

London
show
Special
guide

Ham Radio TODAY

WIN
Icom IC-746
and a
Hora C-408
WIN



Ham Radio TODAY

FREE

Over 500 pieces
of useful Freeware,
Shareware, and
Public Domain
files & programs
including:

- ➔ Transceiver & Receiver Remote Control
- ➔ Logging
- ➔ Rig Modifications
- ➔ Service Bulletins

PLUS

AIRMASTER 2000
(demo version)

This CD may be read on any current version of DOS, Windows 3.1x, and Windows 95. Airmaster requires Windows to run. This software is offered as is, without any warranty whatsoever of suitability for any particular purpose.

previewed

● **Yaesu FT-847**

reviewed

● **Icom IC-746**

● **Hora C-408**

● **Icom IC-T8E**

● **Internet Radio - and much much more!**

www.rsgb.org/hrt



9 770269 826130

03 >

JUDGEMENT DAY!

YAESU FT-847



ICOM IC-746



The Tale of the Tape

- 100 Watts on HF & Six Metres
- 50 Watts on Two Metres & Seventy-Centimeters
- SSB/CW/FM & AM
- Built In DSP
- Tracking for satellite operation
- Full duplex crossband operation
- Voice announcement
- IF Shift
- Built In Keyer
- 1200/9K6 Ready
- CTCSS built in
- New 'cool blue' display
- Optional external Auto ATU
- Keypad entry with ident for blind operators on 5
- Only a little larger than the FT-900

- HF to 2M (incl 6M), 100W on 2M
- All modes on all bands PBT, APF
- Built in Keyer
- Auto ATU fitted
- Gen Cov receiver
- Built in spectrum scope (similar to IC-756)
- 100 Memories
- Excellent noise blanker.
- Automatic DSP for noise, notch and passband
- Twin Pass Tuning
- Optional Voice Module
- 12.5kHz FM Narrow Capability
- Quad RX Conversion
- AM TX & RX

BOTH A KNOCKOUT, BUT WHO WILL WIN?

BOTH ARE AVAILABLE FROM STOCK

COME TO THE MARTIN LYNCH & SON STAND IN THE RED HALL AT PICKETTS LOCK TO SEE THE BEST MIDDLEWEIGHTS IN ACTION!

MARTIN LYNCH
& Son
THE AMATEUR RADIO EXCHANGE CENTRE

0181-566 1120

EASY TO REMEMBER MAIL ORDER
NUMBER: DIAL 07000 73 73 73
There is a small increase in call rate when
using the 07000 number.



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

World Radio History

regular columns

- book browser** 23
A new service to readers which lists some of the best amateur radio publications currently available
- net communication** 36
Jeremy Boot, G4NJH, finds out about Amateur Radio national societies around the world.
- vhf / uhf message** 38
Geoff Brown, GJ4ICD, sheds light on what's happening on the bands
- qrp corner** 40
Dick Pascoe, G0BPS, reports on a couple of QRP conventions to look out for and offers some circuit ideas
- data connection** 44
Get set for the Spring RTTY contest and learn about data comms in developing countries with Chris Lorek, G4HCL
- satellite rendezvous** 48
A round-up of satellites news and views from AMSAT-UK's Richard Limebear, G3RWL
- hf happenings** 50
Don Field, G3XTT, turns the spotlight on some of the new awards on offer to HF operator
- free readers ads** 56
For Sale, Wanted and Exchange, published free

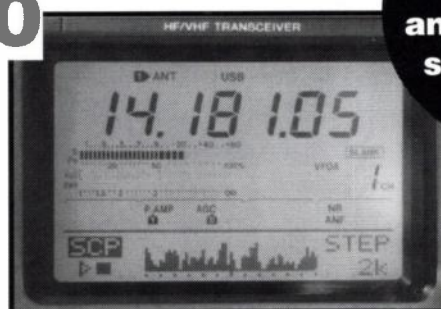
reviews

- yaesu ft-847 transceiver** 9
'Sneak preview' of this highly impressive new transceiver by Chris Lorek, G4HCL
- hora c-408 70cm handheld** 19
This tiny, beautifully-formed transceiver is put through its paces by Ham Radio Today's new editor Steve Telenius-Lowe, G4JVG.

features

- all in a day's work** 16
More handy tips on fixing rig problems from the ever resourceful Harry Leeming, G3LLL

10



WIN WIN
an **IC-746**
see page 5

ham radio today **contents**

volume 16 no.3

news and views

- radio today** 4
The latest Amateur Radio news
- trade topics special** 28
Find out what the major exhibitors will have on offer at this year's London Amateur Radio and Computer Show
- letters** 21
Frank and forthright words from our readers
- this month at the clubs** 52
Details of club events around the country, plus some useful radio-related contact information

readers' information

- ham radio today subscription offer** 58
- ham radio today back issues** 58
- advertisers index** 58
- editorial & reader services contact information** 58

42

**London
Amateur Radio
and Computer
Show Guide**
page 27 - 34



free free
CD-ROM
with this issue
see page 5

All reasonable care is taken in the preparation of the magazine contents, but the publishers, nor the Editor, cannot be held legally responsible for errors in the contents of this magazine, or for any loss arising from such errors, including loss resulting from negligence of our staff. Reliance is placed upon the contents of this magazine at readers' own risk.

Ham Radio TODAY

Editorial

Staff Editor

Steve Telenius-Lowe, G4JVG
Tel: 01707 853300
Fax: 01707 645105
e-mail: hrt@rsgb.org.uk

Technical Consultant

Chris Lorek, G4HCL

Production

Designer

Wai-Yee Man

Technical Illustrator

Bob Ryan, 2E1EKS

Senior Designer

Jennifer Crocker, 2E1ENT

Printer

Hearon Gate, Langley Mill,
Nottinghamshire

Origination

JJ Typographics, Southend, Essex

Sales

Subscriptions

Sylvia Manco, 2E1CYL
Tel: 01707 853300
e-mail: subscriptions@rsgb.org.uk

Advertising

Malcolm Taylor Associates
Tel: 01202 777852
Fax: 01202 317902
e-mail: adman@mcmail.com

Management

General Manager

Peter Kirby, G0TWW

Publications Manager

Mike Dennison, G3XDV

Sales and Marketing

Marcia Brimson, 2E1DAY

Subscriptions

12 issues: UK £26.50. Europe and Eire
£36.50. Rest of the World (surface mail)
£38.50, (air mail) £54.00. Cheques should be
drawn on a UK bank and made payable to the
Radio Society of Great Britain.
Subscriptions and back issues hotline:
01707 853300.

Published by the Radio Society of Great
Britain, Lambda House, Cranborne Road,
Potters Bar, Herts EN6 3JE.

© RSGB Publications 1998. All rights
reserved. ISSN: 0269-8269

The publisher's written consent must be
obtained before any part of this publication
may be reproduced in any form whatsoever,
including photocopyers and information
retrieval systems.

You may know by now that the Ham Radio Today title has just been bought by the Radio Society of Great Britain. The former publisher, Nexus Special Interest Publications, decided to dispose of Ham Radio Today to concentrate on core activities after my predecessor, Sheila Lorek, G8IYA, resigned in order to have more time for her hobbies and family. However, it's not all change and we're delighted that Sheila's husband, Chris, G4HCL, will be staying on with Ham Radio Today as our Technical Consultant.

We are very grateful for the many congratulatory comments received by phone, fax and e-mail when the news was released that the RSGB had acquired Ham Radio Today. There were, however, a few who thought that because the RSGB was now the owner, it would change the magazine significantly. To those people I would say that editorial independence will be maintained, and



Editor G4JVG

liest and best-informed Amateur Radio writers in the UK, and our regular columnists, such as Geoff Brown, GJ4ICD; Don Field, G3XTT; and Dick Pascoe, G0BPS (to name but three), are internationally-acknowledged experts in their field who I am proud to have writing for us.

dio pages on the web that the Internet now adds a whole new dimension to our hobby. We too have a Ham Radio Today web page at www.rsgb.org.uk/hrt and this page will be growing along with us. Tells us what you think - you can e-mail us at hrt@rsgb.org.uk

We're giving away a free CD-ROM with hundreds of Amateur Radio programs on it with this is-

The Best Just Got Better! Ham Radio Today Editorial by Steve Telenius-Lowe, G4JVG

that I have no intention of destroying a successful formula. Wait and see: give us, say, a year, and write in to tell us what you think then! By the way, my first Amateur Radio writing was for Ham Radio Today, way back in 1984, so I have now gone full circle.

continuity

I'm pleased to say that Chris Lorek will continue to write up his famous PMR conversions and carry out his detailed and unbiased reviews of new equipment for Ham Radio Today. This being the time of the London Show, there are several new rigs around and in this issue alone, Chris reviews the Icom IC-746 HF/VHF base station transceiver and IC-T8E triple-band handheld, as well as taking a sneaky preview of Yaesu's latest wonder - the FT-847. Meanwhile, I've been taking a close look at the Hora C-408 70cm handheld that everyone's talking about - a new Amateur Radio rig for under £90 has just got to be good news for our hobby!

Ham Radio Today has the live-

We'll continue to portray Amateur Radio as a young and exciting hobby for all, and that includes continuing the campaign started by Sheila and Chris to make it easier and more rewarding to hold an Amateur Radio licence, as well as championing the cause of improving Novice Licence privileges.

improvements

But I said "the best has just got better". We hope you'll have noticed some improvements already. We're using better quality paper and, for the first time since Ham Radio Today's inception in the early 80s, we're using full colour photographs inside the magazine. This is progress indeed.

We're the only UK magazine with a regular column devoted to Amateur Radio and the Internet. So many active Radio Amateurs are now on the Internet that it can't be ignored, as some would try to do. OK, it may not be Amateur Radio, but it sure does complement Amateur Radio perfectly. There are so many Amateur Ra-

sue of the magazine - and there'll be more free software in the future too.

Ham Radio Today now has a new service for readers: a book page - see the 'Book Browser' on page 23.

Although the cover price remains the same, the price of an annual subscription has been reduced to £26.50 for 12 issues. And, for this month only, you have the chance to win a brand-new Icom IC-746 HF/VHF rig (a Hora C-408 70cm handheld is on offer for a runner-up) in our prize draw - see page 8 for full details. The Icom rig is the most valuable Amateur Radio prize ever offered by a UK magazine. (Hint: we're not actually expecting thousands of entrants, so YOU have a really good chance of winning one of these rigs - don't forget: it could be you!)

Not only has Ham Radio Today had more equipment reviews than the other magazines, it has always had the best reviews, PMR conversions and regular columns. But the best just got better.

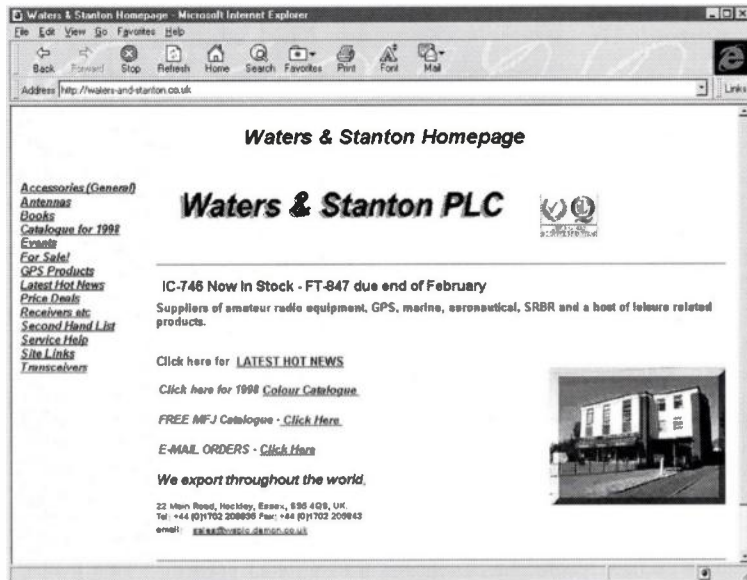
Waters & Stanton Introduce Electronic Ordering

Peter Waters, G3OJV, says that 'electronic ordering' is now becoming a significant part of Waters & Stanton PLC's business, and that they aim to be right at the forefront with the latest customer services. Peter told Ham Radio Today; "We realise that many customers want to make use of this new system and take advantage of low-cost electronic communications systems which are available 24 hours a day."

Waters & Stanton PLC's electronic ordering line is scheduled for completion by mid February. Customers can visit their web site at <http://waters-and-stanton.co.uk> and place orders on a special secure order form, safe in the knowledge that all information is encrypted

from the moment the data leaves their PC until it reaches W&S's mail order department. Peter Waters said, "Advanced software will be triggered as soon as our server senses that a customer is about to e-mail an order form to us, and as a result, the data will be encrypted before it leaves the customer's PC."

Waters & Stanton PLC will continue to expand their electronic ordering service and customers can see the latest products by visiting the W&S web site at the address above.



Licences Revoked

The RA has revoked the Amateur Radio Licence of J C A Websdale, M0AKO. Also, D N Drake's Citizens' Band licence has been revoked. The RA says it is not able to provide any further information on these cases.

radio today radio today
latest news on ham radio today

This Month's FREE CD-ROM

This month we feature a free cover-mounted CD-ROM, packed with files and software that'll keep you busy for many days, weeks, and months! If your copy of Ham Radio Today did not have a CD-ROM on the front cover, please contact us on tel: 01707 853300 and we'll rush one to you.

CD Contents

This CD has an 'equipment and operating' theme, and is packed with literally hundreds of transceiver and receiver update and modification files, from manufacturers' service bulletins and by Radio Amateurs themselves.

You'll find out how to modify and improve the performance of many types and models of ham radio equipment, past and present, including wide-band upgrade modifications.

Besides this, the CD also contains a huge collection of programs for transceiver and receiver remote control from your PC, HF and VHF logging, and operating aids, to help you get the very best out of your PC-equipped station!

How to Use the CD

Simply place the CD into your computer's CD-ROM drive, log on to that drive in either DOS or Windows, and run the 'GO.COM' file (in DOS, simply type "GO" followed by a press of the 'Return' or 'Enter' key).

The CD should be compatible with a CD reader in an IBM compatible PC. All the modification files are in plain text format, and may be read on-screen, printed out, or imported into your favourite word processor. We've also including a handy 'LIST' utility on the CD to help you select, read, copy and print files.

The rig control, operating, logging etc programs require different minimum PC hardware and operating system capabilities, these usually being detailed within text documentation files in each program file collation. Some require 'high spec' machines and monitors, others will run on simple DOS machines with just a black and white monitor. Please note that many programs on the CD are shareware which may require a payment to the software author should you find the program(s) useful following initial trial use.

RSGB Publishing and the software collators, QSP73 Services, offer the software and files in good faith as either freeware, shareware, or public domain, but no responsibility can be accepted for suitability for any particular purpose. The files and programs have been virus checked using regularly updated proprietary virus-scanning software, but you should carry out your own checks.

Airmaster

The other major give-away is a demonstration version of Airmaster 2000. This is a decoding system for ACARS, the Aircraft Communications Addressing and Reporting System, a system that allows transfer of flight information, engineering data and plain text messages between aircraft, ground stations and airline companies.

With this software, a suitable high-performance computer and, of course an air band receiver, you can receive and display accurate data regarding flight numbers, tail numbers, weather, schedules, flight plan information and positional information, together with a host of flight engineering data, including engine performance and fuel status - all this in real time as it happens!

Lowe Electronics have provided the demo for Ham Radio Today readers so that you can take a look before you buy.

New Band for UK Hams

The Radiocommunications Agency (RA) issued a notice in the *London, Edinburgh and Belfast Gazettes* on 30 January 1998, varying the full Amateur Radio Licence to include the 136kHz band. With effect from that date, all full Class A licensees are permitted to operate between 135.7 and 137.8kHz using up to 1W ERP. Permitted modes are Morse, telephony, RTTY, data, facsimile and slow-scan television.

The RA told Ham Radio Today, "For many years, Amateurs have sought a spectrum allocation which would enable them to investigate the propagation characteristics of Low Frequency radio signals . . . The long term goal of the Amateur community has throughout been to establish an international band in the vicinity of that allocation [73kHz]. The RA worked with CEPT to agree a European wide allocation for low frequency experimental work. CEPT / ERC Recommendation 62-01 was agreed in early 1997 and the RA is pleased to be able to implement the specified allocation within the UK." Unlike the existing 73kHz band, special permits are not required for 136kHz. All 73kHz permit holders may continue to use that band until 30 June 2000, after which it will be withdrawn from the Amateur Service. No new applications for 73kHz Notices of Variation will be accepted after 30 June 1998.

In Europe

The wavelength of 136kHz is 2205 metres. Even very good antennas for the band are likely to have a gain as low as -20dB so a transmitter power output of around 100 watts is necessary to run 1W ERP. The low power output should not be seen as a disincentive: tests by European Radio Amateurs have shown that distances of several hundred kilometres are relatively easy to achieve, and certainly easier than on the UK-only 73kHz band.

In Ireland, Finbar, EI0CF, is already active on 136.36kHz from Malin Head. Meanwhile, European Radio Amateurs who have had access to the 136kHz band for a while have been working greater and greater distances. OH1TN, on the west coast of Finland, has been heard by G4GVC in Leicester, at a record distance of 1762km, and five stations in the UK have now received transmissions from DA0LF in Germany on 137.1kHz.

The stand of regular Ham Radio Today advertisers SRP at the Stockland Green Radio and Computer Rally last November. Norman Gutteridge, G8BHE, of the Midland Amateur Radio Society told Ham Radio Today that the show was well attended by 60 traders and 840 visitors.



today radio today

latest news on ham radio today

Exam Reports

City & Guilds have issued reports on the December 1997 Radio Amateurs Examination (RAE) and Novice Radio Amateurs Examination (NRAE). In the case of the RAE, 73.3% of candidates were successful in paper 1 and 68.6% were successful in paper 2.

From May 1998, the RAE will comprise just a single paper of 80 questions, of which 35 will be in the first part, covering licensing conditions and operating procedures and practices. Candidates must be successful in part 1 of the paper to be successful in the examination as a whole.

No less than 81.7% of candidates for the December 1997 Novice RAE passed the examination.

Photograph by John Thornton, G4ZJQ.



One of the courses for the Novice RAE was at the Nunsfield House Community Association Amateur Radio Group, where student Laura Pryor is seen here mastering the technique of tuning in to HF SSB signals.

The Doomed Space Station

Ralph Barrett, G2FQS, is staging another of his informal, yet dramatic debates, full of information, education and entertainment at 7.00pm on Tuesday 17 March, at the Royal Institution of Great Britain, 21 Albemarle St, London W1 (nearest tube Green Park).

Imagine that Guglielmo Marconi, Dorothy Hodgkin, Marie Curie and Enrico Fermi are trapped in a space station, where oxygen is in short supply. The audience will have to decide which of the four Nobel scientists will be ejected for the salvation of one . . . Ralph Barrett is, of course, the advocate for Marconi!

No booking is necessary. Just turn up, and admission is free.

The HRT African Connection

Ham Radio Today's Technical Consultant, Chris Lorek, G4HCL, has had a paper on HF and VHF / UHF data communications accepted by the International Telecommunication Union (ITU)

[congratulations, Chris - Ed]. The paper will be presented at the ITU's 'New Solutions for Rural Communications' forum at Africa Telecom '98, which takes place in Johannesburg in May. But you don't need to wait until May or travel all the way to South Africa to learn about Chris's proposals - you can read Chris's *Data Connection* column on page 44 of this issue!

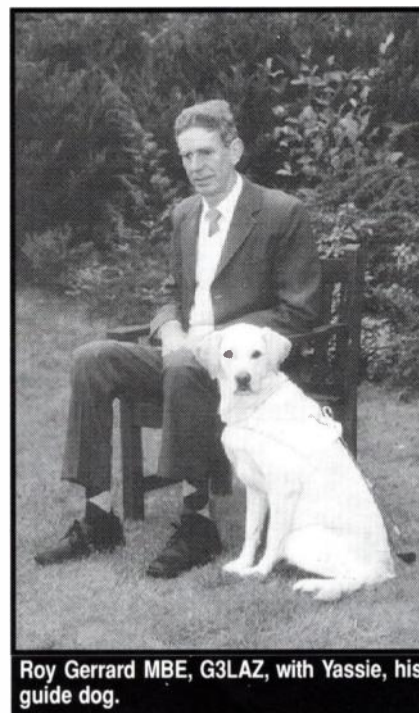
Gongs for Hams

At least two British Radio Amateurs were awarded MBEs in this year's New Year Honours list. Roy Gerrard, G3LAZ, was awarded an MBE for services to the community over a 21-year period. Roy, who has been blind since childhood, founded the charity Enterprises by the Blind, which provides equipment to help blind people in Bedfordshire, and is currently the charity's vice-president. Enterprises by the Blind was one of the first organisations to introduce 'talking newspapers'.

Frank Howe, G3FIJ, has also been awarded an MBE in recognition of services to disabled people and to the community in Colchester, Essex. Frank was founder member and the first chairman of the northeast Essex REMAP, a group of engineers and health workers who design and manufacture equipment to increase the independence of disabled people. For many years he has also provided tuition for partially-sighted, blind and wheelchair-bound candidates for the Radio Amateurs Examinations and Morse code tests. He has taught RAE and Morse courses for more than 40 years, and was a founder member of the Colchester Radio Amateurs club.



Frank Howe MBE, G3FIJ, with one of his blind RAE students.



Roy Gerrard MBE, G3LAZ, with Yassie, his guide dog.

Congratulations to both Ray and Frank for their richly-deserved honours from all of us at Ham Radio Today.

today radio today

latest news on ham radio today

Marconi Plaque

In 1897 Marconi made his first transmissions across water, from Lavernock Point in South Wales to Flatholm Island in the Bristol Channel. The Barry Amateur Radio Society (BARS) commemorates this historic occasion every year with a special event station, GB3FI, on Flatholm.

Sadly, the brass plaque which was erected at Lavernock Point in 1947 to mark the 50th anniversary of Marconi's transmission was hacked off its stone mount and stolen in the 100th anniversary year. BARS has launched an appeal in order to raise money to fund its replacement. If you or your club would like to contribute please contact john@datasafe.demon.co.uk John, GW0ACH / GW8VBV, says; "We are very grateful to those who have made contributions to date and for the expressions of sympathy received." We understand that Martin Lynch, G4HKS, of Martin Lynch & Son has already offered funds for the replacement plaque.

The Royal Omani Amateur Radio Society (ROARS) are featured on an Omani stamp and First Day Cover which was issued on 23 December. The stamp, commemorates the Silver Jubilee of ROARS.



Radio Amateur philatelists are invited to send US\$3.00 (to cover the cost of first class air mail postage) and an SAE for their personal copy of the First Day Cover. Write to the Royal Omani Amateur Radio Society, PO Box 981, Muscat 113, Sultanate of Oman.

CARA Gets Key to the Door

The Cheltenham Amateur Radio Association (CARA) celebrates its 21st Anniversary this year. The club was formed in 1977 by the amalgamation of the Cheltenham Group of the RSGB, and the Cheltenham Amateur Radio Society. CARA has met with mixed fortunes since, but is currently enjoying a renaissance. Patricia Thom, G1NKS, the club's secretary, said: "Everyone is very enthusiastic and we are particularly pleased to have in our number several 'M' calls. We also have as members a GM and an Italian SWL!"

The 21st anniversary year will be marked by special meetings and events, including the annual club dinner in May, to which past and potential members are invited. The talk for the actual anniversary in November will be given by the person who addressed the very first meeting, Richard, G4ERP, who is Head of Electronics, Benetton Formula. His talk will be about 'Radio and Motor Racing'.

For further details of CARA, contact Patricia, G1NKS, on tel: 01242 241099, or by packet: G1NKS@GB7GLO; or e-mail: g1nks@g3nks.demon.co.uk

Talking TARS

TARS Talk, the quarterly magazine of the Torbay Amateur Radio Society, can now be found on the Internet at www.btinternet.com/~g4vpm

Andy Stafford, G4VPM, told *Ham Radio Today*; "It is, of course, my home page, but it includes the magazine. It's early days yet, but it will be improved. It's my first attempt at web publishing."

Subscribe to Ham Radio Today and Win an Icom IC-746 HF / VHF transceiver!



Hora C-408 70cm handheld for runner-up

Now you've seen the new-look Ham Radio Today, we're sure you'll want to read it every month. To be certain of being able to get hold of a copy every month, the best way is to subscribe. That way, you'll have Ham Radio Today delivered to your door as soon as it's published. No more queuing up at the newsagents, only to find that they've sold out of your favourite Amateur Radio magazine the day before! And no more missing out on all those great bargains in the Free Readers' Ads because you didn't buy your copy of the Ham Radio Today on the day it came out!

More good news - at £26.50 per year (for UK readers), including postage, it actually works out cheaper than buying each copy at the newsagent!

To 'encourage' you to subscribe, we have a prize draw - with some *really* terrific prizes. Subscribe before 31 March and you will automatically be entered into our free draw. The first prize will be a brand-new Icom IC-746 transceiver, worth nearly £1700! The rig is reviewed by Chris Lorek, G4HCL, on pages 10 - 13 of this issue. This superb new 100W transceiver covers 50 and 144MHz as well as all the HF bands, so is ideal for both Class A and B amateurs.

The runner-up will win a Hora C-408 70cm handheld, reviewed by your editor on pages 19 - 20, and kindly donated for this competition by Waters & Stanton Electronics.

All you have to do is fill in the form and send your cheque or credit card authorisation to the address on the form. If you do not want to cut your copy of Ham Radio Today, please feel free to photocopy this page.

All forms must be received by 31 March 1998 to be included in the draw.

To: Ham Radio Today Subscriptions,
RSGB Publications, Lambda House,
Cranborne Road, Potters Bar, Herts EN6 3JE.

Subscription rates (12 issues/year)

UK - £26.50; Europe & Eire - £36.50; Rest of the World - Surface £38.50, Air Mail £54.

**Yes, please send me the next year's Ham Radio Today and
enter me for the Icom IC-746 Prize Draw.***

Name _____ Callsign (if appropriate) _____

Address _____

Post Code _____

Credit Card No _____

Exp Date _____ Switch Start Date _____ Issue No _____

Signature _____ Date _____

* No purchase necessary. Competition forms available on receipt of an SASE to the above address.

Yaesu FT-847 Previewed

Chris Lorek, G4HCL, gets a 'sneak preview' of this superb new transceiver

The all-new Yaesu FT-847 allows for full-duplex cross-band operation, as well as normal and reverse VFO tracking for satellite operation. Shown here, the FT-847 is in satellite mode transmitting on the uplink on 70cm and receiving the downlink on 2m.



The Yaesu FT-847 is described as an "HF / 50 / 144 / 430MHz ultra-compact satellite and all-mode transceiver". This could easily say it all, because that's just what it is, but with plenty of 'bells and whistles' to boot. I was extremely pleased when I was told by Yaesu UK that I would be receiving the very first demo model of the FT-847 to arrive in the UK, prior to its planned launch at the London Amateur Radio and Computer Show on 7 / 8 March.

bands and power

In a single box, the FT-847 provides transceive coverage of all the HF amateur bands from 1.8MHz to 29.7MHz (no, they haven't got 136kHz into it yet!), together with 6m (50MHz) transceive, all with up to 100W output power on CW / SSB / FM and 25W on AM. The same set also covers 2m (144 - 146MHz) and 70cm (430 - 440MHz) transceive with 50W output.

A variable front power TX power control lets you reduce power as needed for QRP and satellite operation on all bands, and there's also the usual HF general coverage receive facility over 500kHz to 30MHz.

size isn't everything

The transceiver isn't large by any standards, measuring just 260 x 86 x 270mm and weighing 7kg. In a box this size there is naturally no AC mains power supply

built in. The transceiver operates from a 13.8V DC supply drawing between 1.5A and 2.0A on receive and up to 22A peak on transmit.

satellite mode

Yaesu have, I believe, been the very first manufacturer to ever offer all the above bands in one transceiver. Yet this was over 10 years ago, in their FT-767, a true 'pioneer'. The matching FT-736R, a model which I had the pleasure of owning for some years, was the de facto first choice for amateur satellite operators around the world, and it now appears that the FT-847 could easily rival this role.

The FT-847 offers full-duplex cross-band operation, as well as normal and reverse VFO tracking for satellite operation - indeed there's a special set of four control buttons together with a further 'Sat' VFO mode button on the front panel, dedicated to satellite operation. Dedicated satellite memories can also be stored in the set, each having an eight-character alphanumeric 'tag', which you can use to indicate the satellite name or mode.

controls

A 'shuttle jog' tuning system, similar to that on the FT-920 and FT-1000MP, is used to complement the main tuning knob, and there's a small separate dedicated 'sub-tune' knob just to the right of the main frequency display for independent sub-band tuning. The front panel keypad also lets you enter frequencies directly, and

there are ample memory channels with plenty of store, retrieve, and scan facilities.

For repeater operation you can easily switch in a repeater TX / RX split with a single button push, and there's also a quick-access 'reverse' check facility from the front panel.

A built-in CW keyer is fitted with front-panel adjustable speed, and CW sidetone and pitch can also be adjusted to suit your own preferences. There is also a built-in SSB speech processor, an audio monitor facility, together with a switchable receive RF amplifier, attenuator, and noise blanker on receive. You can also fit an optional voice synthesizer in the set, something blind operators have been requesting for a long time.

As you may imagine from this latest rig from Yaesu, DSP (Digital Signal Processing) is also built in. There's an automatic notch facility to get rid of annoying audio heterodynes, a noise reduction facility, as well as audio bandpass filtering with independently variable upper and lower cut-off.

technicalities

A direct digital synthesiser gives 0.1Hz tuning steps on SSB and CW, 10Hz steps on AM and FM, and an adjustable IF shift of ± 1.2 kHz can be switched in.

The receiver uses a double conversion superhet design on all bands, with intermediate frequencies of 45.705MHz and 455kHz. IF filters are fitted for SSB, CW and AMN (AM Narrow) at 2.2kHz, AM and FMN (FM Narrow) at 9kHz, and FM at 15kHz, and

there's an optional 500Hz bandwidth filter available for CW.

The FM deviation can be switched to either 2.5kHz or 5kHz peak, for use on either 12.5 or 25kHz channel spacing. CTCSS (sub-tone) encode and decode is built-in for repeater access as well as quiet monitoring, together with DCS (Digital Coded Squelch) encode and decode as used on a number of Yaesu's other VHF / UHF transceivers.

Round the back of the case, an N-type antenna socket is used for UHF, with SO-239 sockets for the other bands, and there are dedicated packet radio connections for 9600 baud and 1200 baud operation for either terrestrial packet or amateur satellite use. As well as a dedicated audio frequency shift keying input for data modes (J1D, J2D and F2D modes), there's also an external input for VHF / UHF direct frequency shift keying (F1D mode).

on show

As soon as I have been able to have an extended play with the FT-847, you will certainly be seeing a full review of the transceiver coming from my keyboard. In the meantime, you should be able to see - and try out - a demo model of the new rig at the Picketts Lock London Show this month, where it's planned to be on display and operating on the Yaesu UK stand.

And the price? I'm told it's likely to be around £1700. I'm already starting to save up!

Our thanks go to Yaesu UK for their help and assistance in producing this transceiver preview.

A demo model of the Icom IC-746 was first revealed in the UK at last year's Leicester show, and regular readers may already have seen the first available details and photo in *Ham Radio Today's* Leicester Show Report on this rig. Within a couple of days of the first batch of IC-746s arriving in the country during the Christmas and New Year period, I was happily sat using one on the air - that's dedication for you!

coverage

The transceiver covers all amateur bands from 1.8 to 52MHz, together with a general coverage receiver from 300kHz to 60MHz (the actual tuning range goes down to 30kHz), as well as 2m transceive over 144 - 146MHz. A power output of 100W (40W on AM) is offered on all bands including 2m, with a front-panel variable power reduction which can continuously reduce the power to around 5W if you wish. There's also a modification available

A number of otherwise undedicated buttons immediately below the LCD are used to operate various functions according to the operating mode selected, the changing functions being indicated in a dot-matrix text on the LCD itself. This way, you get plenty of operating functions without a front panel filled with buttons galore.

A press of the 'Menu' button brings up this 'soft key' display, where the F1 - F5 keys immediately below the LCD act as selection buttons. One of these selections brings up a 'set' mode, where the transceiver's default parameters such as LCD contrast, beep level, filters, meter peak hold, split / duplex offsets and so on can all be selected and changed. There's also a simple 'bandscope' function available, with selectable step sizes. Here, the lower section of the LCD can give you a bargraph-type bandscope of signal activity on either side of your tuned signal, although the receive au-



m 746 Reviewed

Chris Lorek **G4HCL**, puts this new

which adds wideband VHF receive coverage over 108 - 174MHz.

Operation modes offered are CW, RTTY, LSB / USB, AM and FM, and the FM deviation can be switched between 2.5kHz and 5kHz for 12.5kHz / 25kHz channel spacing on 2m, the receiver filter bandwidth automatically switching to suit (see later).

The IC-746 operates from a 13.8V supply, requiring 20A on transmit and 2A maximum on receive. It measures 287W x 120H x 316.5D mm and weighs 8.5kg.

display

The IC-746 follows Icom's trend in recent years of using a large and very visible LCD (Liquid Crystal Display) on the front panel. This not only displays the usual operating mode, frequency, memory channel, S-meter etc, but also provides a menu-based 'soft key' control facility along the lower section of the panel. If you've ever used an IC-706, you'll know just what I mean.

dio is disabled while it is sweeping.

antennas

There are three antenna sockets fitted on the rear panel, two for HF / 6m, and one for 2m. On the HF and 6m bands, either of the two antenna sockets can be selected from the front panel, and when you return to each band your last-selected antenna on that band is automatically re-selected for you.

There's a built-in ATU which operates on the HF and 6m bands, to 'fine tune' a mismatched antenna that has an SWR of between 1.5:1 and 3.0:1 (2.5:1 on 6m). Once the tuner matches the antenna, the variable capacitor angles are memorised as a preset point for each frequency range in 100kHz increments, with 100 memories. Therefore, when you change the frequency range, the variable capacitors are automatically pre-set to the memorised point.

receiver

To match the receiver's dynamic range to the operating conditions at any time as well as your antenna type, a switchable attenuator is fitted to guard against strong-signal overload, together with two switchable preamps fitted for the HF and 6m bands. Over the 1.6MHz to 30MHz receive range you can select either Preamp 1, which is a 10dB gain type, suitable for the lower frequency bands, or Preamp 2 which has a higher gain (16dB) and which is suited to the higher frequency bands, ie 21MHz and above, where signal levels are usually less. On 2m a single switchable high-gain preamp is also fitted.

dsp

Audio-frequency based digital signal processing is built in, this operating at the final 'IF', which is actually in the upper audio frequency range. There's a variable-level noise reduction facility, and

for CW a variable frequency audio peak filter is available. This can peak audio signals of between 300 and 900Hz in 3Hz steps, with switched filter bandwidths of 320, 160 and 80Hz.

The received CW audio pitch and monitored CW audio can also be adjusted to suit your preferences, again between 300 and 900Hz in 3Hz steps.

In SSB, AM and FM modes, the DSP can be switched into an audio auto-notch mode, where it can automatically notch out up to three simultaneous interfering audio beat notes.

tuning

The main dial can be used to tune around in 1Hz or 10Hz steps on CW / SSB, with a selectable frequency display readout also to either 1Hz or 10Hz. A 'quick tuning step' button speeds this up to 1kHz steps. The tuning steps also automatically change according to the rate at which the main dial is rotated, when turned slowly (10Hz



given a short alphanumeric tag, so you can easily remember what each channel contains.

filters

Internally-cascaded IF filters are provided in both the 2nd IF of 9MHz and the 3rd IF of 455kHz. The transceiver comes supplied with a 2.4kHz filter in the 9MHz IF, and 2.4kHz, 9kHz and 15kHz filters at 455kHz. The 455kHz filters are used for normal operation with the 9MHz path in 'through' mode, and a press of the 'Filter' button in SSB / CW mode switches in the 9MHz 2.4kHz filter for a slightly narrower overall IF bandwidth.

Up to two optional filters can be added at the 9MHz IF, available types being 250Hz, 350Hz, 500Hz, 1.9kHz and 2.8kHz, and one further optional filter at 455kHz, with available types being 250Hz, 500Hz, 1.8kHz, 2.8kHz and 3.3kHz. The 'set' mode can be used to individually program any combination of filters for each mode in either normal or

746 to simulate most common situations.

On HF from my house I use a three-element compact Yagi on my Versatower, a fan dipole system for each HF band, a CobWebb multi-band system, plus my trap dipole system for 160, 80 and 40m. I also have use of a TH5 on a 25m tower at my club station which I visit each day, from which I also tested the IC-746. On 6m I used my rotatable three-element yagi (the HF compact Yagi having this facility on 6m) together with a roof-mounted 6m half-wave vertical, and on 2m a chimney-mounted VHF / UHF collinear and tower-mounted beam.

In operation for the first time, I found the receiver reasonably easy to use, the large tuning knob being an absolute pleasure. The receiver sensitivity was very good on 6m and 2m, certainly equal to that of the best VHF receivers I'd expect to find elsewhere.

Although it isn't mentioned in the handbook, I found that press-

The Icom IC-746 Reviewed

transceiver through its paces

tuning steps) it gives 5kHz per revolution, speeding up to 25kHz per revolution (50Hz steps) when rotated quickly. On AM and FM the tuning steps can also be selected to suit your needs, either fine-tuning as above or in programmable steps like 12.5kHz on FM, 5kHz (for shortwave broadcasts) or 9kHz (for mediumwave broadcasts) on AM, etc. A small front-panel screw lets you adjust the torque of the main tuning knob, there's also a switchable '1/4' rate which reduces the tuning rate per main knob revolution to 25% of the normal rate.

You can quickly switch between two digital VFOs, A and B, and there's a selectable Tx / Rx split frequency operation facility between VFO A and B, a one-press 'XFC' button giving you a quick check of your transmit frequency. As well as a variable RIT facility up to 9.99kHz, a variable XIT (transmit incremental tuning) can also be switched in. Each press of any of the front panel

band buttons gives you repeated access to your last three selected frequency / mode combinations on that band, and the front panel keypad can be toggled to act as either band selection or for direct frequency entry.

In tuning through the bands, a 'memo-pad write' button programs the selected readout frequency and operating mode, as well as any split transmit frequency, into an internal memory pad. This stores the five most recent entries into memo pads, and can be increased to ten memories, if you wish, in the transceiver's 'set' mode. The front panel 'memo pad read' switch then recalls these in sequence when you've finish your initial tune around the band or bands in each operating session.

Besides this, 102 memory channels are provided consisting of 99 regular memories, two 'scan edge' memories and one 'call' channel memory. Each of the memory channels can be

narrow bandwidths. However, twin concentric pass-band tuning controls are fitted on the front panel, so that the overall IF bandwidth can be narrowed or shifted as you wish on various modes.

CW

An electronic memory keyer is fitted for CW, this having a four-channel, 50-character memory, complete with an automatic contest-number generator. On CW you can use the internal electronic keyer, or a bug key, or use a straight key, a separate jack socket being fitted for the latter. On CW and RTTY, a switchable reverse BFO injection facility can change the carrier injection side. This can be very useful when an interfering signal on one side of the wanted signal gets the better of the receiver filtering.

on the air

I'm admittedly not a great HF DX guru, LF 'greyline' DXing being my favourite HF activity. However, I have attempted to test the IC-

ing the 'Filter' switch on FM to switch to narrow mode usefully also reduced the transmit deviation accordingly. I found this ideal when switching between 2m simplex operation, where most amateurs in my area currently use 5kHz deviation, and packet on 2m (this now all being 12.5kHz spaced), and 6m which of course uses narrower deviation than 5kHz peak.

Concentric to the rotary volume control is a combined RF gain and squelch control, which initially took me a little time to get used to. With this at the 12 o'clock position gave normal operation, ie maximum RF gain and unmuted squelch. Rotating it anticlockwise from this point reduced the RF gain proportionally, alternatively rotating it clockwise firstly brought in the noise squelch for the first 30 degrees of rotation, moving it round a little further then brought in an S-meter controlled (ie carrier level) squelch. I found that I had to be rather careful on 6m and 2m FM using the noise

squelch, as rotating this any further than the critical threshold point sometimes did cause the receiver to miss fairly weak, but otherwise quite readable, signals. It did however work well when monitoring the calling frequencies on CW or SSB, using the carrier squelch facility.

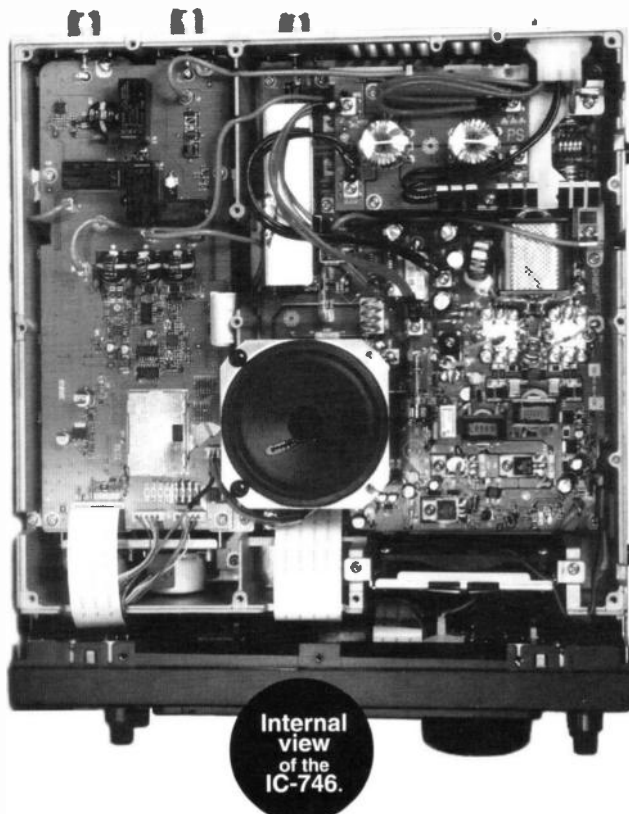
signals

Even though the DSP system operated only on audio and not at RF / IF, I found the automatic audio notch was superb, and I invariably had this switched in when I was using SSB. I usually only found that it had acted 'in anger' when the receive audio suddenly went quiet, ie when a strong on-channel beat signal was present, the audio otherwise appearing unaltered. A real IF notch would have been rather better, but you can't have everything I suppose.

The APF also worked well, although I sometimes noticed a series of clicks when tuning this on strong signals. The DSP noise reduction was very effective, especially at the top end of 80m when I was listening to a weak ZL and slightly stronger VKs coming in as dawn broke each morning. Although switching this in and cranking the level up tended to make received audio sound increasingly 'nasal', it certainly did improve very weak-signal readability. Testing this on distant 6m and 2m beacons gave me a similar readability improvement.

I normally always use an switched external DSP filter with my usual HF transceiver, but I found the variable noise reduction level on the IC-746 to be very handy, in that I could adjust this exactly to the band conditions at any time. I invariably found that I used this in preference to the carrier squelch when listening for signals on 6m or 2m whilst I was otherwise occupied in the shack. Here the background noise remained fairly quiet, but as soon as even a very weak signal came up, the receiver audio nicely came to life.

On transmit I found the auto ATU worked well, giving a very quick match from its stored memory each time I changed frequency. I received a number of good reports on my SSB audio, the passband tone response of this can also be altered via the transceiver's 'set' mode, the local monitor facility being handy in giv-



Internal view of the IC-746.

ing a local check of what I should sound like on the air. When operating in one or two nets, some stations did tell me that they preferred my audio without the transceiver's compressor switched in, whilst others reported the opposite. A test with the set's 'monitor' facility, however, indicated - to me at least - that the compressor was actually *improving* the audio, so something is different here. The compressor level control is a tiny knob at the bottom section of the rear panel, which was naturally rather difficult to adjust in normal on-air use, so eventually I left the compressor set at mid-level and just switched it in and out as needed.

On the critical side, I tended to find the top-panel internally-mounted speaker a little 'woolly', or muffled, this being particularly noticeable on FM. Plugging in an extension speaker brought an improvement here. Also, the 'scope' function was sometimes little more than a novelty, as the receiver speaker was muted whenever this was in sweep mode. However, I found that I could manually select a single sweep to quickly show me if there was anything else around on a quiet band such as 6m or 10m.

I couldn't use the noise blanker on any band that was even moderately busy with signals, this consistently bringing up the background 'mush' due to off-fre-

quency signal intermodulation even with no preamps switched in. Using this whilst suffering from constant ignition noise one Sunday afternoon, when a neighbour was working on his car with its bonnet raised, actually worsened the overall noise rather than giving me any improvement in reception.

vhf signals

I didn't find any problem with this initially, although a lab measurement brought up a potential problem with the review set. Here, when the VHF antenna was connected but I was operating on HF, VHF image signals at 138.023MHz above the tuned frequency could be received via the VHF antenna. These broke through on the HF receiver.

Deliberately tuning into a few calculated 'problem frequencies' in my location using the set on the higher HF bands did show me that it could sometimes suffer from breakthrough from very strong, albeit intermittent, VHF PMR signals. At the end of the review period, Icom (UK) kindly provided me with full dealer-modification details of a 'fix' for this, which they had received from Japan that day. This described two internal modifications, one a wire link which improves the rejection by around 40dB, another the addition of two diodes and a resistor which improves the rejection

by a further 40dB. By carefully following the instructions it took me around an hour to perform the modification, and a further test then showed the earlier breakthrough limitation had been completely eradicated. I must stress this certainly is not a 'user mod', due to the very fine PCB tracks and soldering dexterity required (it will also invalidate the guarantee!). Icom (UK) say that all currently-shipped sets from Japan now have this modification incorporated.

lab tests

The measured lab results show the receiver's strong signal handling to be up with the best of sets in most respects. I found the close-in reciprocal mixing performance to be slightly worse than one or two other up-market (and fairly expensive) HF-dedicated rigs I've used in the past, although the intermodulation and blocking performance results a little further away from the tuned frequency were overall very good. Possibly surprisingly, the strong-signal blocking performance on 2m I found to be excellent.

On transmit, the SSB linearity when the compressor wasn't switched in was excellent, with well-suppressed intermodulation products, ie with little 'spreading' of the signal. The compressor did, however, markedly bring up some low-order non-linearity in the transmitted two-tone signals.

conclusions

My first thoughts on the IC-746 were, and still are, "it's a winner". After having used the transceiver for several weeks, I found that I was liking it more and more each day, appreciating its easy-to-use band and VFO switching facilities, and the handy pass-band tuning and audio DSP capabilities. It works well, with the DSP noise reduction being particularly effective. It's an easily transportable size, and I'm sure it will find a home not only in a number of shacks around the world but also out portable on field days and mini-expeditions.

Our thanks go to Icom (UK) for the loan of the equipment for review.

now turn to
page 8 to find out
how to
WIN an IC-746!

laboratory results

All measurements carried out on 21.4MHz in SSB mode, with DSP, attenuator, preamps and ATU disabled, with set powered from stabilised 13.8V DC using supplied length of DC lead, unless otherwise stated.

receiver

sensitivity:

Input level in μV pd required to give 12dB SINAD, measured with preamp off (Nor), Preamp 1 on (P1) and Preamp 2 on (P2).

Freq MHz	SSB/CW			AM			FM		
	Nor	P1	P2	Nor	P1	P2	Nor	P1	P2
1.8	0.24	0.11	0.08	0.71	0.26	0.18	-	-	-
3.5	0.22	0.10	0.08	0.55	0.24	0.19	-	-	-
7.0	0.21	0.09	0.07	0.59	0.22	0.16	-	-	-
10.1	0.16	0.08	0.06	0.62	0.23	0.16	-	-	-
14.0	0.16	0.08	0.06	0.55	0.25	0.16	-	-	-
18.1	0.17	0.09	0.06	0.63	0.25	0.16	-	-	-
21.0	0.19	0.09	0.06	0.55	0.26	0.15	-	-	-
24.9	0.25	0.09	0.06	0.73	0.26	0.16	-	-	-
28.5	0.26	0.09	0.06	0.65	0.24	0.17	-	-	-
50.5	0.29	0.08	0.07	0.86	0.26	0.18	0.50	0.16	0.12
145	0.09	0.05	-	-	-	-	0.17	0.10	-

Rejection of 145.500MHz VHF 1st IF image (into VHF ant) on 7.477MHz HF, unmodified and with 1st and 2nd image mods carried out:

Normal	-42.6dB
Mod 1 (wire link)	-81.5dB
Mod 1&2 (added components)	124.2dB

selectivity:

	CW/SSB Nar	CW/SSB	AM/FM Nar	FM
-3dB	1.97kHz	2.33kHz	10.52kHz	12.39kHz
-6dB	2.34kHz	2.82kHz	11.48kHz	14.98kHz
--60dB	3.50kHz	3.99kHz	19.98kHz	26.56kHz

3rd order intermodulation rejection:

Increase over 12dB SINAD level of two interfering signals giving identical 12dB SINAD on-channel 3rd order intermodulation product, measured with preamp off (Nor), Preamp 1 on (P1) and Preamp 2 on (P2).

21.4MHz	Nor	P1	P2
10/20kHz spacing	79.9dB	76.8dB	70.7dB
50/100kHz spacing	101.3dB	93.4dB	83.2dB
50.5MHz	Nor	P1	P2
10/20kHz spacing	80.8dB	73.4dB	73.2dB
50/100kHz spacing	96.2dB	73.8dB	83.9dB
145MHz	Nor	P1	P2
10/20kHz spacing	82.1dB	73.7dB	-
50/100kHz spacing	81.4dB	81.4dB	-

s-meter linearity:

Measured at 14.25MHz

Indication	Sig Level	Rel Level
S1	4.73 μV pd	-24.4dB
S2	5.34 μV pd	-23.3dB
S3	6.51 μV pd	-21.6dB
S4	8.14 μV pd	-19.7dB
S5	10.0 μV pd	-17.9dB
S6	14.5 μV pd	-14.7dB
S7	22.8 μV pd	-10.7dB
S8	40.0 μV pd	-5.8dB
S9	77.8 μV pd	0dB ref
S9+20dB	650 μV pd	+18.4dB
S9+40dB	5.81mV pd	+37.4dB
S9+60dB	42.0mV pd	+54.6dB

s-meter s9 level:

Freq MHz	Sig Level
1.8	91.7 μV pd
3.5	95.0 μV pd
7.0	80.9 μV pd
10.1	76.8 μV pd
14.0	78.7 μV pd
18.1	75.2 μV pd
21.0	78.7 μV pd
24.9	94.6 μV pd
28.5	96.9 μV pd
50.5	110.8 μV pd

blocking:

Measured as increase over 12dB SINAD level of interfering signal, unmodulated carrier, causing 6dB degradation in 12dB SINAD on-channel signal, measured with preamp off (Nor), Preamp 1 on (P1) and Preamp 2 on (P2).

21.4MHz	Nor	P1	P2
+/-50kHz	97.0dB	97.3dB	93.5dB
+/-200kHz	105.5dB	106.4dB	105.8dB
50.5MHz	Nor	P1	P2
+/-50kHz	97.0dB	97.1dB	97.0dB
+/-200kHz	105.5dB	105.1dB	105.2dB
145MHz	Nor	P1	P2
+/-50kHz	107.7dB	107.2dB	-
+/-200kHz	107.1dB	107.2dB	-

image rejection:

Increase in level of signal at the first and second IF image frequencies, and the first and second IF, over level of on-channel signal, giving identical 12dB SINAD signal.

Freq MHz	1st Image Rej	1st IF Rej	2nd Image Rej	2nd IF Rej
1.8	-103.9dB	-86.7dB	>110dB	106.9dB
3.5	>110dB	>110dB	>110dB	>110dB
7.0	>110dB	>110dB	>110dB	91.7dB
10.1	>110dB	>110dB	>110dB	84.6d
14.0	>110dB	>110dB	>110dB	87.0dB
18.1	>110dB	>110dB	>110dB	>110dB
21.0	>110dB	>110dB	>110dB	>110dB
24.9	>110dB	>110dB	>110dB	109.7dB
28.5	>110dB	>110dB	>110dB	108.6dB
50.5	>110dB	-84.1dB	>110dB	>110dB
145	>110dB	-73.8dB	>110dB	>110dB

transmitter

tx power and current consumption:

Measured under normal front panel selection.

Freq MHz	Max Power	Min Power
1.8	125W/18.1A	3.1W/5.1A
3.5	122W/16.6A	3.2W/5.3A
7.0	120W/16.8A	3.2W/5.1A
10.1	119W/16.1A	3.2W/5.0A
14.0	119W/18.9A	3.1W/5.6A
18.1	119W/16.7A	3.1W/5.2A
21.0	118W/17.0A	3.1W/5.0A
24.9	117W/17.1A	2.9W/5.1A
28.5	116W/17.1A	3.0W/5.1A
50.5	114W/16.2A	2.8W/5.1A
145	116W/18.1A	3.9W/5.8W

harmonics:

Freq MHz	2nd	3rd	4th	5th	6th	7th
1.8	-63dBc	-59dBc	-80dBc	-75dBc	-72dBc	<-80dBc
3.5	<-80dBc	-66dBc	<-80dBc	<-80dBc	-62dBc	<-80dBc
7.0	-79dBc	-75dBc	-80dBc	-75dBc	<-80dBc	<-80dBc
10.1	-67dBc	-58dBc	<-80dBc	-68dBc	-67dBc	<-80dBc
14.0	-76dBc	-67dBc	-70dBc	-68dBc	<-80dBc	<-80dBc
18.1	-64dBc	-63dBc	<-80dBc	<-80dBc	<-80dBc	-67dBc
21.0	-78dBc	-67dBc	<-80dBc	<-80dBc	<-80dBc	<-80dBc
24.9	-69dBc	-65dBc	<-80dBc	<-80dBc	<-80dBc	<-80dBc
28.5	-72dBc	-68dBc	<-80dBc	<-80dBc	<-80dBc	<-80dBc
29.5	-71dBc	-69dBc	<-80dBc	<-80dBc	<-80dBc	<-80dBc
50.5	<-80dBc	-78dBc	<-80dBc	<-80dBc	<-80dBc	<-80dBc
145	-76dBc	-67dBc	-79dBc	<-80dBc	<-80dBc	<-80dBc

HAYDON COMMUNICATIONS

MAIL ORDER: 0181-951 5781/2

London showroom & Mail Order

132 High St. Edgware, Middx HA8 7EL.

Tel: 0181-951 5781/2. Fax: 0181-951 5782

Open Mon-Fri 9.30-5.30pm. Sat 9.30-2pm

W. Midlands showroom

Unit 1, Canal View Ind. Est., Brierley Hill, W. Mids.

Tel: 01384 481681

Open Mon-Fri 9.30-5pm. Sat 9.30-2pm



SERENE BASE ANTENNA

TSB-3301 GF	144/70, 6.5/9dB (3m)	£69.95
TSB-3302 GF	144/70, 4.5/7.2dB (1.7m)	£54.95
TSB-3303 GF	144/70, 3/6dB (1.1m)	£39.95
TSB-3315 GF	144/70, 8.5/11dB (5.4m)	£149.95
TSB-3608 GF	50/144/70, 2.15/6.2/8.4dB gain	£79.95

ACCESSORIES

TSB-6001N	Duplexer (+Coax) 2/70 (N/N259)	£24.95
TSB-6003	Duplexer (Coax) 2/70 (PL/259's)	£19.95
CFX-514	Triplexer (6/2/70) (Coax)	£56.95

MOBILE ANTENNAS

DB-7900	144/70 cms, (5/7.6dB) 1.5m	£29.99
DB-770M	144/70 cms, (3/5.5dB) 1m	£24.95
DB-1304	144/70 cms, (2.15/3.8dB) .41cms	£19.95
DB-EL2E	144MHz, 1/4ths, 4.5dB (1.8m)	£29.95
DB-285	144MHz, 1/4ths, 3.4dB (1.3m)	£15.95
PL-6M	50MHz 1/4 wave (1m)	£16.95

ACCESSORIES

MT-1301	H/Duty Mag Mt + Coax	Top Quality £24.95
MT-3302	H/Duty Hatch/Trunk Mt	Top Quality £24.95
CF-BPF2	2m band pass filter	£49.95
Q-Tek	6m band pass filter	£42.95

Q-TEK ANTENNAS P&P £8.50

Q-TEK ZL SPECIALS

2m	5ele (boom 45"/9dBd)	£36.00
2m	7ele (boom 60"/11dBd)	£45.00
2m	12ele (boom 126"/13.8dBd)	£69.00
70cm	7ele (boom 28"/11dBd)	£24.00
70cm	12ele (boom 48"/13.8dBd)	£44.00

Q-TEK YAGIS FOR 2/4/6m + 70cm

2m	5ele (boom 63"/9dBd)	£36.00
2m	8ele (boom 125"/11dBd)	£46.00
2m	11ele (boom 186"/12.7dBd)	£65.00
2m	5ele crossed (boom 64"/9dBd)	£69.00
2m	8ele crossed (boom 126"/11dBd)	£85.00
4m	3ele (boom 45"/7dBd)	£39.00
4m	5ele (boom 128"/9dBd)	£59.00
6m	3ele (boom 72"/7dBd)	£49.00
6m	5ele (boom 142"/9dBd)	£69.00
70cm	13ele (boom 76"/12dBd)	£36.00
70cm	13ele crossed (boom 83"/12dBd)	£55.00

Q-TEK HB9-CV

70cm	HB9CV (boom 12")	£16.95
2mtr	HB9CV (boom 20")	£19.95
4mtr	HB9CV (boom 22.5")	£29.00
6mtr	HB9CV (boom 32.5")	£36.00
10mtr	HB9CV (boom 52")	£65.00

NEW HF MOBILE WHIPS (PL-259)

Easy to mount HF mobile whips ready to go with PL-259 fitting.		
PL-80	80m whip (approx 1.5m long)	£21.95
PL-40	40m whip (approx 1.5m long)	£19.95
PL-20	20m whip (approx 1.5m long)	£19.95
PL-6m	6m whip (approx 1.2m long)	£16.95

END FED HALF WAVES

Ground plane free		
4m	Length 92" (S0239)	£39.00
6m	Length 126" (S0239)	£49.00
2m	Length 52" (S0239)	£25.00
70cm	Length 26" (N-type)	£20.00

NEW TRIBAND MOBILE

TSM-1612

New tri-band mobile covers 6, 2, 70cm. Gain 2.15, 6, 8.4dB. PL-259 fitting. 2.1m max length. Superb quality.

£54.95 P&P £8.50

D-308B BLACK DELUXE DESK MIC

(with up/down). Super quality. (Supplied with 8 pin pre-wired Yaesu lead)

£49.95 P&P £5.50

OPTIONAL LEADS (P&P £1.50)

A-08	8 pin "Alinco" round	£9.95
K-08	8 pin "Kenwood" round	£9.95
I-08	8 pin "Icom" round	£9.95
AM-08	Modular phone "Alinco"	£9.95
YM-08	Modular phone "Yaesu"	£9.95

U-120 headset

A high quality headset that will fit hand portable + most HF & VHF/UHF tcvrs with optional interface.

£24.95 P&P £3.50

Supplied with two pin molded plug-will fit Alinco/Yaesu/Standard/ADI/Icom hand holds)

F-3035	8 pin "Standard" round	£16.95
F-303Y	8 pin "Yaesu" round	£16.95
F-303K	8 pin "Kenwood" round	£16.95
F-303I	8 pin "Icom" round	£16.95
F-303YP	Modular "Yaesu" phone	£16.95
F-303KP	Modular "Kenwood" phone	£16.95
F-303IP	Modular "Icom" phone	£16.95

DELUXE G5RVS

Multi-stranded plastic coated heavy duty antenna wire. All parts reusable. Stainless steel and galvanised fittings. Full size - 102ft.

Only £39.95

Half size 51ft. Only £29.95 Carriage £6.00.

STANDARD G5RVS

Full size	102ft	£24.00 P&P £4
Half size	51ft	£21.00 P&P £4

NEW Q-TEK INDUCTORS

80mtr inductors. Add them to your 1/4 size G5RV and convert it to a full size. (New length only 69 feet total).

£22.95 P&P £2

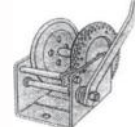
COPPER WIRE (ALL 50MTR ROLLS)

Enamelled	£9.95 P&P £5
Hard drawn	£12.00 P&P £5
Multi-Stranded (Grey PVC)	£8.95 P&P £5
Extra H/duty (Clear coated)	£20.00 P&P £5
Flexweave (H/duty)	£30.00 P&P £5
Flexweave H/duty (20 mtrs)	£12.00 P&P £5
Flexweave (PVC coated 20 mtrs)	£16.00 P&P £5

Q-TEK WINCHES

NEW Q-TEK WINCHES

A range of fully galvanized all steel construction winches with safety ratchet. (SEND SAE FOR SPEC SHEET)



STANDARD WINCHES (DIRECT PULL) P&P £8

QW-400	400LB	£21
QW-800	800LB	£27
QW-1000	1000LB	£31
QW-1200	1200LB	£36
QW-1400	1400LB	£45

BRAKE WINCHES AVAILABLE

TELESCOPIC MASTS

5 section telescopic masts. Starting at 2 1/2" in diameter and finishing with a top section of 1 1/4" diameter we offer a 8 metre and a 12 metre version. Each mast is supplied with guy rings and stainless steel pins for locking the sections when erected. The closed height of the 8 metre mast is just 5 feet and the 12 metre version at 10 feet. All sections are extruded aluminium tube with a 16 gauge wall thickness.

8 mtrs £69.95 12 mtrs £99.95

Carriage £10.00.

GUY WIRE KITS P&P £5

Standard kits	£20.95
Heavy duty kits	£25.95

NEW FREE STANDING

TRI-POD

Heavy duty free standing tri-pod. Constructed to mil spec. Available for our 8m or 12m telescopic masts (specify which).

ONLY £84.95 P&P £10

NEW MAST HEAD PULLEY

Simple, easy to fit pulley with mast clamp. Simply clamp to mast (up to 2").

ONLY £7.50 P&P £1.50

SECTIONAL MASTS Carriage £8.50

4 x 5 foot aluminium sections each swaged at one end.

1 1/4" dia	£19.95
1 1/2" dia	£29.95
1 3/4" dia	£36.95
2" dia	£45.95

WALL BRACKETS + MAST BASE PLATES

2" Mast base plate	£12.00 P&P £5
Stand off	£6.95 P&P £5
9" Stand off	£8.95 P&P £5
12" T&K Brackets	£12.00 P&P £8
18" T&K Brackets	£18.00 P&P £8
24" T&K Brackets	£20.00 P&P £8

GET THE ACCESSORY CATALOGUE

Send £1 in stamps to receive your copy of the accessory catalogue full up with
100s of accessories that you have always needed

NISSEI METERS



NISSEI METERS

RS-102	1.8-150MHz (200W)	£59.95 p&p £5
RS-402	125-525MHz (200W)	£59.95 p&p £5
RS-101	1.8-60MHz (3kW)	£79.95 p&p £5
RS-502	1.8-525MHz (200W)	£99.95 p&p £5
TSA6601	144/430MHz Pocket PWR/SWR Meter (60W)	£34.95 p&p £1

DL-60 ★ Dummy load ★ DC-500MHz ★ 60W max
★ PL-259 fitting **£16.99** P&P £1

THE IDEAL SHACK
ACCESSORY

NOW IN STOCK



GARMIN GPS-III

Latest UK version complete with moving map of UK & Europe. **£449.**

£UKs lowest price

OTHER MODELS AVAILABLE

HF ACCESSORIES



P-2512 'M'

25-30 amp power supply with variable volts (3-15). Dual meters (Volts + amps). The UKs best selling power supply. Most of our competitors are

selling the 20A versions for the same price.

RRP ~~£99.95~~ OUR PRICE

£89.95

CE
Approved

P-1012	12 amp PSU	£49.95
PS-200	Portable PSU	£46.95



VECTRONICS VC-300DLP

UK's most popular 300W ATU with built-in dummy load.

£129.95

SPECIAL OFFER

MFJ-949 Special offer.....**£139.95**



SGC-230

Superb ATU will work with any HF transceiver. **£349.**

£289.00



MFJ-259

HF digital SWR analyser + 1.8-170MHz counter/resistance meter.

RRP **£225.00** P&P £5

HANDHELD ACCESSORIES



Nissei EP-300T

Over the ear earpiece with lapel mic & PTT. Fits Kenwood, Alinco, Yaesu or Icom

£22.95 P & P £1

Please specify brand of radio when ordering

This Ear/Mic comes with an "over the ear" earpiece as EP-300
MS-107 FIST MICROPHONE.....**£16.95**

T-2602

2m/70cm/23cm (2/3/5.5dB) flexible antenna with wideband receive (14" long BNC).

OUR PRICE

£22.95

P&P £1

DB-770H

High gain 2m + 70cm telescopic antenna with wideband receive.

OUR PRICE

£24.95

P&P £1



NB-30W

2M FM handheld amplifier 2-SW input. 30W output (for 5W ip). Turn your handheld into a mobile for under £50

RRP **£49.95** P&P £2



POLICE STYLE HOLSTER HHC-2

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

£19.95 +P&P £1

Waterproof case for handheld

£00.00 P&P £1



EP-300

Deluxe over the ear earpiece.

£9.95 + P&P £1



QS-200

Mounts on the air vent grille on a car dashboard to allow easy and safe operation of most handhelds.

£9.95 P&P £2

QS-300

Deskstand.....**£19.95**



QS-300

A fully adjustable desk top stand for use with all handhelds. Fitted coaxial fly (FAI) with BNC & SO239 connectors

OUR PRICE **£19.95** P&P £2

COAX SWITCHES (P&P £2.50)

CX-401	4 way (SO-239).....	£49.95
CX-401 'N'	4 way (N TYPE).....	£54.95
CX-201	2 way (SO-239).....	£18.95
CX-201 'N'	2 way (N-type).....	£24.95



S.W. PORTABLES

SONY SW-100E

Award winning miniature portable SW receiver. Its performance is brilliant for its size. The best shortwave receiver for under £250.



RRP ~~£220~~ SALE PRICE **£149.95**



SONY SW-55E

Superb quality portable SW receiver with 125 presets. 100Hz step tuning for shortwave. Includes compact antenna, stereo headphones and carry case. RRP ~~£299.95~~

SALE PRICE **£235.00**



ROBERTS R-861

Portable SW receiver with SSB and RDS. RRP ~~£199.95~~

OUR PRICE **£169.00**



ROBERTS RC-828

Portable all mode SW receiver with built-in cassette recorder.

OUR PRICE

£199.95

OPTOELECTRONICS



TECHTOYZ MICRO COUNTER

Optoelectronics are ready to pioneer the market by proudly introducing the latest in technology for frequency counter, the Techtoy Micro counter. It is the smallest frequency counter in the world with a frequency coverage of 10MHz-1.2GHz. The AA alkaline battery which powers the counter acts as the antenna, so no external antenna is needed.

INTRO PRICE **£89.95**

TNC-100 Optional antenna.....**£6.95**



OPTO SCOUT 3.1-Mk2

Latest mini frequency finder from Optoelectronics. It will capture and memorise up to 400 frequencies that can be recalled directly into the AR-8000. Supplied with ant, nicads and fast charger. RRP ~~£399~~

SALE PRICE **£349.95**

Opto Cub	Our price	£99.95
Opto Explorer	Our price	£795.95
Opto Lynx	Our price	£129.95
Micro DTMF decoder	Our price	£89.95
R-11 Interceptor	Our price	£349.95

Henry was having trouble with his fairly new FT-290, and so he sent it away to a large service centre for repair and alignment. When he got it back it seemed fine, the receiver was spot on, and it gave full power into a dummy load. When he tried to make contacts however, nearby stations who were S9+ could only just about detect him at about S1, and no-one else could hear him at all.

Thinking that something might be wrong with his antenna system he put an SWR / power meter in circuit, and found that the SWR was about 10:1. It looked like something was wrong in this department, but how come that the reception was so good? Puzzled, Henry transferred the rig to the mobile whip on his car, and got exactly the same results.

He was rather reluctant to post it back to the repairers when he could not make sense as to whether or not it really was faulty,

and so he asked me to test it. From the story I was expecting the set to be going into violent parasitic oscillation, but tests on a dummy load seemed OK. I had a listen to the output on a receiver, and it seemed quite clean, but perhaps not quite as strong as I would have expected. At that time I didn't have a spectrum analyser, but I had a flash of inspiration!

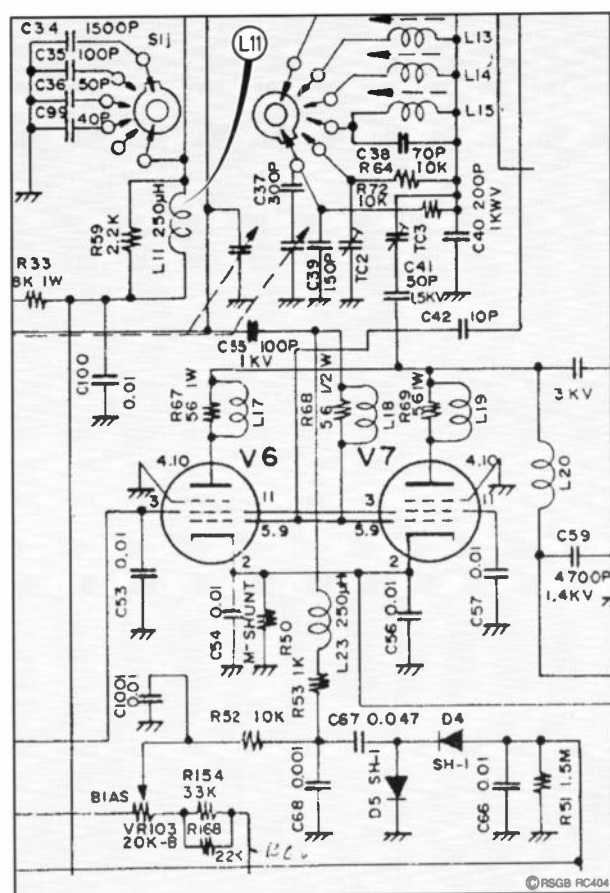
I hooked the output of the rig to my frequency counter, and, lo and behold, when the rig was set at 145MHz, the main output then turned out to be not on 2m, but bang in the middle of the air band. The problem was that in some strange way the service centre had managed to line up the transmit output and driver stages on the *image* of the correct frequency. When operating at 145MHz the local oscillator runs at 145 minus the IF frequency of 10.81MHz = 134.19MHz. Hence with correct alignment the output frequency is generated by add-

ing the oscillator frequency to the IF frequency. Henry's radio was aligned so that the output frequency was the difference between the two, and so when set at 145MHz it produced $134.19 + 10.81 = 123.38\text{MHz}$. Henry was very lucky not to have received a rocket from the DTI (or from an aircraft trying to use that frequency!) He ended up returning his FT-290 to the service centre who proceeded then to correctly align it, and to express their profuse apologies.

Perhaps this incident, which happened about 12 years ago, should be a reminder to us all, that we are legally responsible to check that our transmissions are clean, and on the correct frequency, and not just to rely on the readings on dials. A frequency counter should now be in the possession of every licensed amateur, as quite reasonable ones are now available without having to spend a fortune. Do ensure that you are where you think you are.

find a fault that someone else has had a go at, is not to believe a word they have said! And so I first went through all the normal checks. A diode probe showed that there were around 5 - 6 volts of RF on the control grid of the 12BY7A, but that the stage was not amplifying this at all. Whereas there should have been around 40 volts drive on the PA valves control grids, there was only a scant amount of drive. Testing the rig on a few bands showed that the anode / PA grid tuned circuit did not seem to want to peak at all, suggesting that something was damping it. After testing just about everything in the driver stage the 'something' eventually turned out to be L11, the DC feed choke to the anode circuit, across which is fed back the PA stage neutralising voltage. Replacing the choke provided a complete cure, and after touching up the alignment, full power was obtained on all bands.

Harry Leeming, G3LLL, gives us the benefit of his years of experience



mysterious lack of drive

Bert never liked to pay someone else for a job he could do himself, but this time he was admitting defeat. The drive on his FT-200 had dropped to almost nothing, and the most power he could get out was about 5 watts on 80 metres, and even less on the other bands.

By using a diode probe, Bert had established that there was plenty of drive at the grid of the driver valve, but very little coming out of its anode circuit. All voltages were normal, and there just didn't seem to be anything else left to test. "I've done my best, Harry, I'll leave you to have a go", he said as he left the rig with me.

The first rule, when trying to

Since doing this repair more years ago than I care to remember, I have had quite a few different models of Yaesu rigs which use a similar circuit (shown in Fig 1) with exactly the same fault.

"How much do you charge an hour?", people often ask. If repair departments charged strictly by time, Bert would have had to pay for a day's work. In practice, most of us use hourly rates very loosely, and charge more on the line of 'what a job is worth'. The first time I come across a fault, I can't possibly charge for all the time I spend, I just book it down to 'experience'. When, however, the same trouble occurs later on a different piece of equipment, I make sure to add a little extra to pay for my 'experience'!

tx off frequency

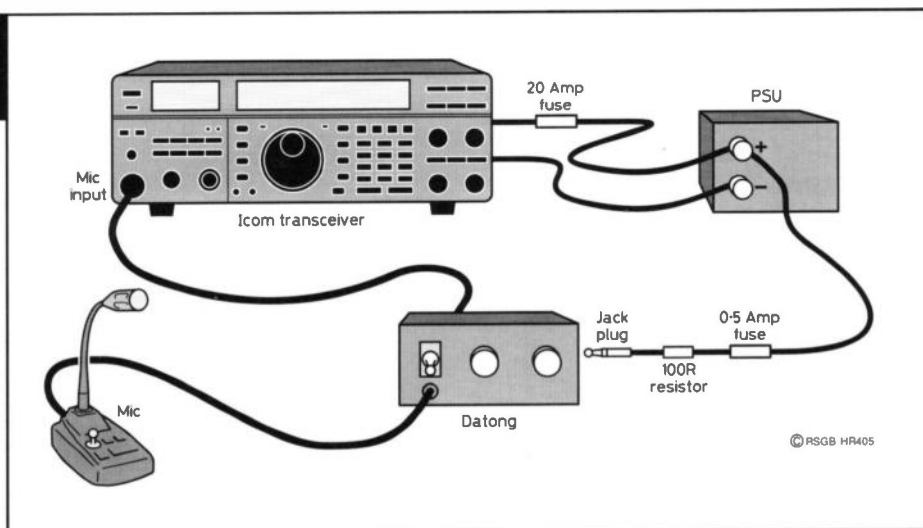
Some of the older analogue VFO-controlled rigs have a tendency to transmit and receive on slightly

Fig 1: Part of the circuitry around the 6JS6A PA valves of an FT-200. Replacing L11, shown, cured the lack of drive problem (see text).

Fig 2: Always fit a fuse in the positive leads of DC supplies.

different frequencies. Tony had been having complaints from his friends that he was not netting correctly, and so had read his manual, and then had a go at correcting the matter.

Unfortunately the instructions demanded more test equipment than Tony possessed, and so he tried on the air adjustments, with the help of his friends. After the 'on the air' adjustments, Tony's FT-101 was worse than it had been before. Trying to set the transmit and receive frequencies to coincide by relying on someone over the air is about as good as trying to reverse a car with the help of a non-driver who is confused as to his right and left. There is, however, a very simple way to set the TX / RX clarifier on the older rigs, which is never



tained with the clarifier control central, and with the rig set to TX, or RX, and with the clarifier in or out.

It might sound complicated, but in practice, once one has the equipment set up, the whole alignment job can be done in less than 60 seconds.

would take the trouble to fit an in-line fuse! Look at Fig 2. The Datong is fed from the 12 volt supply by a 3.5mm jack plug. Try to disconnect this while the power is still on, and you have a dead short as the tip of the plug touches the outside of the jack socket. The microphone socket of

some years, and so he decided to fit a new one. He managed to obtain a switch, and proceeded to remove the old one. Somewhere in the proceedings, he lost the paper he had drawn the connections on, and after much trial and error, and attempts to wire up the new switch, he gave up

All in a Day's Work

in the workshop with more tips for fixing rig problems

mentioned in the service manuals.

Non-digital transceivers have a variable frequency oscillator (VFO) which usually tunes over a range of about 550kHz, somewhere in the region of 5 to 10MHz. The way to get the transmit / receive and clarifier on / off frequencies to coincide is to listen directly to the VFO on a separate receiver. With the FT-101 for instance I tune the VFO to about half-scale, and attach a short length of insulated lead to the antenna socket of an adjacent SSB short-wave receiver. I then run this insulated lead near to the VFO out socket on the rear of the rig. If I then tune around 9MHz I can receive the VFO and 'zero beat' it on the receiver. Switching between TX and RX, and switching the clarifier in and out on the rig, results in a change of beat note if the frequency of the VFO changes. It is then only necessary to adjust the pre-set clarifier and TX / RX frequency-setting 'pots', until zero beat is ob-

use a fuse!

Andrew rather liked his Icom IC-735 but, like us all, he always wanted just that little extra punch. He hadn't got the room for a bigger antenna system, and felt that perhaps a big linear would be pushing his luck with the neighbours, so he settled on a speech processor. Everyone he asked recommended the Datong, and so he followed suit and started to get some very good results, until one day he found that his mic would not key up his rig. He tried with and without the processor, but to no avail, and so soon he was standing at the other side of my counter. "It couldn't be anything to do with the processor, could it?", he said. But it was.

This is a classic fault with several Icom rigs, if the microphone input is short circuited to the DC supply. It sometimes happens when someone has been wiring up a packet unit, but most of all after use of the excellent Datong speech processor. If only people

the IC-735 is connected to the main circuit board by a thin ribbon cable, and several RF chokes. In Andrew's case neither the chokes or the ribbon cable liked the idea of carrying 20 amps, and so had fused, leaving behind a melted mess, and taking current down to chassis all the wrong ways.

All equipment fed from a high current DC supply should be fitted with an in-line fuse. I tend to 'push' in-line fuse holders, and strongly recommend that they are always used, but some people just have to learn the expensive way. Sorting out the damage that occurs when high-power DC goes in the wrong way can be very expensive, and Andrew is now over £100 wiser. I'm not complaining though: it's people who will not fit a fuse that keep me in work!

noisy mode switch

The mode switch on Dick's receiver had been intermittent for

and brought the receiver to me. Fortunately, I just happened to have a second-hand unit in to copy from, and so all was well.

When he was collecting the repaired receiver, I asked him why he had started to replace the switch in the first place, and was told he had done this, "Because the switch is a sealed unit and you can't clean it."

Quite a few early Yaesu units use the same kind of switch as the FRG-7700, and it does look to be sealed. Further inspection shows that on the back of the switch is a flat plate held in place by two rivets. Get a sharp knife under the edge of this plate, and it is just possible to lift it ever so slightly, just sufficient to squirt WD40 under the edge. I have cleaned dozens of FRG-7700 mode switches this way, and have never had to replace a noisy one yet. Dick had made hard work out of a very simple job.

More from Harry's workshop next month.

Everything for the VHF Enthusiasts

THE VHF/UHF HANDBOOK

*Edited by Dick Biddulph,
G8DPS*

This successor to the VHF/UHF Manual is the essential guide to the theory and practice of amateur radio reception and transmission on the VHF and UHF bands. It gives the reader the background to such essential topics as antennas, EMC, propagation, etc. together with constructional details of many items of equipment. As most amateurs today use commercial transceivers, the emphasis is on accessories and add-ons which are relatively simple to build.

*317 pages; hundreds of illustrations and photos;
272 x 199mm.*

**Ring Julia on 01707 660888
to place your order**

£18.80 (+P&P)



RSGB, Lambda House,
Cranborne Road, Potters Bar,
Herts EN6 3JE ☎ 01707 659015
<http://www.rsgb.org>

EDITED BY DICK

**If you work
the VHF/UHF
bands this is the
book for you -
order your copy
TODAY!**

VHF/UHF
HANDBOOK

Chapters included:

Introduction to VHF/UHF	Dave Stockton, GM4ZNX
Getting Started	Dick Pascoe, G0BPS
Propagation	Ray Flavell, G3LTP
Receivers, transmitters and transceivers	Mike Wooding, G6IQM Steve Thompson, G8GSQ Geoff Pike, G10GDP
Antennas & transmission lines	Peter Swallow, G8EZE
EMC	Dave Lauder, G0SNO
Data Modes	Chris Lorek, G4HCL
Amateur television	Brian Kelly, GW6BWX
Satellite communications	Ron Broadbent, G3AAJ
Repeaters	Geoff Dover, G4AFJ
Test equipment, methods & accessories	Clive Smith, G4FZH
General data	Dick Biddulph, G8DPS
Fitting coaxial connectors	Roger Blackwell, G4PMK

The average Radio Amateur may be forgiven for thinking that there is some sort of competition between manufacturers to make the smallest pieces of equipment. On HF, first came the Kenwood TS-50S then, not so long after, came the even-smaller Icom IC-706. VHF and UHF handhelds have been getting smaller and smaller since the first 'bricks' hit the market around 20 or so years ago.

Back in 1996, the Japanese firm Standard brought out a tiny 70cm FM 'handy', the C408. Now, the Hora C-408 has come along, and it doesn't require a degree in forensic science to spot that the Hora C-408 and the Standard C408 are not entirely dissimilar. They are very similar indeed - almost identical in fact. Made in Taiwan, the Hora C-408 is literally a 'Chinese copy' of the Standard transceiver.

There is one big difference between the two models, though. The Standard retails for around

£180, whereas the Hora C-408 is being sold for just under *half* that amount, making it not only 'probably' one of the smallest Amateur Radio transceivers in the world, but one of the cheapest too.

So, what do you get for your money?

first impressions

It comes in a colourful little cardboard box about the size of a paperback book, and weighing not a lot more. My first impression was one of disbelief - there can't be an Amateur Radio transceiver in there, can there?

Sure enough, there was of course. At 58 x 80 x 25mm, the C-408 is around the size of a credit card, and weighs in at just 130g. On top is a 7cm-long helical ('rubber duck' type) antenna. At about one-tenth of a wavelength this is very short, even for the 70cm band.

The rig has a small rotary channel knob on the top panel,

full-featured 70cm handheld transceiver, apart from its low power output. The 230mW output is typical of the 'low power' setting on a traditional 70cm handheld. The C-408 provides digital frequency readout, VFO and 20 memory channels, scanning facilities, CTCSS tone access, programmable repeater shift, battery save mode, priority or 'Call' channel, dual watch etc.

The set comes programmed for (presumably) the Japanese market, so UK users will need to change the repeater shift to +1.6MHz and VFO tuning steps to 25kHz. The VFO can be user-programmed to tune in 5, 10, 12.5, 20, 25 or 50kHz steps; useful for when 12.5kHz channel spacing becomes more widespread here, or when using the rig abroad.

Six of the seven push buttons on the front panel have only one or two functions. For example, pushing 'Call' switches you to your pre-programmed priority channel,



Hora C-408 70cm Handheld

Ham Radio Today's new Staff Editor, Steve Tenius-Lowe, G4JVG,



as well as 3.5 and 2.5mm jack sockets for an external speaker / mic, packet TNC, or an earphone for listening in noisy surroundings. On one side of the case is a rotary volume control, with a rubberised press-to-talk switch on the other. On the front panel there is an LCD for the frequency readout, a circular grill the size of a 2p coin behind which sits the loudspeaker, a hole literally the size of a pinprick behind which is the electret condenser microphone, and finally seven tiny push buttons which control most of the rig's functions.

The Hora is operated from a pair of AA-sized batteries, either two 'penlight' torch type dry cell batteries, or nicads. The rig will operate over a voltage range from 2.2 to 3.5V. The 'rated' supply voltage is 3.0V, meaning that at this voltage it will give the rated 230mW output power.

features

Despite its size and simple appearance, the Hora C-408 is a

such as your local repeater frequency or favourite simplex channel. 'Lamp' switches on and off a backlight for the LCD display so you can use your rig in the dark, whereas 'SC' starts and stops the scan facility. The seventh button, labelled 'Set', controls the operating parameters for no fewer than 23 different operating functions.

Repeated pushing of the 'Set' button cycles through all 23 functions, which include turning on and off the repeater mode or writing to the memory channel. Turning the VFO knob whilst in 'Set' mode changes the parameters for these functions. Like most things, writing about it makes it sound more complicated than it really is. Whilst it's necessary to have the Owner's Manual at your side in order to remember what the alphanumeric display represents when in 'Set' mode, after a while its use becomes second nature.

There are a number of different scan modes. When in 'VFO' (as opposed to 'Memory') mode,

you can scan either a 1MHz increment or between any two programmed frequencies. In 'memory' mode you can scan either all the memory channels, or selected memory channels. The scan can be set to 'pause' mode, where it carries on scanning five seconds after finding an active channel, or 'busy' mode, where it halts on an active channel until the received signal disappears.

in use

It was immediately apparent that the C-408 incorporates a very sensitive receiver. Even when using just the 7cm long helical set-top antenna, the GB3VH repeater at Welwyn on 433.325MHz provided a fully-quieting signal, from a very low location in Stevenage, some 10km north of the repeater, to Potters Bar, 12km south. Certainly, the C-408 was receiving at least as well as, if not better than, other 70cm transceivers used - both handhelds and base station units.

In common with a number of Far Eastern rigs these days, there is no 1750Hz toneburst built in. This is because most countries these days use CTCSS sub-audible tones, rather than 1750Hz tone bursts, to access repeaters, and so tone burst units tend only to be fitted to units specifically manufactured for the UK market. More and more UK repeaters are now being fitted with CTCSS tone access, but for those which are not, repeater access using the Hora C-408 must be by the old method of whistling at 1750Hz. Fine for those with perfect pitch, but otherwise a little hit and miss.

I took the Hora C-408 out in the car and communicated back home to my wife, Eva, 2E1FHJ, over a distance of a few hundred metres, before signals became too 'scratchy' to be readable. Even this relatively short distance is quite remarkable, considering that Eva was using an identical rig, so the power level was about 200mW each way, the antennas

specification

(Abridged from the Hora C-408 Owner's Manual)

general

Frequency range	430.0 - 439.995MHz
Transmission type	F3
Operating voltage range	2.2 - 3.5V
Rated voltage	3.0V
Main body dimensions	58.0H x 80.0 x 25.0Dmm
Weight (including dry batteries and antenna)	Approx 130g

current consumption

At transmission (at 3.0V)	Approx 230mA
At reception standby	Approx 30mA
At battery save	Approx 0.5mA
At auto power off (APO)	Approx 80µA

receiver

Double superheterodyne	
1st IF	23.05MHz
2nd IF	450kHz
Receiver sensitivity (12dB SINAD)	-10dB
S/N at input of 1µV	30dB or more
Squelch opening sensitivity	-14dB (0.1µV)
Audio output (at 8 ohms, 10% distortion)	Approx 80mW

transmitter

Output	Approx 230mW
Max frequency deviation	±5kHz
Spurious output	-60dB or more
Microphone	Built-in electret condenser

times distant stations will call into your local repeater during such 'lift' conditions, and this has given many a Novice their first taste of working DX, even if it is only

squelch threshold to 'low' lessened the distraction of the squelch opening and closing.

On transmit, 230mA is drawn from the batteries, and so a typi-

cheap supermarket batteries will last a good long time, thanks to the set's excellent battery-saving modes.

It would be ideal, too, for a sec-



Hora C-408 70cm Handheld

reviews this small, but beautifully-formed, transceiver

are so small and therefore inefficient, mine was *inside* a car (stationary, of course) and hers inside the house, and that our house is in about the worst UHF location in southeast England, being at the bottom of a valley surrounded by hills on all sides! So the range of a Hora C-408 to another Hora C-408 is from a minimum of a couple of hundred metres up to probably a kilometre or so, for stations well-sited at both ends.

Although the range of a Hora C-408 to an identical transceiver may only be a few hundred metres, the range of a Hora to a well-equipped base station would be many times this. If you're lucky enough to have a 70cm repeater within range, you could of course work several tens of kilometres via the repeater. During a 'lift' (enhanced tropospheric propagation usually experienced during periods of atmospheric high pressure, often in spring and autumn) it should be possible to work more distant stations still. (Some-

through a local repeater.)

The excellent receive sensitivity of the C-408, however, did mean that it was possible to receive stations - sometimes at quite good strength - who could not hear me at all. This, of course, is the disadvantage of having only 230mW of transmit power available.

There is no rotary squelch knob on the C-408. Instead, the Hora has a preset 'Auto Squelch', the level of which can be set to a high or low threshold (this is one of the 23 parameters controlled using the 'Set' mode). The default was set at 'high', and although this wasn't a problem when operating the rig at home, whilst using it out portable and mobile I found that weakish signals were dropping out rather too often. Here, the 'Moni' button on the front panel was useful. It opens the squelch and means that you can check when a signal - too weak to open the squelch but still just audible - stops transmitting. Adjusting the

cal pair of nicads would allow about 12 hours of operation, assuming an average transmit to receive ratio. In 'standby' mode (receiving but with no signal present) the C-408 takes just 30mA current, and only 0.5mA in 'battery save' mode on a quiet channel. The selectable APO (Auto Power Off) mode stops you from flattening your batteries if you forget to switch the set off when you're not using it.

The reports received on transmitted audio were very good. On receive, the audio output was perfectly sufficient in most circumstances. If operating the C-408 in a noisy location, such as a mobile rally, an earphone would probably be necessary though.

conclusions

The Hora C-408 is the ideal rig for the amateur who is out and about a lot. It is so small and light that you can take it anywhere with you and - providing you don't do too much talking - even a pair of

ond amateur in a family to keep in contact with home when walking around town. If your partner is a Radio Amateur, a pair of C-408s would make it easy to keep in touch at rallies, and they could even make it fun doing the weekly shopping at the local supermarket!

The performance of the C-408 matches that of much larger handhelds, apart from the lower transmit power. The range could be extended, especially when operating the rig from home, by using an antenna with more gain, such as a collinear (the antenna socket on the C-408 is an SMA-type).

Best of all is the price. At £89.95 and *free* P&P, the Hora C-408 is superb value for money.

Thanks to Lowe Electronics Ltd (no relation), Chesterfield Road, Matlock, Derbyshire DE4 5LE (tel: 01629 580800) for the loan of the C-408 for review. Now turn to page 8, where you can learn how to win a C-408!

Do you have something constructive to say on the state of amateur radio today? Perhaps you'd like to put your viewpoint to the readers, get some discussion going, or give an answer to one of the issues raised? We'll pay £10 for the best letter we publish each month (paid 6-8 weeks following the publication date). So write in with your views to; letters Column, ham radio today, Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JE. We reserve the right to edit letters for length, grammar and clarity for publication. Letters must be original and not have been sent to any other magazines, and must include name and address plus callsign if held (name and callsign will be withheld from publication if requested). Reader's views published here are not necessarily those of the magazine.

letter of the month letter of the month letter of the month

Dear HRT,

I am writing to you about the magazine with thanks for having a great free readers' ads column, as I have just found a scanner at a bargain price. If it wasn't for a highly dedicated team producing a high standard magazine for the radio amateur, in my opinion it would be hard to find information on ham radio and conversions and information on new and second hand goods.

Thanks for your time, and wish all the team a happy new year.

Yours, D J Simmons

Editorial comment:

Thanks for your comments, Mr Simmons, and we're pleased you picked up such a bargain thanks to HRT. Interestingly, although everyone complains about the price of amateur radio equipment, in real terms - eg the number of days work required to pay for a transceiver - equipment has never been cheaper. Back in the late 1970s, the Editor bought a second hand, several year old, KW2000B for £200. Several-year old, working, second-hand transceivers are still available for little more than that amount today. And back in the late '70s, £200 was a lot of money!

letters letters letters

10 for letter of the month

Dear HRT,

I read with some disquiet the letter in your 'Letters' page of volume 16/2 from a Mr Graham Rogers. In his letter he bemoaned the constructional articles in your magazine. He states, "The sooner we see an end to home constructional features in *HRT* the more space we can devote to getting youngsters involved in our hobby."

I was horrified to see this statement. I presume that Mr Rogers can afford all the transceivers he wishes to use; most youngsters who wish to gain access to our hobby do not. Most are studying in one form or another, or are in the low-income bracket that precludes what are seen as expensive hobbies such as ours.

What cheaper or simpler way is there to get on to the amateur bands than a circuit built from a magazine with components gathered yourself?

Keep up the many and varied constructional articles, after all the hobby is supposed to be about self-training, and what better way than to build something?

Cllr R A (Dick) Pascoe, G0BPS

Dear HRT,

I wish to raise the subject of amateur radio logkeeping, my question being "Why do we have to do it?"

Other radio related services, ie the fire brigade and mini cabs, don't have to do it. Neither do yachtsmen and CB operators, so why do we?

As I see it, logkeeping is a hangover from the days when anyone who owned a radio transmitter was a potential spy, and the government wanted to keep a careful eye on them. With everyone and his dog now owning a mobile phone, how can this arcane practice be justified?

Norman Greenwell

Editorial comment:

I believe that in the USA it is no longer necessary to keep an amateur station log - although it seems that, except when operating mobile, most US amateurs do nevertheless still keep a logbook for their own use. If an interference complaint is received a couple of weeks after the event, keeping a logbook may sometimes be one way to prove your innocence.

"TONE" BURST

by GMBMEN



I'll check it out.



Dear HRT,

Like the greater number of amateurs, I am also a motorist and I enjoy the odd trip or two to practice my mobile comms skills, as first learned in the Royal Corps of Signals. My biggest bugbear, as both a motorist and a licensed amateur, is the probable failure of the electrical system in the car, either at the start of the trip or during a prolonged QSO at some

and to retain even a small charge. The result is that your maintenance free battery has to be replaced.

On the other hand, if you've ignored the idiotic maintenance free idea, you'll have kept the battery topped up with distilled water as well as re-charging the battery every month or so, and the battery's life will be trebled. Yes, trebled. I have one on my present car, a diesel, the battery was bought and

letters letters letters

10 for letter of the month

scenic static location.

From the age of 17 years I have held a full UK driving licence, as well as an HGV, which I obtained in the army. For most of my motoring life, the vehicles that I have driven have been 6, 12 or 24 volts systems. The batteries have always, up to about 20 years ago, been of the type that has to be maintained on a daily basis. The first time that I bought a maintenance free battery, it was in 1977, I fitted it to my 3-litre Ford Capri, prior to a trip to Rhyl. 24 hours later the battery was dead and would not hold a charge. I received no help from the garage that had supplied and fitted the battery, and as for the makers, well that was almost as bad, as they insisted that there could not possibly be a fault with their product. So, as I was a fully paid-up member of the AA I called them in, to carry out an inspection. They backed up my statement on how faulty the battery was, and even after the AA man had removed the seal, found the cells completely dry, the makers refused to replace the battery. I sued and won. The moral of this story is: "There is no such thing as a maintenance free battery".

Now I know that there are going to be some few folks who will disagree with this statement, but the cells in every car battery are supposed to be full of a mixture of distilled water and sulphuric acid, swishing about between the metallic components of the cell, which provides the battery's charge. If the liquid, due to the heat generated during use and charging, evaporates - as it does - then a time will come when there is insufficient liquid in the cells to maintain the voltage

installed in April 1993, close to five years ago. On average I top the battery up with 25 to 40 millilitres of water per cell each and every week, and once every three months I re-charge the battery (trickle charge over 48 hours) and the battery is as clean and as healthy as I could wish it to be.

During the nine and a half years that I spent in the Royal Corps of Signals, as a Driver Radio Operator, I was responsible for both the maintenance and upkeep of the vehicle and radio batteries, both during exercises and back in camp. So I do know just how close to being impossible it is to claim that any battery is even partially maintenance free. To my mind, as I am sure it is or it should be to yours, maintenance free batteries are just another of those jokes perpetrated on the motorists whereby the makers of vehicle accessories make more money than is really necessary.

I suspect that the concept for this type of battery is based upon the fact that there are many motorists who are completely incapable of simple maintenance of their vehicles. Why should this be, when each and every one of them has to be able to read, in order to pass a driving test? If one can read, in order to pass the driving test, then one can and should be able to read the step-by-step daily, weekly, and monthly routine maintenance charts for their particular car. If my mother, who is 74 years of age, can and has been doing it since the 1950s, when the Army Education Officers finally taught her to read, can carry out maintenance of her car, then anybody can, and that's a fact.

J Davies-Bolton, G4XPP

Book Browser

Ham Radio Today's great new service to readers. You can order by e-mail, phone, fax or the good old postal service. See below for details.

Radio Communication Handbook

edited by Dick Biddulph, G8DPS

A comprehensive guide to the theory and practice of Amateur Radio communication. If you're into Amateur Radio, this is the book to buy!

6th Edn, 763 pages

£21.00 (plus P&P)

PMR Conversion Handbook

by Chris Lorek, G4HCL

Private mobile radio (PMR) equipment rapidly appears on the surplus market and can be acquired very cheaply at rallies. Often it can be converted to amateur bands quite easily and without expensive test equipment. This book tells you what to buy and how to convert it.

1st Edn, 192 pages

£15.28 (plus P&P)

VHF / UHF Handbook

edited by Dick Biddulph, G8DPS

Guide to the theory and practice of Amateur Radio reception and transmission on the VHF / UHF bands including antennas, EMC, propagation, receivers and transmitters, together with constructional details of many items of equipment. One of the most complete guides around for VHF / UHF operators. See the review in *Ham Radio Today* December 1997!

317 pages

£18.80 (Plus P&P)

VHF / UHF DX Book

edited by Ian White, G3SEK

VHF / UHF DX is one of the growing points where Amateur Radio shows that it still has a real future - and that's what this book is all about.

1st Edn, 447 pages

£18.00 (plus P&P)

Amateur Radio Operating Manual

edited by Ray Eckersley, G4FTJ

This book covers the essential operating techniques required for most aspects of Amateur Radio, taking the reader from the principles of basic contacts right through to the secrets of working DX and winning contests.

4th Edn, 249 pages

£12.23 (plus P&P)

IOTA Directory and Yearbook

edited by Roger Balister, G3KMA

The explosion in 'IOTA' (Islands on the Air) activity in recent years has been enormous. If you're on HF, you'll want to be part of it. The IOTA Directory gives you a complete listing of all the islands which 'count', and lots of articles about activating islands. Even includes a £5 discount voucher off new RSGB membership, so it's got to be good value! Don't be left out: become an IOTA operator today! 96 pages

£8.47 (plus P&P)

RSGB Yearbook - 1998

edited by Brett Rider, G4FLQ

Formerly known as the RSGB Callbook, the Yearbook has been enhanced to include a wealth of information for all Radio Amateurs. Includes all UK and Republic of Ireland callsign listings, plus over 120 information pages. Reviewed in *Ham Radio Today* December 1997.

1998 Edn, 517 pages

£13.95 (plus P&P)

Passport to World Band Radio

edited by Lawrence Magne

How to find hundreds of programmes you won't find on ordinary radio or TV, from the BBC's incomparable reporting to music from the South Seas. Passport to World Band Radio covers it all - what's on, what to buy, how to get started, and how to get the most from your listening.

1998 Edn, 560 pages

£14.99 (plus P&P)

World Radio & TV Handbook

edited by Andrew Sennitt

The comprehensive guide to broadcasting, including domestic and international radio listings, web sites, e-mail addresses, frequency listings, English broadcasts, 1998 survey of shortwave receivers and accessories, worldwide TV station addresses and contacts.

1998 Edn, 608 pages

£22.94 (plus P&P)

Radio Logbook - Receiving

Spiral bound 100 pages

£3.67 (plus P&P)

Radio Logbook - Transmitting

Spiral bound 100 pages

£3.67 (plus P&P)

Your First Amateur Station

by Colin Redwood, G6MXL

How to set up a station and get on the air as cheaply and effectively as possible. It covers all bands, with special emphasis on VHF / UHF. A 'must' for everyone who has just passed the RAE or NRAE. (See the review in *Ham Radio Today* December 1997!)

1st Edn, 124 pages

£5.85 (plus P&P)

Your First Packet Station

by Steve Jelly, G0WSJ

How to set up a basic packet radio station and enter the world of data communications from your shack. Explanations are kept as simple and non-technical as possible, making this book an ideal choice for the beginner.

1st Edn, 76 pages

£5.74 (plus P&P)

The Antenna Experimenter's Guide

by Peter Dodd, G3LDO

Take the guesswork out of adjusting any antenna, home-made or commercial, and make sure it's working with maximum efficiency. An invaluable companion for everyone who wishes to get the best results from their antennas.

2nd Edn, 160 pages

£15.00 (plus P&P)

Practical Wire Antennas

by John Hey, G3BDQ

A 'down to earth' guide to the construction of many different types of wire antennas, ranging from simple dipoles to ingenious multi-wire systems. Boring and unnecessary theory is kept to a minimum - instead the author shares his years of experience, offering advice for beginners and enthusiasts alike.

1st Edn, 96 pages

£8.92 (plus P&P)

Practical Receivers for Beginners

by John Case, GW4HWR

Contains a selection of easy-to-build receiver designs suitable for amateur bands, together with simple 'fun' projects and test equipment. The theory and practice of receiving techniques is outlined to help with understanding the circuits presented. This book is of value to anyone who is building receivers for the first time, or who is considering moving up to microwaves.

1st Edn, 165 pages

£12.50 (plus P&P)

to order

post: Ham Radio Today, RSGB Sales, Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JE.

tel: 01707 659015

fax: 01707 645105

e-mail: hrt.sales@rsgb.org.uk

Internet: www.rsgb.org/books/bookmenu.htm

postage and packing

UK: For one item £1.25, two items or more £2.50. Delivery by Parcel Force (7 - 10 working days). For next day service (on orders received before 12 noon): £4.85.

OVERSEAS - For one item £2, two items £4. Extra books over two items, an additional 50p per book. Delivery by surface mail. Air mail rates available on request.

NB: all prices include VAT (where applicable) and are subject to change without notice.

Many amateurs are now within the coverage range of a 6m repeater in the UK and Europe, and a number are already happily having QSOs from home and whilst mobile. But what about handheld use? There's not much around at the moment, but having a 6m handheld by your side lets you catch that extra activity, possibly even the occasional 6m 'opening' to distant parts of the globe.

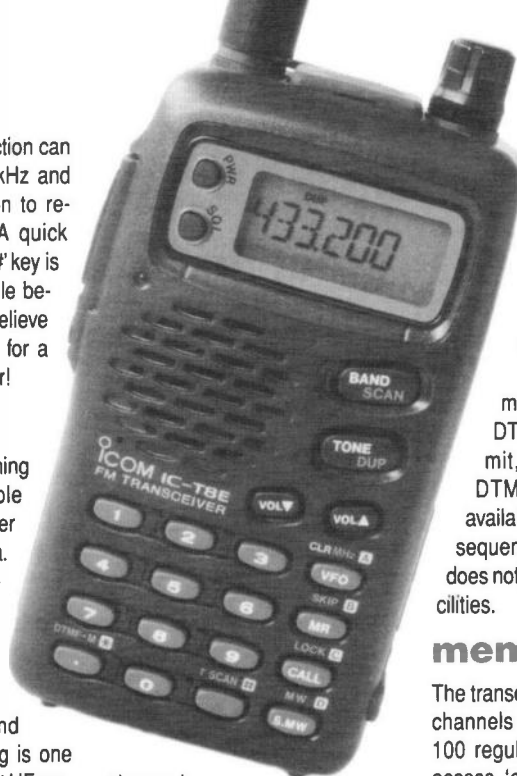
I tested the predecessor to this set, the 2m / 70cm Icom IC-T7E handheld, in the May 1996 issue of *Ham Radio Today*, yet Icom have now managed to squeeze in a 6m transceiver into a similar case size. Not only that, but with ongoing improvements in battery technology the Nickel-Metal Hydride battery supplied with the IC-T8E has made the overall set even smaller and lighter.

I fondly remember using Icom's earlier three-band handheld, around five years ago (before 6m repeaters appeared in Europe) -

T8E's 2m transmitter section can be switched between 5kHz and 2.5kHz speech deviation to respectively suit these. A quick press of the front panel '#' key is all that's needed to toggle between the two. Now I believe that's another 'first ever' for a handheld FM transceiver!

antenna

What must be the first thing that strikes most people about the set is the rather unusual set-top antenna. There's a very good reason for this. At 6m, a full-length quarter-wave would be 1.5m long, so it must be shortened somehow for easy handheld use. Bottom-loading is one option, but if you ask most HF mobile operators they'll tell you that centre-loading an otherwise lengthy mobile whip, or more preferably top-loading it, will give the best efficiency in a reduced length. The same goes for a small



handy if you want to know which CTCSS tone a repeater you are receiving needs, or indeed if there's a CTCSS tone present on its transmission.

The front panel numeric keypad acts as a DTMF encoder on transmit, and there are nine DTMF encode memories available for storage of tone sequences, although the set does not have DTMF decode facilities.

memories

The transceiver has 123 memory channels in total, consisting of 100 regular channels, a quick-access 'call' channel for each band, and 10 pairs of scan edge channels for searching. Apart from the call channels, the memories aren't grouped according to the band, so you can program whatever band frequency you

through the bands, one by one, and you can use the top panel knob to tune around each of the band frequencies as you wish. The front panel keypad can also be used for direct frequency entry.

Icom IC-T8E Review

Chris Lorek, G4HCL, tests the world's first ever

this being the Icom Delta-1E which covered 2m, 70cm and 23cm. It was almost as thick as a brick, but still remarkable at the time, technology certainly changes!

coverage

The IC-T8E covers 50 - 52MHz, 144 - 146MHz and 430 - 440MHz, all in the same box. As well as amateur band coverage, it also offers wideband receive, including VHF airband, Band II broadcast band on wideband FM, together with 300MHz and 800MHz receive ranges, the 300MHz range having switchable AM / FM receive. Due to its size, it's a 'one-band at a time' transceiver; unlike some dual banders you can't operate cross-band duplex, nor monitor more than one frequency or band at a time. Even so, the set does have plenty of scanning facilities to make sure you miss very little!

With many European repeaters now changing from 25kHz to 12.5kHz channel spacing, the IC-

handheld whip, and the best use of available length has been made on the IC-T8E with a loading coil 'bulge' at the top section of the whip.

Unusually for an antenna of this size, a small SMA coaxial connector is used, although this is similar to many recent small handhelds launched by Japanese manufacturers.

controls

Like many new handhelds, the transceiver doesn't have any 'analogue' rotary controls. Up / down buttons on the front panel are used for volume adjustment, even the on / off switch is an electronic button rather than a mechanical switch. There is, however, a click-step rotary control on the top panel, which is used after another button push for squelch setting again in preset steps, for channel and frequency change, and various 'set' operations for changing the default parameters of the set. A larger 'band' button next to the LCD panel cycles

tone signalling

The transceiver has CTCSS (sub-tone) encode and decode fitted as standard, which can be used for repeater access as well as for quiet monitoring of a given channel. The front panel 'tone' key cycles through encode, encode and decode modes, plus a 'pocket bell' function where the set will bleep at you when the squelch raises with the correct sub-tone present on the received signal. Pressing this button when you're transmitting will send a 1750Hz tone, for an alternative means of repeater access on 2m and 70cm. With many repeaters now also having sub-tone access facilities, a one-second press of the front panel 'Tone Scan' key usefully places the receiver into a sub-tone decode mode. Here it will step through each CTCSS tone frequency and display the tone, if any, present on a transmission being received on the tuned channel. This facility can be very

wish into any memory channel. Each channel can store the operating frequency together with any programmed repeater offset, together with the sub-tone frequency and tone encode or encode / decode function, and memory 'skip' on / off. You can also use an optional cloning lead and PC software not only to program the memories, but also to add a short alphanumeric tag to each memory channel in place of the frequency display with a push of the 'MR' key.

scanning

Keeping the 'Band' button pressed for more than a second puts the receiver into VFO scan mode. You can select a full scan of the 6m, 2m or 70cm band, the Wide FM broadcast band, the AM airband, or any one of the 10 available user-programmed bands, after you have stored your choice of lower and upper scan limit frequencies into these.

Memory channel scan is of course also available. Here, a

press of the 'MR' button for more than a second gives you the choice of scanning either all the programmed memory channels that you haven't entered a 'skip' mode into, or just the 6m, or 2m, or 70cm, or WFM, or airband programmed memory channels. In each case the scan halts when the receiver squelch raises, and resumes either two seconds after the signal drops, or for a maximum of ten seconds on each busy frequency before resuming.

The receiver squelch can be preset, using the squelch button in combination with the top panel knob, to one of ten preset steps, these being fully open, an 'Auto' level, or further levels of 1 - 8. In duplex mode pressing the 'SQL' button opens the squelch and switches the receiver to the input frequency.

power

A BP-199 6V 700mAh battery pack is supplied with the set, and using this the transmitter puts out about 2W on each band, with a

the set's battery pack was charging up. But I quickly overcame my hesitation to switch the set on and have a listen on the air - as the charger also acts as a nice power supply, at least for receive, whilst it is simultaneously charging the battery pack. Using the set-top whip inside my shack, the receiver pulled in my local 70cm repeater well, as well as my two semi-local 2m repeaters, although (maybe not surprisingly) I heard nothing on 6m.

Out portable, the set worked well on both 2m and 70cm, less so on 6m with rather poor signals when chatting back to my home station. (That's just one benefit of having a wife with a licence: she's always willing to help me with reviews!)

After hunting out a suitable SMA to BNC adapter, I connected my rooftop antenna system to try DXing a little further afield. The 6m side really did 'open up' here, and I managed a number of simplex contacts on this band, achieving the range I had typically

which I found I could do on loud speech peaks. Even so, a quick test with the 1750Hz toneburst didn't trip the repeater's over-deviation indicator.

The set worked very well on both 2m and 70cm in most areas, although a trip into my nearby city centre did prove rather trying due to strong-signal breakthrough on 2m from out-of-band signals.

The 2m receive side I felt was just about acceptable for 12.5kHz channel spacing operation. In my area my local packet BBS operates 12.5kHz away from my local node, and I found the receiver squelch would normally open whenever either station was

harmonics. The 6m deviation was somewhat on the high side, as I'd found on the air, although I'm told by Icom UK that this can be internally adjusted separately from the 2m and 70cm deviations.

laboratory results next page

conclusions

Icom I believe should be commended in bringing out what must be the world's first amateur 6m / 2m / 70cm portable transceiver. Not only that, it has easily switchable deviation on transmit to suit either 12.5kHz or 25kHz channel spacing on 2m. In use as a portable set, the transceiver worked very well on air, both on transmit and receive. I'd be tempted to adjust the 6m deviation, reducing this to suit current usage. The IC-T8E is compact, very portable, and with the growing number of 6m repeaters complementing our national network of 2m and 70cm repeaters, I'm sure this new addition to Icom's portable range is

Note the curious 'bulge' at the top of the IC-T8E's antenna. This is the 6m top loading coil (see text).

Icom IC-T8E Review

6m / 2m / 70cm handheld transceiver

switchable low-power setting of around 500mW on each band.

An overnight plug-in wall charger is also supplied for charging the battery, which plugs into the side-mounted external power socket. Connecting an external 12V DC supply here also charges the battery, as well as usefully boosting the maximum transmit power level to around 5W on each band. The set will operate from any external voltage in the range 4.5V to 16V.

A pod-type fast charger is available as an option, as is a BP-200 9.6V 680mAh battery pack, which boosts the portable transmit power up to 4.5W.

The transceiver measures 106W x 58H x 28.5Dmm and weighs around 310g.

on the air

The IC-T8E comes supplied with a well-written 35-page user instruction book, although this had no circuit diagram or internal adjustment information, so I sat down to have an initial read whilst

come to expect from my location on FM. I managed a number of 6m contacts, all with good audio reports although I did receive reports of quite 'loud' audio.

The set was also good on 70cm, pulling in distant signals well. On 2m it did suffer a little from very local strong paging signal breakthrough; I needed to keep the squelch turned up here to prevent the receiver continually halting in scan mode. But other handhelds I've tried have been rather worse in this respect; at least I could use the IC-T8E on 2m when I just had to give up with a number of other handhelds.

Out mobile with the IC-T8E with a 6m quarter wave whip on the car helped enormously in overcoming the limitations of the built-in short antenna on this band. I didn't have any problems accessing my nearest 6m repeater when I was within range, although I tended on the cautious side and spoke a little further away from the microphone than normal to prevent over-deviating,

transmitting. However, with more distant signals, the 12.5kHz rejection was entirely adequate.

lab tests

The receiver measured up well sensitivity-wise, with good rejection of 25kHz spaced adjacent signals. The rejection of 12.5kHz-spaced signals was also adequate for most needs. Likewise the blocking and intermodulation performance, ie the rejection of other unwanted and out of band signals.

The 'Auto' squelch setting seemed to be the most sensitive of the available levels, this coinciding with a typically easily-read signal but with some degree of noise present - other settings requiring somewhat stronger signal levels.

The transmitter gave an adequate power level on all bands, together with well-suppressed

going to prove very popular.

My thanks go to South Midlands Communications Ltd (tel: 01703 251549) for their loan of the IC-T8E for review.



all measurements taken using set powered from fully-charged battery pack as supplied, high power tx, unless otherwise stated.

receiver

sensitivity:

Input level required to give 12dB SINAD:

50.0MHz	0.15µV pd
51.0MHz	0.14µV pd
52.0MHz	0.14µV pd
144MHz	0.13µV pd
145MHz	0.13µV pd
146MHz	0.14µV pd
430MHz	0.15µV pd
435MHz	0.14µV pd
440MHz	0.14µV pd

adjacent channel selectivity:

Measured as increase in level of interfering signal, modulated with 400Hz at 1.5kHz deviation, above 12dB SINAD ref level to cause 6dB degradation in 12dB on-channel signal.

	51MHz	145MHz	435MHz
+10kHz:	3.3dB		
-10kHz:	3.5dB		
+20kHz:	56.0dB		
-20kHz:	55.3dB		
+12.5kHz:	-	30.3dB	31.7dB
-12.5kHz:	-	37.9dB	34.7dB
+25kHz:	-	66.6dB	61.5dB
-25kHz:	-	62.6dB	65.2dB

intermodulation rejection:

Increase over 12dB SINAD level of two interfering signals giving identical 12dB SINAD on-channel 3rd order intermodulation product.

	51MHz	145MHz	435MHz
25 / 50kHz spacing:	61.0dB	61.3dB	64.5dB
50 / 100kHz spacing:	62.9dB	63.2dB	65.9dB

squelch sensitivity:

	51MHz	145MHz	435MHz
Auto:	0.13µV pd (11dB SINAD)	0.12µV pd (10dB SINAD)	0.14µV pd (12dB SINAD)
Minimum:	0.40µV pd (27dB SINAD)	0.24µV pd (23dB SINAD)	0.28µV pd (25dB SINAD)
Maximum:	0.81µV pd (31dB SINAD)	0.53µV pd (29dB SINAD)	0.59µV pd (30dB SINAD)

blocking:

Increase over 12dB SINAD level of interfering signal modulated with 400Hz at 1.5kHz deviation to cause 6dB degradation in 12dB SINAD on-channel signal.

	51MHz	145MHz	435MHz
+100kHz:	69.9dB	74.2dB	72.8dB
+1MHz:	78.0dB	81.9dB	78.4dB
+10MHz:	85.4dB	96.5dB	88.2dB

maximum audio output:

Measured at 1kHz on the onset of clipping, 8Ω load.

	51MHz	145MHz	435MHz
	143mW RMS	146mW RMS	146mW RMS

image rejection:

Increase in level of signal at IF image frequency, over level of on-channel signal, to give identical 12dB SINAD signal.

	51MHz	145MHz	435MHz
Half 1st IF:	87.8dB	95.4dB	101.5dB
1st IF image:	87.2dB	93.8dB	62.3dB
2nd IF image:	60.2dB	62.0dB	54.6dB

s-meter linearity:

	51MHz Sig Level	51MHz Rel Level	145MHz Sig Level	145MHz Rel Level	435MHz Sig Level	435MHz Rel Level
S1	Sq open	-	Sq open	-	Sq open	-
S3	0.87µV pd	-67dB	0.57µV pd	-60dB	0.73µV pd	-61dB
S5	1.05µV pd	-51dB	0.67µV pd	-47dB	0.94µV pd	-39dB
S7	1.32µV pd	-31dB	0.85µV pd	-26dB	1.08µV pd	-27dB
S9	1.88µV pd	0dB Ref	1.14µV pd	0dB Ref	1.48µV pd	0dB Ref
S9+	2.64µV pd	+30dB	1.75µV pd	+17dB	2.16µV pd	+33dB

transmitter

tx power:

Freq	Power
50.0MHz	High 2.15W Low 540mW
51.0MHz	High 2.07W Low 520mW
52.0MHz	High 2.00W Low 500mW
144MHz	High 1.85W Low 570mW
145MHz	High 1.87W Low 550mW
146MHz	High 1.89W Low 550mW
430MHz	High 2.10W Low 500mW
435MHz	High 1.98W Low 560mW
440MHz	High 1.85W Low 600mW

harmonics:

	51MHz	145MHz	435MHz
2nd Harmonic:	<-90dBc	-73dBc	-76dBc
3rd Harmonic:	-77dBc	-78dBc	-85dBc
4th Harmonic:	-85dBc	<-90dBc	<-90dBc
5th Harmonic:	-79dBc	-87dBc	-
6th Harmonic:	-82dBc	-85dBc	-
7th Harmonic:	<-80dBc	<-90dBc	-

toneburst deviation:

51MHz	145MHz	435MHz
3.53kHz	2.84kHz	3.58kHz

peak deviation:

51MHz	145MHz	435MHz
5.76kHz	5.19/2.11kHz	5.46kHz

frequency accuracy:

51MHz	145MHz	435MHz
+40Hz	+110Hz	+280Hz

rally of the month

The 'Rally of the Month' is the London Amateur Radio and Computer Show, which will be held at the usual venue, the Lee Valley Leisure Centre, Picketts Lock Lane, Edmonton, London N9, on **7 / 8 March**. Doors open 10.00am to 5.00pm each day.

The event features around 130 exhibitors, including Ham Radio Today, of course! Come and say hello to us on Stand W in the Red Hall!

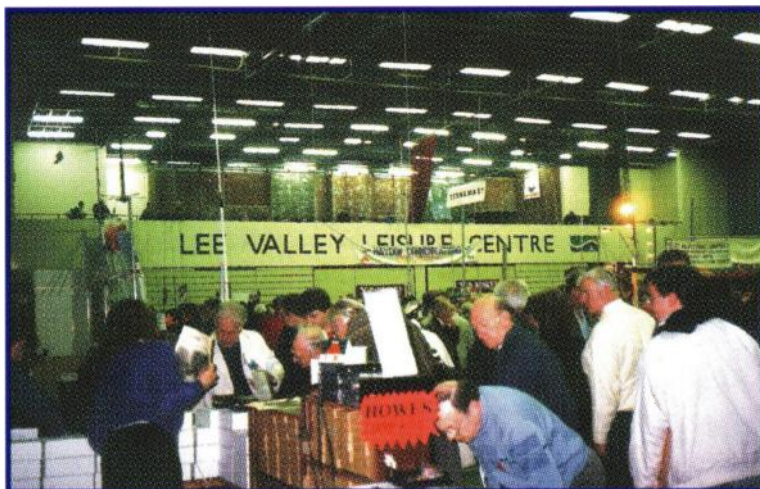
There'll also be RSGB committee, membership information and book stands, lectures, a huge bring and buy stand, stacks of second-hand radio and computer bargains, special interest groups, electronic component specialists and representatives from government agencies, and on-demand Morse tests (two photos needed).

Since its inception, the London Amateur Radio and Computer Show has established itself as one of the world's premier Amateur Radio events. Naturally most visitors come from the UK and the near continent, but often from places such as America, Japan, Malta, Canada, Eastern Europe and Russia too.

Ever mindful that the choice of going to many events exists, the organisers have worked constantly to produce an event that is not only huge, but of the highest standard. With a balanced mix of radio and computing exhibitors, visitors know they won't just be able to see all the latest equipment, but that they'll be able to buy it at the keenest price.

The venue offers disabled facilities, free parking and restaurants. Talk-in will be on 2m and 70cm. Admission: Adults £3.00, pensioners / under 14s £2.00. For further details tel: 01923 893929; fax: 01923 678770; e-mail: bookings@radiosport.co.uk

Lee Valley Leisure Centre is situated on the A1055, about 5 miles from junction 25 of the M25. Parking is extensive and free. By public transport, the W8 bus from Edmonton Green station will drop you at the door. On site there are leisure activities such as golf, swimming, a 12-screen cinema, kiddies playground, restaurants and a licensed bar.



Ham Radio this month

ham radio today events news

rallies

8 March

Wythall Rally, Birmingham. No further details received.

15 March

Norbreck Radio, Electronics & Computer Exhibition, organised by the Northern Amateur Radio Societies Association (NARSA), will be held at the Norbreck Castle Exhibition Centre, Blackpool. The organisers say it's the largest single-day exhibition in the country. For further details contact Peter Denton, G6CGF, tel: 0151 630 5790.

29 March

The Pontefract & District ARS Component Fair will be held at Carlton High School. Featuring traders (on the ground floor) and Morse tests. Tea room and bar available on the first floor. Doors open at 11.00am (10.30 for disabled visitors). Talk-in on 2m. Admission by prize programme. For further details contact Nigel, G0BPK, tel: 01977 616935 evenings, or 01977 606345 daytime (Trade bookings tel: 01977 677006); e-mail: g0bpk@aol.com; Internet: <http://members.aol.com/g0bpk/pdars.htm>

5 April

The Cambridgeshire Repeater Group annual rally, at the Bottisham Sports Centre (part of village college), Lode Road, Bottisham, near Cambridge (please note this is a *new venue*). Event features auction sale, trade stands, bring and buy stand, and car boot trading area. Admission £1. Further details from Paul Dyke, G0LUC, 41 High Street, Puckeridge, Ware, Herts SG11 1RX; tel: 01920 821536.

5 April

Cheltenham Radio Rally, traders, bring and buy stand etc. For further details contact the Cheltenham Amateur Radio Association secretary, Patricia Thom, G1NKS, on tel: 01242 241099, packet: G1NKS@GB7GLO, or e-mail: g1nks@g3nks.demon.co.uk

other events

28 February / 1 March

RSGB 7MHz DX CW Contest (1500 - 0900UTC).

7 / 8 March

RSGB 144 / 432MHz Contest (1400 - 1400UTC).

11 March

'Baird - the Man and His Television', by Ralph Barrett, G2FQS. Public lecture and demonstration at Maple Rooms, Fairfield Halls, Croydon, 7.30pm. Free entrance, coffee and sandwiches.

14 / 15 March

RSGB 61st Commonwealth Contest (10 - 80m CW, 1200 - 1200UTC).

17 March

'The Doomed Space Station' dramatic debate, with Ralph Barrett, G2FQS, 7.00pm at the Royal Institution of Great Britain, 21 Albemarle St, London W1 (see Radio Today).

21 - 23 March

British Amateur Radio Teledata Group's Spring RTTY Contest (for details see this month's *Data Connection* column.)

27 March

Ham Radio Today April publication date.

28 / 29 March

CQWPX SSB Contest (10 - 160m, 0000 - 2400UTC).

31 March

RSGB 144MHz SSB Fixed Station Cumulative Contest (1900 - 2100UTC)

To include your rally in this section, please make sure you send us details of your event in time. Please note the new address for submissions: The Editor, Ham Radio Today (Rallies), RSGB Publications, Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JE; fax: 01707 645105. We would be grateful if Ham Radio Today readers would alert their local rally organiser to this change of address. If you're travelling a long distance to attend rallies, we recommend you contact the organisers of the events first, to check if there has been any changes since this magazine went to press.

lowe electronics

Red Hall F

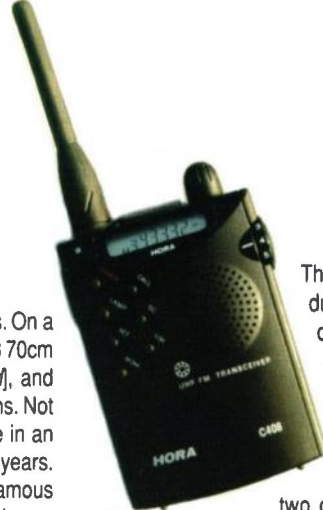
Lowe Electronics are showing several new and exciting products. On a recent visit to Taiwan, Lowe's spotted the 'super-mini' **Hora C-408** 70cm shirt pocket sized transceiver [reviewed on pages 19 / 20 - *Ed*], and have been selling these like hot cakes over the past three months. Not surprisingly, as according to Lowe's it represents the best value in an Amateur Radio transceiver that they have ever sold in the last 30 years.

They will also be launching the new 'Europa' version of the famous **Lowe HF-150** receiver, with band switched front-end filters and a re-designed RF section amongst a number of other improvements.

Also on the receiver front will be the first showing in Europe of the brand new top-line DSP receiver from **JRC**, the **NRD-545**. Using state of the art technology, this receiver represents the ultimate in performance from this world-famous manufacturer.

On display on the Lowe stand will be the new competing rigs from **Icom** and **Yaesu**, the **IC-746** and **FT-847**, both examples of the new trend to complete HF and VHF stations in one box.

The first **Lowe full-colour catalogue** was launched last autumn, and it was their intention to make this an annual event. However, the response to it has been so great that they have brought forward the new 1998 edition and will be giving it away for the first time *free* at the Picketts Lock show.



aor (uk)

Red Hall X

The AOR brand name is well-known for producing innovative designs in the field of radio receivers and accessories. The very latest addition to the range is the new portable **ARD-2 ACARS and NAVTEX decoder** and display unit. This is a self-contained unit allowing reception of

two data modes in one cabinet. It can be powered from internal batteries (4 x AA) or from an external 12V DC source. A built-in LCD provides two lines of 32 characters with a scroll-back 512 character buffer - this means that it is *not* necessary to connect a computer, although an RS-232 port is required should you wish to connect a computer for terminal operation etc. An *optional* custom Windows-based PC software package

is under development and should be available shortly.

The ARD-2 is now available and the price is £295.00 + £4.00 P&P. For further details please contact AOR (UK) Ltd, tel: 01773 880788.



Trade Topics - London Amateur R

This is what these major exhibitors will be

kenwood (uk)

Red Hall M

A new **Kenwood** model which will be launched at the Picketts Lock show - the **TM-G707E**. It's a VHF / UHF dual-band mobile transceiver which complements the existing TM-V7E but is simpler in operation, providing 'one band at a time' operation rather than full-duplex dual-receive. At just 140 x 40 x 189mm and weighing 1.2kg, the TM-G707E will fit in just about any vehicle. It provides 50W output on 2m and 35W on 70cm, with mid and low power settings of 10 and 5W for local operation.

Although the rig is as simple to operate as a car radio - simply choose a frequency and press one of the three memory keys for one second to save it - the TM-G707E has a built-in CTCSS encoder and decoder unit, enabling operation of the 38 standard CTCSS subtone frequencies. It's expected that the TM-G707E will sell for £439.95.



martin lynch & son

Red Hall R/U

Just like at Radiosport's Christmas show, Martin Lynch and his gang have secured the largest stand at the March event too. Martin was the very first retailer in the UK to place orders for the new **Yaesu FT-847** HF + 6m + 2m + 70cm transceiver [previewed on page 9 - *Ed*] with the UK distributor. Stock of this new product will naturally take pride of place on the Lynch stand, together with the new **Icom IC-746** [reviewed by Chris Lorek on page 10 - *Ed*].

Martin promises a 'showdown' between the two products, and they will both be in operation throughout the two days of the show.

In addition, the Lynch Mob will have their enormous range of Amateur Radio products including a mass of used equipment. Finance can be instantly arranged (subject to status), should anything take your fancy!

waters & stanton plc

Blue Hall W

Once again the Waters & Stanton team will have one of the largest stands at the London Show. Most of the products in their Amateur Radio catalogue will be on display on the stand in the Blue Hall.

For the first time at Picketts Lock will be **SGC's** long-awaited QRP transceiver, the **SG-2020**. With a power output adjustable between 0 and 20W PEP, the SG-2020 operates between 1.8 and 29.7MHz and has a highly competitive price tag of £599.

New from **Cushcraft** will be their **X-7** triband (10-15-20m) seven-element **Yagi**. Built without compromise to withstand all that monther nature can throw at it (remember the New Year storms?), the X-7 has 12.5 - 13dB gain and a boom length of 5.48m. It sells at £499.95.

For the first time at the London Show will be the US-made **Kachina 505 DSP** computer-controlled HF transceiver at £1995, and the popular **Kenwood TH-G71E** low-price dual-band handheld transceiver.

The latest version of the **Fairhaven** receiver covering 20kHz - 1.75GHz, selling at £798, and the latest **Garmin GPS** unit, the **GPS III**, with international mapping, at £349, will also be shown.

In addition to showing the new **Icom IC-746 HF** and **IC-T8E** triband handheld [reviewed by Chris Lorek on page 24 - Ed], Waters & Stanton hope to have the latest **Yaesu** rig, the **FT-847**, on their stand.

Waters & Stanton now distribute the **Vectronics** and **Mirage** ranges, and first stocks will be available at the show - including several new models! Various new **Watson** products will be on display, together with latest offerings from **Yaesu**, **Welz** and **Tonna**.



radio and Computer Show Special

showing at this year's London Show

nevada

Red Hall H

On the Nevada stand will be two new **Palstar** products which are being shown for the first time now at the London show. The **Palstar WM-150** is a power / SWR meter covering 1.8 to 150MHz. It can measure both average and peak power in two ranges from 300 to 3000 watts. The unit is solidly constructed and is an ideal piece of test equipment for the amateur shack. The WM-150 sells at £89.95.

The **Palstar AT-300CN** is a cross-needle compact antenna tuner using a 48-position switched toroidal inductor, with silver-plated contacts, to ensure easy matching of virtually all types of antenna. The AT-300CN sells at £139.95.

Nevada will also be showing several new **Alinco** items, including the first **Alinco DX-77 HF base station transceiver**. This 100W transceiver will sell at £699.

Nevada also hope to have the first models of the **SGC SG-2020** low-power transceiver at



the London Show. This is a small, but rugged, transceiver covering the 160 to 10m bands and is sure to be a favourite with QRP fans.

don't forget to
visit the
**Ham Radio
TODAY**
stand - **Red Hall W**



Waters & Stanton PLC

FREE-PHONE ORDER LINE

0500 73-73-88



Peter Waters G3OJV / G0PEP

Part Exchange Welcome

Download our latest second hand list from our web site



22, Main Road, Hockley, Essex. SS5 4QS

Open Mon-Sat 9.00AM - 5.30PM

New Web Site:- <http://www.waters-and-stanton.co.uk>

25th YEAR of Service to UK Amateurs

This is our 25th Year of retailing Ham Radio equipment - unmatched by any of our competitors. We shall be offering some unique deals - also unmatched by our competitors! **UK's TRUE Number One Dealer**

Read the latest Hot News on our Web

Orders: 0500 73 73 88

01702 206835

Enquiries 01702 206835

01702 204965

FAX 01702 205843

E-mail sales@wsplc.demon.co.uk



NEW

C-408
From
HORA
70cms
Handheld
Full
CTCSS



£89.95!

FREE Postage

SPECIAL OFFER PRICE

Full CTCSS; 20 memories; 1.6MHz repeater shift; Priority channel, Scanning; Dual watch; Dual mode squelch; PTT lock; 12.5/25kHz steps, 230mW output - all from just 2 x AA cells

SGC-2020 QRP HF Transceiver



NEW £599

1.8 - 30MHz

0 - 20 Watts SSB and CW with full break-in. Can run from 12 volts or internal pack. Delivery expected at the end of February

1998 Catalogue



- * Largest in Europe
- * 176 Colour Pages
- * 1000 Photographs
- * 1400 Products
- * Technical Specifications
- * News Snippets

Now established as the foremost equipment guide this edition is completely new with every page in full colour and almost every item illustrated. For the cost of a magazine you can get the best guide ever.

£2.95 plus £1 postage

WATSON

Hunter

Frequency Counter

Features:

10MHz - 3GHz

Ni-cad Pack

AC Charger

BNC Antenna

Full Instructions

£59.95

Add £2.50 Post & Ins.

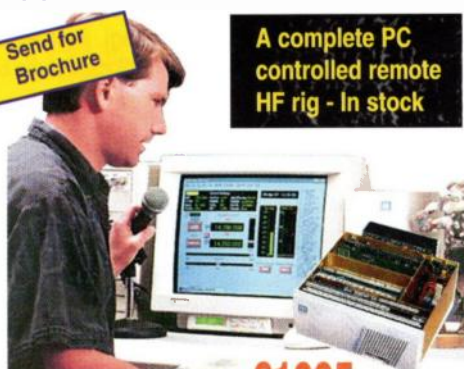


FREE frequency guide worth £12.95 on orders during Feb. & March

Check your base or handheld transceiver, or hunt out frequencies of nearby transmitters or handhelds. The "hold" button lets you lock on and store the frequency.

Kachina 505DSP HF Transceiver

Send for Brochure



A complete PC controlled remote HF rig - In stock

Main Features

100W HF All bands + Receive 100kHz - 30MHz
Filters for SSB 3.5, 2.7, 2.4, 2, 1.7kHz
Filters for CW 1kHz, 500Hz, 200Hz, 100Hz
Band Scope, DSP filter, Memory keyer, log book, VSWR meter, Smith Chart, pre-amp, 20dB attenuator, plus many software controlled functions.

£1995

YAESU
FT-8100 Dual Bander Mobile

£449



Yaesu's new dual band mobile makes the competition look old and out-dated. You get a detachable head, 300 memories, true dual same band rx, CTCSS encode and the best display in the business. This is proving to be one of the best sellers ever - particularly at Our Price!

SGC-230 Auto Wire ATU

1.8 - 30MHz

£299



Apply 12V and feed with any power up to 200 Watts for instant matching to any end fed wire - any length!! Build a true all-band long wire system to fit any garden

Alinco DX-70s TO CLEAR!!

£599



1.8 - 30MHz
100W PLUS
10W 50MHz

The last few of these rigs at a very special price. Where else could you get a 100 Watt hf rig at this price?

YAESU
FT-50R 2m/70cms Handy

£269



- * Wideband Rx (AM Airband)
- * FM Broadcast receive
- * CTCSS & 1750Hz
- * 112 Alphanumeric Memories
- * Dual Watch - Military rated
- * 5W from 12V DC input
- * Ni-cads and AC Charger

This is a very solid rig that is proving one of the most popular dual band handhelds

KENWOOD
TM-451E 70cms Mobile

Save £210!



£459 £249

A chance to purchase this top range 70cms mobile at a silly price! 35 Watts output, 41 memories and CTCSS encoder gives you all you need to enjoy mobile or base station operation. 12.5kHz/25kHz steps are featured together with a clear LCD.

ADI
AR-146 2m 50W



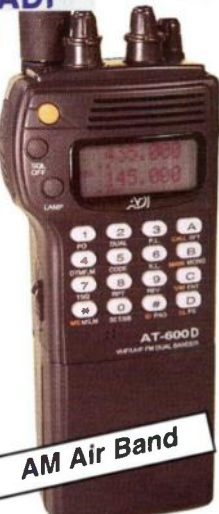
£249

FULL CTCSS

- * 3 Power levels - Wideband receive
- * 40 Memories plus call channel
- * 7 Programmable steps
- * Channel or frequency display
- * The best sensitivity in the business
- * Keypad mic and mounting kit
- * CTCSS Encode and Decode!

ADI
AT-600 Dual Bander

New Low Price £249



PW says: "an incredibly well priced radio - amazingly sensitive - audio - worked very well with 12.5kHz channel spacing - An Absolute Cracker"

- * CTCSS encode/decode
- * Full DTMF + 1750Hz tone
- * Alphanumeric memories
- * Full duplex
- * CTCSS tone reader
- * 29 programmable features
- * AM airband receiver
- * Rx up to 990MHz
- * Ni-cads and charger

ADI
AT-201 2m FM Handy

FULL CTCSS £149



- * 40 Channels
- * 5W on 12V
- * Illuminated keypad
- * Full CTCSS
- * 1750Hz tone
- * DTMF
- * Channel Reassort or
- * Frequency Readout
- * Set to Set Cloning
- * Uses AA cells

UK's Top Dealer for YAESU, KENWOOD & ICOM

World Radio History

W&S

YAESU FT-847 1.8 - 440MHz! £1600



From Your Favourite Dealer!

ICOM IC-746 1.8 - 144MHz £Phone!



PRICE MATCH

- * 100W 1.8 - 146MHz * SSB - CW - FM AM
- * Electronic keyer * Gen. cov receiver * Spectrum scope * DSP noise filter * Notch filter * IF pass band tuning.

Delivery from stock.

ICOM IC-756 HF + 50MHz £1895



PRICE MATCH

- * 100W of pure Magic
- * 160 - 6M
- * SSB - CW - AM - FM
- * Spectrum display
- * Auto ATU
- * Superb DSP built-in
- * CW Memory keyer
- * 100% duty cycle
- * Keypad entry option
- * DXers choice in the USA

KENWOOD TS-570 1.8 - 30MHz £1249



PRICE MATCH

Kenwoods new transceiver that is earning a reputation for offering one of the best receivers in the business. If you are looking for a hot little number that is not too expensive (Radio we mean!), send for brochure.

ICOM IC-207H 2m/70cm Mobile £329



PRICE MATCH

- * 2m & 70cm
- * 50W / 30W
- * Detachable head
- * Packet 9600 bps ready
- * 180 Memory channels
- * CTCSS & 1750Hz tone

KENWOOD

New TM-G707

£439



New Model

- * 144 & 430MHz 50/35W
- * Packet Ready
- * 180 Memories
- * Detachable front head
- * CTCSS & 1750Hz Tone
- * Large clear display

WATSON

W-MM1 Multimode Modem

£69.95



- * Packet, AMTOR,
- * CW, SSTV, Fax, RTTY
- * NAVTEX, SYNOP
- * Transmit and receive
- * Powered from RS-232 port

YAESU FT-920 1.8 - 54MHz £1399

- * 100W 1.8 - 50MHz * 50W 2m/70cm*
- * SSB - CW - FM - AM * CTCSS
- * Alphanumeric * 0.1Hz steps * Packet ready 1200 & 9600 * DSP filtering
- * Dual display * squelch * IF shift
- * Notch filter * Power control * Tx monitor
- * Electronic keyer * 12.5 / 25kHz switched FM filtering
- * Switchable pre-amp * Size 260 x 86 x 270mm * weight 7kg

Free Base Mic



+ Free FM board & AM Filters

- * 1.8 - 54MHz 100W * DSP filter * MOSFET PA
- * Internal ATU * Auto notch * Twin VFOs * Auto glow display * Shuttle jog * Digital voice memory
- * Electronic keyer * RS-232C converter * Quick memory bank + lots more phone or e-mail for colour leaflet

YAESU FT-1000MPDC £1999



- * 1.8 - 30MHz 100W * SSB - CW - FM - AM * Rx 100kHz
- * 30MHz * Message memory * Dual in-band rx * EDSP filter * RF processor * RF pre-amp * Electronic keyer
- * IF shift width * Collins filters * Comprehensive menu system * RS-232 interface and more - send for details

TONNA Antennas - Perform!



Balun matched excellent gain and VSWR. The favourite of the contest groups. Mount horizontal or vertical.

March Offer:

20505 5 EI 50MHz

£86.95 £79 carr. £4

Just a small selection!

2 Metres			20921	21 El. 18dB	£69.95
20804	4 El. 8dB	£44.95	23 cms		
20809	9 El. 13dB	£52.95	20623	23 El. 18dB	£51.95
20811	11 El. 14dB	£79.95	20635	35 El. 20dB	£61.95
20817	17 El. 15dB	£97.95	20655	55 El. 21.5dB	£65.95
70cms			20696	4 x 23 El. kit	£319.95
20909	9 El. 8dB	£45.95	20666	4 x 55 El. kit	£419.95
20919	19 El. 16dB	£53.95	Full range of splitters etc. Phone		

Datong D-70 Clearance Offer £49.95



This classic Morse tutor is offered at a really low price. Adjust speed, spacing and volume. Built-in speaker and powered from PP-3. Very limited stocks

Rechargeable Alkaline Cells For Starter Kit



In stock now! * Note: you must use the special charger supplied with Starter Kit.

Starter Kit: Comprise 4 x AA cells and dedicated AC wall charger

4 x AA cells (ready charged)	£5.99 (£1.00 post)
8 x AA cells (ready charged)	£10.99 (£1.50 post)
4 x AAA cells (uses standard charger)	£8.25 (£1.00 post)

ICOM IC-706 Mk II 1.8 - 146MHz £995



PRICE MATCH

We are pleased to endorse the performance and design of the IC-706 Mk II transceiver as the best compact hf mobile bar none. It out performs and out specifies any other model. The only choice left is which dealer you buy it from! We offer you an unbeatable price and an unbeatable back-up service plus optional extended 5 year warranty for an extra £98!

Alinco Prices Down!



DJ-C1E 2m FM

Credit card size with full CTCSS - 300mW 20 memories - AM Air

Review February RadCom

Normally £169.95

£139.95



DJ-C4 70cm FM

Slip into your pocket for rally use or the local repeater. Earpiece and AC charger included. See page 52 of Feb RadCom

Normally £99.95

£169.95

KENWOOD THG-71E Dual band

- * Dual Band 2m/70cm
- * 200 memories
- * Alphanumeric Display
- * Full CTCSS
- * DTMF
- * Up to 6W out
- * Wideband Receive
- * Illuminated Keypad
- * PC Compatible
- * Windows Programming

Send For Brochure



Phone Special Price £279

ICOM IC-T8E Dual Band handy 6m 2m 70cms £349.95

All in one small package.

- * 5W output (13V)
- * 25 / 12.5kHz ready
- * Wideband Rx
- * Nickel Hydride batt
- * Wide FM broadcast
- * AM for airband
- * Rapid scanning
- * Alphanumeric



ICOM IC-T7E Dual Band handy Special Price £219.95



- * 2m & 70cm Handy
- * 70 Memories
- * Full CTCSS
- * Tone scan function
- * Up to 4W out
- * 8 tuning steps
- * DTMF
- * Auto power saver
- * 600mAh 7.2v ni-cad
- * AC charger and helical

MFJ

Ham Radio Accessories

1.8-30MHz 300W ATU

MFJ-948



MFJ-949



Same as MFJ-948 above but with internal dummy load.

£149.95

New QRN Noise Filter

MFJ-1026

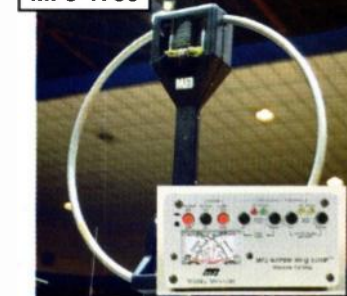


- * Phases out noise at the antenna socket
- * Kills local QRN - lets signals through
- * No more electrical interference!
- * RF sensed for transceiver use (150W)
- * Up to 20dB noise reduction
- * Recovers signals below the noise!
- * Adjust to suit local problems
- * Kill that thermostat problem

£149.95

Magnetic Loop Antenna

MFJ-1786



The antenna for those with small gardens or no gardens at all! Just 3ft in diameter it performs as well as a full-sized dipole. Tuning control signals are sent up the coax cable. The only extra you need is a length of coax cable to go between the supplied control box and the loop. 2" mast mounting brackets included for loop.

- * 10 - 30MHz Size <1m (36")
- * 50 Ohm feed 150W
- * Remote control head included
- * auto band select Fast/Slow tune
- * Cross needle VSWR meter

£299.95

MFJ-901B HF Atu

Price Down!

£69.95



- * 160 - 10 ATU 300W PEP
- * Very easy to adjust and match
- * Wires, Coax and Balanced Feeder
- * Well rated components
- * A really low cost winner from MFJ

The Best DSP Filter in the World!

MFJ-784B



Hear those weak signals - Get rid of the QRM - works better than any internal rig DSP - 16 memories - totally programmable

£239.95

- * 300 Watts PEP 150W CW
- * 1.8 - 30MHz - with ease!
- * Wire, coax or balanced line
- * Balun included for best match
- * 30 / 300W power meter - PEP / RMS
- * Antenna selector, by-pass etc.

£129.95

UK's Top-Selling Linear

- * 160 - 10 Metres
- * 600 W linear 7.5dB Gain
- * Like a 3 element Monobander!
- * Uses low cost 811A tubes
- * Built-in rugged AC Supply
- * Instant by-pass switch
- * PA V/A meter + Grid meter
- * Over rated variable capacitors
- * Fan cooled for long life

Perfect CW Tutor

£799.95

MFJ-418



"It's an Amazing Idea!"

- * Displays words, letters and numbers
- * 3 to 35WPM with natural CW note
- * Various modes including Farnsworth
- * Enormous vocabulary of words
- * Actually sends QSOs as well!
- * Individual characters or groups
- * Headphone socket; Power from PP3
- * Sends text just like an actual test.
- * A tutor that displays what it sends.

Nothing Compares £79.95

The Famous Antenna Analyser

1.8 - 170MHz

£229.95

There's nothing else like it!

Connect to aerial or coax and adjust it in seconds. Turns hours into minutes and ideas into antennas! Give your antenna system a complete check out. Over 500 sold so far! A great piece of kit.

- * 1.8MHz - 170MHz * Digital Readout
- * Resonance * VSWR
- * Impedance * AA batteries or 12v external

MFJ-250X 1kW load

- * 1kW Dummy Load
- * Oil cooled design
- * SO-239 socket
- * Ideal for linears
- * 1MHz to 400MHz

£34.95



Vectronics VC-300DLP ATU



- * 1.8MHz - 30MHz 300W ATU
- * Balanced, coax, long wire
- * PEP, Average and VSWR
- * 3-way antenna selector
- * Built-in dummy load
- * Thru position * Size 257 x 85 x 197mm

£129.95

VHF Power DX

145MHz 160 Watts

SSB & FM

- * 160W output for 20-60W input
- * GaAsFET switchable pre-amp
- * RF sensing - adjustable delay
- * VSWR & temperature protected

Auto ATU Matcher

£59.95



MFJ-914

Auto-Tuner Extender

Connect between transceiver and antenna - no more problems with G5RVs and all those difficult antennas - 160 to 10 metres

£179.95

MFJ-462B

- * Decodes CW, RTTY, ASCII, AMTOR FEC
- * LCD 2 x 16 characters
- * 8000 character RAM
- * Key input for CW practice
- * Epson compatible printer port
- * Requires 12V at 300mA DC

DSP Data Audio Filter

MFJ-781



£139.95

- * CW 50, 100, 200, 500Hz filter
- * Suits all data modes
- * Full adjustable pass band & filter

The DX Machine

Ameritron AL-811X



1.8 - 30MHz 3kW ATU £349.95

MFJ-989C



- * 1.8 - 30MHz with roller coaster
- * Cross needle VSWR & PEP
- * "T" network with 4:1 balun
- * Long wire, coax and balanced feed
- * By-pass and Antenna select switch
- * 270 x 375 x 115mm

Work DX on 50MHz

MFJ-9406



6M SSB Transceiver £249.95
10W Complete & Ready to Go!

Vectronics 2.5kW Load

DL-2500 £189.95



- * 2.5kW (1 min) 50 Ohm Load
- * 500W Continuous (50% cycle)
- * DC - 150MHz
- * Fan cooled (AC adaptor included)

200W Low Pass Filter

MFJ-702



- * 1.8 - 30MHz 200W PEP
- * 50 Ohms impedance
- * 50dB @ 50MHz 0.5dB at 30MHz
- * SO-239 connectors

MFJ-1278BX Data Unit

The best choice by Far £299.95



Multi-mode data controller offering all modes including SSTV. Software included.

WATSON

Great Value New Mini Case

WATSON

For your handheld

Ideal for the modern mini dual bander. It holds the rig firmly in place. The Patented belt clip provides a quick release and has a curled end to prevent it from accidentally riding up, and off the belt. **WSC-3**

£12.95

Alloy Antenna Wire £12.95

Each reel contains 55ft of 3.5mm alloy wire (ideal for G5RVs etc.) Its ultra light - 55ft reel weighs 400 grams! This alloy wire will not tarnish like copper and its lighter weight means safer aerials.

New Triple Bander

6m - 2m - 70cms £34.95

WATSON W-627

Now you can have all three bands on one compact antenna!

* 2.15dBi / 4.8dBi / 7.2dBi
* 100W maximum
* Length 1.62m

New

Available End of March

DC Mobile Leads £6.95

Standard "T" connector lead used by all modern rigs. 15A dual fused, 1.9m long.

WSM-270 Mag. Ant £24.95

* Dual; Band 2m/70cms
* Mini Magnetic design
* Super strong magnet
* Base just 29mm diameter
* Pre-tuned for 2m & 70cm UK
* Low Profile whip
* 2.75m of mini coax - BNC
* Power rating 50W max.

Base Antennas

W-2000 6m-2m-70cm (2/6.2/8.4dB 2.5m long)	£89.95
W-30 2m/70cm (3/6dB 1.15m long)	£39.95
W-50 2m/70cm (4.5/7.2dB 1.8m long)	£54.95
W-300 2m/70cm (6.5/9dB 3.1m long)	£89.95

All aerials have SO-239 sockets, mounting hardware for masts up to 62cm diameter and three radials. All tuned for UK bands.

Mobile Whips

Stainless Steel Mobile Whips with hinged bases. Pre-tuned.

W-285 2m whip **£15.95**
W-770HB 2m/70cm **£24.95**

New Super Gainer

W-7900

Best value in high quality antenna design we have ever seen! A super antenna at a very special price!
* 144 & 430MHz
* 5dB 2m / 7.6dB 70cm
* L 1.58m Power: 150W
* PL-259 connector
W-7900 - **£34.95**

W-PL70 Patch Leads £6.95

A 66cm long PL-259 patch lead using semi-stiff cable that stays put. A smart idea!

*** Dual band "Gainer" whip 2m / 70cm £19.95**
* 21cms long fitted BNC connector.

VSWR / Power Meters

Prices Down

W-220 1.6-200MHz 5/20/200W	£59.95
W-420 118-530MHz 5/20/200W	£59.95
W-620 1.6-530MHz 5/20/200W	£129.95

Lapel Talker £24.95

Earpiece with lapel mic. and PTT. Models for all makes including Motorola. The ideal item for handhelds

QS-110 Speaker Mic £14.95

Available in versions to match all models. Just tell us which transceiver you have.

WEP-400 Earpiece £14.95

Deluxe earpiece has removable pad and soft ear grip. Extremely comfortable - 8 Ohms and 3.5mm plug.

QS-400 Mount £9.95

Clip onto dash grill and simply push handheld or GPS in between sprung fingers. No sticky pads needed. Another great idea from Watson!

QS-200 Mount £4.95

Dash mount for handies. Fits on dash grill vent

WM-308 Base Mic £59.95

Superb audio quality. Can be powered from most modern rigs 8 pin mic plug or use internal battery. Full connection details inc.

Mast/Base Station Duplexers £24.95

Split-1: 1.8-225MHz
Split-2: 350-540MHz
Power 300W / Loss 0.2dB
Socket SO-239

Save on coax cable! Accepts masts up to 2.25" diam. Includes water-proof plug shrouds. Use indoors or outdoors.

W-3CK Cable Kit £18.95

A 5m long mobile cable kit using 5D-FB cable. Very low loss with 30cm thin pigtail.

W-3HM Hatch Mount £14.95

Matching hatch mount with adjustable angle and thumb wheel

WEP-300 Earpiece £9.95

Our standard 8 Ohm earpiece that is ideal for long-term wear. Comes with 3.5mm plug.

SGC Products

Distributed in UK by W & S

Power Clear DSP Filter



PW Review Short Wave Mag. Sept. says:- "the Power Clear is simplicity itself -

you'll certainly hear the difference."
A complete DSP audio filter and speaker unit in one smart case. Works with any receiver. Requires 12v DC. Superb unit.

£299.00

SG-500 Power Cube

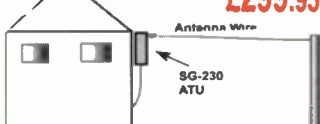
Here's a 500 Watt output solid state linear that will operate between 1.6 - 30MHz. Input of 50-90W is required and the DC supply needs 10 - 18V @ 40A (SSB). PTT or RF sensing

£989.00

160 - 10m Self Tuning Antenna!

SG-230 Auto 200W ATU lets you build this weatherproof all-band end-fed antenna. Use any length of wire, connect 12V to ATU and feed it with RF. It will self-tune in a fraction of a second. Highly efficient for the small garden. Also use it for verticals and inverted "L" systems. We have tested this and it is the perfect all-band antenna system!!

£299.95



SGC-231 Auto Wire ATU

New version of "230" unit above, but covering 1.8 - 54MHz. Works with any length of wire. (12v DC). Just feed with RF. **£499.00**



Cushcraft Antennas

What the mags say!

R-7000 7 Band Vertical 46-119 Metres

80M Option Kit Available

Practical Wireless:
"An excellent DX antenna - Extremely impressed with standard of workmanship and ease of erection"

RadCom:
"Ideally suited to the small garden - an investment which lasts"

* 7 Bands 40-10m
* Power 1.5kW PEP
* Height 7.3m (24ft)
* 7 x 49 inch radials
* Self-supporting.

£369

Other Cushcraft Models

R-80	80m kit for R-7000	£129.95
AV-80	80m vertical 1.5kW 10.5m	£349.95
A-3S	10-15-20m beam 2kW	£389.95
A-4S	10-15-20m 4 el beam 2kW	£489.95
X-7	10-15-20m 7 el beam 2kW	£499.95
X-9	10-15-20m 9 el beam 2kW	£749.95
Ten-3	10m 3 el beam 2kW	£139.95
10-4CD	10m 4 el beam 2kW	£269.95
15-3CD	15m 3 el beam 2kW	£249.95
20-3CD	20m 3 el beam 2kW	£379.95

FC-130 Counter

£79.95

Now being shipped to UK Gov. departments.

* 1MHz - 3GHz
* LCD Display
* BNC Whip Antenna
* Very sensitive "off air"
* Ni-cads and Charger

Super Hunter

New

£149.95

* 10Hz - 3GHz
* 16 segment field meter
* 4 x gate speeds
* Noise filter
* 50 Ohm / 1M Ohm
* Hold button / Beeper
* Backlight / Battery Saver
* Charger, Ni-cad & whip

24 Hour Digital WallClock

£34.95

+ Temperature

* 265mm diameter
* 24/12 hours LCD
* 55mm digits
* date - day - month
* Celsius / Fahrenheit
* 2 x AAA cells

Available End of March

WDB-30 Dual Band Amp £139.95



Boost the power of your dual bander with this well-designed amplifier. Covering 144 / 430MHz it requires 0.3 - 5W FM drive for 6 - 30W output. The unit is RF sensed and fitted with SO-239 sockets. Requires 12V DC at approx 7A.

GPS-38 Clearance Limited Stock 20% Discount

This model is offered at an amazing price. The fully specified garmin is ideal for walkers and marine use. First come first served!

£99.95

Carriage is charged at cost - Phone, fax or e-mail for total cost.

Free-Phone Orders 0500 73 73 88

Waters & Stanton PLC

E-mail: sales@wspc.demon.co.uk

Web Site: <http://www.waters-and-stanton.co.uk>

Enquiries Tel. 01702 206835 / 204965
Fax. 01702 205843
22, main Road, Hockley, Essex. SS5 4QS

London Amateur Radio and Computer Show

OPENING TIMES

**SATURDAY & SUNDAY
10 AM TO 5PM**

ADMISSION

**ADULTS: £3.00
CONCESSIONS £2.00**

HOW TO GET THERE

Lee Valley Leisure Centre is situated on the A1055, about five miles from junction 25 of the M25. Parking is extensive and free.

By public transport, the W8 bus from Edmonton Green station will drop you at the door.

FEATURES

*** TRADE SHOW * LECTURES * BRING & BUY * MORSE TESTS * CATERING * TALK-IN ON 2M & 70CM
* FREE PARKING * SPECIAL INTEREST GROUPS * BAR * DISABLED FACILITIES * TWO RSGB STANDS**

WHERE ARE THEY?

The Most Up To Date List Published

BLUE HALL

AA Computers	M	Hoddesdon Radio Club	D
AJP Communications	X	Jester Computing	A
AKD	K	JM Accessories	K
Arcade Shop	M	LCE Len Cooke Enterprises	A
Bakewell Computers	N	Mikay Distributors	A
Bear 7 Video	M	Radio Bygones	K
Belcyber	F	RAIBC	D
CD Plus Distribution Ltd	Q	Remote Imaging Group	B
Computer Junk Shop	Y	RNARS	B
Display Electronics	I	RSARS	B
Field Electrics	F	RSGB Committees	FH
Future Business Systems	O	Transworld Satellite	B
Gigabytes Software	V	UKRS	
GS Electronics	S	Vann Draper Electronics	N
Haydon Communications	Z	VCR	J
Howes Communications	L	Verulam Amateur Radio	C

RED HALL

Keytronics	ZA	Agile Tools	P
Longreach Marketing Ltd	O	AOR (UK) Ltd	X
Lord Enterprise	V	Association for Int	M
Loutronics	J	BEC	C
Moonraker UK Ltd	Q	Bill Macdonald Ltd	P
Multicomm 2000	U	Capital Products	F
No Nuts	R	J Doshier	P
Optical Illusions	V	Eastern Communications	J
PC Solution	V	Garex Electronics	D
Proline	G	Gemini Electronics	O
Radio Communications	T	Harp Shareware	W
SGS	N	Ham Radio Today	S
Satellite Surplus	J	Icom UK Ltd	W
Southern Aerial Services	M	J & J Associates	S
Squire V Ltd	G	Kenwood Electronics UK	G
Strikalite	M	Linear Amp UK	N
Sudbury Electronics	S	Lowe Electronics Ltd	G
SW Shareware	M	Maittech	M
Three R Communications	N	Martin Lynch & Son	R/U
TLX Electrical Ltd	H	Music Maker	M
VCR	M	Nevada	H
Waters & Stanton	W	Pivot Computer Systems	M

GREEN HALL

Air Training Corps	D	Radio Active Magazine	Lobby
AMBYR Ltd	M	Sweet Box	Lobby
AMSAT-UK	C		
ATM	K		
BARTG	D		
Beacom	N		
Bring and Buy	E&G		
British Citizen Band	B		
Confidential	A		
Games Without Frontiers	N		
Guide Dogs for the Blind	D		

LECTURES / MEETINGS

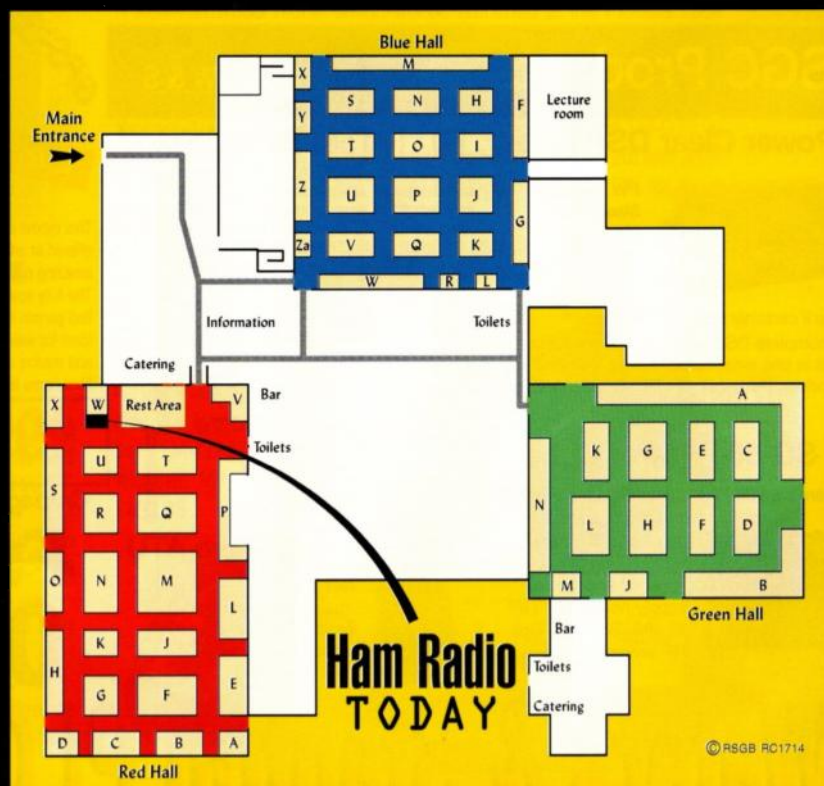
Saturday 7 March

12 noon: Amateur Television by Mike Sanders, G8LES. Mike can frequently be seen at rallies and events, transmitting live pictures from his mobile camera back to a stand. Come and learn what equipment is needed to do this, how ATV repeaters work, and how to get going yourself on ATV.

2.00pm: How to Make your Own Amateur Radio Antennas by Roy Powers, G8CKN. Come and learn from an expert in the field of antennas how to save money by building your own. Topics covered will include a variety of differing antennas, from HF to UHF, from simple dipole, through co-linear, to beam. Also, adjusting for peak performance, weatherproofing and efficient feeding techniques.

SUNDAY 8 MARCH

12.00noon: Remote Imaging of Weather Satellites by Frank Bell. From the Remote Imaging Group, Frank Bell will demonstrate how to get going in this fascinating area of listening. Gathering data from a variety of sources, you will discover what is being transmitted on what frequencies, and what you need to receive, process and display pictures.



© RSGB RC1714

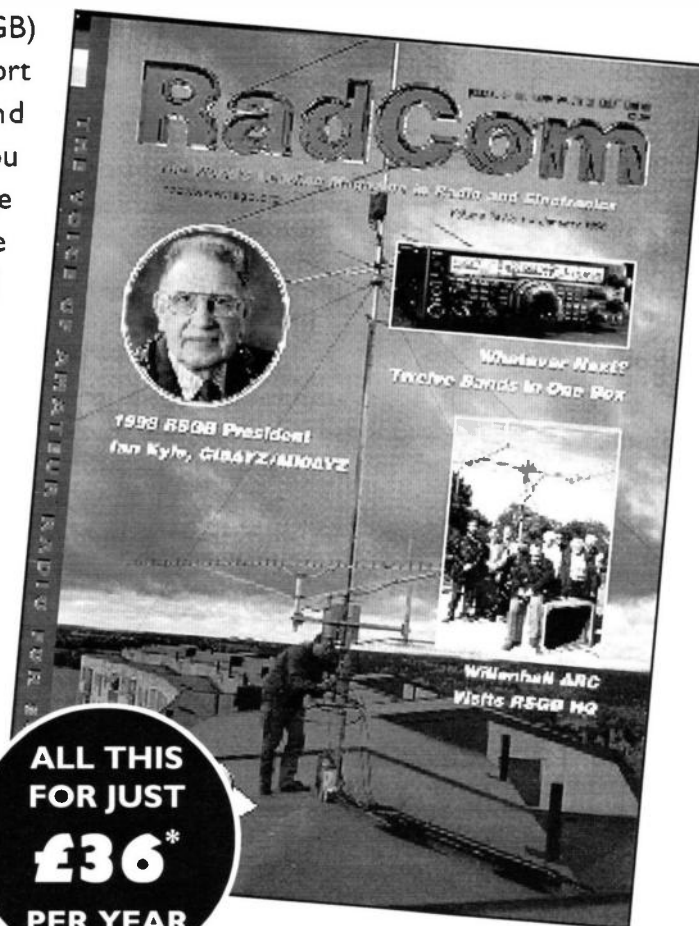


JOIN THE RSGB

Your National Society

The Radio Society of Great Britain (RSGB) represents UK radio amateurs and short wave listeners at a national and international level. By becoming a member you will be sent RadCom, the Society's 100 page colour magazine, every month and also be able to take advantage of many specially selected benefits, such as:

- Discounted publications and sundries
- QSL Bureau - cards despatched free
- EMC Advice
- Planning Advice
- Novice Training
- Contests
- Specialist advice
- Discounted Amateur Radio Insurance (ARIS)
- Affinity Credit Card - Bank of Scotland
- Discounted Personal & Medical Insurance (HMCA)
- Preferential Personal Loans



** Concessionary rates available - call Sylvia on 01707 659015 for details*

To: Radio Society of Great Britain, Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JE
Tel: 01707 659015, Fax: 01707 645105. Web: www.rsgb.org. E-mail: Sales@RSGB.ORG.UK
I would like to join the RSGB. My payment for £36* is enclosed with this form.

Name Callsign (if licensed)

Address

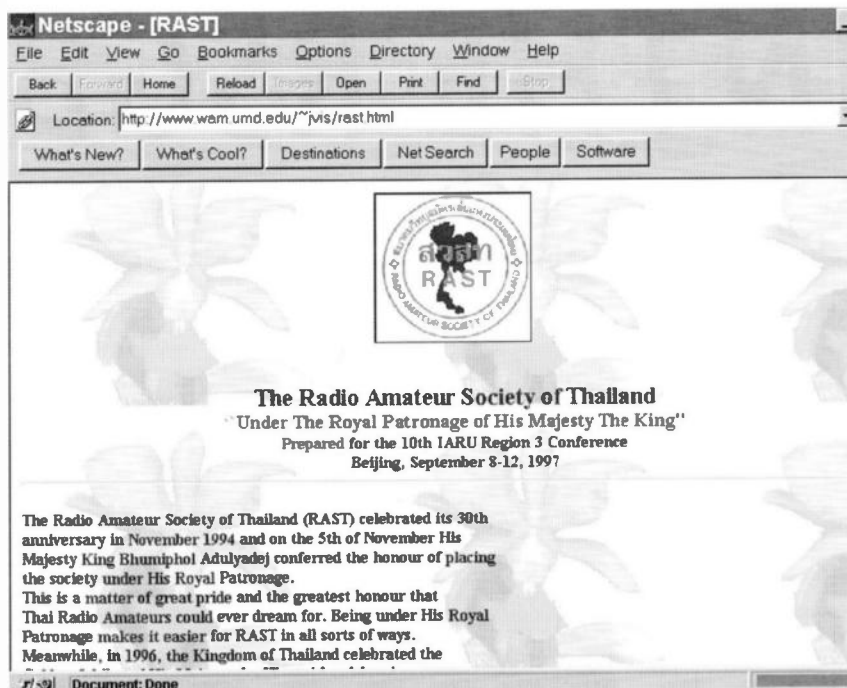
..... Post/Zip Code:

Credit card number:

Expiry date: Switch Issue No: Start date:

Signed: Date:

HRT3/98



Net Communication

Jeremy Boot, G4NJJH, takes us on a whirlwind world tour of Amateur

We all know that the RSGB has pages on Internet - at www.rsgb.org - and that through them you can read about their services, the latest Amateur Radio news and now even correspond with them or order goods through e-mail. But I thought that in this edition it would be fun to have a look at other national radio societies' pages and see how they stand up too. In fact I've had a great time surfing around the world. The variety alone is quite entertaining.

why have a page?

One wonders just why a radio society has a page in the first place. Is it to advertise their wares, and if so, to whom - to the domestic market, or to the world? Then, should it be a sort of 'parish newsletter', or a general showcase for the hobby in general? Should it try to address all issues itself, or should it provide links to sites that deal with vari-

ous radio-related topics? How should it give a flavour of the country it represents? And lastly, who will read it anyway? Presentation does count, and a scruffy national site would send the wrong message entirely. Well, see for yourselves.

Apart from English-speaking countries, the first barrier, one imagines, will be one of language. Depending on whether the target audience was domestic or international, often English appeared as alternative pages. English is the *lingua franca* of the world these days, in much the same way that Latin used to be in the Middle Ages. There are some surprises though: the page of the Netherlands' society, VERON, <http://www.veron.nl/> has no English alternative and is decidedly domestic. Italy's society, ARI, had an English link in their pages, but it didn't work. Sweden's SSA page was also without an English alternative and one presumes therefore for domestic consumption only.

the pages

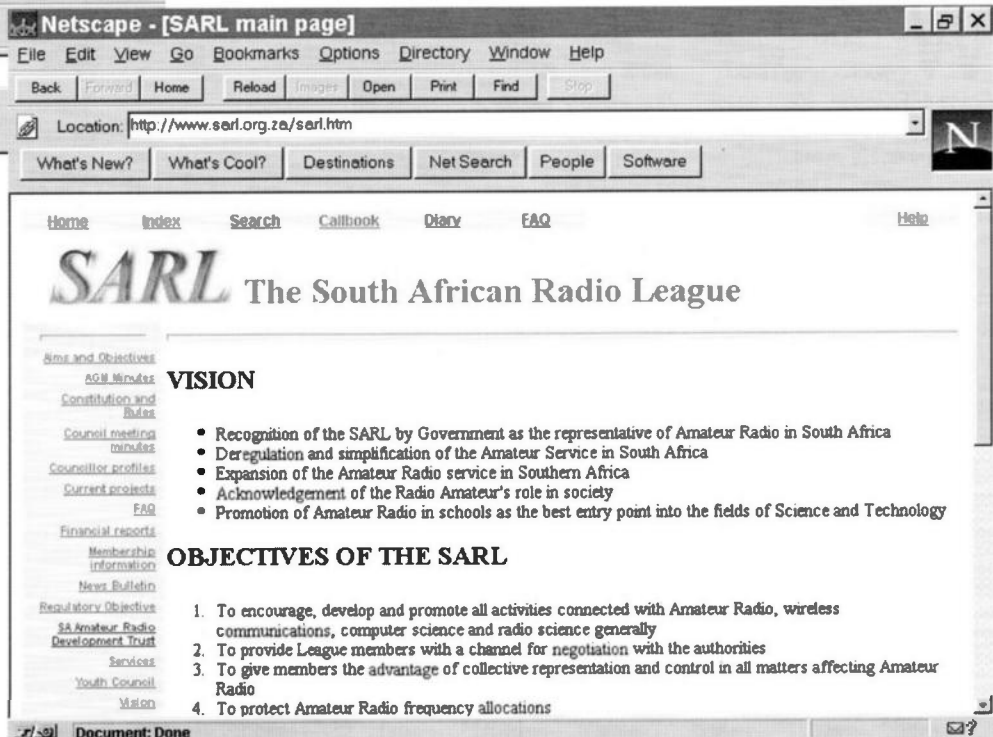
Some of the biggest and best were predictable enough: the ARRL pages <http://www.arrl.org> have a feeling of authority and weight, with extensive details of services and links to a myriad of places. The Australian WIA page <http://www.spirit.net.au/~vk1kcm/> is quite plain in design on first view but similarly has a wealth of information, including - and this is useful - how to obtain a reciprocal licence, with full details of which countries' class of licence corresponds to what. This same idea I found on other pages too, particularly in places where obviously they are frequently being asked this question.

Even beyond the 'what we do' and useful links, some pages, notably Canada's RAC pages at <http://www.rac.ca/> included some national interest. As I write this, Canada is gripped in the most appalling freeze and the emergency services, including their equivalent of Raynet, are engaged in the clear up. There were

detailed maps of what was happening and the state of emergency, which would be read by visitors to the site outside Canada.

Besides having the longest URL - <http://www.lookup.com/Homepages/57531/jarahome.html> - Jamaica's JARA pages had a very different feel about them. I have included an image of their page in this article from their photo album. Much of the carefree Caribbean flavour is in their pages, and very nice too. Less forthcoming is Singapore's SARTS page at <http://www.sarts.org.sg> - just names and addresses, but with useful links too.

Mexico's FMRE, though Spanish only, at <http://www.fmre.org.mx/> played music to give the feel of the place, as did RCV's (Venezuela) <http://www.qsl.net/yv5aj/> - which seemed only to have had 290 visitors when I looked. My favourite for sheer exoticism with its orchids in the background and most respectful references to His Majesty the



Undisputed Profile. 6Y5RL "Roland"

Net Communication

Radio national societies, courtesy of their Internet pages



King, Thailand's pages (RAST) at <http://www.wam.umd.edu/~jvis/> takes a lot of beating. A link giving more information about the king was not working, which was disappointing, but the pages are really charming and I vote them the find of this exercise.

Indecipherable both on Netscape and Explorer. Taiwan at

<http://www.ctarl.org.tw> (showing a character set of x-x-big5) [presumably the pages are in Chinese characters - Ed]. I see, though, some lists give <http://www.show.org.tw/~bv3co/htm/ctarl.htm> which may be OK. Cuba's pages (FRC) <http://www.binfocon.etecsa.cu/yp/> I could not connect to (but that could

have been the net in a funny mood) and Switzerland's 'Redaktion Old Man' intriguingly I could not fathom at all!

South Africa's SARL pages at <http://www.sarl.org.za> were first class. I really liked them. No language problem, and they included an A - Z of all possible queries and subjects for amateurs and beginners alike. They also included a South African callbook, band- plans, constitution and a host of other goodies. Someone really has put some time into this and the target audience is clearly envisaged as going well beyond the domestic.

no pages

There are still a lot of countries without any official Internet address or web site: some are predictable enough, others less so. There is nothing I could find listed for Algeria, Bahrain, Belarus, Bolivia, Botswana, Faroes, Grenada, Iraq, Jordan, Liberia, Malta, Mali, Monaco, Mozambique, Nigeria, Philippines, Senegal or Zaire. There are doubtless others. Ire-

land has just announced it will be setting up its own site "to be ready by the New Year" (from the IRTS Newsletter)

The key to the tour of national societies' web sites lies in a very convenient list provided by the IARU at <http://www.iaru.org> and another on the Canadian site, <http://www.rac.ca/>

I hope you enjoyed this brief tour of other societies' pages. There are more of course than I have reviewed. I have taken some screen shots from the Austrian pages <http://asterix.nt.tuwien.ac.at/~oevsv/> whose design I liked; the photo album page from Jamaica's site <http://www.lookup.com/Hompages/57531/jarahome.html>; South Africa <http://www.sarl.org.za> and Thailand <http://www.wam.umd.edu/~jvis/>. Happy hunting!

Take a look at the G4NJH Amateur Radio pages at <http://www.innotts.co.uk/~asperges> and please send input or feedback on this column to Jeremy Boot, G4NJH, by e-mail to asperges@innotts.co.uk

regular

We start this month with a 144MHz EME ('moonbounce') report. Graham, F/G8MBI, spent about eight hours on 144MHz EME on 6 December. He writes, "The receive equipment in use was the usual 6.6 lambda with simple polarity switching vertical and horizontal. The receive pre-amp measured at less than 0.3db NF, receive system yields circa 4db of sun noise on a quiet sun. Signal strengths are referenced to MDS, measurements made using a step attenuator and 'averaging over time' technique, not the best, but results to within 2dB. In the log, RX is polarity used on receive and TX is that used on transmit. The moon distance degradation during the period ranged from -0.08db to -0.05db and T sky from 314K down to 280K. Declination was -8.9 to -7.1."

Graham's grid locator is JN04FT. His first contact was with JL1ZCG (PM95) in Japan at 1328, with R0 reports both ways,

49.7498MHz, the problem is that the CIS (former USSR) has several hundred 49MHz transmitters on the same offset throughout the 11 times zones that it occupies, so no positive identification can be made. That is, reports of Moscow TV could have well been a transmitter on the border of Mongolia, or China, or even Vladivostok in Far Eastern Russia.

It is rather a shame that it looks like we can never locate precisely 49MHz TV transmitters within Russia. However, we are still trying to get more information on the subject from ORTV who are the main suppliers of television in Russia, so more later.

The impressive VHF antennas of John Quarmby, G3XDY.



VHF / UHF Message

Our regular round-up of VHF and UHF news

and his next contact was with well-known 'EMer' SM5MIX (JO78) at 1457. Many other QSOs were made, including: 1514 LA9NEA, 1533 I2FAK, 1749 G4YTL.

vhf tv dx news

There has been some confusion regarding reports of video signals being received in Australia, during late November and early December, reports were received stating that VKs were copying the 49MHz offset from Moscow. Extensive enquiries were made as to the facts about the reports and the following data was received and retrieved from the Internet, which is becoming a very useful tool.

There are some 14,000 TV transmitters in the former USSR. Whilst most of these are UHF, there are also many on 49.750 / 49.740MHz. Usually a VHF (Band 1) TV transmitter can be identified as it has an offset from the main 49.750MHz frequency, ie

uksmg contest

Well-known contest group OZ5W sent in the following log extract on their 50MHz contacts during the UK Six Metre Group (UKSMG) 7 December contest.

Time	Call	Sent	Received
1046	GJ4ICD	26 001	26 280
1054	OZ4LP	59 002	59
1159	OZ3ZW	59 003	59 924
1337	G4YTD	59 004	59
1446	OZ2LD	59 005	59
1449	G1SWL	26 006	55
1455	OZ7JV	59 007	58

Heard but not worked were: G4HBA, "we exchanged calls but I never copied the report, I called him for over 10 min", said Palie, OZ1RH, of the OZ5W / OZ9EDR contest team, plus the following:

Time	MHz	Call
1109	50.160	G1S?
1138	50.170	G4?
1150	50.160	G1SW?
		("I guessed and called G1SWL, no answer.")
1412	50.160	I5???
		("I5MXX I guess.")

At 1449 on 50.160, "G1SWL finally copied the report on a good burst, but the contact was not complete due to no UKSMG number or County. G4YTD was worked on a long burst but he did not send the UKSMG membership number nor the County, but repeated IO93 twice. Only GJ4ICD used MS report and followed Region 1 Meteor Scatter procedure. However, he was 41 to 51 on ionosscatter, so meteor scatter procedure was not really necessary. More stations could have been worked if they had used meteor scatter procedure", said Palie, OZ1RH.

big 50mhz opening

Well it has happened, the first ZL to Stateside opening, on 1 January. Mike, ZL3TIC, worked into the W5 area and sent in the following report:

Time	Callsign	MHz	Report
0040	FO5DR/B	50.050	51!
0045	W5WUB	50.1063	55

0047	W5IUA	50.1063	51
0048	W5VY	50.1063	55
0049	W7CI	50.1063	55
0056	W5EU	50.1063	57
0057	W6KV	50.1063	55

Mike says, "Also heard lots of other stations including a W2 and an XE2! It appears that there was a massive Sporadic E across the Pacific which linked into some TEP to the W5 area."

Also, on 15 January, Peter, PY5CC, made contact with LU1ZC on Antarctica for his 153rd country on the band. This was clearly an Es opening. Now that's what I call a nice New Year's present!

sporadic e

December and January are the months for Sporadic E in the Southern hemisphere and on 7 December Paul, ZS6PJS, reported an Es opening between ZS6AXT (KG33) and 7Q7RM (KH74) at approximately 1000UTC. The distance was around 1350km. On 8 December another Es opening between

ZR1EV (JF96) and ZR6AUI at 1217 and then another one at 1533 between ZR1EV and ZS6PJS (KG46), the distance being about 1500km. These are the first 50MHz Es openings that have been reported from South Africa for many years, let's hope we get more.

Mike, ZL3TIC, sent in numerous reports of Sporadic E openings coupled with TEP into New Zealand. On 6 December Mike listed 3D2CM and V73AT, and on the 9th contacts with VK1, 2, 3, 4, 5 and 7.

new 24ghz world record

The French microwave newsletter *Hyper* reports a new world 24GHz record of 398km. This took place on Sunday 26 October 1997 between F6BVA/P (in JN02SV) and F5CAU/P and FA1ONQ/P (both in JN33DU). This world-beating contact effectively linked the Pyrenees with

the Alps for the first time on this band. It also sets a new French national record for the band, a considerable increase in distance over the previous record reported.

The three operators had been waiting for suitable weather conditions to develop: cold, dry and with no snow at each end on the site access routes. F5BVA/P was located at an altitude of 1400m above sea level, above Foix in the Pyrenees. The other two stations were located at 1900m ASL at Le Chiran, in the mountains of the Verdon, in the French Alps. Jean, F6DER, was also due to be involved in this DX test but unfortunately had to withdraw due to a back problem that had been giving trouble for some weeks.

The two ends of the contact were in place on the Saturday afternoon but strong winds at Le Chiran prevented any contact at that time. A tentative sked was therefore made for 0600 local

time the next day, Sunday 26 October. At 0630 on the Sunday, a 10GHz link was set up and worked first time with no problems, signals being very strong indeed. By inserting an attenuator between the 10GHz transverter and the receiver IF at 144MHz, signals were made weak enough to allow a very accurate setting of the dish (which was also used on 24GHz). By 0645 the Alpine end of the link was hearing F6BVA/P on 24GHz. Signals were very readable, the necessary exchange of information being completed on SSB by 0700. Everyone concerned was in a state of euphoria of course!

Since that Sunday was also a French activity contest day, starting at 0800, the two teams made a sked for 0800 so that a repeat contact could be made, one which could count for scoring purposes in the contest. At 0805 the QSO was made, SSB reports of RS52 being exchanged.

Thanks to Peter Day, G3PHO, for this information.

70mhz in south africa

Some ZS stations are now active on 4m, including Rudi, ZR6VE, who recently completed a 60km QSO. There are early plans for a 4m beacon in ZS on 70.015MHz. The proposed site is in KG44CE, which is 5820ft ASL on a ridge overlooking Pretoria and Johannesburg. A Pye commercial transmitter has been obtained for the planned beacon. Thanks are due to John Wilson, G3UUT, for advice as IARU Region 1 VHF beacon co-ordinator, and to Rudi, ZR6VE, for obtaining the site. It is anticipated that the project will take some months to get on the air. This news came via GM4ZUK.

Please send all news and views on VHF / UHF matters to: Geoff Brown, TV Shop, Belmont Rd, St Helier, Jersey, Channel Islands or by e-mail to equinox@itl.net

VHF / UHF Message

from Geoff Brown, GJ4ICD



Well-known
Australian 6m
operator VK3ALM
in this shack near
Melbourne.

Adam, VK3ALM, Melbourne

FOR MANY, the highlight of the QRP calendar is the QRP Convention held at the church of St Aidan's at Rochdale in Lancashire. Without doubt the second highlight is the annual Yeovil QRP Convention held in Sherborne in Dorset.

Yeovil QRP Convention

This year the convention is to be held on 19 April with Rev George Dobbs, G3RJY, being the star guest. Many QRP-type vendors will be there and lots of fun will be had by all.

As usual, there will be a talk by George who, if you have never heard speak before, is a must. He can hold an audience enthralled for hours and at Dayton we have to drag him off stage! The American audience just wants to hear more from him.

George and I have missed the Yeovil QRP Convention for several years, so it will be a delight

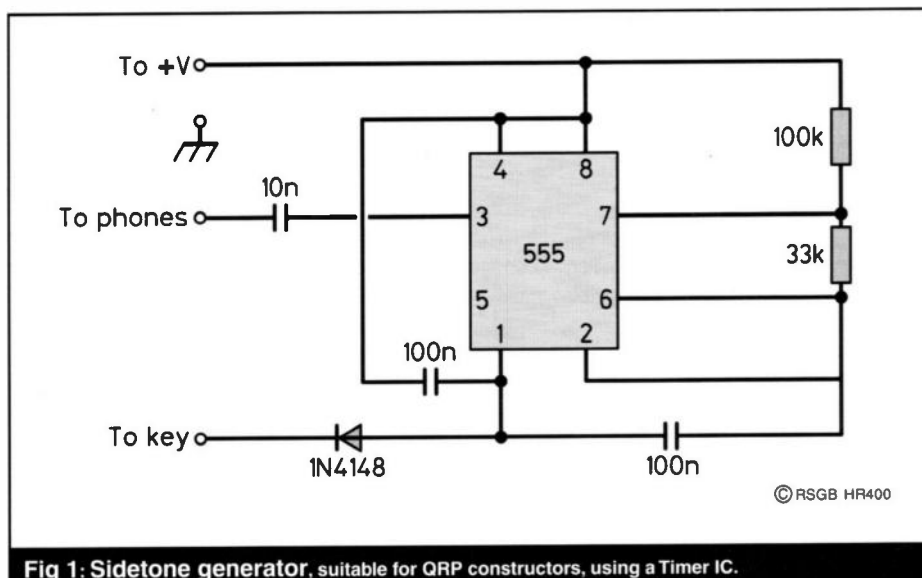


Fig 1: Sidetone generator, suitable for QRP constructors, using a Timer IC.

may also know about adding some inductance first. This pulls the frequency low, whilst the capacitor pulls it slightly high, enabling the user to swing over the crystal frequency.

Another trick I have seen is to have modules ready built with

Fig 1 is one version of a sidetone generator, using the well known Timer IC, whilst **Fig 2** is another version, this time using an equally well-known Op-Amp. The circuits are very straightforward and should provide no problems for home constructors. They

of new capacitors when compared with the price of a simple varactor diode, which works by changing the capacitance of the diode by changing the voltage.

Claton, KA0GKC, came up with a neat idea that provides two VFOs for the price of one. There

QRP Corner

Dick Pascoe, G0BPS, recommends the QRP

to see everyone there again. I hope to see you there too.

Sidetone Generator

One of the down sides of simple construction is often the lack of facilities found on simple transmitters. We all know about the use of a capacitor to 'pull' the frequency of a crystal a little. You

simple connectors. For example, low pass filters should be used in all transmitters, even those putting out just a few watts. If the low pass filter is built into its own box it can be used whenever required.

The circuits shown this month are for other units which can be built into their own boxes and used when needed.

can be made up 'ugly style', on Veroboard, or any way that you prefer. I have seen a version where the IC was glued to the box with the legs pointing up, and all other components hung from the IC's legs.

Many of the QRP rigs offered today do not use a variable capacitor for VFO tuning, this is possibly because of the high price

isn't a real extra VFO, but by cheating a little, the use of your VFO can be made to appear to be double. This can of course be done with a second capacitor too. The addition of a second varactor diode and a simple two-pole, one-way, switch enables the user to select which VFO they are using. Ideal if switched by the PTT line, perhaps, to enable split frequency working on simple rigs. The potentials are endless. **Fig 3** gives the circuit idea, you may like to adjust it to suit your own ideas.

Following this idea, there are occasions if you have a VFO running on 5 - 5.5MHz and mix it with a crystal to provide two bands. One combination often used is 9MHz to provide 14 - 14.5MHz and also of course 3.5 - 4MHz.

Now the VFO frequency is selected by the combination of capacitance and inductance (the coil and the variable capacitor). A different band may be selected by either selecting a different

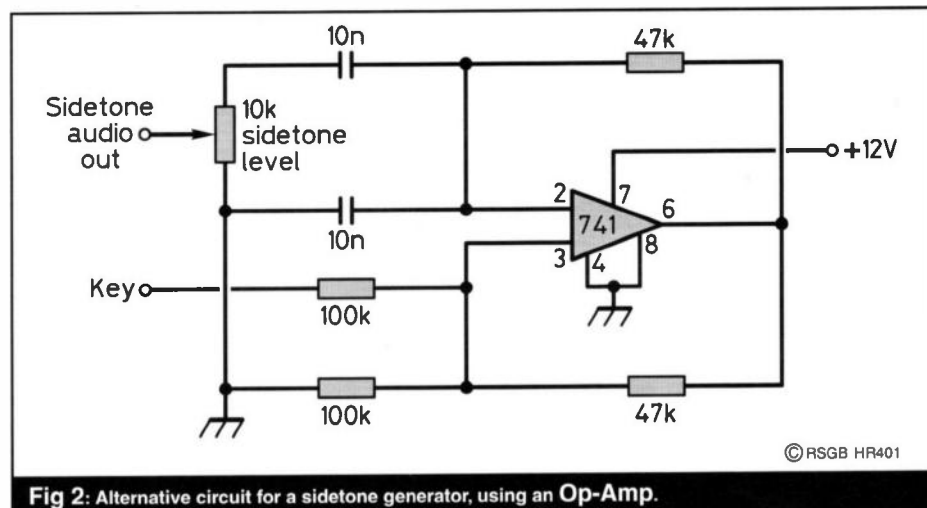


Fig 2: Alternative circuit for a sidetone generator, using an Op-Amp.

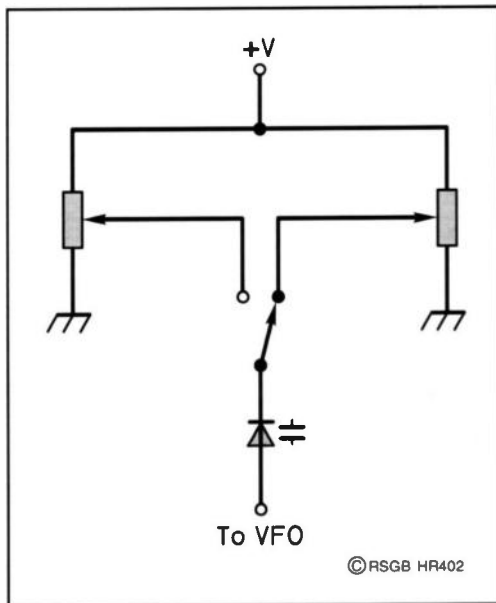


Fig 3:
Basic idea
of circuit
to allow
for split
frequency
working
when using
simple
QRP rigs.

crystal or changing the value of the inductor. This will change the VFO operating frequency (see Fig 4). Careful selection of values will give two other bands, one inside and one outside our allocated frequencies.

<http://RTPnet.org:80/~qrp/>
(QRP ARCI, our American cousin's web site. Lots of information here on US QRP.)

<http://www.scn.org/IP/nwqrp>
(Northwest QRP Club.)

<http://www.infinet.com/~len>

on the Internet). To join, send a message to listserv@lehhigh.edu (note the missing E) and in the body of the message put "subscribe qrp-l [yourcall]", you will get a check message, reply to that and you are on. Beware, this is a busy list and you may get up to 100 postings a day! The British version is also available, send a message to majordomo@blacksheep.org and in the body put "subscribe gqrp-l [yourcall]" (note it is a lower case 'L' in each case).

Dayton HamVention

Ade is to be the guest speaker at the Dayton HamVention QRP banquet in May and I am looking forward to meeting this icon of QRP! I always enjoy Dayton, especially meeting friends old and new at the QRP events. I get involved with several of these, and one that I really enjoy is the NorCal (Northern California QRP Club) building contest.

change in the rules and builders are permitted to build anything they want. The catch is that only 2N2222 transistors may be used. The rules specify that constructors must "build a transceiver that uses no ICs, no pre-packaged mixers (SBL1s, 6440s), and no more than 22 2N2222s as active devices . . . Any diode may be used."

One of the additional rules I like to see is "the stealing of ideas from other circuits is actively encouraged, though an entry from just one published design will be penalised." Other rules include "the look of the finished project will not be judged, it must work though. Any transceiver that explodes in the judge's face when fired up may not be seen as a quality entry and may be excluded."

The rules also encourage builders who cannot attend the show to send them in. If any British builder fancies having a go I will take it with me. I will even

QRP Corner

On the Internet

Whilst browsing the Internet recently, I came across the home pages of the G-QRP club, which are managed by Tony, G4WIF, for the club. Now I had visited the site several times in the past, but I was pleased to see the new style that Tony has introduced. Lots of good information and access to lots of other sites of interest.

The Internet hasn't taken over amateur radio yet, as some predicted, and I guess that it won't. Having been on for almost five years now I have seen many changes. I still use my radio, though, when I want some *fun*.

I recommend the following sites, which will be of particular interest to QRP enthusiasts:

<http://www.ourworld.compuserve.com/homepages/g4wif/gqrp.htm> (G-QRP Club homepages.)

<http://www.barville.demon.co.uk/qrpinfo.htm> (Peter Barville's QRP pages.)

(Columbus QRP Club, home of the MRX-40 QRP and NBSP kits.)

<http://www.erols.com/ke3nv/>
(W3CV's QRP site.)

<http://www.qsl.net/k7on>
(K7ON's QRP home page.)

<http://www.fix.net/~jparker/norcal.html> (Norcal kits and Northern California QRP club.)

<http://www.gqrpcub.demon.co.uk> (G3YCC's QRP page.)

<http://www.fix.net/jparker/wild.html> (QRP Wilderness Radio.)

The one advantage that I find is the quickness of finding that individual piece of information that I want in a hurry.

Another piece of information that came via the Internet is that the 'world famous' *Joy of QRP* book by Ade Weiss, W0RSP, is back in print. No details are available yet, but I also note that Ade is active again in radio and has been about on the US QRP list (a place where QRP folk gather

In the past, entrants have had to build a project of their choice, put it into a box and give a brief description of it for the judges. Now I enjoy judging these and I take a delight in seeing other people's work. Some of them are a real pleasure to handle. We don't get to try them out though, and this is the down side.

This year there has been a

promise not to claim it as my own!

Full reports on the Dayton QRP symposium in a later column.

That's it for this month. Please send news and views to me via packet to GB7RMS, e-mail to Dick@kanga.demon.co.uk or by post to Seaview House, Crete Road East, Folkestone CT18 7EG.

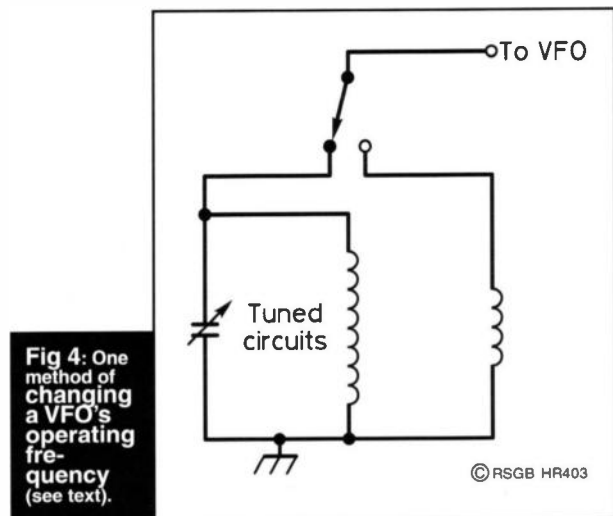


Fig 4: One
method of
changing
a VFO's
operating
frequency
(see text).

AERIAL ROTOR FOR ONLY £49.95!



AR300XL Light Duty Rotor

Rotor unit type AR300XL and control console. Continuous indication of beam heading. Clamps to 2" (52mm) max. mast and takes 1 1/2" (38mm) max. stub. mast. 'Offset' type mounting. Vertical load carrying 45kg.

Special offer £49.95.



AR1201 Alignment Bearing

Allows greater/higher head loads. Fitted above rotor.

£18.95.

Carriage on either rotor £5.50.

New Channel Master Medium Duty Rotor



2" main mast 1 1/2" stub mast. Vertical load carrying 113kg. Colorator £89.95. Bearing £18.95.

GLOSSY 34 PAGE CATALOGUE AVAILABLE BY RETURN @ £1

E-mail: atech@dircon.co.uk (sales)

AERIAL TECHNIQUES

Tel: 01202 738232

11 Kent Road, Parkstone, Poole, Dorset BH12 2EH

Fax: 01202 716951

G6XBH G1RAS G8UUS

VISIT YOUR LOCAL EMPORIUM

Large selection of New/Used Equipment on Show

AGENTS FOR:

YAESU • ICOM • KENWOOD • ALINCO

Accessories, Revex/Diamond Range of SWR/PWR, Adonis Mics, Mutek Products, Barenco Equipment, MFJ Products, we specialise in all types of plugs, ADP etc

AERIALS: Tonna, Maspro plus full range of base/mobile Ants

★ NOW ON THE INTERNET ★

Radio Amateur Supplies

3 Farndon Green, Wollaton Park, Nottingham NG8 1DU Off Ring Rd, between A52 (Derby Road) & A609 (Ilkeston Road)

Monday: CLOSED Tuesday-Friday 9 am to 5 pm Saturday 9 am-4 pm

Internet: <http://www.geocities.com/Eureka/1448>

E-mail: ras-notm@geocities.com

Tel: 0115 9280267

R.A.S. (Nottingham)

R.A.S. (Nottingham)



WEATHER MONITORING

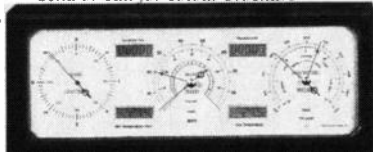
by
R&D Instru-MeT Ltd

U.K.'s leading Meteorological Instrument Manufacturer

Beautifully styled instruments in solid hardwood cabinets with clear displays showing all parameters at a glance, shelf or wall mounting. Parameters available (depending on model):- Price from £246.

- * Wind Speed & Direction
- * Temperature Min./Max.
- * Barometer
- * Rainfall
- * Sunshine Hours
- * Mains or 12 Volts
- * Computer Data Logger

Send or call for colour brochure



R&D Instru-MeT Ltd Percy Avenue Kingsgate Broadstairs Kent CT10 3LB
Tel. (01843) 866662 Fax. (01843) 866663



WILSON VALVES

(PROP JIM FISH G4MH)

Over 2500 different types stocked, Ham Radio, Military, Audio, Vintage, etc.

6146A £17.63, 6146B £19.98, 6146W (MISpec) £19.98, 6JS6C (NEC) £25.85, 6LQ6 (SOV) £17.63, 6JB6A (NAT) £29.38, 12BY7A (NEC) £11.75, 12BY7A (USA TYPES) £9.99, 6HF5 £23.50, 572B (SVT) £49.35, 572B (CETRON, USA) £56.40, 3-500ZG £155.10, 811A (SVT) £19.39

Matched pairs available * VAT included
Plus £2.35 pp & ins * Most major credit cards
Many more available. SAE for list to:

28 Banks Avenue, Golcar, Huddersfield
West Yorkshire, HD7 4LZ Tel 01484 654650 Fax 01484 655699
Email: wilsonvalves@surflink.co.uk

R.N. Electronics Ltd

EMC TEST FACILITY & R.F. DESIGN SERVICES

www.rfdesign.co.uk

EMC TESTING

Electro Magnetic Compatibility is now a legal requirement. All electrical & electronic goods sold within the EC must comply with the directive and generally carry a CE mark.

We test to generic and product specific standards including ETS 300 684 for Commercial Amateur radio equipment.

R.N. Electronics has been established for 10 years.

Our wide areas of commercial expertise include:

- Wireless (RF) Design
- Microwave Antenna Design
- EMC testing
- MPT pre-compliance testing

* We still supply our popular AMATEUR RADIO
Four & Six metre TRANSVERTERS *

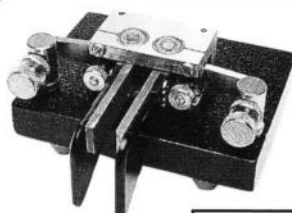
Arnolds Court, Arnolds Farm Lane, Mountnessing, Brentwood, Essex, CM13 1UT
Telephone: Sue Ray on 01277 352219

KENT

MORSE KEYS

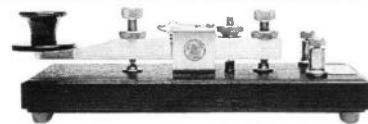
Send NOW for our new catalogue on our full range of morse keys, keyers and electronic kits.

Quality British made Morse keys



**R. A. KENT
ENGINEERS**

243 Carr Lane, Tarleton, Preston, Lancs PR4 6BY
Tel: 01772 814998 Fax: 01772 815437



QUARTZ CRYSTALS

CUSTOM MANUFACTURED CRYSTALS AND OSCILLATORS

FUNDAMENTALS

FREQUENCY RANGE

1.5 to 2.0 MHz
2.0 to 4.0 MHz
4.0 to 6.0 MHz
6.0 to 22.0 MHz
22 to 26.0 MHz

PRICE

£9.50
£9.00
£8.75
£7.50
£9.00

OVERTONES

MODE

3rd OVT
3rd OVT
5th OVT
5th OVT
5th OVT
9th OVT

FREQUENCY RANGE

21.00 to 60.00 MHz
60.00 to 75.00 MHz
60.00 to 110.0 MHz
110.00 to 126.0 MHz
125.00 to 175.0 MHz
170.00 to 225.0 MHz

PRICE

£7.50
£8.75
£8.50
£10.00
£13.50
£13.75

1.5 - 2.0MHz available in HC6/U or HC33/U only

2.0 - 10.0MHz available in HC6/U HC33/U HC18/U or HC25/U only

10.0 - 225.0MHz HC6/U HC33/U HC18/U HC18/T HC25/U HC25/T HC25/TT and HC45/U.

Where holders are not specified, crystals above 2.00MHz will be supplied in HC25/U.

For HC18/T and HC25/T (11.7mm ht.) add £1.00. For HC18/TT & HC25/TT (9.6mm ht.) and HC45/U add £5.00.

Delivery approx 2 weeks. For 5 day EXPRESS service add 50% to above prices.

Prices include P&P and VAT. Minimum order charge £10.00. We do not accept credit cards.

Unless otherwise requested fundamentals supplied for 30pF load & overtones for series resonant operation. Where applicable please state the make and model number of the equipment the crystals are to be used. This will assist us in providing the correct specifications.

Crystals available to PWM and other commercial specifications.

Custom Manufactured TTL and CMOS oscillators 3.5 - 85MHz £20.35 each 1 - 4 pcs

QuartSlab Marketing Ltd

PO Box 19, Erith, Kent DA8 1LH

Phone 01322 330830 Fax 01322 334904

SAE with enquiries please

DIGITAL INDUCTANCE & CAPACITANCE METER

A real breakthrough in L/C measuring equipment at the price. A must for home constructors to help identify components and as an aid for winding coils, etc. At 5 samples per second the unit will also track adjustable components. Microcomputer based - Auto-Ranging - Self Calibrating 0.1pF to 1µF non-polarised (1.5µF typ) 0.001µH to 100mH (150mH typ)



Kit & case

LCKIT £79.00 + VAT

(UK p&p free)

Built & tested

LCMBLT £94.00 + VAT

(credit cards OK)

Mainline Electronics, P.O. Box 235, Leicester, LE2 9SH

Tel: (0)116 277 7648/278 0891

Fax: (0)116 247 7551

Email: sales@mainlinegroup.co.uk

VALVES WANTED

TOP PRICES PAID FOR NEW BOXED VALVES

A2900.....GEC.....£4.00	L63.....GEC.....£3.00	PX650.....£45.00
ACO44.....Mullard.....£10.00	LP4.....Ferranti.....£20.00	RS237.....European.....£35.00
DA100.....GEC.....£150.00	LS6A.....£10.00	RV218.....European.....£20.00
DA30.....GEC.....£100.00	MZ1-100.....Mullard.....£50.00	RV239.....European.....£20.00
DA60.....GEC.....£150.00	MZ1-70.....Mullard.....£25.00	V503.....£50.00
DET25.....£35.00	MZ1-75.....Mullard.....£25.00	VR40.....£60.00
DO25.....Mullard.....£50.00	MZ05-50.....Mullard.....£10.00	VT1.....£10.00
DO26.....Mullard.....£100.00	MZ05-60.....Mullard.....£20.00	VT2.....£20.00
DO60.....Mullard.....£150.00	NR47.....£100.00	VT25.....£35.00
E80CC.....Mullard.....£4.00	NR56.....£30.00	VT4C.....£25.00
E88CC.....Mullard.....£2.00	NT18.....£30.00	VT75.....£30.00
ECC32.....Mullard.....£3.00	NT36.....£30.00	2A3.....£5.00
ECC33.....Mullard.....£4.00	NT40.....£60.00	4XP.....Cossor.....£30.00
ECC82.....Mullard.....£2.00	P12-250.....£10.00	6B4G.....USA.....£8.00
ECC83.....Mullard.....£3.00	P15-250.....£10.00	6L6G.....USA.....£8.00
EF86.....GEC.....£3.00	P25-500.....£30.00	203A.....USA.....£10.00
EF86.....Mullard.....£3.00	P27-500.....Mazda.....£35.00	205A.....USA.....£20.00
EL34.....Mullard.....£15.00	P5-400.....Mazda.....£35.00	(211).....USA.....£25.00
EL37.....Mullard.....£15.00	P625.....Mazda.....£10.00	300B.....STC.....£150.00
EM1.....Mullard.....£5.00	P650.....Mazda.....£20.00	300B.....USA.....£150.00
EM34.....Mullard.....£5.00	PA20.....Ediswan.....£20.00	845.....USA.....£25.00
EM4.....Mullard.....£5.00	PA40.....£20.00	4212E.....STC.....£150.00
GZ32.....Mullard.....£4.00	PP3-250.....Mazda.....£50.00	4242A.....STC.....£40.00
GZ34.....Mullard.....£4.00	PP5-400.....£45.00	4274A.....West. Elec.....£25.00
KT61.....GEC.....£5.00	PT25H.....£15.00	4300A.....STC.....£60.00
KT66.....GEC/Osram.....£40.00	PX25.....Marconi.....£110.00	4300B.....STC.....£60.00
KT66.....Marconi.....£30.00	PX25.....Osram.....£110.00	(6550).....USA.....£10.00
KT77.....GEC.....£12.00	PX4.....Marconi.....£60.00	6550A.....USA.....£10.00
KT88.....GEC.....£60.00	PX4.....Osram.....£60.00	

AVO VALVE TESTERS

CT160.....£40 each
VCM Mk 3.....£50 each
Mk 4.....£80 each
VCM 163.....£270

TEST EQUIPMENT

R & S Polyskops, swab 1 or 2..£20 each
Marconi TF801D.....£15 each
Solartron HT PSU
Model SRS 151
SRS 152 } POA
SRS 153 }

TRANSFORMERS

Oil filled or potted transformers and chokes by Parmeko, Gresham, Gardners, etc.

Radio spares, mains transformers and chokes, audio output transformers by Partridge, Wooden, Parmeko, etc. POA

CAPACITORS

Oil filled block paper or axial by TCC, Plessey, Dubilier, etc.....POA

TANNOY

- ALL 15" TANNOY DUAL CONCENTRIC LOUDSPEAKER DRIVE UNITS MADE BETWEEN 1947 AND 1974 INCLUSIVE. We will buy singly or in pairs and pay very high prices indeed for these - i.e. typically up to £450 per pair for 15" Golds, up to £500 per pair for red and silver. We can only offer top price for those units still with Tannoy labels attached and drivers MUST BE COMPLETE WITH ORIGINAL TANNOY CROSSOVERS.
- TANNOY 12" LSU UNITS. We offer up to £60 per unit with Tannoy crossover.
- AUTOGRAPH with 15" LSU DRIVE UNITS..... We offer up to £1,500 a pair.
- CORNER GRF with 15" LSU DRIVE UNITS..... We offer up to £850 a pair.
- RECTANGULAR GRF with 15" LSU DRIVE UNIT..... We offer up to £600 a pair.
- CORNER YORK with 15" LSU DRIVE UNITS. We offer up to £750 a pair.
- RECTANGULAR YORK with 15" LSU DRIVE UNITS..... We offer up to £850 a pair.
- LANCASTER with 15" LSU DRIVE UNITS..... We offer up to £500 a pair.
- IIILZ (3LZ) with IIILZ drive units..... We offer up to £150 a pair.
- TANNOY 15" DUAL CONCENTRIC LSU CROSSOVERS..... We offer £35 each.

SUSSEX SURPLUS

13 STATION ROAD, HORSHAM,
WEST SUSSEX RH13 5EZ
Tel: (01403) 240257 Fax: (01403) 270339



Some of the people behind ON4VRB, Belgium's first SSTV repeater.

This month sees the British Amateur Radio Teledata Group's Spring RTTY Contest. It takes place on the third full weekend in March, this year's contest being from 0200UTC on Saturday 21 March to 0200UTC on Monday 23 March. This contest gets great activity from all over the world, and I'd certainly recommend you either 'have a

contacts on same band receive zero points and must be clearly marked in the log.

Final score: Total QSOs x Total multipliers x Number of continents (max 6).

Logs: Use separate logsheets for each band. Logs must show: Band, Date and Time (UTC), Callsign, Message Sent and Received, Countries and Points

The fact that W / VE / VK call areas count as separate countries on each band means that CQing can often be the most productive way to make a good score for the W / VE / VK operators.

amateurs show the way

Regular readers may have read about the proposal I submitted last year to the International Telecommunication Union (ITU) on HF and VHF / UHF data communications to link schools and communities in tribal villages in African and other developing countries, and a number of readers have asked me for more details.

I'm very pleased to say that I've just heard that the ITU has accepted my paper for inclusion in their 'New Solutions for Rural Communications' forum at Africa Telecom '98. Whether I'll be in Johannesburg on the afternoon of Wednesday 6 May to present

similarly been provided in the past, by national or international aid organisations or by their government. There is, however, an increasing need for e-mail and file transfer communication to facilitate such 'distance learning', as well as for the exchange of intra-community news and information.

My accepted paper details a modern, but low-cost, system for this purpose, based upon Amateur Radio-based software and hardware data communication. This is the WINLINK software linked with AX25 packet and HF PacTOR, as already used by ham BBSs around the world and which is also available for use in other circles for vital radio communication use, as it lends itself ideally for use in developing countries.

A typical system employs an existing central 'host' computer with hard disk and / or CD-ROM storage, typically located in the library or school of a central town or regional tribal centre, which is possibly also linked to the

Chris Lorek, G4HCL, gets ready for the Spring RTTY contest, and tells how

go', even if you're just listening around or maybe giving away a few points to other participants.

The contest rules are:

Mode: RTTY only

Bands: 80, 40, 20, 15, and 10m

Categories:

- 1) Single op, all band
- 2) Single op, single band
- 3) Multi-op, all band
- 4) Multi-op, multi-transmitter
- 5) SWL

Note: Categories 1, 2, and 3 may not transmit on two or more bands at the same time. No station may enter more than one category.

Exchange: Send RST + QSO number + Time in UTC.

Multipliers: Each DXCC country, including first QSO with W, VE and VK, counts as a multiplier on each band. Each call district in W, VE, and VK will count as an additional multiplier on each band. Also, each continent (6) will count once, not once per band.

QSO points: Count 1 point per QSO. Same station may be worked on other bands. Duplicate

claimed. The summary sheet must show full scoring, times of operation, and address for correspondence. Include names and callsigns of all multi-op station operators. Computer-generated logs containing all specified info are welcome.

(The organisers tell me that your comments on the contest would be much appreciated, just include them with your log.)

Deadline: Logs must be received by 31 May to qualify. Post your log to: John Barber, G4SKA, PO Box 8, Tiverton, Devon EX16 5YU.

Awards: Certificates will be awarded to the top three stations in each category, the top five single operators in each continent, and to the top single operator in each W / VE / VK call area.

If you're entering the contest as a single operator, or indeed just 'fishing around' for data contacts, here are a few operating hints. Firstly, try to plan your 'off' times to be during the least productive time of day, such as when propagation does not favour your area.

the 'full works' personally or not isn't definite at the moment (it's all down to the cost of the air fare!), but here's what it's about.

Remote villages in developing countries may often not have telephone lines usually required for voice or e-mail communications, relying instead on HF and / or VHF radio communications. Satellite-based communications with resultant call costs are often beyond the financial reach of these communities, thus low-cost radio systems are often used as an intra-community 'telephone'. These commonly rely on battery-based power, often with hand-generator based recharging methods, with small electronic inverters used where mains power is needed for short durations.

With the evolving needs of up-to-date education techniques in these communities, village schools are often becoming equipped with a computer for learning purposes, typically a 'low specification' PC which may have been provided, as power and radio communication facilities have

Internet. In turn, this PC information server is locally connected via a desktop-sized radio data controller unit to an HF and / or VHF radio transceiver and antenna system, allowing automatic data communication over radio with remote units. At outlying locations, low-cost radio data terminals, including simple types which may be locally built, are fitted between the PC and the HF or VHF radio for data transfer and remote file access from the central system. Automatic error-detecting data is employed which allows low transmit power and minimal antennas to be used. Additional outstations can thus be added at low cost.

Just like we amateurs 'log on' to our local BBS periodically for messages, The system would typically be used to allow a small daily 'upload / download' of file-based information, ie text, images etc between locations, or 'on-demand' at any time by the remote users. As radio, rather than satellite or cellular telephony, is used, there are no ongoing call or us-

age charges, and there is no landline or cellular infrastructure required.

Once again amateurs, who have pioneered developed the software and packet / PacTOR hardware, have shown the commercial lads and - possibly more importantly - the people who vitally need communications, 'the way ahead' for low-cost, simple and basic communication, such as the use of a simple BayCom packet modem and amateur-written software. Significantly, it *doesn't* rely on antiquated communication methods, such as manually-sent Morse code, where we amateurs are usually laughed at by our peers.

aprs in europe

Ciemon (Simon), G10TRT, from sunny Northern Ireland sent me an e-mail to say that there are a small number of amateurs in the UK running the APRS (Automatic Position Reporting System) soft-

APRS activity in Europe. He has been reading about the US APRS system in use and wonders whether there's a similar system in use in Europe, asking also about the availability of European maps for the WINAPRS software. Well, Frank, part of the answer's above, there certainly *is* activity, although it's still 'taking off'. If you're active on APRS in Europe then why not drop Frank a packet, to ON9CFB@ON4RAT.LG.BEL.EU or to his e-mail address: fbogers@gresults.com

sunpac on the net

If you have an Internet account, a new site you could take a look at is the SUNPAC (Southern Users Packet Network) site at <http://www.theshorts.demon.co.uk/sunpac/>. As well as giving local news and information, it also contains much general help and guidance for first-time packet users, the site owner being John,

I'm told that GB7VES in Frimley, Surrey, has now ceased operations. Nick, G8NLY, has provided temporary 1200 baud access to CAMBLY node (and from there to GB7NLY) on 144.550, in addition to his 9600 baud access port on 144.975MHz and 1200 baud access port on 432.650MHz. Any users who find that the temporary 144.550MHz port is their best option for BBS / network access, are asked to please let Nick know, to assist in the evaluation of what needs to be provided to fill the gap left by GB7VES / FRIMLE node. Some 'displaced' users may find that GB7PFD in Petersfield, which is due on-air soon, may be of assistance to them. This BBS, operated by Peter, G6HJP, will have user access ports on 144.950 and 432.650MHz.

10m sstv

With 10m potentially 'opening up' more often now that we are beginning the climb up the next peak

mits a beacon picture every 15 minutes, which can also be a good propagation indicator. To open the SSTV repeater, send a 1750Hz tone, but if initially you get no response on 28.700MHz USB try altering your transmit frequency very slightly either side. The repeater will then acknowledge your access, and you can transmit your picture. Once completed, the repeater re-transmits your SSTV picture on both the 10m and 70cm frequencies, so you as well as others can see your picture coming back. Reports to Danny, ON4VT, either via packet to ON4VT@ON7RC.BR.BEL.EU or by e-mail to ON4VT@ping.be or for more info take a look at <http://www.ping.be/on4vt/> on the web.

ctrl-z, end of message

If you'll be at the London Amateur Radio and Computer Show at Picketts Lock this month, then do drop by the Ham Radio Today

amateurs are showing the way in data comms for developing countries

ware all the time, although Dave, G0DJA, is the only other UK-based ham that Ciemon has contact with on APRS. He adds that although its fans are few and far between, quite a few seem to have a go every now and then. Ciemon says that he thinks there are a number of reasons for this, but particularly as DOS APRS, which is the type that most people get introduced to first, isn't very user friendly and you've got to know how to use it before you can get on to APRS. But there's also WinAPRS (his favourite), MacAPRS and JavAPRS. Also, some amateurs believe that there aren't UK maps available, which is wrong, as both Ciemon and I have a number. I also know that many map sets have been supplied through the HRT software offer service in the past, and plenty of UK maps are included together with the latest versions of DOS and Windows APRS, on the QSP73 Ham Software CD-ROM (tel: 01703 263429 for info).

Frank, ON9CFB, asks about

G8OQN, who's the very active secretary of the equally-active SUNPAC group. SUNPAC is a non-profit making organisation, dedicated to the improvement and development of the packet network in Hampshire, Dorset, Isle of Wight, South Wiltshire and surrounding areas. For more information on the group by packet, send a message to John G8OQN@GB7SUN.#48.GBR.EU.

bbs news

A new packet BBS now on air is GB7BMT in Bournemouth. If you live in or around the Swanage, Wareham, Poole, Bournemouth, Christchurch, Lymington, Cowes, Yarmouth and Totland areas, and are currently using a different BBS, you can try accessing GB7BMT directly on 144.9375 or 432.650MHz. You can get further information from the SysOp, Roy, G1GRB@GB7BMT.

in the sunspot cycle, a message from Pablo, LW5DGW, in Argentina says that he's listening out on 28.100MHz for SSTV QSOs.

A little closer to home, the ON4VRB SSTV repeater is now again operational on 28.700MHz USB, with a link with the co-sited 70cm repeater on 433.925MHz FM. It trans-

stand in the Red Hall and say hello: the stand is right next to the main café area. I plan to be there periodically and look forward to meeting you!

I'm always pleased to hear from readers, you can contact me by e-mail: g4hcl@amsat.org or packet: G4HCL@GB7SOU.#48.GBR.EU or by post via the editor.

The ON4VRB SSTV repeater awaits your call on 10m - or even 70cm.

ON4VRB
SSTV Repeater

Transponder 10m ↔ 70cm

28,700 USB
433,925 FM
BEACON
PIC

Give a short 1750Hz tone or whistle
TX ur picture within 8 sec after repeaters "k" tone
The repeater will repeat ur picture on 28,700 USB 433,925 FM

Products from our range designed to increase your range . . .

HF

Our superb Alpha amplifiers need no introduction! With an easy 1.5kW out, these loaf along at the UK limit. See Feb 97

RadCom review by Peter Hart for an independent verification of their quality. We reproduce his verdict on the 91b manual-tuning amplifier (£2,199)

"An excellent amplifier in all respects", and he called the no-tune 87A (£5,295) "The Rolls-Royce of all amplifiers". As the 87A interfaces with all brands of HF radio (unlike other "no-tune" amplifiers), you can change your radio to *any* make without losing amplifier compatibility.

Antennas? What a choice, from HyGain, Cushcraft, KLM, M-squared, Force 12 and GemQuad. In stock now, the amazing C-4SXL (£795) from Force 12. This antenna implements 40-20-15-10 yagis on one 24ft boom and weighs only 48lbs. For those who would like to have as super signal on 20 through 10m, including the 17 and 12m bands, the GemQuad is an excellent choice. For only £380, the WARC version of the Gem takes a lot of beating. We have *lots* of others, and as we list everything from 10m verticals to a 4 ele 80m yagi, we have something for *you*!

Rotators? Rotators 'r us! Call us for the latest and best.

Planning Probs? They can't touch you for this one! The amazing Force 12 ZR-3 tri-band vertical dipole (£449) is less than 6ft high, yet retains good bandwidth and high efficiency, on 20-15-10m with no tuning.

. . . And specials? . . . We have good stocks of baluns, cable, wire, remote antenna switches, tri-band stacking units, "four-square" vertical phasing systems, and (nice one this) an antenna switch that can be driven by any "band data output" Yaesu or ICOM transceiver, or from your PC LPT port (with appropriate software) to change up to six antennas automatically, triggered by a band change on the radio.



VHF

NEW! From T E Systems, a series of the highest-quality VHF/UHF amplifiers. These all have GaAsFET preamps as standard, with RF VOX, or PTT switching. Here is just some of T E's range -

Band	P In	P Out	£	Band	P In	P Out	£
6m	10	170	319	2m	25	350	509
6m	10	375	499	2m	80	350	459
6m	25	375	459	70cm	10	100	359
2m	2	150	319	70cm	10	185	569
2m	10	200	329	70cm	25	185	529

For VHF Antennas, who has got more to offer than we have?

We represent M-Squared and KLM in the UK, and also offer you Eagle Antenna and CushCraft. We particularly recommend Eagle, and some of the Eagle range are listed below. You'll find cheaper, but not better . . .

Band/	dBd	Boom	£	Band/	dBd	Boom	£
eles		(m)		eles		(m)	
6/3	7.0	2.3	79	2/15	14.2	8.3	149
6/4	8.0	3.6	95	2/18	15.0	10.5	169
6/5	9.0	5.2	115	70/15	14.0	2.9	55
4/3	7.0	1.7	75	70/26	17.0	5.9	139
4/5	8.0	3.7	99	23/25	16.1	1.9	75
2/9	11.5	3.4	59	23/40	18.7	3.2	99
2/10	12.4	4.99	105	23/60	20.0	5.2	165

As well as VHF antennas, we can provide stacking frames, power splitters, harnesses, indeed all you need to implement an excellent system.

Our opening hours are 9am to 10pm, Monday to Saturday. We welcome personal callers, but by appointment only please.

Vine Antenna Products - The Vine, Llandrinio, Powys, SY22 6SH. Tel 01691 831111, fax 01691 831386. Email ron@gw3ydx.demon.co.uk

C.M.HOWES COMMUNICATIONS

www.howes-comms.demon.co.uk

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



DC2000 built in HA22R hardware option

DC2000 electronics kit: £22.90
(Extra band module kits: £7.90 each).
HA22R Hardware (case etc.): £18.90

HOWES DC2000

Amateur SSB/CW Receiver Kit - £22.90

The ease of construction combined with excellent performance make this a great project for both the beginner and the experienced operator. Plug-in band modules (one included) give flexible frequency coverage. There is a full range of matching accessories including transmitters, so you can **expand your receiver into a transceiver** as you build up your station! There have been excellent reviews in many radio magazines, (RadCom included). Use the DC2000 on any band from 1.60 to 10M. Enjoyable to build, with great results!



Multiband SSB Receiver

DXR20. Covers SSB and CW on 20, 40 & 80M bands as standard. Optional extra plug-in band modules available. Can link to TX2000 or AT160 for transceive (by adding LM2000 linking module). Versatile & great performance!
DXR20 Kit: £39.90. DCS2 "S meter" Kit: £10.90.
HA20R hardware pack: £28.90

Enjoy home construction with a top class Winter Project from HOWES!

ACCESSORY KITS

ASL5	SSB and CW AF external filter	£15.90	DFD5	Digital Frequency Counter/Readout	£54.90
ASU8	RX Antenna Selector/Attenuator	£27.90	MA4	Microphone preamp and filter	£6.20
CSL4	Internal SSB & CW Filter for our RXs	£10.50	ST2	Morse Side-tone/Practice Oscillator	£9.80
DCS2	"S Meter" for direct conversion RXs	£10.90	SWB30	SWR/Power Indicator, 30W 1-200MHz	£13.90
CBA2	Counter Buffer (fit to Rx to feed DFD5)	£5.90	XM1	Crystal Calibrator, 8 intervals + ident	£16.90
DFD4	Add-on Digital Readout for superhets	£49.90		(optional hardware packs are available to suit most kits)	

Transmitting ATUs

Neat "T match" HF ATUs with air-spaced Jackson tuning capacitors and switched inductor. All parts mounted on PCB. 30 or 150W versions. Additional 4:1 balun & 50MHz coverage on CTU30.
CTU30 kit: £39.90.
HA30R hardware: £17.90.
CTU150 kit: £49.90.
HA150R h/ware: £16.90



Receiving ATUs

CTU8 (pictured). Covers 500kHz to 30MHz, with S0239 sockets for coax fed antennas, or long wires - matches almost anything!
Built: £49.90, Kit (inc. h/ware): £29.90
CTU9. All the features of the CTU8 plus 4:1 balun, bypass switch and terminal posts.
Built: £69.90, Kit (inc. h/ware): £39.90



TX2000 and HA22R



AT160 & MA4 in HA160R hardware

TRANSMITTERS

AT160 10W AM/DSB/CW 80 & 160M. Kit: £39.90 HA160R Hardware for AT160: £22.90
TX2000 5W CW. Plug-in band filter. Kit: £24.90 HA23R Hardware for TX2000: £16.90
LM2000 Links the above transmitters to DC2000 or DXR20 for transceive. Kit: £16.30

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 parts locations, full, clear instructions and all board mounted components. Sales, constructional and technical advice are available by phone during office hours. Please send an SAE for our **free catalogue** and specific product data sheets, or you can browse this information on our **Internet Website** (address at top). UK delivery is normally within seven days.

73 from Dave G4KQH, Technical Manager.

RF/GSM Engineers

We specialise in the supply of

- Systems Design
- Circuit Design
- Development/Test
- Production
- Commissioning

Looking for a career move?

We can help you!

We are the specialists!

We have hundreds of permanent and contract opportunities across the UK and Europe. For a fast positive response phone:

92 Broadway, BRACKNELL, Berks RG12 1AR Tel 01344 489489 Fax 01344 489505
161 Bitterne Road West, SOUTHAMPTON, Hants SO18 1BH Tel 01703 229094 Fax 01703 220326
Email: cliveden@cliveden.co.uk Vacancies: <http://www.cliveden.co.uk>

CLIVEDEN

Cliveden Recruitment plc

Offices at Birmingham, Manchester, Bristol, London

STORNO 5662 UHF synthesised 12v mobiles supplied with pre-programmed EPROM, BCD switches etc and full info to make 100CH. 70cms mobile, 15w O/P, just needs 2 crystals, mic and L/S (not supplied) to complete the kit.....**£45**

STORNO 4662 UHF synth h/helds supplied with Ni-Cad no ants.....**£15**

STORNO 4114 VHF as above.....**£15**

STORNO 2-way desktop chargers for above series.....**£15**

STORNO 5114s VHF high band mobiles synthesised supplied sets only but with circuits and 2m. Modification info.....**£35**

PYE WHITEHALL 12V mobile units low-band 68-88 MHz AM/FM bootmount with control box but no cable with info..**£25**

YAESU 545L14 UHF synth h/helds need external programmer supplied with desktop charger, batt, ant no info.....**£50**

PYE PF85 3CH FM h/helds for 2m with Ni-Cad + ant.....**£30**

PYE M293 'E' band AM 6CH mobiles, OK to mod for 4m or RAC rally channel etc with MIC+L/S.....**£25**

PYE 5002 'E' band FM h/helds no batts or ants but supplied in original ex MoD packing, 2 units for.....**£25**

VINTAGE - new/unissued hand microphones for wireless sets No. 18 in original ex MoD packing, 2 units for.....**£15**

We have a wide range of 'one or two offs' please ring for particular requirements, receivers, PMR h/helds, mobiles etc.

Please send self stamped addressed envelope for mail list.

NOTE CLOSED ALL DAY ON WEDNESDAYS

All goods are supplied in "as is" condition but are checked for completeness before despatch.

All goods include UK mainland p/p and VAT.

Technical Modification enquiries after 4.30p.m. please.

Most credit cards accepted.

G.W.M. RADIO LTD



40/42 PORTLAND ROAD, WORTHING, WEST SUSSEX BN11 1QN
TELEPHONE: 01903 234897 FAX: 01903 239050



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
 - ★ Hot dip galvanised to BS729
 - ★ Simple four bolt installation
- Many other mast types available

Call 01505 503824

Fax 01505 503246

or write to

TENNAMAST SCOTLAND LTD

81 MAINS ROAD

BEITH, Ayrshire KA15 2HT

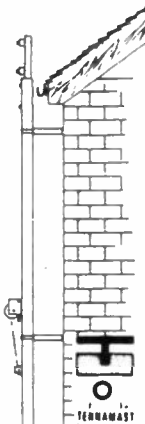
Email: tennamast@btinternet.com

For Benelux Countries contact

Doeven Elektronika - Tel: + 31 (0) 5280 69679



Also Eurocard



RADIO + TELECOMMUNICATIONS CORRESPONDENCE SCHOOL

AT OUR NEW OFFICE

2 SOMERSET PLACE, TEIGNMOUTH
DEVON TQ14 8EP

START training now with the specialists for the following courses:

Telecomms Tech CG 2720, Radio Amateur Licence "A" or "B", Micro Processor and introduction to Television.

FOR our FREE Brochures write to the above address or call

01626 772414

"DTR7-5...Remarkable performance!" says Peter Hart



Band-pass input giving good rejection of "out of band" signals. Low-noise devices used throughout, resulting in a sensitivity figure of around 1µV MDS.

All versions, DTR3-5, DTR7-5 or DTR10-5 - only £168 plus £4 p&p
The Kit "with all the bits" - just £97.80 plus £4 p&p

Send SAE for brochure or call Alan G4DVGW on 0115 9382509

Now 3 versions - for 80, 40, or 30 metres.
Hear them on the bands! These remarkable little single band CW rigs are ideal for your next IP operation, regular QRP activity, travel and holidays.
Transmitter: stable Colpitts VFO, 7-pole filter at PA.
Power output nominally 5W into 50Ω but can be adjusted from a few mW to about 8W.
Receiver: Direct-conversion.



LAKE ELECTRONICS

7 Middleton Close, Nuthall
Nottingham NG16 1BX
(Callers by appointment only)

advertise hrt

To advertise in
Ham Radio Today

Phone 01202 777852

Fax 01202 317902

Email: adman@mcmail.com

The MIREX group reports that Mir's announced crossband experiment has been abandoned for now because of problems with the antenna onboard. The crossband test was to have begun on 1 December and was to have involved a 70cm uplink and a 2m downlink. US astronaut Dave Wolf, KC5VPF, has been heard on 145.985MHz FM simplex, but only sporadically.

A space walk at the end of December was to check and, if necessary, repair the 2m / 70cm antenna that might have been damaged during a space walk in November. The Kenwood TM-733 aboard Mir has been connected to the spacecraft's SAFEX antenna.

A new dual-mode packet radio TNC was also recently sent to Mir and was tested onboard. The new TNC supports both 1200 as well as 9600 baud connections, and has a message buffer size of 100 kilobytes; substantially larger than that of the TNC previously in use.

9600 baud communications will be delayed until a suitable cable can be wired up and installed. The ground teams are aware of a problem with the new TNC; they know exactly what the problem is, but they have to wait for the crew to have time to make the adjustments.

NASA delayed the January space shuttle flight to Mir, leaving American astronaut David Wolf, KC5VPF, aboard the space station for at least another few days. *Endeavour* was supposed to lift off on 15 January, but NASA have announced that 20 January will be the new launch date. *Endeavour* will pick up Wolf and drop off his replacement, Andy Thomas, KD5CHF, who will be the last US astronaut to live aboard Mir.

Digital Satellites

G3CWX's monthly Oscar-11 Report states that this satellite has continued to provide good signals on its 145.826MHz beacon, al-

though some interference has occurred from DOVE and Sputnik-40, which also transmit near this frequency.

Reports have been received about the mode-S beacon; apparently it is three to four S-points above the noise, compared with Dove's eight to nine. A new format AMSAT-UK bulletin is now being transmitted. This contains details of amateur satellite frequencies and modes of operation. It may be changed at monthly intervals.

WEBERSAT (WO-18) is also back and gathering and sending Whole Orbit Data. The PHOTO task should have been uploaded by now; the command team hoped to have pictures and spectra by about 12 December. WO-18's return to service is suspected to be seasonal in nature.

Phase 3D

Phase 3D Project Leader, Karl Meinzer, DJ4ZC, recently visited the Integration Lab in Orlando for a top-to-bottom review of Phase

is a good chance for AR-503, but this is unconfirmed. According to the original schedule, Ariane 503 is due to lift off in May this year, for the final qualification flight of the Ariane 5 program. The first Ariane 5 *commercial* launch (AR-504) is currently planned for the second half of 1998.

Short Bursts

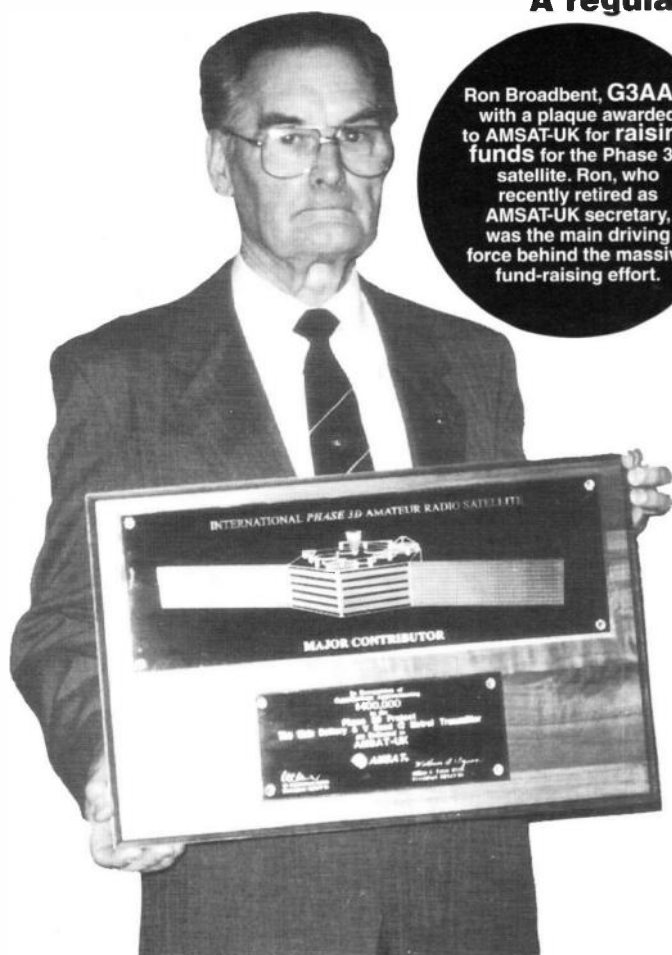
When the new year starts, so do the day-numbers in the 'Keplers', and some old tracking software refuses to cross between the years. A tactic to use in this instance, until 1998 Keplers arrive, is to 'deceive' the software by giving it a 1997 date, eg 2 January is 33 December, etc.

Another problem comes in some software when the epoch in the Keplers contains spaces, ie "1998_4.xxxxx". Here, just edit the Kepler file before feeding it into the program so that the spaces are replaced by zeros - extra zeros do *not* affect the checksum of two-line elements.

Some amateurs still use 'old'

Satellite Rendezvous

A regular round-up of satellite news and views



Ron Broadbent, G3AAJ, with a plaque awarded to AMSAT-UK for raising funds for the Phase 3D satellite. Ron, who recently retired as AMSAT-UK secretary, was the main driving force behind the massive fund-raising effort.

3D's status. The Phase 3D satellite was to have been aboard the Ariane 502 flight on 30 October, but ESA's revision of launch environments, and the consequent structural modifications to the satellite's spaceframe made it impossible for Phase 3D to meet the 502 flight schedule.

The structural work is now essentially complete and the crew at the lab are beginning to re-install electronic modules and other equipment which had to be removed so that the structural work could proceed. Following this, tests will be conducted to confirm satisfactory inter-operability of all of the satellite's various sub-systems, and then environmental testing will take place.

We do not expect any new information concerning a launch date and vehicle for Phase 3D until well after European space authorities determine the root cause of the early engine shutdown that took place on the recent Ariane 502 flight. My personal understanding is that there

tracking software which requires a sidereal time offset, and it is necessary to update it at the beginning of each year. The number for 1997 was 0.27693880 and the number for 1998 is 0.27627570 (an extra year 2000 problem for amateurs is that, after next year, I will not be giving out these numbers!) Of course, it would be better to buy new tracking software from your local AMSAT organisation, as all recent software calculates sidereal time routinely.

If you were fortunate enough to work the recent T49C DXpedition which was active on the satellites you can check out their web site at: <http://sk7do.te.hik.se/clubs/sk0ux/T48RCT.html> to see if you *really* made it into their log. There is an electronic QSL server online. Search for your call. When it comes up, select it and download a .PS file (Postscript). Send this to your postscript printer and *voila*, you have a QSL card. But I understand that most award organisations will *not* accept this card for award purposes.

International Space Station

Various published news reports are now saying that NASA will not have the International Space Station fully assembled until December 2003. AMSAT-NA's VP of Manned Space, Frank Bauer, KA3HDO, indicates that ham radio's presence on the station should also happen far sooner than the full assembly date. Frank reports that the current plan is to operate the space station in a 'crew tended' fashion sometime beginning in early 1999. In line with that schedule, Frank says that the ISS Amateur Radio team is now working very hard to incorporate the first phase of the ISS Amateur Radio project - a transportable station - and deliver this equipment to the Johnson Space Center in Houston, Texas, for flight certification in June this year. Delivery of that equipment to the space station is now down for December 1998.

NASA also recently named the

though Bowersox has also said he would like to get a licence.

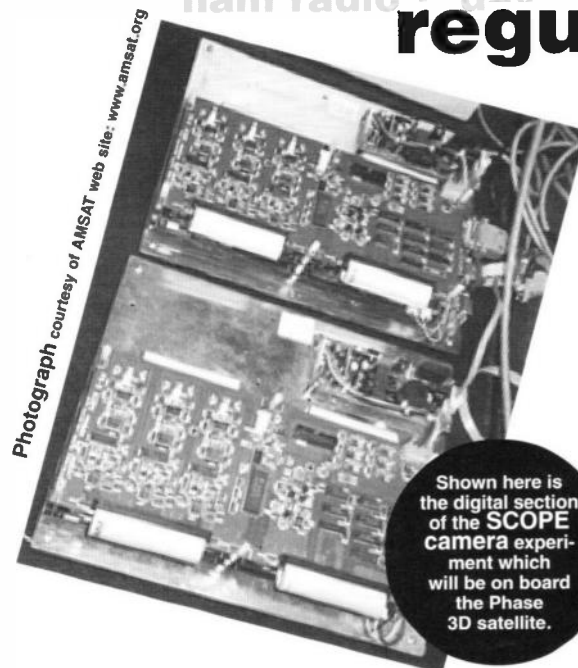
Russian cosmonaut Yuri Onufrienko will head the fourth crew. US astronauts Carl Walz, KC5TIE, and Daniel Bursch will accompany him.

Initially, ISS crews will inhabit the service module, which will include an Amateur Radio antenna, with amateur gear scheduled to be delivered aboard the STS-96 shuttle flight. Microsat / repeater payloads are tentatively scheduled to arrive in early 2002, expanding Amateur Radio capability aboard the station.

Several people have apparently been looking for a program to decode HF fax and WXSAT image transmissions with a Soundblaster card. A good free-ware program can be found at: <http://ourworld.compuserve.com/homepages/HFFAX/>

Thanks Ron

An announcement by G2UK in *Oscar News* (No 20) of January 1978 hailed Ron Broadbent's,



Photograph courtesy of AMSAT web site: www.amsat.org

Shown here is the digital section of the SCOPE camera experiment which will be on board the Phase 3D satellite.

AMSAT-UK News

As stated above, G3AAJ retired from the position of AMSAT-UK Secretary on 31 December 1997. This demanding task has been taken on by Fred Southwell,

be published at the same time. We normally prefer authors to present the papers themselves, rather than having someone else read them in the author's absence, but we also welcome 'unpresented' papers for the document.

Satellite Rendezvous

from AMSAT-UK's Richard Limebear, G3RWL

first team members to live and work aboard the International Space Station, and four crew members already hold amateur licences. In addition, several of the crew members are studying for their tickets.

The first crew will consist of American astronaut William M Shepherd as the expedition commander. Shepherd is currently studying for his ticket. He will be accompanied by Russian cosmonauts Yuri Gidzenko and Sergei Krikalev, U5MIR. The crew is training for an early 1999 launch and a planned five-month mission on the ISS.

The second crew, headed by Russian cosmonaut Yuri Usachev, R3MIR, will include US astronauts Susan Helms, KC7NHZ, and James S Voss, who has indicated an interest in getting an Amateur Radio licence.

No licensed hams are among the third crew, which will be headed by astronaut Kenneth Bowersox and will include Russian crewmates Vladimir Dezhurov and Mikhail Turin, al-

G3AAJ, arrival as AMSAT-UK's first Secretary; the grapevine said he "did things to lighthouses" for a living. The very next edition of *Oscar News* saw Ron taking us to task for various matters. Let it never be said that he doesn't start out as he means to carry on. That edition also announced that AMSAT-UK's minimum donation would be £3 for the following year. It is no small tribute to Ron that now, twenty years on, the amount has only risen by a relatively small amount (to £14) - his ability to extract money for the amateur satellite programme from all and sundry has been nothing short of phenomenal.

Ron's efforts over the years led to him receiving the MBE three years ago. Everyone agreed that the award was well earned but, to Ron, someone saying "thanks for your hard work" and buying him a beer is appreciated almost as much.

Doubtless other tributes to him will appear in a fairly short time scale so, for now, Ron, thanks for all your hard work: I owe you one.

G6ZRU, so the telephone and fax numbers are changing. AMSAT-UK's phone number changes to 01273 495733 and fax to 01273 492927. As always, a big SASE still gets membership information and SWLs are, of course, welcome too.

Other changes to the AMSAT-UK Committee can be found in the most recent issue of *Oscar News* which everyone should have received before Christmas. In particular, folks renewing their annual donation should note that it should now be sent to Fred's address.

The 13th AMSAT-UK Colloquium will be held at the University of Surrey in Guildford between Friday 31 July and Sunday 2 August 1998. This year's event will include technical and operational matters, as well as an IARU forum.

AMSAT-UK invites authors to submit papers, about Amateur Radio space and associated activities, for this event and for the *Proceedings* document which will

Offers of papers should be submitted as soon as possible. The final date for full documents is mid-June, so that the *Proceedings* document will be available to participants. A second (and final) call for papers will be issues in about March, probably at the same time as Colloquium booking information becomes available.

Submissions should be sent to me *only*, via any of the following routes: by post, G3RWL QTHR; e-mail: g3rwl@amsat.org; packet radio: G3RWL@GB7HSN.#32. GBR.EU; or satellite: AO16/19/22/23/25.

AMSAT-UK also invites anyone with requests for programme topics to submit these as soon as possible, also to me. Invitations for papers on specific subjects will be included in the future call.

One suggestion already in is for a forum on "What to do with P3D?", ie the general schedule of modes, what kind of software needs to be developed, what experiments are of general interest, and so on.



I wonder if any of you who are RSGB members have been chasing the special award which is running this year in connection with the centenary of amateur radio? The award involves collecting points from working Commonwealth call areas, UK post codes, IARU countries, IOTA island groups and ITU zones, in other words those 'counters' which normally relate

advertent, and I was actually 2kHz away which ought to have been enough), but a polite request to move (I had been there for an hour or more without apparently offending anyone) would have been sufficient. As amateurs we need to stand together to preserve our frequency allocations, not to create divisions amongst ourselves. In this respect, if this Centenary award helps us to un-

is inactive at any one time, for family or other reasons, and many of the others cannot be available for such events because of other commitments, I think this is a fairly impressive figure, and it was especially encouraging to work many recently-licensed M0 callsigns. And, of course, I'm sure there were plenty of other amateurs on for the contest whom I failed to catch up with.

And while on the subject of UK activity, it is fascinating to see the interest generated by the special one-by-one callsigns available these days to UK clubs for special event and contest operations. This year the callsigns will use the digit '8' (for 1998, of course). If your club has obtained one of these calls, then do encourage its use, as many overseas amateurs enjoy working these stations and collecting the QSL cards.

I started the New Year by chasing points for the Centenary award myself, and it was an opportunity to try out my new HF

of a station I heard on 160 metres in the early hours of New Year's day. G4VFU/MM (/MM means maritime mobile) was an outstanding signal, and it turned out that he was using two five-eighth wave vertical antennas on topband. What wouldn't I give for just one of those! These antennas are each 100m high, and were possible because he is on an oil exploration vessel with its own derrick from which they are suspended. Can't be bad!

The most notable DX-pedition operation during January was probably XW30 and XW30A operating from Laos. The group got special permission for the operation, and did a good job despite having to operate from a downtown (and therefore noisy) location and also having to attend a number of official functions. Hopefully this will have been good groundwork to make licensing more straightforward in the future, and at least some members of the same group are already planning

HF Happenin' **G3XTT** HF Ha

This month Don Field, **G3XTT**, looks at some of the new

to the various RSGB awards programmes. There are also bonus points for using additional bands and modes, as well as for entering RSGB contests. The idea is to encourage HF enthusiasts to try out different bands, modes and activities as the year goes on. It's true, I'm sure, that many of us get stuck in a 'rut', perhaps just 'ragchewing' with friends on 80 metres, or only going on for contests, and miss out on a lot of what HF has to offer. In doing so we can easily become intolerant of others.

I was operating in the RSGB AFS (Affiliated Societies) SSB contest in mid-January (more of this in a moment) when a Dutch amateur came on my frequency and, without identifying himself at first, started to swear at me for interfering with the SSTV (slow-scan television) frequency. He then proceeded to transmit an SSTV carrier on top of me to force me to move. Now I may well have been too close to the SSTV calling frequency (if so it was in-

derstand a little better what it is our fellow amateurs enjoy about different activities on the bands, so much the better.

Talking about the AFS contests, in the two weekends of the events (CW one weekend, SSB the next) I made a total of almost 600 contacts, mostly with UK stations. Although there was obviously some overlap between the stations I worked on the two weekends, I would guess that in all I worked well over 1% of the UK Class A amateur population during that time. Given that perhaps half the amateur population

Yagi antenna, which I had put up over the holiday period to replace my TH-5. I now have one of the Force 12 C-4 beams, which is trapless, works on 40 through 10 metres and, although not specifically designed for 17 and 12 metres, is supposed to give a good account of itself on those bands too. It's always fun to try out a new antenna, though by no means easy to make fair comparisons with what you may have been using before. Anyway, the early signs are encouraging, so I'll keep my fingers crossed.

But I have to say, I was envious

a second operation in October. They were worked in the UK on most bands, including 160m, though I only managed to catch them on 80m.

dx news

A Czech group should be operating from various Pacific islands by the time you read this, with their March itinerary due to include Tonga, Western Samoa and Fiji. QSL information is via: OKDX Foundation, POBox 73, Bradlec, 293 06 Mlada Boleslav, Czech Republic.

Belgian amateurs ON4APS

current fee	item	new fee
Free	Initial application each year, member	\$10
\$10	Additional application, member	\$20
\$10	Initial application, foreign non-member	\$20
\$20	Additional application, foreign non-member	\$30
\$2	Convention / HQ walk-in card check	\$5
10c	Per additional QSO*	15 cents
\$10	Certificate fee (includes pin)	\$10
\$25 + shipping	Honor Roll & 5-Band DXCC plaques	\$30 + shipping**
\$40 + shipping	#1 Honor Roll plaque	\$50 + shipping**

Table 1: New ARRL DXCC fees.

*First application prices are for 120 QSOs maximum and additional application prices are for 100 QSOs maximum. QSOs beyond those limits are charged at this price. **includes pin

(YL operator), ON4APS and ON4CEL will be active from Libya between 2 and 8 March. The special callsign 5A21PA will be used on CW, SSB and RTTY. QSL via ON4APS either direct (Patrick Piesen, Koolkerkes teenweg 141, B-8800 Brugge, Belgium) or through the bureau. Logs will also be available at <http://users.glo.be/~franky/5a21pa.html> after the operation. Libya is an easy propagation path from the UK on all bands, so this is definitely one to look out for.

An era came to an end in January, when Sheridan, A92BE, closed down from Bahrain after 23 years and moved to Oman. He will be there for two years and expects to be back on the bands with an A4 callsign.

dxcc new fees

The ARRL DXCC Desk has announced new fees for DXCC, which went into effect on 1 Janu-

K1BV's awards pages on the Internet.

Belgium - UBA 50 Award

Issued by the Belgian IARU national society, UBA, to celebrate its 50th anniversary in 1998. Earn 50 points by contacting Belgian amateurs during calendar year 1998. Club stations of all UBA divisions will be using the special prefix ON50 throughout 1998 and count 4 points each for the award. Other 'normal' Belgian stations count 2 points each. Special contest stations count 2 points each: OT8A, OT8B, OT8C, OT8D, OT8E, OT8G, OT8H, OT8K, OT8L, OT8M, OT8N, OT8O, OT8P, OT8Q, OT8R, OT8T. SWL OK. Each station may only be worked one time. All bands and modes may be used. Send a log extract, certified by two other amateurs, and fee of 200 BEF, DM10, or US\$5 to: Danny Commeyne, ON4ON, Rozenlaan 38, 8890 Dadizele, Belgium.

lished for the awards:

- Basic - 50 points including 2 Pioneer stations.
- Bronze - 100 points including 4 Pioneer stations.
- Silver - 150 points including 6 Pioneer stations.
- Gold - 200 points including 8 Pioneer stations.
- Platinum - 250 points including 10 Pioneer stations.

For SWLs the same rules apply, providing the log extract shows the particulars of both stations heard. A special 50th Anniversary, 'Israel State Medal' will be awarded to the three highest scores in each of the IARU Regions 1, 2 and 3. Logs must be sent to the IARC Award Manager before 30 June 1998. Send to: POBox 17600, Tel Aviv 61176, Israel or e-Mail: josepho@shani.net

Expo 98

Rede dos Emissores Portu

contact with the official Expo station CT98EXPO, 5 points for a QSO with CT98REP, and 2 points for QSOs with other Portuguese (including Azores and Madeira) stations using the various special '98' prefixes. UK amateurs need 30 points in total to qualify for the Diploma, and a merit plaque is available for achieving this score on at least three of the five main HF bands. An official application form can be obtained from the REP awards manager in return for an SAE and one IRC, or you can prepare your own application in the recognised format. The awards are free, but you are asked to include two IRCs to cover postage. The REP Awards Manager is at PO Box 2483, 1112 Lisboa Codex, Portugal.

A further Diploma, the Diploma 'Vasco de Gama' is also being introduced, with various classes, and allowing retrospective credit for contacts made since 15 November 1945. Points can be

openings HF Happenings

awards currently available for the HF operator

ary. These are shown in Table 1, and are in addition to the requirement to ensure that you include sufficient return postage. That's the bad news. The good news is that DXCC checking for new applications and updates, for the 250 most 'common' countries, is now available in the UK. Jim Kellaway, G3RTE, will be the checkpoint for English amateurs, and Rob Ferguson, GM3YTS, for amateurs resident elsewhere in the UK. The standard DXCC fees apply, but can be paid in sterling, and at least you don't have to mail your cards to the USA. I imagine both Jim and Rob can provide further information, and also that they will try to be available in person at many UK events so that you can have your cards checked on the spot.

more awards

Finally, news of a few awards you can chase during 1998, over and above the RSGB Centenary award mentioned above. Most of this information was taken off

Israel's 50th Anniversary Award

The award commemorates the 50th Jubilee of the State of Israel and the establishment of the Israel Amateur Radio Club. The activity period started 1 January 1998 and ends at midnight on 1 May 1998, which is the date of Israel's 50th Independence Day. The aim is to contact as many Israeli amateurs as possible. To honour the IARC founders, a special callsign will be used by those amateurs who belong to the founders group (Pioneers). They will use the prefix 4X50. Special event stations will be active to commemorate 4X Silent Keys, any of whom belonged to the founder's group. They will use the 4X50 prefix and the Silent Key's old suffix ending with /SK. (For example, 4X50BX/SK). Each contact with an IARC member will count one point. Each contact with a 'Pioneer Station' will count five points. The following point requirements are estab-

gueses, the national amateur radio association of Portugal, is running a Diploma 'Lisboa' from 1 January until 30 September to celebrate Expo 98 in Lisbon. Score 10 points for a mandatory

claimed for contacts not only with Portugal, but with a number of countries with historic links with Portugal. I can provide a photocopy of the full rules in return for an SAE.

The Vasco de Gama award, issued for contacts with stations in Portugal and countries with Portuguese connections.

LANCASHIRE

AMATEUR ELECTRONICS/HOLDINGS G3LLL.

YAESU, AOR, ICOM, ETC. FT 101 EXPERTS

6JS6C 6146B 12BY7A Original type approved valves and our own Double Balanced Mixer and new band WARC Kits for original FT101 MK1-E. S.A.E. List Full Yaesu range. 15 mins Junction 31 M6. Free parking. Call and consult G3LLL without obligation. Holidays? Phone, check we are open before calling. Lunch 12-1.30pm.

45 JOHNSON STREET, BLACKBURN BB2 1EF

(01254) 59595. OPEN: Thursdays, Fridays and Saturdays ONLY from July '96

NORTH WEST & NORTH WALES

AMATEUR RADIO COMMUNICATIONS LIMITED

OPEN
Tues to Sat
10-5pm

We are official factory appointed stockists and approved Service Centre for all the major brands.

ICOM - YAESU - KENWOOD - ALINCO

TEL/FAX: 01925 229881/2

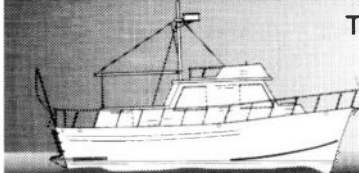
We are 1 mile from J23 M6,
4 1/2 miles off J9 M62



38 Bridge Street, Earlestown, Newton le Willows, Merseyside WA12 9BA

CORNWALL

For All Your Marine Radio Communications



Try us first for all your Radio
amateur and marine
communications
ICOM YAESU NAVICO JAYBEAM

SKYWAVE
OF CORNWALL

Give Mike G1DDK a call today!

SKYWAVE MARINE SERVICES, SQUARE SAIL BOAT YARD, CHARLESTOWN HARBOUR, ST AUSTELL, CORNWALL. P25 3NT. TEL: 01726 70220

SCOTLAND

JAYCEE ELECTRONICS LTD

20 Woodside Way, Glenrothes
Fife KY7 5DF

Tel: 01592 756962

NEW OPENING HOURS:

Tues-Fri 9 am to 5 pm, Sat 9 am to 4 pm. Closed Sunday & Monday
Good range Kenwood, Yaesu & Icom etc, plus quality secondhand equipment

PLEASE MENTION

HAM RADIO

TODAY

WHEN REPLYING

TO ADVERTISEMENTS

CAMBRIDGE

CAMBRIDGE MULTICOMM 2000

- Wide range of new and used equipment always in stock
- International mail order service
- Fast friendly service

Unit 3, 86 Cambridge Street,
St Neots, Cambridgeshire

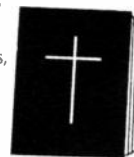
PE19 1PJ

Tel: 01480 406770

CHARITY RADIO

CQ CHRISTIAN AMATEURS!

The World Association of Christian Radio Amateurs and Listeners actively promotes Christian fellowship worldwide, regular nets, activity days, Annual Conference, handbook, magazine etc. Call our UK Sunday SSB nets 3747 kHz at 8am and 2pm, or 144.205 MHz at 3pm.



For full info write to our
Membership Secretary
WACRAL
51 Alma Road, Brixham,
South Devon TQ5 8QR

See Web [HTTP://www.GOPPOQ.DEMON.CO.UK/](http://www.GOPPOQ.DEMON.CO.UK/)

VALVES

WILSON VALVES
(PROP JIM FISH G4MH)
Over 50,000 valves stocked,
2000 different types,
vintage, military, audio, etc.
Fast service. Send SAE for list
VALVES WANTED FOR CASH
28 Banks Avenue, Golcar, Huddersfield,
West Yorks HD7 4LZ
Tel: 01484 654650
Fax: 01484 655699

HOLIDAYS

NORTH WALES HOLIDAYS -
Caravan - bunkhouse - camping.
Elevated rural site, two miles
from beach, use of shack and
antennas, open all year. Tynrhos,
Mynytho, Pwllheli. Tel: 01758
740712.

advertise hrt

To advertise in
Ham Radio Today
Phone 01202 777852
Fax 01202 317902

Email: adman@mcmill.com

It is said that radio clubs are the backbone of Amateur Radio in the UK. We are therefore very keen to promote the work of active radio clubs. To include your club in this section, please make sure you send us details of your events in time. We only list active clubs - those who send us their diary of planned talks and events. Please note the new address for submissions: The Editor, Ham Radio Today (Club News), RSGB Publications, Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JE; fax: 01707 645105. We would be grateful if Ham Radio Today readers would alert their club secretary / public relations officer to this change of address. We have included all clubs whose details had been received at the new Ham Radio Today editorial office as of 5 February.

Appledore and District ARC

meet on the 3rd Monday of the month at the Appledore Football Club room. **16 Mar - AGM.** Contact Den Williams, G0UMT, on 01237 471802 for details.

Bangor and District ARS

meet on the 1st Wednesday of the month (except June and July), at the Clandeboye Lodge Hotel, Bangor, Co Down. **4 Mar - Packet radio,** by Hugh, G13TLT. **1 Apr - Talk** by RSGB President Ian Kyle, G18AYZ / M10AYZ. Contact Roy, G10WVN, on 01247 460716 for details.

Bristol (RSGB) Group

meet on the last Tuesday of the month, at Avon Combined Services Club, St Pauls Rd, Clifton, Bristol. **31 Mar - The Norman Lockyer Observatory,** by Jack Wickins. Contact Robin Thompson, G3TKF, on 01225 420442 for details.

the radio club room, behind the Sports and Social Club, Grange Road, Somerford, Christchurch. Contact K P Harris, G7WSN, on 01202 484892 (evenings) for details.

Cockenzie & Port Seton ARC

has 'normal club nights' on the 1st Friday of the month at the Thorntree Inn, High Street, Cockenzie. 7.00pm 'til late. **20 Mar - IOTA / IOSA,** by Tom Wylie, GM4FDM. Contact Bob Glasgow, on 01875 811723 for details.

Cornish RAC

meet on the 1st Thursday of the month at Perranwell Village Hall, near Truro. **5 Mar - Fund Raising and Radio,** by Dennis. **2 Apr - AGM.** Contact Robin Worsley, G0MYR, on 01209 820118 for details.

Coulsdon ATS

meet on the 2nd Monday of the month, 7.45pm, at St. Swithun's Church Hall.

Beds. 20 Mar - Quiz. Contact Paul McVay, G7TSJ, on 01582 861936 for details.

Exeter ARS

meet on the 2nd Monday of the month at The Moose International Centre, Blackboy Road, Exeter. **9 Mar - Construction competition.** Contact Theo, G3EQM, on 01392 875498 for details.

Halifax and District ARS

meet on the 1st Tuesday of the month at the Tap and Spile Pub, Clare Road, Halifax, for committee and Morse tuition. On the 2nd and 4th Tuesdays they meet at Queens Road. **17 Mar - Fibre optics,** by Steve, G4RCH. Contact Mr D Moss, G0DLM, on 01422 202306 for details.

Hambleton ARS

meet at Allertonshire School, Northallerton. **5 Mar - Demo of new**

exhibition: 'The World of Communication 1900 - 1998' at the Central Library, Lincoln, 31 March - 4 April. **11 Mar - Lincoln at War,** by Dave Willey, G1WVO. Contact Cliff Newby, G3EBH, on 01522 750637 for details.

Liverpool and District ARS

meet every Tuesday at the Churchill Club, Church Road, Wavertree, Liverpool. **3 Mar - Special events.** **10 Mar - Club on the air.** **17 Mar - RF power measurement,** by G8FHD. **24 Mar - SWR: talk and demo.** **31 Mar - Surplus sale.** **7 Apr - Robotics.** Contact Ian Mant, G4WWX, on 0151 722 1178 for details.

Lothians Radio Society

meet on the 2nd & 4th Wednesdays of the month at Orwell Lodge Hotel, Colinton Road, Edinburgh. Contact Tommy Main, GM4DCL, on 0131 663 8501 (packet GM3HAM@GB7EDN) for details.

This Month at the Clubs

ham radio today latest club news

Bristol (South) ARC

meet every Wednesday at the Whitchurch Folkhouse Association, Bridge Farm House, East Dundry Road, Whitchurch, Bristol. **4 Mar - 15m activity evening.** **11 Mar - Portable radio demo.** **18 Mar - Club quiz night.** **25 Mar - SWL evening - bring your own receiver / scanner.** **1 Apr - 10GHz activity evening.** Contact Jean Fletcher, G0AWX, on 01275 834282 for details.

Bromley and District ARC

meet on the 3rd Tuesday of the month, at the Victory Social Club, Kechill Gardens, Hayes, Kent. **17 Mar - Equipment test evening,** by Ian Daniels, G4VTD. Contact Alan Messenger, G0TLK, on 0181 777 0420 (e-mail: alangm@clara.net) for details.

Cheltenham AR Association

meet on the 1st Friday of the month at the Prestbury Library, The Burgage, Prestbury, Cheltenham. **6 Mar - Constructor's contest.** Contact Patricia Thom, G1NKS, on 01242 241099 for details.

Christchurch ARS

is the new name for the former Siemens Plessey Christchurch ARS. The club meets Thursday evenings in

Grovelands Road, Purley. **9 Mar - The history of aircraft simulators,** G6MFM. Contact Alan Bartle, G6HC, on 0181 684 0610 for details.

Coventry ARS

meet every Friday at Binley Church Hall, Brinklow Road, Coventry. **6 Mar - Slow scan TV demo.** **13 Mar - VHF, HF and packet night on the air.** **20 Mar - Bowling evening.** **27 Mar - Demo on VHF packet, DX Cluster and BBS.** Contact Robin, G4JDO, on 01203 673999 for details.

Dover Radio Club

meets on Wednesdays, during term periods, at the Duke of York's Royal Military School, Guston, near Dover. **4 Mar - talk** by Dr Ken Smith. **18 Mar - Video history of Dover Radio Club,** by G8YZ. Contact Brian Hancock, G4NPM, on 01304 821007 for details.

Dragon ARC

meet on the 1st and 3rd Mondays of the month at the Ebenezer Hall, Foel Graig Lane, Higher Village, Llanfairpwll. Contact Tony Rees, GW0FMQ, on 01248 600963 for details.

Dunstable Downs Radio Club

meet every Friday at Chews House, 77 High Street South, Dunstable.

equipment. **19 Mar - Operating night VHF/UHF.** **2 Apr - Construction Competition final.** Contact John Hampson, G0VXH, on 01845 537547 (Packet @GB7CYM) for details.

Hastings Electronics and RC

meet on the 3rd Wednesday of the month at West Hill Community Centre, Croft Road, Hastings. **18 Mar - Clandestine radio.** Contact Doug Mepharm, G4ERA, on 01424 812350 for details.

Hoddesdon Radio Club

meet Thursdays at the Conservative Club, Rye Road, Hoddesdon, Herts. Contact Don, G3JNJ, on 0181 292 3678 for details.

Horndean and District ARC

meet on the 1st and 4th Tuesdays of the month, at Lovedean Village Hall, 160 Lovedean Lane, Lovedean, Hants. 1st Tuesday is usually a 'Natter Night'. **3 Mar - Club social evening.** **24 Mar - Measurements,** by Dr Dick Biddulph, G8DPS. **7 Apr - Club social evening.** Contact Stuart Swain, on 01705 472846 for details.

Lincoln Short Wave Club

meet at the Railway Sports and Social Club, Ropewalk, Lincoln, each Wednesday. The club is holding an

Newbury and District ARS

meet on the 4th Wednesday of the month at the Memorial Hall, Upper Bucklebury, near Newbury. **25 Mar - Homebrew transceivers and mobile aerials,** by Mike Grierson, G1TSD. Contact the club secretary on 01635 863310 for details.

Norfolk ARC

meets every Wednesday at the Ugly Bug Public House, Colton. **4 Mar - Foxhunt Forum.** **11 Mar - Informal.** **18 Mar - NFD briefing.** **25 Mar - Informal.** **1 Apr - AGM.** Informal evenings include nights on air, construction, QRP, and Morse practice. Contact Sandra Simpson, 2E1FOF, for details.

Salop Amateur Radio Society

Shrewsbury. **5 Mar - Night on the Air.** **12 Mar - Equipment sale.** **19 Mar - Night on the Air.** Contact Trevor Davies, G0JIX, on 01743 365818 for details.

Shefford and District ARS

meet Thursdays at the Church Hall, Amphil Road, Shefford, Beds. Contact Derek Clarkson, G4JLP, on 01462 851722 for details.

Silverthorn Radio Club

meets Fridays at the Adult Education and Community Centre, Friday Hill House, Simmons Lane, Chingford, London E4 6JH. **20 Mar - the MFJ Antenna Analyzer**, by G0CIB. Contact Dave, G0KHC on 0181 505 1871 (packet G1NPT@GB7TUT) for details.

West Somerset ARC

meet on the 1st Tuesday of the month in Room GB7, Gibbs Block, West Somerset Community College, Minehead, Somerset. Contact Alan Elliott, M0AOJ, on 01643 707207 for details.

Spalding and District ARS

meet Fridays at the Old Fire Station, Spalding, Lincs. **20 Mar - RAOA**, by Dennis Hoults, G4OO. Phone 01775 750382 or 0976 271796 for details.

Stourbridge and District ARS

meet on the 1st & 3rd Mondays of the month at the Robin Woods Centre, Scotts Road Entrance, off Enville Street, Stourbridge. **The first Monday is usually an 'on air and natter night'. Visitors always welcome.** **16 Mar - AGM.** Contact Gordon Bryant, G0TZV, on 01384 395206 for details.

Trowbridge and District ARC

meet at Southwick Village Hall, Southwick, Trowbridge/Frome (on the A361). 'Natter nights' are usually held on the 3rd Wednesday of the month. **4 Mar - Surplus equipment sale.** **1 Apr - SSTV with Brian, G0IER.** Contact Ian Carter, G0GRI, on 01225 864698 (eves /weekends) for details.

Verulam ARC

meet at the RAF Association HQ, New Kent Road, St Albans. **10 Mar - RF Measurements**, by Hugh Young, G3YHY. Contact Walter Craine G3PMF, on 01923 262180 for details.

Wirral ARS

meet at The Club Room, Ivy Farm, Arrowe Park Road, Birkenhead. There are activity nights every 1st, 2nd & 4th Wednesday, lectures / talks every 3rd Wednesday. 'Natter nights' are every Tuesday from 7.30pm and Morse tuition every Thursday. **18 Mar - Surplus equipment sale.** Contact John Phillips, G3PXX, on 0151 336 4452 (packet @GB7OAR, e-mail: vectis@nordee.u-net.com) for details.

Wisbech Amateur Radio and Electronics Club

meets at the RAFA club, Old Market (next to the TSB). Contact Bill, G3XZF, on 01945 588102 for details.

Jubb, G3PMR, 30 West St, Gt Gransden, Sandy, Beds SG19 3AU, for details. Internet <http://www.cdxc.org.uk>

G-QRP Club

publish a quarterly journal, *SPRAT*, devoted to low power communication. For details, contact the Secretary, Rev G Dobbs, St Aiden's Vicarage, 498 Manchester Road, Rochdale, Lancs OL11 3HE; tel: 01706 31812. Internet <http://ourworld.compuserve.com/homepages/g4wif/gqrp.htm>

International Short Wave League (ISWL)

run an international QSL bureau for amateurs and SWLs, publish a monthly magazine (*Monitor*), hold regular get-togethers at their rally stands, plus several on-air nets, HF and VHF. For details send an A4 sized SAE to: ISWL, 267 Pelham Road, Immingham DN40 1JU. Internet <http://www.aber.ac.uk/~srj5/iswl.htm>

Irish Radio Transmitters Society (IRTS)

publishes regular newsletters giving details of local activities, plus a yearly IRTS Calbook. They also have a video library. Their AGM takes place this year on 22 March at the Limerick Rally. For further details contact Joe Ryan,

Radio Amateur Relief Expeditions (RARE)

is a registered charity who take aid to Eastern Europe and organise summer camps for young people to learn about amateur radio, English language and life in the UK. Contact The Secretary, RARE, 1 Allfield Cottages, Condovery, Shrewsbury SY5 7AP; (tel: 01743 873815; fax: 01743 874729; packet: G6FHM@GB7PMB; e-mail: rare@donsun.demon.co.uk) for details.

Radiocommunications Agency (RA)

is the licensing authority for all UK radio amateurs. RA's free publications include the booklet *How to Become a Radio Amateur*, and the *Novice Licence Information* sheet. They're in temporary offices at New Kings Beam House, 22 Upper Ground, London SE1 9SA. Direct Amateur Radio line, tel: 0171 211 0160. General enquiries, tel: 0171 211 0211.

Radio Society of Great Britain (RSGB)

is the internationally-recognised national society, which has been representing UK radio amateurs and short wave listeners for 85 years. Members receive a 100-page colour magazine

This Month at the Clubs

ham radio today latest club news

Stratford upon Avon & District RS

meet on the 2nd & 4th Mondays at the Home Guard Club, Main Road, Tiddington, Stratford upon Avon. **9 Mar - Surplus equipment sale.** **23 Mar - Practical Wireless**, Past, Present and Future, by Rob, G3XFD. Contact Jeff Porter, G4OHJ, on 01789 773286 for details. The club also run RAE, NRAE and Morse courses. Write to Mr J Harris, 57 Evesham Road, Stratford upon Avon CV31 2PB, enclosing an SAE, for details.

Sutton and Cheam RS

meet on the 1st and 3rd Thursday of the month at Sutton United Football Club, The Borough Sports Ground, Gander Green Lane, Sutton, Surrey. **14 Mar - Golden Jubilee Dinner.** **19 Mar - TBA.** **2 Apr - Natter Night.** Contact John Puttock, G0BWV, on 0181 644 9945 for details.

Torbay ARS

meet Fridays at the ECC Social Club, Highweek, Newton Abbot. **20 Mar - Astronomy**, by Craig, M0BFC. **21 Mar - Annual Dinner**, at Dolphin Hotel, Bovey Tracey. Contact Peter Tanner, G4VTO, on 01803 864528 (working hours) for details.

national & international

British Amateur Radio Teledata Group (BARTG)

publish a quarterly magazine, *Datacom*, and hold a rally and HF RTTY contest each year. The Membership Secretary is Bill McGill, G0DXB, 14 Farquhar Road, Maltby, Rotherham, S.Yorks S66 7PD, tel 01709 814010 (packet via GB7WRG, internet <http://www.bartg.demon.co.uk>).

British Amateur Television Club (BATC)

produce a quarterly magazine entitled *CQ-TV*, and hold their own rally each year. Contact Dave Lawton, G0ANO, Grenehurst, Pinewood Road, High Wycombe, Bucks HP12 4DD for details (internet <http://www.batc.org.uk>).

CDXC (Chiltern DX Club)

the UK DX Foundation - is the UK's first and largest group of amateurs interested in HF DX and contesting. Membership is open to all amateurs and SWLs who have worked (or heard) more than 100 DXCC countries. Contact the Secretary, Alan

E17GY; tel: (Eire) 01 2854250, or e-mail jryan@ol.ie. For book sales contact Dave Moore, EI4BZ, 12 Castle Ave, Carrigtwohill, Co Cork; tel: (Eire) 021 883555.

Radio Amateurs' Emergency Network (RAEN)

can be contacted at Hunters Moon, Newton le Willows, Bedale, N Yorks DL8 1SX. 24hr national emergency contact line: 0141 621 2121. Other contact points: Training Team, PO Box, 2 Chinnor, Oxon OX9 4JY. Packet @GB7NRC. Internet <http://www.reality.sgi.com/csp/raynet/>

Radio Amateur Invalid and Blind Club (RAIBC)

is a registered charity which raises money for radio / computer equipment, and audio cassette courses for home study, for blind deaf and disabled amateurs. The club attends rallies throughout the year, and collects surplus equipment for resale. If you have equipment to donate, contact Ian 2E1EGV, on 01274 723951. The Northern Ireland Club collect unwanted tokens or vouchers (petrol, etc), which can be sent free of charge to: The Charities Appeal Officer, RAIBC NI, Freepost BE 1789, Belfast BT15 3BR

sent to their home each month, and also have the advantage of free QSLing, the opportunity to enter RSGB contests, help in obtaining planning permission for antennas, and other technical support. Over 2000 volunteers are on hand to help the radio amateur and short wave listener with any enquiry. RSGB's address is: Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JE; tel: 01707 659015; Internet <http://www.rsbg.org>, e-mail: info@rsbg.org.uk.

Subscription Services Ltd (SSL)

handle the issuing of amateur licences in the UK, on behalf of the RA. SSL can answer enquiries concerning individual licences (rather than general licensing matters, which the RA handles). The Radio Licensing Centre, SSL, PO Box 884, Bristol BS99 5LF; tel: 0117 925 8333.

United Kingdom Radio Society (UKRS)

is a new society for UK radio amateurs. They can be contacted at PO Box 100, Meadow Street, Northwich, Cheshire CW8 1FA. Tel: 01606 783270 or 0115 925 6597; packet UKRS@GB7OAR; e-mail admin@ukrs.org; Internet <http://www.ukrs.org>.

Classified advertisements

Classified advertisements 58p per word (VAT inc.) minimum 14 words £8.70.

All classified advertisements MUST be prepaid.

Please write clearly. No responsibility accepted for errors. Latest date for acceptance is 1st of issue month.

Cheques should be made payable to RSGB.

Copy and payment to Malcolm Taylor Associates, P.O. Box 3241, Bournemouth BH8 8WT. Telephone: 01202 777852 Fax: 01202 317902

FOR SALE

G3LLL OFFERS. Pair G.E. Military Quality 6146 plus NEC 12BY7A for 101ZD, etc £65. Unstamped 6146B (Chinese, sometimes go S/C!) £15 pair. AL51A spectrum analyser 4, 1000MHz with AF unit, mains/bat £375. S.H. FT101Z Mk 2 (missing digit on counter) £249. TS530S + CW £345. FT101Z Mk 2 £225. IC737A HF 12v inc. super auto atn and matching PSU £799. FT50B HF 50 w £189. FT790Mk 1 boxed £215. FT101E mint £219. FT101B £169. IC730 HF 12v £249. TS770 2m/70cms base £325. FT77 HF + fm & cw £289. Oscilloscopes £50-£200. JBeam 5XY2m £30 and LW16 2M £39. Stereo mp3 fm generator £35. 386, 486 & Pent. computers and monitors. Some items callers only. Please note that G3LLL hopes to do repairs at home part time after he has retired (and moved house) towards the end of 1998. The business is for sale (stock fixtures and fittings, building is on low rent). Any offers? Holdings Amateur Electronics, 45 Johnston Street, Blackburn BB2 1EF (01254) 59595. Open Thurs, Fri, Sat, but check before calling.

We'H' FOLDING ANTENNA >6db Smaller Gammaless HB9CVI 10m-70cm Versions £20-£35. Literature available. John (G0WEH) 01705 466522, QTHR 1998. Email: john.j.hill@gecm.com

RESTRICTED SPACE AND FULL SIZE MULTIBAND AERIALS. 28/132ft, built, kits, parts, baluns, data sae. Aerial Guide £1.50. G2DYM, Uplowman, Devon EX16 7PH. Tel: 01398 361215 anytime.

LIMITED SPACE ANTENNA 160-10 metres 84' overall with 76' of balanced feedline £59.95 plus £5.00 P&P. Choke Baluns Std model £36.85, Yagi model £37.45 (state boom size) G5RV £28.50 all inc P&P. Amidon Cores, limited stocks available. Send SAE for full details of all the above. Ferromagnetics, P.O. Box 577, Mold, Flintshire, CH7 1AH.

"RAYNET" YELLOW REFLECTIVE TABARDS with "RAYNET". Medium £11.00, Large £11.50, XLarge £12.00. "RAYNET CONTROLLER" 50p extra. EPSON PX4+ lap top computer, built-in printer, charger Eprom for packet £46.50 inc. pp. Non reversible battery connectors line/panel mounting (10 pairs/pack) £7.00. Mike Watson G8CPH, Ipswich (01473) 831448.

QSL CARDS printed to your own specification on white or coloured gloss card. SAE for sample pack to: The Caswell Press, 11 Barons Way, Woodhatch, Reigate, Surrey. 01737 244916.

ALUMINIUM TUBE. Heavy-duty (scaffold) tube approx. dimensions 20' long, 2" dia. 1/4" (4.5mm) wall thickness, 20' and 10' lengths available @ £1.80 + VAT per ft. C.W.O. Rusper Hire (Crawley) 01293 871621 office hours only.

QSL CARDS – low cost, quick delivery, superior designs, quality guaranteed, personal designs our speciality. L.S.A.E. for samples: The Standfast Press, 5 South Drive, Inskip, Preston PR4 0UT.

ESSEX AMATEUR RADIO SERVICES. New and used amateur equipment bought and sold. PX welcome. All warranted and serviced. 8am till 9pm. Ring Alan – 01268 752522, 4 Northern Avenue, Benfleet, Essex SS7 7SN.

G4TJB QSL CARDS printed to your specification, send large SAE for samples and full product list. Unit 6, Worle Industrial Centre, Coker Road, Worle, Weston-super-Mare BS22 0BX. Tel/Fax: (01934) 512757.

CTCSS ENCODERS £20 each. Decoders £39 each + postage £1.75 (inc vat) CWO MDH radio telephones. Tel/Fax 01646 651599 (GW4CBR QTHR).

LANDWEHR VHF/UHF MASTHEAD PREAMPLIFIERS, 2 metre 145MAS £150 and 70cm 435MA £155 plus £4.50 p&p. Write, phone, fax or email for leaflet. Qualitas Radio, 23 Dark Lane, Hollywood, Birmingham B47 5BS. Note new telephone numbers, 0121 246 7267. Fax 0121 246 7268. Email: g0eyo@compuserve.com

QSL CARDS. Gloss or Tinted Cards. SAE for Samples to Twrog Press, Penybont, Gellilydan, Blaenau Ffestiniog, Gwynedd LL41 4EP.

POWABEAM ANTENNAS – from G4CQM Optimised Current Vector Yagis. 2M-2.5WL (9 ELE) 15DBi £84.95. Leaflets 01288 381289.

COURSES

CITY & GUILDS RADIO AMATEURS EXAM. Pass your exam the easy way with an RRO homes study course. For details write or phone THE RAPID RESULTS COLLEGE, Dept. JT400, Tuition House, London SW19 4DS. Tel: 0181 947 2211.

RSGB AMATEUR RADIO INSURANCE SCHEME

"ALL RISKS" INSURANCE for portable/mobile/base station amateur radio and ancillary equipment. A service for RSGB members only. Also public liability and equipment for affiliated clubs and societies. Details and leaflets from Amateur Radio Insurance Services Ltd, Freeport, 10 Philpot Lane, London EC3B 3PA. Telephone: 0171 338 0111. Fax: 0171 338 0112.

MISCELLANEOUS

VIDEO TAPE CONVERSIONS to and from all modes N.T.S.C.: S.E.C.A.M.: P.A.L.N.: P.A.L.M. Digital processing. Fast and economic service. Also 'cine' conversions. Phono G4WMP 01932 846139.

PATENTS, TRADE MARKS, DESIGNS, COPYRIGHT. For professional advice contact KINGS PATENT AGENCY LTD (Est 1886 by Benj. T. King). Dir J.B. King (G5TA mem. RSGB) Regd. Patent and Trade Mark Agent. Information, fees and literature on request. Phone 0171-248 6161. Fax: 0171-831 0926. 73 Farringdon Road, London EC1M 3JB.

CALL IN ON THE 'GOOD NEWS' CHRISTIAN NETS! Every Sunday at 8am and 2pm around 3747 KHz and 144.205 Mhz at 2pm sharing Christian fellowship over the air. Info from WACRAL, 51 Alma Road, Brixham, South Devon TQ5 8QR – Tel: 01803 854504.

VHF/HF valve amplifiers repaired/ serviced, all USA, Japan, EU makes. Collection/delivery available. Very competitive rates. Faircrest Services, Mon/Sat, 08.00-17.00, 24hr answerphone 01744 637271.

NORTH DERBYSHIRE COMMUNICATIONS. Service and Sales to most Amateur Radio Equipment. Unit 6, Ireland Close, Staveley, Chesterfield, Derbyshire S43 3PE. Tel/Fax: 01246 280358.

ADVANCE NOTICE. The BARTG Rally will be held at Sandown Park on Sunday, 13 September 1998. Tell the XYL now that you will be unable to do the decorating that weekend.

COMPUTER SOFTWARE & HARDWARE

INSTRUCTOR MORSE PROFESSIONAL – The ultimate Morse Code training package for beginners and advanced users (for IBM PCs & Compatibles). As used by the US Military, Canadian Military and the British Military! Price £169.00 + PP + VAT – Tel 01526 833042 – email imorse@sdesign.demon.co.uk

SHACKLOG 4.4 the PC logging system. Real time and post event QSO logging. QSL labels. Database analysis, reports, import, packet terminal. Plus lots more!! Only £29.50!! SASE (+disk for demo copy) for full details. IOTA database (G3KMA) £7.50. IOTA Awards Manager £5.00 Alan Jubb, G3PMR, 30 West Street, Gt. Gransden, SANDY, SG19 3AU. 01767 677913.

G4UXD's 'UK-QSO' MORSE TUTOR- PRACTISE DOES EVERYTHING! Reviewed Feb/94/95 'Novice News'. PC-compat. Everything adjustable, 150 tests! Teaches correct keying! £10-99. SAE details. P. Brandon, 1 Woodlands Rd., Chester CH4 8LB, 01244-683563.

SUPER-DUPER, EI5DI's CONTEST LOGGER. "Highly recommended" – RadCom, September 1993. HF £25.00, VHF £25.00, both £39.00. Paul O'Kane EI5DI, 36 Coolkill, Sandford, Dublin 18 (00 353 1295 3668). www.iol.ie/~okanep Version 9.00 is ready now for the new RSGB District Code multipliers. Clubs – please enquire about group registration rates.

G4TYF LOG. Try before you buy. Send S.A.E. for Demo. Updates £5.00. 64 Gurney Valley, Bp Auckland DL14 8RW. Tel: 01388 607500.

PC SSTV-DATA Tx/Rx pack £29.95 PC/AMIGA SSTV/Packet Interfaces. SAE leaflets, 1.44 demo £1. G8SLB. Peter Lockwood, 36 Davington Road, Dagenham, RM8 2LR. 0181-5950823.

PC software by G4BMK for RTTY Amtor Pactor CW with call sign database and on-screen tuning aid, plus built modem £165. State call sign. BMK Communication Ltd, 2 Beacon Close, SEAFORD BN25 2J7. (01323) 893378.

HOLIDAY ACCOMMODATION

NORTH WALES. Caravan, bunk house, camping. Elevated site. Use of shack and beam antenna. Open all year Rural setting. "Tynrhos", Mynytho, Pwllheli, LL53 7PS (01758 740712).

BED AND BREAKFAST/MEALS. SCOTLAND NORTH COAST. GMOEXN QTHR. HF available. Packet/Pactor. Tel: 01847 851774. email: bandb.farnorth@btinternet.com.


AMATEUR RADIO SALES MANAGER

A very well known established firm require a Sales Manager to take over responsibility for all aspects of direct retailing of amateur radio, scanning and Short Wave equipment. The ideal applicant will be an experienced and enthusiastic operator holding a class A licence. He/she will have acquired extensive knowledge of the hobby over a period of several years, and will be able to act on their own initiative to prospect for, negotiate and close sales of a wide range of radio equipment. Previous retail experience is not mandatory, but the ability to put in the effort required to get the job done properly is a pre-requisite. Age is not a relevant factor.

An interesting job in a pleasant location with the opportunity to use all the latest equipment to your heart's content!


Applications in writing with a full CV to forwarding agent.

Jobs Application c/o Malcolm Taylor Associates PO Box 3241 Bournemouth BH8 8WT



MARTIN LYNCH & SON
THE AMATEUR RADIO EXCHANGE CENTRE
NEWSFLASH

**ALL FT847s BOUGHT FROM
MARTIN LYNCH & SON
HAVE 10 WATTS ON 70MHz**



free readers' ads

for sale

● **D70 Morse** tutor, key and homebrew oscillator. £45. Andrew Davies, tel: 01766 780043. (Harlech).

● **PDL 2** cubical quad suitable for 10 / 15m. rotator. control box, cables, mast support bracket, used very little due to neighbours. Also, Kenwood TS-870S transceiver with 25 / 30A PSU, MC-85 mic and Vectronics VC-300DLP ATU. Offers, or what have you? Please write: Keith Winward, B5440 BANN 3, HMP Maghaberry, 17 Old Road, Upper Ballinderry, Lisburn BT28 2PT.

● **Lowe HF-150** shortwave Rx, gwo, boxed with manual, whip antenna: £275. Icom UI6T 99-channel 70cm handheld, charger, £100. Desktop charger and batteries: £75. Speaker mic: £5. Call Stephen, G7VFX, on 0956 544202 (N W London).

manual inc. £100. J W Trickett. G4JMC, tel: 01709 542498: 86 School Rd, Thurcroft, nr Rotherham, Yorks S66 9DL.

● **Kantronics** all mode TNC KAM v6.1 for VHF and HF provides packet RTTY, CW, AmTOR and PacTOR, complete with manual and various software programs, £110. Contact Jack, tel: 0181 340 4784 (North London).

● **Pair Wharfedale** hi-fi speakers. Teak cabinets 53cm high 33cm wide 20cm deep. 300mm bass plus tweeter 25W RMS 100W music power. In perfect order. Cabinets unmarked, can demonstrate any time. £40. Bill Green, tel: 01493 855594 (Gt Yarmouth).

● **Silent key Icom IC-751A** £425, Icom IC-271H £275, HCA400HF linear £350, FT-480R £200. HF beam. Mini SSTV Robot 180 PK232 and Micro Power TNC. Low pass filters. Two Icom speak-

● **Complete HF station.** Kenwood TS-430S, AT-230, PS-430S, SP-430S, MC-60, Junkers Morse key and multi dipole. Excellent condition. £550. G4SQV, tel: 01332 831300 (Derby).

● **Alinco DJ-X1D** scanner 100kHz - 1300MHz, as new. boxed. £150. Tel: 01203 730669 (Coventry).

● **Kenwood TS-440S** with mic, manual, boxed, superb condition, general coverage, SSB, AM, FM, FSK £475. Also 70cm h/held Philips PFX, charger, 2 batts, 60+ channels £70. John, tel: 01203 450476 (Coventry).

● **Icom IC-730** £300. FT-77 £190. AKD 70cm £85. Motorola UHF Micro 20 channel £90. Two Icom HI6T portables 2m programmable 16 channels £210 the pair. Contact Alistair, GM4UQD, tel: 01506 467351.

● **Yaesu FT-290Rii** as new, little use, boxed, all accessories inc FL-

169.99MHz, boxed, manuals, power supply, plus G5RV antenna 50ft CTU8 antenna tuner, shortwave freq book, sell £450. Mr Rigby, Mobile 0961 894216 (Morecambe).

● **Yaesu FT-1000D** 200W, heavy duty built-in PSU, true all mode dual receivers. £400-worth of options fitted. inc band pass filter, mic. manuals, box. Reluctant sale by fastidious owner. Latest serial number. £1995. Carl, G4GTW, tel: 01489 789960 (Southampton).

● **For sale: TS-180S** remote VFO, as new £50. TS-180 upgrade kit for WARC bands. New, £20. A Newton, G3WXX. Please phone 01626 833832.

● **Eddystone 840C** vintage classic HF communications receiver. 475kHz to 30MHz in 5 overlapping bands. £100. Circuit and data included. Collect (North Hampshire). Trevor Wiltshire. G8AKA, Tadley, tel: 0118 970 1163.

● **Icom IC-R70** comms receiver 100kHz to 30MHz. As new, boxed with manual: £420 plus carriage. Tel: 01792 830962 weekends please.

● **Heathkit valve** voltmeter model 1M-13W, excellent condition, manual, leads: £45 plus P&P. F Fernandez, 26 Gastons Road, Malmesbury, Wilts or tel: 01666 823765 evenings.

● **Yaesu 227R** 2m mobile £70. M/M 50W amp £50. SMC 6A PSU £10. SMC speech processor £10. 2m collinear £20. or whole station £140. 286 computer colour VGA monitor 40 Meg hard drive, £80. Dave. G1GVM. tel: 01703 491032 (Southampton).

● **ADI AT-2000** 2m handheld. Boxed, as new £70. Army receiver R216 19 - 157MHz made by E K Cole Ltd October 1955. As new, in original cardboard box. Service manual £100 ono. Peter, tel: 01760 337463 (Norfolk).

● **Racal RA17** very good cond. Full wkg order with copy of

ers. FT ATU £198. SWR bridge. Tel: 01435 862498 or 01892 770638 (East Sussex).

● **Drake TR7** transceiver together with RV7 remote VFO. MS7 extension speaker. PS7 30A PSU. complete £550. Yaesu FC-902 antenna tuner £85. Yaesu 23R 2m rig £95. Extending tower for wall fitting £85. All seen working. G4WKZ. tel: 01527 544394 (Redditch).

● **Icom IC-745** HF all band radio, all mode including FM. All filters for SSB and CW. Mint, boxed, with all details. With desk mic Icom IC-SM2, 200W PEP. Wasted on Novice. Sell for £575 ono or swap for Alinco DX-70T. Phone 2E1FCG, tel: 01226 742971 (Barnsley).

● **Military sets.** A14 Trx LP with ATU £85. 46 set £90. ET-4336 HP HF Tx £200. 19 for restoration £60. Swap anything for No 11, 12, 21 set, any Para airborne gear or small HF sets. Ben, tel: 01562 743253 (Worcestershire).

202S linear £340 ovno. Tel: 01366 384968 (Norfolk).

● **Yaesu FT-2311R** 23cm FM transceiver. Fitted with CTCSS. Good working order. Reluctant sale due to relocation. £250 ono. Ian, tel: 01706 852789, or e-mail: ian65@btinternet.com (Rochdale).

● **FT-980 £575** ono, VC-300DLP ATU £115 ono, MFJ-704 LPF £15 ono, triband vert £30, D4000014 connection cable for FT-980 / FC-757AT £15, ARRL Morse Course, 3 sets inc 5 - 10WPM, 10 - 15WPM, 15 - 22WPM, 2 tapes each course £15 the lot. Steve, tel: 01482 795646 (Hull).

● **Tait's One** VHF One UHF EPROM converted full 2m coverage part 70cm coverage offers. Also oscilloscope VC5430 LCD colour by Hitachi worth £1000 WHY? Contact John tel: 01908 642506 anytime (Milton Keynes).

● **AOR AR-3030**, bought 16/9/97, as new, cost £684, fitted Collins 2.5kHz filter, VHF converter 140 -

wanted

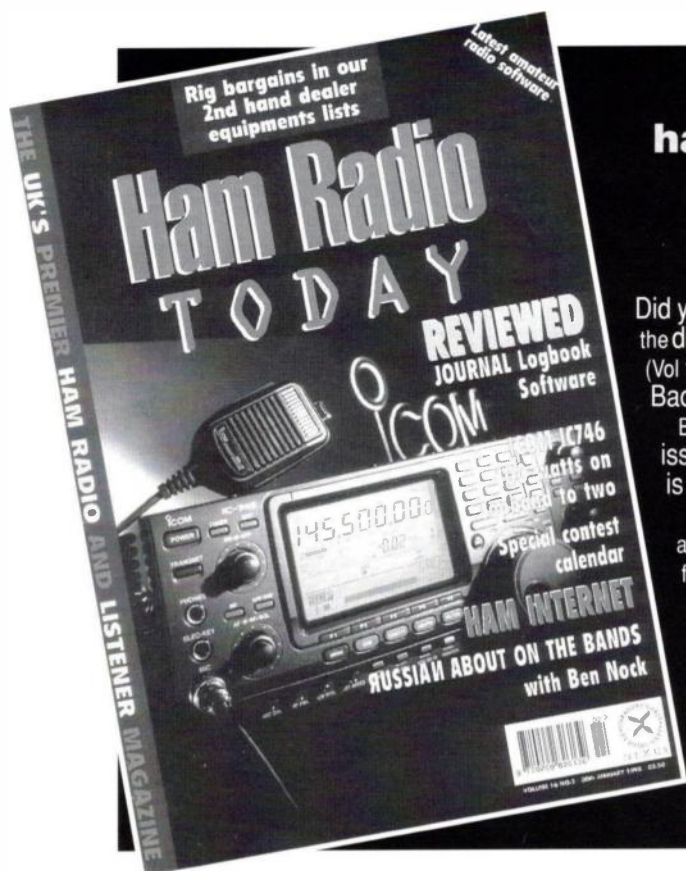
* **Daiwa** rotator DR7600 or similar. Tel: 0151 678 1215. (Moreton, Merseyside).

* **Mini Products** HQ-1 hybrid quad antenna. with or without rotator. Would consider damaged antenna, providing all coils and spokes are intact. Also G3JKE antenna vector processor AVP4. Also help to remove 6MHz pirate mod on Sommerkamp FT-767DX. Tel: 0141 334 0734 (Glasgow).

* **Wanted: large** low-g geared hand winch for tower, required by disabled op G0GHX, Ron, tel: 01202 880194 (Dorset).

exchange

* **PDL II** 2-element cubical quad, suitable for 21 / 28MHz, mast, support bracket, rotator, control box, cables etc; for Morse tutor, tapes. WHY? Please write: Keith Winward, B5440 BANN 3, HMP Maghaberry, 17 Old Road, Upper Ballinderry, Lisburn BT28 2PT. G4JMC, tel: 01709 542498; 86 School Rd, Thurcroft, nr Rotherham, Yorks S66 9DL



ham radio today back issues ham radio today back issues ham radio today back issues

Did you miss that Kenwood TH-G71E review (Vol 15 No 13)? Or perhaps the digital controller project for converted PMR transceivers by G6RHB (Vol 15 No 7). If so, you'll want to take advantage of the Ham Radio Today Back Issues service.

Back numbers are normally available for 12 months after publication. Each issue costs £3.20 inc P&P, but please check the issue you require is available before sending your cheque.

If the issue you require is not available we can photocopy individual articles for you. The cost is £2.75 for the first article, and £2.00 for further articles. Multiple parts count as separate articles. Please add £1.25 (UK) and £2 (overseas - surface mail) P&P.

to order

post: Sales Department, Ham Radio Today, RSGB Publications, Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JE.

Tel: 01707 659015; fax: 01707 645105 or

e-mail: hrt.sales@rsgb.org.uk

ders ads free readers ads ham radio free private ads

free readers' ads

name _____

signature _____

address _____

date _____ send this coupon to: Free Readers' Ads, Ham Radio Today, RSGB Publications, Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JE.

The above details will not be published. Enter all that is to be published, including contact information, in the boxes below (Amateur Radio and electronic equipment only please).

(BLOCK CAPITALS OR TYPED PLEASE, ONE WORD PER BOX)

FOR SALE / WANTED / EXCHANGE / HELP NEEDED*

*Delete as appropriate

March 1998

free readers' ads conditions

1. Free Readers' Ads will be inserted as and when space becomes available, on a first-come, first-served basis, subject to these conditions. If you require a *guarantee* immediate insertion of your ad, please use the pre-paid Classified Ads section at the rear of this magazine.

2. These advertisements are offered as a free service to readers for the sale, exchange, wants, or help with, privately-owned amateur radio and electronics equipment. Ads from traders, or apparent traders, will be rejected. Readers should use our Retail Network and Classified Ads section for ads not fulfilling these conditions. our Advertising Department (tel: 01202 777852) will be pleased to accept prepaid ads.

3. All submitted free ads must be on a recent form printed in Ham Radio Today. Photocopies are not acceptable. Include your name and / or callsign, and either a contact telephone number (with STD code) and location (eg town or country) or a full address, or both, for readers to reply. These details must be included within your advertisement. Advertisements must be no longer than 40 words. Only one advertisement per section ('For Sale', 'Wanted' etc) per reader per month. Each advertiser must also fill in their name and address in the space provided (these details will not be published), and must sign the form to indicate acceptance of these conditions.

4. We cannot be held responsible for transcription errors, however, we will attempt to ensure that legible submissions are reproduced correctly. Please write clearly and include punctuation. In the event of a gross error, at the request of the advertiser and at the editor's discretion, a corrected version of the advertisement will be printed in the earliest issue in which space is available.

5. Neither the magazine nor its publishers will accept any responsibility for the contents of the advertisements, and by acceptance of these conditions the advertiser undertakes to indemnify the publisher against any legal action arising out of the contents of the advertisement.

6. Advertisements are accepted in good faith; however the publisher cannot be held responsible for any untruths or misrepresentations in the advertisements, nor for the activities of advertisers or respondents.

7. As this is a free service, postal or telephone communication regarding publication of ads *cannot* be accepted unless an error is involved. Please remember, all ads received fulfilling these conditions will be published as space permits.

8. Advertisements which are suspected of including illegal equipment will not be published. The magazine reserves the right to either refuse to accept entirety, or to delete any sections, or the entire text of any advertisements not fulfilling the above conditions.

Advertiser index

Aerial Techniques	42
Amateur Electronics	52
Amateur Radio Communications	52
C M Howes	46
Cliveden Recruitment plc	47
Cushcraft	IBC
GWM	47
Haydon Communications	14, 15
Jaycee Electronics Ltd	52
Lake Electronics	47
Mainline Electronics	42
Martin Lynch & Son	IFC
Multicomm 2000	52
Quartslab Marketing Ltd	42
R & D InstruMet	42
R A Kent	42
R N Electronics Ltd	42
Radio & Telecommunications	47
Radio Amateur Supplies	42
Skywave Marine Services	52
Sussex Surplus	43
Tennamast Scotland	47
Vine Antenna Products	46
WACRAL	52
Waters & Stanton plc	30, 31, 32, 33
Wilson Valves	42, 52
Yaesu UK Ltd	OBC

Ham Radio TODAY Publication Dates

Make a note of these dates so that you can be the first with all of the news, reviews and features in Ham Radio Today.

Issue Date	Publication date
April	Friday 27 March
May	Friday 24 April
June	Tuesday 19 May

Don't Miss Out - Place a regular order with your newsagent.

Dear Newsagent, Please deliver / save me a copy of *Ham Radio Today* magazine every month.

Name: _____

Address: _____

Ham Radio Today is available from: Comag Magazine Marketing, Tavistock Road, West Drayton, Middlesex UB7 7QE. Tel: 01895 444055. Fax: 01895 433602. ISSN No 0269-8269

Ham Radio TODAY

contact information

Ham Radio Today Editorial: RSGB Publications, Lambda House, Cranborne Road, Potters Bar, Herts, EN6 3JE. E-mail: hrt@rsgb.org.uk. Tel. 01707 853300. Fax 01707 645105.

Regular Contributors:

Data Connection: Chris Lorek, G4HCL. E-mail: g4hcl@qsp73.demon.co.uk. Packet: G4HCL@GB7SUN. #48.GBR.EU. Post: via Editor.

HF Happenings: Don Field, G3XTT. E-mail: g3xtt@lineone.net. Post: 105 Shiplake Bottom, Peppard Common, Henley on Thames, Oxon RG9 5HJ.

Net Communication: Jeremy Boot, G4NJH. E-mail: asperges@innotts.co.uk. Post: via Editor.

QRP Corner: Dick Pascoe, G0BPS. E-mail: dick@kanga.demon.co.uk. Packet: G0BPS@GB7RMS. Post: Seaview House, Crete Road East, Folkestone CT18 7EG.

Satellite Rendezvous: Richard Limebear, G3RWL. E-mail: g3rwl@amsat.org. Post: via Editor.

VHF/UHF Message: Geoff Brown GJ4ICD. E-mail: equinox@itl.net. Post: TV Shop, Belmont Road, St Helier, Jersey, Channel Islands. Tel/Fax 01534 877067.

Subscriptions:

Subscription rates: 12 issues (1 year) - UK £26.50. Europe and Eire £36.50. Rest of the World (surface mail) £38.50, (air-mail) £54.00. Cheques should be drawn on a UK bank and made payable to the Radio Society of Great Britain. Available from: RSGB Publications, Lambda House, Cranborne Road, Potters Bar, Herts, EN6 3JE. E-mail: subscriptions@rsgb.org.uk. Tel. 01707 853300. Fax 01707 645105.

Back Issues:

Back issues are normally available for the last twelve months, at £3.20 per issue. Post and packing is £1.25 for one copy, £2.50 for two or more. Please telephone or E-mail first to check availability of the issue you require. Cheques should be drawn on a UK bank and made payable to the Radio Society of Great Britain. Available from: RSGB Sales, Lambda House, Cranborne Road, Potters Bar, Herts, EN6 3JE. E-mail: sales@rsgb.org.uk. Tel. 01707 659015. Fax 01707 645105.

Article Photocopies:

If the back issue you require is not available, we can photocopy individual articles for you. The cost is £2.75 for the first article, and £2.00 for follow-up articles. Multiple parts count as separate articles. Post and packing is £1.25 (UK) and £2.00 overseas by surface mail. *Note: when requesting photocopies, please specify Ham Radio Today and give the article title and which issue it appeared in.* Cheques should be drawn on a UK bank and made payable to the Radio Society of Great Britain. Available from: HRT Photocopy Service, RSGB Sales, Lambda House, Cranborne Road, Potters Bar, Herts, EN6 3JE. E-mail: sales@rsgb.org.uk. Tel. 01707 659015. Fax 01707 645105.

Ham Radio Today Distribution:

UK newstrade distribution by Comag Magazine Marketing, Tavistock Road, West Drayton, Middlesex UB7 7QE, Tel. 01895 444055, Fax. 01895 433602. Overseas and non-newstrade sales by RSGB Sales, Lambda House, Cranborne Road, Potters Bar, Herts, EN6 3JE. E-mail: sales@rsgb.org.uk. Tel. 01707 659015. Fax 01707 645105.

10, 15, 20 Meters
9 Elements on a 28 ft (8.6m) Boom
Optional 2 Element 40 Meter Kit

**BIG
THUNDER**
SERIES

X9



Boom to Mast Clamp



Element to Boom Mounting



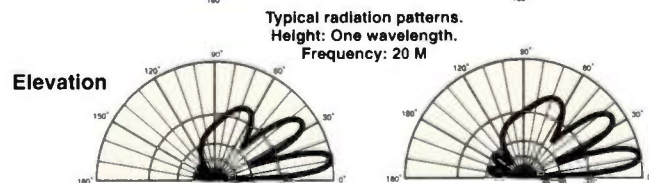
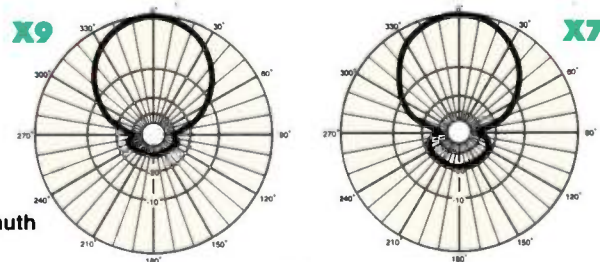
The Performance Tribander for the DX Years Just Ahead

- ▶ **New High Efficiency Computer Optimized Design for Maximum Gain and Ultra Clean Radiating Pattern**
- ▶ **100+ MPH Construction for Best Reliability and Long Life**
- ▶ **NEW 4L Log Cell Driven Elements for better VSWR Bandwidth**
- ▶ **Trapless Driven Elements and Reflectors for Reliable Power Handling**
- ▶ **Interleaved Element Design for Mono-Band Performance**
- ▶ **Add-on kits available for 40 Meters**

The new X9 and X7 Triband Yagis are geared to set new standards in both radiating performance and mechanical reliability. Cushcraft's product development team has employed the latest computer modeling technology to achieve a superior electrical

design as well as elegant new mechanical hardware and assembly techniques.

Each mechanical component was designed to 100+ MPH wind survival with a 1.25 safety factor. Traps were eliminated from the high current driven elements and reflectors using the new 4L Log Cell design, which yields virtual monoband performance and maximum power handling capability. Traps are employed only in the lower current directors for increased gain and sharper pattern. The result is a truly high performance antenna family which will easily handle the legal limit.



SPECIFICATIONS	X9	X7
Frequency Coverage (Meters)	10, 15, 20	10, 15, 20
Total number of Elements	9	7
Maximum Gain (dB)		
@ One Wavelength	20M 13.0 @ 14 deg	12.5 @ 14 deg
	15M 13.9 @ 12 deg	13.0 @ 12 deg
	10M 14.0 @ 15 deg	12.9 @ 14 deg
Maximum Front to Back Ratio (dB)	30	30
Number of Elements per Band	4	3
VSWR Minimum	1.1:1	1.1:1
VSWR 1.5:1 Bandwidth (KHz)	20M 350	600
	15M 450	750
	10M 1500	1700
Longest Element, ft (m)	36.5 (11.12)	37.2 (11.33)
Turning Radius, ft (m)	21.7 (6.61)	20.0 (6.09)
Boom Length, ft (m)	28 (8.53)	18 (5.49)
Boom Diameter, in (cm)	2-1/2 (6.35)	2-1/2 (6.35)
Maximum Mast Diameter OD, in (cm)	2-1/2 (6.35)	2-1/2 (6.35)
Maximum Wind Survival, mph (kph)	>100 (>161)	>100 (>161)
Maximum Wind Surface Area, ft² (m²)	9.9 (.92)	7.9 (.73)
Windload @ 80 mph, lb (kg)	255 (116)	202 (92)
Maximum Power Handling (KW)	2	2
Weight, lb. (kg)	85 (38.5)	60 (27.2)
List Price	\$995	\$675



CUSHCRAFT
COMMUNICATIONS ANTENNAS

48 Perimeter Rd, Manchester, NH, USA 03103 • 01-603-627-7877 • FAX: 01-603-627-1764
Email: hamsales@cushcraft.com • World Wide Web: <http://www.cushcraft.com>

FT-847

Ultra-Compact Satellite
and All Mode Transceiver

FEATURES

- All band performance (SSB, CW, FM, AM)
- 100 Watt output on HF/50MHz bands
- 50 Watt output on 144/430 MHz bands
- Cross-band full Duplex operation
- Normal/Reverse tracking for satellite operation
- CTCSS & DCS encode/decode built-in
- High resolution 0.1Hz tuning steps for ultra smooth tuning
- Digital Signal Processing filters (Bandpass, Notch, Noise Reduction)
- Simplified tuning with Shuttle Jog control
- Direct frequency keypad entry
- Dedicated satellite memories, with 8-character Alpha Numeric Labels
- TX Freq. (MHz): 1.8 - 50 (amateur band) 144-146/430-440
- RX Freq. (MHz): 0.5-30/50-54 108-174/420-512
- Emission modes: LSB, USB, CW, AM, FM, PACKET(9600/1200bps: External input.)
- Freq. Steps(Min): 0.1Hz for SSB and CW 10Hz for AM and FM
- Modulation Types:
 - SSB: J3E Balanced, filtered carrier
 - AM: A3E Low-level (early stage)
 - FM: F3E Variable reactance
 - FSK: J1D, J2D, F2D Audio frequency shift keying (external input), F1D Frequency shift keying (V/UHF: external input)
- Options:
 - FC-20 Automatic Antenna Tuning Unit (External)
 - FVS-1A Voice Synthesiser
 - ATAS-100 Active Tuning Antenna System

4 into 1 does go!

Technology moves inexorably onward, evolving, adapting, forever changing. At the same time, today's Radio Amateur puts even more demands upon designers to build quality, sophisticated, but easy to use stations for Voice, Packet, Satellite, CW, VHF, UHF, HF, just to mention a few. Yaesu's designers took on that challenge, and following in the footsteps of the revolutionary FT1000, FT1000MP and FT920 are now proud to offer today's Radio Amateur the station in a box - the all new FT-847!

The Yaesu FT-847 Ultra-Compact Satellite and All Mode Transceiver has jumped the technology with a transceiver ready for the new millennium. With it's high-tech design

and revolutionary features, the FT-847 is truly the one radio that can do it all! Massive band-width coverage from a single unit, the FT-847 has many features to keep it at the top of the evolutionary pile. These include crystal clear 100 watts on HF and 50MHz, a massive 50 watts on 2 meters and 70cms, Yaesu's effective DSP for bandpass, noise reduction and notch filter, and direct input of frequency on the supplied keypad. Silky smooth tuning with 0.1MHz tuning steps. Cross band and full duplex, CTCSS and DCS encode and decode built in. And for Satellite reception, normal and reverse tracking. A matching ATU (Automatic Antenna Tuning Unit) is also available as an option.

YAESU
...choice of the World's top DX'ers



<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.

FT-920

The highest performing HF 6 meter rig in its price class with Yaesu's renowned Omni-Glow display



YAESU UK LTD. Unit 2, Maple Grove Business Centre, Lawrence Road, Hounslow, Middlesex, TW4 6DR, U.K. 0181-814-2001