facilitates switching of the output frequency in predetermined steps, while still retaining these attributes.

Although stability and accuracy can be matched by quartz crystal oscillators, a disadvantage here is that major frequency changes require crystal changes. But such oscillators do have the advantage of low noise and purity of output and it is possible to shift their frequency slightly (the VXO), as was noted when looking at local oscillators in a previous instalment.

Reference Signal

A quartz crystal oscillator commonly provides the synthesiser's reference signal, whose frequency is divided by a predetermined fixed ratio. The synthesiser's main output emanates from a voltage controlled oscillator (v.c.o.), a sample of which is also frequency divided by a ratio selected by digital logic or frequency switching.

A phase-locked loop (p.1.1.), which constitutes the heart of the synthesiser, then compares the phase of the two divided signals. The block diagram in Fig. 1 reveals the primary elements.

Now, should the phase of the divided v.c.o. signal fail to coincide with that of the reference signal, the phase detector will respond to the error and deliver a d.c. voltage related to the phase error.

The potentially adverse higher frequency components accompanying the d.c. voltage are eliminated by the low-pass filter. The resulting "smoothed" voltage is then applied to the junction of the v.c.o.'s varicaps D1 and D2. This is the control voltage which adjusts the capacitance of the varicaps, which form part of the v.c.o. tuning. Hence frequency of the divided sample of the v.c.o. signal corresponds to the phase of the divided reference signal.

A steady-state situation occurs when the two signals become phase constant constant at 90° offset, but whenever there's a tendency for the frequency of the v.c.o. signal to drift, then the control voltage will again adjust the v.c.o. tuning slightly until phase coincidence is restored and the frequency drift is corrected.

The capacitance value of a varicap decreases as reverse bias of, say, 1V, it may be in the region of 80pF, while at 40V, it might have reduced to around 18pF, depending on the type of varicap.

The v.c.o. in Fig. 2 uses an n-channel junction f.e.t. (J.f.e.t.) based on a Colpits type oscillator. Diodes D1 and D2 are the varicaps which, together with L1, form the tuned oscillatory circuit. Because the control voltage is applied to the cathodes of the varicaps, it would be positive-going relative to 'earth' to decrease the capacitance across L1 and hence increase the output frequency.

A pair of varicaps connected as shown in the diagram are commonly used, instead of just a single device, to give the required capacitive swing and to avoid the oscillatory signal from affecting the capacitive function. Output is taken from the source of the f.e.t. and is usually fed to the mixer (or transmitter) via a buffer stage.

Component values depend on the v.f.o.'s operating frequency. Nowadays the phase detector is commonly an integrated circuit (i.c.), which may be a part of the synthesiser i.e. a more sophisticated device and there are many such devices around these days.

Output Frequency

The output frequency of a p.l.1. synthesiser can be set digitally, by programmed press-buttons, scanned electronically, or changed in discrete steps by a rotary control. The amount by which the frequency changes per step is established by the division ratio of the reference frequency's fixed divider.

As an example of this, consider a reference frequency of 1MHz and a required synthesised output corresponding to the 144MHz band, from 144-146MHz. switch the reference frequency to 12.5kHz.

The fixed divider ratio would thus be 80 (1 000 000 divided by 12 500), while at 144MHz the frequency select divider ratio would be 11 520 (144 000 000 divided by 12 500) and at 146MHz 11 680 (146 000 000 divided by 12 500).

For 25kHz steps, both the fixed divider and the frequency selecting divider ratio would be half the 12.5kHz step ratios. Each time the ratio is changed one step by the switching logic or programming, the v.c.o. output will change accordingly. The dividers work digitally, rather like counters.

Local Oscillator Application

For local oscillator (l.o.) application, the synthesiser would be programmed to take account of the i.f. offset by onboard logic and it's not uncommon for several p.l.1.s and dividers to be found in latter-day equipment to produce the required frequency ranges with the desired step resolution (right down to 10Hz per step in some cases). Phase noise and undesirable 'sproggies' on the synthesised signal are minimised by careful attention to design and component layout.

This Phase-Locked loop (p.l.l.) synthesis is also known as indirect synthesis. There's another approach where the signal is synthesised digitally, which is known as direct digital synthesis (DDS).

While having been restricted to expensive test equipment, over to its need for elaborate filtering, DDS is now finding its way into Amateur Radio equipment. But that's another story - for another article!
The last major
Radio & Computer Show
this century will be held at
Picketts Lock!

The venue: Lee Valley Leisure Centre,
Picketts Lock Lane, Edmonton, London N9

The dates:
Saturday 27 November
& Sunday 28 November
(10am to 5pm each day)

Admission:
Adult...... £3.00 OAP...... £2.50
Under 14 £2.50 Under 5.. Free

Displays by the Japanese manufacturers
Stands from importers and distributors
Special Interest Groups
Thousands of computer bargains
Bring & Buy sale
Bar and restaurants
New and second hand rigs
Disabled facilities
On-demand Morse tests
Free parking for all
On-site camping and caravanning
Cloakroom
Cinema and sports facilities*

Trade enquiries to RadioSport Ltd.
126 Mount Pleasant Lane, Bricket Wood, Herts, AL2 3XD.
Tel 01923-893929 Fax 01923-678770 www.radiosport.co.uk

* not included in admission to the event

There'll be
a hundred
good reasons
to be there,
including:
James Brett G0TFP shows you how to make a very useful meter that can be used to measure far more than the name suggests. Read on to see what it could be capable of in your workshop.

There are many measurements in Amateur Radio and general electronic design work that normally need an oscilloscope. For instance the radio amateur licence requires that, when using amplitude modulation (a.m. - A3E), the licensee makes measurements of percentage depth of modulation and of p.e.p. in a.s.b. (J3E) ‘from time to time’.

When testing modulation depth, the transmitter waveform normally has to be viewed on an oscilloscope and the maximum and minimum amplitudes of the modulated carrier compared with the mean carrier level. For a.s.b. the transmitter output is again viewed and the two tone test used to indicate on the oscilloscope screen the peak power levels permitted.

This article describes a comparatively simple, easily built and calibrated accessory which will enable these and many other measurements to be made. The circuit monitors the r.f. current into a resistive load, rectifying it to produce the characteristic demodulated waveform as shown in Fig. 1.

The second part of the circuit enables measurement of the carrier level \( V_c \) shown as \( V_3 \) and the modulation peak \( V_c + V_h \) (shown as \( V_2 \)) in Fig. 1. A secondary function, without the r.f. section of the meter, the measuring circuit allows measurements of ripple superimposed on d.c. supplies and many other useful measurements described later.

**Circuit Description**

The overall circuit of Fig. 2, shows the meter circuit and the sensing unit (connected between the transmitter output and a matched dummy load). Although the sensing head is designed for 50Ω impedances, other values will work. The coaxial inner line current is sensed by the transformer \( T_1 \) and its load \( R_{11} \), is rectified by \( D_1 \). Capacitor \( C_4 \) filters out the r.f.

The recovered audio waveform across \( R_{12} \) is of a form, similar to that shown in Fig. 1. The audio signal (or a d.c. voltage with ripple) is applied, via \( S_1 \) (shown in the modulation position) and the attenuating circuit of \( R_2 \) and \( R_3 \) to input pin 2 of the op-amp \( I_1 \). The main purpose of which is a gated level sensing circuit.

When the potentiometer \( R_{13} \) is at minimum, \( I_1 \) output will be high and \( D_3 \) will be lit. As \( R_{13} \) is advanced a point will be reached where the level on pin 3 (\( I_1 \)) will be just positive with respect to the negative peak of the applied waveform. The op-amp output will thus briefly ‘pulse low’.

Advancing the potentiometer further will lengthen this negative pulse and \( D_5 \) will start to glow, and \( D_3 \) will dim. As the potentiometer is further advanced the point will be reached where pin 3 of the op-amp is just higher than the positive peak of the applied waveform, when \( D_5 \) will be fully lit and \( D_3 \) fully extinguished.

As it’s difficult to determine accurately when the l.e.d.s are...
Two Main Units

The two main units are shown within dotted lines on Fig. 2, but layout is not critical and my prototype is shown in the annotated photographs. The layout can be modified to accommodate the shape of the box available. A separating screen between the r.f. and the rest of the circuit must be used to prevent possible interference to the metering circuits by the r.f. fields. My prototype is shown in the annotated photographs of Figs 3, 4 and 5.

The sensing transformer, T1, consists of 20 turns of insulated wire wound on a toroidal core, with tails left long enough to connect the r.f. strip board. The inner of the coaxial cable is passed through the centre of the toroid before soldering in place. The toroid and its winding are fixed in place with a generous application of a rubbery adhesive.

Variable resistors R13 and 14 are directly mounted in to the bottom of the box after first drilling the necessary holes and covering the outside with sticky white paper. The strip boards are supported by screws and extra nuts to space them from the box. The mounting holes on the strip boards should be slightly countersunk on the copper side and insulated washers used to prevent any of the strips short circuiting to the mounting nuts.

Test & Calibrate

It's now time to test and calibrate the unit, but first, carry out a careful wire check before connecting the battery.

Connect a 'spare' fresh 9V battery to the input terminals (P1 and P2), observing correct polarity, and switch on to the 'Voltage' position of Si. Set R13 fully anticlockwise and R14 mid way, only i.e.d. D3 only should be illuminated.

Advance R13 slowly clockwise about a third of the way, at which point D3 will go out and D5 light. By varying R14 about the mid point, D4 should pulse on in keeping with the movements of R14. Now connect a transmitter and matching dummy load to the coaxial connectors.

Set the potentiometer R12 fully clockwise and switch on the transmitter at a low power level. Set the switch to the 'r.f.' position (as shown in Fig. 2) and check the unit's operation as described for the 'Volts' case. The unit is now functioning correctly.

To calibrate the potentiometer scales, an adjustable dc supply of 0-30V and a suitable voltmeter are required. Several (9V1 dry batteries and a high resistance potentiometer (about 100kΩ) could be used instead.

With the switch set in the 'Volts' position set R14 to mid scale and mark the scale at this point as '0'. Now set the test supply to 2V and adjust R13 to the point where D3 and D5 just change over and mark this point 2. Carry on over the whole range of R13, marking the scale at appropriate points, say every 2V.

To calibrate R14, you use a similar method. Leave R13 somewhere mid scale, and the test supply set to the i.e.d. change over point. Now make small adjustments in voltage of around 0.1V intervals. By referring to Table 1 (see Fig. 1), the power calibrations can be marked around R13's scale.

Now you need to set R12 for correct reading. A 50Ω dummy load with a calibrated power meter is connected to one of the coaxial connectors and a transmitter with a 50Ω output is connected to the other.

Set R14 to '0', with the transmitter switched on, adjust its output to a convenient level as indicated on the power meter. Set R13 to the same power indication and adjust R12 to the point where D5 and D3 just change over. That is the calibration done! But what can you use it for? In answer to that look at the following:

Transmitter Power

The transmitter output is connected, via the unit, to a 50Ω dummy load. The transmitter should operate in f.m. or c.w. mode. With R14 set to the zero point, adjust R13 until the i.e.d.s 1 and 2 change over. Read the power directly of the
signal is marked with a line on the screen. This line

p.e.p. case.

signal is fed to a power meter and the transmitter adjusted

envelope at the difference frequency of the two tones. This

the two audio tones that produce a sinusoidal modulation

modulate the transmitter as measurements are made.

amplitude audio tones are simultaneously used to

is employed, where two non-harmonically related equal

recommended that the 'two-tone method' of measurement

400W maximum on some bands, less on other bands. It's

licence requires that any transmissions are limited to

crest of the modulation envelope. The Radio Amateur

supplied to the load during one radio frequency cycle at the

Peak Effective Power

Peak Effective Power (p.e.p.) is defined as the peak power

supplied to the load during one radio frequency cycle at the

crest of the modulation envelope. The Radio Amateur

licence requires that any transmissions are limited to

400W maximum on some bands, less on other bands. It's

recommended that the "two-tone method" of measurement

is employed, where two non-harmonically related equal

amplitude audio tones are simultaneously used to

modulate the transmitter as measurements are made.

The procedure is to fully modulate the transmitter with

the two audio tones that produce a sinusoidal modulation

envelope at the difference frequency of the two tones. This

signal is fed to a power meter and the transmitter adjusted

to show an average power level of 100W for the 400W

p.e.p. case.

If monitored on an oscilloscope, the peak point of the

signal is marked with a line on the screen. This line

represents the p.e.p. value of 400W and must not be exceeded during

normal speech modulation.

Using the Modulation Meter between the transmitter and the

power meter, the signal is monitored as already described. With the two

tone audio signal applied to the transmitter, the transmitter output is

adjusted to indicate 100W on the power meter, then R13 is adjusted

until, with D5 lit, D4 just extinguishes. In effect this is the line marked on the

oscilloscope screen.

Now with the antenna connected and normal speech modulation used,

it is only necessary to set the transmitter modulation gain/level

control to a position where the D4
does not pulse on even in the loudest speech points. And of

course other p.e.p. level may be set by setting 25% of the

required power level on the scale of R12

Ripple Measurements

With the switch S set to the 'Volts' position, P1 and P2 can

be used to monitor the positive and negative peaks of the

ripple in a power supply. The measurement is made by

turning up R13/R14 from zero until D4 just lights, for the

the lowest voltage (V1 in Fig. 1). Further advancing of R13

or R14 until D4 extinguishes indicates the maximum

positive of the supply.

The facility is, of course, an important measurement when

considering the design of a power supply on load. The input

to the regulator can be checked to ensure that there's always

sufficient voltage across the regulator for correct operation

whatever the loading.

Other Uses

There are other uses of the meter, when it's used in the

'Volts' position. These include such things as amplifier

output (before the capacitor coupling to the loud speaker)

can be monitored. With no audio signal the mean voltage

level can be determined by noting the readings where D5

and D6 just change over.

By now applying the audio the peak positive and

negative excursions can be measured by observing the

voltages when D4 just extinguishes. For a good amplifier

these voltages should be equally disposed about the mean

level previously measured.

Similarly, oscillator outputs and other circuit

performances can be checked. There are, no doubt, other

useful measurements which can be made, even to using it as

a simple voltmeter when the workshop multimeter is not to

hand.
RAE Course Listing

It's that time of year again and the team here at Practical Wireless have done their best to bring you news of RAE, Novice RAE and Morse courses across the country, so there's absolutely no excuse now for all you 'would-be' Radio Amateurs! Hook out those RAE textbooks which you bought all those months ago and haven't used, and get studying!

The list which we have provided here consists of those courses which we have been told about and is not exhaustive - there are many other courses going on all over the country that may not be mentioned here. For details of other courses that are running this year, contact the City & Guilds (C&G), 1 Giltspur St, London EC1A 9DD, Tel: 0171-294 2468, FAX: 0171-294 2400.

For more information on becoming a Radio Amateur, contact Subscription Services Ltd. (SSL) in Bristol on 0117-925 8333 who act as the licensing issuing point for the DTI and will, on request, send copies of the free booklet 'How To Become A Radio Amateur' and provide other DTI publications associated with the hobby. You could also contact the Radio Society of Great Britain (RSGB) on (01707) 659015 or if you have an enquiry regarding licensing, etc., then please get in touch with the Radiocommunications Agency (RA) on 0171-211 0211.

So, what are you waiting for? Browse through our list, pick a course in/near your area, get enrolled and start studying!

Who knows, your name may be among the new batch of Licensees! Good Luck!

Beasley College will be running a City & Guilds RAE course from September 1999. The course will run for an academic year finishing in May 2000 with students able to sit the May 2000 RAE. Morse will be taught from May to July 2000. Interested enthusiasts should contact Beasley College's Guidance & Admissions Centre on (01322) 404000 or (01322) 404001, leave your name, address and telephone number and an enrolment form will be posted to you in the summer break.

Bishop Auckland RAC (BARAC) which meets at the Stanley Village Hall, Rear High Rd, Stanley, Crook, Co. Durham, will be running an RAE and Novice RAE course starting in September 1999. The club is also a registered examination centre. For further details please contact Tim on (01388) 832943 or Mark GC0FG on (01588) 745353.

Carisbrooke College, Victoria Place, Carisbrooke CA1 1SF will be running an RAE course beginning on Wednesday 10 November 1999 between 1800-2100. The charge for the course will be £130 plus registration and exam fee of £30 and will last 20 weeks. The tutor will be Bruce McCartney and if you require any more information, please contact the Information Unit on (01228) 819000.

East Cleveland ARC (ECARC) will be offering a Novice RAE course on Friday evenings at the Jubilee Hall, Gurney St, New Marske, near Redcar. Enrolment will be on 3 September 1999. Details are available from Alistair G4OLK on (01642) 475071.

Farnborough College of Technology is offering RAE and Morse courses. The courses are held on Tuesday & Thursday evenings and start the week commencing 13 September 1999. For further information please telephone: (01252) 407440.

Foyles & District ARC (FDARC) will be running an RAE course from September 1999. Numbers are limited due to the fact that the lessons will have to be held at the Course Tutor's home in Co. Tyrone, Northern Ireland. Anyone interested should contact either Terry White G7THH (QTHR) on (01504) 885461, or the Course Tutor, Ronnie GIWYO (QTHR) on (01504) 349836.

Hastings Electronics & Radio Club (HERC) will be running courses for the RAE and Novice RAE this autumn. For details of the RAE course please contact G Parsons G6AIY at Gulf Cottage, Brixhill Close, Fairlight, East Sussex TN35 4DP or telephone (01424) 812846. For details of the Novice RAE course (starting on 16 October) contact D Mepham G4ERA at 8 The Close, Fairlight, East Sussex TN35 4AJ (where the course will be held) or telephone (01424) 812850. (HERC is an approved City & Guilds examination centre for both the RAE and NRAE).

Highfields ARC (HARC) will be running RAE classes commencing in September 1999 with Clive GW4YKL, every Thursday at 1900. Contact Kevin O’Reilly GW0K1G on Cardiff (01222) 561542 or you can contact the club via their Web site: http://www.freezone.co.uk/shortwave/.

The Hilderstone RAE Course will be running this year, the tutor will be Dr. Ken Smith G5JIX. The course will commence on Thursday 22 September 1999 from 1900-2100, the venue will be in the Sandwich area, East Kent. For further information please telephone Ken Smith G5JIX on (01304) 812175 or E-mail: ken.smith@netscape.co.uk.

Hillcrest School & Community College, Simms Lane, Netherton, Dudley, West Midlands are holding an RAE course, every Thursday evening from 1900-2100 starting on the 16 September 1999. Details can be obtained from Dr. Ken Smith G5JIX, 22 Park Road, Goodrich, Hereford at (01904) 781688. The course will commence on Thursday 22 September 1999 from 1900-2100 the venue will be in the Sandwich area, East Kent. For further information please telephone Ken Smith G5JIX on (01304) 812175 or E-mail: ken.smith@netscape.co.uk.

Huntingdon School, Huntingdon Road, York Y032 9WT. Tony Skaithe G4XIV will be running another RAE course this year and it will be starting in September. Contact Tony Skaithe on Tel: (01904) 782102, 144 Carr Lane, York Y032 9HG or E-mail: t.duff@huntingdon-ed.org.uk

Keighley College, Keighley, West Yorkshire will be running an RAE course which will be held on Tuesday evenings from 1900-2100, enrolment is in the first week of September. The course tutor will be Ralph Turner G3VYX. For more details, please telephone the college on (01535) 816855 or (01535) 816825.

Practical Wireless, September 1999
Limerick Radio Club (LRC) will be running a course leading to the Irish Radio Experimentalist's Examination in October 1999 at the Adult Education Centre, Sexton Street, Limerick. Please contact the Limerick Radio Club on 061-300122.

Maidstone YMCA ARS will be running RAE, NRAE and Morse courses at the YMCA Sports Centre, Melrose Close, Cripse St, Maidstone, Kent ME15 6BD. To enrol please call the Course Co-ordinator, Keith Maskell G4YTV on (01684) 831504 or alternatively, you could visit any of the Club nights which take place on Fridays and arrange it that way.

Mordern & District ARS (M&DARS) are running RAE, Novice RAE and Morse code courses at Mordern Radio Club, Harrop Hall, Mordern, South Yorkshire. RAE enrolment takes place at 1900 on Friday 10 September 1999 and the course will start at 1900 on Friday 17 September. The Novice RAE and Morse code, rolling program, any Friday. For further details telephone Tom GOKSK on (01709) 586329 or Roy GOFMY on (01977) 648561.

Murray Park Adult Education Centre will be running an RAE course from Wednesday 22 September 1999. It will take place between 1900-2100 at the centre. Murray Road, Mickleover, Derby DE3 5LD. General enquiries on (01332) 515922, 24 hour enrolment line on (01332) 518099.

Newstead Woods School, Aerebury Rd, Orpington In Kent will be running an RAE course leading to the May 2000 examination which will be held at the school. The course will take place on Monday evenings between 1900 and 2130 commencing 20 September 1999. For further details, please contact the course tutor A E Betts on (01460) 831123. Enrolment should be done through Bromley Adult Education Centre, Nightingale Lane, Bromley BR1 2SQ. Tel: 0181-460 0203.

North Bristol ARES are continuing their RAE and Morse classes and they meet in north Bristol on Friday evenings and contact details are in the RSGB Callbook or via Dick Elford G0XAY on (01454) 218092.

North Trentoford College are running an RAE and an advanced RAE course commencing 13 September 1999. The Radio Amateurs evening course will take place. Monday 1800-2030; Radio Amateurs afternoon course: Wednesday 1300-1615 and the Advanced Radio Amateurs construction: Tuesday 1300-1615. For further details please contact John Beaumont G4NGI, North Trentford College, Talbot Rd, Stretford, Manchester M32 0XH. Tel: 0161-886 7977 or contact admissions on 0161-886 7000. Early enrolment will be every Wednesday throughout July and August, 1600-1900 and 1 September. For further information, please contact Steve Dow TWIB on (01332) 404414 or by E-mail stevedow@btinternet.com for course information.

Oldham ARC (OAR) will be running an RAE Course commencing at 1800 on the 16 September 1999. The course will be geared to candidates taking the RAE in May 2000 and will be held at Mossendale Conservative Club, 633 Ripponden Rd, Moorside, Oldham. Oldham ARC is a fully registered City & Guilds Examination Centre and all candidates can sit the exam at the club. Further details from Geoff Oliver G0UHJ on 0161-452 4184 or by E-mail oar@men.co.uk

Nottingham: A 26 week RAE course starts at South Notts College, Greystone Drive, West Bridgford, Nottingham on Wednesday 15 September 1999. Class times are 1830-2100 and the Course Tutor will be Alan Lake G4DVW. For further details Tel: 0115-938 2509 or E-mail: radkit@compuserve.com

Plymouth ARC (PARS) will be running a City & Guilds RAE course starting on the first Thursday in September 1999. Classes will be held for one hour every Thursday from 1830-1930 in Room 312 on the third floor of the Streatham Building of the University of Plymouth. The course will run from September to December 1999 and the first Thursday in May 2000. Full details of the course, fees, etc., from Bob Griffiths GTNBH on (01752) 343177. Practical Wireless, September 1999.

For more information on becoming a Radio Amateur, contact Subscription Services Ltd., on 0117-925 8333 or the Radio Society of Great Britain (RSGB) on (01707) 659015 Licensing enquiries, call the RA on 0171-211 0211.

Preston Amateur Radio Society (PARS) run an ongoing Novice course which takes place every Tuesday evening from 1945-2000. The venue is Lonsdale Sports & Social Club, Fulwood Hall Lane, OFF of Watling Street Road, Fulwood, Preston. The contact for this course is Erle Eastwood G1WQC on (01772) 688768. The cost of the course is approximately £40.

Redhouse Community College, Amptill, Mid Bedfordshire will be offering an RAE course on Monday evenings starting 13 September 1999 for the May 2000 examination. Contact Mr. N. Reynolds on (01525) 404412 for enrolment details or the tuted Steve Downs G1USE on (01234) 270238 or E-mail steve.downs@btinternet.com for course information.

Rugley Adult Education Centre, Taylors Lane, Rugley, South Staffordshire - Tel: (01889) 274728 Term-time only is running an RAE course commencing from Monday 13 September 1999, from 1900-2100. Please contact Brian Smith G4EQC on (01543) 663039 for further information.

Sawston Village College near Cambridge will be holding an RAE Course (theory only) starting in mid-September 1999. Contact (01223) 834482, FAX: (01223) 836690. Or E-Mail: peterbuchen@bigfoot.com

Sharnbrook Community College, Sharnbrook, North Bedfordshire will be offering an RAE course on Wednesday evenings starting 15 September 1999 for the May 2000 examination. Contact Mrs J Barnett on (01543) 769241 for enrolment details or the Tutor, Steve Downs G1USE on (01234) 270238. E-mail: steve.downs@btinternet.com for course information.

South Normanton Alfred & District ARC (Mr Alfred, Derbyshire) are running a Novice Amateur Radio Examination Course to commence from September 1999 at New Street Community Centre, New Street, South Normanton, Derbyshire. For further details contact the Club Secretary, Russell Bradley GOORD on (01773) 663192.

South Yorkshire Repeater Group is now a registered test centre for the RAE and the Novice RAE and they will be holding an RAE course starting from Wednesday 8 September 1999. The RAE course starts from Friday 17 September 1999. Both courses take place at Valley Community Centre, St. John's Rd, Cudworth, Barnsley. For further information, please contact Ernie Bailey G4LUF., 99 Avenue, Cudworth, Barnsley, South Yorkshire S72 8RN, Tel: (01226) 716338. Mobile: (0836) 748958.

The Flight Refuelling ARS at Wimborne in Dorset will be running an RAE course starting on Tuesday 14 September 1999, new members would be welcome. Contact Tony Baker G3PFM on (01202) 622262 for full details.

The Hill College, Tile Hill Lane, Coventry CV4 8SI will be running an RAE course this year leading up to the December 1999 and May 2000 examination. For further information, please contact Student Services at the above address, Tel: (0203) 694200, FAX: (0203) 616378 or E-mail: info@tilehill.ac.uk

Widnes & Runcorn ARC will be running an RAE & Novice RAE Course at the Beacons, Simmons Lane, Frodsham, Cheshire. Enrolment takes place on Friday 3 September 1999 from 10.30. Further details can be obtained from Course Tutor Dave Bibby G1PIX on (01252) 591441 and Dave Wilson G7OWB on (01219) 261006.

Yns Mon Radio Users Group will be holding its annual RAE course at the Llangefni Scout Hall, Llangefni. In September times and dates to be verified. Any persons wishing to attend can contact the group on either (01470) 702197 or E-mail Tony.Ancian@gofrev.co.uk
Richard Newton G0RSN, our keen h.f. mobile operator, takes a look at the Icom IC-706 MkIIIG and says he likes its appearance and layout (but what did he think about its operation)? To answer, he begins with a look at its features and then describes how effective it was on air.

The Icom IC-706 MkIIIG

I have always been a keen h.f. mobile operator and, in particular, have a fascination with small h.f. radios. Whenever I think about small h.f. transceivers, the IC-706 always springs to my mind. This little bundle of fun started out a few years ago by astounding the market with its features - mainly, all the h.f. bands, 50 and 144MHz and all in one little radio! Icom didn't rest on the laurels of its success where their IC-706 was concerned though, they've been improving its excellence ever since. Now they've added another string to the '706 bow, the Icom IC-706 MkIIIG, which includes 433MHz!

What's The Fuss?

So, what's all the fuss about? Just what is the Icom IC-706 MkIIIG? Well, to answer, it's a very smart 'box', measuring a modest 167mm wide by 85mm high and 200mm deep (not including its projections) and inside this relatively small 'box' is packed a veritable arsenal of functions and features.

As well as general coverage (g.c.) receive from 30kHz to 199MHz and receive from 400 to 470MHz, the IC-706 MkIIIG has an all mode transceive capability on all the amateur h.f. bands, 50, 144 and 433MHz. The '706 MkIIIG delivers variable power settings of up to 100W on h.f. and 50MHz, up to 50W on 144MHz and up to 20W on 433MHz, although transmit powers on a.m. are somewhat reduced on all bands.

Where do I start? Well, let's try taking a look at an overview of the radio itself. One of the first things which might strike you about the IC-706 MkIIIG is that it has a detachable front head and all the controls of the transceiver are on this head. (See Fig. 1). The head is very easily detached (and reattached) and, when used with the optional cable, the radio can be boot-mounted and the head easily mounted in the front of a vehicle. Whilst trying out the transceiver I found that, because I was able to remove the head so easily, it was also a good security feature, even when not using the separation cable.

My first impression of the Icom IC-706 MkIIIG was its appearance - I thought that it looked very good. The controls are well laid out and Icom have made the best of space, allowing easy access to controls along with a decent size display. The radio appears to be well made and is professionally finished. The '706 MkIIIG has a quality and an attention to detail which immediately gives you confidence in its ability.

One example of the quality of this rig would be the rubberised ring which is situated around the outside of the tuning knob, making it a pleasure to tune. In contrast to the IC-706 MkI, I am pleased to say that most of the more important controls on the front panel are now backlit. (See Fig. 2).

To mention all the controls for the radio would be both pointless and laborious. I will, however, mention a few. The 'Phones' 3.5mm jack socket can be set to output either for headphones or for a speaker. (See Fig. 1, on the bottom left hand side of the front panel). The a.f. (volume) and r.f./Squelch controls are on one set of rotary controls whilst the Memory channel select and the Lf. shift controls share another. Both are well spaced and of a good quality.

The extensive v.f.o. range of the IC-706 MkIIIG can be accessed in several ways. The first way is by tuning up and down in varying steps using the tuning knob and the TS (Tuning Step) button. The main tuning knob has a convenient friction brake which increases the tension on the knob. (See Fig. 3). I found this to be very useful when I was using the '706 MkIIIG in the car, as it was less likely to slip off frequency. The radio can easily be 'locked' to a given frequency as well.

Alternatively, you can navigate by amateur bands by use of the band keys which will take you up and down through the bands. Another improvement which, I feel, has been made over the MkI is the tuning. I found that the MkIIIG was a lot easier to operate as far as tuning was concerned.

Advanced Functions

The advanced functions on the IC-706 MkIIIG are accessed by means of a two-tier menu system. The more frequently used functions, such as setting transmit power, microphone gain, VOX, and CTCSS tones for repeater access, can all be done easily by pressing the 'Display' button for far less than two seconds.

More advanced parameters are set by tuning the MkIIIG on while depressing the 'Lock' key which will give you access to a large menu of features and parameters which include setting the off set for repeater operation on 144, 433 and 50MHz and h.f.; tone search during CTCSS operation; c.w. settings and many more.

The operating controls and features are cleverly accessed via three buttons on the front panel called 'F1', 'F2' and 'F3'. The designation to these buttons is displayed above them on the I.c.d. - the designation can be changed fairly simply by toggling through different menus which gives the operator a larger number of features accessed only by a few button presses.

The features under each set of controls also change depending on the menu you are using. For example, in c.w. mode the controls under the 'M4' set of commands are like this. 'F1' is... (this gives extra fine-tuning) 'F2' is BRK (this selects semi or full QSK break-in facility) and 'F3' is the automatic gain control (a.g.c.). Changing the radio to side band operation automatically changes the 'M4' set, 'F1' becomes VOX, 'F2' becomes COM (speech compressor) and 'F3' remains the control for the a.g.c. circuit.

Do not be put off by my rambling about menus and F buttons. It's so difficult to try and explain, in words, how the functions are set up, the IC-706 MkIIIG is very easy to use.
The MkIIG On Air!

I decided that it was time to get the '706 MkIIG on the air. My first QSO was on 51MHz with Peter 2E1HFD. He was only about 15km away from me and was using his Icom IC-706. He was kind enough to give me a report on both 50 and 433MHz and his report on the '706 MkIIG audio was very favourable.

Peter told me that the MkIIG was, "Beautiful modulation, BBC quality." I received him very well on 433MHz and felt that the '706 MkIIG had passed its first u.h.f. test very well. Norman G7VIK, who was situated just up the road from me in Bournemouth, joined us. He also gave the '706 MkIIG's performance on this contact.

I was joined in the shack by my two sons, four year old Oliver and five year old Thomas. I can only assume that Oliver was prompted by all the contacts I was getting, but he made a completely unsolicited remark that I just had to quote. He said: "Works fine doesn't it Daddy?" "Yes Oliver", I replied, "it does".

On The HF Bands

The IC-706 MkIIG had done well on 433MHz, I'd had some good reports and managed to work both the Salisbury and the Weymouth repeaters. Content that the '706 MkIIG had proved itself on the higher bands and being particularly impressed with the newest band of 433MHz, I decided to try out the radio on the h.f. bands.

I made a simple contact with G3XFD near Wincanton. The contacts on 50, 145 and 433MHz started coming in thick and fast and we had a pleasant chat. One of the best contacts I had, proving the receive capabilities on 433MHz, was a simplex contact with Dave G3ZXM (near Wincanton). He was on the way home from doing more work to the new 50MHz repeater GBSW near Wincanton - good luck with that one Dave. I was very pleased indeed with the '706 MkIIG's performance on this contact.

I was joined in the shack by my two sons, four year old Oliver and five year old Thomas. I can only assume that Oliver was prompted by all the contacts I was getting, but he made a completely unsolicited remark that I just had to quote. He said: "Works fine doesn't it Daddy?" "Yes Oliver", I replied, "it does".

The IC-706 MkIIG had done well on 433MHz, I'd had some good reports and managed to work both the Salisbury and the Weymouth repeaters. Content that the '706 MkIIG had proved itself on the higher bands and being particularly impressed with the newest band of 433MHz, I decided to try out the radio on the h.f. bands.

I made a simple contact with G3XFD near Wincanton. The contacts on 50, 145 and 433MHz started coming in thick and fast and we had a pleasant chat. One of the best contacts I had, proving the receive capabilities on 433MHz, was a simplex contact with Dave G3ZXM (near Wincanton). He was on the way home from doing more work to the new 50MHz repeater GBSW near Wincanton - good luck with that one Dave. I was very pleased indeed with the '706 MkIIG's performance on this contact.

I was joined in the shack by my two sons, four year old Oliver and five year old Thomas. I can only assume that Oliver was prompted by all the contacts I was getting, but he made a completely unsolicited remark that I just had to quote. He said: "Works fine doesn't it Daddy?" "Yes Oliver", I replied, "it does".

The IC-706 MkIIG had done well on 433MHz, I'd had some good reports and managed to work both the Salisbury and the Weymouth repeaters. Content that the '706 MkIIG had proved itself on the higher bands and being particularly impressed with the newest band of 433MHz, I decided to try out the radio on the h.f. bands.

I made a simple contact with G3XFD near Wincanton. The contacts on 50, 145 and 433MHz started coming in thick and fast and we had a pleasant chat. One of the best contacts I had, proving the receive capabilities on 433MHz, was a simplex contact with Dave G3ZXM (near Wincanton). He was on the way home from doing more work to the new 50MHz repeater GBSW near Wincanton - good luck with that one Dave. I was very pleased indeed with the '706 MkIIG's performance on this contact.

I was joined in the shack by my two sons, four year old Oliver and five year old Thomas. I can only assume that Oliver was prompted by all the contacts I was getting, but he made a completely unsolicited remark that I just had to quote. He said: "Works fine doesn't it Daddy?" "Yes Oliver", I replied, "it does".

On The HF Bands

The IC-706 MkIIG had done well on 433MHz, I'd had some good reports and managed to work both the Salisbury and the Weymouth repeaters. Content that the '706 MkIIG had proved itself on the higher bands and being particularly impressed with the newest band of 433MHz, I decided to try out the radio on the h.f. bands.
I'd hoped that my good friend, Hank K2IJB, from New Jersey would be able to help me, so I arranged a sized at very short notice and we tried for a contact on 21 and 18 MHz. I've only got a 20 m long wire, poorly positioned in the back garden at the moment and it was to prove insufficient to be able to have a contact with Hank. Again the 706 MkIIG receiver proved itself, I could hear Hank reasonably well on both bands, he, alas could not hear me.

I tried on the lower bands and got the following report from Derek G3NKS (well known for his work on Four Metre News for 70MHz fans) on 7MHz. Derek was situated in Cheltenham and gave me a 5 and 9 report and said, "it sounds very good, natural, crisp and clear."

It was with this excellent report still ringing in my ears that I then had a multiple contact with Dave G6BDV/V in Milford on Sea, using his ICF-706 MKII, Colin G3EIG in Ringwood, Ron G6FBR in Bournemouth and Ernie ZE2/EFRY on 50MHz fm. To my dismay and amazement, I was told that the audio was abysmal, it was sounding overdriven and distorted!

After much worry, I noticed that the speech compression was still activated from when I was on the air. At first, I dismissed this as a possible cause as I didn't expect this to be activated when in f.m. mode. However, in desperation I reverted to side band, turned off the compressor and went back to f.m. and was informed that the audio was now excellent!

The receiver on the IC-706 MkIIG on the h.f. bands was quite impressive, I heard Aki 9J2AM from Zambia romping in on 18 MHz one evening, but something rather disturbing - we'd taken a portable 'power station' that normally keeps my 145 MHz radios on the market, it represents excellent value for money, much packed into such a small space and, compared to other appearance. It's very easy to operate, considering that it has so extremely well. It's a well-built radio with an impressive key, connectivity is excellent and compared almost like for like with my little hand-held.

The IC-706 MkIIG is designed for mobile/portable use, but it's just as capable of being a reasonable base station. In my opinion, its greatest strength has to lie in the size - to - battery, be warned - you may need a push!

Icom have told PW that they have a special offer at the moment if you order an IC-706 MkIIG from them you will receive a free IC-706 MkIIG which I've now reviewed all three versions of the IC-706 and, in my opinion, the 706 MkIIG lives up to its predecessors extremely well. It's a well-built radio with an impressive appearance. It's very easy to operate, considering that it has so much packed into such a small space and, compared to other radios on the market, it represents excellent value for money. I was very impressed with its performance on all bands, especially the new additional 43MHz band. I can see that with the advent of the A2 licence, a radio such as the Icom IC-706 MkIIG is going to get more and more popular - it will give most operators everything they would want in one magnificent little unit.

My thanks go to Dale Blackman and Ian Lockyer at Icom UK Ltd for the loan of the Icom IC-706 MkIIG which costs £1199 including VAT. You can contact Icom UK Ltd on 01227-741741. FAX: (01227) 741742. Sea Street, Herne Bay, Kent CT6 8LD.

Icom have told PW that they have a special offer at the moment - if you order an IC-706 MkIIG from them you will receive a free IC-T8E tri-band handheld! An offer you will not be missed!
C.M. HOWES COMMUNICATIONS
www.howes-comms.demon.co.uk

Build Your Station in Easy Stages!

DC2000 SSB & CW Receiver Kit
Great for the beginner as well as the experienced QRP'er. Plug-in band system. DC2000 Kit: £22.90 (one band module included). Extra band module kits: £7.90 each, from 160 to 10M. H2R2 hardware (painted top left): £18.90.

TX2000 QRP Transmitter Kit

LM2000 Linking Module
Fits in receiver to link to transmitter. Side-tone, tuning, L/W, CW filter kit. £16.30. Total to build this QRP Station: £99.90 (plus postage)

Audio Filter - £29.80. Clean up your reception!
Reduce noise and interference. Sharp SSB / Speech filter with faster rolloff than IF crystal filters. 100 kHz bandwidth (CW filter) Printed and punched front panel. AL aluminium case. TC8081HG connects between radio and extratuner/doubler or headphones. Subs receivers & transceivers. ASL kit plus H2AR hardware pack: £29.80.

ANTENNA
DIAMOND V2200 £50.00
COMET CFX 514 £54.00
COMET CF 706 £44.00
CUSHCRAFT AR2 £28.00
TOWNA RIFT 135 £70.00

MAIL ORDER TO: Eydon, Daventry, Northants. NN11 3PT
01327 260178

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

MULTIBAND SSB Receiver
DX2R0. Covers SSB and CW on 20, 40, 60 & 80 bands as standard. Optional extra plug-in band modules available. Can link to TX2000 or AT160 for transceive (by adding LM2000 linking module). Versatile and popular, with great performance!

DX2R0 Kit: £39.90. DCS2 "5 meter" Kit: £10.90. H2AR hardware pack: £28.90

Multiband SSB Receiver

Top Value Receiving ATUs

CTU8: covers 500kHz to 30MHz. Efficient, flexible "T match" circuit. 30259 sockets. Improve your antenna performance!
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 BXR2 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 screen printed pads and technical advice are available by phone during office hours. Please send a SAE for catalogue and specific product data sheets, or you can browse this information on our Internet Website (URL at top). UK delivery is normally within seven days.

7 Days from Dave G4HMQ, Technical Manager.
Counting Up From The Millennium!

Most of us are somewhat tired of the various 'count downs' to the coming Millennium. However, Rob Mannion G3XFD is doing something quite different by 'counting up' from the Millennium! Rob is letting his imagination run wild with 'cuttings' of imaginary Amateur Radio 'news' item which (might) appear in the magazine in future years. They're intended to be thought provoking, sometimes controversial and interesting but above all ... totally imaginary!

Mystery Objects - A Radio Connection?

Half a dozen or so 'mystery objects' have been unearthed from below what appears to have been a workshop in a garden in the town of Poole, formerly in the old county of Dorset. The Federated English States (Wessex Region) industrial archaeologists were called in to examine the - mostly well preserved - items which were complete with what appeared to be connecting wires.

Speed was of the essence if the remarkable find was to be fully explored before work on the new Eurolink-Freeway from the West Country starts. And as the Freeway - especially designed for guided multi-trailer 200 tonne lorries is due to open in 2011 they had to be quick!

Experts believe that the objects are actually electronic components dating from the mid 1960s which, if true, are a remarkable find as they are around 150 years old. Preserved in dry, salt-free sand under an old-fashioned plastic membrane (once commonly used to keep the damp out of buildings) even the colours are easily indistinguishable. Additionally, one of the specialist team (a bio-chemist) states that "Some even appear to have a thin coating of a wax-like substance. What this could mean we don't know" he told our reporter.

Colour Coding?

The largest items found have coloured bands marked on them and it seems - from references to old electronics manuals that the colours refer to numerical codes. Nowadays of course, all electronics - including active multiprocessors - are organically grown by genetic engineering. There's no need to wire up (in those days they used metal wire to provide interconnections rather than the present day electrically conductive vegetable fibres which are of course now 'grown' in order) components, all that's needed in the assembly units today is for the relevant genetic information to be fed to a bio-computer and it will produce the vegetable protein circuit required.

One or two of the items were broken, and this led to another mystery! Some appear to be made up of fine metal strands, using alloys that have disappeared into the mist of time and some contained carbon. Holographic Spectrographic analysis even identified (from very old records) one alloy called 'Constantin'. Next job is to find out what this material was used for.

Three Pins

One - rather rusty - three pinned device appeared to contain layers of silicon with the addition of other materials. Further investigation showed traces of the long since banned alloys of lead and tin often referred to as 'Solder' in the history books. In the next issue of Industrial Archaeology Today we hope to bring more news of the interesting objects found in Poole. Much more has to be unearthed yet!

Please direct any correspondence or comments to the PW office in the correct year - remembering to add the relevant space-time-warp code.
Most advertisements are legal, decent, honest and truthful. A few are not, and, like you, we want them stopped.
If you would like to know more about how to make complaints, please send for our booklet: 'The Do's and Don'ts of Complaining'. It's free.

The Advertising Standards Authority.
We're here to put it right.

ASA Ltd., 2 Torrington Place, London WC1E 7HW
This space is donated in the interests of high standards of advertising.

**Bristol Radio & Computer Rally 1999**

**Sunday 5th September 1999**

Brunel Centre
Temple Meads Station, Bristol

10.30am to 4pm
(Disabled from 10.15am)

**Admission: £1.00**
(Accompanied children under 12 - FREE)

**Parking: £1.00**
(Large NCP opposite entrance)

- Over 150 tables
- Table hire at £15.00 each
- Large Bring & Buy
- Under £30.00 Bring & Buy
- ATV demonstration
- Raffle
- Refreshments

For more information or to book tables contact Muriel Baker G4YZR (QTHR)
Tel: 01275 834282
(24 hour answerphone)

---

**HF AMPLIFIERS**

- **AMPLIFIER**
  - Single or double, (8876) or a
  - typical HF amplifier
  - Output: 10kW
  - Price: £1995

- **EXPLORER 1200**
  - 2 x 500W AM
  - Up to 1100W output
  - Price: £1995

- **HUNTER 1000**
  - All features the same as the Replika 1100 except that it uses a single 3-500G as drive-sound.
  - Price: £1195

- **RANGER 811F**
  - 4 x 80W and 54kW output
  - Price: £895

---

**VHF AMPLIFIERS**

- **DISCOVERY**
  - 2 m
  - Single 2500VA rectifiers
  - 2000W output
  - Price: £1995

- **ENGINEER**
  - Electrical output 2m model except for the C/P
  - Price: £1595

- **DISCOVERY**
  - 2 m
  - Single 1000VA rectifiers
  - Price: £1395

---

Please mention Practical Wireless when replying to advertisements.
Ben Nock G4BXD, one of our resident 'Valve & Vintage' authors, specialising in military equipment, writes about the 'Spy Set' a set which, he claims, has been a fascination with "many a collector and radio enthusiast for years".

The 'Spy set' has been the fascination of many a collector and radio enthusiast for years. The idea of operating a clandestine set, hidden from detection, running off batteries with a bit of wire as the antenna, while working the world, is a great attraction to many.

As with most things however, the reality is not as attractive. Operating low power (usually crystal controlled) from batteries, with a bit of wire as the antenna, usually results in frustration and depression when very few, if any, stations are contacted.

The romance of operating as a spy greatly exaggerates the practicality of such operation. It's true that, way back in the dark days of the early 1940s, the operator in the field had less QRM to deal with, less interference from other radio traffic, a nice big home base signal to listen to and the knowledge that their crystal controlled transmissions were being monitored by decent receivers with great big antennas, both his own and the enemies. Their chances of success were a lot higher than someone operating on today's crowded, noisy bands.

However, pushing aside the problems of practicality, let's now look at a few 'spy' sets that you can still press into service and possibly get a contact on these days.

The No. 121 Set

I'll start with the No. 121 set, but I have to admit that I know very little about this set (see Fig. 1). Upon acquiring the example shown, I did ask (in the appropriate circles) for any information anyone else had. I received one reply, from that well known collector Bob Warner, who gave me a circuit diagram and a snippet of information about the 121.

Apparently, the 121 and the 122 set are nearly identical in layout with the slight electrical difference that the 121 is a single band set while the 122 is a three band set. The 121 was supplied in five different versions covering 2.9-6MHz, 4.4-8MHz, 6.6-14MHz, 8-17MHz and 9.4-20MHz. However, pushing aside the problems of practicality, let's now look at a few 'spy' sets that you can still press into service and possibly get a contact on these days.

The Blue Brick No. 123

Although the number is amazingly close to the previous set, the two could not be further apart in style and appearance, the 123 far surpassing the 121. The Mk 123 set (see Fig. 2), tuning 2.5-20MHz, bears more than a passing resemblance to the 121 though, it to has its receiver on the left, its multi voltage p.u. in the centre and the transmitter on the right.

The receiver uses three valves in a standard single conversion superheterodyne design, with an i.f. of 470kHz. The transmitter uses two valves, a crystal oscillator and a class C p.u. stage.

In addition to the set box there's a vibrator supply unit operating from 6V, luckily I acquired the vibrator supply at the moment, I get about 11W out on 3.5MHz into 100 to 250V a.c., selectable in 10V steps and over a range of frequencies from a supply of 40-400Hz.

The 121 in the photograph, though not in its original case, is fairly complete. The case was found at a rally and had once housed a domestic radio. It just happened that its dimensions were correct with about a quarter of an inch extra, so it was purchased, much to the surprise of the trader, to house the 121.

It appears that someone has done a modification to the p.a. stage but this could be undone with ease. With the 6V6 in it at the moment, I get about 11W r.f. out on 3.5MHz into 50Ω.

The date of the set is difficult to guess, though the few printed sheets sent by Bob are dated January 1960. The style of the set does look dated, though I guess that as it was conceived towards the end of the 1950s perhaps that does explain it.
the Lo. circuit. The i.f. signal is amplified by an EF73 and fed to the detector valve, an EA76. The bfo, uses an EF73 and the audio output stage an EF73 with a resistive load giving output suitable for high impedence phones. A 'crash' limiter comprising of a pair of semiconductor diodes wired back to back is fitted across the phones connections.

The receiver has a quoted i.f. response of around 10dB at ±5kHz. Sensitivity is quoted as around 3µV at 2.5MHz, falling to 30µV at 20MHz.

The transmitter is a two valued unit, a 5A/163K oscillator/doubler and a 5B/251M or 254M p.a. valve giving up to 25W. An OCT1 transistor operates as a side tone generator, the only mode of operation is c.w.

The No. 128 Set

Obviously designed by the same team as the 121/122, the No. 128 set comes in separate units, though. The receiver and transmitter are housed in their own little cases, the various power supplies being external as well.

For the usual configuration for the 128 is in its green canvas carry case as pictured (see Fig. 5), the side pockets holding the batteries, headphones, microphones and key. There was also an arrangement where the 128 was housed in a wooden box affair.

The photograph of a 128 installed in a brown leather suitcase (see Fig. 5) is my idea of a spy set and would not have been seen in service. It's just easier and less conspicuous to carry a suitcase around than have a green pack on your back.

The B2

The B2 spy set, or more correctly the No. 3 Mk II, the idol of so many spy films, came in an infamous leather case. This, or so I've been told by an ex-agent, was so self-evident that landladies in the south immediately knew who the clandestine operators were awaiting transportation to a mission.

In addition to the suitcase, the B2 was also supplied in a metal case, ideal for transporting through thick jungle or over mountains after being parachuted in. The transceiver and receiver were in one box, the p.s.u. and spares in another. (See Fig. 6).

As can be seen in the pictures, with the suitcase version the power supply is on the right, spares box on the left and set in the middle. The transmitter has plug-in p.a. coils and the receiver's dial is viewed through a tiny fish eye lens, not the easiest set to use.

While not actually a miniature set, the B2 was however extremely compact, being about 450mm wide by 300mm deep and about 100mm tall, a completely equipped case weighed about 15kg (32lbs), not exactly light. The receiver uses four valves in a superhet circuit while the transmitter uses two valves, crystal oscillator and p.a., a good 30W of r.f. being available.

The power supply was able to run from a.c. mains, between 90 and 250V or 6V d.c., a vibrator being built in to the p.a. chassis.

The vibrator was useful in the event of the enemy cutting the domestic supply in order to locate the site of the transmitter. Switching over to the d.c. supply could fool the enemy into thinking the set was elsewhere.

Odd Little Receivers

Every now and then, there appears on the surplus market, these odd little 'spy' or clandestine receivers. Little is known about them and little is published, making it doubly difficult to write any really helpful material.

The Mk 301 (see Fig. 8), as it's apparently called, is a real tiny and compact set, this being the right hand one in the photographs. The open box by its side with the battery showing holds that and another battery, about 67.5V or so, supplying the h.t. This box also holds the earphone and antennas leads when not in use, while the lid of the box has a frequency scale set against the dial numbers seen on the set.

The mid 1950's Mk 301 tunes 600kHz to 18.5MHz in four bands, the band being selected by pulling off the coil pack and either reversing it or turning it over. The set has a b.f.o. and provision for attaching a wire antenna and ground lead. Five valves of the D variety are used, one B7G the others being the miniature wire ended type.

A 'drop in' replacement a.c. power supply is available that replaces the batteries in the spares case. In addition to the h.t. voltage, the i.f. is generated and developed across a miniature battery. When not in use, both the a.c. is turned off and the on/off switch on the receiver set to off to stop this cell discharging.

The other set in the picture, Receiver Radio Mk 328 as it is referred to, is a far more modern looking set, actually using transistors this time. This set covers 2.5-30MHz in five bands, has a b.f.o. and a 1MHz and 250kHz calibrator built-in.

A 'screw-in' whip antenna can be used or an external antenna and earth attached. Power comes from a couple of penlight cells, though 6.75V variety, held inside the set or again, an externally connected 10.5-16V supply can be used.

The set is tuned using a rolling film scale which is visible through a small perspex window in the bottom left of the set. A sliding cursor allows accurate frequency setting using the calibrator. He's not known how many of this set, and the 301, were made but this 328 has the serial number 297.

Many Other Sets

There are many other small, clandestine sets still to mention. These include for instance the MCR1, another receiver only, the 53 Mk I receiver, the 61/7 transceiver, the A Mk II and Mk III suitcase sets, the Polish AP4 and BPI transceivers and the Mark XV receiver and transmitter to name but a few.

There are, of course, many more from other countries. Hopefully, I can continue my research and bring you further information on these and others in the near future. My thanks go again to Bob Warner for his photo of the B2 and his help in verifying the information used in this article.

*Photo by B. Warner*
We stock all you need to build your own PC and the peripherals to help you use it.

K62-350 £39
We have AMD / Cyrix / Intel

visit us at http://www.ronal.freeserve.co.uk

Hewlett Packard 610C
£ 78
Ask about our range of printers

Don't forget we have
Motherboards, Fans,
Memory, FDDs, HDDs,
CD-ROMs and lots of
other bits

Mustek Scanner 6000P(300x600) only
£41
We build PCs to order
Prompt mail order service

All prices include V.A.T, but exclude delivery.
This is only a small selection of our stock, please phone for prices or items not mentioned.

CO, CO, New A/B Licence...M5???
The Radio Society of Great Britain has yet again led the way forward with the introduction of a new class of amateur radio licence...

Exciting news for Class B licencees
* NEW Class A/B licence to provide access to all HF bands
* 100 watts PEP level

Plus! Exciting News for Novices
* Novice licencees on 2m
* VHF allocations on existing bands
* Higher output power

A full range of free membership benefits is readily available including a monthly 100 page colour magazine, RadCom, delivered to your door for only £36.50 annually or £9.62 quarterly, Direct Debit (£29.50 over 65; £24.50 students; £14.50 under 18)

Act now and enjoy your hobby to its full potential

01707 650015 to join or for a free copy of RadCom

Radio Society of Great Britain, Lunters House, Crabtree Road, Potters Bar, Herts EN6 3JE
Cheque/Postal Order payable to Radio Society of Great Britain

Please enrol me as a member of the RSGB

Name (last, first, mi.) ___________________________ Call Sign ___________________________
Address ___________________________________________ Postcode ___________________________
Town ___________________________ Signature ___________________________ Date ___________________________

...The Voice of Amateur Radio for over 85 Years

Please send me a Direct Debit form

40 Practical Wireless, September 1999
August 13: The Cockenzie & Port Seton Amateur Radio Club are holding their 6th Annual Radio Jamboree Night at the Cockenzie & Port Seton Community Centre, South Seton Park, Port Seton, East Linton, Scotland, from 1830 to 2130. Bring along your own jug and sell yourself. Tables will be provided on a first come first served basis - with no charge for the table. There will be a raffle at approximately 2100 and refreshments will be available. Discounted access. Entry fee is just £1 per person, with all money donated to the British Heart Foundation.

Bob Glasgow GM4UYZ & GB7DJD (on 01975) 817282. E-mail: r.glarigoss@m4.0:400.wins.iel.co.uk or bob.gm4uyzt@tinternet.com

August 22: Telford Rally & Computer Fair will be held at Telford International Centre. Opening at 1000 there will be Morse tests (Inc A/B), Bring & Buy, flea market, licensed bar, catering, disabled facilities, special interest groups and trade stands. Exit at Junction 5 of M5. Talk-in on GB4TRG on 145.500 (S22); GB7TP (RB) (07887) 883296 (new). Further information from John带领er i6.freebase.co.uk Tel: (01952) 681413 or (01952) 770922. Website: www.telford-rally.co.uk

August 29: The Milton Keynes ARS Annual Rally & Car Boot Sale is to be held at the Bletchley Park Museum, Wolverton, Milton Keynes. Open from 0800 for traders, 0900 for buyers. Museum open with tours. Morse test on demand (bring two passageways size photos). Talk-in on S22. Contact Dave G3ZPA on (01908) 501310.

August 29: The Torbay ARS are holding their annual rally at Churston Grammar School near Brixham. A wide variety of traders will be present and food refreshments will be available. Doors open at 1000. Further details from Peter G4VTO Tel: (01803) 684528.

August 29: The Coleraine and District ARS will hold its annual Radio Rally in the Ballyhated, Cleefyn Rd, Coleraine, Northern Ireland. Full catering facilities available in Hotel. Why not stay overnight and visit the famous Causeway Coast? Doors open midday. All enquiries to G3LTH on (01235) 823989 or G1T0ONQ on (01235) 825502.

August 30: The Huntingdonshire Amateur Radio Rally are holding their rally at the Eynsham Community Centre, St. Neots, Cambridgeshire (near Tesco Superstore on the A428). Doors open 1000 till 1400 and admission is just £1. Hot and cold refreshments will be available. Features hall and car boot sale on hardstanding. Talk-in on S22. David Leech G7DEU on (01480) 433303 (between 0900 and 2100).

September 5: The Andover Amateur Radio Club are holding their annual Radio Rally and Boot sale at Middle Wallop Airfield near Andover, Hants. Talk-in on S22. Tables and further information available from Jim G4NWJ on (01903) 610034 or E-mail: liscountrypursuit.freeserve.co.uk

September 5: The Bristol Radio & Computer Rally is to be held at the Brunel Centre, Temple Meads Station, Bristol. Doors open 1000 till 1800 (disabled entry from 1010). Admission is just £1, accompanied children under 12 free. Features include 150+ tables, large Bring & Buy, under £10 Bring & Buy refreshments, on-site parking £3.50, also NCP £1 opposite, ATV demonstration and a raffle. Details from Muriel Baker G4ZTR, Rally Manager, on (01275) 834382 (24hr. answeringphone).

September 11: The Reddish Rally is to be held at 1000 to St Mary's Parish Hall, Reddish, Stockport. More information from G4ILM on 0161-477 6702.

September 12: The Lincoln Hamfest will take place at the Lincolnshire Showground on the A15, five miles north of Lincoln. There will be extensive free parking and overnight facilities for tents and caravans for the previous arrangement. There will also be a licensed bar, catering on the day, trade stands, flea market, Bring & Buy, car boot sale and Morse tests. Talk-in on 2m. Other 'non radio' attractions. Admission is £2 per person (under 14 free). Bob G3VBD on (01522) 333223.

*September 25-26: The Leicester Amateur Radio Show will be held at the Castle Donington International Exhibition Centre at Donington Park, Castle Donington, Leicestershire. The hall itself is purpose built and features a floor area approximately one third larger than the two Granby Halls. There is free parking and easy access. with good, inexpensive facilities for tents and caravans by overnight arrangement. There will also be a licensed bar, catering on the day, trade stands, flea market, Bring & Buy, car boot sale and Morse tests. Talk-in on 2m. Other 'non radio' attractions. Admission is £2 per person (under 14 free). Bob G3VBD on (01522) 333223.

**DELUXE HIGH STRENGTH BASE ANTENNAS**

- Made to last, from the highest quality materials. These are no "chinese copies". Sturdy, reliable and high performance. All have N socket base connectors, and incorporate a custom inclination system allowing them to be tilted 90° without keys or tools. The UHF male antenna connector has a gold plated centre pin, Teflon insulator and a silicone tilted 90° without keys or tools. The UHF male antenna connector has a gold plated centre pin, Teflon insulator and a silicone tilt. All have N socket base connectors, and incorporate a custom inclination system allowing them to be tilted 90° without keys or tools. The UHF male antenna connector has a gold plated centre pin, Teflon insulator and a silicone tilt. Available only by mail order from our sole distributor.

- Suitable mobile mounts are available.

**DELUXE HIGH STRENGTH BASE ANTENNAS**

- Made to last, from the highest quality materials. These are no "chinese copies". Sturdy, reliable and high performance. All have N socket base connectors, and incorporate a custom inclination system allowing them to be tilted 90° without keys or tools. The UHF male antenna connector has a gold plated centre pin, Teflon insulator and a silicone tilt. Available only by mail order from our sole distributor.

- Suitable mobile mounts are available.

**DEVELOPMENT SETUP**

- Short Wave Magazine
- Practical Wireless, September 1999
- OFFERS CLOSE 20TH SEPTEMBER

- 2M MONO BAND MOBILE
  - HP2000 Length 1.23m £99-70 £36.00
  - 5/8×
  - HP2000C Length 1.97m £46-70 £39.00
  - 2 x 1/2×

- 70CM MONO BAND MOBILE
  - HP7000 Length 0.42m £36-70 £32.00
  - 5/8×
  - HP7000C Length 0.73m £42-70 £37.00
  - 2 x 5/8×

- 2/70CM DUAL BAND MOBILE
  - HP2070 Length 0.45m £36-70 £32.00
  - 1/4 × 5/8×
  - HP2070H Length 1.05m £46-70 £39.00
  - 1/2 × 2 × 5/8×

- 70CM MONO BAND VERTICAL BASE
  - SA703N Length 1.8m £67.45 £62.00
  - 3 × 5/8×
  - SA705N Length 2.8m £87-45 £77.00
  - 5 × 5/8×

- 2/70CM DUAL BAND VERTICAL BASE
  - SA270SN Length 1.3m £67-45 £62.00
  - 1/2 × 2 × 5/8×
  - SA270MN Length 1.8m £99-70 £77.00
  - 6/8×, 3 × 5/8×
  - SA270LN Length 2.7m £97-45 £87.00
  - 2 × 5/8×, 5 × 5/8×

- 6M MONO BAND VERTICAL BASE
  - GP49-70 Length 2.5m £99-45 £89.00
  - 1/4 × G, Plane 49-70MHz £69-00 £62.00
  - 500W SO239 Socket Mast 40mm

**MULTIBAND TX/RX DELUXE DISCONE**

- SD1300N Length 1.7m £97-45 £89.00
- TX MHZ: 49-51, 120-180, 215-300, 415-465,
- 610-850, 710-1100, 1310-1500,
- RX MHZ: 25-1300,
- 2.15dB Gain VHF 300W, UHF 200W

Available only by mail order from our sole distributor:

**EASTCOM**

Cavendish House, Rippsburgh, North Walsall

Free UK mainland carriage! For full catalogue send £2 in stamps.
Save yourself a fortune in OUR SUMMER SIZZLER SALE

**SALE NOW ON!**

*We also have a few prime used examples—please call.*

**Yaesu FT-1000MP**
HF Bands including DSP
Most of the top CDXC members use FT-1000MP's—supplied by MILUS. We have a couple of a "brand new" used AC versions supplied with full 12 month warranty. We also have a batch of boxed UK supplied units at the lowest price in the U.K. Give us a call.

**SALE NOW ON!**

**Yaesu VX-5R**
- 5 Watts out of the Best

Yup, it’s true. The VX-5R is the best selling handle available today. 20/40/80 as standard. Lithium battery and easy to use.

**SALE NOW ON!**

**Icom IC-C801E**
The only handle with all FOUR bands, 6/7/12, 80W output. Superb computer with Nicad charger. Save yourself a fortune IN OUR SUMMER SIZZLER SALE

**SALE NOW ON!**

**Yaesu FT-920AF**
HF Bands + 6/8/10/12
Save yourself a fortune in OUR SUMMER SIZZLER SALE

An excellent Base Transceiver for operation on HF or Six. The new FT-901 comes supplied with A50/694 units and a free Base supply to run it.

**SALE NOW ON!**

**Elephant**

Save yourself a fortune in OUR SUMMER SIZZLER SALE

**SALE NOW ON!**

**Kenwood TH-D7E**
More of a hand held Data Communicator than a hand held. 2100 220 MHz Packet modem. Lovely.

**SALE NOW ON!**

**Icom IC-950**
Simple Twin Band Remote Head 27050W/SW Mobile.

**SALE NOW ON!**

**Kenwood TMG-707**
Twins Sester with a bloody great display that’s easy to read. Remote Head & the usual features.

**SALE NOW ON!**

**Yaesu FT-8100**

**SALE NOW ON!**

**ONLY**

If you want the best HF performance and a true ‘digital receiver’, for repeater capability mobile, then this is it!

**SALE NOW ON!**

**New**

**Yaesu VX-1R**

**SALE NOW ON!**

**ONLY**

The smallest cutest modem loss
- Bunt in 40 Packet Data Communssator
- With a few prime used examples—please call.

**SALE NOW ON!**

**New**

**Icom IC-2800**

The only Dual Band with a TFT Colour display with Video Input. Ideal for Packer, Slow Scan etc.

**SALE NOW ON!**

**New**

**Yaesu FT-90**

The worlds smallest, lightest
- WATT Twin Band Remote Head Radio.

Available end of August, this remarkable transceiver leaves the competition in its dust. It literally is HALF the size of similar competitors and yet still offers the same features AND a remote head.
Kenwood TS-950SD

All the new 950SD/2s are gone but we always have a selection of prime used stock available. TS-950SDs from only £495 and "X"s from only £229. If you have the sales desk a call.

From Only £1495

YAESU Quadra VL-1000

ACCURATE TRACKING. The ultimate station accessory, a true "plug and go" I/Q output Linear Amplifier operating 1500-6000. Fully automatic including P.S.U and auto antenna.

SALE NOW ON!

ICOM IC-PW1

The smallest compact 1W HF Linear available with PSU and ATU. Easy to use and will interface with most HF rigs available. Call for trade in values and finance.

SALE NOW ON!

Micro Twin Bander.

Price is £2889. Call for details or see our web site.

And hassle-Free Shopping!
ML&S now offer you the chance to come and look at our amazing range of Amateur Radio and Short Wave products on Sundays.
Yes, that's right - no traffic, no parking restrictions, no pressure!

OPEN 7 DAYS A WEEK
MON - SAT, 9.30am - 6.00pm
SUN, 10am - 4pm

For Accessories

Kenwood VCH-1
A Visual Communication terminal & vector colour pictures. Just hook up to a transceiver and start sending! RRP £995 ML&S £995.95 or £1227 deposit & £350.25 pcm (£65 P.M R.R.).

Shure 526T
Since ML&S introduced the famous 526T, the bands have sounded much better! You can't beat the TX audio. From a 526T. Ask any one. £1295 pre-wired to your radio.

YAESU Rotators
G-45C Light to medium duty, low price perfect entry level motor supplied with 25m cable. RRP £599, ML&S £599

G-65C Medium Duty motor, ideal small H.F. Beams etc. c/w 25m Cable. RRP £499.95 ML&S £479.95

G-1005SD Medium heavy duty, for larger H.F. Beams. RRP £599, ML&S £599

G-2808SDX The ultimate high torque, planetary gear, terror exterminated motor. RRP £629.95. ML&S £629.95

GC-03 Lower Mast Clamps ........ £24.95
GC-03D Stay Baring, 2 ...... £47.95
G-606U Heavy Duty any bearing ........ £79.95
GA-2500 Tower Mounted shock absorber .... £55
GA-300 Heavy Duty tower shock ........ £80.00

MyDEL Wire Antennas
BACK IN STOCK!
MyDEL Multitrap/megatrap

Inrad Filters
FT-1005F model
ML-S111 1.8k Hz SSB (£215M1L) £100.00
ML-S302 2.1kHz SSB (455Hz) £145.00
ML-S301 3kHz SSB (855Hz) £105.00
ML-S305 4kHz SSB (1250Hz) £130.00
FT-103T £199.95
ML-S301 1.8kHz SSB (855Hz) £149.95
FT-210 model
ML-S715 1.8kHz SSB (£259.51L) £119.00
ML-S701 2.1kHz SSB (455Hz) £145.00
ML-S611 3kHz SSB (855Hz) £105.00
ML-S614 4kHz SSB (1250Hz) £130.00
IC-745 model
ML-C110 160Hz SSB (855Hz) £99.95
ML-S311 1.8kHz SSB (455Hz) £145.00
ML-S314 2.1kHz SSB (855Hz) £145.00
ML-S316 3kHz SSB (1250Hz) £130.00

Heil Sound
ML&S are the sole authorised retailers of this excellent range of TMX Audio products from the USA. As used by the VoiceMax DJ profession last year, try yourself to either the HBC-5 for DX or HCS "full articulation" inserts.

The Pro Series Headsets are designed to meet the demands of top contesters and DXers. The light and comfortable headset combines with a flexible boom which houses either an HCA DX or HCS "full BQC quality" microphone insert.

This month we are offering a special package deal: Prove 4 DX (het + boom) with FREE HCS insert and lead for your rig.
Total RRP £172, ML&S £129.95.

Heil Proset Professional Headset & Boom Microphone
HC-3 & HC-5 Inserts
Prodx Microphone Lead & Boom Mic Headset

Icom IC-PS85
If space and weight is a premium and a good reliable PSU is in the order of the day, then try a space mode Icom PS-85 for your rig. Very small and compact and backed by Icom's famous two year warranty.

RRP £245, ML&S £199.95

Diamond GSV3000
Identical to Yaesu FP-1830A
High quality Regulated DC PSU specifically designed to work with their current including the FT817CDN range of H.F. Transceivers.

ML&S ONLY £129

hot news...NEW KENWOOD ALL-BAND, ALL-MODE SUPER RIG AVAILABLE SEPTEMBER. CALL FOR DETAILS!
"A device without an oscillator either doesn’t do anything or expects to be driven by something else ... which probably contains an oscillator.”

Horowitz and Hill, from their book The Art of Electronics

After his usual appropriate quote the Rev. George Dobbs G3RJV describes what he says is a “Reliable and stable variable frequency oscillator”.

As the quotation from The Art of Electronics suggests, oscillators are a key part of electronics and an essential part of radio communications. We have to get a signal from somewhere! Many simple low power transmitters use a crystal oscillator as their frequency source. Although a crystal controlled oscillator can be varied in frequency as a VFO (Variable Crystal Oscillator), the amount of frequency shift is limited.

Effective transmitters and receivers really require a variable frequency oscillator. These days, in commercial equipment, it’s likely to be some form of synthesised oscillator but most home constructors will use a form of free running high frequency oscillator.

Building a stable high frequency v.f.o. is usually recognised as one of the more difficult tasks for the radio constructor. Despite this, it’s simple to get a circuit to oscillate at a high frequency, in fact we often struggle to prevent this happening in some circuits!

Stable Enough?

Obtaining a high frequency signal that’s stable enough for a transmitter or receiver application is more difficult. After many years of building v.f.o. circuits, some successful - some not, my conclusion is that the type of circuit used is only part of the answer to stability.

I suggest that:

A: Most experienced radio constructors have a favourite v.f.o. circuit: most of these circuits will work well.
B: The choice of components for a v.f.o. is important. You should use the best quality parts for the frequency determining parts of the circuit.
C: The way the oscillator is built is as important as the choice of oscillator circuit. A v.f.o. must be mechanically stable to be electrically stable.
D: There is a limit to the frequency that you can expect to build a free running v.f.o. To this end, I suggest that about 10MHz is the highest frequency the constructor can expect to build a stable v.f.o.

Bearing the points A, B, C, D in mind, let’s now look at a suitable circuit.

My Favourite Circuit

The circuit of Fig. 1 shows my favourite v.f.o. circuit. Readers who have followed my writings in the past will recognise it. The circuit is the adaptation of the Seiler-type, a parallel tuned Colpitts circuit, oscillator developed by George Hanchett W2YM, in the QST for December 1966. It has stood the test of time. In the

Fig 1: The diagram shows G3RJV’s favourite v.f.o. circuit. George says “Those who have followed my writings in the past will recognise it. The circuit is the adaptation of the Seiler-type, a parallel tuned Colpitts circuit, oscillator developed by George Hanchett W2YM, in the QST for December 1966. In the original version W2YM used a dual-gate m.o.s.f.e.t. but the circuit works well with a j.f.e.t. as shown here”.

Practical Wireless, September 1999
original version, W2YM used a dual-gate m.o.s.f.e.t. but the circuit works well with a j.f.e.t. as shown here.

The j.f.e.t. oscillator, T1, uses capacitive feedback via C4 and C5, the frequency being determined by the tuned circuit, L1, C1/2. A diode is added to the gate input to provide some automatic bias to aid stability. Any common silicon diode will serve this purpose.

The transistor, T3, is provided with a stabilised supply from a three-legged regulator chip. I used a 78L08 type regulator to provide 8V, but a 6V supply would also do the job. A 1mH r.f. choke provides the r.f. load in the source of T1.

It's essential to use components capable of good frequency stability for those parts which influence the frequency of the oscillator. To this end, C1 needs to be a good quality variable capacitor, perhaps of the sort mounted on a ceramic plate. The choice of polyvaricon variable capacitors of the type used in domestic transistor radios rarely gives good results in a v.f.o.

Capacitors C2, C3, C4 and C5 need to be temperature stable capacitors. Many books urge the use of NPO types but these are difficult to obtain. Others suggest silvered-mica capacitors, again difficult to obtain these days. However, I've had good results by using the more common, and cheaper, polystyrene capacitors.

**Toko Inductor**

Some may question my use of a standard 'off the shelf' Toko inductor for L1. The ideal choice is an inductor wound on a cylindrical former without a core that may introduce thermal instability.

One great advantage in using a core is the ability to preset the frequency of the v.f.o. Experience has taught me that using a v.f.o. with a core usually results in a v.f.o. that may introduce thermal instability.

A common way to get the v.f.o. on the required frequency range is to adjust the amount of capacitance in the tuned circuit. This often involves adding small values of fixed capacitance in parallel with the variable capacitor, but the addition of extra capacitors can also degrade thermal stability.

**Swings & Roundabouts**

So, here we find ourselves with a case of 'swings and roundabouts'! To get over the problems, my usual approach is to hit the required frequency range as near as possible with the variable capacitor and one fixed capacitor (C2) and to use the core to attain the desired low frequency end of the range.

With my approach, the values for C1 and C2 are such that the core is inserted only a very small part of the length of the coil. At the risk of being thought a Philistine I adjust the range of the variable capacitors by pulling on the vanes. This is possible by carefully using a pair of thin nosed pliers but probably dedicating that particular variable capacitor for use in the particularly v.f.o. under construction.

To help you use them, Table 1 gives a set of what our American friends would call "ball park values" for using standard Toko Coils for the v.f.o. Values up to 14MHz are given but after 10MHz you're on your own!

The values for C1, C2 and C3 will certainly need adjustment to achieve the desired frequency range. Begin with these values and adjust according to need.

The final adjustment is done by using a proper trimmer tool on the core of L1. Take care - these cores are brittle and easy to break.

Fixing the core is simple. I use a blob of bee's wax melted on the tip of the soldering iron and dropped on to the top of the core. However, it's possible to make further slight adjustments after the bee's wax is in place.

To help further, Table 2 contains another set of "ballpark" figures for the v.f.o. In these, the inductance values are included for those who wish to wind their own coils. A combined value for Cl/C2 is quoted and this will require individual adjustment as described above.

The smaller table, Table 3, is to help you design a 5 to 5.5MHz v.f.o. circuit. This would, of course, be for use with a 9MHz i.f.

**Two Stage Buffer**

The rest of the v.f.o. circuit is a two stage buffer amplifier, provided by T2 and 3. The r.f. output level of this amplifier can be altered by adjustment of R8.

The output of the v.f.o. is at the emitter of T3 and is a pre-set control to allow adjustment of the output.

The v.f.o. supply is well decoupled including the use of C11 which is a 1000pF feed-through capacitor set into the box which holds the circuit board. In practice, the frequency determining capacitor, C1, will probably require a reduction drive. My usual solution is to use the small in-line epicyclic drives.

Whatever method of construction is used, the components must be rigidly mounted. But 'Ugly' construction works well if there are no loosely mounted parts.

The photograph shows my prototype 7MHz v.f.o. which is built on pern-board. I find this is a good medium for v.f.o. construction but avoid making the layout too tight and introducing stray capacitance between components.

**So, get that soldering iron busy and I hope to work you on the bands!**
With the Millennium fast approaching, the Editorial team (last month) began looking at books which covered the development of wireless over the last century – specifically valve regenerative receivers. This month, the 'Book Profiles' will continue along this theme and the Editorial team have picked out some real goodies for you.

The following six titles cover a variety of subjects - from one about the secrets of Tesla's radio to those covering Crystal sets and old radio projects and includes one fascinating book on the early use of Radio Photographs and Radio Photograms.

If you're a Radio Amateur who enjoys learning about early radio projects and other historical aspects of Amateur Radio then one of these books could be for you.

**Book Profiles**

*Radio Tesla - The secret of Tesla's radio and wireless power.*

*George Trinkaus*

This book is a short (37 page), soft cover format publication detailing the "peculiar radio technology of Nikola Tesla" - in the words of the author, George Trinkaus, himself.

The author uncovers the secrets behind a topic that, he says, is taboo in official science. All aspects of Tesla's work in the field of radio and wireless power are discussed in this booklet.

Some examples of what you will find beneath the covers of this book are: 'High Voltage, Sudden Pulse'; 'Low Frequency', 'Conduction Through The Ground', 'Resonance' and 'Aerial Capacity'. All chapters are, once again, well illustrated. Good information source.

*Henley's 222 Radio Circuit Designs*

*John E. Anderson, Arthur C. C. Mills & Elmer H. Lewis*

Henley's 222 Radio Circuit Designs is a reprint from Lindsays Publications Inc. and it contains various circuits with which the radio novice or experimenter can build their own Amateur Radio equipment. In the Preface to the book, the Editors say that it was their aim to "present the various circuits with their complete electrical design in such a specific manner that the novice can build successfully any of the circuits without any other assistance, and yet in such a manner that the more advanced experimenter can use the book as a reliable reference". This book would, therefore, be useful to both beginners and the experienced alike.

The Editors also go on to say that they have chosen those circuits which are in use daily "with a view of including only typical and practical circuits". Some of the Chapters include: 'Meaning Of Wave Length And Frequency'; 'Antennas'; 'Fundamental Coupling Schemes'; 'Coils And Condensers'; 'Simple Crystal Detector Circuits'; 'Simple Detector Circuits Using Vacuum Tubes'; 'Amplifier Circuits' and 'Transmitting Circuits' - to name a few!

The diagrams are fairly clear, if a little small at times, but if you love experimenting with different things then this book could be worth a read. Recommended.

*Crystal Set Loopers A 3 Tuber & More*

*Volume 8 Crystal Set Society Newsletter*

Most Radio Amateurs are no stranger to the building and design of crystal sets and because of this, most will have heard of the Crystal Set Society and their newsletters. We featured a lot of them in the Book Profiles in the March edition of Practical Wireless - Crystal Set Loopers A 3 Tuber & More, however, wasn't featured in those profiles.

This compilation contains all issues from January 1998 through to November 1998 and is "packed full" of projects and information about Crystal Set radios, mostly dealing with design and electronics issues. In the Preface to this collection the Editor, Rebecca Hewes, says that they "focus on simple, old-time, elegant radio circuits that enthusiasts can build from scratch". Some of the Chapters in...
Crystal Set Looper A 3 Tuber & More include 'An AM/SW Frisbee Crystal Radio', 'Biasing Effects On Diode Performance' (Parts 1 & 2), 'Scott's Bucket 'O Rocks Indoor Antenna', 'Mike's Super-Duper AM/SW 3-Tuber', 'Loop With A New Twist' and much, much more! Intrigued? You should be. This book is definitely worth a read, Highly recommended.

Crystal Set Building And More (Volume Six and Seven) Various Authors

With various contributions from different authors, this volume of the Crystal Set Society Newsletter has a number of varying topics. Some of them follow the same sort of line as Rob Mannion G3XFD's beginners series 'Radio Basics', for example, 'A Crystal Headphone From A Cat Food Can'.

In this newsletter, William E. Shims states: "The instructions that follow are intended to demonstrate just how simple building a functional high-impedance crystal headphone can be ...". He goes on to describe how he uses a cat food can for this project.

Another interesting book from the Crystal Set Society with the emphasis on the building of crystal sets. If you are interested in building a crystal set yourself, this book would be a useful starting point. Recommended.

Heathkit - A Guide To The Amateur Radio Products Chuck Penson WA7ZZE

This book would be useful to anyone who has an affection for the Heath company and its kits - both its history and their various Amateur Radio products. In the Foreword to his book, the author - Chuck Penson WA7ZZE - states that "This book is intended to be a kind of field guide, or spotter's guide if you prefer. It is a book to keep in your backpack while roaming flea markets, a book to keep in your shack for handy reference when you work someone running an HW-12A ...".


Vision By Radio • Radio Photographs, Radio Photograms C. Francis Jenkins

Vision By Radio is a Lindsay Publications Inc. reprint of the original which was first published back in 1925 and looks at the first pieces of equipment capable of sending photographs and pictures by wire and radio and is, if you like, the beginnings of facsimile - and what we have come to term as FAX.

This fascinating book covers various elements of the origins of sending photographs via wire and by radio and contains some of the fascinating first experimental pictures and pieces of text which were sent electronically. Highly Recommended.
**UK’s Premier Service Centre**

12.5kHz

**CONVERSIONS**
Save money and keep your existing rig. Castle can convert most makes and models. Call us to discuss your requirements.

**RIG CHECKS**
Do you ever wonder if your rig still performs as it should? You suspect something’s not quite right? Let Castle Electronics test your rig. We have been checking and servicing all the major brand names for many years. Call us for more details.

**MAIL ORDER**
Right in the heart of England, we are well placed to supply all the major brand names, at competitive prices by mail order. Before you buy from anyone, give us a call. You might be pleased you did!

**FOR SERVICE...**
There really is only one choice. The choice many manufacturers have made when they want their own equipment serviced. When you send a repair or service to Castle Electronics, we do the job in house. We do not use sub-contractors!

**Castle Electronics**
Unit 20, Halfpenny Green Airport
Bobbington, Nr Stourbridge
West Midlands DY7 5DY
Telephone (01384) 221036 Fax (01384) 221037
Email: services@castle-elect.demon.co.uk
Trade Enquiries Welcome

---

**Universal Radio Communications trading as:**

**Unicom**

**MAIL ORDER HOTLINE**

- All major credit cards accepted
- Prompt Despatch

**IC-Q7E**
- Tx 2m/70cm
- Rx 25-1300MHz
- AM/FM/NFM
- CTCSS
- 200 memory channels
- Compact size
- £159

**ICOM IC-T8E**
- Tri-band operation
- Rugged construction
- Tone squelch
- DTMF
- £269

**TH-D7E**
- True dual band
- NFM Tx switch
- Packet modem built in
- APRS-beacon
- Rx 118-174, 300-470
- CTCSS fitted
- Dx cluster monitor
- Rugged construction
- £299

Phone/Fax: (01227) 749352
E-mail: unicom@cqdx.co.uk
Web site: www.cqdx.co.uk/unicom
112, Reculver Road, Beltinge, Herne Bay, Kent CT6 6PD

---

Please mention Practical Wireless when replying to advertisements
antennas in action

welcome to AiA!
Hello and welcome to the September 1999 Antennas-in-Action, our bi-monthly column of ideas, designs, news and reviews of antennas, accessories and books covering all these topics.

News Releases
I’ve had several news releases in from Procom A/S of Denmark, suppliers of high quality antennas, measuring equipment and accessories. I’ve had three sheets of antenna details about their CXL range of antennas, for use in the 150, 450, 900, 1800 and 2400MHz bands. Procom can also supply a vast range of connector adapters to match other plugs and sockets to the FME style of connector, there are 21 variations shown on the second leaflet.

Duplexers for use around 150MHz are shown on another leaflet, featuring the DFP2/1, DFP2/6 and MPX2/6 range of compact units. Various models cover the range of 138 to 175MHz; range with a duplex spacing of 4- 10MHz (4-15MHz on the MPX2/6); the units have maximum r.f. input of 50W. The various duplexer units also feature a band rejection of 60-90dB (depending on the model) while claiming an insertion loss of less than 1.5dB.

Another leaflet describes the Procom SWR 3000 antenna analyser that covers 30-2700MHz, with a graphical display showing the s.w.r. of the antenna (over a range of frequencies) attached to the N-type test socket. A small keypad controls all functions and ranges. For more information about these or other contact Procom A/S direct at Vinkelanget 21-29, DK-3330, Gerlese, Denmark. Tel: (+45) 48 27 84 84. Or you can contact their UK agent Communication Technical Services Ltd., Unit 15 The Gatwick Metro Centre, Balcombe Road, Horley Surrey RH6 9CA, Tel/FAX: (01293) 822602.

Two Books
Now to have a look at two books for you. The first book is from The ARRL ‘stables’ in the form of Vertical Antenna Classics compiled and edited by Bob Schelgen KU7C. This large-format book contains, within the six chapters, reprints from the best articles to be found in other ARRL publications. The chapter headings are: ‘Theory and Modelling’, ‘VHF and UHF’, ‘HF’, ‘Reduced Size’ and ‘Radials and Ground Systems’.

If like me you have struggled to make sense of one of the antenna modelling software packages (like MININEC, ELNEC and MIN), then the first chapter of this book is required reading. In the last five pages of this chapter, there’s a good grounding (parton the pun) on MININEC, its strengths and limitations in use. Then follows three chapters of practical vertical antennas, using a variety of materials including copper water pipe.

In chapter two there are nine subsections giving a variety of antennas for use in the 144 and 430MHz bands, although the antennas and references to the 220MHz band are superficial to the UK and Europe. One interesting design that I might ‘have-a-go’ at is a vertical wire Extended Double Zepp (EDZ) for the 50MHz band. Although I’ll probably modify it for the 144 or even the 430MHz band. Chapter three does a similar job covering h.f. with eight sections this time.

Chapter four has five subsections on directional arrays including steerable arrays for low band work, phased arrays and using the guy wires on a vertical to give an directional gain ability. Chapter five shows you how to reduce the overall height of an antenna by either ‘capacity hat’ or loading coils while chapter six deals with radials and ground systems, subjects often ‘forgotten’ about in vertical antennas. All in all, I think it’s an excellent read, packed with details.

Vertical Antenna Classics

The second book, also from the ARRL is another compilation offering. The ARRL’s Wire Antenna Classics, compiled by Chuck Hutchinson K8CH, has ten chapters and presents quite a few h.f. antenna designs that are very unusual. The chapters are: ‘Dipoles’, ‘Multiple Dipoles’, ‘Loop Antennas’, ‘Collinear Antennas’, ‘V and Rhombic Antennas’, ‘Wire Beams’, ‘Vertically Polarised’, ‘Our Friend The Tree’, ‘Receiving Antennas’ and finally ‘Antenna Ideas From W1J’.

There are over 100 pages of ideas and designs in this new book, including more information on the EDZ described elsewhere on these pages, how to make traps for wire antennas, how to increase the bandwidth of a ‘simple’ dipole, ‘V’, inverted ‘V’s and ‘V’ beam antennas, ‘J’ and multiple ‘J’ poles (J). There are Delta Loops and ‘Curtain’ antennas, Slopers and quad antennas. Quarter waves and Inverted ‘L’s and of course... how
to use trees in your antenna system.

Much thought and hard work has gone into compiling ARRL's Wire Antenna Classics. For instance In chapter two on Multi-band Antennas there are nine articles dealing with antennas covering more than one band, including a very good description by 'our own' Louis Varney G5RV about the antenna bearing his callsign. There is also a very interesting section on making traps that resonate on two bands at the same time.

In Chapter Nine 'Discussing receiving antennas', there are many antenna ideas worth looking at. Although if you intend putting up a Beverage antenna for 'Top Band', you'd better make sure you have a lot of space. Although more modestly, for listening to the 1.8 and 3.5MHz bands, the 6.5m square K6STI receiving antenna with a 20dB amplifier works well, having a good noise rejection capability. The ARRL's Wire Antenna Classics is excellent reading, and very tempting to try new antennas that are both cheap and easy to put up.

**Crazy Dipole**

I've received a letter from Bill G3XZJ, who says 'Here's an item for your 'Antenna Workshop', the 'Crazy Dipole', or to give it the more correct name, an asymmetric dipole for the 7MHz band. Some years ago I put together the illustrated antenna which works a dream. If you imagine a normal dipole cut, for say 7MHz and that consists of two element, each a little over 10m long' (as shown in Fig. 1).

*To one side of this antenna I

21MHz - but that's another story*.

**Another Wire Antenna**

Thanks Bill, and another wire antenna type letter I've had was from Mike Doubleday G3HUT saying that he'd seen an article by G40BE in a recent journal about a variant of the original single radiating element Zeppelin or 'Zepp' antenna. The design had been 'stretched' or extended to become what we now know as an 'Extended Double Zepp' ('EDZ'). Mike says that having operated, with a fair amount of success, on most bands with an h.f. EDZ for many years, readers might like more information about this antenna that may be used to work any or all of the 3.5 - 28MHz bands but may be restricted by the size of the location.

Mike suggests taking the dimension for the EDZ antenna, as given in antenna books, but by concentrating on the higher bands, you can provide an 'all singing and dancing' antenna that works on most bands, but with a maximum horizontal top of just over 22m. Mike says he started by designing his h.f. EDZ for 18MHz (originally calculating the overall top length in Imperial measurements). For a frequency of 18.15MHz, he says he arrived at a measurement of the top elements of 22.45m. The EDZ, at its design frequency exhibits approximately a 3dBd gain (reference to a halfwave dipole) in a radiation pattern with two major and four minor lobes. But, surprisingly, as Mike says, he's found it will also perform usefully on several bands lower in frequency.

Mike says he makes no claims of originality for this EDZ design (shown in Fig. 2), but says 'I have merely collated Information over many years and then set about to prove that, in the main, the system works well. My findings have been supported by W7KMZ who, having been given my basic parameters such as real ground conductivity, type and gauge of wire used, height, and actual description of the design of the EDZ carried out a computer analysis (using ELNEC version 3.08) of the design.

*From the analysis and with the antenna centre fed with 300 or 450k ladder line, W7KMZ had 'predicted' results (lobe pattern analysis is derived from computing gain, take off angle, heights, beamwidth, degrees, slope and angle, etc) that agree quite well with my findings. The 21-page analysis is rather complicated to read and far too lengthy for this article, since the results were not only continued to the 21MHz EDZ but included all other bands 3.5-
resistance reading (or so it seems) but the method described by Colin does work for a receiver. I'm less sure about its effectiveness for a full legal amount of r.f. though.

I would imagine that a combination of the 'earth rod' that Colin uses and several counterpoise elements attached to the ground rod itself and taken around the garden just under the surface of the soil (flower bed or lawn) should prove rather better for a transmitter. But as I've said before, unless you on a VK2BUA Web site page (see text), try it in your location you cannot say if it's really going to work or not!

Antipodean Wires

The Internet is a wonderful place for finding things, and I found some 'Antipodean' wire antenna ideas on a website for the Australian company Philip Collins & Associates Pty Ltd of Sidney Australia. On one of their pages called 'HF Broadband Wire Antennas' by Marc Robinson VK2BUA makes a few ideas available for you to try out 'at home'.

Marc starts the pages "Early in my training I was taught that an antenna must be cut or tuned to a quarter wave resonate length, or a multiple thereof, if it is to radiate efficiently. That statement still holds true, but we can bend the rules and trade a bit of the efficiency for bandwidth when we need it. Such is the case with the lengths of wire described here. All are proven in commercial installations I have engineered 'here and there' on my travels".

The actual graphics within the Web page would not reproduce too well, so I've drawn a representation of them in Fig.s 4, 5 and 6. The designs are mainly terminated wire antennas, a system that improves the bandwidth, somewhat at the expense of efficiency. But go and have a look for yourself at their website http://www.pca.cc

Webwatch

Philip Collins & Associates Pty Ltd. (Australia)
www.pca.cc/ANTENNAS/BROADBAND/broadband.html
Email: sales@pca.cc info@pca.cc

Well that's all I have room for this issue, I'll see you in the November issue again.

G17EA
Please mention Practical Wireless when replying to advertisements

MULTICOMM 2000
LARGE SHOWROOM BEST PRICES

ICOM
ICOM
ICOM
ICOM

IC-706MKII "DSP"
IC-725 DSP
IC-745
IC-710

£675
£2399
£259
£1025

ICOM
ICOM
ICOM
ICOM

IC-2071
PCR-100
PCR-1000
IC-R8500

£289
£199
£259
£1099

ICOM
ICOM
ICOM
ICOM

AH-4
PCR-100
PCR-1000
IC-706 MkII G

£279
£259
£1099

£849

JAESU
CALL FOR OUR LATEST JAESU PRICES!

FT-820AF
FRC-100
FT-940
FT-847

£1069
£369
£569
£1299

£175
£1275

FT-1000
VX-5R

£275

VX-5R

HEAVY DUTY
G-900S DX

£259
£275

WEIGHT
£1099

JRC
JST-245
AUTO ATU, AUTO NOTCH, FABULOUS FRONT END

£1799

£1595

PATCOM PC-16000
UNBELIEVABLE "DSP" RIG

ALINCO

DX-70T H
DJ-455EY
DR-510
DR-150

£599
£225
£425
£239

£195

£345

KENWOOD

TS-570D G
TM-6707
TH-97

£799
£299

£299

COME VISIT OUR "NEW" IMPRESSIVE SHOWROOM!
Please mention Practical Wireless when replying to advertisements

SALES HOTLINE 01480 406770
NO DEPOSIT FINANCING AVAILABLE
USED EQUIPMENT URGENTLY WANTED!

S G C

$569

SG-2020 Brilliant HF DRO transceiver

SG-221 $289

SG-230 $259

SGC POWER CUBE
Compact 500W transistorised linear

$775

SUPER SALE

MFJ SUPER SALE

MFJ-989C 3kW HF ATU
£245

MFJ-992D 1.5kW HF ATU
£199

MFJ-969 300W HF ATU
£129

MFJ-949 300W HF ATU
£99

MFJ-948 300W HF ATU
£89

MFJ-945 300W HF ATU
£75

MFJ-941 300W HF ATU
£89

MFJ-924 Ground + ATU
£149

MFJ-951 Artificial Ground
£65

MFJ-748B DSP unit
£169

MFJ-906 6 meter ATU
£68

MFJ-901 HF ATU
£65

MFJ-815 HF + 6 SWR
£55

MFJ-917 VHF/UHF SWR
£59

LOADS OF MFJ STOCK

10.5% A.P.R. WRITTEN QUOTATIONS AVAILABLE UPON REQUEST

MFJ-812 VHF SWR
£29

MFJ-921 VHF ATU
£55

MFJ-924 UHF ATU
£55

PRO SET £99

PRO-MICRO £79

OUTbacker®

MOBILE ANTENNAS

Junior 80-1 4ft £169
Junior Plus HF/6/2 £165
OB100 7.5ft £175
OB-T 160-10 £89
Perth 80-10 7.5ft £175
Perth-T 160-10 £195
Perth Plus HF/6/2 £195
Obtr tri split £215
Outreach 160-10 12ft £229

UNIT 4, 17-E, LITTLE END ROAD, EATON SOCON, CAMBS PE19 3JH
Website: http://www.multicomm2000.com E-mail: sales@multicomm2000.com

Practical Wireless, September 1999
The selection of PWs from 1950s and 1960s on the ‘shop’ counter tells us that it’s Phil Cadman G4JCP in charge this month. And, resplendent in the shopkeeper’s traditional sandy brown dustcoat, is that a B9A based valve he’s holding in his hand?

Warm greetings from an even warmer G4JCP (The Midlands are experiencing one of those rare hot spells as I write). However, before moving on to my main topic, I’d like to mention some readers’ letters on a subject I covered last time - low voltage valves. The first letter came from John Hodgkins G3EJF and concerns the ECH81, a low-voltage mixer-oscillator. John tells me he has distinct recollections of replacing ECH83s with ECH81s, the mains-voltage equivalent.

Not every ECH81 worked, John says, but that didn’t matter - he had a plentiful supply of ECH81s and no ECH83s! Apparently, this unofficial substitution may have given rise to the story that ECH83s were simply specially selected ECH81s.

The EBF83 - a low-voltage I.F. amplifier - also has a ‘mains’ equivalent in the EBF89. John cannot remember whether he ever made this substitution but considers it to be worth trying.

A Sceptical G4JCP

At first I was rather sceptical about John’s claim about the ECH81. However, consulting my battered old *Millward Maintenance Manual* I was surprised to find that the inter-electrode capacitance of both the ECH81 and the ECH83 are the same but for one small discrepancy.

A strange finding! If the valves are physically different - a reasonable assumption considering the operating voltages are so dissimilar - I would have thought the capacitance in either valve would be different too.

Even more surprising was the comparison between the EBF83 and the EBF89; they have identical inter-electrode capacitance so it seems! Well, now I have suspicions too.

If anyone else has heard about the substitutions, or knows anything about the manufacture of low voltage valves, can they please write and tell me. Meantime, I shall soon (with luck) be in possession of a genuine valve tester. Then I can check the story out for myself.

Hybrid Design

A letter sent to Jack Spratt G2KWG, who had a rather nice hybrid communications receiver design published in the September 1962 issue of *Short Wave Magazine*, elicited a most interesting response. His rather professional looking design used ECH83s for all functions except for the audio driver and output stages.

My feeling that the receiver was not simply a one-off amateur project was confirmed when Jack told me that it was based on a commercial design he did back in 1960. The set was part of a type-approved marine radiotelephone for fitting to merchant ships and small craft under 1600 tons. Marketed as the A20 by Ajax Electronics Limited, some 200 of the design were sold. Unfortunately, Jack doesn’t have one.

The performance of the receiver was 5µV for 30dB signal to noise ratio at 30% modulation. (The receiver was designed for a.m.). Intermodulation and cross modulation, etc., performance was never measured, but the receiver was good enough to coexist with the 10-20kW pirate radio stations that were then operating in the Thames Estuary!

Before reading Jack’s letter I’d not thought of a maritime use for low voltage valves, yet operating from small craft clearly has parallels with operating from a vehicle. Although the A20 was made obsolete by the eventual change to s.s.b., Jack has heard that some are still in use. I wonder, has anyone got one for sale?

On a related point, Dr. Godfrey Manning G4GLM of SWM ‘Airband’ fame, sent me a note about making a list of commercial hybrid radios. So, silly me agreed to do one: just those listed in the *Radio and Television Servicing* series for now.

Actually, I was surprised to find so few, a little over 20 basic designs and that includes both car radios and battery portables. If you want a copy of the list just send an s.a.e. direct to me.

By the time you read this it should be on my Web page at [www.oldpark.demon.co.uk](http://www.oldpark.demon.co.uk) and then follow the ‘Valve and Vintage’ link. Any hybrid set that you know of that isn’t there, please send me the details and I’ll add it to the list.

Godfrey also commented on the OCR2/OCR2D transistors found in one hybrid car radio I mentioned. This little-known combination was popular for a short time but was quickly superseded by the better specified (and ultimately very popular) OC81 and OC81D.

Tape Recorders

A chance encounter at the Three Counties Radio and Computer Rally, held in Worcester a few weeks back, put me in touch with an old friend and his wife, both now retired. Long time readers of *PW* who live, or once lived, around Dudley will remember J. Arthur Parkes and his wife Freda who used to run a small but popular radio and TV shop in the town.

A frequent source of components and advice when I was in my late teens. (Arthur and Freda were also well known for having two gorgeous daughters).

Editorial comment: Here it should be noted readers that G4JCP is a very eligible Bachelor - and not so bad looking himself!

Arthur just happened to be selling some of his old equipment which included several valued tape recorders. At last I was able to obtain a tape recorder (two, actually) on which to play back my old reel-to-reel tapes.

My original and very much worn-out tape recorder was disassembled long ago and the components used to make a valued audio amplifier. Which still works, by the way!

---

The selection of PWs from 1950s and 1960s on the ‘shop’ counter tells us that it’s Phil Cadman G4JCP in charge this month. And, resplendent in the shopkeeper’s traditional sandy brown dustcoat, is that a B9A based valve he’s holding in his hand?

Warm greetings from an even warmer G4JCP (The Midlands are experiencing one of those rare hot spells as I write). However, before moving on to my main topic, I’d like to mention some readers’ letters on a subject I covered last time - low voltage valves. The first letter came from John Hodgkins G3EJF and concerns the ECH81, a low-voltage mixer-oscillator. John tells me he has distinct recollections of replacing ECH83s with ECH81s, the mains-voltage equivalent.

Not every ECH81 worked, John says, but that didn’t matter - he had a plentiful supply of ECH81s and no ECH83s! Apparently, this unofficial substitution may have given rise to the story that ECH83s were simply specially selected ECH81s.

The EBF83 - a low-voltage I.F. amplifier - also has a ‘mains’ equivalent in the EBF89. John cannot remember whether he ever made this substitution but considers it to be worth trying.

A Sceptical G4JCP

At first I was rather sceptical about John’s claim about the ECH81. However, consulting my battered old *Millward Maintenance Manual* I was surprised to find that the inter-electrode capacitance of both the ECH81 and the ECH83 are the same but for one small discrepancy.

A strange finding! If the valves are physically different - a reasonable assumption considering the operating voltages are so dissimilar - I would have thought the capacitance in either valve would be different too.

Even more surprising was the comparison between the EBF83 and the EBF89; they have identical inter-electrode capacitance so it seems! Well, now I have suspicions too.

If anyone else has heard about the substitutions, or knows anything about the manufacture of low voltage valves, can they please write and tell me. Meantime, I shall soon (with luck) be in possession of a genuine valve tester. Then I can check the story out for myself.

Hybrid Design

A letter sent to Jack Spratt G2KWG, who had a rather nice hybrid communications receiver design published in the September 1962 issue of *Short Wave Magazine*, elicited a most interesting response. His rather professional looking design used ECH83s for all functions except for the audio driver and output stages.

My feeling that the receiver was not simply a one-off amateur project was confirmed when Jack told me that it was based on a commercial design he did back in 1960. The set was part of a type-approved marine radiotelephone for fitting to merchant ships and small craft under 1600 tons. Marketed as the A20 by Ajax Electronics Limited, some 200 of the design were sold. Unfortunately, Jack doesn’t have one.

The performance of the receiver was 5µV for 30dB signal to noise ratio at 30% modulation. (The receiver was designed for a.m.). Intermodulation and cross modulation, etc., performance was never measured, but the receiver was good enough to coexist with the 10-20kW pirate radio stations that were then operating in the Thames Estuary!

Before reading Jack’s letter I’d not thought of a maritime use for low voltage valves, yet operating from small craft clearly has parallels with operating from a vehicle. Although the A20 was made obsolete by the eventual change to s.s.b., Jack has heard that some are still in use. I wonder, has anyone got one for sale?

On a related point, Dr. Godfrey Manning G4GLM of SWM ‘Airband’ fame, sent me a note about making a list of commercial hybrid radios. So, silly me agreed to do one: just those listed in the *Radio and Television Servicing* series for now.

Actually, I was surprised to find so few, a little over 20 basic designs and that includes both car radios and battery portables. If you want a copy of the list just send an s.a.e. direct to me.

By the time you read this it should be on my Web page at [www.oldpark.demon.co.uk](http://www.oldpark.demon.co.uk) and then follow the ‘Valve and Vintage’ link. Any hybrid set that you know of that isn’t there, please send me the details and I’ll add it to the list.

Godfrey also commented on the OCR2/OCR2D transistors found in one hybrid car radio I mentioned. This little-known combination was popular for a short time but was quickly superseded by the better specified (and ultimately very popular) OC81 and OC81D.

Tape Recorders

A chance encounter at the Three Counties Radio and Computer Rally, held in Worcester a few weeks back, put me in touch with an old friend and his wife, both now retired. Long time readers of *PW* who live, or once lived, around Dudley will remember J. Arthur Parkes and his wife Freda who used to run a small but popular radio and TV shop in the town.

A frequent source of components and advice when I was in my late teens. (Arthur and Freda were also well known for having two gorgeous daughters).

Editorial comment: Here it should be noted readers that G4JCP is a very eligible Bachelor - and not so bad looking himself!

Arthur just happened to be selling some of his old equipment which included several valued tape recorders. At last I was able to obtain a tape recorder (two, actually) on which to play back my old reel-to-reel tapes.

My original and very much worn-out tape recorder was disassembled long ago and the components used to make a valued audio amplifier. Which still works, by the way!
Any recorder - particularly if substantially free of any mechanical defects - should be stored in a cool dry place, and treated with more than a little respect.

If you want to get involved with valve tape recorder restoration and repair, the book which is a "must-have" is the Tape Recorder Servicing Manual by H. W. Hellyer, see Fig. 3. First published in 1965 by George Newnes Limited, it's a collection of circuit diagrams and servicing notes on just about every domestic tape recorder marketed up to the mid-1960s.

The book also has a general introduction to tape recorders, tape recording and microphones. Long out of print, a copy occasionally turns up at book sales. And your local library might just still have one - so it's worthwhile asking.

When Cleaning

When cleaning tape heads and guides, use solvents specifically intended for the purpose. The stuff for cassette decks is fine. Use either a purposely designed applicator (which are, unfortunately, not commonly available) or cotton wool buds.

If at all possible, deflux (de-magnetises) the tape heads and guides before playing back (for recording) any tape. Magnetised heads can cause loss of high frequencies and even partial erasure of your irreplaceable recordings if severe. Having said that, I don't know of any suitable head defluxer that's readily available*. Editor's offer of help: As a keen tape-recording enthusiast with a large collection of reel-to-reel machines I have a 'head de-magnetiser' myself. Any reader wishing to borrow it can do so by contacting me at the office. G3XFD.

Any lubricant should be used very sparingly. Take great care to keep oil well clear of all driving surfaces. Initially check play, fast wind and rewind functions with an old tape. Brakes can snatch (or not work) and even modest strain can easily snap the old acetate recording tape. If that happens you'll need a splicing kit - if you can find one.

De-magnetised scissors and Scotch Magic Tape might provide an acceptable short-term substitute to a proper splicing kit. But don't be tempted to use ordinary adhesive tape.

Recording Tape

Now we come to the recording tape itself. Old acetate tape becomes brittle with age so care is needed at all times. Modern tapes with later types of backing - polyester and pvc - should still be in good condition and remain quite strong. However, there is one problem that affects even modern tapes. It's to do with the binder; the 'glue' that sticks the tiny particles of iron oxide to the plastic backing.

To be fair, the binder problem mainly affects professional and semi-professional tapes which have a matt-black back, rather than the domestic varieties that have a traditional 'shiny' back. But it can occur with any tape that hasn't been stored correctly. It's called sticky shed syndrome and tape manufactured from the middle of the 1970s through the early 1980s is most at risk.

Unfortunately, under anything but controlled low humidity storage, the polyurethane used in the binder has a tendency to absorb water. The water reacts with the urethane molecules causing them to migrate to the surface of the tape. As the tape passes the heads and guides the molecules rub off and 'gum up the works'. You'll know you have a problem when the tape starts to squeal and slow down!

Fortunately, sticky shed syndrome due to water absorption is almost always fixable, although the fix only lasts about a month under normal storage conditions. This miraculous fix is commonly known as 'baking a tape'.

The idea is to expose the affected tape to even heat - around 54°C - for about four hours and then let it slowly cool back down to room temperature. Baking a tape can be done several times but really you should copy the tape soon after treatment and then store the original tape in an airtight container with some desiccant.

When you wish to clean your tape, use the solvents indicated above. But don't use the defluxer. It's only going to cause more problems.

Restoration Difficult

Restoring old tape recorders can sometimes be difficult. The electronics are usually easy to fix but the mechanics can be quite a problem. Rubber and other similar compounds can deteriorate to the point where a recorder is rendered useless for want of a new belt or idler wheel.

Incidentally, Arthur was also quite familiar with the ECH83/ECH81 story too.

One of my new acquisitions is a Ferguson 3202. As shown in Fig. 1. There were several variants of this model in both two-track and four-track forms. The basic design was also marketed under the HMV and Ultra brand names.

The other model is an Elizabethan L229/L, see Fig. 2. Incidentally, Elizabethan was the brand name of well-respected independent tape recorder manufacturer who was proud enough to tell purchasers where the tape recorders were made - see the inset badge. (See text).

Incidentally, Arthur was also quite familiar with the ECH83/ECH81 story too.

One of my new acquisitions is a Ferguson 3202. see Fig. 1.

Practical Wireless, September 1999
MULTICOMM 2000
LARGE SHOWROOM BEST PRICES

ANTENNAS

MFJ-1796
6-band 40-2 vertical
£199

R-7000
40-10 £289
R-5000
20-6 £259
X-7
20-10 £425
A3S
20-10 £299
MA5B
20-10 £275

FULL RANGE OF COMET ANTENNAS IN STOCK AT DISCOUNTED PRICES

RECEIVERS

ICOM IC-R75E
Short wave receiver £625

YAESU FRG-100
Short wave receiver £369

DRAKE R-8B
Short wave receiver £929

JRC HRD-545
Short wave receiver £1199

AOR AR7030
Short wave receiver £669

AOR AR6900
SW/VHF/UHF receiver £1145

ICOM IC-R3500
SW/VHF/UHF receiver £1099

ICOM PCR-100
SW/VHF/UHF receiver £199

FAIRHAVEN RD-500
SW/VHF/UHF receiver £799

ICOM PCR-1000
SW/VHF/UHF receiver £249

AOR AR8200
SW/VHF/UHF scanner £349

DJK-10
SW/VHF/UHF scanner £259

IC-R10
SW/VHF/UHF scanner £225

MVT-9000
SW/VHF/UHF scanner £299

MVT-7100
SW/VHF/UHF scanner £179

VIBROKEYER DELUXE £139
ORIGINAL DELUXE £169
PACIFIC BRASS HAMMER £75
BENCHER BY 2 £69
BENCHER BY 4 GOLD £129

Please mention Practical Wireless when replying to advertisements

56 Practical Wireless, September 1999
Red Sprites & Blue Jets

Patrick Allely GW3KJW investigates the theory of Sporadic-E, the 'E'-layer and the path played by 'Red Sprites' and 'Blue Jets'.

Haven't got a clue what he's talking about? Read on and discover some possible reasons as to why v.h.f. signals can all of a sudden appear at enormous strengths from exotic lands at seemingly impossible distances.

No, this article is not just another title for a musical version of Romeo and Juliet, nor A Midsummer Night's Dream, but a genuine source of investigation for v.h.f. enthusiasts - a chance to finally solve one of the greatest propagation mysteries of all time.

I refer to the enigma of Sporadic-E (Sp-E) propagation, that wonderful engine which causes v.h.f. signals to appear at enormous strengths from exotic lands at seemingly impossible distances.

Many of us will have sat and wondered at 144MHz, for no apparent reason, has changed from a dead band which was occupied by only a few faint beacons and an awful lot of local Packet radio, to a band which has suddenly burst into life, with strong signals coming in from Greece or Hungary, Malta or Romania. Signals that have lifted out of the noise threshold to S9 plus and remained so, sometimes for hours on end, at other times merely for a few minutes.

Most of us will know what's happening - 'it's Sporadic-E propagation' - we tell ourselves, we know that at about 90km above the earth the 'E' layer is reflecting v.h.f. signals without causing much attenuation to them and that these signals are quite choosy where they land. You might hear and work someone in Slovakia, whilst 20km down the road, your friend is hearing nothing from Slovakia and thinks that his antenna must have become faulty.

But do we really know what is happening? As far back as 1932, Professor F. E. Terman, Dean of the School of Engineering at Stanford University and assisted by three fellow professors, wrote his famous book Electronic & Radio Engineering. In it there's a short description of Sporadic-E (just one paragraph in fact) where he states: "The occurrence of Sporadic-E is quite unpredictable, it may be observed both day and night, The cause of Sporadic-E ionisation is still uncertain". We've not made great progress into understanding this mode of propagation in the intervening years, but I believe that we are now much closer to understanding and, perhaps, predicting more accurately how and when Sporadic-E propagation will appear.

What About Sporadic-E?

Now what do we know about the E-layer? Well, we know that between 90 and 130km above the earth, there's a layer of gas molecules (nitrogen and oxygen mainly) which will ionise under certain conditions, giving off light and capable of reflecting electro-magnetic energy. We also know that this layer is constant in height, is not greatly affected by the sun and is present both day and night. (Terman was right on this point).

How do we know? The quick answer is that we can see it, or at least we can see its effects. I refer to the Aurora Borealis (and Aurora Australis), the Northern Lights, the effect of the solar wind passing through the earth's magnetic field and ionising the gases, roughly above the Arctic and Antarctic circles.

There, at roughly 90km above the earth, exists ionisation and v.h.f. signals will reflect off this ionisation. We can see it, we can hear it on our radios and it happens both day and night.

We also know that, following certain predicted meteor showers, we can work long distances on v.h.f. via the E-layer. This is because the individual (minute) meteors, which vary in size from a grain of sand to the size of a pea, strike the gas molecules at speed, thereby causing these molecules to ionise and reflect radio signals. (This happens at any time of the day or night, totally independently of the position of the sun and there again we can, during the hours of darkness, see the effects of these collisions as well as hear them on v.h.f.).

Just think, the next time you see a shooting star, a local amateur may be making a 2000km QSO on 144MHz via that same meteor trail!

Incidentally, the average size of a meteor trail is 1.6km (1 mile) wide and 32km (20 miles) long and that's from a piece of material smaller than a pea!

What About Sporadic-E?

However, you may ask "but what about Sporadic-E (Sp-E)"? Well, let's consider the 144MHz band. From records kept over the years, we know that contacts via Sp-E start roughly in May and end usually in August, with a peak during the month of June. There are exceptions, though, openings have occurred both earlier and later, but generally speaking May to August is the period.

An interesting phenomena is that the openings rarely happen during the hours of
LEICESTER SHOW SPECIAL
The 28th Leicester Show will be taking place on the 24/25 September 1999 at Donington Park for the second time and PW will be bringing you details of all you need to know.

REVIEWED!
Richard Newton GORSN reviews the Alinco DJ-V5 u.h.f./v.h.f. dual-band transceiver.
Rob Mannion G3XFD reviews the Texas Bugcatcher HF Mobile Antenna courtesy of Waters & Stanton PLC.

NEW THREE PART SERIES!
David Butler G4ASR begins his three-part series which he says will "get you going on Microwaves".

BUILD!
A 'Power/SWR Meter' courtesy of Jim Brightman GOJXN!

FEATURES
The October issue sees the first in a three part series on Microwaves by PW's very own 'VHF Report' columnist, David Butler G4ASR! Also featured in the October issue is an article by Ray Herbert G2KU entitled 'A Start With Television From 2LO', an article by Gordon King G4VFV (our 'Looking At' author) on 'SWR & Radiation Efficiency', and Henri Walser-Wohnlich discusses his opinions on the use of 'Morse In The Digital Age' ... and much more.

Plus all your regular favourites including

and much, much more!
* Contents subject to change

OFFERS CLOSE
20th SEPTEMBER
Do you remember when VHF/UHF Beam antennas were built to last?
Not only do some lightweight makes fold up in the first puff of wind, but their bandwidth is poor due to the small diameter of the elements. CQ-DX Beams are made to last, and their bandwidth is excellent - no trimming capacitors necessary. Each beam is D.C. grounded, completely sealed to prevent moisture ingress, and fitted with a downlead and 'N' socket. All saddle clamps are Diecast Zinc Alloy.
Don't throw money away on short term solutions. Buy a beam that will last! BUY CQ-DX!

Model | Elements | Gain | Boom | Price
---- |--------- |----- |------ |------
CQ-DX 430/10Y | 10 El | 13.6dB | 1.5m | £54.95
CQ-DX 430/18Y | 18 El | 17.6dB | 2.8m | £64.95
CQ-DX 430/18XY | 18 El Cross | 17.6dB | 3.2m | £84.95
CQ-DX 430/24Y | 24 El | 18.2dB | 3.5m | £94.95

Available only by mail order from our sole distributor:
Cavendish House, Happisburgh, Norfolk NR12 8RU
Free UK mainland carriage! For full catalogue send £2 in stamps.
Sales order line
01692 650077
Fax: 01692 650925 Website: www.cqccq.com
darkness and seem to peak around the late afternoon period. For those of us living on the fringes of Western Europe, these openings enable us to make contacts with stations more than 800km and sometimes up to 2000km away in all directions except to the West. There’s a ‘stop’ distance of about 900km, which precludes us working these shorter distances via Sp-E.

We can now deduce that because we have a skip distance, we must have an angled reflective signal with a chordal hop of about 2000km average. This places the reflecting layer at about 90km or so - our mysterious E-layer - but what’s now exciting it and then exciting us?

One way of attempting to unravel the enigma is to study the paths and directions of known contacts, who was working who and when. To help, I offer a number of contacts based on some of my own QSOs that might provide hints as to the direction of propagation.

Another time, again in the afternoon on a fine June day, there seemed to be a great deal of Sp-E propagation. I was working stations in the Barcelona area of Southern Spain and not hearing signals via E-layer from any other direction. A near neighbour in Ireland (I live on the West coast of Wales), was working northern Italian stations, I could hear him but not them and I later found out that at exactly the same time, a friend in the Netherlands was working stations in Portugal!

The lines drawn between these points of contacts would converge roughly in the same area over northern France and, believe it or not, a thunderstorm was taking place there at that time. Similarly, with other Sp-E contacts I’ve had, there has always been a thunderstorm roughly halfway along the path. It’s more than coincidental that the greatest number of thunderstorms occur in Europe during the month of June - the time of the greatest number of Sp-E openings. (See Fig. 1).

**Why Thunderstorms?**

But why should thunderstorms affect the E-layer which, you must remember, is about 90km high and thunderstorms, big as they are, top off at roughly 15000m, some 75km short of the layer?

Is there something in the electrical discharges affecting the E-layer? Well, I believe that there is. Some time ago, a BBC ‘Horizon’ TV programme on the power of lightning showed film footage taken of the tops of thunderstorms from a high flying military aircraft. Large plumes of blue light were clearly shown moving upwards from the clouds up to a height estimated to be 100km. Further pictures in this programme showed numerous thunderstorms with bright upward discharges, these latter pictures were taken from a space shuttle.

**Blue Jets & Red Sprites**

Scientists are now taking an active interest in newly discovered phenomena and have already found that, what are now termed Blue Jets are optical ejections from the tops of electrically active core regions of thunderstorms. They propagate upwards in narrow cones with vertical speeds of roughly 100km/s, disappearing optically at roughly 40-50km. Their optical energy has been estimated as about 4k.J. - with a total energy of about 50MJ.

Red Sprites are massive, but weak, luminous flashes that appear directly above an active thunderstorm and occur at the time of lightning strikes, either cloud to cloud or cloud to earth. They are predominantly red (hence their name) and they range from single spots to groups and extend above the cloud tops up to 90km and extend across horizontal distances of up to 50km or more. Their optical energy is roughly 10-50k.J. giving a total energy estimated to be of the order of 10-100MJ within the total of 5-50GW (Giga Watts) of power!

A curious study of the daily weather forecast shown on the TV reveals the presence of thunderstorms likely to occur on the continent. For the purpose of possible Sporadic-E openings, thunderstorms close to home will not be of interest in this context, but a line of storms situated over the Alps could, and does, occasionally bring Romanian contacts.

**Similarity** in storm region over Andorra brings contacts with Gibraltar or Tunisia. The hot, humid days of mid-summer make for spectacular storms, especially over the higher regions and, unfortunately, over most test match pitches.

Could it be that these Blue Jets and Red Sprites, with their enormous charges of energy, have the power to effect the gas molecules in the E-layer? The energy is such that almost continuous ionisation could take place as long as the storm was in being. This could account for the Sp-E openings that last for some hours whilst others just last a few minutes.

Again, the fact that thunderstorms become electrically active, then die away only for another one to appear perhaps many hundreds of km away, could be the cause of the openings to various countries being so separated. As I’ve previously stated, I was working into Italy for a while, then suddenly I was working southern Spain. There’s no doubt that the reflecting area had changed.

The belief that Red Sprites may extend horizontally over 50km suggested other ideas. In fact, it gives rise to my belief that there’s room for stations many hundreds of kilometres apart to reflect signals off this ionised patch to specific points without the signals scattering and, from the strength of the incoming signals, without much attenuation.

Although a 50km diameter patch seems large, it appears that there’s a definite cut-off point at its edge where, from full deflection, there’s nothing and the v.h.f. signals simply pass away into outer space. This, I believe, is borne out by the fact that you may hear a near amateur exchanging 5 and 9 reports with someone, say, in Austria, whilst you are hearing nothing of the DX. Then, miraculously, it’s your turn and your neighbour is left out in the cold and the patch has shifted in your favour.

**Many Proposed Theories**

I have seen many proposed theories on how Sporadic-E (Sp-E) propagation is switched on at v.h.f., none of which are entirely convincing and some of which are so complicated ‘that I cannot totally understand them. Perhaps there are many reasons why this wonderful v.h.f. mode of propagation occurs, perhaps a combination of various natural weather and sun activity.

I’ve been lucky, being able to spend a lot of time on v.h.f., I’ve been about in numerous Sp-E openings, on which happened as late as 2100UTC and this immediately followed a good aurora. That was an evening to remember! I’ve also worked Sp-E at 0700UTC, but most openings have taken place during later afternoons, the peak time for thunderstorms.

As Terman said so many years ago, the cause of Sp-E is not known, I do not know the answer, but I believe that in a few years time, someone will be able to prove the reason and I would suggest that Red Sprites and Blue Jets will somehow be involved in the theory.

Serious investigation is already being undertaken, especially in the USA, to attempt to prove a relationship between thunderstorms and Sp-E. I would like to think that all of us interested in v.h.f. working will make a note of our Sp-E openings, the places we contacted and, if possible, find out where the thunderstorms, if any, were at the time.
Please mention Practical Wireless when replying to advertisements

**AKD**

UNIT 5, PARSONS GREEN ESTATE
BOULTON ROAD, STEVENAGE, HERTS SG1 4QG.

**WAVEMETERS**

**KEEP YOUR STATION CLEAN**

**WA1**
The VHF Absorption Wavemeter for the 2 metre band. Range 120MHz to 450MHz. Meets licensing requirements. Can also be used as a field strength meter within its range. Requires PP3 battery (not supplied).

£34 incl VAT. Add £1.50 P&P

**WA2**
The VHF Absorption Wavemeter for the 4 & 6 metre bands. Range 50MHz to 70MHz. Meets licensing requirements. Can also be used as a field strength meter within its range. Requires PP3 battery (not supplied).

£34 incl VAT. Add £1.50 P&P

**WA3**
The HF Absorption Wavemeter covers the range 1.8MHz to 92MHz. Ideal for the law abiding operator. Requires PP3 battery (not supplied).

£58.45 incl VAT. Add £2 P&P

**BRITISH MADE**

**TRANSCEIVERS**

CE approved

£193.74 incl VAT (Add £6 P&P)

**2 MTR MODEL 2001**
144.500 - 145.9975

PTT tone burst. Listen on Input. Facility 12.5kHz, Spacing 25/5 watts.

**4 MTR MODEL 4001**
70.250 - 70.4675

12kHz Spacing. Power 25/5 watts.

**6 MTR MODEL 6001**
50.300 - 51.990

10kHz spacing where applicable. 25/5 watts. CTCSS tone held in non volatile memory.

**70 CMS MODEL 7003**
432 - 500 to 434 - 517MHz


**UPGRADES AVAILABLE FOR OLDER 2001 & 6001 MODELS**

AKD internet details: Web site: http://www.kbnet.co.uk/akd
E-mail: akd@kbnet.co.uk

**TEL:** 01438 351710
**FAX:** 01438 357591

---

**DELTAS**

**HEAVY DUTY**

**COAXIAL SWITCHES**

"First in the industry" standards for surge protection, precision low-loss switching and master antenna ground functions - all in a single, cost effective product.

**Delta 2N**

Arc Plug cartridge surge protection system - replaceable element provides continuous protection of the active antenna circuit. Unused circuits are automatically grounded. Easy access through front panel.

Master antenna ground function - internally disconnects and grounds all circuits when in centre "off" position.

Efficient low-loss cavity design - uses constant impedance micro-strip construction for outstanding low-loss performance and state-of-the-art co-channel isolation. No lossy wafer switches are used.

Positive detent roller bearing drive for "no question" switch positioning.

The Delta Series handles 1.5kW. Cheaper switches typically don't have N-type connector options, as poor non-constant impedance designs become obvious when using precision N connectors. One look inside cheaper switches will tell you why they are still overpriced.

**2 WAY**

Delta 2N (N connectors, 1300MHz) £92.45

**ALL 4 WAY SWITCHES ORDERED BY 20th SEPTEMBER COME WITH FREE CONNECTOR KIT WORTH £30!**

**4 WAY**

Delta 4 (UHF connectors, 500MHz) £102.45
Delta 4N (N connectors, 1300MHz) £119.95

Available only by mail order from our sole distributor:

**EASTCOMM**

Cavendish House, Happisburgh, Norfolk NR12 0RU

Free UK mainland carriage! For full catalogue send £2 in stamps.

Sales order line

**01692 650077**

Fax: 01692 650925 Website: www.cqcqcq.com

Practical Wireless, September 1999
Free Adverts

Your chance to send in a photograph of your equipment (and good idea if you're promoting or seeking to acquire your advent). Please note that all photos will only be published at our discretion and are non-returnable.

When sending in your advert, please write your name or call sign next to equipment plus 'blowup' to approximately a maximum of 30 words, plus some related contact details. Please use the order from provided.

Advertisements for traders or for equipment that is illegal to possess, use or which cannot be licensed in the UK, will not be accepted. No responsibility will be taken for errors.

You should state clearly in your advert whether the equipment is professionally built, home-brewed or modified.

For Sale

AEE P106 TVC box, with manual and software. £15.00.
Mavix M7 & M8. £15-30 ea.
IBM PC. £1,100.
InfoCircuit SM-110, £95.
Vue 120 Wide screen tv. £15.

[Various equipment ads]

Send your advert to Practical Wireless, Bagnall Avenue, Armitage, Staffs. ST6 6LF.

Free Adverts:

Send your advert as a photograph and/or description of your items to Practical Wireless, Bagnall Avenue, Armitage, Staffs. ST6 6LF. Please include your name or call sign and any other relevant contact details.
MILITARY WIRELESS EQUIPMENT

The "SEM 35" is a West German army manpack/vehicle P.T. Rx. Similar to the AN/PRC-77. Fully transistorized. Frequency range 28–30 MHz. 50kHz channel spacing. Digital (mechanical) switch. The unit operates from an external 24V supply or from ordinary D cells internally fixed. The transmitter output power is switchable for either 1 watt or 100 watts with PTC capacitors for the aerial section. Site 10V 9±0.5 W. Weight approx. 10kg. Robust olive green case. Supplied in good condition with handset and 35 page manual [German] £77.00 each Cartridge 4/6.

NEW BOOKS

Top Secret Exchange. By David Zimmermann. The Tizard Mission and the Scientific War. This new book tells the exciting story of the exchange between Britain and the USA in WWII of their military technical secrets including British radar, the Maginot Line. etc. 235 pages with 210 illustrations limited to anyone interested in early radar. Published at £19.95. Our price £11.50 P&P £2.50.

The Guinesses Book of Espionage by Lord North. This unique book shines a revealing light on particular clandestine business of the art of spying and the technical development of spying with particular emphasis on WWII. Includes photos and details of spy sets, Enigma equipment and clandestine diamonds. 250 pages £12.95 P&P £2.50.

MILITARY MANUALS


The Ultra-Magic Deals by R P Smith. A well researched book on Ultra code-decoding operations providing a fascinating study of the technologies, personalities and politics of Britain and America's secret military-spying secrets - the pooling of their cryptological intelligence against Germany and Japan. Includes recently released details of Bletchley Park operations and one of the few books published on cryptography operations. 276 pages. Published at £17.95. Our price £11.50 P&P £2.75.

Interested in vintage wireless or military radio? Why not subscribe to The Village Wireles Newspaper. Published every two weeks. Contains 100% of out of print old and collectible wireless books, magazines, ephemera, vintage communications and domestic receivers, government radio military equipment, cars and components etc., as affordable prices as well as subscribers wants and sales. Send £1 for the new eight issues.

(Dept PW) CHEVET SUPPLIES LTD.
157 Dickson Road, BLACKPOOL FY1 2EU
Tel: (01253) 751958. Fax: (01253) 302975.
E-mail: chevet@globalnet.co.uk Telephone orders accepted.

BOOK NOW FOR LEICESTER SHOW

Purposely designed to suit everyone's requirements in every way. Ideally located just off Junction 24 of the M1, 2 miles from Donington Park. The East Midlands Hilton has 152 luxurious rooms from family rooms to our superior plaza rooms.

With everything under one roof you don't even have to leave the hotel, fully equipped Livingwell Health Club, dining choices from our atmospheric Deli Lounge to the cosmopolitan feel of our a la Carte Pavilion Restaurant. Not forgetting our dedicated weekend host who is here to solve any questions you may have about the hotel or the local area.

We haven't forgotten your younger guests. We have a fully supervised Yogi Play Park and many more facilities available to them and you.

SO TAKE ADVANTAGE OF OUR COMPETITIVE RATES AND CALL US NOW TO MAKE YOUR RESERVATIONS ON:
01509 674000

Practical Wireless, September 1999

Please mention Practical Wireless when replying to advertisements.

MOONRAKER (UK) LTD
UNIT 12, CRANFIELD ROAD UNITS, CRANFIELD ROAD, WOBNUR SANDS, BUCKS MK17 8UR
TEL: (01908) 281705. FAX: (01908) 281706.
Practical Wireless, September 1999

August 1999 Issue

Was It All Done By Pigeons? Eric Westman gives us his fascinating account of America's first commercial wireless telegraph service.

Joe Carr K1IPV looks at the all important issue of matching your home built Yagi to the feeder in Part 2 of 'Building VHF/UHF Yagi Antennas'.

Kevin Nice G7TZC spends some time with the Grundig YB400 PE portable and sees how it compares to his shack in storage.

Ian Doyle gives us a glimpse behind the scenes at the annual RIAT focusing on Air Traffic Control in the busy skies above RAF Fairford.

Joe Carr K1IPV looks at the all important issue of matching your home built Yagi to the feeder in Part 2 of 'Building VHF/UHF Yagi Antennas'.

John Wilson G3PCY continues his popular look at second-hand bargain receivers - this month its the turn of the Trio R-600.

Kevin Nice G7TZC spends some time with the Grundig YB400 PE portable and sees how it compares to his shack in storage.

Ian Doyle gives us a glimpse behind the scenes at the annual RIAT focusing on Air Traffic Control in the busy skies above RAF Fairford.

On sale NOW
- £2.99 -

Miss it, Miss out!
VHF REPORT

REPORTS & INFORMATION
BY THE LAST SATURDAY OF EACH MONTH.

DAVID BUTLER G4ASR
YEW TREE COTTAGE
LOWER MAESCOED
HEREFORDSHIRE HR2 0HP

TEL: (01873) 860679
E-MAIL: g4asr@btinternet.com
 PACKET RADIO @ GB7MAD
UK DX Cluster @ GB7DXC

THIS MONTH DAVID BUTLER G4ASR HAS REPORTS OF CONTACTS INTO RUSSIA ON THE 144MHz BAND AND THE START OF WORLD-WIDE DX ON THE 50MHz BAND.

Propagation on the 50MHz band during June was reasonably good with sporadic-E (Sp-E) openings occurring on many days during the month. On a few occasions multi-hop Sp-E paths formed enabling contacts to be made into Asia and North America.

Trans-equatorial propagation (I.e.p.l) was also noted with a number of UK stations making contacts into Africa and South America. Contacts via Sp-E were also made on the 144MHz band with stations up to 2000km away. During one of these events an opening occurred to Russian stations located near Moscow some 2600km from the UK.

THE 50MHz BAND

First of all I will be taking a look at recent DX contacts made on the 50MHz band. On June 7 between 1740-1815UTC, the station of A61AH (LL75) in Dubai (United Arab Emirates) was heard on 50.120MHz by a number of stations in the UK. He was strongest in northern England and is known to have contacted G0JHC (IO83) for his first G contact followed by G4FVP (IO94) and G3WOS (IO91).

The station of A61AH runs 100W from an Icom IC-706 transceiver into a 5-element Yagi. Neil Carr G0JHC reports working 6W4IK in Senegal on June 8 at 1328UTC. Most G-stations worked him on c.w., with signals peaking around 529. In Cornwall, however, the station of G8BCG/P (IO70) made a contact with s.s.b. with 59 signals being exchanged.

There was a brief opening to South America on June 10 around 1815UTC. Andy Kissack G0DTTEP (IO74), located on the Isle of Man, worked PP5BC in Brazil and heard the PY3ARL beacon. Across the water in Blackpool, the station of GOJHC heard the LU (Argentina) and PY beacons for an hour but no other activity during this time. Neil did find some activity on June 13 when he worked 9J2BO in Zambia during an early evening opening.

Propagation between the UK, North America and the Caribbean area were noted on June 15 and June 16. The Newfoundland beacon VO1ZA (SO.039MHz) was heard by G1ZYY (IO70) at 1635UTC on June 15 peaking to 539 at times. Later in the evening at 2140UTC it reappeared again with a much stronger signal and the c.w. station of VO1JN was heard.

Roger Horne G4HBA (IO80) reports working VO1JN at 2146UTC and hearing the F7SXAB beacon (S1. Pierre and Miquelon) for 20 minutes. On the following evening, June 16, the station of WP4D reported working a number of European stations including E15FA, G0JHC, G3CEG, G3NVO, G4HBA, G4ICO and GW4VEQ. The Puerto Rican station runs 150W into a 4-element Quad antenna. Neil GOJHC also made a contact with KP4E1T (FK68) during the same opening.

Ivan Palmer G7SNC (IO72) mentions that he made an s.s.b. contact with OD55X (KM74) on June 20. Ivan uses an Yaesu FT-690 transceiver, a 10W amplifier and 5-element Yagi and was very pleased to receive a 55 report from the Lebanese station.

A few days later on June 22 there was an opening into Africa. Between 1530-1615UTC the station of T66VVI in Mali was heard contacting many UK operators. The opening was quite widespread with stations located from the south coast (IO90) to the north Midlands (IO93) getting in on the action.

Events on June 23 were quite extraordinary. It started early in the morning with the first sighting of DX from the Far East. At 0850UTC Hans Wilke DK2PH reported hearing JE1BMJ (Japan) on 50.111MHz calling CQ and then going on to work OH7Y. Andy G0DTTEP copied the Japanese station briefly before signals disappeared into the noise.

The Japanese station was also heard at the QTH of G0JHC peaking 419 but European QSOs on 50.110MHz completely wiped out the signal. Neil recommends that DX stations call CQ below 50.100MHz to clear the European QRN that exists on the International calling frequency.

The station of JE1BMJ runs 1kW output into a pair of 5-element Yagis at 30m above ground level (a.g.l.). Bear in mind that if you are running the full UK power limit of 400W and hear JE1BMJ peaking 51 then it's very unlikely that he would copy you.

Later in the day Peter G3ZSS (IO91) heard JY4NE (Jordan) for 15 minutes around 1700UTC on 50.095MHz. His c.w. signal was in and out of the noise. To round off the day, David MM40AMW (IO75) reports that he caught his first transatlantic opening of the season. Between 2020-2115UTC he worked 30 stations in Canada and the USA via multi-hop Sp-E propagation. His contacts included the stations of KU4IU (EM54), K6EID (EM73) and VO1JN (GN37).

Mike VE9AA reports that MM40AMW was a very consistent signal during the opening and that G0DTTEP was also heard with a genuine 599 signal. By the way, the station of G0DTTEP runs 100W into a 7-element Yagi. Mike mentions that all his contacts were on c.w. as most signals were generally weak with the exception of stations in CD and GM. Also participating in the opening was the station of WB8XX (EM79) located in Ohio. He reports working 12 stations located in CT, EA, EH8, EL, GM and OK. He also heard stations in DL, SP, SS and YO.

Propagation on the 50MHz band was particularly good during this period. On June 24, Jim Smith G1OFE (IO90)
reported hearing the PY3ARL beacon at 1900UTC and Chris G3WOS (IO91) heard the Brazilian station PY5SC. The PY beacon runs 5W into a simple vertical antenna so the propagation must have been quite good.

On the following evening there was an excellent opening to North America. Stations in the UK were working into the W1, W2, W3, W4, VE3 and VO call areas for six hours or so. Catch of the evening for some was C6AGN (FL16) in the Bahamas. If you didn't hear him or much of the other DX then you really must brush up on your Morse code!

The band was open at the QTH of MB Mobile WA10UB (FN43) to somewhere in Europe for nearly 12 hours. Between 1253-2400UTC he contacted 27 English stations, seven Scottish, three Welsh and one operator in Northern Ireland. Bob also worked stations in DL, EA, EA8, EA9, F, HB9, LZ, OE, OK, OM, ON, PA, SS, SP, YO, YU, 9A and 9H. We really are going to have a competition when the 50MHz band opens up for world-wide DX later in the year.

To round off the month, GD0TEP reports hearing 9J2BO for 30 minutes on June 29 with s.s.b. signals peaking to 59 for much of the time. So, not a bad month at all for DX openings on the 50MHz band. At GO1HC a total of 72 DXCC countries were heard in a six week period with 22 of them being outside of Europe.

Chris Tran GM3W0J (IO77) reports that in a similar period he worked 4LS0 (Georgia) and 9H3US (Tanzania) for two new countries and made contacts with stations in South Africa (ZS6), Zimbabwe (Z23), Zambia (9J) and Malawi (7Q). Having recently improved his antenna system John Hilton GM1ZYV (IO68) has now decided to concentrate solely on the 50MHz band. He's now using a 5-element F9FT Yagi and looks forward to working stations outside of Europe very soon. This will increase his country score which currently stands at 38 since March 1998.

John, using an Alinco DX-70TH transceiver running 100W, recently made s.s.b. contacts with stations located in Portugal (CT), Spain (EH), Canary Islands (EH8), France (F), Sardinia (ISO), Lithuania (LV), Austria (OE), Finland (OH), Czech Republic (OK), Slovenia (SS) and Croatia (9A).

THE 144MHz BAND

Two Sp-E openings on the 144MHz band occurred on May 24. Around midday there was a very brief event, but most operators appeared to have missed this. Later in the afternoon, between 1430-1435UTC, Doug Hurr G6MFF (IO92) worked F1EYB and F5LKW both located in JN23 on the Mediterranean coast. Doug runs 25W from an Icom IC-271E into an H9BCV antenna at 5m above a.g.l.

The opening also spread into south Wales (IO81) with the station of IZ5EME (JN52) and then later in the afternoon between 1413-1429UTC he made eight s.s.b. contacts with stations in southern France. The Sp-E opening was very geographically selective as all stations were in the same locator square, JN23.

A few minutes later the ionised 'cloud' had moved and Julie then made contact with two stations on the island of Sardinia. IS0DJK and IWOQU, both in locator JM49. On June 19 at 1709UTC there was an excellent opening into the Moscow area of Russia.

Julie contacted RX3PX (KOB4) and mentions that she was very pleased as the contact over a path of 2600km better her previous best by some 300km. Also heard around the same time was the station of RA3LBK (KOB5). Both Russian stations are well known v.h.f. DXers being active on both earth-moon-earth (e.m.e.) and meteor scatter modes.

On June 20 and June 22 she heard Belgian stations working more DX via Sp-E but nothing could be heard at her QTH (IO92) in the West Midlands. Her last Sp-E contact of the month occurred on June 23. An s.s.b. contact was made with SP7JSG (K001) at 1045UTC and the stations of SP3MUC and SP7CDN heard briefly. Julie runs a Kenwood TS-700S transceiver, a 90W amplifier and a pair of 9-element Yagis. The set-up is obviously working!

Another station to work into Russia during the Sp-E opening on June 19 was David Edwards G7RAU (IO90). He managed to work RK3AF but it took five minutes to crack the pile up. Dave Dibley G4RGK (IO91) reports that he caught a Sp-E opening on June 20 between 1130-1230UTC. He contacted YO4FYQ (KN44), YO4JNF (KN44), YO5BSE (KN16) and YO9AZD (KN35) and heard ten other Romanian stations. Later in the evening between 1620-1700UTC stations in East Anglia (IO01/IO02) were heard working U5W5U (KN20), UT5ER (KN78) and U5O9 (KN88) but nothing was heard at his QTH.

Nigel Booth M1DKN (IO02) wrote to me before the start of the Sp-E season mentioning that, in his opinion, the 144MHz band has been rather 'flat'. He hasn't been hearing anything on s.s.b. despite occasionally copying the G83YHF beacon 140km away and the PI7OS beacon at 225km with good signals. He mentions that next time you notice a lift in conditions you might care to beam towards his QTH in north Norfolk as he is always looking out for f.m. and s.s.b. contacts.

The photograph in Fig. 1 shows the 144MHz antennas used at the QTH of M1DKN. I'm not certain from the photograph whether the beams can be rotated, if not, then that could be the reason why Nigel is not hearing much on the band - with any type of directional antenna you need some form of azimuth rotation. Assuming Nigel has a rotator, the next area that needs attention is the coaxial feeder. The cable looks very thin, the consequence of this being that it will attenuate signals to some extent. For example, UR4M3 cable (5mm diameter) has a...
loss at 144MHz of around 1.5dB for every ten metres. If the antenna is 20m away from the rig (not untypically) then 3dB, i.e. half the received signal power, will be lost. Throw in at least five plugs/sockets to get around the 'linear' (not in most cases), the v.s.w.r. bridge and the transceiver plus a few dodgy joints and water in the coaxial and it's a wonder anyone can hear anything!

RECEIVE LOSSES

One method I use to keep receive and transmit losses to a minimum is shown in the diagram, Fig. 2. It applies to a single-Yagi system which I use primarily for meteor scatter (m.s.) communications.

Starting with the 144MHz Yagi antenna, this is supplied with a moulded N-socket which eliminates water ingress. These sockets are designed to work up to 18GHz and, if the matching N-plug is terminated correctly, the combination will provide a very low loss connection capable of withstanding high power.

An important point to note is that the cable you use must match the impedance of the driven element of the antenna. Don't use a 75Ω feeder with a 50Ω antenna. I use 1 inch diameter Andrews LDF5-50 Heliax as the main feeder to keep the losses to a really low level - a few tenths of a decibel.

However, it's not flexible having a solid copper outer sheath and cannot be used to go around the rotator. It might work once or twice and then the feeder will literally break in half! This is also a problem with other cables that have a thin copper outer coating. Although this type of cable is quite flexible it really does not stand up to continual flexing and eventually (within a year or so) the screening cracks into small sections and you'll wonder why your v.s.w.r. has suddenly got worse.

To go around the rotator I introduced a short length of flexible FSJ4-50 Heliax cable. This is a low loss cable especially designed to be twisted around a small radius. All interconnecting joints are made using n-plugs/sockets and covered with self-amalgamating tape to keep the water out.

The lower end of the main feeder comes directly through the cottage wall. I first removed some stonework and cemented a drainpipe in place as a cable duct. The end of the cable is arranged to be about 1m away from the transceiver. The LDF5-50 feeder is terminated in an n-socket and connected directly to a 4-port coaxial switch.

You may not be familiar with this type of switch but they are very useful indeed. Unlike a conventional changeover relay this switch has four ports (or connections). If you look at the diagram you'll see I've shown the switch in the receive position. When I put the transceiver into the transmit position, the switch flips over, one half connecting the amplifier to the main feeder and the other half terminating the receiver in a low power 50Ω load. I use LDF4-50 (0.5 inch Heliax cable) as patch leads from the switch to the transceiver.

To further reduce losses, I completely removed the output switching circuitry from my Yaesu FT-221RD transceiver and provided separate sockets for the transmit and receive ports. With an optimised Mutek replacement front-end this ancient transceiver really does have better sensitivity than many, if not all, v.h.f. multi-mode radios available today.

Indeed, in terms of noise figure and sensitivity the rig performs much better than a £2000 transceiver which I've recently bought. The FT-221RD doesn't send the operating mode in Morse code when you switch the mode button and it doesn't say "Hello" on the l.c.d. display when you turn it on. But then again.....!

DEADLINES

That's it again for another month. I hope you've been working some good DX on the v.h.f. and u.h.f. bands. Please forward any news, views, comments or photographs to the address and by the date given at the top of the column.

THANKS FOR YOUR LETTERS AND GOOD LUCK WITH THE DX. SEE YOU AGAIN NEXT MONTH.

79 David GW4ASK

HF FAR & WIDE

LEIGHTON SMART GWOLBI
33 NANT GWYN
TRELEWIS
MID GLAMORGAN
CF46 6DB
WALES

TEL: (01443) 411459

THIS MONTH LEIGHTON SMART GWOLBI BRINGS YOU

TWO PAGES FULL OF REPORTS ON LAST MONTH'S VARIOUS BAND CONDITIONS. AS WELL AS REPORTING ON MORE EXPLOITS FROM THE SHACK OF MOBCL!

Reports of propagation conditions in June have varied between 'pretty good' to 'pretty bad', according to our reporters this month. All told though, I have had some reports come in of some nice DX being worked from all parts of the world on all, if not most, of the bands, which tends to speak for itself.

The WPX contest helped a few of our reporters snap a few rare countries which are only activated during such events, so I guess that's one good reason for having h.f. contests!

Whilst I'm on the subject of contests, it never ceases to amaze me how 'keen' the ears of contest operators are. Isn't it strange that during 'normal' operating sessions, one just can't seem to get that new country you've been chasing for months, but as soon as a contest comes along, you suddenly work it with 3mW and a dummy load for an antenna, getting a 5 and 9 report as well! Ever noticed this phenomenon, anybody, or is it just me I wonder?

OLD ACQUAINTANCES

A letter came in this month from Tom Hutton GW0HUT of Osbaston near Monmouth which shows just how this
706 TUNE Control

- Make your TUNER/CALL button work on your ICOM 706 (all models)
- Eats 10 watts & sidetone
- Reverts back to previous mode/power
- Great for tuning SWR, antenna, tuner, etc
- Small PC board, plugs into Molex connector at rear of radio (no radio-mod)
- 160 through 10 meters

$32.95
$0.00 &H EUROPE
MC/VISA/AMEX

The BetterRF Co.
43 Dusty Trail
Plasticus MI 87043
USA 00 1 (505)771-4001
www.qth.com/betterRF 00 1 (505)771-6289

SYCOM
P. O. Box 148, Leatherhead,
Surrey KT22 9AZ
Tel: 01372 372587 Fax: 01372 361421
E-mail:robin@sycomcomp.co.uk Web site: www.sycomcomp.co.uk
Try us for:
- Resistors - Capacitors - Switches - Semiconductors -
Cable connectors etc.
- Plus all those hard to find parts for the constructor.
SEND OR PHONE FOR OUR NEW CATALOGUE TODAY!
COMPONENTS AND AMATEUR RADIO EQUIPMENT PURCHASED
Robin G3NFV Geoff G4ECF

THE COMMUNICATION SPECIALISTS
Recceurs - Scanners - Transceivers
Call & discuss which part of the radio spectrum you wish
to operate and we will advise you on the most cost effec-
tive way achieving it.
- Full range of new & second-hand equipment available.
- We stock all leading brands:-
Airband Amateur CB, Marine Shortwave

Web site: http://www.shortwave.co.uk
4 MILES FROM BOURNEMOUTH INTERNATIONAL AIRPORT ON B3073
500 YARDS FROM CHICHESTER RAILWAY STATION, PUBLICKIT PARKING FOR DISABLED

Best seller...the bargain priced
Adapt-A-Mast
- Lifts to 25ft - Wall mounting
- Complete with all brackets, cable and winch
- Accepts 2in stub mast - Adaptable to tilt-over
- Available hot dip galvanised BS729
- Simple four bolt installation

MANY OTHER MASTS AVAILABLE
Call (01505) 503824 Mobile (0374) 951660
or write to
TENNAMAST SCOTLAND LTD
81 MAINS ROAD, BEITH, AYRSHIRE KA15 2HT
E-mail:smurren@tennamast.com Web site: www.tennamast.com
For sales in Belgium countries contact
Doeven Elektronika. Tel +31 (0) 5282 69679

P.O. Box 148, Leatherhead,
Surrey KT22 9AZ
Tel: 01372 372587 Fax: 01372 361421
E-mail: robin@sycomcomp.co.uk
Web site: www.sycomcomp.co.uk
Try us for:
- Resistors - Capacitors - Switches - Semiconductors -
Cable connectors etc.
- Plus all those hard to find parts for the constructor.
SEND OR PHONE FOR OUR NEW CATALOGUE TODAY!
COMPONENTS AND AMATEUR RADIO EQUIPMENT PURCHASED
Robin G3NFV Geoff G4ECF

THE COMMUNICATION SPECIALISTS
Recceurs - Scanners - Transceivers
Call & discuss which part of the radio spectrum you wish
to operate and we will advise you on the most cost effec-
tive way achieving it.
- Full range of new & second-hand equipment available.
- We stock all leading brands:-
Airband Amateur CB, Marine Shortwave

Web site: http://www.shortwave.co.uk
4 MILES FROM BOURNEMOUTH INTERNATIONAL AIRPORT ON B3073
500 YARDS FROM CHICHESTER RAILWAY STATION, PUBLICKIT PARKING FOR DISABLED

Best seller...the bargain priced
Adapt-A-Mast
- Lifts to 25ft - Wall mounting
- Complete with all brackets, cable and winch
- Accepts 2in stub mast - Adaptable to tilt-over
- Available hot dip galvanised BS729
- Simple four bolt installation

MANY OTHER MASTS AVAILABLE
Call (01505) 503824 Mobile (0374) 951660
or write to
TENNAMAST SCOTLAND LTD
81 MAINS ROAD, BEITH, AYRSHIRE KA15 2HT
E-mail:smurren@tennamast.com Web site: www.tennamast.com
For sales in Belgium countries contact
Doeven Elektronika. Tel +31 (0) 5282 69679

P.O. Box 148, Leatherhead,
Surrey KT22 9AZ
Tel: 01372 372587 Fax: 01372 361421
E-mail: robin@sycomcomp.co.uk
Web site: www.sycomcomp.co.uk
Try us for:
- Resistors - Capacitors - Switches - Semiconductors -
Cable connectors etc.
- Plus all those hard to find parts for the constructor.
SEND OR PHONE FOR OUR NEW CATALOGUE TODAY!
COMPONENTS AND AMATEUR RADIO EQUIPMENT PURCHASED
Robin G3NFV Geoff G4ECF

THE COMMUNICATION SPECIALISTS
Recceurs - Scanners - Transceivers
Call & discuss which part of the radio spectrum you wish
to operate and we will advise you on the most cost effec-
tive way achieving it.
- Full range of new & second-hand equipment available.
- We stock all leading brands:-
Airband Amateur CB, Marine Shortwave

Web site: http://www.shortwave.co.uk
4 MILES FROM BOURNEMOUTH INTERNATIONAL AIRPORT ON B3073
500 YARDS FROM CHICHESTER RAILWAY STATION, PUBLICKIT PARKING FOR DISABLED

Best seller...the bargain priced
Adapt-A-Mast
- Lifts to 25ft - Wall mounting
- Complete with all brackets, cable and winch
- Accepts 2in stub mast - Adaptable to tilt-over
- Available hot dip galvanised BS729
- Simple four bolt installation

MANY OTHER MASTS AVAILABLE
Call (01505) 503824 Mobile (0374) 951660
or write to
TENNAMAST SCOTLAND LTD
81 MAINS ROAD, BEITH, AYRSHIRE KA15 2HT
E-mail:smurren@tennamast.com Web site: www.tennamast.com
For sales in Belgium countries contact
Doeven Elektronika. Tel +31 (0) 5282 69679

P.O. Box 148, Leatherhead,
Surrey KT22 9AZ
Tel: 01372 372587 Fax: 01372 361421
E-mail: robin@sycomcomp.co.uk
Web site: www.sycomcomp.co.uk
Try us for:
- Resistors - Capacitors - Switches - Semiconductors -
Cable connectors etc.
- Plus all those hard to find parts for the constructor.
SEND OR PHONE FOR OUR NEW CATALOGUE TODAY!
COMPONENTS AND AMATEUR RADIO EQUIPMENT PURCHASED
Robin G3NFV Geoff G4ECF

THE COMMUNICATION SPECIALISTS
Recceurs - Scanners - Transceivers
Call & discuss which part of the radio spectrum you wish
to operate and we will advise you on the most cost effec-
tive way achieving it.
- Full range of new & second-hand equipment available.
- We stock all leading brands:-
Airband Amateur CB, Marine Shortwave

Web site: http://www.shortwave.co.uk
4 MILES FROM BOURNEMOUTH INTERNATIONAL AIRPORT ON B3073
500 YARDS FROM CHICHESTER RAILWAY STATION, PUBLICKIT PARKING FOR DISABLED

Best seller...the bargain priced
Adapt-A-Mast
- Lifts to 25ft - Wall mounting
- Complete with all brackets, cable and winch
- Accepts 2in stub mast - Adaptable to tilt-over
- Available hot dip galvanised BS729
- Simple four bolt installation

MANY OTHER MASTS AVAILABLE
Call (01505) 503824 Mobile (0374) 951660
or write to
TENNAMAST SCOTLAND LTD
81 MAINS ROAD, BEITH, AYRSHIRE KA15 2HT
E-mail:smurren@tennamast.com Web site: www.tennamast.com
For sales in Belgium countries contact
Doeven Elektronika. Tel +31 (0) 5282 69679
hobby of ours brings people together from all over the globe. Tom received a surprise visit from Bob TZ6DX recently, who he last saw in India in 1991.

Tom explains that Bob is a Diplomat ‘by trade’ and has more callsigns than anyone he knows! As a result of the visit, a “great radio evening” was had by them both and they were joined by a couple of local amateurs as well. See Fig. 1.

FURTHER EXPLOITS!

Further to his exploits published in the June ‘HF Far and Wide’ regarding his underground antenna system, it seems that Paul Williams M6BCL of Wellington in Somerset is at it again!

This time though, his antenna is above the ground, but not by much! He’s been using a 1.5m vertical telescopic whip antenna (of the type found on transistor radios) on the 21MHz band, which is mounted directly from his tuner using a right angled P1.259 plug.

Using this most basic of set ups and just a couple of watts of c.w., he’s managed to hook up with 4K6GF in Azerbaijan at around 5777km with 4.5W, as well as UA3WFS in Russia with 2100W. They came in on the short path between 1100 and 2300UTC, with the best openings up to as late as 2300UTC. For a few days the long path to Australia was open at around 2300UTC, while Africa came in during morning and afternoon. North America was best between 1400 and 2300UTC, while south America came in from 2100UTC onwards.

The 24MHz band was patchy. Only a few Asian signals were heard between 1500 to 1600UTC and a few east coast US stations at around 2100UTC. The long path to Australia opened just a few times at 2200UTC and only a few African stations were heard during the afternoons.

“Finally, the 28MHz band was very patchy, with just a few north Americans being heard around 2100UTC, most signals being from south America during the evenings, although there were some Africa stations heard around 1600UTC”,

By the way, Don G3NOF mentions a visit made recently to his club, Yeovil ARC, by our very own Rob G3XFD and says how interesting it was!

YOUR REPORTS

Starting with the 1.8 and 3.5MHz band this month comes Eric Masters G6KRT of 2230 regardless of conditions using a Yaesu FT-920 running 100W and a 2-element TET triband beam antenna/half-wave vertical antenna;

Leighton Smart GW0ULB operates: on 1.949MHz s.s.b. and around 1.820-1.836MHz c.w. on weekday evenings between 1900 and 2230 using a Yaesu FT-747 QRP transceiver at 5W maximum and a 60m long wire Marconi antenna;

Rob Mannion G3XFD listens and operates: (weekdays & weekends) 1800-1830 on 3.7MHz 100W s.s.b. & 3.530 or 3.560MHz and 18.105MHz QRP c.w. using an Alinco DX-70 transceiver and a long wire antenna. Also at 2300 on either 3.560, 7.025MHz (c.w.) or 3.7MHz s.s.b. (All operation dependent on PW work/traffic);

Sean Gilbert G4UCJ operates: around 0700 to 1100 and 2100 to 0000 seven days a week on 14MHz and 7MHz using an FT-307 and Alinco DX-70 transceivers at 3/30W output and a G3RV dipole antenna in the loft space.

TRISTAN DA CUNHA

Colin Topping GM6HGW and his wife Gail GM7GKE are visiting Tristan Da Cunha with a dental team and would like readers to know that they will have a rig with them and will be operating on the 14MHz band whilst on the island. They have sent us their “provisional” itinerary and would welcome any contacts from PW readers.

They will be travelling to Cape Town by aircraft on August 30 where they will sail (on the South African research vessel S A Agulhas) to Tristan on September 2 and will arrive in Tristan on September 8/9. They will be leaving Tristan and sailing to Cape Town on October 1, arriving in Cape Town on October 7. They will be leaving Cape Town and flying back to the UK on October 10. There will be an Amateur Radio station on the ship and there may be an opportunity for them to use the equipment whilst they are on the boat as well.

PROPAGATION REPORT

Now over to Don McLean G3NOF of Yeovil for his regular h.f. ‘Propagation Report’. Don says: “Generally, the h.f. bands, with the exception of 14MHz have not been too good during the daytime, with the best conditions appearing from 1600UTC onwards, 14MHz was the most reliable, being open day and night for the most part.

“The 18MHz band Japanese and other Asian stations came in on the short path between 1100 and 1600UTC, with North America being heard at various times between 1100 and 2300UTC, Africa was more elusive, with just a few being reported in the mornings and afternoons.

“The short path to Asia on 21MHz was good between 1500 and 2000UTC, with a few openings up to as late as 2300UTC. For a few days the long path to Australia was open around 2300UTC, while Africa came in during morning and afternoon. North America was best between 1400 and 2300UTC, while south America came in from 2100UTC onwards.

“Finally, the 28MHz band was very patchy, with just a few North Americans being heard around 2100UTC, most signals being from South America during the evenings, although there were some Africa stations heard around 1600UTC”,

By the way, Don G3NOF mentions a visit made recently to his club, Yeovil ARC, by our very own Rob G3XFD and says how interesting it was!

PW Listening & Operating Watch List

(All times in UTC):

Charlie Blake M6AJI listens and operates: 0500-0700 on 7.061MHz s.s.b. with an NRD-525 receiver & Sloping Wire antenna and is also busy with his mobile rig;

John Heys G3BDQ operates: mainly weekends, during daylight hours on the 1.8 and 3.5MHz band this month around 0700 to 1100 and 2100 to 0000 seven days a week on 14MHz and 7MHz using an FT-747 and a 2-element TET triband beam antenna/half-wave vertical antenna;

George Woods G3LPT (Suffolk) operates: an open net on 29.630 f.m. every weekday morning, except Monday, at 0930 local time;

Don McLean G3NOF operates: 1030 Sundays on the Yeovil ARC Net on 29.600 n.b.f.m. every evening between 1730 and 2130, and Wide' regarding his station in the daytime, with the best openings up to as late as 2300UTC, while Africa came in during morning and afternoon. North America was best between 1400 and 2300UTC, while south America came in from 2100UTC onwards.

The 24MHz band was patchy. Only a few Asian signals were heard between 1500 to 1600UTC and a few east coast US stations at around 2100UTC. The long path to Australia opened just a few times at 2200UTC and only a few African stations were heard during the afternoons.

Finally, the 28MHz band was very patchy, with just a few North Americans being heard around 2100UTC, most signals being from South America during the evenings, although there were some Africa stations heard around 1600UTC. By the way, Don G3NOF mentions a visit made recently to his club, Yeovil ARC, by our very own Rob G3XFD and says how interesting it was!

YOUR REPORTS

Starting with the 1.8 and 3.5MHz band this month comes Eric Masters G6KRT of...
contact this month from Don McLean G3NOF in Yeovil in the form of CY95S (St. Paul Island).

He was much more active on 18 MHz, however, contacting BV5BG (Taiwan), CP6XE (Bolivia), QSL via IK6SNR, J1RKE (Greece), a string of Japanese stations, YBOCEF (Indonesia), 524GS (Cyprus), QSL via W82YQH, as well as 7K2PMJ, Japan, 9V1A (Singapore) and 457DA (Sri Lanka) QSL via W3HMK, all contacts worked using 100W and a Yagi beam antenna. Eric GO6RT has been using high power this month too, listing s.s.b. contacts on 18 MHz with 42J5EJ (Israel) at 2055UTC and RN1A43 "the only Englishman with a Russian callsign" he reckoned!

Meanwhile, over in Bishopston near Swansea, Robin Trebickoc GW3ZCF lists impressive 14 MHz s.s.b. contacts with HK1A3VN (Honduras) at 0731UTC, EK6TA (Armenia) at 1949UTC, A45AR (Oranien) at 1936UTC and VK6MW (Australia) at 0821UTC.

Robin’s 18 MHz contacts included UJ2XV (India) at 1455UTC, DS5KH (Kenya) at 1900UTC, S3L15K (Egypt) at 1930UTC, 9K2HN (Kuwait) at 1630UTC and while out portable in Permbrokeshire he also racked up J88GW (Japan) at 2011UTC and VL3MCV (India) at 1624UTC.

THE 21MHz BAND

It looks like the 21 MHz band was the centre of activity for most of our reporters this month which their logs show. Despite conditions being somewhat ‘up and down’ they certainly managed to dig out that exciting stuff, no doubt all down to their patience, expertise and skill.

First of all though, a warm ‘HF Far & Wide’ welcome to Declan E9HQC this month who sends a single band 21 MHz report from the Emerald Isle. Using 400W into a 3-element Yagi beam he lists his contacts with BV4QJ (Taiwan) at 1600UTC, HL0UPK (South Korea) at 1822UTC, E9Y0Z (Khinchigia) at 1840UTC, 9Y4ZA (Trinidad & Tobago Islands) at 2240UTC, CEI1UW (Chile) at 2332UTC, AL7J (Alaska) at 2356UTC, C07DS (Cuba) at 0008UTC, V31DPC (Belize) at 0126UTC, ZL3JT (New Zealand) at 0235UTC and H9HLE (Haiti) at 0230UTC.

Using 3 and 30W of c.w. on 21 MHz, Sean G4UCJ lists his contacts as HCR8N (Galapagos Islands) at 2247UTC, TIC3 (Costa Rica) at 0048UTC, BH2DWW (China) at 1850UTC, WHZ2N2LN (Guam) at 1927UTC, as well as VR2BG (Hong Kong) 12236UTC, HK6ER (San Andreas Island) at 2340UTC and KH6ND (Hawaii) at 1702UTC.

Between sessions in the garden, Ted G2HKU had a bash at the 21 MHz band using 70W of c.w. and a mixture of G5K2 and vertical antennas. With this set-up, he hooked up with S3N3CR (Nigeria), J2ZZW (Japan), VO9VK (Chagos Islands) and PT7SJ (Brazil) at around 1500UTC.

While operating at 1800UTC he brought in COBLY (Cuba), J8Y8B (Jordan) and FY5YE (French Guiana) and at 2000UTC he lists L9AY (Argentina). He also adds a SW QRP contact with UI3JDDMN in the Mediterranean Sea at 150UTC.

The 21 MHz band was the main attraction this month for Don G3NOF too. His huge log for this band, includes s.s.b. contacts with RA7JG (China) QSL via PO Box 1711 Guangzhou, Peoples Republic of China, BV4KA (Taiwan), JT1CO (Mongolia) QSL via Box 905, Ulan Bator 23, Mongolia, FG5FY (Guadeloupe), VK3MAA (Australia), YBOECT (Indonesia), 457DA (Sri Lanka), 9M2A/G4YXI (Malaysia), UV2JSW (India), ET3AA (Ethiopia) and 5Y1T (Uganda).

Eric GO6RT, using high power on 21 MHz this month, lists V28E (Antigua and Barbuda Islands) for a new country, as well as K2UOP (USA) and SC8N (Morocco), all at around 2200UTC.

THE 24MHz BAND

The 24 MHz band is one place to keep half an eye on as it very often throws up quite a gem or two in terms of DX. Fortunately enough, I talk to many amateurs who have yet to even try out 24 MHz, yet it can be a very productive band.

Robin GW3ZCF hooked up with 5X1T (Uganda) at 0929UTC, as well as 5792G (Republic of Seychelles) at 1900UTC, while Sean offers c.w. contacts with ZS6AVP (South Africa) at 2100UTC, 5Z4FM (Kenya) at 0940UTC, R1AND (Antarctica) at 1423UTC and a QRP contact with 5N0MSV (Nigeria) using just 3W output.

Ted G2HKU had a crack at 24 MHz too, digging up AD6C (USA), Z55RON (South Africa) who is ex-G0IEZ and SV9AGY3OR (Cote) with 70W of c.w., while a switch to 5W brought a nice two-way QRP contact with Z56AVP (South Africa), all at around 1500UTC.

THE 28MHz BAND

Finally we come to the 28 MHz band where, despite it being ‘extremely patchy’, some nice stuff was worked this month. Eric GO6RT for instance mentions working P3A (Cyprus) at 2000UTC, plus NY4A (USA) and LS0UG (Argentina) at around 2130UTC, while Don G3NOF offers s.s.b. contacts with ZW55HEL (Brazil), 5Z4IC (Kenya) QSL via MWDAIE, 9Z2AM (Zambia) and L22ATR (Argentina).

Using a HF6 vertical antenna and 30W of power on this band, Sean G4UCJ spent quite a bit of time here and logged c.w. contacts with 388BCF (Mauritius) at 1421UTC, 3CI2 (Equatorial Guinea), at 0906UTC, 5X1T (Uganda) at 1657UTC, YY4A (Venezuela) at 2011UTC, V266 (Antigua) at 2015UTC, plus 3W QRP contacts with L29GR (Argentina) at 1600UTC, VP5GA (Truk & Caicos Islands) at 1325UTC and P49V (Aruba Island) at 1644UTC.
To tie up the ribbons for this month, we have Ted G2HKU who offers two contacts on 28MHz in the form of PY2OW (Brazil) and KP4TF (Puerto Rico) both at around 1500. This just goes to show that even when a band appears 'dead', as 28MHz often does, it's well worth putting out a call. After all, if we all listen, no-one will work anybody!

SIGNING OFF

Well it appears that our intrepid reporters know no bounds when it comes to chasing DX on the h.f. bands and long may it continue. Most importantly of course, we hope it gives you the readers an interesting and advanced feature, as well as helping newcomers to h.f. to see what can be done with all types of antennas and stations, from the most basic to the most advanced.

Thanks again to all correspondents for their reports, Information and Input to the column. As usual, reports and information (and photos as I'm still looking for photographs of our reporters!) by the 15th of each month. Details at the top of the column.

Roger Cooke G3LDI

DATA SCAPE

ROGER COOKE G3LDI

TEL: (01508) 570278

E-MAIL: rcooke@g3ldi.freeserve.co.uk

PACKET: G3LDI@GB7LDI

THIS MONTH ROGER COOKE G3LDI LOOKS AT THE VFAST28.8 HIGH SPEED MODEM FROM GMSK DATA

Products, Examines the Health of Our Computers Due to the Threat of So Many Viruses and Finally He Looks at the Possibility of Free Telephone Calls and Much More.

I've written about the GMSK modem before, but it was a while ago and I think it should be given some more publicity, to encourage the use of higher speeds on our Packet network.

The VFast28.8 is a high speed, radio modem adapter for AX25 Packet radio users. The modem has been developed by GMSK Data Products specifically for Radio Amateur use. It uses the latest in VLSI component technology but has no relationship with the VFast Class modems used on telephone lines.

The design of this modem provides a neat solution to converting a 1200 baud 'TNC 2' or similar TNC to high speed with the minimum of effort. The completed p.c.b. fits onto the modem disconnect header of either a TAPR TNC2 or clones such as the GOBSX, GCBTW 'TNC 2' PLUS, Paccomm Tiny 2, or many other TNC designs. The modem is also suitable for use with PC based SCC expansion cards such as the Thor RLC100 4 port card, Baycom USCC and others. Additionally, it requires only seven external wires to complete the installation. (With some TNCs it may be possible to fit the board inside the case, with others a separate case may be required).

As a direct f.m. type of modulation method and data scrambler is used, designs based on the G3RUH modem will inter-work with the VFast28.8 modem successfully. The board is simple to construct and measures only 140mm x 60mm and uses simple-to-buy components with 4 i.c.s required.

The VFast28.8 modem kit comprises a high quality p.c.b. with full ground plane and careful analogue/digital separation, a pre-programmed "mController" and a Technical Manual.

The FX589 modem i.c. used can be obtained direct from the manufacturer and full contact information is given in the VFast28.8 manual. The Web site has further details and the front page is shown in Fig. 1. The URL is www.gmskdata.co.uk

Several of these are already in use in the UK at various node-sites and, indeed, we have one here in Norfolk at GB7NP.

NEW DATA TRANSCEIVER

From GB7DIP comes the news about a new 1296MHz Data Transceiver which is a new modified version which uses only easy to get parts. As I prepare this column (in June) a kit will be available starting on the launch day at Elvaston Castle Rally in Derby on the 13 June 1999. However, the p.c.b.s and a Programmed Pic Chip are now available although the price has yet to be finalised.

This transceiver is designed for high speed Packet and can transfer data at a lightning rate of 115kb and In full duplex mode (cheap modem required but details will be given). This could provide an excellent improvement to the Packet network, but can also be used for Voice communications, as it has full 1296MHz band tuning range, plus an i.c.d. frequency readout for TX and RX.

For more information on this new 1296MHz transceiver, you can try the GB7DIP Web site at: http://www.gb7dip.freeserve.co.uk/dipg/index.htm Once again, you can see the introductory page in Fig. 2. OR show your interest by sending for a zip file containing the full description and set-up details.

Fig. 1: The first page of the GMSK Data Products Web site can be seen at: www.gmskdata.co.uk

Fig. 2: For more information on the new 1296MHz transceiver visit this Web site: http://www.gb7dip.freeserve.co.uk/dipg/index.htm

Fig. 3: Visit the F11111.1 Web pages for more information on the high speed tests at: http://www.ccr.jussieu.fr/physio/f6bvp/thd2.html

Roger Cooke G3LDI takes a look at high speed modems, some viruses & free 'phone calls!
HIGH SPEED TEST

Tests of high speed transmission via Packet radio took place on Saturday 27 March 1999 at Muret (Sub-Prefecture of Haute Garonne Department), near Toulouse, in France. It took place at SARATECH, the show for Radio Amateurs.

For the first time in France, FT1BU and F6FBB succeeded in transmitting digital information between two stations via Packet radio using 76800 bauds on 1.2GHz. Success was not guaranteed insofar as the development of the radio equipment and the software data-processing was done separately. Those involved were Victor FT1BU and Jean-Paul F6FBB. Briefly, the configuration was as follows:

Jean-Paul F6FBB had prepared two computers, a Pentium 100MHz with 16Mb of memory RAM, 200Mb hard drive, equipped with HDLC SCC4 ATEPRA cards and G3RUH f.s.k. modem with the addition of an adapter card by FT1E. Jean-Paul has the modifications necessary for the SCC4 card (for the use of moderns providing RX and TX clocks).

The operating system was Linux 2.0.36 (SuSE 6.0) on each PC (memory 16Mb) with modules AX25, ROSE and FPAC. Parameters EAX25 were MAXFRAME 63 and packet 256. The Packets were 16128 bytes.

Although the stations were only a few metres apart, the connection was via radio with TX/RX antennas to complete a radio link. First tests were at half-duplex and finally full-duplex was achieved.

Further details of these tests can be found on the FT1BU Web pages for high-speed Packet at:

http://www.freecall.uk.com

Fig. 4: Freecall's Web site can be found at: http://www.freecall.uk.com

FREE 'PHONE CALLS?

A few months ago, I mentioned that the only thing left in the UK now was the free telephone calls! With the amount of free ISPs about now, competition is fierce and it does seem that every day a new "freebie" comes along. Even AOL now offer TWO months free trial before extracting £1 per month! I can't see this lasting too much longer.

Anyway, back to the free phone calls! I recently received a Packet message from Peter G0CSZ asking if I had seen the information from Freecall.

http://www.ccr.jussieu.fr/physio/f6bvp/thd2.html (See Fig. 3),

Fig. 5: The results of the May 1999 RAE examination are on the Web site now at:
http://www.kippax.demon.co.uk/c-and-g/index.htm

Apparently they are offering a free 0800 number to the first 20 000 people to sign up four others. The offer sounded like a 'scam' to me, but as there was nothing to lose, I followed their instructions. I'm still waiting to hear from them, but if it does come off, then it might be a forerunner of more still. So, hang in there and keep an eye out for the information.

Here's the message I received from them after supplying my four contact names: "Thank you for taking the time to complete our form. As you are probably already aware this is a new and unique service being offered to a select few. We intend initially to issue around 25 000 connections and this will be done on a first come, first served basis.

"As stated on your information pages this is a totally FREE service, all we ask, to complete your registration, is for you to offer this same service to four friends or colleagues from your address book, this is to enable us to keep advertising costs to a minimum. On receipt of their registrations your application will be complete. Please ensure that they enter your name in the referrer section on the form. We will contact you over the next few weeks with your password and access details.

SHARE THE BENEFITS OF FREE GLOBAL COMMUNICATION".

Freecall have a Web site
and if you want to take a look here's the URL: http://www.freekall-uk.com (Fig. 4 shows their first page). Peter tells me he is also still waiting and apparently over 120 000 applied so they are trying to sort all the applications.

**VIRUS ALERTS**

Recently, a couple of nasty Viruses (or should that be Virii) were caught, Including the *Melissa* virus. Since then there have been E-mails asking you to send a copy of a warning to ALL your friends in your address-book. I was caught with one of these messages, sent to me by a good friend. It was sent in good faith and he obviously also received a copy, before sending it on to me. However, these type of messages in themselves are started by somebody with nothing better to do than to try and clog up the network, whether it be on the Internet or on the Packet network, as I've also seen them there.

The most recent Virus reports were the AIDS Virus and another similar one. If we acted on the advice and produced numerous E-mails from our address-books, this then becomes a chain letter which in itself contributes to the E-mail/Packet pollution!

A survey, carried out recently by a Networking Paper found that 74% of the respondents thought that the threat from Viruses was real but over-hyped. Most were aware of the danger of the real virus, 57% admitted to having had experience of a virus attack. Only 2% had no virus protection in place and 48% thought they were "pretty secure". The Ethic virus remains the pest that is most likely to bother people and held the top place in a table of statistics.

The following table was relevant during the week of April 26 1999 and shows the top ten viruses caught (see table on previous page).

Obviously the best advice is to keep your Virus protection as current as possible and don't get too complacent about not getting caught. It CAN happen to YOU!

**RAE REPORT**

Input from David Pratt

G4DMP. Chief Examiner at City & Guilds. tells me that the Examiners' Report for the May 1999 City and Guilds Radio Amateurs Examination (RAE) is now available for candidates, tutors and any other interested party. Check out the Web site at: http://www.kippax.demon.co.uk/c-and-g/index.htm (See Fig. 5).

The report contains the overall performance of candidates in each section of the examination syllabus and details of the number of candidates who entered and were successful.

**EINSTEIN USERS?**

I'm not sure just what an Einstein computer is myself, I've never seen one nor do I know anybody who has one. However, there's an active users group and, recently, I had the *Einstein Magazine* sent to me.

The *Einstein Magazine* is published for the users of the Einstein and other computers, by the Secretary and Publisher is: A.E. Adams, Ivy Cottage, Church Road, New Romney, Kent, TN28 8TY. The Editor is Ted Cawkwell, 9 King St., Winterton, N. Lincoln DN15 9RN.

The material in the magazine looks to be aimed at the programmers, those Interested in machine code, DOS, utilities, etc. The spread of material is obviously dependent upon input (sounds familiar) but the editor does try to cater for all range of abilities.

The Einstein seems to be a machine of about the Spectrum or BBC B vintage, so they're obviously getting quite ancient - almost stone age where computer technology is concerned! However, there must be some users still out there, so it's good to see these machines still being used.

I overheard a station on 144MHz the other day (who works as a computer engineer) He said that he was on the way to the skip with a boot full of BBC B machines, printers and so on. Nobody was interested in having them - even free - so they were going to the 'bit bucket' in the sky.

What a waste! What's wrong with the youngsters of today? Are they unable to hook up these old machines, learn how to use them or are they just too well heeled that it's easier to buy a Pentium? It's not the impression I get when listening, but they certainly seem to avoid effort these days!

**THAT'S ALL I HAVE TIME FOR THIS MONTH, LET ME KNOW OF ANY NEWS OR VIEWS THAT YOU HAVE ON ANYTHING TO DO WITH THE COLUMN, UNTIL NEXT MONTH ...**

73 Roger
In response to an influx of Albanian refugees from Kosovo, RTE, Ireland's national broadcaster, has started a daily service in Albanian. This goes on the air at 1800UTC on 612 and 1278kHz medium wave and comprises relays of programmes in Albanian from the BBC, Deutsche Welle, Radio Tirana and Swiss Radio International.

The RTE service reaches overseas with daily English-language shortwave transmissions, targeting Asia and the Pacific at 1000UTC on 7.74MHz via the BBC/Merlin site in Singapore and at 1830UTC on 7.685MHz for Africa out of Ascension. On weekdays there's a transmission at 1830UTC for Europe, Africa and America on 12.16MHz relayed from WWCR in the USA. This broadcast starts at 1900UTC on Saturday and Sunday.

Radio Yugoslavia is still on the air to Europe via shortwave transmitters in Bosnia. The service opens at 1830UTC on 7.23MHz with Serbian, followed at 1900UTC on 7.22MHz with Spanish. At 1930 there is Serbian on 6.10MHz followed by German. From 2030UTC there's a sequence of 30-minute programmes in French, English and Serbian, all on 6.185MHz.

In the refugee camps in Albania and Macedonia, there's a need for information and it's radio that can deliver this. Britain's Department for International Development is responding to the need through the supply of 10 000 RayGen wind-up radio sets. The International Committee of the Red Cross is handling the distribution of the sets that will be used by refugees to listen to the plethora of 'missing persons' programmes on the air.

Many major western international radio stations are broadcasting 'missing persons' announcements, including Deutsche Welle which says that it has broadcast the names of more than 30 000 people since the refugee crisis began.

There's a huge need for people who have lost touch with relatives and friends to try and discover their whereabouts so that the process of rebuilding lives can begin. When Briton, Trevor Baylis, invented his clockwork radio, he envisaged that people who have lost touch with relatives and friends to try and discover their whereabouts so that the process of rebuilding lives can begin.

That's all for this month. Remember that the nights are starting to get longer and so that means more time for trawling across the broadcast bands in search of interesting catches. Please write to me with details of any discoveries you make and I'll pass the tips on to other readers - and you'll see your name in print!

UNTIL THE NEXT EDITION, 73 & GOOD LISTENING,

Peter

FREQUENCY NEWS

Now let's take a quick canter around some International frequency news. Adventist World Radio has leased time on the Radio Monte Carlo medium wave transmitter in Monaco. It's on the air at 2100UTC in Arabic and French on 702kHz, broadcasting to North Africa and the Middle East.

NHK Radio Japan has English broadcasts - some beamed from the UK to Europe - shown here in bold - as follows (all times are in UTC):

0000-0015 on 13.65, 11.815MHz;
0000-0100 on 11.705, 9.665, 6.18MHz;
0100-0200 on 21.67, 17.835, 17.685, 15.59, 15.57, 15.325, 11.87, 11.86MHz;
0300-0400 on 21.61, 17.825MHz;
0500-0600 on 17.825, 15.59, 15.23, 11.85, 11.84, 11.715, 7.23, 6.11MHz;
0600-0700 on 17.825, 15.85, 11.84, 11.74, 7.23, 5.975MHz;
1000-1100 on 15.59, 11.85, 9.695MHz;
1100-1200 on 15.59, 11.89, 5.695, 6.125kHz;
1400-1500 on 11.88, 11.73, 9.305MHz;
1500-1600 on 11.73, 9.75, 9.505, 7.20MHz;
1700-1800 on 15.355, 9.825, 7.11MHz;
2100-2200 on 21.61, 17.825, 9.725MHz.

Nearby, South Korea has English from Radio Korea International on the air (all times are in UTC):

0200-0300 on 15.575, 11.81, 11.725, 7.275MHz;
0800-0900 on 13.67, 9.57MHz;
1030-1100 on 11.715MHz;
1230-1330 on 13.67, 9.64, 9.57MHz;
1600-1700 on 9.87, 9.515, 9.575MHz;
1900-2000 on 7.275, 5.975MHz;
2100-2200 on 15.575, 6.48 and (via the UK) 3.97MHz.

Although it beams to the continent bearing its name, Radio Free Asia, the newest US-government international station, can be heard in Europe thanks to an extensive network of relays in the USA, Germany and parts of the former Soviet Union. The following is a selection of transmissions which you can have a go at receiving - let me know how you get on! 0000-0030UTC in Vietnamese on 1536, 13.72, 11.58, 11.56 and 11.54MHz, 1600-1800UTC in Mandarin on 15.68, 15.51, 13.69, 11.945, 11.795, 11.75 and 9.905MHz, 2230-2330UTC in Cambodian on 17.51, 15.705, 11.57, 11.52 and 9.93MHz and, finally, 2300-0000UTC in Tibetan on 15.695, 9.875, 9.365 and 7.47MHz.
...bring your scanning directories to life!

*With 2 Megabytes of Memory*

The RD500VX is a new kind of wideband receiver with sleek, robust styling, ...only 8 inches wide!

Its massive memory can store information equivalent to several scanning directory books. Any word such as "Fire", "Air", "Voice Of America", or even your local town can be searched for. It can hold 54,682 entries, each with 20 characters of text, mode, and frequency. A 45 key TV style remote is provided for text entry and control, and a PC keyboard can be plugged into the receiver.

...No more thumbing through scanning directories, and no PC needed!

**Price £799 inc postage**

The RD500VX gives wideband coverage with auto memory, skip list, priority channel, pause/hold, AFC, world time clock, and S.meter, and its HF performance is complemented with pass band shift, notch and peak filter, noise blanker, and smooth 5Hz tuning steps.

Modes include USB/LSB, AM, sync AM, stereo CW, NBFM/WBFM and stereo FM, with TV sound and video output as standard.

We include Windows software to make it easy to gather information from document scanners, the Internet and other sources. The RD500VX can be linked to your PC to backup or download information, and a database is loaded into the receiver before shipping.

It also has a built in digital sound recorder and editor so a news flash or rare DX can be recorded. Up to 4 minutes of sound can be permanently stored!

**Specifications:**

- Sensitivity (10dB S/N) HF SSB 0.2uV, IP3 +10dBm.
- VHF/UHF NBFM 0.3uV. Scan speed 50/second.
- Frequency range 0 - 1750MHz
- Collins filters available.

Please make cheques payable to Fairhaven Electronics Limited

Phone +44(0)1332 670707 Fax +44(0)870 055 88 99

http://www.fair-radio.demon.co.uk

47 Dale Road, Spondon, Derby DE21 7DG

Includes software, PSU, remote and 2 year guarantee.
Practical Wireless, September 1999

**HATELY ANTENNA TECHNOLOGY**

CROSSFIELD ANTENNAS of the several forms we produce are continuing to amaze people who have tried them. One American amateur-constructor reader of the Internet antenna experimenters' magazine who made a small copy of our published GP CFA and obtained results from indoors which were all within 1.5 point of an outdoor inverted V on 40 metres. The E-plate cylinder was 5" dia. & 7" tall. The O-plate disc was 9" in dia. (Ref. K5CNF on CFA forum on www.antennex.com May 8th, 1999)

For technical details and prices write, phone or E-mail stating whether you want:

1) Hembold Crossfield Field Loop for any band pole mounting or mobile, or
2) Multiband CFA for a balcony or vehicle, or
3) EM Delay-Line Radiator for laying-on, or around, the house.

Proprietor: Maurice Hately, MSc FIEE - Chartered Electrical Engineer

**DEMODULATORS FOR JVFAX HAMCOMM**

**SkySpy Radiodraft DL4SAW & POCAG**

**THE ORIGINAL RECEIVE ONLY with 25 way D type £16.99**

POCAG RECEIVE version (as above, with variable hysteresis) £19.99

**TRANSMIT version (Pocsag Rx & Fax/331/NetComm Tx) £24.99**

Adaptors 23/9 O23.0C. 25m 25m 23.0C. 4 way RS22 Switch Box £17.50

135 way cable £6.99 Shareware on 3.5" SD Disks JVFAX7 & HamComm 3.1 + Pktmon12 & Pocsag (PD.04) + Watgraph & Free (2.50) RADIFAX V3.0 (25.00) DLSAWARE (25.00) JANCOMM (22.00) £30.00

Minimum credit card order £15.00. Outside British Isles add £2.00

Pervisell Ltd, 8 Temple End, High Wycombe Bucks HP13 5DR

Tel: (01494) 443033 Fax: (01494) 446230

www.pervisell.com e-mail: ham@pervisell.com

**HOMETECHNICS**

**HATLEY ROTTOR TECHNOLOGY**

**Special Offer**

CABLE BULK PURCHASE PER 100M ROLL

**RS213U**

**WCS19**

Very low loss £65 + P&P

**RS281C**

£90 + P&P

**7 CORE ROTATOR.**

£45 + P&P

**OSL CARDS 13 PIECE LARGE SAE FOR SAMPLES.**

**LOG BOOKS.**

**OSL CARD HOLDERS.**

**EARTH RODS.**

Please mention Practical Wireless when replying to advertisements

**COMMUNICATIONS**

**NEW YAESU VX-5R**

6M, 2M 70CM

**PHONE**

For all your needs phone now for a very competitive price

**Read the Big Adds**

**NEW**

**PHONE US FOR SMALL PRICES**

**Authorised Dealers for**

**ICOM, YAESU, ALINCO, KENWOOD, REALISTIC, AOR, AKD, FAIRHAVEN.**

**All Major Manufacturers of**

**PS.U.s, TUNERS, ROTATORS, ETC**

**All Major Manufacturers of**

**ANTENNAS, CUSHCRAFT, TOWHA, CHELCOM, WATSON, DIAMOND**

**MUCH MORE**

For all your needs phone now for a very competitive price

**CROSSFIELD ANTENNAS**

**If you need Valves/Tubes or other electronic components**

... then try us!

We have vast stocks, widespread sources and 38 years specialist experience in meeting our customers requirements.

As from 1st August, 1999 our address will be: The Stables, Baddow Park, Great Baddow, Chelmsford, Essex CM2 7SY

Tel: 01245 474147 Fax: 01245 474347

**CXC CHELMER VALVE COMPANY**

Please mention Practical Wireless when replying to advertisements

**Communications**

**Unit 6, Worle Industrial Centre, Coker Road, Worle, Weston-Super-Mare, BS22 6BX**

TEL/FAX 01934 512757

**SPECIAL OFFER**

**Authorised dealers for ICON, YAESU, ALINCO, KENWOOD, REALISTIC, AOR, AKD, FAIRHAVEN.**

**All Major Manufacturers of PS.U.s, TUNERS, ROTATORS, ETC.**

**All Major Manufacturers of ANTENNAS, CUSHCRAFT, TOWHA, CHELCOM, WATSON, DIAMOND.**

**Read the Big Adds**

**NEW YAESU VX-5R**

6M, 2M 70CM

**PHONE**

For all your needs phone now for a very competitive price

**COMMUNICATIONS**
For Sale

TECHNICAL MANUALS, AR88, CR100, R210, HR0, £5 each. Circuits £1.50. Hundreds available. SAIE list. Benton, 27 De Vere Gardens, Ilford, Essex IG1 3EB. Tel: 0181-554 6631.


E-mail: tudor.gwilliam-rees@virgin.net

Class stamps or browse tudorgwilliam-rees@virgin.net

TECHNICAL MANUALS, AR88, CR100, 78, Practical Wireless, September 1999

Pwllheli. two miles from beach, use of shack and bunkhouse - camping. Elevated rural site, NORTH WALES HOLIDAYS - Caravan - & pieces. etc. Old Time Supplies, PO Box 750420. Fax: 01509 551635. E-mail: gopher@sk1.freeseerve.co.uk

EXPLORE 136 Our sensitive upconvertor tunes 0 to 500kHz on four or 14MHz IF. £22.95. EXPLORE 6 sensitive low noise converter 28MHz IF, many Europeans received on prototype £23.95. SIGNAL BOX audio switch. Catch the radioactivity on your cassette tape £19.50, post £1.50 any item. Detailed information sheets on request. Livewireless, 25 Haleall Road, Birkdale, Southport, Lancs PR8 3DB. Tel: 01704 563178 after 6pm.

INTERESTED IN VINTAGE WIRELESS old TVs and telephones? Send 2 x 1st class stamps for catalogue of books, bits & pieces, etc. Old Time Supplies, PO Box 209, Banbury, Oxon OX16 7GR.

Holidays

NORTH WALES HOLIDAYS - Caravan - bunkhouse - camping. Elevated rural site, two miles from beach, use of shack and antennas, open all year. Tywyns, Mynytho, Pwllheli. Tel: 01758 740712. Packet address: GW4WAG@GB7BAY#56.ORG.EU

Miscellaneous

VALVE ENTHUSIASTS: Capacitors and other parts at attractive prices! Ring for free list. Geoff Davies (Radio). Tel: (01788) 574774.

VALVES

VALVES GALORE Most valves available from stock. Otherwise obtained quickly. Please send SAIE stating requirements or telephone.

VALVE & ELECTRONIC SUPPLIES Chevet Books, 157 Dickson Road, Blackpool FY1 2EU. Tel: (01253) 751858 or Fax: (01253) 302979. E-mail: chevet@globalnet.co.uk

VALVES: OVER 50000 STOCKED Ham, Vintage, Military, Audio. SAIE for FREE list to: Wilson Valves, (Jim Fish HN50) 09920, Fax (0101) 699650. Colman, Huddersfield, West Yorkshire HD7 4LZ. Tel: 01484 654650. Fax 01484 655699. E-mail: wilsonvalves@surflink.co.uk Visa etc. Fast & personal service.

CASH FOR VALVES, ECC32 £10. ECC33/35 £6. ECC83/86 £3.50, KT66 £35, KT88 £55. EL34 £20. EL37 £18. PX4 £70. PX25 £130. GZ34 £8. GZ32 £8. DA100 £150. 4212E £150. PT15 £10. Ask for free wanted list.

Colomor (Electronics) Ltd, Unit 5, Huffwood Trading Estate, Bookers Road, Billingham, Middlesbrough, Cleveland TS23 1AP. Tel: 01403 786559. Fax: 01403 786560. E-mail: giacomelli@colomor.demon.co.uk

VALVES FOR SALE, swap, wanted. Thompson, 83 School Lane, Hartford, Cheshunt. Tel/Fax: 01484 654650. Fax: 01484 655699.

VINTAGE VALVE RADIOS Various models for sale all fully restored. Wireless repairs and cabinet restoration. Established on the south coast for 17.5 years. Tel/Fax: Geoff Luxton 01903 531389.

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 ensure 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.

ORDER FORM FOR CLASSIFIED ADS PLEASE WRITE IN BLOCK CAPITALS

The prepaid rate for classified advertisements is 42 pence per word (minimum 12 words), box number 70p extra. Semi-display setting £13.90 per single column centimetre (minimum 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, Broadstairs, Kent CT10 2BP. Tel: 01227 820010, Fax: 01227 820011.

Please photocopy this form if you prefer

Please mention Practical Wireless when replying to advertisements

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.

ENQUIRIES TO:

TOP PRICES PAID

for all your valves, tubes, semi-conductors and ICs.

Langrex Supplies Ltd. 1 Mayo Road, Croydon Surrey CR0 2DP. Tel: 0181-684 1166. Fax: 0181-684 3056.

WANTED

WANTED FOR CASH Valve or solid state communication receivers Pre-1980. Preferably working and in good condition. Non working sets considered also domestic valve radios. Items of Government surplus wireless equipment and obsolete test equipment. Pre-1985 wireless and audio components and accessories. Pre-1975 wireless and TV books and magazines. Also, most valves wanted for cash. Must be unused and boxed. CBS, 157 Dickson Road, Blackpool, FY1 2EU. Tel: (01253) 781858 or Fax: (01253) 302979. E-mail: cheve@globalnet.co.uk

QUARTZ CRYSTALS 1kHz-250MHz, >20,000 stocked. 32.768kHz/£1.65, 38kHz/£1.85, 400kHz/£3.95, 455.2kHz/£1.50, 3.2768MHz/£1.95. 7.03MHz/£3.50, 10.106MHz/£3.50, 10.7MHz/£1.75, 11.0592MHz/£1.60, 21.06MHz/£3.95 etc. SPOX/TCXO/VCKO devices from £2.50. Ceramic filters & oscillators. 28 page list. Circuits & applications booklet/£5.00. Q-Electic Design. Tel: 0181-391 0545. Fax:Mesge 0181-391 5258.

PC-AMIGA SSTV-PACKET Tx/Rx interfaces from £28.50. SAE leaflists, demodisk £1. Peter Lockwood G8SLB, 36 Davington Road, Dagdenham, RM8 2LR. Tel: 0208-595 0823. http://www.angelfire.com/ok/g8sib

Computer Software & Hardware

Please photocopy this form if you prefer

ORDER FORM FOR CLASSIFIED ADS PLEASE WRITE IN BLOCK CAPITALS

The prepaid rate for classified advertisements is 42 pence per word (minimum 12 words), box number 70p extra. Semi-display setting £13.90 per single column centimetre (minimum 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, Broadstairs, Kent CT10 2BP. Tel: 01227 820010, Fax: 01227 820011.

Please photocopy this form if you prefer

Please mention Practical Wireless when replying to advertisements

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.
VHFILMF HAND HELD TRANSCEIVER
1299
MOIL.
1291
Dopier
Mom 011-1406T t2 On FM Ilutrk IOW CTCSS
4245
Abaco 136.590E 2m7Oceo FM Monk 451V.HAV Full
KONMED TS -M05 Bar Tnomorna sods Got
RETRANSCEIVERS
Reatuir
Opts R-10.2 30M114 -20H1 FM hunceproi
Neuet Pro46 6$456MHe mot poi ANUM I COM 199
kina IC411 0 0 I
Sueploece 34111-7 M9 .LW_Sw Wut I07 1761411:
Sway ILT-S06000 Perulok Manisa win FM unto and
SSB
Scat' ICE-SIV7600 Poneic Restort out FM EIMMI tad
Scar ICFSWIOE t2 Pcciat Rower slit FM steno and
TRIO FT 1011 TO FM Ifhldd1125
Kneveal 11678E al Wenn FM 147MoW with Full
Kawai 1S -711E bie All Monk Raw Trims:en et 2511.
Kaiwood 2/4732E 2a.70c0 FM %Mk tOW 3AW 1479
757GX PSC
Tno TS -930S line Traweaver Mains
40. liOn
TeoTcc Scout 555 Monk C11/451 SOW ink IQ 24 VI
km
PC ma

Please mention Practical Wireless when replying to advertisements

YAESU FT -8100V HE RECEIVER - VHF
SONY KE-76000 SHORTWAVE RECEIVER
KENWOOD R.2000 010 HE RECEIVER
/RC 5180 30 HF RECEIVER
ICOM IC -71E 11F RECEIVER. REMOTE
DRAKE - RSA HE RECEIVER.
RECEIVERS
019
5AESti 0129211 214 MULTIMODE  CASE
YAESU FT.N7R 2991114 FM MOBILE
11101S -7002M MU1T1MODE BASE
UK/TR-9130 2.21 MULTIMODE
TRIO TR2200 GX :MIR PORTABLE
STANDARD C.8900134 MOBILE
STANDARD C -5X10 TWINBAND SOW MOBILE
KENWOOD TRINE 214 IdULITMODE
1ENW000 714-732E DUAL BAND MOBILE
KOMODO D.1 -201A 2.14 FM MOBILE
ICOM IC MI 2M 15W MOBILE
ALLSCO DR NM 22V7CCM FM MOBILE
TRANSCEIVERS V1071.11F
FILTERS
KENWOOD154805 KOW HF IOW 6M  CICSS14.91
Mom
11299
Ion 1C-736 BF 6 60 107111Tatinewer  3 FILTER
IRANSCEIVERS HF
YAESI FT -70I
MSC FT-
KENWOOD TH-21E IMER Mt TX. 70CM RX
CHRGR ETC
ICOR W1-11EACC 632P,V70C14 HANOI FAST
ALINICO 03 -ISO 214TR WHEW  EOC16 Fast
ALL000 03-190EB .7.M HA,NDIE . EX 00.10
HAMHELLIS
01705 662145
RR 2M HANOI

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. While the publishers will give whatever assistance they can, they cannot accept liability for any errors of price quoted, late delivery or failure to advertise.

TRADE'S TRADER

WATERS & STANTON
1702 206835

Nevada
01705 662145

SOUTH EAST COMMUNICATIONS
03535 51 871278

UNICOM
01227 749352
Order Form

FOR ALL MAIL ORDER PURCHASES IN PRACTICAL WIRELESS

SUBSCRIPTION RATES
See our Subscriptions page on p.83 to see how you can pay for your PW subscription in three easy instalments!

Practical Wireless – 1 year.
- £28 (UK)
- £35 (Europe Airmail)
- £38 (Rest of World Airsaver)
- £45 (Rest of World Airmail)

Special joint subscription with Short Wave Magazine – 1 year.
- £55 (UK)
- £68 (Europe Airmail)
- £74 (Rest of World Airsaver)
- £85 (Rest of World Airmail)

PLEASE START MY SUBSCRIPTION WITH THE…………………………. ISSUE.

Monitoring Times – 1 year (12 issues).
- £38 (UK)
- £43 (Europe Airmail)
- £49 (Rest of World Airmail)

SPECIAL OFFER
Please send me…………………………………………………………………………………………………………………………
copies of 1999 Radio Amateur Callbook on CDROM @ £25 plus £1 P&P (UK) plus £2 (overseas). Offer closes 30 September 1999.

Book Orders

Postal charges:
£1.25 for one, £2.50 for two or more (UK)
£2.50 per book or £4 for two books Three or more books an additional 50p per item (overseas surface)

NEW FASTER NEXT DAY SERVICE (UK MAINLAND ONLY)
£4.50 per parcel (orders must be placed by 12 noon)

GRAND TOTAL…………………………… £……………………………

Thankyou for using PW for your purchases

PAYMENT DETAILS

CREDIT CARD ORDERS TAKEN ON (01202) 659930
between the hours of 9.00am - 5.00pm. Outside these hours your order will be recorded on an answering machine.

FAX ORDERS TAKEN ON (01202) 659950
or please fill in the details ticking the relevant boxes, a photocopy will be acceptable to save you cutting your beloved copy!

To: PW Publishing Ltd., FREEPOST, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW

Name.................................................................................................................................
Address..............................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
.................................................................................................................................
....................................................................................................................................
If you ever need to contact Practical Wireless concerning any part of the magazine then there are three telephone numbers which you can ring.

Knowing the right phone number to use for the right department will save time for both you and members of staff here at PW. Please help us to help you by using the correct telephone number. Thank you.

Editorial Dept. - (01202) 659910
You should ring the PW Editorial telephone number if you have a query on any of the articles which are produced in the magazine or if you would like to talk to any of the Editorial staff - Rob Mannion G3XFD (PW Editor); Tex Swann GITEX (PW Technical Projects Sub-editor) or Joanna Williams (PW News & Production Editor). Also, 'Bargain Basement' queries should come to the Editorial department. (Out-of-hours service by answering machine).

Advertising Dept. - (01202) 659920
If you have any queries regarding advertisements (including the Classifieds section) in PW, either one that has gone in the magazine or how to place an advert yourself - (Please note, NOT 'Bargain Basement'), then you should telephone the advertising department. Please do not contact the advertisement department with queries on subscriptions or books or Bargain Basement queries. Alternatively, you can contact our Advertising Manager, Roger Hall G4'TNT, on London 0171-731 6222. FAX: 0171-384 1031.

Books/Subs Dept. - (01202) 659930
The PW Books/Subs department is there for readers to order books, magazines and subscriptions from. If you have any queries regarding your subscription, a book or if you want to order a back issue of Practical Wireless, then this is the phone number which you need to ring. Speak to Michael or Shelagh - they will be happy to help you. (Out-of-hours service by answering machine).

Other ways of contacting PW:
If you need to send anybody at PW Publishing a FAX then you should use (01202) 659950.

You can send anyone here at PW Publishing an E-mail by typing in their first name, i.e. rob, and follow it with @pwpublishing.ltd.uk

Or why not visit our Web site at: http://www.pwpublishing.ltd.uk

Postal Queries:
As with the telephone numbers, it would be helpful if you could direct letters to the correct department. Anything regarding Editorial (i.e., articles, Bargain Basements, news, etc.), should be addressed to the Editorial Department. Anything regarding advertisements placed in PW (i.e., dealer's advertisements, 'Classifieds' but NOT 'Bargain Basements') should be addressed to the Advertising Department. Finally, anything concerning subscriptions and book or magazine orders should be addressed to the Books/Subs Department.

Subscribe in Three Easy Instalments
Want to subscribe to Practical Wireless but can't afford the initial subscription fee? Well, why not take this opportunity to order a subscription and pay for it in three easy instalments? Your subscription will begin with the October 1999 Practical Wireless and end with the September 2000 issue.

Payments will be accepted by Credit card (1st payment will be charged immediately, 2nd payment on 21/2/2000 and 3rd payment on 14/4/2000), or three post dated cheques drawn on a UK bank. (You must send three cheques with your order - the first cheque dated immediately, the second dated 21/2/2000 and the third dated 14/4/2000). To order, please use the order form on this page or telephone the PW Subscriptions department on (01202) 659930 and quote PW9.

Postal Subscription Order Form, Publodging Ltd, Arrowmith Court, Station Approach, Branscombe, Devon. EX11 8PF

I would like to subscribe to Practical Wireless in three easy instalments.

Name
Address
Telephone No.
Postcode
Signature

I enclose three cheques (Payable to PW Publishing Ltd). Credit card details: (Payable immediately) 1st payment 2nd payment 3rd payment

Valid From To

Order Price: £28 / £35 / £38

<table>
<thead>
<tr>
<th>Subscription Price</th>
<th>UK</th>
<th>Europe</th>
<th>Rest Of World</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost of Sub</td>
<td>£28</td>
<td>£35</td>
<td>£38</td>
</tr>
<tr>
<td>1st payment</td>
<td>£10</td>
<td>£12</td>
<td>£13</td>
</tr>
<tr>
<td>2nd payment</td>
<td>£9</td>
<td>£11.50</td>
<td>£12.50</td>
</tr>
<tr>
<td>3rd payment</td>
<td>£9</td>
<td>£11.50</td>
<td>£12.50</td>
</tr>
</tbody>
</table>

Practical Wireless, September 1999
Index to Advertisers

Adur Communications ...............69
Aerial Techniques ...............77
AKD ........................................61
Birkett, J ..................77
C M Howes ..........35
Castle Electronics ..........46
Cellular Design Services Ltd .14
Chelmer Valve Co ........77
Chevet Supplies Ltd ........64
Eastern Communications ..41, 59, 61, 65
Electrovalue ................77
Essex Amateur Radio Services ....35
Fairhaven Electronics ........76
Hately Antenna Technology ....77
Haydon Communications ........6
Hilton National Hotel ............64
Icom (UK) Ltd ................18
Langrex Supplies Ltd ........69
Leicester ARC ................24
Linear Amp UK ........37
Martin Lynch & Sons ....42, 43
Moonraker (UK) Ltd ..........64
Multicom 2000 ..........52, 53, 56, 57
Perivess Ltd ................77
Practical Wireless ........59
QSL Communications ........77
Radiosport Ltd ..............26
Radioworld .................4, 5
Ronal Computers ..........40
RSGB ..............................40
Shortwave Magazine ..........65
SMC Ltd ......................18, 19
South Bristol ARC ........37
SRP Trading ...............15
Sycom .....................69
Tennamast .................69
The Better RF Company .....69
The Short Wave Shop ........69
Unicorn ..........................48
WACRAL .........................69
Waters & Stanton Ltd .......I.F.C., 1, 2
Yaesu UK Limited ..........OBC

Please mention Practical Wireless when replying to advertisements.
GET THE BIG PICTURE WITH THE NEW IC-2800H, ICOM'S LATEST DUAL-BAND, MOBILE TRANSCEIVER. THE IC-2800H'S UNIQUE LCD HAS USER-SELECTABLE DISPLAY MODES AND VIDEO CAPABILITIES. BUT IT'S NOT JUST PRETTY - IT'S GOT DURABLE CONSTRUCTION, INSTALLATION FLEXIBILITY, A BANDSCOPE FUNCTION, INDEPENDENT TUNING CONTROLS, CONVENIENT MEMORY EDITING AND MUCH MORE - ADVANCED FUNCTIONS, CONVENIENT FEATURES AND SUPERIOR PERFORMANCE - GOOD GRIEF!

- 3-inch, multi-function color LCD
- The IC-2800H's unique color LCD provides four different display modes and switch labels to help nighttime viewing.

- Separate controller
- The controller is separated from the main unit for installation flexibility. Install the controller on your vehicle's dashboard with the main unit under your seat.

- External video input
- The IC-2800H's external video terminal can monitor TV broadcasting with a TV tuner, recorded pictures from a video/digital camera or display a GPS map via a car navigation system.

- Simple bandscope function
- Easily find busy frequencies or unoccupied frequencies within a specified frequency bandwidth (up to ±500kHz; according to selected tuning step).

- 9600bps packet socket
- The packet socket connects directly to a packet modem. 1200bps packet is also possible via this socket.

- Independent tuning control
- Icom's independent tuning control system is employed with tuning dial, AF and squelch level controls and 4 function control switches for each band.

- Convenient memory editing
- Convenient memory editing lets you transfer a memory to VFO, then reprogram it after doing any editing. Not so with the IC-2800H.

- Remote control capability
- The HM-98 remote control microphone controls almost all functions remotely.

- Cloning capability
- All memory channel contents and set mode contents are programmable from your PC with the optional CS-2800 cloning software and OPC-478 cloning cable.

- Convenient memory
- A total of 232 channels, 99 regular, 5 for log and repeater and 1 call channel for each band, are available.

- FM narrow capability
- To improve operation on narrow band VHF FM channels the IC-2800H is equipped with a dedicated narrow band FM mode.

- Plus much, much more.
**EARTH STATION**

**FT-847**

HF/50/144/430 MHz All Mode Transceiver

The FT-847 changes base station operation forever. Now, three radios in one—HF, VHF/UHF, satellite—technology in its finest application, from the world leader in amateur communication.

With its unequalled combination of features, like DSP filters— notch, NR and BPF, built-in 6-meter, voice monitor, separate sub-band dial, Shuttle Jog dial, Smart Search, and digital meter, the FT-847 is the only radio of its kind! Exclusively for satellite work, 19 memories exceed any other radio. For performance, power-up with 100W for HF/6-meter, and 50W for 2-meter and 430 MHz. Additional "must-haves" include cross-band full duplex, normal/reverse tracking, CTCSS and DCS encode/decode, and direct keypad frequency entry. Plus, the FT-847 is 1200/9600 bps packet-ready.

Take the next step in all-band performance and take home the FT-847 today!

Only one transceiver gives you all mode operations on HF/50/144/430 MHz with full Satellite capability.

**NEW**

Yaesu Patented Design

**ATAS-100**

Active Tuning Antenna System

Designed for the FT-847. Works on 7/14/21/28/50/144/430 MHz Amateur Bands for mobile operation.

**YAESU**

Choice of the World's top DXers

http://www.yaesu.co.uk

Specifications subject to change without notice. Specifications guaranteed only within amateur bands.

Some accessories and/or options are standard in certain areas. Check with your local Yaesu dealer for specific details.

YAESU UK LTD Unit 12, Sun Valley Business Park, Winnall Close Winchester, Hampshire, SO23 0LB, U.K.