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Wireless

THE UK'S BEST SELLING AMATEUR RADIO MAGAZINE

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*PULL-OUT
year planner*



**"AN INCREDIBLE
PACKAGE"**

The Timewave
DSP-599zx DSP Filter
Reviewed by G3XFD

Organise Your 'Amateur
Radio' Year With The
FREE YEAR PLANNER
In This Issue!

**"AN EXTREMELY
IMPRESSIVE
TRANSCEIVER"**

says GORSN reviewing the
Kenwood G71E Hand-Held

BUILD

Canny Cavities &
Overcome Two Metre QRM

8 PAGES OF ANTENNAS

*antennas
in
action*



"Join our Celebrations" says G3MYM

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WATSON

Features

10 - 2.8GHz

Ni-cad Pack

AC Charger

BNC Antenna

Full Instructions

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Add £2.50 Post & Ins.

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Can you afford not to have a frequency counter? At our unbeatable price you can 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. And all this at an amazing offer price.

1998 Catalogue



1998

- 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

NEW



C-408
70cms
Handheld
Full
CTCSS

£89.95!

Add £5.00 Post & Ins.

SPECIAL OFFER PRICE

Can you believe your eyes? We are offering a 70cms handheld transceiver for 89.95! Features: Full CTCSS; 20 memories; 1.6MHz repeater shift; Priority channel; Scanning; Dual watch; Dual mode squelch; PTT lock; Programmable battery save; tuning steps 5, 10, 12.5, 20, 25, 50kHz. and more! This 230mW output transceiver operates from just 2 x AA cells (not supplied) and comes complete with antenna. Get your order in today!

Kachina 505DSP HF Transceiver

Send for Brochure



505DSP
Computer-Controlled
HF Transceiver

A complete PC controlled remote HF rig - In stock



New 6th Edition UK Scanning Directory

Covers every frequency between 25MHz and 1.8GHz. Police, Military, Aviation, Maritime, Motor Racing etc.

£17.95 plus £2 postage

TOP 2m/70cm Mobile Yaesu FT-8100R



£449
Price
Match

or £467 inc 3yr Wtty.

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!

TOP 2m/70cm Handy



£249

ADi AT-600

or £314 inc 3yr Wtty.

New Low Price
This Month

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
- Nicads and charger

Price Down



2 Years Warranty

W&S
£249



- 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!

AR-446 70cm 35W



FULL CTCSS

3W Novice version available

W&S
£269

ADi AT-201 2m FM Handy



NEW

W&S
£149

- 40 Channels
- CTCSS Encode
- CTCSS Decode
- DTMF
- Channel Reasout or
- Frequency Readout
- Set to Set Cloning

JUST ARRIVED

Look at the Features
Compare the Price

ADi AT-400 70cm FM Handy



FULL CTCSS

Value

W&S
£169

- 70cm FM Handy
- 2W output
- 5W on 13.8v
- 1750Hz tone
- Illuminated keypad
- Ultra sensitive
- Wideband Rx
- 20 memories
- Keypad entry
- DTMF
- Uses AA cells

Now the standard radio for Novice hams. It's sensitive, cost effective and was featured on Anglia TV

UK's Top Dealer for YAESU, KENWOOD & ICOM

W&S

NEW Icom IC-746

**100W
1.8 - 50MHz
50W
144MHz**



Phone for LOWEST UK Price!!

The most potent rig yet for 1.8 - 144MHz. All modes plus general coverage receive. Electronic keyer, Spectrum scope, DSP noise filtering and a host of features that will shake the competition into submission!

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Voucher**



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Deal
Match**

5 Year Warranty £115

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**Plus £100
Accessory
Voucher**



**£1999
Deal
Match**

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FT-1000MPDC £2599 £1999

ICOM IC-756 HF Rig

**Plus £50
Accessory
Voucher**



**£1895
Deal
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 HF RIGS

NEW TS-570

**W&S
£1199**



**Plus £50
Accessory
Voucher**

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.

NEW

**Garmin
GPS-III**

**With complete
moving map of
the UK
& Europe**



£349.95

The new GPS-III is loaded with a moving map covering millions of miles of motorways, ordinary roads, railways, rivers and shorelines. 12 channel receiver means fast positioning from switch-on, and the display width can be zoomed to cover from 500ft to 5,000 miles. Accurate to approx 45ft the display can be electronically rotated to suit car or hiker use. Just sit the GPS-III on the dashboard and watch your progress as you travel. Powered by 4 x AA cells - truly amazing! Get the best possible deal on this from Waters & Stanton. We have the latest UK version - phone today.

NEW Icom IC-T8 Tribander



**£349
£319.95**

IN STOCK

- * 6m - 2m - 70cm
- * Dual 12.5 / 25kHz Filters
- * Up to 4 Watts output
- * WFM 88 - 108MHz
- * AM airband
- * Hopefully 4m Tx / Rx !!
- * Ni-MH Battery Pack
- * Full CTCSS
- * AC charger

Icom do it again! The new T8 has everything you could want in a handheld. Imagine being able to operate three bands from a handy that is truly pocketable. The Ni-MH battery pack has no memory effects so charge it when you like. Nothing to work? Then switch to high quality FM broadcast or listen beyond the ham bands!

ICOM IC-821H 2m/70cm

**Plus £50
Accessory
Voucher**



**£1395
Deal
Match**

- * 2m/70cm All Mode
- * 45/40W adjustable
- * Full duplex
- * Satellite features
- * 160 Memories
- * 9600bps capability
- * Electronic keyer
- * IF shift, noise blanker

Yaesu FT-736R - Finished!



New Model Coming January

ICOM IC-207H 2m/70cm Mobile



**Price Down £329
Deal
Match**

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

New Batteries



- * Rechargeable Alkaline
- * 1.5V cells
- * No memory effects
- * Charging mid cycle is OK
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- * 3 times capacity of ni-cads
- * Very low cost

1.5v cells that hold their charge for 5 years and have 3 times the capacity of ni-cads. Offered at a very special price direct from Canada. In stock now! Note: you must use the special charger supplied with Starter Kit.

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4 x AA cell Packs: Ready charged. **£4.99 + £1 p+p**

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**W&S
£69.95**

NEW

- * Packet, AMTOR, CW
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- * Transmit and receive
- * Needs PC 286 or better
- * Includes software
- * No external power required
- * Connects to RS-232

Price Down

ICOM IC-706 MK II

**£995
Deal
Match**

**Plus £50
Accessory
Voucher**



or £1059 inc 5yr Wtty

160-6m 100W 2m 25W + +

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!

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£269

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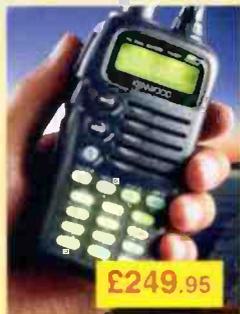
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- * Illuminated Keypad
- * PC Compatible
- * Windows Programming



Send For Brochure

£249.95

Special Purchase £349

£229

**IC-T7E
Dual Bander**



- * 2m & 70cm Handy
- * 70 Memories
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- * Tone scan function
- * Up to 4W out
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- * Auto power saver
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- * AC charger and helical

Your chance to purchase this fine handheld at a very special price - whilst stocks last

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Earpiece with lapel mic. and PTT. Models for all makes including Motorola.

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NEW



Clip onto dash grill and simply push handheld or GPS in between sprung fingers. Another great idea from Watson!

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Price Down 50%!

Dash mount for handys.

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W-420 118-530MHz 5/20/200W £69.95
W-620 1.6-530MHz 5/20/200W £129.95

WATSON Base Antennas



Fibre Glass casing and pre-tuned. Fit and forget.

Watson - Unbeatable

Watson sell more VHF base antennas in the UK than any other manufacturer. Famous world-wide, they are sold in USA and all major European countries. Buy the best from the UK dealer you can trust for honest service and friendly advice. We recommend Watson because we know they work - rugged, long lasting and low VSWR! No other range can beat these well engineered antennas.

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

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

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

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A 5m long mobile cable kit using 5D-BD cable

£18.95

£14.95

Matching hatch mount with adjustable angle and thumb wheel



Cushcraft Antennas

Cushcraft R-7000 Vertical

R-7000
7 Band Vertical
40-10 MHzes

90M Option Kit Available

£369

What the mags say!

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.

Cushcraft HF Antennas



A-3S

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A3WS 3 El 12 & 17m 2kW Gain 8dB F/B 25dB El. 7.66m Boom 4.27 £299
10-3CD 3 El 10m 2kW Gain 8dB F/B 30dB El. 5.38m Boom 3.05m £189
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20-3CD 3 El. 20m 2Kw Gain 8dB F/B 30dB El. 10.96m Boom 6.1m £369
20-4CD 4 El. 20m 2Kw Gain 10dB F/B 30dB El. 11m Boom 9.75m £499
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Combined quick release spring clip and belt loop. Self adjusting, fits all handys. Keeps your handy handy! Exclusive Watson design

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* Dual; Band 2m/70cms
* Mini Magnetic design
* Super strong magnet
* Base just 29mm diameter
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* 2.75m of mini coax - BNC
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* LCD Display
* BNC Whip Antenna
* Very sensitive "off air"
* Ni-cads and Charger

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Socket SO-239

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

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£80



ICOM IC-821H
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MFJ-784B
£179



MFJ-949 ATU
£95



MFJ-948B ATU
£79



MFJ-969 HF + 6 ATU
£139



MFJ-959B
£69



MFJ-259
£145



MFJ-941E ATU
£79



MFJ-921 2mtr ATU
£55

SALE ★ ★ SALE ★ ★ SALE ★ ★ SALE



HF VERTICAL

R-7000 10, 12, 15, 17, 20, 30, 40£339
AP8-A 10, 12, 15, 17, 20, 40 80£225

BEAMS

A3-S 10, 15, 20 3ele.....£380
AR-S 10, 15, 20 4ele.....£445
A3WS 12, 17 3ele.....£290

VHF VERTICALS

AR-6 6mtr Ringo 3.7dB.....£55
ARX-6 6mtr Ringo 5.5dB.....£195
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A2710-S 2,70 5ele.....£76

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The Directors and
Staff of
PW Publishing Ltd.
wish all our readers and
advertisers a very
Merry Christmas
and a
Prosperous New
Year

Please note that the Editorial and
Advertising Offices will be closed
from Christmas Eve until Monday
5th of January 1998.



EDITOR'S Keylines

Rob Mannion's viewpoint on the World of Amateur Radio

Welcome to 1998 - which is being recognised as the centenary year of 'Amateur Radio'. And throughout 1998 *Practical Wireless* will be celebrating a century of experimentation, discovery, initiative and expertise by non-professional radio enthusiasts.

Our celebration year starts off - appropriately enough - by the person who first ensured the Editorial team were fully aware of the significance of 1998 - with an article by **Rob Micklewright G3MYM**. Then throughout the year *PW* will feature historical features and achievements, specialised projects and reports.

We also plan to keep readers up-to-date with what's happening in the 'vintage & museum department' by publicising events and exhibitions. We've certainly got a lot of treats in store for you this year!

And, mindful that we are fast approaching the much vaunted millennium, the Editorial team are very busy preparing state-of-the-art projects and ideas which will take the magazine and its readers into the run-up to the new century. This is because *PW* is the magazine where the latest technology and vintage style memories, computers, data systems and Morse techniques all co-exist happily together - to everyone's advantage.

It's our versatility and unique approach to the hobby which helps to make *PW* so special. This is made possible by you the readers. So, keep a look out and don't miss each feature-packed *PW*!

Club Visits

The numerous club visits I undertake each year have become a very important - and integral - part of *Practical Wireless* itself. This is because your input is so important (don't forget - Ian Poole G3YLX's long series 'Specifications' came about from a club visit - North Ferriby in this instance).

By visiting a club I'm able to devote a whole evening to talk to readers, non-readers and people just entering the hobby. There's an



enormous amount of two-way 'feedback' from the visits and everyone benefits (especially me as I enjoy meeting YOU!).

This year I'm letting you all know what my 'Club Visits' programme is so that if I'm coming to a club in your area you may be able to come and join in for the evening because I always suggest that other clubs are invited for the evening. Additionally (and this has become an important aspect) clubs who may not have had much contact with each other - often continue the links after they've met through my visit.

First for 1998 is the **Warrington** club on Tuesday 27th January, followed by the **Derwentside** club (County Durham) on Wednesday 4th February.

March is a busy month indeed! On Tuesday 3rd of March I'm at the **Plymouth** club, Monday 16th at the **Dragon** club in North Wales, and Friday 20th sees me at the **Hereford** club. Pausing for breath over the weekend I'm then off to the **Stratford on Avon** club in Warwickshire!

The reason why March is so busy with club visits is that I was determined to squeeze in a holiday to the North West of Ireland in late March and early April. During my holiday I hope to do two important things - explore the old County Donegal narrow gauge railways with the help of my friends in the 'Donegal Gang', operate /P on 3.5MHz and meet friends old and new at the

Donegal club - one of the busiest in EI so I've learned.

I don't have a date for the Donegal club visit yet (possibly 27 or 28th of March) - but if you live in the area keep an ear open and we may meet! I then travel back home on Saturday 4th April to catch up with the rest of the schedule! But at least I'll return to a nice warm home and meal after my travels as my daughters are 'house sitting' for me while I'm away (daughters are great aren't they?).

Tuesday 28th of April is the date I'm visiting the **Verulam** club in Hertfordshire. Next on the list (after recovering from the Dayton HamVention in the USA!) is the **Cheshunt** club in Hertfordshire on Wednesday 27th of May.

Wednesday 3rd of June means another welcome visit to the north-east of England when I visit the **Great Lumley** club in County Durham.

It's off to North Wales on Tuesday 7th of July. This is when I'm visiting the **Wrexham** club. And Friday 7th of August will see me at Cheltenham - not for the races but to visit the **Cheltenham Amateur Radio Association!**

Monday 24th of August is the day I'm due in Derbyshire to visit the **South Normanton** and **Alfreton** club. Next on the list is a trip to visit the **Leicester** club on Monday 7th September. Later on in September - Friday 18th of September - I'm visiting the **Mid-Sussex Amateur Radio Society**.

Last, but certainly not the

least, is my visit to the **Oulder Hill Society** in Rochdale on Friday 23rd of October, the evening before the **Rochdale QRP Convention**. You might say it's a case of 'two birds with one Rob' to round off my club visits for 1998!

Hand-Held Apologies

I'm afraid that I have to offer my apologies to those readers waiting for the second part of **Geoff Pike G10GDP's** u.h.f. hand-held transceiver project to be published. The problems have been caused by technical production difficulties and I had to take the decision to 'hold over' part 2 from the December issue (a note to that effect was placed on the contents page).

Unfortunately however, due to continuing technical difficulties - made worse by the much shortened Christmas-time publishing schedules - I have decided that it's best to publish the final part of the GDP-430 in our March issue which will appear on the bookshelves on February 12th 1998.

I hope readers will accept my apologies for the delay and realise that the decision is part of my determined policy to ensure the project is completely error-free when it's published. Personally...I think it will be well worth the wait!

Year Planner

By the time you've read 'Keylines' you'll have discovered our free Christmas and New Year gift - **especially for you**. We hope that you'll find the *PW* 1998 Year Planner useful throughout the very special new year. So, please enjoy using it with our compliments!

Finally, as this issue appears just before Christmas 1997 I'd like to wish you all a happy and peaceful season. Everyone on the Editorial team - **Donna Vincent G7TZB**, **Zoë Crabb** and **Tex Swann G1TEX**, and of course I also wish you a very happy new year.

*Rob Mannion
G3X7D*

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

RECEIVING You

PW's Postbag. If your letter is published you'll win a prize.

Letters Received Via The 'Internet'

Many letters intended for 'Receiving You' now arrive via the 'Internet'. And although there's no problem in general with E-Mail, many correspondents are forgetting to provide their postal address. I have to remind readers that although we will not publish a full postal address (unless we are asked to do so), we require it if the letter is to be considered. So, please don't forget to include your full postal address and callsign along with your E-Mail hieroglyphics! Editor

This Month's Star Letter

Gratitude To Practical Wireless

Dear Sir

I am writing to thank you for the interesting talk which you gave to the South Manchester Radio Club in Sale on Friday 24th October. It was very interesting for me to hear of the early history of *PW* and of the recent history too. Needless to say, the breadth of your experience is truly amazing.

I had intended to tell you an anecdote about a debt of gratitude which I feel I owe to *Practical Wireless*, but the question session was so well occupied that I decided I would write to you personally instead.

The story starts in 1942 when I was 13 and I found, at home, three copies of *PW*, which my older brother had bought in 1937. I started reading them and found articles with 'news' about various short wave broadcasting stations and other sections of UK listeners' reports of stations they had heard from all over the world. There were 'blueprints' in each copy too, and they were genuinely blue in those days of course!

The idea of being able to listen to distant stations with a receiver which you'd made yourself fascinated me. My parents' radio only covered medium and long, so short wave radio was a field of which I'd had no experience.

One of those *PW* copies also contained an article by a UK listener with a title like 'listening to US 'amateurs' during the summer nights' in which he listed the call signs of stations he had heard. This introduced me to the idea that there were lots of people who had short wave transmitters and receivers at home which they used to 'talk' (probably by Morse code) to other 'amateurs' - that was an even more fascinating idea of course!

I then discovered that my father had kept a box of radio components, some of which he'd used to build domestic radio sets in the late 1920s or early 1930s, and amongst the components was a rather tattered copy of *The Beginner's Guide To Wireless Telegraphy & Telephony* by Roberts Heys, published by the Saxon Radio Co. of Blackpool, which included a design for a one-valved medium wave receiver.

I built it using a 'dull emitter valve' and I heard the Home and Force programmes with it using a single headphone. Incidentally, a glance at the adverts in your old copies of *PW*'s predecessors bought back memories of the names of component manufacturers with which I had been familiar as a result of 'rooting through' my father's old box.

As a result of this new interest, my parents gave me money for my 14th birthday to buy a copy of F. J. Camm's *Short Wave Manual* (I think it cost 7/6d), which I'd seen advertised in a new copy of *PW*, because I'd become a reader by then (I must confess that I ceased to be a regular reader at some stage in the late 1940s when I changed to *Wireless World* as I couldn't afford both).

My father bought me a second-hand pair of headphones (S. G. Brown no less for 5/-) and I bought myself an HL2 triode so I was equipped for starting on a

practical demonstration of short wave radio. I built a one valve receiver from a design in the *Short Wave Manual*, but I used a Telsen 'two band' short wave coil (which was in my father's collection, but which he'd never used) instead of the home-made single band coil wound on a glass test-tube as described in the book.

I strung up 30 feet of aerial wire to the bottom of the garden and began learning the technique of gentle reaction control and not moving my hand because of 'hand capacity effects' and I soon began hearing stations like Radio Brazzaville from the Belgian Congo, All India Radio, Japanese broadcasts and US Armed Forces Radio Service programmes from stations like WNBC, WGEO, etc., and it was all very exciting for me. Later on I converted my receiver to a 2 valve 'detector + i.f.' version and heard Radio Australia, so I felt I'd really 'heard the world' then!

Needless to say, by the time I was 15, I 'knew' that I wanted to become a Radio Engineer and staff at school directed me into thinking of a Physics degree course as the way to proceed to become a professional radio engineer. I never did become that, but I spent all my working life in Physics and Electronic Engineering so I was in the right sort of area!

But going back to the s.w.l. area, it was in the latter half of 1944 that, in my after school listening, I came upon stations MCN, MCO and MCP, which were used by the BBC War Correspondents, like Chester Wilmot, Frank Gillard and Richard Dimpleby to send their reports back to BBC London. It meant that I could tell my father what the reporters were going to say before the six o'clock news on the Home Service and, more exciting still to the budding s.w.l., I also heard the preamble chit-chat between the correspondent and 'London' before the actual report.

I think that must have been the nearest thing to Amateur Radio which was available in wartime. (It was 30 years later that I found out the first, MCO, was a 250W (input) transmitter and the others were big, MCP being 5kW and MCN 7.5kW). You will deduce that it wasn't long before I was 'hooked for life' on short wave listening and when Amateur Radio appeared again in 1946 I felt even keener, with the 28MHz band providing a lot of thrills.

So, I am deeply thankful to *PW* for having started me on that path which helped me into a career and which has also given me nearly 50 years of interest in short wave listening and 47 years of activity as a radio amateur - almost all of the latter on c.w. by the way. Well, that isn't all of my early history in radio, but I'm sure I've consumed enough of your 'spare time' already, so thank you once again and best wishes.

Alan Errock G3HCO
Cheshire

Editor's reply: Thanks for the memories Alan...they were absolutely fascinating! I thoroughly enjoyed my visit to your club...thanks for the hospitality.

Ecko Service Department

Dear Sir

As a pre-war member of the Ekco service department I was most interested to read the letter entitled 'Vintage Vale' and referring in part to the article by Ian Liston-Smith G4JGT in the August issue of your magazine.

New Ekco models were brought out in the early autumn and the last figure of the type number indicated the following year. Thus the PB279, which incidentally was not motor driven, was first made in 1938.

The first motor-driven automatic-tuning set was, to the best of my memory, the PB288, this had a narrow spacer between the two halves of the selection disc fitted to the variable capacitor spindle. Small variations in the final position of the switching off contacts were taken care of by automatic frequency control (a.f.c.).

The use of a.f.c. violated the patent held by another radio company and the next year in the new model - the PB289 - I believe it was called, used a different method of frequency control. The motor was now 2 speed, when it stopped, it over-ran the insulation strip and made contact with a small roller. One of two fitted each side of the insulating strip, the motor direction reversed at a slower speed the selection disc inched back to the off position.

The PB279 was a cheaper simpler model where station switching was simply done by

selecting a pre-set tuned circuit. After all these years, my memory is dim, but the above principles are basically correct.
Ron Parry G5XV
Berkshire

PW Sprat Project

Dear Sir

I am writing about the PW Sprat project in July/August 1996 and I wonder how many of your readers have built one, and if so... how have they found the construction and performance of this project? I have built the 3.5MHz version and found that it gives very good results.

I found there were one or two faults with the circuit, one of which the tuning was too coarse, however, this was cured by changing R3 to 2.7kΩ. I have gone on since to build a 7MHz version and had quite a number of continental DX QRP QSOs.

I think the design is great and brings a complete c.w. superhet in a single chip and wonder if anyone has thought of building an s.s.b. transceiver using the design? It is a great portable rig when going /P using batteries and if you use the case recommended it fits in the palm of your hand. So, I hope to QSO with other Sprat users and hear more from them on their experiences.

Jim Walker G0WMIJ
Lancashire

Island PCB Technique

Dear Sir

A variant to the cut and glue 'island' technique of construction used for the connections of the r.f. amplifier (October issue) is to isolate the islands required directly on the un-etched p.c.b. board. A model maker's electric drill fitted with either a burr cutter (or a small drill with just a small amount of projecting from the chuck)

is used to cut a narrow channel through the copper around each island. Then you should test for short circuits, and then if it's okay...solder on the components.

Assuming that a general layout has been planned, one advantage of this method is that the islands may carefully be cut out as work progresses to suit the size of the component. It is also possible to channel the connections to standard dual in line (DIL) integrated circuits (i.c.s) so that they may be soldered in a normal upright position.

However, a better method for more complex circuits especially ones using integrated circuits is to make a sandwich of Veroboard and single-sided p.c.b. material, the latter copper side down as a groundplane and Vero copper tracks up. Initially, the Veroboard is located and fixed on the p.c.b. material by using the corner track holes to drill through the p.c.b. material and insert wire links soldered on both sides.

Component ground connections are passed through Vero track holes and ones drilled in the bottom copper then soldered on both sides. All other connections are made to the Vero tracks using

Working 'Stroke Portable' On HF

Dear Sir

I read with interest your 'Keylines' comment regarding working 'Stroke Portable' (/P) in deepest Wales. Here, I take great pleasure in working /P from isolated locations, mainly from hilltops on 'two metres' and h.f.

Like you, being outside the home QTH brings the magic of amateur radio back into the hobby, no 'phone, no TV or computers, just a radio (in my case a Ten-Tec Scout 555, a battery and a W3EDP long wire strung to the nearest fence or tree plugs an MFJ random wire tuner). I get a real sense of communication from this set-up and of course the fresh air and in your case, steam, heaven!

It always amazes me when working /P how many people come up to see what's going on. Many cannot believe the distance being worked, even on 3.5MHz inter UK. Who said amateur radio was outdated?

I look forward with great interest to hearing your ideas in print regarding a good portable antenna. In the meantime, thanks for an excellent magazine.

Peter Caldwell G4PAC
Berkshire

Editor's Reply: Working h.f. portable is great fun Peter...as we've both 'rediscovered'! I hope to publish my /P antenna ideas later in 1998.

them as normal or grouped in islands and removing those not required with a track cutter. Components such as small transformers and inductors may be glued to the Veroboard to

achieve stability and external connections made to the Vero tracks as in normal use. This method allows i.c.s to be mounted in the upright position and connections to be made

without the interpolation required in the 'upside-down dead bug' method.

I've used the first method on a superhet receiver. Both methods require a steady hand, good magnifying glass, testmeter to isolate shorts, fine tipped preferably temperature controlled soldering iron and some practice but these of course form the basis of any satisfactory electronic construction method.

N. L. Smith
Staffs

Memories Of 1936

Dear Sir

In reference to your 'olde world radio making' on page 21 PW October issue. This really brought memories flooding back to me when I was 10 years old in 1936.

I recall my father making a radio from the PW magazine of the time. Not that I've followed in his footsteps. Unfortunately, he passed away at 35 two years later.

The set I recall was a blessing for entertainment. My father had to wind the coils by hand. The cabinet for the receiver was also hand made too...with 'twisty legs'.

Thinking of the compact radios of today, it was glamorous and enormous! There was a deck inside behind the dials, where everything was laid out, valves, coils, etc., grid bias, all in a little rack.

For the tuning knobs, they were mounted on a Bakelite fascia panel. Behind the lower doors of the cabinet, there could be found a beautiful glass accumulator and a large high tension battery. The large speaker sat on top of the whole assembly. The aerial was a long wire type and there was a substantial 'earth' connection.

Of course, I also quite often had a trip to the top main road to have the accumulator recharged. Quite some memories eh? And thank you for your memories and congratulations on your 65 years of PW service.

George H. Taylor
Doncaster

Editor's reply: Thanks for your memories too George...and keep the memories coming readers - please!

Send your letters to the PW Offices, marking it clearly for 'Receiving You'



NEWS 1998

Compiled by Donna Vincent G7TZB

The Biggest Electronics Catalogue Ever!

Tandy, who say they are "Britain's largest high street electrical retailer" have just launched, what they are claiming to be their "biggest and best catalogue ever". Tandy are part of InterTAN Inc., who are based in Fort Worth, Texas in the USA. InterTAN is an international consumer electronics retailer with over 1,800 retail stores and dealer outlets in the UK, Canada and Australia.

The Tandy stores carry a wide range of both brand and ownlabel consumer electronics including

audio and video, communication products, telephones, computers, batteries, accessories and much more. And the new Tandy Electronics

Catalogue is no

exception, its 500 pages are packed with products including specialist electronic components.

A new feature of Tandy's new catalogue is Tandy 'Unlimited' which is a mail order facility giving customers access to the full range of products including the more unusual and state-of-the-art technology. Orders placed from the Tandy 'Unlimited' range are despatched within 48 hours and are subject to a nominal P&P charge.

Tandy Customers can also benefit from the 'Repair Shop at Tandy' service. Under this service Tandy will repair a range of electrical items whether they come from Tandy or not. Full details of this are given in the catalogue.

The new Tandy Electronics Catalogue is available for only £1! from all Tandy stores and includes £25 worth of vouchers. To find out where your local Tandy store is call (0500) 300666 or alternatively check out their Web page at WWW.tandyuk.co.uk



Keeping In Touch

The Open Museum at the National Maritime Museum, Greenwich, London, will be running a one day course on Saturday 21 February to look at the subject of how communication on land and at sea has always been vital and essential for safety and security, to Naval and Merchant fleets. The course, entitled 'Keeping In Touch' will explore the early methods used to assist ship-to-ship and ship-to-shore communications and will include flag signalling, the Admiralty Telegraph, the early electrical telegraph and the wireless telegraph.

Speakers on the course will include **Dr Allan Chapman** (Oxford University), **David Brown** (Naval Historical Branch), **Mary Goodwin** (Cable & Wireless PLC) and **Jenny Wraight** (Admiralty Library). The cost of the course is £25 (£15 for concessions).

For a free prospectus or to make a booking please contact **Caroline Tilbrook** on 0181-312 6747 or look to the National Maritime Museum's Web site at <http://www.nmm.ac.uk>

ZN414 Chip Supply

As many *PW* readers are aware the Plessey ZN414 i.e. appears to be in short supply, as we discovered after publication of **David Rowland G6UEB's** 'Matchbox Midget Receiver' project in the September issue of *PW*. However, help is at hand if you're trying to locate a supplier.

Mike Dudley of **Worldwide Electronic Components (UK) Ltd.**, has contacted the 'Newsdesk' to say that he has several hundred Plessey ZN414Z's in stock and that he can locate and supply most parts under the Plessey name. However, he would like to point out that his business is fairly small and therefore would

'Vintage Visit' For PW Editor

It's quite a few years since I last visited the **National Vintage Communications Fair (NVCF)** at the **National Exhibition Centre** near Birmingham. This year however, the Autumn NVCF was on the day following the **Rochdale QRP Convention** (Sunday (26th October) and I took advantage of the fact that the event was on my way home!

Although the NVCF is certainly not an Amateur Radio event and many of the prices I saw displayed reflected the specialist collector's market -



visitors have got to remember that the venue is the NEC! I certainly met many Amateur friends and saw a lot of interesting older equipment.

In fact, I was very pleasantly surprised at the number of interesting items and just missed a bargain, a beautifully made (home-brewed) receiver (£20) incorporating the Eletroniques front-end. A lucky Irish enthusiast had 'bagged' it!

Although I could only stay for a few hours I can certainly recommend anyone to visit the NEC for the NVCF. I didn't buy anything but I wallowed in nostalgia - from valves to early Amateur Radio equipment round to microscopes and even vintage medical equipment!

There's certainly something for everyone and I shall be making an attempt to visit the main event in the Spring of 1998. Perhaps I'll see you there? For further details of the regular NVCF events contact **Jonathan Hill** on (01392) 411565.

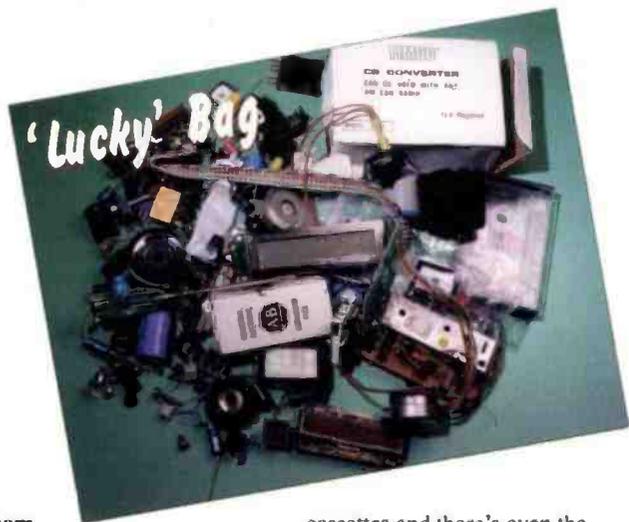
Rob Mannion G3XFD



Jim Fish G4MH well known to *PW* readers and a long way from his Huddersfield home, had an interesting collection of valves and valved audio equipment for sale.

appreciate orders for reasonable quantities. Mike can be contacted at **48 Elizabeth Crescent, East Grinstead, West Sussex RH19 3JD. Tel: (01342) 312024 or FAX: (01342) 312025.**

The *PW* 'team' have also been informed that **Greenwell Electronics** of **27 Park Road, Southampton SO15 3UQ. Tel: (01703) 236363** have stocks of the ZN414 chips available albeit at a cost of £5 each.



Procom

Electronics of Lancashire have notified the 'Newsdesk' that due to storage problems they have decided to sort out and bundle-up a selection of their components into 'lucky' bags and to sell them off. The bags measure approximately 10 x 12in and Richard Swindells G0WCP of Procom says they estimate to have enough components to fill around a thousand bags!

As you can see from the photograph the lucky bags contain a selection of 'bits and bobs' ranging from resistors, displays and other components through to head cleaning

cassettes and there's even the odd screwdriver in there too! The bags are available direct from Procom who can be found at 182 Stamford Street, Ashton-under-Lyne, Lancashire OL6 7LR for £7.99 each or by mail order by calling 0161-343 2782. If mail ordering please remember to add £2.50 P&P, all cheques should be made payable to Procom Electronics.

So, if you're looking for some additions to your 'junk box' why not order a lucky bag and you never know you may get hold of that all important component you've been searching for!

Student Air Waves

As reported in last month's 'Newsdesk' the 1997 Radio 1 Student Radio Awards took place on Saturday 1st November 1997 and we are now pleased to announce that University Radio Falmer from the University of Sussex beat strong competition to earn the vote of Best Student Radio Station of '97. The prize for the up and coming broadcasters is an hour of broadcasting on Radio 1 which will give them the chance to broadcast to approximately one million listeners.

Other winners in the other categories included the city of Nottingham whose two universities swept the board by winning five out of seven awards in the remaining categories. These included Best Factual Programme and Best Radio Presenter.

Student radio broadcasting is fast becoming an everyday part of university life and provides an essential grounding for the radio broadcasters and technicians of tomorrow. So, if you're at university and are interested in getting involved with The Student Radio Awards contact Radio One Awards, c/o NUS Press Office, 461 Holloway Road, London N7 6LJ for more details.



PW QRP Contest Presentations



Winners of the 1997 Trophy were the North Wales Wafflers (GW0NWR/P) seen accepting their hard won award after several 'near misses' from the Editor Rob Mannion G3XFD deputising for Neill Taylor.

Despite the delayed publication of the 1997 PW 144MHz QRP Contest results - due to Neill Taylor G4HLX's temporary 'exile' in the USA - the presentation of the winner's trophy, and the 'runner's-up' award took place at the last Granby Halls Leicester show event.



Communications. As the 'North Wales Wafflers' team all own hand-held transceivers they expressed a wish to donate it to the Radio Amateur's Invalid & Blind Club for use by their disabled members.

The photograph shows the DJ-190 being presented to Shelagh Chambers, Treasurer & Membership Secretary of the RAIBC and wife of Nick Chambers G0IRM who is seen standing (centre) to the left of his wife. Mike Devereux G3SED is standing to Nick's left but perhaps the most important member of the 'Chamber's' team - Clyde, Nick's Guide dog...decided to hide himself from the camera!

Gratefully accepting their DJ-190 from the 'Wafflers' Shelagh Chambers said it would be most useful for when RAIBC members were in hospital away from their main rigs. Let's hope there's not too much QRM on the electrocardiographs!

Alinco Presented - Twice!

The North Wales Waffler's group also won an Alinco DJ-190 144MHz hand-held transceiver, kindly donated by Mike Devereux G3SED of Nevada

Solar Power For Runners-Up



the solar panel units to members of the Oldham RC who have now totally recovered from the effects of bad weather and broken limbs!

The 1997 144MHz QRP Contest Runners-up - the Oldham Radio Club (GIORC/P) along with being able to tell of their adventures in appalling weather at their /P 144MHz site - are now the proud owners of a Solar Panel unit kindly donated by Bob Keyes GW4IED of Key Solar Products. The photograph shows Bob Keyes (second from right) presenting

Tennamast Trophy Presented

Winner of the Tennamast Trophy (In Memoriam to Frank Hall GM8BZX) was again the Cockenzie & Port Seton Amateur Radio Club (C&PSARC). They were presented with the Special Clock Trophy (kindly donated and supported by Norrie Brown GM4VHZ of Tennamast, at the (C&PSARC) 'Junk Night Event' by Beth Hall (widow of Frank) in the late summer.

Shown in the photograph are Beth Hall (left), Bob Glasgow GM4UYZ, Colin Smith GM0CLN, Ron Fraser GM0NTL and Jim Martin MM1BGL.

(Photo.courtesy of C&PSARC)



Zoë says:
 "keep the News and
 those Club magazines
 coming!"

CLUB Spotlight

Compiled by Zoë Crabb

Visit To Portishead Radio

On Saturday 4 October former Merchant Navy Radio Officers, members of the **Radio Officers Association of Europe (ROAE)**, descended on Burnham-on-Sea, Somerset, for a visit, or should one say pilgrimage, to Portishead Radio GKA. The visitors, most of whom hold amateur licences, had travelled considerable distances, from all parts of the UK, Eire and Switzerland.

Many of the delegates had sailed in the Merchant Service during the heyday of Portishead, when it had a staff of 350 and was the mainstay of Burnham-on-Sea's economy in the 1950s and 1960s. Radio Officers would contact GKA to receive all their telegrams or Marconigrams and send messages for onward

transmission to the shipping companies

and from the passengers or crew to their family.

There was even a facility for sending gifts and flowers from ships. However, it was the first time that some ROAE members had visited the site with which they had been in contact so many times.

Portishead Radio was the major centre of world-wide communications and while a ship might have one or two messages per day to send, GKA would have 50 or 60 ships to contact every four hours, and passenger ships could have 20 or more messages at a time. The workload would be enormous, especially at Christmas.

Perhaps it was coincidence when, early in the visit, the group encountered 'Sparks', the station's aptly named cat, who is on the 'payroll'. The visitors were told that there had always been a cat on the premises, to ensure that the station was mouse free! After all, with over 300 Radio Officers on site, individuals could not all be called 'sparks' as were their counterparts on board ship, so it was a safe name for Portishead's cat!

One reason for the visit was the probability that the station will close in 1999, as modern technology overtakes the need for communications by Morse key. The numbers employed at the station today are substantially fewer and traffic passing through the station infinitesimal compared with days past.

The visiting ROs, nevertheless, were fascinated by the home, and, purpose-built modern consoles they saw in operation and the Morse key was seen in use, so rumours of its demise are a little premature. On the RT side, there were conversations with a lone round-the-world yachtsman and first news of the ship *Romanica*, which was on fire in the Mediterranean.

Following the visit to GKA the ROAE members retreated to a local hostelry for a gathering. It could not be called a 'reunion' because the Radio Officer was usually a one man department on board cargo ships and his only contact with others was either when in port or by using the Morse key.

However, many anecdotes were shared and much common ground was found. Everyone was most grateful to BT Maritime Services for allowing the visit to the station.

For ROAE details and information, please contact **Paul Durkin, 73 Maple Drive, Burnham-on-Sea, Somerset TA8 1DH.**



'Sparks', Portishead's aptly named cat, who is on the 'payroll'.



A 'Net' of Radio Officers swapping stories after a visit to Portishead Radio.



The consoles at Portishead Radio GKA.

50 Years In Amateur Radio

At the Annual General Meeting of the **Dragon Amateur Radio Club**, held back on the 6th October 1997, **Dan Lockyer GW3HCL** was congratulated on attaining 50 years in Amateur Radio. The retiring Chairman **Dewi Roberts GW0ABL** presented Dan, on behalf of the club, with an inscribed tankard. Dewi challenged if any other amateur could possess such number and variety of callsigns. Dan also held several more other temporary callsigns.

Dan, who is a native of the Isle of Wight, has led a varied and interesting career in radio and electronic engineering first in the RAF and then on Government Service in the 'Third World'. At one stage he was the Communications Officer for the Gilbert and Ellice Islands. Now retired, he is an active member of the Dragon Club, preferring as a keen c.w. operator to use the key at the special events.

Dan was also congratulated by the new Chairman **John Parry GW3VVC** elected at the AGM. Dan himself was elected as the new Vice Chairman.



Dewi GW0ABL (left) the retiring Chairman presenting Dan GW3HCL with an inscribed tankard in celebration of this 50 years in Amateur Radio.

21st Anniversary Award

To celebrate its 21st Anniversary, **Poole Radio Society** is offering an award. To claim the award, stations should send an extract of their log showing contacts worth 30 points. Any station contacted in Poole is worth one point (two points if the station contacted is a Novice station). Any member of Poole Radio Society is worth five points (six points if the station is a Novice). Any contact with the club station G4PRS (P) or GX4PRS (P) is worth ten points.

Contacts can be made using any bands or modes permitted by the applicant's licence, but must not make use of repeaters, etc. Contacts with Novice stations are worth an extra point. Only one contact with a station on the same band and mode will count. To count towards the award, contacts should be made between 1st November and 31st December 1997. So, get going!

To claim the award, please send a copy of your log and cheque for £1.50 to cover printing, postage and packing, payable to Poole Radio Society, to **Brian Baverstock G4WCJ, 28 Kingston Road, Poole, Dorset BH15 2LP.** Please allow 28 days for delivery of your award.

Joined Forces

The **Hastings Electronics & Radio Club (HERC)** and the **Southdown Amateur Radio Society (SARS)** have joined forces with the object of encouraging Novices in all aspects of the amateur radio hobby. The first of these activities is a 'Novice Xmas Party On The Air' or 'How To Gain The Devonshire or 1066 Awards', or both!

Cocky Cockenzie's Cup!

The activities are being held on December 26, 27 and 28th 1997 at 3 till 4.30pm each day on 70cm (430MHz) only. A special award will be made to the holder of the full 'A' or 'B' licence whose call appears most in the submitted Novice log. QSOs using repeaters will not count for either awards.

Both these awards can be claimed by 'working' five club members, i.e. five HERC members for the 1066 award and/or five SARS members for the Devonshire award.

To claim the awards all you have to do is send a copy of your log showing the appropriate contacts to the relevant Awards Manager where they will be checked against the current membership lists. Both awards may be endorsed, QRP, single band, etc.

Contact details are: Devonshire Award, Mr J. Harris G4DRV, 11 Boscawen Close, Eastbourne, East Sussex BN23 6HF or for the 1066 Award, Mr B. Loram G0ILK, 12 The Finches, St Leonards on Sea, East Sussex TN38 9LQ.

Chester's 50th Anniversary

The Chester & District Radio Society will celebrate its 50th anniversary on June 13th 1998. The whole year will witness various events to mark this landmark in the Society's history.

Firstly, an award will be made to applicants who work or hear Chester & District Radio Society members stations, five callsigns qualify for the award. A small charge will be made for the award certificate and postage.

March 21st 1998 will see the Society's 50th Anniversary Dinner and the RSGB President Ian Kyle G18AYZ/M10AYZ will be the Guest of Honour. Ian Kyle will address the 'congregation' during the course of the evening.

Tickets for the dinner will be available at a cost of £20 each and the venue is the Jarvis Abbots Well Hotel, Christleton, Chester. Further information regarding the award and the 50th Anniversary Dinner are available from Roger Howells G8GWX (Society Chairman), 52 Upton Park, Upton, Chester CH2 1DG. Tel: (01244) 374252.

Yeovil Convention - New Date!

The Yeovil Amateur Radio Club's 14th QRP Convention will be held at the earlier date of 19th April 1998 at the Digby Hall, Hound Street, Sherborne, starting at 9am. The convention VIP will be The Reverend George Dobbs G3RJV, who will also present the afternoon lecture.

The event will also feature trade stands, Bring & Buy, interesting displays ranging from vintage radio to modern techniques, prize draws, plus the ubiquitous 'Constructors Challenge', which will be to produce the most efficient 20m (14MHz) QRP transmitter. Morse tests on demand will be available again. Remember too that the historic Abbey town of Sherborne offers a wide range of interest for the XYL and family.

For further details contact Peter G3CQR on (01935) 813054.

Bristol's Club Nights

Dick Elford, committee member of the North Bristol Amateur Radio Club has written in with details of their RAE class and Morse tuition group, both of which run all year. They are held on club nights at the club's QTH at SHE7 Braemar Close, Northville, Bristol. Further details on (01454) 218362 or at G0XAY@AOL.com

Change Of Venue

The Fylde Amateur Radio Society, as from the first meeting in 1998, will meet at Comed Aviation Club Room, Building 28, Blackpool Airport, Squires Gate Lane, Blackpool. The meetings take place as usual on the 2nd and 4th Thursdays each month, commencing at 7.45pm. New members welcome.

Further information about the Society can be obtained from G4IHF on (01253) 726685 or from G7CUL on (01772) 635464.

Warrington Beware!

Rob Mannion G3XFD is giving a talk about PW past, present and future at the Warrington Amateur Radio Club on the 27th January 1998 at Bellhouse Lane, Grappenhall, Warrington. The talk will start at 8pm. Non-members of the club are very welcome to attend.

For any further details about the club and its activities, why not contact John G0RPG on (01925) 762722.

Exeter ARS

Members of the Exeter Amateur Radio Society meet on the second Monday of each month at the Moose Centre, Spinning Path Lane, Blackboy Road, Exeter at 7.45pm. The third Monday is set aside for projects, on air activity and natter night.

More information about the

The Cockenzie & Port Seton (C&PS) Amateur Radio Club, based in the Lothians near Edinburgh, Scotland, have got every right to feel 'cocky' at winning the *Practical Wireless* and Kenwood 'Club Spotlight' Club Magazine Trophy. Presented with the magnificent trophy by Kenwood's Dave Wilkins G5HY, Bob Glasgow GM4UYZ accepted the award on behalf of the club and was accompanied by a strong contingent from their very active members during a ceremony at the Leicester Show in October.

Well known for their fund-raising activities on behalf of the British Heart Foundation, the C&PS ARC just clinched their win - from an excellent selection of other club magazines - by their approach. The judging panel had an extremely difficult job and working in isolation each came to their decision independently with C&PS ARC's entry winning 45 points (out of a possible total of 50) with the joint runners-up Hoddesdon RC (the first winners in 1996) and the Warrington ARC scoring 44 points.

And although the C&PS magazine is simple in format (stapled A4 sheets) the judging panel were extremely impressed by the general 'feel' and coverage of their entry. The judges' comments ranged from "I did like this one...very readable...how do they do it?.. and another commented "Excellent 'newsey', friendly, lots of features, highly commended".

Other remarks included "highly commended, produced without sponsorship, a newsey relevant publication" and from another judge came the final comments "Good couple of newsletters - nice to see colour in December's, liked the recipe idea and events column. Nicely spaced out and easy-to-read".

So, well done Cockenzie & Port Seton in winning the 1997 award. Our congratulations also go to Hoddesdon and Warrington for their marvellous efforts. Don't forget - this is a friendly competition. The judges have a difficult job to do and are looking for what they consider to be the best 'club' magazine.

There's a good range of opinions on the judging panel and a good chance of winning for all entries. The only advice I can offer for future entrants is don't try to produce a competition winner. Just try to represent your club and its members interests in the best way you can. In this way you will always 'win' the appreciation of your club and your readers and you may well also win the 1998 'Club Spotlight' Trophy. So, good luck to you all!

Rob Mannion G3XFD

Society can be obtained from Theo G3EQM on (01392) 875498.

Loughton & DARS

Marc Litchman G0TOC has recently E-mailed me with a brief history of the Loughton & District Amateur Radio Society, of which he is the Web pages Editor. The Society has had a presence on the world wide web since last December.

Since then, the number of pages has increased and details shown within these pages has undergone a series of changes. Currently you can find articles from the Society's newsletters, photos of club meetings and rallies, scrap-book articles, links to other amateur radio related web sites, members' E-mail details, for sale/wanted pages and a guest book to name but a few!



Bob Glasgow GM4UYZ, accompanied by club members, accepts the *Practical Wireless* & Kenwood Club Spotlight Magazine Trophy on behalf of the Cockenzie & Port Seton Club from Kenwood's Dave Wilkins G5HY and G3XFD.

The www address of the Society is as follows:
<http://www.ndirect.co.uk/~marc.litchman/ladars/laracs.htm>

Marc says please feel free to wander around the site, but don't forget to sign the Guest Book!

Quiz Night

The Bangor & District Amateur Radio Society are holding a quiz night on Wednesday 7th January at 8pm when there will be an open quiz at the Club Room in the Clondeboye Lodge Hotel, Bangor. Visitors from other radio societies will be warmly welcome. Roy G10WVN, QTHR.

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- Mathematics for the RAE
- Kit Suppliers Showcase
- Hands Electronics RX1 3.5MHz Kit Review

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- Alenco DJ-180ED Hand-Held Review
- Build A Valved Active Antenna
- A Receiver Construction Experience
- Tuned CW Filter Project
- Eddystone Radio Tribute

March

- London Amateur Radio Exhibition Show Guide
- Free! Greenweld Catalogue
- Maxcom MX-9000 Test Equipment Review
- Modifying the Pye Olympic P Band Transceiver
- Maritime Mobile - Amateur Radio All At Sea

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- Jim MX-14S SSB Hand-Held Review
- The World Of QRP
- Build The Queensbury 7MHz Transceiver

August

- Antenna Special
- Icom IC-2iE Transceiver Review
- Tiny Tim 3.5MHz SSB Transceiver Project - Part 2
- Palomur PK-44 Keyer Review
- Radio Personality - Louls Varney G5RV

September

- Test Equipment Special
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December

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RADIO

DISCOVER THE BASICS

By Rob Mannion G3XFD

Having discussed the generation of alternating current and rectification last time, Rob Mannion G3XFD now demonstrates a classic use of a single diode rectifier in a simple receiver.

Fig. 1: Circuit for the diode detector circuit. For best results use an 'air spaced' variable capacitor. The fixed vane contact should be soldered to point A and the moving vanes contact to point C. High impedance headphones are best, but low 'Z' impedance will work but cassette player types are not suitable.

I hope you've enjoyed the experiments and ideas I've suggested in the series so far. But now that you've learned a little about how we generate current - both in 'direct' and alternating forms - I can digress a little from the purely theoretical teaching to demonstrate a very simple and practical application of the rectifier and take you back to 'Great Grandad's time' by making a 'crystal set'.

Strictly speaking our 'crystal set' is not a crystal set because it uses a modern rectifier diode rather than a mineral crystal. But, after you've got your 'bogus' crystal set working there's nothing to stop you experimenting and reliving the 1920s era!

So, to start the project off you will need a small rectifier diode (virtually any type will do), some enamelled wire and several small components. I'll provide a 'shopping list' for the small number of parts needed - and if you're really desperate I'll even let you know how to get hold of what you need for free!

The Circuit

You'll see immediately that the circuit, Fig. 1 is extremely simple. And of course you will recognise the 'half-wave' rectifier circuit I described last time.

However, this time the circuit is being used to rectify or 'detect' (the generally used term for this job) a radio frequency (r.f.) signal. And when you realise that the radio transmissions we use are in fact high frequency alternating currents - it will all begin to make sense.

The coil, L1, is formed by winding 40 turns of enamelled copper wire onto a

convenient 'former' is tapped every 10 turns. This can be an empty plastic 35mm film canister or even a 'cotton reel'. One end of the coil should be soldered to point 'A' (same point as the diode 'anode' end and fixed vanes contact of the capacitor). The other end of the coil can be soldered to the 'chassis' of the capacitor, one of the headphone leads and the earth connection.

If you've played around with this type of simple receiver before - you'll realise that with the variable capacitor value shown in Fig. 1, it will not tune to the usual long and medium waves. And in fact, this 'crystal set' is designed to tune the short wave bands.

Just where your receiver tunes on the short wave bands will be down to your coil winding. But as this type of receiver can be extremely effective on short waves (because of the very high field strengths being refracted from the ionosphere) you won't be disappointed - even when a relatively short antenna is used. The vertical bar on the diode symbol (at the 'B' end) represents the cathode and is usually marked with a coloured band on the diode itself.

Important Antenna

The all important antenna is even more important for a crystal detector receiver! This is because the detector can only provide you with what the antenna can 'extract' from the passing electromagnetic waves.

Although I shall be discussing radio waves later on in the series, the diagram in Fig. 2, provides a simplified explanation to help you understand how the 'crystal set' works. Here it's convenient to regard the antenna as being the equivalent of the field windings on the simple alternator, with the passing radio waves playing the part of the moving magnetic (but in this case it's electromagnetic) field. And of course...the diode is rectifying the output!

The antenna should be as long as possible and on the short wave bands

you'll find you can hear quite a few broadcasting stations at good headphone level. You'll also notice that stations will often be heard together and sometimes it will be difficult to listen because of the mixture of programmes! This is a fundamental problem of the simple receiver and later in the series I'll show how you can reduce the problem and improve sensitivity by adding a stage of r.f. amplification.

Home-Brewed 'Crystal'

Once you've got the receiver working...and they can be great fun-working on 'free' energy supplied by the radio signal itself - you can try a home-brewed 'crystal'. The simplest uses the metal oxide rectifier effect and for this you'll need a copper washer (available from hardware shops) and some lemon juice!

Cover the copper washer with lemon juice or vinegar (best done outside!) and leave it for a few days to go green. The resultant green layer is copper oxide and with the sharp pointed contact shown in Fig. 3, touching the surface, and wired up as shown - YOU MAY (depending on signal strength, the oxide surface and your patience!) get a signal.

If you do get a signal - it's a fascinating experience! And if you want to experiment further you can try using pieces of coal, burnt coal (coke if you can find it!) and galena (lead sulphide, the commonest form of lead) crystals. This is one of the original types used in crystal sets and can be obtained from specialised shops providing 'Gem Stones' and lapidary products.

In rounding off this time I have a shopping list and 20 or so single earphones and diodes available for anyone who wants to 'have a go' and doesn't have easy access to a component source. So, if you're keen and fall into this category, write to me enclosing an A5 sized self-addressed strong envelope with a 50p stamp on it and I'll send you an earphone insert and a diode to get you going. Good Luck!

PW

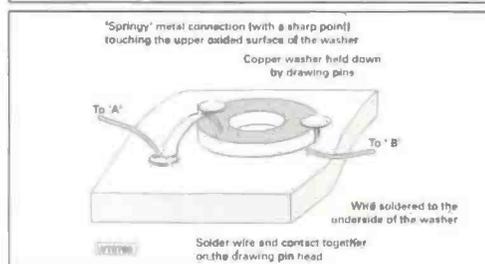
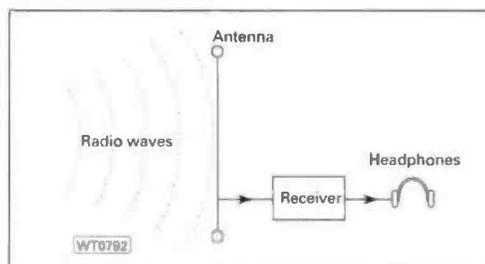
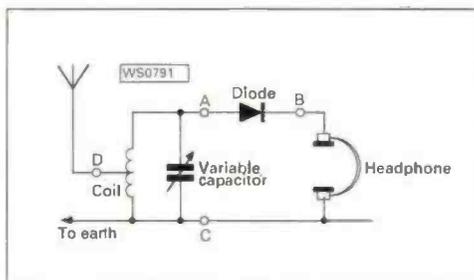


Fig. 2: Simplified diagram illustrating how the antennas intercepts the passing radio waves. In this diagram the antenna wire is horizontal and the view is from above the antenna wire and looking down. For clarity only the electric field of the electromagnetic wave is shown.

Fig. 3: Making your own copper oxide point-contact rectifier. It needs patience to work...but can prove rewarding!



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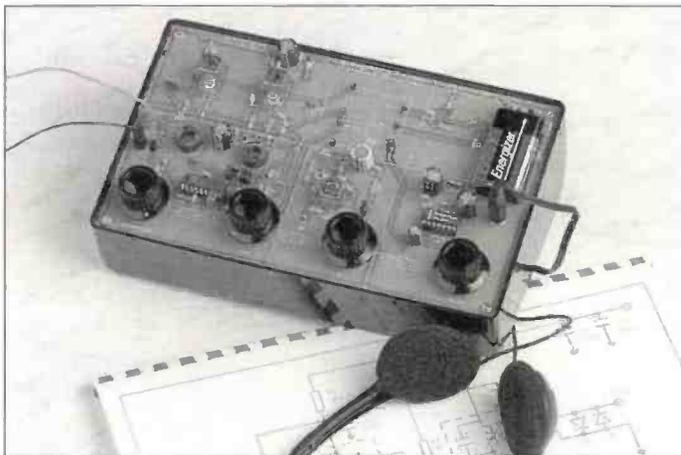
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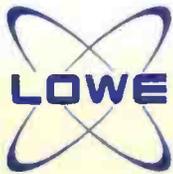
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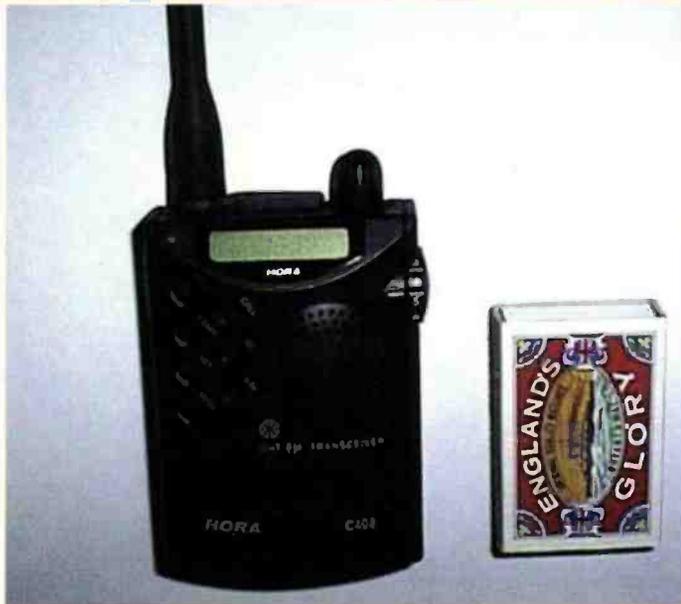
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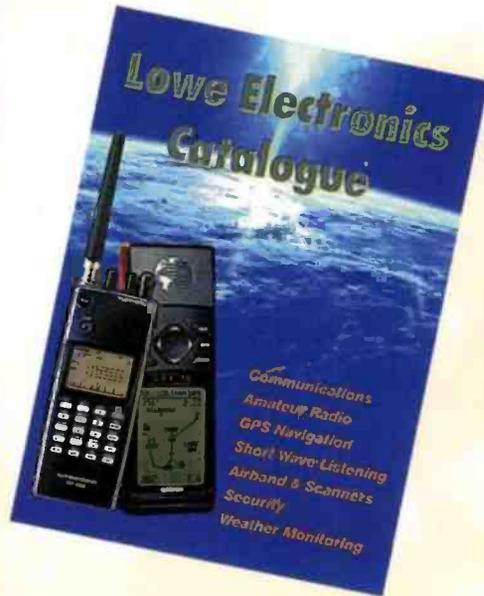
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Amateur Radio - 1

It was Rob Micklewright G3MYM, who reminded PW that 1998 marked the Centenary of Amateur Radio. So, it's appropriate that Rob starts the 'celebrations' with a 'potted' look at the first 100 years of our scientific, technical and above all - 'fun' hobby.

This year, 1998, the scientific hobby of Amateur Radio has been going for 100 years. And in this context, a Radio Amateur is defined as a person using radio transmission purely as a hobby and not for any commercial, vocational or professional reason.

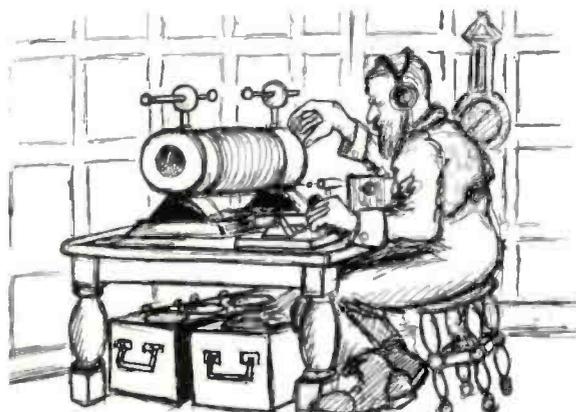
The first Amateur Radio station in the world was set-up in England in 1898. The station belonged to a M.J. C Dennis, who later had the callsign DNX, then EF2B, and who was made a Vice-President of the Radio Society of Great Britain (RSGB) in 1936.

The 100 years of Amateur Radio can be divided into four distinct periods. These are 1898 to 1914, 1920 to 1939, 1946 to 1969 and 1970 to 1998.

The reason for the gaps in the dates from 1914 to 1920 and from 1939 to 1946 is that in Britain Amateur Radio stations were closed down during these periods because of the two World Wars. (The close down dates were different in the USA).

Spark & Detector Era

The period from 1898 to 1914 was the era of the 'spark' transmitter and the detector only receiver. At the beginning of the period, a Radio Amateur would have used a spark transmitter and a coherer receiver and would probably have had a likely transmission distance of about 1 to 3.2km.



1898 - 1914 was the era of the 'spark' transmitter and detector only receiver.

It was during the early times that the first Amateur Radio clubs and societies were formed (some of these early clubs and societies are still in existence today) and in 1913, the RSGB was founded. Across the Atlantic the American Radio Relay League (ARRL) began life in 1914.

In 1910, British Amateur Radio stations were required for the first time to use a callsign. And the callsigns that were issued up to 1914 as a result of this requirement were mainly three letters (these callsigns were cancelled in 1919 and a new style British Amateur Radio callsign was issued in 1920).

At the end of the period, the equipment used by an Amateur Radio station was a spark transmitter and a crystal diode receiver. But because the crystal diode was a far more effective detector than the coherer, a typical transmission distance had improved to 16km.

Discovery & Development

The years between 1920 to 1939 saw the use of valves in Amateur Radio equipment, the discovery and development by radio amateurs of trans-world short wave radio communications. It also saw the international recognition and organisation of amateur radio.

By 1920 the triode valve had been developed. This valve could be used to amplify weak signals or to generate a radio wave, and before long amateurs soon began to use valves in receivers and transmitters.

In the early 1920s, amateurs



Technology was moving on rapidly between 1920 and 1939 and valves were beginning to play a major part in Amateur Radio equipment.

were way ahead of the professionals in the discovery and development of trans-world short wave radio communication. For example in December 1921, Amateur Radio signals were transmitted across the Atlantic for the first time. And in November 1923, the first two-way trans-Atlantic amateur contact took place.

In October 1924, Radio Amateurs in Britain and New Zealand made the first contacts between the Antipodes and Europe. All of these contacts were made on wavelengths that at the time were considered by the professionals as useless for long distance radio communication. In my view, it was this achievement by Radio Amateurs, which more than anything else has given amateur radio the fame and status that it enjoys today.

In 1924, the International Amateur Radio Union (IARU) was founded. Then at the International Radio Telegraphic Conference held in Washington in

CELEBRATING
100
189
OF AMATEUR

The First 100 Years



In the period 1946 to 1969, the transistor was invented and Radio Amateurs started to use the s.s.b. mode more making it very popular.

1927, an international agreement was reached about Amateur Radio bands on a world-wide basis.

In 1931, the first British Empire Radio Union (BERU) contest was held and in 1933 the first National Field Day in Britain took place. Compared with the events in the 1920s, Amateur Radio in the 1930s had settled into a steady routine.

All the amateur bands were used during the 1930s, from 'Top Band' (1.8MHz) to v.h.f. using c.w. and a.m. and mainly home-made equipment. This state of affairs continued until amateur radio stations were closed down at the start of the Second World War.

Pioneering Amateurs

In the period 1946 to 1969, the now familiar transistor was invented. Radio Amateurs pioneered the use of single

sideband suppressed carrier (s.s.b.) transmission and the first amateur radio satellite Orbital Satellite Carrying Amateur Radio (OSCAR 1) was launched.

Shortly after the end of the Second World War, surplus services equipment was made available to the general public and for many years, such radio equipment, particularly receivers, became part of many amateur stations. At this time however, most Radio Amateurs still built their own transmitters. When information about the transistor became available, radio amateurs were quick to experiment with the use of the transistor for transmitting.

A milestone was reached on 21 February 1954, when the Yeovil Amateur Radio Club made, what is almost without doubt, the first long distance radio contact to be made with a transistor transmitter. This was an unarranged 136km contact made on the 3.5MHz band.

By 1969 s.s.b. had become a popular mode of Amateur Radio telephony. However, because of the complexity of s.s.b. equipment, most radio amateurs chose to buy commercially made equipment rather than build their own. The end result was that the move to s.s.b. transmissions meant that 1946 to 1969 became the last period in which home-made equipment was a main part of amateur radio stations.

Present Day

The period from 1970 to the present day is the era of commercially made Amateur Radio equipment, where the vast majority of radio amateurs use

factory produced equipment of ever increasing complexity. The main modes now in use are s.s.b., c.w. and f.m. and data. Despite this, home-made equipment has not disappeared entirely from Amateur Radio and is still being prominently used in areas such as microwaves and lower power (QRP) operations.

As 1998 and the centenary of Amateur Radio progresses, two questions can be posed. The first of these is what has been the significance of 100 years of amateur radio and secondly what will the hobby be like in the first few decades of the new century? Perhaps these two topics and others like them will be the subject of editorials, articles and debates in Amateur Radio magazines such as *Practical Wireless*.

The purpose of my article has been to give an outline of Amateur Radio over the last 100 years since 1898 and I hope you have found it both interesting and informative. For those of you who want to know more I will be giving a detailed account in my talk at the Yeovil Amateur Radio Club on the 8th January 1998.

(Don't forget that PW will be running further articles to mark the first 100 years of Amateur Radio throughout 1998. Ed)

PW



From 1970 to the present day has very much been the era of commercially made Amateur Radio equipment with the vast majority of amateurs using factory produced equipment.

The A41 VHF Manpack Transceiver

By Ben Nock G4BXD

Stand to attention and 'listen' carefully! Ben Nock G4BXD is now about to take a look at an interesting military surplus v.h.f. transportable transmitter-receiver from the Radio Amateur's viewpoint.

If you look carefully on the surplus market...you'll find that the A41 military transceiver is now cheap to buy. It can also easily be pressed into service as an interesting 50MHz ('six metre') receiver.

The A41 is a v.h.f. f.m. manpack, designed for short range inter-unit communication. It operates in the 38 to 55MHz range.

The A41's cheapness means that a very nice receiver and, what must have been an expensive piece of kit when new, can now easily be obtained. It also makes an interesting general coverage receiver for these frequencies. As the set covers 50MHz it also makes a cheap option for exploring that band.

There appears to be more than one version of the A41. I myself have an A41 set and an A41 No 2. The No. 2 set differs from the original No.1 unit in that it has a squelch control (not fitted on the original) and round handset connectors in place of the oblong connectors on the other set.

Valves & Transistors

The A41 set uses 13 miniature valves, 3 transistors and a few semiconductor diodes. For military use power is supplied from a special multiple voltage battery housed in the lower part of the unit in a detachable compartment much akin to the 31 Set that preceded it.

Supplies of 1.5, 6, 67.5 and 135V d.c. are needed to fully power the set, although the 135V is only required for the transmitter. The basic block diagram of an A41 is shown in Fig. 1.

The receiver uses ten of the valves in a fairly straightforward single conversion superhet design. Two r.f. stages are used, and four i.f. stages to feed the semiconductor discriminator that feeds a valved audio output stage.

Small replaceable units are used to house some of the various stages, some shown in Fig. 2a, etc. The unit number referring to each particular stage is detailed in Table 1 along with the remaining valves.

Two Valve Transmitter

Two valves are used in the transmitter strip, a self oscillating p.a. stage and the modulator valve. A six section variable capacitor is used to tune the transmitter oscillator tuned circuit, the p.a. output circuit, the two receiver r.f. amplifiers and the receiver local oscillator.

A variable inductance connected in series with one of the antenna 'options' is also ganged to the same shaft. Three antennas 'options' are provided and they include: a long whip, a short whip or a coaxial cable feed suitable for a dipole antenna.



On the battlefield in Kidderminster! Ashley Hull models the infantry use of the A41 'Manpack' transmitter-receiver unit mounted in its carrying-pack.

Reactance modulation is applied to the oscillator via V1 and transformer X1. There is no provision to adjust the modulation depth or deviation: So you either have to whisper or shout!

Power Supply

There are two power supply options (well, three if you count buying a new battery of the exact type if a supply could be located!) possible when using the A41. You can either produce all the voltages from a mains source or produce the low tension from batteries with the h.t. being derived from the mains.

In practice the 1.5 and 6V supplies can easily be obtained from standard batteries. However, if you're considering using NiCads, then a little 'jiggery pokery' is needed as the NiCad cells usually provide 1.2V.

Several 1.2V batteries could be used in series and would give steps of 1.2/2.4/3.6/4.8/6V. So the 6V option is catered for but the 1.5V supply would need separate cells as the A41 requires a positive ground 6V supply. However, it requires a negative ground 1.5V supply) and due to components in the set this polarity cannot be changed.

So, if I assume you're using 1.2V NiCads for the 1.5V supply, then two in series would give 2.4V. If a series silicon diode is used this drops the supply by 0.6V giving 1.8V to the set. a further germanium diode in series would drop a further 0.3V thus

continued on page 26

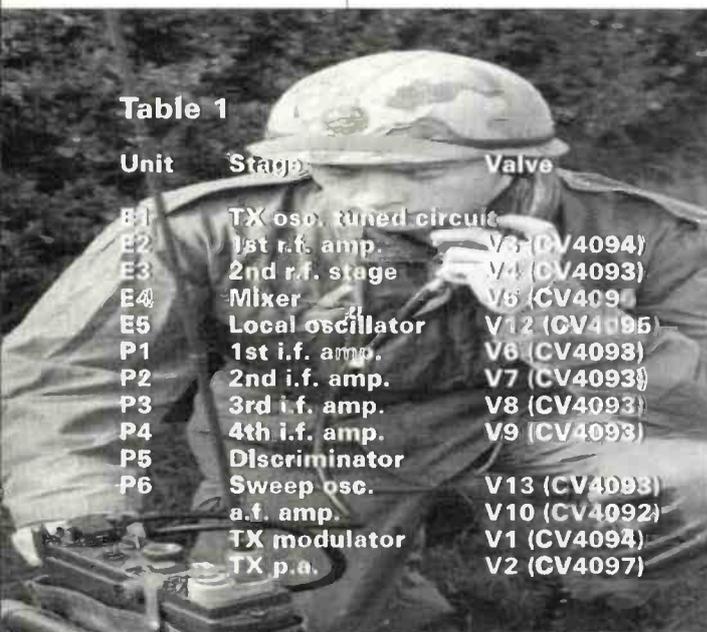


Table 1

| Unit | Stage | Valve |
|------|-----------------------|--------------|
| B1 | TX osc. tuned circuit | |
| E2 | 1st r.f. amp. | V3 (CV4094) |
| E3 | 2nd r.f. stage | V4 (CV4093) |
| E4 | Mixer | V5 (CV4093) |
| E5 | Local oscillator | V12 (CV4095) |
| P1 | 1st i.f. amp. | V6 (CV4093) |
| P2 | 2nd i.f. amp. | V7 (CV4093) |
| P3 | 3rd i.f. amp. | V8 (CV4093) |
| P4 | 4th i.f. amp. | V9 (CV4093) |
| P5 | Discriminator | |
| P6 | Sweep osc. | V13 (CV4093) |
| | a.f. amp. | V10 (CV4092) |
| | TX modulator | V1 (CV4094) |
| | TX p.a. | V2 (CV4097) |



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Fig. 1: Block diagram of the A41 station.

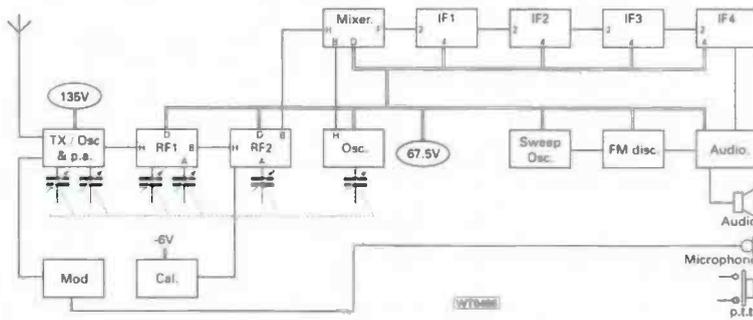
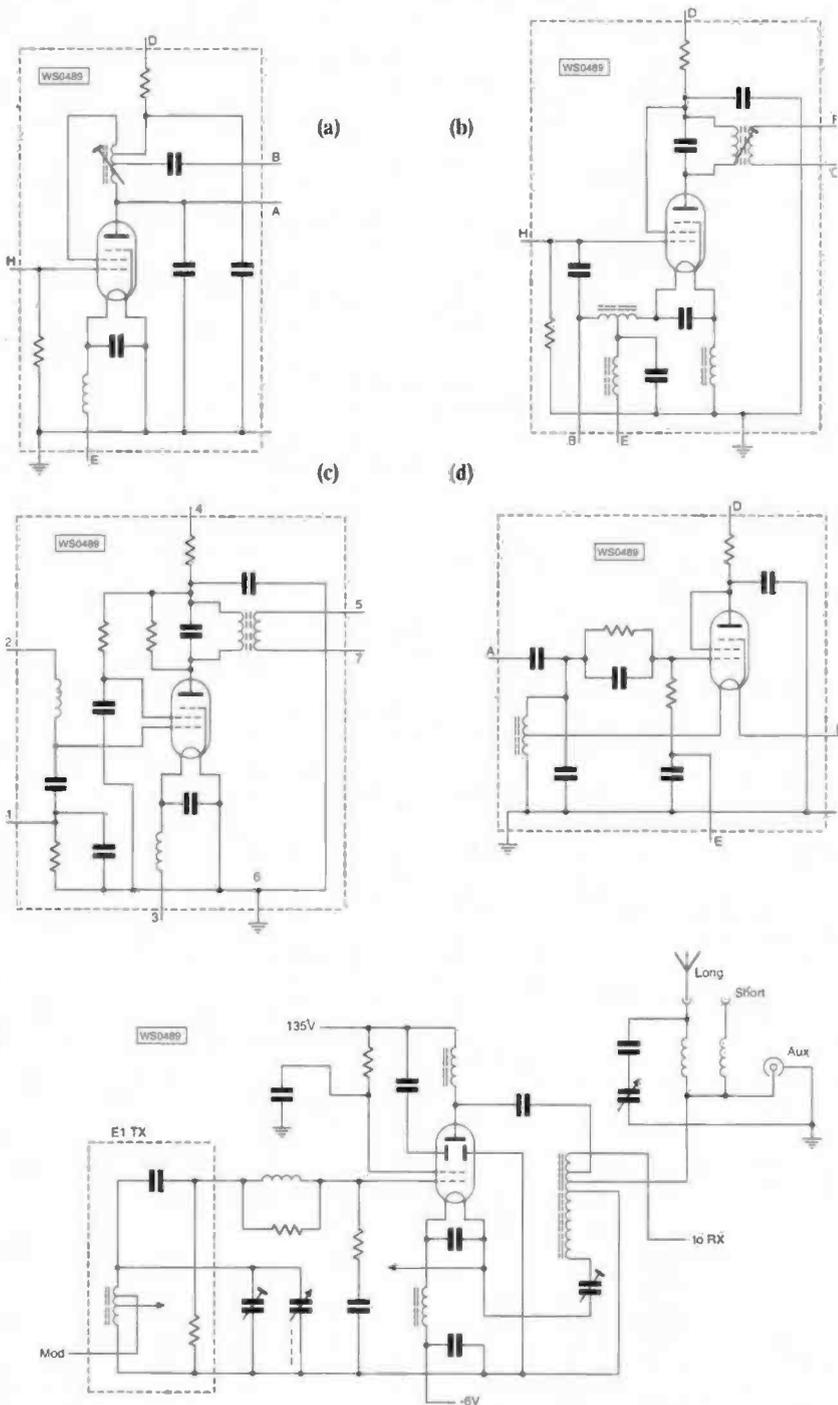


Fig. 2: Circuits of the sub-units used in the A41. 2a - r.f. amplifier, 2b - mixer, 2c - i.f. amplifier, 2d - local oscillator, 2e - modulator and p.a. stage.



giving the required 1.5V.

I have seen 2V rechargeable cells offered by certain suppliers, three of these would provide the 6V supply, and one of them with a series silicon diode would provide the 1.5V supply.

Mains Power Unit

A suitable mains power supply unit circuit is shown in the diagram, Fig. 3. The actual mains transformer used will depend upon junk box or suppliers stock.

The main h.t. winding needs to be around 50-0-50V otherwise the final voltage will be too high. If receive only is required then the h.t. needs only be 67V or so.

The 1.5V supply can be obtained from a 6.3V a.c. heater (filament) winding. The 6V supply needs around at least 10V a.c. (two 6.3V a.c. windings in series or a 12V winding could be used).

Many older mains transformers had 5 and 7V windings for valve rectifier heaters, these in series could be used. But failing this a separate 6-0-6V transformer could be used as a 12V supply.

To provide a regulated supply, I used the LM317T regulator chip, and the pin-out details are shown in Fig. 4. This provides a variable voltage set by the combination of the fixed 240Ω resistor and the pre-set variable resistor.

The metal heat sink fin of the regulator used for the 6V supply is at output potential and can therefore be bolted directly to 'ground'. But of course - the 1.5V supply regulator will need insulating of course.

The two variable resistors are adjusted to set the required volts. The pin connections to the set are shown in Fig. 5, (this is shown from the viewpoint looking at the pins, from outside the set).

My circuit shown is quite basic, and extras like fuses and a few indicator lamps or l.e.d.s can be added. The only important criteria are the 1.5 and 6V levels, it would be wise to get these as accurate as possible, and definitely regulated. The 1.5V rail draws about 350mA, with the 6V rail consuming about 400mA on transmit.

The power supply can be built on a small chassis and mounted in the A41's original battery box with a small hole drilled near the bottom for the mains cable to exit from.



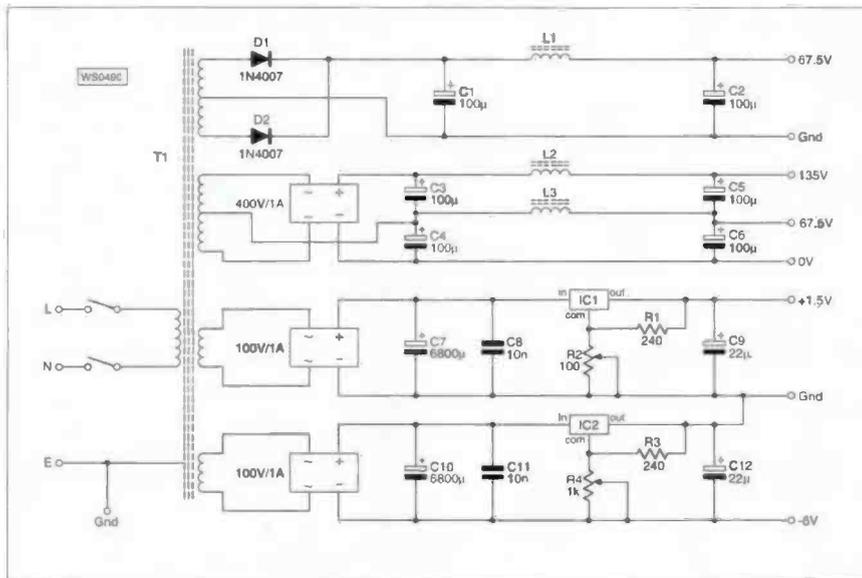
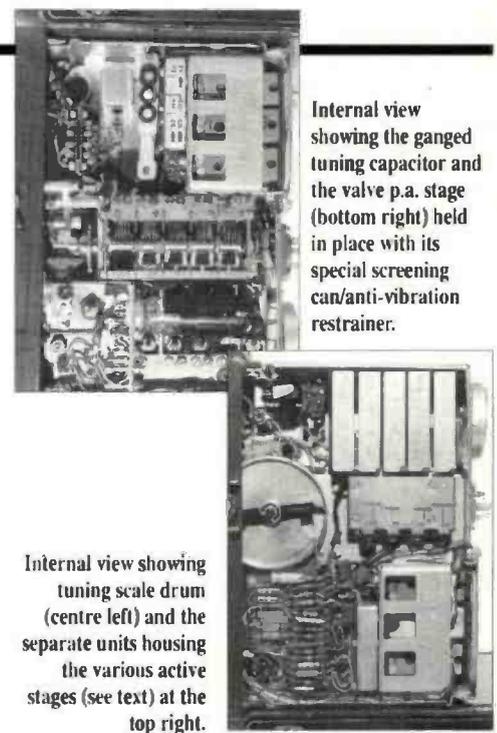


Fig. 3: Suitable mains power supply circuit (see text).



Internal view showing tuning scale drum (centre left) and the separate units housing the various active stages (see text) at the top right.



The A41 sub-assemblies. Main unit in the centre foreground, battery on left with the battery housing unit centre background and the radio housing on the right.

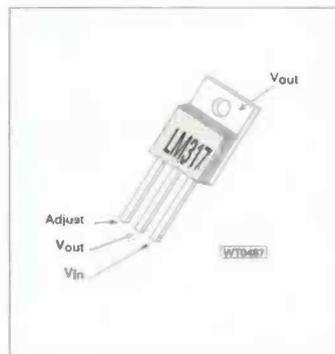


Fig. 4: Pin-out details of the regulator i.c. used in G4BXD's suggested power supply unit (see text).

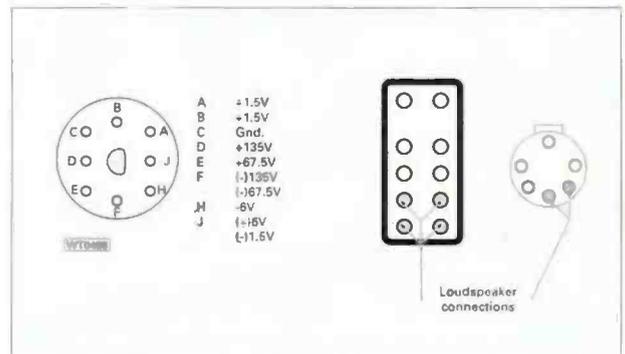


Fig. 5: Connection details for the A41's power supply input and handset/microphone socket details.

Choice Of Antenna

A BNC plug on the front of the set provides for a choice of antennas. The use of a coaxial fed antenna, either a dipole or some form of beam are all possible.

There are some military antenna kits available. These include dipoles of various lengths (complete with guys, insulators, etc.) all contained in a canvas tool kit type bag. They're often available at rallies and would prove ideal for the A41's needs.

For military use A41s normally have a telephone type handset with loudspeaker, microphone and push-to-talk (p.t.t.) all in one unit. If this is not available the diagram, Fig. 5a, provides details of the pins on the handset socket.

The socket, either an oblong type or a round version, has provision for a pair of handsets, so either bank or socket will

suffice. (A low impedance loudspeaker can also be used and works well).

Little Setting-Up

After construction there's little in the way of setting-up to do. After checking the voltages are correct, you can then wire the p.s.u. to the A41 and switch on, if all is well then the familiar 'shush' of f.m. noise will be your reward!

Attaching the antenna and tuning around should produce the odd signal or two. Listen out on the 50MHz band during 'lift' conditions for that rare DX station, or the odd baby alarm around 49MHz!

For the more ambitious type, modification to the set for s.s.b. reception could be an option. Certainly getting a.m. out is quite easy. So, with addition of a small b.f.o., the reception of s.s.b. should be possible, though whether the local oscillator would

be stable enough is another thing!

Reception of c.w. is another modification that could be carried over to the transmitter. The possibilities are perhaps endless...but the other ideas are for you to decide on!

PW

Power Supply Shopping List

- | | | |
|---|---|----------------------------------|
| Resistors 0.5W metal film | | |
| 240Ω | 2 | R1, R3 |
| Variable resistors (trim-pot type) | | |
| 100Ω | 1 | R2 |
| 1kΩ | 1 | R4 |
| Capacitors | | |
| Electrolytic: | | |
| 22µF | 2 | C9, 12 (16V tantalum) |
| 100µF | 6 | C1, 2, 3, 4, 5, 6 (200V working) |
| 6800µF | 2 | C7, 10 |
| Polyester | | |
| 10nF | 2 | C8, 11 |
| Semiconductors | | |
| Diodes: | | |
| 1N4007 | 2 | D1, 2 |
| Bridge rectifiers 400V/1A (1) | | |
| Bridge rectifiers 100V/1A (2) | | |
| Miscellaneous: | | |
| See text for comments. | | |

An Incredible Package!

The Timewave DSP-599zx Audio Filter

By Rob Mannion G3XFD



Rob Mannion G3XFD has been looking for an audio Digital Signal Processing unit to use in conjunction with his Alinco DX-70 transceiver. And from what he says in this review - he's found what's needed.

Ever since the mainstream manufacturers have been incorporating audio digital signal processing (DSP) into equipment, I've been left wondering how long it would be before true radio frequency DSP arrived on the Amateur Radio scene. Well, it's not happened yet and I don't suppose I'll be able to afford the equipment when it arrives!

So, I have to make the best of what's available to fit my wallet so to speak. To that end - to 'practice what I preach' in my reviews I've got what I consider to be a very good basic transceiver, fitted with narrow band filters as standard and working well under very difficult, busy and noisy band conditions on 3.5 and 7MHz (my favourite bands).

However, having had a great deal of experience in using state-of-the-art transceivers while reviewing them for PW, I've come to the conclusion that an add-on audio DSP unit would be a good idea. And after a lot of looking, research and one or two trials and errors on the way, I think I've found the ideal unit - the Timewave Technology DSP-599zx audio DSP filter.

The Timewave unit has been around for some while and I must admit that I had used one on a transceiver in the USA while attending the Dayton HamVention. However, trying something at a show is entirely different to using one at leisure at your own station in conjunction with equipment and working conditions you're entirely familiar with!

Incredible Package

The Timewave DSP-599zx is an incredible package and packs an enormous amount of technology into a very small, neat and easy-to-use unit. Using it is simplicity itself and literally all you do is connect the unit to the audio output of your receiver and it does the rest for you!

'The rest' is in actual fact a great deal indeed. But for the purposes of this review I'm concentrating on the use of the DSP-599zx as an add-on for normal c.w. and s.s.b. operation - despite the fact the unit can do a great deal more.

In appearance, the DSP-599zx is small, neat and very well presented. Its

small physical size means that it sits very comfortably underneath my Alinco DX-70 and in appearance (black painted aluminium casing) it matches very well indeed.

The comprehensive back-lit yellow-green dot matrix I.c.d. alpha-numeric display, although small (in keeping with the size of the unit) is also pleasant to the eye. (Further comments on this later).

What's On Offer?

So, what's on offer with the DSP-599zx? And to quote directly from the extremely comprehensive (and easy-to-read) manufacturer's handbook "The DSP-599zx is an extraordinarily versatile signal processor" and in that I agree wholeheartedly!

Aimed at use in Amateur Radio communications using voice, c.w. and data, the DSP-599zx offers some extremely effective and useful features. These include random noise reduction, adaptive multi-tone and manual noise reduction, bandpass, high-pass and low-pass filtering.

Also included (for the data modes enthusiasts) signal re-generation including RTTY modulation and signal detection and measurement including RTTY demodulation. For the purposes of this review however, I have not considered the data modes as I don't operate them myself. Instead, I've concentrated on my 'main modes' - s.s.b. and c.w. operating.

When I first 'met' the DSP-599zx in the USA (at the Dayton HamVention) I was impressed. But it wasn't until I was loaned one for review at my home that I realised what a truly amazing little package it is. So...with no more 'to do', read on and see just what I thought it was like on my operating desk.

On The Air

In line with my policy of providing extensive 'on air' evaluation I gave the DSP-599 a really thorough 'work out' on the bands. And to help, the 1.8, 3.5 and 7MHz bands provided some really noisy (both QRM and QRN) conditions.

I found that on c.w. the unit provided truly exceptional results, with

the bandwidth being adjustable from 600Hz right down to 10Hz. I found that the filter's 'skirts' are so steep that the interfering signals seemed to 'drop' off in a very dramatic fashion.

The pleasantly lit green I.c.d. display unit clearly indicates what you've chosen on its screen. And although it is very clear - this is the area where I have discovered the only possible problem with the DSP-599zx. The problem I discovered was directly due to the small size of the displayed figures and my eyesight!

And although my eyesight is a personal problem, I feel I must mention that the display on the DSP-599zx is small and may cause problems for other operators who are at the 'bifocal' spectacle stage of life as I am! However, having mentioned that the display is small...it is of course fully in keeping with the small physical size of the unit.

Additionally, in practice - unless you want to see what the settings are it's perfectly possible to use the filter without referring to the display much at all. So, once set-up I think even a partially sighted or blind operator could take full advantage of the filter.

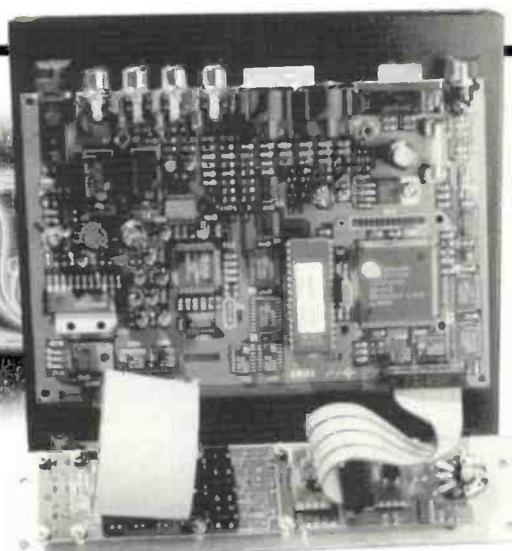
Most of my c.w. operating is done on 3.5 and 7MHz and the DSP-599zx consistently out-performed any add-on DSP unit I've tried in the past. Its performance and the 'roll off' provided by the very sharp audio filter has to be heard to be fully appreciated. And as the operator can adjust the 'high' and 'low' pass filtering to suit in a very easy fashion - it's a joy to use.

Regular readers will have read my often repeated comments regarding the difficulties faced by anyone listening on the Internationally Co-ordinated beacon frequency of 14.100MHz. The QRM from adjacent channel packet radio transmissions (recently I've noticed they can sometimes be found on 14.1MHz itself!) can make reception of the low power timed beacons extremely difficult. That's where I found the DSP-599zx to be truly excellent!

By attenuating the r.f. input to my Alinco receiver (to reduce the chance of QRM from transmitters on nearby frequencies), I found I could hear incredibly weak signals. In this way not only did I reduce the QRM but I found



Close-up view of the comprehensive display (see text).



Inside view of the very compact DSP-599zx.

with the very narrow bandwidth I could hear beacons I've not heard before. Very effective indeed!

The manual notch on c.w. was very effective and easy to use and I found myself using the 'CW Tone Pitch Shift' facility. This changes the beat note tone instantly without the operator worrying about going off frequency to do so. It's hard with transceivers that don't have immediate front panel adjustments for b.f.o. pitch control or require a break in concentration to consult a menu facility. Very useful!

Using the DSP-599zx on s.s.b. proved equally effective as on c.w. and I found myself adjusting the bandwidth of the received audio to suit my own hearing. And although I have already stated that the unit 'comes into its own' on c.w. - the results on s.s.b. were also truly amazing.

The continually adjustable bandwidth enabled me to adjust the filter during a QSO as QRM conditions varied. And of course, the Random Noise filter was particularly useful and extremely effective against static, general random noise and thermostat QRM. Personally, I also found the fact that I could control the 'aggressiveness' of the Random Noise filter very useful to 'attack' the incoming problems in a very positive way.

The automatic multiple tone filter removes interfering 'beat notes' almost completely. When selected I found that when deliberate interference is being created by someone transmitting in an effort to disrupt a QSO - the effect is very positive indeed, the interfering heterodyne disappears and there seems to be minimal reduction in the 'wanted' signal.

During one QSO I tried 'interfering' with my own QSO by introducing signals on the same frequency as I listened to the other station. The transmissions - courtesy of two 'grid dip' meters and the local oscillator of another receiver - were arranged to couple closely into my receiving antenna. The result was a chaotic noise on the QSO channel - until I switched in the auto tone reduction. The result - magic! A clean frequency!

Many Features

There are very many features on the DSP-599zx that in a review of the type I'm attempting (evaluation for use on air for a c.w. and s.s.b. operator) that I don't have time to mention. Despite this, those features must be mentioned because they really do offer many extremely useful functions. So, although I do not like providing lists - I'll do so in this case.

Included in the many features of the DSP-599zx are filters for RTTY, AMTOR, FACTOR, G-TOR, h.f. packet radio, CLOVER, SSTV and WeFAX. There's also a useful RTTY MODEM provided within the unit.

Another - extremely useful facility for many operators - will be provided by the 'Test Instrument' mode. The built-in audio generator covers from 20Hz to 10kHz, providing two-tone (fixed) 700Hz and 1.9kHz signals. The built-in audio millivoltmeter provides (true) RMS values from 4mV to 2V from 20Hz to 10kHz.

Encoding for CTCSS is provided, with the tone frequencies of between 76Hz to 254.1Hz being displayed. And at the same time CTCSS squelch is provided. All from one very small unit. Quite a package!

In My Shack?

If you're now wondering whether or not you're now going to find a Timewave DSP-599zx in my shack - the answer is certainly Yes! I'm so impressed at the quality, performance and 'user friendliness' of the unit I have decided that it's a must for my shack!

Bearing in mind my comment on the small size of the l.c.d. screen and lettering, I still find that the DSP-599zx offers absolutely superb performance and facilities. Another bonus is that it sits very nicely underneath my Alinco DX-70 and matches in very well and at the same time helps to provide much enhanced reception conditions..

Finally, it's often been said that in recent years American-made equipment has not come up to the standards set by the Japanese manufacturers for both quality control, general reliability and

design 'flair'. However, this comment certainly does not apply to the Timewave products I've come across. They've certainly proved to me that to me that innovation and quality are alive and well in the USA!

My thanks for the loan of the review unit go to Mike Devereux G3SED of Nevada Communications. The Timewave DSP-599zx costs £349 inc. VAT and is available from Nevada at 189 London Road, North End, Portsmouth, Hampshire PO2 9AE. Tel: (01705) 662145, FAX: (01705) 690626.

PW

Abridged Manufacturer's Specifications

(The specifications below are a much condensed listing from the very comprehensive full specifications in the user's manual and omit data modes and test instrument mode information)

| | |
|--|--|
| Audio input (A&B) | |
| Impedance: | 20kΩ or 25Ω (jumper selectable) |
| Input signal range for full output: | 10mV to 1V (front panel programmable) |
| Audio output (A & B) | |
| Speaker output | 1W into 8Ω @ 13.8V (both channels operating) 1.5W into 4Ω @ 13.8V d.c. both channels operating. |
| Line output: | 0dB level referenced to input level. (not controlled by gain control) |
| Headphone output: | 0.25in two-circuit jack. |
| Harmonic distortion: | < than 1% @ rated output |
| Noise reduction filters | |
| Random noise | Up to 20dB atten. max delay 5ms |
| Heterodyne eliminator | Up to 50dB atten. max delay 5ms |
| (The random noise reduction and bandpass filter can work simultaneously. The random noise reduction, tone notch and high pass/lowpass filter can also operate simultaneously). | |
| CW Filters | |
| Bandwidth | 5Hz to 600Hz (10Hz steps) |
| Attenuation | 55dB at 60Hz outside passband! 64ms max delay. |
| Voice Filters | |
| Highpass | 100Hz to 1kHz (10Hz steps) up to 60dB atten. max |
| 24ms delay | |
| Lowpass | 1 to 5kHz (10Hz steps) up to 60dB atten (at 180Hz). |
| Automatic Gain Control | |
| Voice mode | 36dB dynamic range |
| Data & c.w. modes | 18dB dynamic range |
| Signal Processing | |
| A-D/D-A Converter | 16 bit linear, sigma-delta conversion, dual channel |
| Signal processing | 16 bit, 27ns Analogue Devices ADSP-2181 with 80kB of memory |
| Memory Information | |
| Memories | Six (all configurations can be stored and recalled except volume control settings). |
| Display Details | |
| Type | 2 x 16 alphanumeric, dot matrix yellow-green back-lit l.c.d. characters |
| Dimensions | |
| Weight | 1.15kg |
| Power | 12-16V d.c. @ 1A |



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WAVEMETERS

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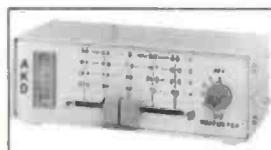


WA1

The VHF Absorption Wavemeter for the 2 metre band. Range 120MHz to 450MHz. Meets licensing requirements. Can also be used as a field strength meter within its range. Requires PP3 battery (not supplied).
£34 incl VAT. Add £1.50 P&P

WA2

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6 MTR MODEL 6001

50.500 - 51.990

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70 CMS MODEL 7003

432 - 500 to 434 - 975MHz

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Carrying on the Practical Way

By George Dobbs G3RJV



For his first column of 1998 the Rev. George Dobbs G3RJV describes a 'Super VXO'. George thinks this month's experimental wide range variable crystal oscillator project should prove interesting and useful. And of course he's found an appropriate quote!

The wish to get radio frequency oscillators to cover a wide range of frequencies is one close to the heart of the radio constructor. Oscillators are used in every application in radio.

However, oscillators have two endemic problems - stability and frequency range. It's as if they know the Biblical words of Job, "Hitherto and no further"!

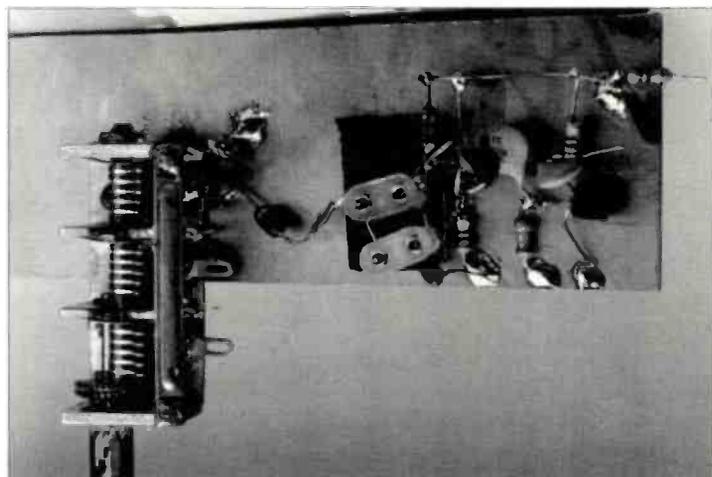
A free running variable frequency oscillator (v.f.o.) can be a difficult brute to tame. And much has been written about the best types of circuit and how to build them.

My experience has shown that most of the common oscillator circuits do work and are capable of stable operation. But the stability often relies on the method of construction as much as the choice of circuit.

For example: an oscillator built to be dropped from 30,000 feet is likely to be a stable oscillator. Mechanical rigidity is essential to the good high frequency oscillator!

Unusual Magazine

Many years ago I came across an unusual magazine produced in Japan. It was called the *Fancy Crazy Zippy*. It was a home construction and QRP related publication produced by



The twin-crystal VXO unit as built by G3RJV. The empty sockets (centre) hold the crystals (see text).

JH1FCZ (hence the 'Fancy Crazy Zippy' title).

The magazine was full of little circuits all surrounded by Japanese script which I couldn't understand. However, circuits are circuits in any language and I enjoyed browsing through the range of circuit ideas without reference to the text!

Many of the circuits in the *Fancy Crazy Zippy* (FCZ) came from a Mr. Shimizu JA0AS. And of course, some readers will recognise the name Shimizu. There are several products

including a semi-kit QRP Transceiver that carried his name in the late 1970s.

The August 1980 issue of *FCZ* carried a wide range Variable Crystal Oscillator (VXO) circuit from JA0AS. And it's this project which is shown in Fig. 1.

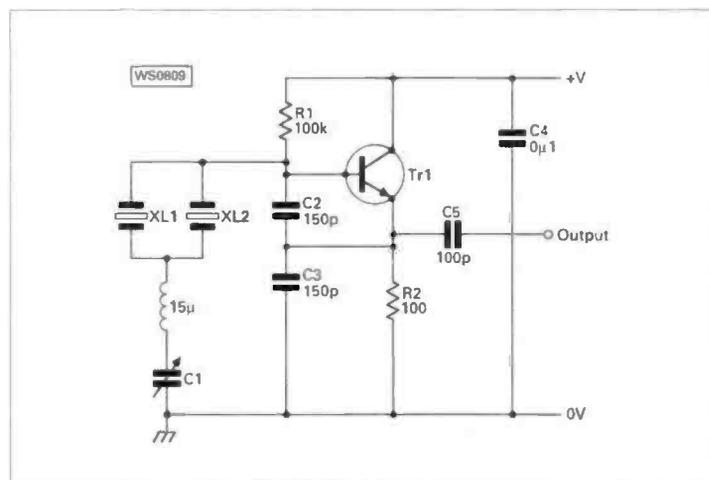
Crystal Oscillator

The circuit shown in Fig. 1 is a crystal oscillator based upon the well-known Colpitts configuration. And in such a circuit the crystal works on its fundamental frequency.

In the diagram C1 and C2 are feedback capacitors that allow some of the signal generated in the transistor to be fed back to the input thus maintaining oscillation. Generally, the values of these capacitors are kept as low as possible to help stability. (They are frequently the same value).

A variable frequency Colpitts Oscillator would usually have a tuned circuit between the base of the transistor and ground. The frequency of the oscillator is determined by the value of the tuned circuit. In this case the

Fig. 1: The original circuit of the double crystal extended frequency range VXO circuit. It was published by JH1FCZ in the *Fancy Crazy Zippy* home-construction and QRP-related magazine using an idea by JA0AS (see text).



frequency is determined by a crystal, or rather two crystals.

Quartz crystal oscillators are by their very nature more stable than free running inductance and capacitance tuned oscillators. The problem is that the crystal has a specific single frequency.

Fortunately however, it's possible to shift the oscillator a little either side of the crystal frequency by use of added capacitance or inductance, or both. The oscillator is then called a Variable Frequency Crystal Oscillator (VXO).

Unfortunately though...the VXO technique has limitations because a crystal wants to oscillate on its resonant frequency. You only have to move it a little in frequency before it becomes unstable or even refuses to oscillate.

Inductance & Capacitance

The circuit in Fig. 1 uses both inductance, which tends to lower the frequency and capacitance, which tends to increase the frequency. This is an old play beloved of QRP operators to get a crystal oscillator to yield a wider range of frequency coverage.

The limitation of the VXO idea is what can be achieved in the frequency movement of a crystal. Some constructors make grand claims but in general it is only in the range of a few kilohertz.

The smaller the crystal, the greater it will move frequency-wise in a VXO. So high frequency crystals move the most as they are usually physically smaller.

The novelty of the Super VXO is that two crystals are used. Both are on the same frequency. The claim is that using the two crystals means that a greater degree of frequency shift is available before the crystals either go unstable or refuse to oscillate.

So, the circuit in Fig. 1 offers the possibility of far more useful VXO applications on the amateur

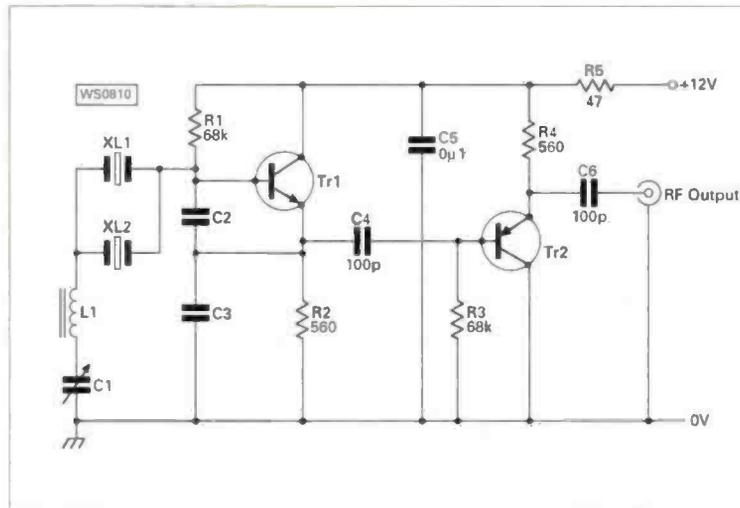


Fig. 2: The final circuit used by G3RJV to test the JA0AS variable frequency crystal oscillator project (see text).

bands. Why this is so is not clear, but it may be that the extra amount of quartz in two crystals allows greater range and stability.

Building The Project

Let's now look at building the project. The diagram, Fig. 2, shows the circuit that I used to test the Super VXO.

The transistor Tr1 is a Colpitts Oscillator using two crystals with L1 and C1 providing the

frequency shift. The values of C2 and C3 depend upon the frequency of oscillation and are chosen to be the lowest values that will maintain oscillation over the whole frequency range.

Inductor L1 is chosen to obtain a

reasonable frequency shift without instability. The variable capacitor, C1, is in the range 20 to 50pF.

The signal from Tr1 is coupled to a buffer stage, Tr2. This is a *pip* transistor. The output from a Colpitts oscillator is small and Tr2 not only provides a buffer between the oscillator and other circuits, but also provides some magnification of the signal. (The output is taken from the emitter follower output of Tr2).

My prototype worked first time and I tested it with two 14MHz band crystals which I happened to have. Both crystals had a nominal frequency of 14.050MHz. My values for C2 and C3 were 220pF and L1 was a

15µH moulded inductor and C1 was 30pF.

Using only one crystal, C1 shifted the frequency from 14.029 to 14.060MHz. But would the second crystal achieve a greater frequency shift? I soon found the answer: when the second crystal was added, the range increased from 13.989 to 14.065MHz!

Very Useful Increase

So, the circuit provides a very useful increase in range: the whole of the useful c.w. portion of the 14MHz band from one crystal! The stability was good through the whole range and (when monitored on a receiver) I found the note was 'clean'.

My findings were similar to other claimed results with the Super VXO. For example: Mikoto Minowa 7N3WVM, who features the Super VXO on his webpage, uses it for a VXO 30 metre (10MHz band) transceiver. He used two 10.15MHz crystals, a 15µH inductor and a 20pF variable capacitor to obtain a 10.10 to 10.15MHz range.

The Super VXO offers a simple way to build a stable VXO QRP transmitter or direct conversion transceiver. The builder does require two crystals on the required frequency but the advantages are obvious for the builder of simple equipment.

PW

See you next time.
Happy Christmas
and new year, and
keep those soldering
irons hot!

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thou come – but
no further"*
(From The Old
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Poled High

Fancy going portable, and you're looking for a support pole? I think I've found the ideal solution at the Leicester show recently, where I found a telescopic 10m glass fibre pole on sale. The small corner stall of **Walter Spieth DK9SQ**, was visible from anywhere in the hall, because he had several of these poles sprouting like Pampas-grass (and selling like hot cakes) with antennas at the top.

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AEA Analysers

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The AEA SWR121 HF costs **£299**, the SWR121 V/U costs **£399**, with optional a.c. adapter and software to interface to a computer, the analysers are available from Nevada, 189 London Road, North End, Portsmouth, Hampshire PO2 9AE. Tel: (01705) 662145, or FAX: (01705) 690626. On Internet, point your web browser at <http://www.nevada.co.uk>

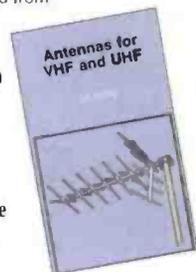
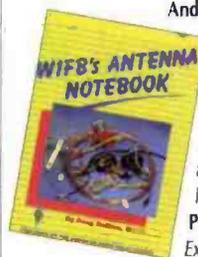
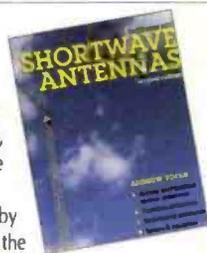
Santa Michael

I've asked Michael, who runs the **PW Bookstore**, to play 'Santa' and look in his sack to come up with some book offers just in time for Christmas and New Year. So, ignoring all the gnomes and elves getting underfoot, the title he has come up with are:

Build Your Own Shortwave Antennas (Second edition) by **Andrew Yoder** and costing **£15.95**, the

ever popular **W1FB's Antenna Notebook** from the late **Doug DeMaw W1FB** priced at **£7.50**, *More Out Of Thin Air*, priced **£6.95** contains many ideas for antennas distilled from *Practical Wireless*. Finally there are two Babani Books, *Antennas For VHF and UHF* (BP301) by **Ian Poole** (priced at **£4.95**) and *Experimental Antenna Topics* (BP278) by **H. Wright** priced at

£3.50. The offer is, that if you order two or more of the above books before **January 21** then they come **Post Free** within the UK. To order use the form on page 82 of this issue.



welcome to AiA!



Welcome to the first 'Antennas in Action' for 1998, and thank you for all of you who took time to complete and send in the questionnaire. I have to write this in advance of knowing what your likes really are, but it seems that we are getting it generally right. I also haven't drawn the

three lucky winners yet either, but whoever they are they should receive the antenna, book or subscription to *PW* soon! I've also managed to give away more than just a copy of *More Out Of Thin Air* in 'Tex Topics' this month (even though it's still only mid-November as I write this).

As I don't have a Christmas issue for A-i-A, I've not really had time to wish you the season's greetings. But I'd like to take this chance in the first issue of 1998 to wish you all the very best in the forthcoming year, and I look forward to meeting many of you at rallies during the year.

G1TEX

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antenna workshop

This time in the 'workshop' I'll take a look at how to make use of surplus satellite dish antennas, and at a design for a feed system for the 10GHz band. But before going into constructional details I'll start by explaining how the different types of dish antennas work.

A dish antenna is a high gain device used for the transmission and reception of u.h.f. and microwave signals. It consists of a driven element or other form of radiating device (the feed) and a large spherical or parabolic shaped element (the reflector). Antennas based on parabolic reflectors are normally preferred to those using a spherically shaped reflector.

Much higher efficiency and gain may be obtained from the parabola shape, because the rays can be focused to an exact point unlike the spherical shape where the rays converge but not to an exact point. So, let's look at the parabolic shaped dish and its variants.

A parabolic antenna must be at least several wavelengths in diameter for effective operation and is therefore an impractical choice for frequencies below the u.h.f. range. Parabolic reflectors can be constructed from a screen or wire mesh or it can be spun from sheet metal.

Because the spacing between screen or mesh conductors (the size of the holes)

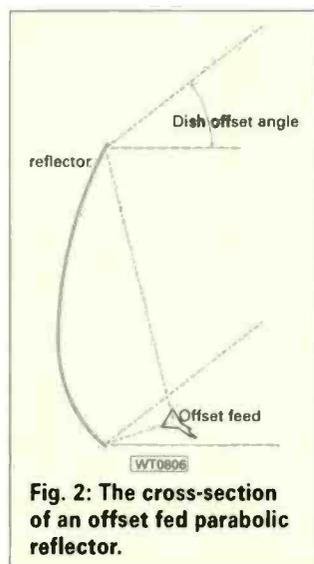


Fig. 2: The cross-section of an offset fed parabolic reflector.

David Butler G4ASR, our v.h.f. columnist, takes a look at how to make use of surplus satellite dishes and ancillaries, to create a feed system for the 10GHz band.

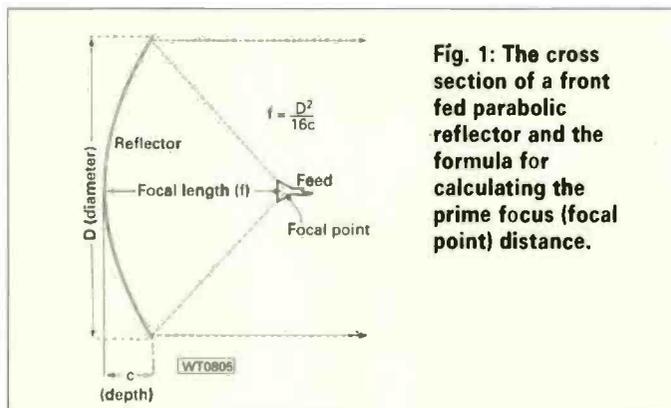


Fig. 1: The cross section of a front fed parabolic reflector and the formula for calculating the prime focus (focal point) distance.

can only be a very small fraction of a wavelength the use of wire mesh is only satisfactory at lower frequencies. At higher frequencies (s.h.f.) the mesh size becomes prohibitive and a solid or perforated metal sheet is preferable.

Physical Size

There is a relationship between the physical size of a parabolic dish, its frequency of operation, gain and beamwidth. For any specified frequency a small diameter dish will exhibit lower gain and a wider beamwidth compared to a larger dish, which will produce more gain but with a narrower beamwidth. For example, if a 1m diameter dish is used on the 1.3GHz band it will have an approximate gain of 17dB with a 20° beamwidth.

If the dish size is increased to 3m it will realise a gain of some 30dB and 5° beamwidth. Similarly, for any specified antenna size it's use at a lower frequency will produce a lower gain and wider beamwidth compared to it's use at a higher frequency (where it will produce more gain with a narrower beamwidth). For example, a 600mm dish used at 10GHz may have a gain of around 33dB and a beamwidth of 4° whilst at 24GHz it will have a gain of 41dB and a beamwidth of less than 1.5°.

The important detail to note is, that a parabolic reflector is inherently broadband. That is to say it can be used over a very wide frequency range. It is simply a function of the driven element or feed system that limits its useful frequency range. Thus a dish can be used on many different microwave bands by simply changing the feed system.

Some microwave enthusiasts do change over the feeder system, but it can be inconvenient adjusting the antenna feed when you want to change bands. Therefore a number of feed systems have been developed that can work effectively on three or more microwave bands at the same time. However, these are normally never as efficient as a single-band feed system.

Basic Geometry

The basic geometry of a parabolic reflector is shown in the diagram, Fig. 1. Electromagnetic (e.m.) radio waves being received are reflected from the dish surface and converge to an area called the focal point or focus. The driven element or feed is placed at the focal point of the reflector to collect the e.m. waves. Similarly energy radiated by the feed is reflected by the dish and sent out as parallel waves. The principle is exactly the same as a torch or searchlight reflector except that

radio waves are involved instead of visible light.

The arrangement where a feed is located at the focal point is called a prime-focus or front-fed antenna. However by locating a feed system directly in front of the dish (usually with a tripod arrangement) and with associated waveguide or cables a considerable blockage effect will occur. This blockage degrades the antenna pattern producing a poor side lobe performance and lowers the efficiency.

To overcome problems associated with feed blockage an offset reflector system is used as shown in the diagram, Fig. 2. Although the geometry is less straightforward than a prime focus dish the principle is exactly the same. The removal of all blockage effects brings about a major improvement in both side lobe performance and antenna efficiency. It is this type of design that is used predominantly for domestic satellite television reception in the UK.

The fundamental factor governing the design of a dish feed is the ratio of the focal length (f) of the dish to its diameter (D). The focal length is calculated from the formula $f = D^2 / 16c$ where D is the dish diameter and c



Fig. 3: Peter Day's 10GHz portable microwave station (G3PHO/P). (Photo by G3PHO)

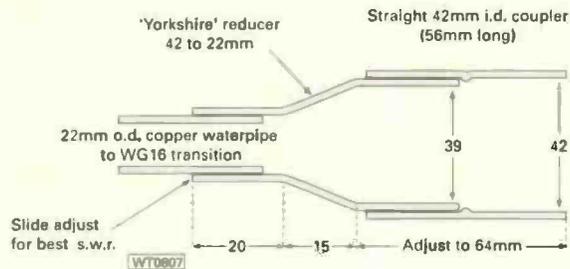


Fig. 4: The 'home-brew' dual-mode feed horn for 10GHz (see text for details).

is the depth of the dish. The units of f are the same as those used to measure the diameter and depth.

Having obtained the focal length (f), the f/D ratio can now easily be calculated. For example, let's consider a 600mm diameter dish (D) which has a depth (c) of 75mm. Putting these figures into the formula gives a focal length (f) of 300mm. The resultant f/D ratio in this case is therefore $30/60 = 0.5$.

Spillover Effects

To overcome 'spillover' effects (radiation beyond the reflector rim) the optimum illumination is considered to occur when power at the reflector edge is 10dB less than that at the centre. Furthermore to fully illuminate the reflector surface the feed must have a specific beamwidth dictated by the f/D ratio of the dish.

An f/D ratio lying between 0.4 to 0.6 is considered ideal for maximum antenna efficiency. It only requires a simple feed possessing a 10dB beamwidth of somewhere between 88-130° (dependant on the f/D ratio). Dishes with a low f/D ratio are increasingly difficult to fully illuminate. For example a dish with an f/D ratio of 0.25 requires a feed beamwidth of 180° which is quite difficult to achieve.

One parameter often overlooked is the focal point accuracy. Experiments have shown that at 10GHz an error of only 6mm results in a 1dB loss of gain when using a 600mm dish of 0.39 f/D . Dishes with a low f/D ratio are very critical in this respect. Although a larger f/D is better it is still vital to have the phase centre of the feed exactly positioned at the focus of the dish.

The popular rectangular horn feed or dipole feed (with asymmetrical E and H planes) has difficulty in producing a common phase centre and equal radiation in both planes. Consequently a dual-mode feed horn, suitable for use with surplus off-set fed dishes of f/D

around 0.5 to 0.6, was developed by **W2IMU**.

The dual-mode horn has a very 'clean' feed in that side and rear radiation is reduced to a low level and it produces a very symmetrical radiation pattern in both the E and H field planes. (By the way dual-mode in this context refers to the ability of the feed horn to support two waveguide propagation modes.)

The dual-mode feed horn that I'm going to describe has been designed by **Peter Day G3PHO** for use on the 10GHz band with a surplus 600mm Amstrad off-set fed satellite dish. When Peter changed from a 460mm dish (using a 'penny' feed system) to an 600mm Amstrad dish a few years ago he found a tremendous improvement on his 10GHz narrow-band performance. A circular dual-mode feed horn taken from a Marconi 'Blue Cap' low noise block-converter (l.n.b.) was pressed into service as the dish feed and this is shown in the photograph, **Fig. 3**.

Marconi Horn

The Marconi horn worked reasonably well considering that the transition from rectangular WG16 waveguide to the circular horn was simply achieved by butting the end of the guide against the circular port on the horn! However the horn was not correctly dimensioned for the 10GHz band and it possessed a bad vertical beam pattern and had a poor s.w.r. match.

The optimised horn design by **G3PHO** is shown in the diagram **Fig. 4**, and is simplicity itself as it uses copper water pipe and couplers available from most plumbing suppliers. It may surprise you that water pipe can be used as circular waveguide but 22mm pipe is in fact very efficient as a 10GHz feeder and it's very cheap as well! The feed horn consists of three components, a straight 42mm Delrop coupler, a 42mm to 22mm Yorkshire reducer and a length of 22mm copper water pipe.

You should be able to get plenty of 22mm pipe from any local d.i.y. store, but you'll probably need to go to a specialist plumber to obtain the coupler and reducer. It's important to obtain solderless fittings as any solder inside the feed horn will cause unacceptable losses. Note also that the couplers are measured internally while normal piping is measured externally.

Before soldering the components together thoroughly degrease all items. Adjust the coupler/reducer length to 64mm as shown in diagram **Fig. 4** and solder around the outside of the joint ensuring that no solder enters inside the coupler. To facilitate the sliding adjustment the narrow end of the reducer can be slotted and fitted with a hose clamp. The 22mm copper pipe used as circular waveguide can be as

The sliding adjustment is best made using a directional coupler (a microwave equivalent of an s.w.r. meter) to obtain the lowest s.w.r. match. Adjustments could also be made using a local beacon or more appropriately a low power source located 50m or so from the dish and mounted at the same height. Or you could just set it for an insertion of 11mm as this has been confirmed as the optimum setting by a number of operators.

The adjustment can be made permanent by soldering on the exterior of the horn or by tightening the hose clamp if using that method. However, don't be over enthusiastic in tightening the clamp as you can easily deform the tube. If you're going to solder the horn onto the pipe place a dampened cloth

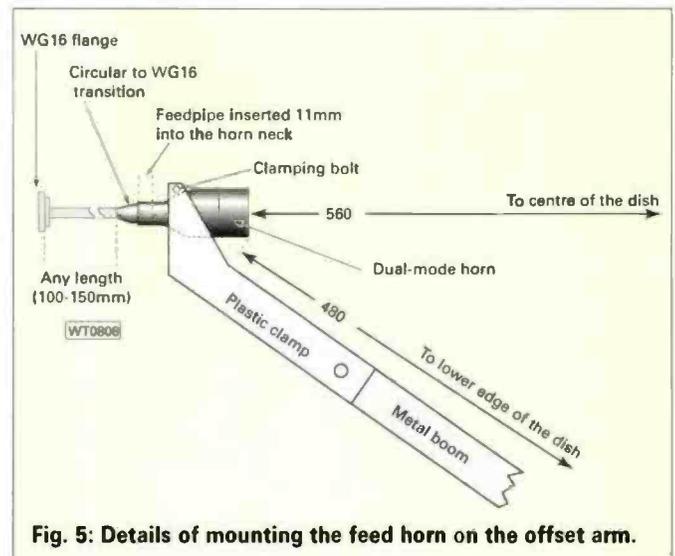


Fig. 5: Details of mounting the feed horn on the offset arm.

long as you wish but bends or kinks must be avoided.

A practical size off the new feed horn would be around 100-150mm. Ensure that the ends are square to the pipe and free of burrs. One end of the pipe must then be shaped to fit a standard WG16 waveguide flange. It is possible to shape the tube with a pair of thin-nosed pliers but you'll probably find it easier to use a forming tool to make this circular to oblong transition. (A suitable tool is described in the *RSCB Microwave Manual Volume 3*, page 18.6.)

around the original soldered coupler to prevent that joint from becoming loose.

Completed Assembly

The completed feed horn assembly can now be mounted onto the original Amstrad feed clamp as shown in the diagram **Fig. 5** and photograph **Fig. 6**. The outer, wider, section of the horn will just rest against the clamp if all dimensions have been followed accurately. With some Amstrad dishes you may need to file the plastic clamp to make it slightly wider to enable the horn to fit securely.

antenna workshop

The focal point on a genuine 600mm Amstrad antenna is 560mm from the centre of the dish. Adjust, if necessary, the position of the feed horn so that the centre of the open end of the horn is correctly positioned. Other off-set dishes may not have the same mounting arm and clamp arrangement as the Amstrad dish.

If yours isn't an Amstrad dish, then set up the horn so that the open end is initially in the same position as the original satellite television l.n.b. horn. This will put you in the right ball park but you may have to alter the feed horn position by a few millimetres to provide optimum results. But before using the antenna for the first time you will need to take into account the dish off-set angle. The Amstrad (and other off-set fed dishes developed for the UK market) have an off-set from the vertical of some 22°.

What this means in practice is that the dish needs to be tilted down by this amount to produce a beam pattern that is exactly horizontal.

For portable operation you can use a pan and tilt mechanism as shown in the photograph Fig. 3. For fixed station operation you could mount the dish 'sideways' so that the off-set is in the horizontal plane rather than in the vertical plane. It would then only be necessary to position the dish 22° out of line from your other antennas to ensure that they are all beaming in the same direction.

When completed you will possess an antenna with a very good beam pattern and a gain well in excess of 30dB. Although it's optimised for the s.s.b./c.w. sub-band around 10.368GHz it has an excellent performance throughout the entire band.



Fig. 6: A close-up shot of the waterpipe feed horn on the offset arm.

(Photo by G3PHO)

■ ALLAN WIGHTMAN CLIMBS INTO THE LOFT TO POINT OUT SOME COMMON PROBLEMS ASSOCIATED WITH DISTRIBUTION AMPLIFIERS.

Up the Ladder - Again

Allan Wightman comes across many difficult TV and radio reception problems in his work in the antenna erecting business. Some of his experience can help transmitting amateurs and recently he's been assisting a (slightly?) awkward Amateur Radio customer with TVI problems.

Recently I've been assisting a particularly awkward customer with his TVI problems. Well, to be honest - it's not the customer who is awkward - it's just his TVI problem that's being a nuisance. Oh, by the way - the customer is Rob Mannion who I understand is perhaps better known to you as G3XFD.

Rob is an active Radio 'Ham' and operates a great deal on the lower frequency 'Ham' bands. But unfortunately for him he's interfering with a near neighbour's TV distribution system although he doesn't cause TVI on his own TV receiver. So, bearing in mind that Rob is an experienced chap and knows what to do to try and prevent interference from his transmissions, I'm writing up from my notebook just how I tackled the first stage of the problem.

Broadband System

From his 'ham' station Rob usually runs his transmitter at power levels of around 75W or so on speech. I

understand that this level is quite usual when you're on single sideband speech (s.s.b.). But when he's using Morse (c.w.) he often uses power levels of less than 5W. When the interference to his neighbour's TV first came to his attention Rob checked his own TV first. And when using the TV by itself (not permanently set to operate via the video recorder as most people normally do) the picture was 'clean'.

However, when transmitting on the

14MHz band - and with the video recorder in circuit - Rob's transmitted speech could be seen to interfere with the received TV picture. Vertical 'wavy' lines (moving in relationship to his voice) could be seen on all channels. The problem persisted on all channels (he receives the Rowridge transmitter (transmitter No. 108, broadcasting on the Group A channels of 21, 24, 27 and 31 from the Isle of Wight on Band IV) despite a low pass filter in the output of his transmitter.

It was then obvious that the broadband amplifier/splitter unit in the video recorder was being overloaded by the high 'out of band' signal levels. So, I then fitted an AKD 'in line' high-pass filter and the picture cleared immediately. However, the problem with the neighbour's TVI wasn't so easy to cure...although it was caused by exactly the same type of broadband amplifier not coping very well with strong 'out of band' signals,

Broadband Problems

Although broad band distribution systems can make the TV and radio engineer's job much simpler (we can literally 'bung' everything up the same cable!) the very fact that the system accepts a wide range of frequencies can cause problems. Add this to the DIY approach of 'over the counter' sales of relatively complex equipment to people unaware of radio frequency techniques - and trouble can start!

I've lived with sorting out d.i.y. mast-

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head problems for years. For example, I went to the aid of a customer who installed (quite unnecessarily - as all he originally needed was a better Band II antenna rather than an amplifier) a combined Band II (commonly referred to a 'v.h.f. f.m.') radio and Band IV/V masthead amplifier. He then couldn't understand why he was receiving unwanted aircraft transmissions on his 'f.m.' radio and local taxi transmissions were coming over his TV set!

The broadband nature of the combined TV-radio mast head unit covered 50MHz to almost 1GHz (you could equate the broadband nature of the amplifier as being rather un-selective in receiver terms) was overloaded itself. It then also helped to overload the TV and radios connected to the circuit.

My customer was disappointed that it was his own handiwork that had caused the problem. But at least his reception problems were overcome and he didn't get someone asking for landing permission, or where the passenger from 'number 24' wanted to be taken to mixed in with his favourite music!

Back Next Door

But back to Rob's neighbour next door, where the problem turned out to be essentially what I'd expected: a wide band unit. It was hidden up in the roof and although I was unable to see it in situ I found out it covered from around 50MHz right up to the top of the Band V TV allocation (well past 860MHz).

With up to six combined v.h.f. (for radio of course) and u.h.f. outlets the unit was obviously a candidate for overloading caused by the close-by (physically speaking) transmissions from Rob's antenna. So, again using an AKD high-pass filter I got the house-owner to place the filter in-line between the u.h.f.

antenna and the distribution amplifier.

Once in place the filter did its job very well indeed and the TV disappeared on the neighbour's

main TV in their lounge immediately. The set in question was a large, modern and well designed receiver which was designed to comply with the latest EMC standards. But the same couldn't be said for the 'transportable' colour set used in the kitchen - this still had interference on some channels.

Back-To-Basics

Having substantially reduced the TVI problem it was obvious to Rob and I that it was a question of going 'back to the basics' and replacing the neighbour's original distribution amplifier. This had to be the route to TVI free reception because it's obviously the amplifier that's causing the

Fitting an in-line filter to the 'kitchen' TV didn't help. The out-of-band signals had to be reduced dramatically before the older TV could cope with everything the distribution system was sending down the cable. Nowadays I find it increasingly common that houses I attend have built-in distribution systems. There's usually a central amplifier with outlets running to literally every major room.

Unfortunately (for EMC purposes) the amplifiers used often leave a lot to be desired and the coaxial cable used is often of the cheapest nature. Added to the problems I've outlined there are others which are often created by the electrician installing the cabling. Electricians - unless they have experience of radio frequency techniques - seem to treat coaxial cable and terminations like 13A mains sockets!

It's not unusual to find coaxial cable 'split' three ways via a handy junction box left over from a lighting circuit

with a very high quality distribution system which was also generally well planned. Unfortunately though - the electrician who had been left to install the cabling had 'taken a short cut'.

The 'short cut' involved an awkward coaxial cable junction, where instead of using a resistive or inductive (I prefer inductive types) two-way 'splitter'. He'd just linked the cables together, and the result was a classic 'ghost' (delayed image) on all the channels received on that 'leg' of the system. Of course, it was caused by the un-terminated 'leg' reflecting the r.f. energy (the TV signals) back on to the main system.

The problem was quickly cured by terminating the unused coaxial 'leg' and replacing the home-made 'splitter' with the correct device. And incidentally - the 'splitter' only cost £4! So, there's a tip in case you move into a new home and find you've got problems. The 'ghost' you could be seeing on the picture could be a cable problem!

Back To Square One

Ideally I would like to get Rob's neighbour to go 'back to square one' to re-install the TV distribution system. But obviously this is not an option and we are going to have to compromise. Rob wants to continue his short wave radio transmissions and the neighbours (fortunately they get on well together) wish to have interference free TV reception. So, we've decided on another approach - by replacing the main amplifier unit.

Replacing the amplifier unit with a 'grouped' unit (in other words a more selective unit which is tuned to work only on the v.h.f. (for radio) and u.h.f. channels required that's designed to cope with the EMC levels required today will help immensely. Of course, the results will be used in 'Up The Ladder' to help you overcome similar difficulties and I hope to write them up from my notebook for you next time. Until then - enjoy yourself on the air and I hope you enjoy watching interference free TV too!

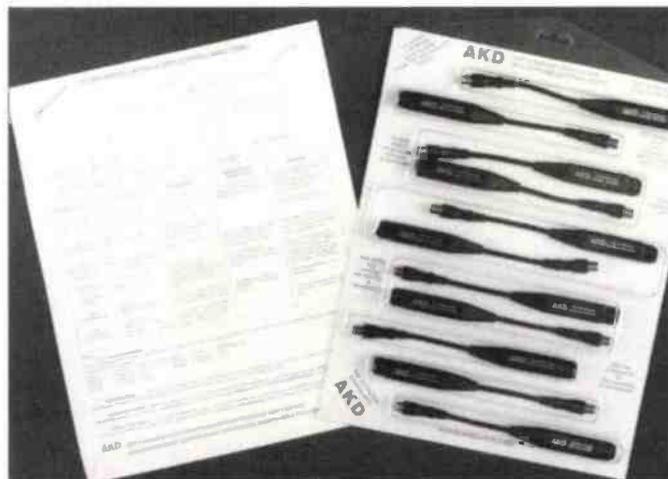


Fig. 1: Stevenage-based AKD have many years of experience in producing in-line filters suitable for helping to eliminate TVI. Allan Wightman used one to tackle problems experienced by G3XFD.

interference by responding the 'out of band' signals amplifying them and superimposing the resultant pattern over the wanted programmes on the older 'budget priced' colour portable set still having problems,

installation! And even newly installed house systems - even well planned versions - can have difficulties caused by lack of knowledge involving r.f. For example, I recently had to attend a brand new house (a six bedroom job)

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Send your ideas and tips to: **Antennas In Action, PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW.**



Some time ago **Brian Williams GW0GHF** wrote to me and asked if I could find an article in *PW* about the 'Bob-Tail' antenna. So I had a quick 'trundle' through the archives - and failed to find it, even though I thought I could remember such an article. But in the end, I had to resort to the *ARRL Antenna Handbook* and memory in my answer to him. However, in the rush to answer, I inadvertently gave the wrong dimensions for the elements.

Brian was kind enough to tell me about the dimensions he had calculated, along with more details of his feeder system, which is shown in the drawing of Fig. 1. For his 'Bob-Tail' he used 5mm brazing rod for the elements and a 450mm length of 300Ω ribbon feeder as a matching line. The lowest s.w.r. occurred with the coaxial feed some 25mm from the closed end, and with the inner connected to the open circuit side of the line.

Brian says "The aerial is right up in the loft under the ridge timber, held up by string! The 'top' part may be looked upon as the 'transmission line' feeding the three vertical 1/4 radiators, which

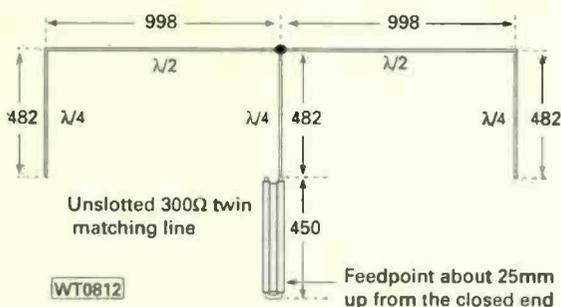


Fig. 1: The 'Bob-Tail' Antenna for 144MHz.

■ A ROUND-UP OF YOUR TIPS AND LETTERS. WHO HAS WON THIS MONTH'S GIVEAWAY MORE OUT OF THIN AIR?

tex topics

because of the equal (hopefully) and opposite phasing of the centre $\lambda/4$ produces a squashed bi-directional pattern".

Brian also reported that the gain quoted is supposed to be around 8dBd (in the directions at right angles to the paper as it's shown). Although he thought that 5dBd was nearer the truth. "The lobes are rather sharp and mine seems to have a 'squint' (no doubt due to some irregularities in my measurements). But on the whole, it's easy to make and handy for a simple 'P' aerial in a pole. I hope you can encourage some of your readers to try it out".

So, why not have a go yourselves at a 'Bob-Tail' antenna? The dimensions shown are for a 145MHz version, but with a little maths you could make one for any other band. When it comes to calculating the length of the 300Ω ($\lambda/4$) matching stub, use a figure of $65/f$ (in metres, where f is the centre frequency of the band of interest). And as to the position of the matching point use a proportional distance from the closed end.

Invisible Antenna

From Peterborough, **Noel Muncey G7VPA**, has come up with a useful tip to go with the 'invisible' antenna that **John Heys G3BDQ** described for 'Antenna Workshop' in the November 1997 issue of A-i-A. In that issue John described an antenna that was simple,

cheap and easy to make from aluminium foil, and because of this, it could be hidden behind wall covering or curtains.

In a letter that starts "It brought to mind the time I was working for an alarm company. We used an 'Aluminium foil windows tape' and 'foil terminations'. Then G7VPA went on to say that by using this self adhesive tape which is 9mm wide, and the terminations, a similar antenna could be put up much quicker than by using John's method. At

the connector end, the tape is folded back underneath itself to give extra strength when being clamped into the terminal block adapter Fig. 2.

However, creating the corners with the somewhat flimsy tape (it is designed to rupture quite easily) is an art, but it is quickly learned as long as care is taken when forming the corners. I've had a go at producing some connections and corners so you can see the technique in photographs Fig. 3 and 4. To make the 'hospital-

Fig. 2: The 'stick-on' connectors used in alarm systems.

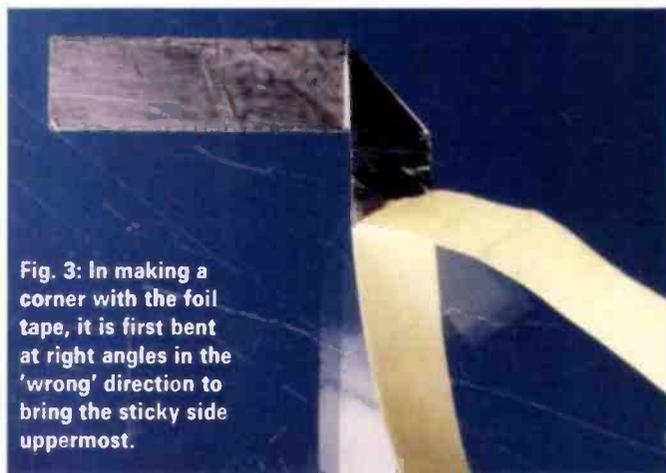


Fig. 3: In making a corner with the foil tape, it is first bent at right angles in the 'wrong' direction to bring the sticky side uppermost.



Fig. 4: Making 'hospital-bed' corners is easy with a little care and practice.

bed' corners that G7VPA provided, needs a special technique as outlined in the annotated examples he produced on paper.

When making corners, the first fold is made in the **opposite** direction to the desired one. This brings the sticky side uppermost and at right angles to the stuck-down run (Fig. 3). Then carefully hold the tape and fold it back on itself (the fold becomes like the gnomon of a sundial). Tidy the fold up by pressing it

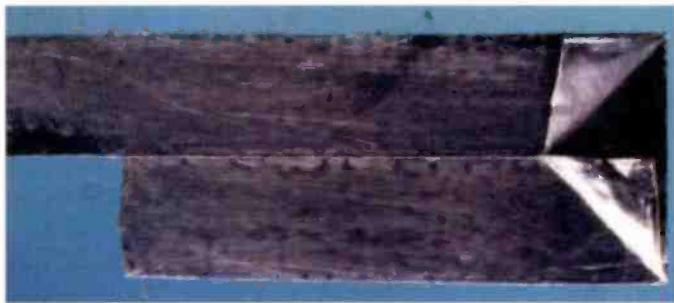


Fig. 5: Making a 'double' corner allows the tape width to be effectively increased.

Fig. 6: Duncan head had some problems with his N-type plugs (see text for more details).

down, and continue in the desired direction with the tape. You may have to practice a few times before it looks as good as the samples sent in the post to me, especially like the double bend example shown in Fig. 5.

Another alternative tape that I've seen, although it's more expensive, is to use the copper foil tape that can be found in many of the handicraft shops. Using the copper tape and the same technique as outlined by Noel, a marginally more efficient antenna could be made. This last comment applies especially when trying to make a double width track, as the tracks could be solder 'tacked' together, reducing the chances of your 'double-width' element really being seen as a 'folded' element.

Antenna Alarm

Still staying on the subject of 'hidden' antennas, **John Bidgood** has sent in a nice idea in a letter that started "With reference to hidden antennas, one item which is 'springing-up' in most areas is the wall mounted alarm box. I have an active one on my house, but as an experiment I will obtain a dummy box and fit a small 144/430MHz mobile antenna and use a metal plate as a ground plane".

Sounds like a good idea to me John, but instead of using a large metal plate (for a ground-plane at 144MHz it would

need to be quite big to be effective) you might like to investigate using $\lambda/4$ stubs for each band running down at an angle from the feedpoint inside the box. Perhaps two stubs for each band and a small helical wound (rubber duck) dual-band portable antenna would be ideal.

If anyone else has ideas along the lines discussed, please let me know so I can share them. Using a 'fake' alarm box to weatherproof a remotely controlled

tuner feeding a horizontal length of wire. The wire could be hidden by running back through the roof space, and such a set-up could serve two purposes. To 'get out' on some of the h.f. bands at anytime and without it being known and perhaps deter those who would like to 'get in' anytime!

N-Type Warning

From **Duncan Head G7PNE** comes a warning to all readers planning on installing N-type plugs and sockets (although his warning applies only to the plugs). Duncan starts his letter "I have just spent two days of my time diagnosing a feeder/aerial problem for my ATV station..." which started off when he decided to change over to 'Heliac' coaxial cable for the main down lead. After adding a new cubical quad loop antenna to the system, Duncan raised the system up into the working position.

Duncan's letter continued "I powered up in anticipation, NOTHING! Further tests proved inconclusive, pre-amp still working, but no ATV repeater". So after a frustrating night Duncan lowered the system the following day and after a lot of hunting around found that the coaxial cable to the ATV pre-amplifier fell apart. It would seem that in the N-type plugs that Duncan used there is no strain relief (or holding ridge) for the plug's centre connector.

Duncan sent me the offending plug to bring to everyone's attention, **Fig. 6**, and as you can see from the photograph there is no retaining lip on the centre pin at all. In an effort to correct the fault, he ordered two new plugs from a "professional electronics catalogue", which to his dismay turned out to have exactly the same problem as he saw it. The centre pin from one of the new plugs shown below in Fig. 6. The two new plugs were returned to the supplier



who refunded the cost.

The letter from Duncan finishes off "Please everyone check when you purchase N-types. If you are at a rally then the supplier will only be too pleased to let you open up the connector before you hand over your money". I have to agree with Duncan's sentiments expressed in his letter as I have made the odd bad purchase (who hasn't?) at rallies, when due to lack of knowledge I've bought the wrong item. (See the question going with Fig. 3 on page 34 (Tex Topics) of the March 1997 PW).

Letter From Zimbabwe

Still on the subject of coaxial plugs and improvements to them, I've had a letter from **Rod Short Z21AF** in Zimbabwe about reducing the chances of a filament of wire from the coaxial screen shorting to the inner pin or conductor. In his letter he says "I have had a few cable failures using small quarter inch coaxial cable and the PL259 plug and adapter. But since using my modification I have had no failures, maybe others would like to share it with me, it is very simple".

And simple it is too, like all great ideas that make some tasks so much easier. Rod's suggestion is to add a one

millimetre section of the inner insulation cut from a length of RG8 coaxial cable (another use for those short lengths that get left over) inside the plug on assembly as shown in Fig. 7. Instead of trimming the inner insulation of the thin cable about 3mm from the turned back screen, trim it at 4mm from the screen in future.

Take a one millimetre 'slice' of the RG8 insulation and gently make the centre hole large enough to pass over the inner insulation of the thinner coaxial cable. If this is done before the section is sliced off then it's easier. Pull the inner conductor out of a length of RG8 inner and using a twist drill of slightly larger size open out the hole left by pulling out the centre conductor.

At this point you may as well make several of the 'rings' so, taking great care and a craft knife with a stiff blade, slice off several 1mm

rings and put them safe in your toolbox for future use. This may be difficult to do but would be worth the effort all at once because you'd have a supply of the rings. Perhaps an amateur, who is also a butcher, would like to contemplate a rather unusual use for his bacon-slicer at this point!

I think that's your idea is great Rod, simple, but a cure for a problem that plagues most of us at some time or other. Although putting another piece of dielectric material inside a coaxial cavity alters the characteristic impedance at that point, I don't see that this is a problem under any circumstance. The PL259 doesn't have a constant impedance anyhow, and most definitely should not be used at any frequency where such a small change of impedance is going to cause a problem.

Design Found

In the November 1997 'Tex Topics' column **Brian Lowe VE3TJE** asked for help with finding the original article for an antenna design that I sketched out in the column. I've had several letters pointing out that the design (even though the sketch wasn't a very good one) was most probably 'The Steeple', an antenna designed and described by **John Heys G3BDQ**. And of course the first letter was from John himself giving

■ **TEX TOPICS IS CONTINUED ON PAGE 46**

antennas in action

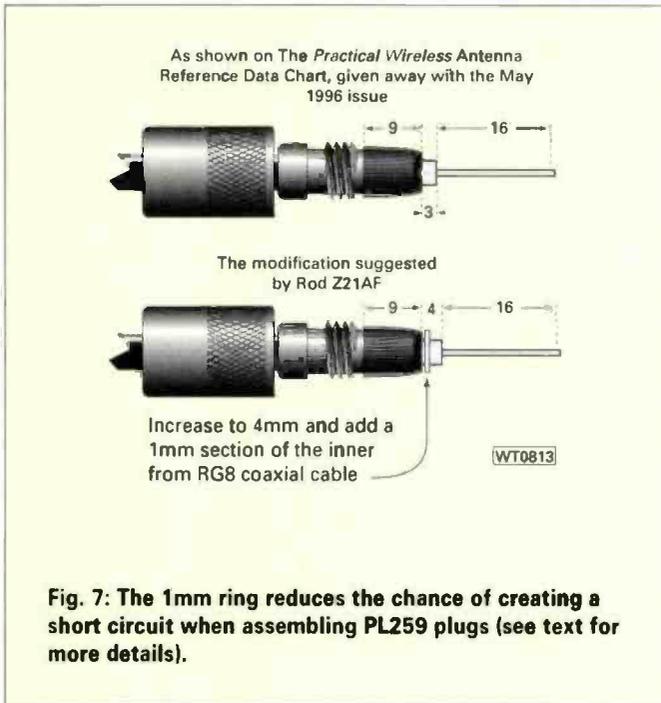


Fig. 7: The 1mm ring reduces the chance of creating a short circuit when assembling PL259 plugs (see text for more details).

me details of when and where the design appeared.

Another letter that I received was from **Richard Kelly G4MGRD** and he was kind enough to send a copy of the original article by John Heys that appeared in 1985. The article is (as John himself pointed out) the Mk1 version which didn't have the broad top run. The end farthest from the house is a cone of wires down to individual earth rods. This cone gives the antenna the characteristic 'Steeple' look, hence the name that it was given.

Not far behind the letter from John Heys, were letters from **G3LCB** and **G3NQX** (sorry about the 'formality' but that's all I have) both telling me that the design appeared in the RSGB's book *HF Antenna Collection* edited by **G4LQI**, and in *Practical Wire Antennas* also by the RSGB. Each took the time to sketch out the MkII version of the 'Steeple Antenna' for my information. Thank you both.

In the rather longer letter by **G3NQX**, he also passed on two simple tips that will be useful to all. The first tip from **G3NQX** is of use to mobile operators. When mounting a mobile whip antenna on a gutter mounting clip on the vehicle he was stuck for a method of securing the coaxial cable in place. The answer after some deliberation turned out to be running the cable along the gutter and holding it in place with blobs of 'Blu-Tack' a blue putty-like substance from Bostik.

By pushing pieces of 'Blu-Tack', large enough to make a bridge on top of the coaxial cable of about 10mm long, every 200mm, the cable is held firmly in place without fear of marking the paint on the vehicle. The second tip from **G3NQX** concerns making an effective centre piece for wire antennas. Have a look at the sketch of **Fig. 8** where I've shown the basics. Two slots,

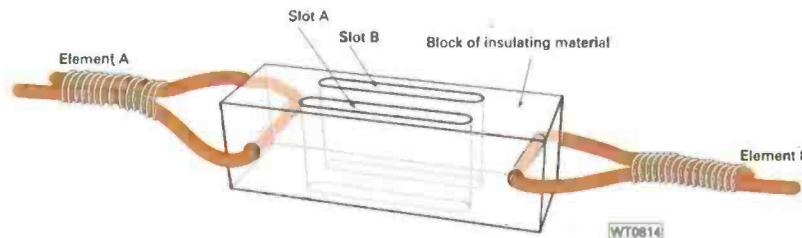


Fig. 8: A simple dipole antenna centre made from a piece of insulating material.

A and B, just slightly larger than the 300Ω ribbon feeder are cut and filed in a block of insulating material.

Pass the feeder up through one slot (say Slot A) and then bend it back to pass through the second slot (Slot B) leaving sufficient length in the 'tails' to connect to the wire elements. Solder the end of each 'tail' to the corresponding element wire and the antenna is ready to be hoisted back up into the air. Friction alone should hold the centre and feeder in place, but just a small blob of hot-

melt glue, or of a bathroom sealant, would improve the grip in slightly oversized slots. This method has proved very successful at the QTH of **G3NQX**, where there's been no failure noted in many years.

Tacks On Two

My final letter this month concerns the effect that using tacks on antennas designed for 144MHz. From **George Ross G4IEI** comes a tale of warning. "I thought you might be interested in my experiences in construction of a 'Slim Jim' for 144MHz in accordance with **G2BCX's** instructions". (Sadly **Fred Judd G2BCX**, who so ably ran the *PW Antenna clinic* for so long, became a silent key in 1992. 'Tex').

George continues the description of his 'Slim Jim', "I used 18g (1.25mm) copper wire mounted on a wooden batten, the wire was not holding tight so I fixed it with a few tacks. The test on receive was very good but on transmit the s.w.r. was dangerously high in spite of adjusting the feed point". George

George continued "The test showed good receive results and the s.w.r. good, so with slight adjustment to the feed point tapping - 'lo-and-behold', a perfect 1:1 s.w.r. You live and learn, that's what radio's all about". I couldn't agree more George, I've been in electronics and radio for over 30 years now and there still seems so much I haven't looked at yet.

Signing-Off

Well that just about rounds it off for another 'Tex Topics'. I'd like to thank all those who wrote in and shared ideas and information with us. As I haven't had time to give your returned questionnaires more than just a swift glance - but thank you all the same. I'll do my best to bring you a resumé of your opinions in the next A-i-A as we include your wishes into the 'look and feel' of my magazine section.

The only other task I still have to perform is to donate a copy of *More Out Of Thin Air* to the best tip of the issue. This has turned out to be a very difficult choice this month as each of

the tips is a useful one. So in the end, much as I'd like to give all who write in something, I decided that **George G4IEI** will get the Book and **Rod Short Z21AF** would get a voucher to be used the next time he orders something from the *PW* Book Service.

See you all next time in 'Antennas in Action', and next month when I've been given a new column called 'Electronics in Action'.



wondered if the tacks, about a dozen of 'blued' types, might be having the disastrous effect on the s.w.r. So, he removed the tacks and taped the antenna to the batten instead.

Best regards and a Merry Christmas to you all

Tex

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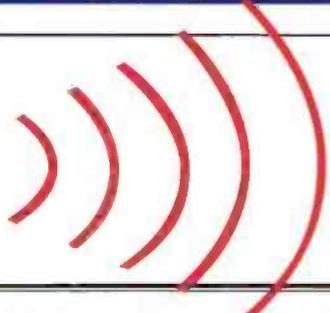
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CHRISTMAS IS COMING-AN

LAST MINUTE STOCKING FILLERS

There's no doubt about it - crystal sets and their very simplicity fascinate some people! There's a lot to be said for what must be the simplest receiver - both as a teaching aid and as a 'serious' interest itself. So, with this in mind the *PW* team have compiled some interesting books on crystal sets as possible Christmas presents and - quite by chance - Rob Mannion G3XFD covers the same subject in his beginners series 'Radio Discover The Basics' this month too!

The Xtal Set Society Newsletter - Volume IV

This specialist society, based in St. Louis, Missouri in the USA promotes and keeps alive a great deal of interest in the good old crystal set. When you read this collection of newsletters on the subject of crystal receivers - you're in for a real surprise because there's an amazing variety of receivers 'on the same theme'!

One of the most interesting crystal set memories tells of a 'Foxhole' receiver built by an American soldier in the Second World War - using a rusty razor blade 'detector'. It worked! Packed with coil information, anecdotes, projects, techniques and ideas this little booklet provides a good read. **Good Reading** costing just **£6.50**.

Crystal Radio: History, Fundamentals, And Design Xtal Set Society

Want to know all about 'Grandfather's Crystal set' - the history, how they worked and how you can build one? Well, this fascinating little book provides a great deal of information in a friendly, informative and practical style. Along the way it provides a very interesting look at the history of radio reception - quite appropriate in the Centenary year of Amateur Radio. **Recommended reading** at **£6.50**.

The Crystal Set Handbook (& Volume III of the XTAL Set Society Newsletter)

Again, this little book provides a great deal of information, covering historical and modern reception techniques using 'crystal receivers'. The historical aspect alone is well worth reading and provides a good insight into the (often slightly hazardous!) early techniques.

The technical information will certainly help the reader to become an expert at winding home-made tuning coils! **Good reading**, *The Crystal Set Handbook* costs **£6.50**

Crystal Set Xtal Set Society Newsletter Volume V

If you think portable receivers are new - you should see the article on page 50 of this collection of news, topical items/letters/articles from the society members. Fascinating reading and at just **£6.50** it's affordable too! **Particular historical interest**.

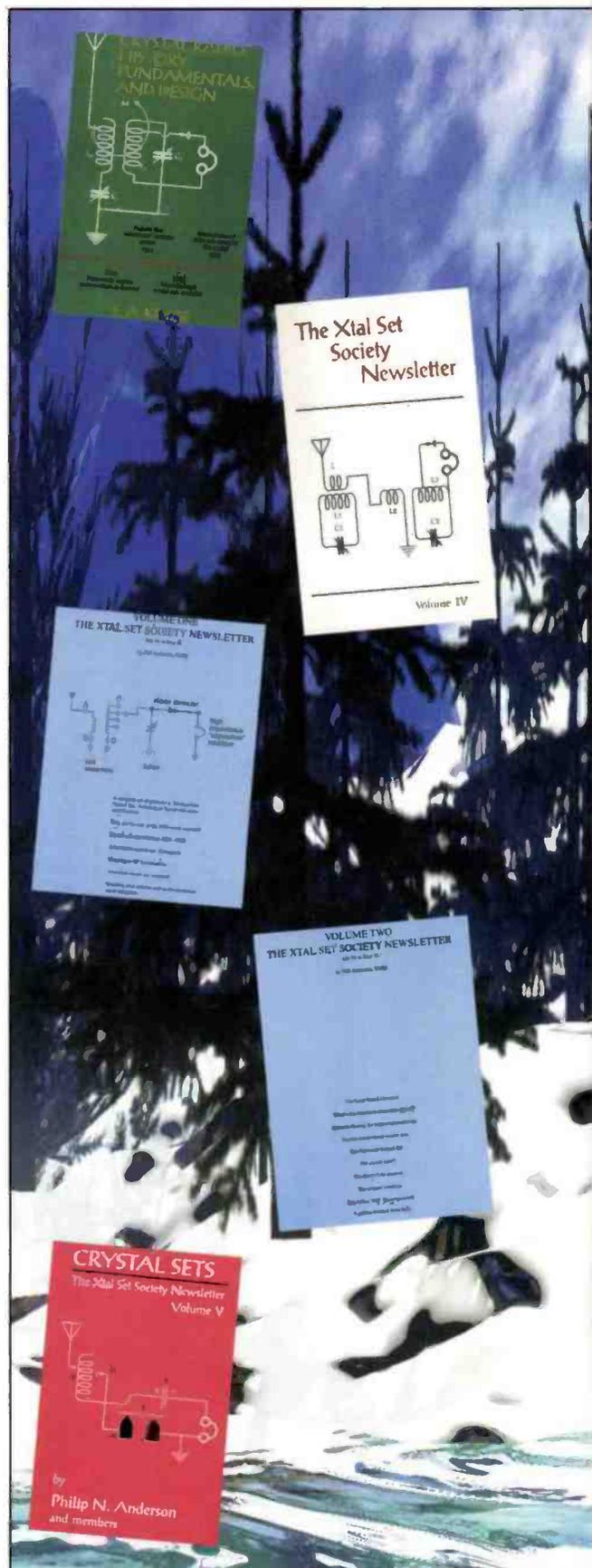
Volume One - The Xtal Set Society Newsletter (July 1991 to May 1992)

This spirally bound, photocopied style collection of newsletters includes topics such as: A complete set of plan for a modern day crystal set including p.c.b. layouts and audio amplification, Why did the sets of the 1920s work anyway?, Crystal Sets & Wireless 1905-1928, A Barebones Crystal Set, Listening to h.f. broadcasting, a toroidal crystal set - compact!, Matching Your antenna for maximum signal reception. **Interesting, informative and informal reading**. Priced at **£6.50**.

Volume Two - The Xtal Set Society Newsletter (July 1992-May 1993)

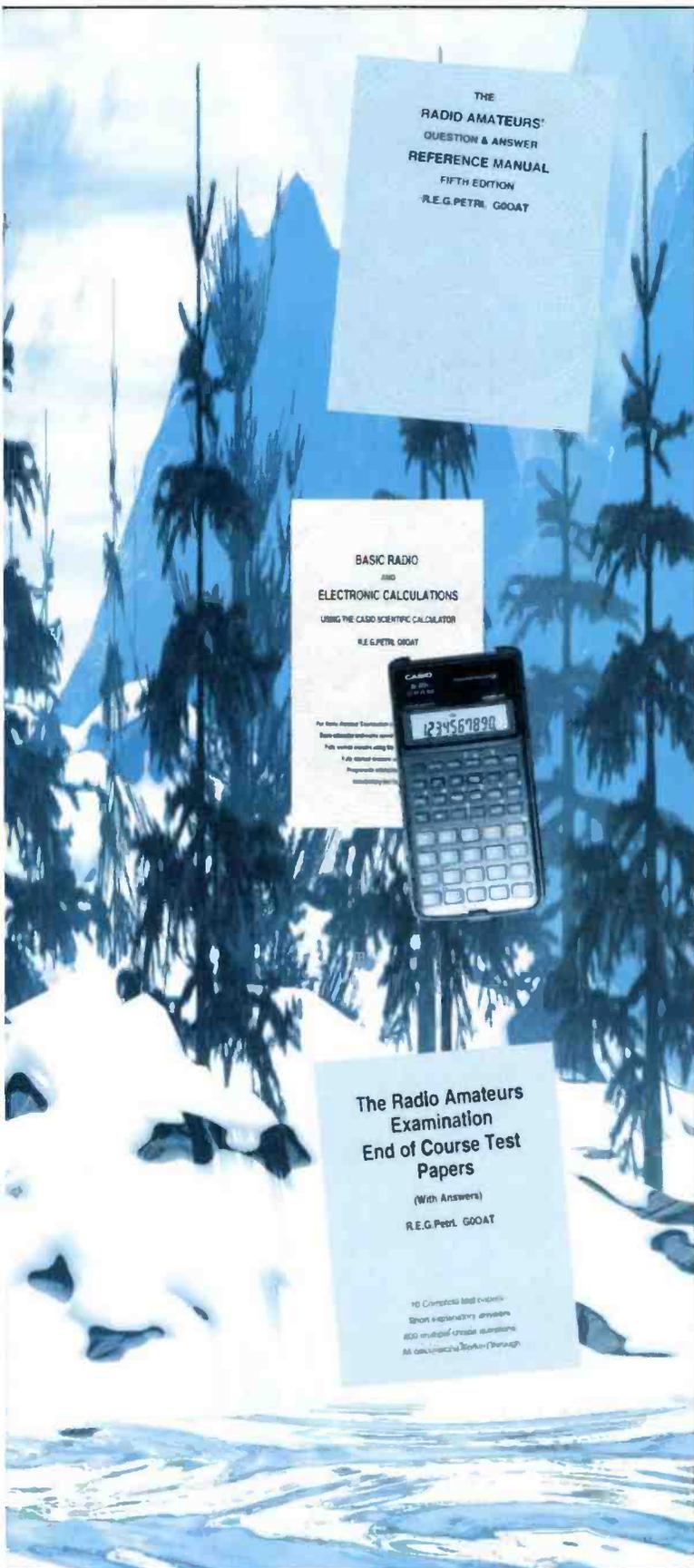
This spirally bound, photocopied style collection of newsletters contains a lot to interest 'crystal set' fan. Topics included are: The Lead Pencil Detector, Detector biasing, double-tuned crystal sets, FM Crystal sets?, Electrolytic detectors, the coherer revisited and a galena detector from Italy. **Interesting and informal technical reading** at **£6.50**.

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AND THE BOOK SHELF'S BARE!



If you're thinking about or in the process of studying for the Radio Amateurs' Examination then you'd be well advised to add the following to your last minute Christmas list!

The Radio Amateurs' Question & Answer Reference Manual (5th Edition)
Written & Published by Ray Petri G00AT

Ray Petri's book is now so long established it has become a 'minor classic'. This 'heavyweight' paper-backed textbook is packed throughout with theory, RAE questions, the background information and answers.

In effect, Ray's book provides a comprehensive course. Many RAE course instructors use his book as the course textbook and it's just as useful for the student working alone. **Highly recommended at £13.95.**

Basic Radio & Electronic Calculations - Using The Casio Scientific Calculator
Written & Published by Ray Petri G00AT

This book, unique in its approach, is proof that mathematics can be fun! Ray Petri undertook a very difficult task when he decided to write this book, but his hard work has produced an extremely useful handbook and electronics textbook.

Anyone contemplating buying the book should also consider buying the Casio FX-115s calculator too, as together they provide a powerful working tool. The author carefully leads the reader through the techniques involved in using the mathematics and provides the information on the necessary keystrokes for the scientific calculator.

Packed with worked problems and answers, this book could help many people overcome a completely unnecessary fear of mathematics and clearly demonstrate that maths is just another useful item in the 'toolbox'. **Very highly recommended.**

Basic Radio & Electronic Calculations costs **£13.95** and we can also supply the **FX-115s calculator** for **£13.25** if required.

The Radio Amateurs Examination - End Of Course Test Papers (With Answers)
Ray Petri G00AT

Ray Petri's books have become well known over the last few years and many RAE students have successfully used his numerous books to help them through the course. Ray, busy as ever, has now produced a natural 'follow-up' with this new book - which as the title suggests is a collection of test papers with answers and in doing so he's broken new ground in the size (A4) and style of presentation.

Anyone undertaking the RAE will find the book to be helpful - particularly because of Ray Petri's detailed attention to 'working through' the calculations. The short answers are extremely useful and in themselves act as a useful memory aid.

As usual this publication is to Ray Petri's high standards and in the new format is easier to hold and use comfortable. **Highly Recommended at £13.95.**

An Extremely Impressive Transceiver!

By Richard Newton GORSN



Richard Newton GORSN has had the latest offering from Kenwood in the palm of his hand. Read on to find out exactly what he thinks of it and whether it really is the successor to the TH-79E.

KENWOOD

The TH-G71E is the new hand-held dual-band transceiver from the Kenwood stables. It has been hailed as the successor to the TH-79E. The TH-G71E covers the 144-146 and 430-439MHz amateur bands and is supplied with a PB38 battery pack, a charger, belt hook, helical antenna, hand strap and instruction manual.

The instruction manual is up to the high standard I would expect of Kenwood. It is written in good English and has lots of diagrams and examples.

The charger I was supplied with the review model had 'shaver type' prongs and was of the type that the whole unit plugs into the wall for mainland Europe. But the UK model will have the required 13A plug fitted.

The PB38 battery pack is of the 6V 650mAh type which gives 2.5W out on high power on v.h.f. and 2.2W out on high power on u.h.f. It would appear from reading the manual that some markets have this radio supplied with the PB39 9.6V600mAh battery pack, this would give 5W out on high power on both bands. Never mind, at least ours lasts longer! The TH-G71E will give an impressive 6W (v.h.f.) and 5.5W (u.h.f.) out on high power when supplied with 13.8V.

The TH-G71E transceiver is small, it fits nicely into a palm and is of a good operating size. It is a very good-looking package and its ergonomic design is excellent.

The main control on the unit is a **dual rotary control** on the top of the radio. The **inner knob** clicks around and tunes the v.f.o. range in that mode and the memories when in that mode. This also gives access to the different user programmable settings such as Auto Power Off, Scan Resume Method and Variable Offset to mention but a few!

The **outer ring** on the rotary control is the volume control. This is a fully variable control having a smooth, continuous action.

Easy To Use

The TH-G71E is easy to use, the controls are large and well labelled.

The unit has a very good back light that really **does** back light the keypad as well as the display.

The belt clip on the transceiver is a good idea, it's made from plastic and slips into a clip on the rear of the radio. You can unclip it and slide it off without having to worry about fixing screws.

The only problem I had was every time I pulled the radio off my belt - the belt clip came off too and fell to the floor. In practice I found that you had to ease the clip off your belt.

The TH-G71E can be configured by the user and has all the Functions you would expect to see on a modern hand-held radio. These included full CTCSS encode and decode and DTMF. The user can either take full advantage of being able to personalise the radio using the set up menu or you can just simply use it as factory-configured.

Kenwood's TH-G71E has 200 memories, these are easily programmed and can contain all the normal offsets and other information. They can be given an Alpha-Numeric 'name'.

Despite being a dual-band transceiver the TH-G71E only displays one band at a time. Both the TH-79E and its predecessor the TH-78E have a proper dual v.f.o. and monitor both bands at the same time.

I own a TH-78E and my father-in-law **Terry G7VJJ** owns a TH-79E. And, we both find the dual v.f.o. very useful as both can be used independently, also you can scan the v.h.f. bands while keeping a constant watch, on the local u.h.f. 'chat' frequency. The TH-G71E scans the memories on both bands together.

A colleague of mine **Bob G6DZM** was once the owner of a Standard C500 which was one of the very first dual-band hand-helds. This, like the TH-G71E, could only



monitor one band at a time.

Bob tells me that he found this 'one band' monitoring very restricting. Although he could scan memories on both bands together, once a busy u.h.f. memory had been found you could no longer listen for a call on the v.h.f. bands.

Bob effectively replaced his C500 with a TH-78E. (The grandparent to the new TH-G71E). I wonder why Kenwood have decided to revert to this style of monitoring one v.f.o. at a time?

Channel Spacing

The thing on everyone's lips at the moment is 12.5kHz channel spacing. So, not having any expensive test equipment I had to think of a way in which I could test the TH-G71E.

I live about 6.4km away from the local 145MHz repeater, **GB3SC**. So, I tuned to the repeater frequency and was pleased to receive GB3SC as a good 5 and 7, this is an usually good signal for my location.

I then tuned 12.5kHz up and there was nothing, alas 12.5kHz

Continued on page 55.

TH-G71E Dual-Band Hand-Held



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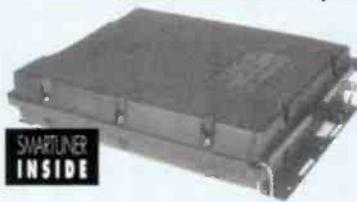
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73 from Dave G4KQH, Technical Manager.

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KENWOOD

TH-G71E Dual-Band Hand-Held

Continued from page 52.

down I could still plainly hear the conversation in progress on 'SC albeit slightly distorted and very much reduced in signal strength. Some tests with my TH-78E at home on Extra Low power using a small helical antenna seemed to support this finding.

All my tests were achieved by using the supplied helical antenna that had been attached to the unit when I picked it up from the PW offices. I wanted to undo the antenna to attach an external antenna, intending to check the radio on my base station antenna and in the car on a mobile whip. To my utter amazement I found that in a hole (that was large enough to have a BNC fitting) there was an SMA antenna fitting.

I have seen the type of SMA fitting used on the set, also used on some mobile telephones, it resembles a TNC fitting but is about half the diameter. This prevented me from doing any tests with any other antenna. I was therefore unable to do any direct comparisons with a TH-79E, which had been my intention.

I decided to contact my local Amateur Radio shop in Christchurch. They informed me that there was another hand-held already on the market with the same fitting. They also told me that they did not carry the adapter as a stock item but they were able to order one and that the cost would be about £5.

Not having placed an order for an antenna plug adapter and undeterred I decided to try talking to someone using the standard helical antenna supplied with the transceiver.

First QSO

My first QSO using the TH-G71E was almost a mistake. I was listening around and heard a 'CQ' call on 145.500MHz. This was **Frank G4JQW** from Alderney, an area of Poole - alas not the Island! Frank was

a very good signal with me so I returned his call.

I would not normally expect to hear such a good signal from Frank's area. It is not far away but the terrain does not normally allow a contact, especially when using a hand-held running just over 2W.

Frank was kind enough to give me a report. I was a good signal with him and the audio quality he said "Sounds very nice". I also had the opportunity to hear the transmitted audio and can confirm it was of the highest quality. The received audio from the transceiver's internal speaker is also excellent.

Next, I employed the help of **Steve G1YNY** for the hand-held to hand-held test. After a very pleasant Sunday lunch, Steve and his wife took my family for a walk around their neighbourhood while I sat in the warmth and comfort of Steve's front room in the name of science and writing a review!

Steve armed himself with his TH-78E and I with the TH-G71E. It was a hand-held to hand-held contact, and the TH-G71E worked very well indeed. Steve had no problems receiving me even on the Extra Low power setting of 50mW!

The TH-G71E proved itself to have an extremely impressive receiver. I wonder if that's why Kenwood are trying to discourage the use of an external antenna?

I drove past the local Pager 'nest' and the TH-G71E suffered no ill effects. The radio is sitting next to me now on top of the computer as I type, monitoring S20 and again it's suffering no ill effects whatsoever.

Critical Aspects

I know I have been critical about certain aspects of the Kenwood TH-G71E. However, these are mostly personal preferences that you, the reader, are either going to share or dismiss.

Manufacturer's Abridged Specifications

General

| | | |
|--|-----------------|--------------------|
| Frequency Range | 144 to 146MHz | 430 to 440MHz |
| Mode | F3E | |
| Usable temp range | -20°C to +60°C | |
| Rated Voltage | External Supply | 5.5 to 16V (13.8V) |
| Weight (with battery/belt hook and antenna) | Approx. | 330g |

Receiver

| | |
|----------------------------|-----------------------------------|
| Circuitry | Double conversion superheterodyne |
| 1st intermediate frequency | 38.3MHz |
| 2nd intermediate frequency | 450kHz |

After seeing a copy of GORSN's review Dave Wilkins G5HY of Kenwood Electronics UK sent us the following comments:

As far as the point raised about the NiCad battery was concerned I can confirm that, yes in some markets the radio is supplied as standard with a high-power NiCad. However, there is also a version available overseas with no NiCad or charger at all, just an empty dry-cell case! UK hand-held radios from all manufacturers are normally supplied as standard to the generally accepted UK level of specification, which is with a NiCad giving around 2.5W r.f. output and with a 'power cube' wall charger included in the basic price.

Secondly I do understand GORSN's comments about the way in which the two bands are accessed and the fact that the TH-78/79E models were more flexible, however the TH-G71E retails at £279 and the TH-79E cost £479! This is an incredible drop in price which far outweighs the actual reductions in the new radio's facilities and functions.

The reality is that the majority (although not all) customers of the major manufacturers have moved away from paying high prices for very high specification hand-helds towards simpler, cheaper radios so we must react accordingly and produce what people actually want to buy.

Finally, the TH-G71E does indeed have a new form of antenna socket, which is of a much higher standard than the old BNC type and already quite common on professional radios. This was used to improve the long term reliability of the connection and certainly not to "discourage the use of an external antenna".

Since as you mentioned in the review, adapters are readily available from several sources. You will probably know that BNC fittings suffer from wear of pins - as these pins are on the radio rather than the antenna, replacement is expensive and we feel that the advantages of the new connector are well worthwhile.

I am glad that Richard seemed to enjoy his time with the TH-G71E, even when it was up against the family's previous Kenwood models!

Dave Wilkins G5HY

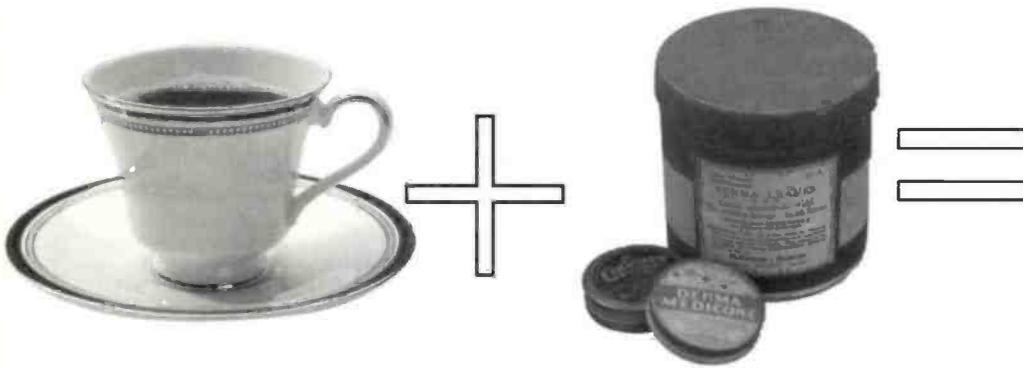
The fact remains that the Kenwood TH-G71E is a well built, professional looking radio packed full of excellent features and in my opinion does its job as a hand-held radio extremely well indeed.

My thanks go to **Kenwood Electronics UK Ltd. of Kenwood House, Dwight Road, Watford, Herts WD1 8EB. Tel: (01923) 816444, FAX: (01923) 212477** for the loan of the TH-G71E for review, which is available from all Kenwood approved dealers for the recommended price of £279.95.

PW



CANNY CAVITIES



By Harry Lythall G4VVJ

Harry Lythall G4VVJ shows you how to make practical resonant cavity filter. But first you need to get the 'cavity' - so make that coffee, drink up and empty that 'canny can'!

A few years ago I found myself living in close proximity to another Radio Amateur who was also active on the 144MHz band. If I went on air when he was on, I suffered from his r.f. field (and I'm sure he suffered from mine).

I eventually hit upon the idea of using a narrow-band resonant cavity filter to solve the problem. The filter allowed me to operate at the opposite end of the 144MHz band without any problems, and the interference and receiver de-sensing were effectively eliminated.

The filter is a tuned circuit made in a metal container, with loops to couple radio frequency energy with very low losses, see Fig. 1. The low losses involved, and the way the tuned circuit is made, results in a very high Q and thus a very narrow bandwidth.

Since $\text{Bandwidth} = F/Q$, as the Q increases, the bandwidth decreases. The bandwidth of a resonant cavity is therefore much more narrow than that of conventional inductor/capacitor tuned circuits due to the higher Q that can be obtained.

My workshop facilities were limited and funds short, so a large (1.5kg) coffee tin was pressed into service to make the cavity filter. The whole project was thrown together in just over an hour, but, the availability of better tools this time could be dramatically reduced.

A two-port resonant cavity filter placed in the antenna circuit of a receiver, Fig. 2, will effectively pass only the narrow band of frequencies to which it is tuned. A single-port cavity may also be placed in the receiver antenna lead, Fig. 3, in such a manner that it rejects (by absorbing) a narrow band of r.f. signals.

Absorption will only occur at the frequency to which the cavity is tuned. By a combination of band-pass and band-stop filters a nearby transmitter can effectively be 'switched off'.

The band-pass filter can only be used over a limited frequency range without adjustment, so they are normally only found on fixed frequency stations such as repeaters.

The repeater system would use several cavity filters to allow

transmitter power to reach the antenna, without desensing the receiver. The layout of Fig. 4 shows the way duplex operation is possible using a single antenna.

A resonant cavity band-pass filter (at say 100MHz) with a Q of 1000 would have a bandwidth of 100kHz. Cascading two or more filters would give an even narrower bandwidth.

Some Dimensions

Some dimensions for the construction of amateur band basic cavity filters are given in Table 1. From the drawing of Fig. 1, you'll see the construction is self explanatory, but I'll give assembly tips as I describe each component.

For the centre conductor almost any household plumbing copper pipe or tubing is ideal. I've found tubing with 15-37mm diameters in the local d.i.y. outlets.

The copper tube should, ideally, have an outside diameter of 15-20% of the inside diameter of the metal container used. The smaller diameter pipes are easier to work with, but the overall performance of the filter may suffer a little if it is too small.

The length of the pipe (ideally) should be about 80-90% of the $\lambda/4$ (free-space) - at the desired frequency. But this length may be reduced if the tuning capacitance is increased. Also, at less than 80% of $\lambda/4$ there may be a degradation of the overall Q of the cavity.

As an example let's design a stub for 400MHz (it's easier!). The free space wavelength at 400MHz is 750mm. So, $\lambda/4$ is therefore 187.5mm. Now, take 85% of this value, for the copper tube, which is about 160mm in length.

The frequency coverage of a

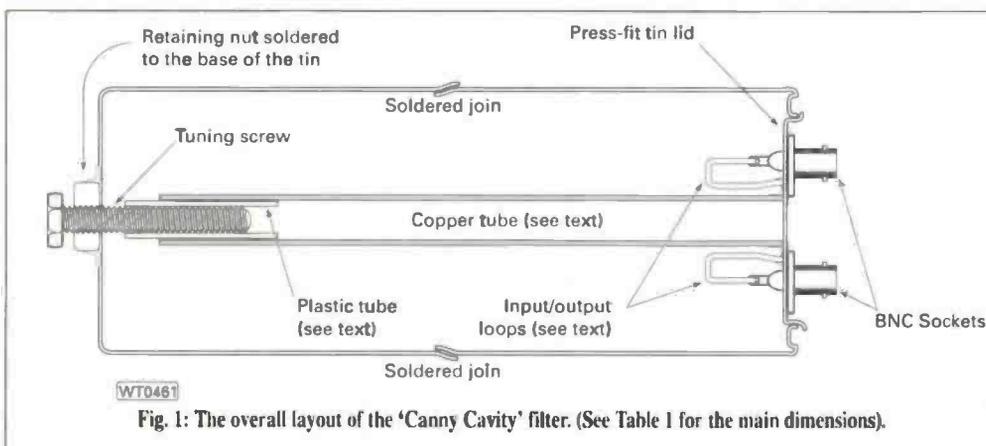


Fig. 1: The overall layout of the 'Canny Cavity' filter. (See Table 1 for the main dimensions).

cavity with this length of copper tube will be about 220 to 420MHz; the upper frequency limit being determined by the length of copper tube. The lower frequency limit is governed by the maximum tuning capacitance provided by the tuning screw.

Large Tins

You might have to find some (very) large tins for use at lower v.h.f. Some commercially available cavity filters even use aluminium beer-barrels!

I have successfully used large tins from coffee or other food products. Whatever the source of the tin, it's most important that the lid fits tightly, forming a good seal, otherwise the overall performance of the filter will suffer.

The container must be a little longer than the copper tube, but this can be made up using two (or more) tins soldered together. Prior to soldering, remove the top from one tin and the base of the second (and subsequent) tin.

Then, using an abrasive, carefully clean the new edges well. The tins may be accurately positioned using masking tape which is then removed as the junction is progressively soldered.

Solder and other metal spikes must be avoided. Soldering the copper tube to the cavity lid may be performed by cleaning and pre-tinning both parts well using plenty of solder. The two components may then be mated together whilst the solder is molten, with the copper tube in a vertical position.

Heating is best achieved with a blow-torch, but a gas-cooker has always worked well for me. Allow the joint to cool naturally without movement and a nice uniform joint should be the result. A final cleaning with wire-wool will remove all traces of flux and any other minor irregularities.

Adjustment Screw

The adjustment screw must be long enough to reach about 20% of the length of the copper tube. Make the hole in the base of the tin before soldering the retaining nut, but take care not to get any solder on the threads of the nut.

For frequencies below 100MHz, the tuning may be carried out with a variable capacitor in order to add the greater capacitance required. The capacitor is connected between the end of the copper pipe and the bottom inside surface of the tin.

Single hole fixing trimmer capacitors are available which will retain the container's r.f. seal. Using this method I've made a small treacle

tin to operate at 144MHz with a very short copper inductor. But the Q wasn't as good as a full sized cavity.

Plastic Tube

The plastic tube has two uses. It helps prevent the copper tube moving about which would alter the resonant frequency of the filter. (The plastic tube must be a tight fit inside the copper tube).

For the plastic tube's other use, it must also be a very slightly 'friction fit' on the adjustment screw. A tube which does not quite bind the adjustment screw thread may be touched on the inside with a soldering iron tip. This will raise small ridges which will bind in the screw threads, and which also aids frequency stability.

Dents in the side of the tin will have little effect upon the operating frequency of the filter, but the top and bottom of the tin must not be allowed to move. If the screw binds on the nut or plastic tube, then the pressure distorts the tin which modifies the tuning point.

Warning: do not use black plastic plumbing pipes as some types can be quite conductive at radio frequencies. The inadvertent use of conductive plastic would introduce massive losses that would render the cavity useless.

Loops In-Out

For input and output purposes, small coupling loops are used. These loops are formed from 2mm (16s.w.g.) or thicker copper wire (preferably silver plated). The size of the loop is fairly important, but not critical.

Small loops will increase the insertion loss of the cavity filter. Loops that are too big will lower the Q of the filter, as well as allowing the filter frequency to be 'pulled' by an external circuit.

Above 200MHz the loops will normally be about about 15% of the length of the copper tube, and about 7.5% of the width. So at 400MHz this is about 25x12mm. Both loops must be identical if the filter input and output impedances are to be equal. The loops should be positioned 2-3mm from the copper tube resonator as shown.

Table 1, gives the important dimensions of the copper tube centre conductor and the input/output loop sizes. As I've said before the dimensions may vary a little without altering the overall qualities of the filter very much. But, below 50MHz some lengths become a little too large to be practical.

Centre Frequency

To carry out the alignment of the centre frequency of the filters, couple a low power transmitter, of the correct frequency, through the filter to a power meter. Then adjust the frequency adjustment screw for maximum power. **But, be sure to use a low power as the filter will cause a very high reflected power until it is correctly aligned.**

Personally, I only construct two-port filters, even when used in a single port configuration. This allows alignment as for band-pass and band-stop (absorption) with the other port unterminated.

Insertion Loss

The filter, as described, will have an insertion loss of about 2dB, and a Q of several hundred. But both parameters may be improved with a little care and attention to detail. (The filter must be mechanically symmetrical with positioning and size of the various components).

Losses can be further reduced by silver plating all metal surfaces within the container. However, I have found this to be an unnecessary luxury; I have always achieved the required bandwidth without silver plating.

The cavity described is so cheap

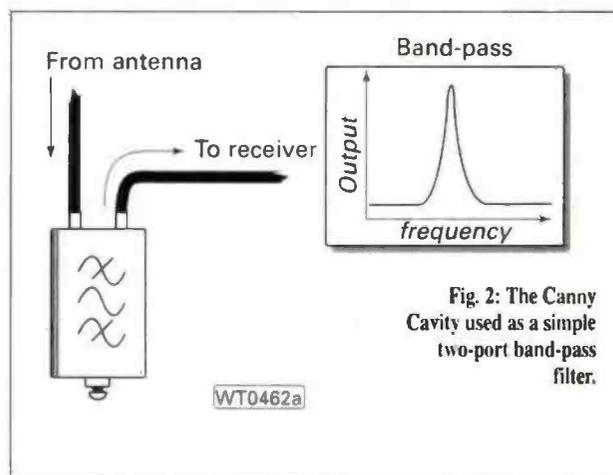


Fig. 2: The Canny Cavity used as a simple two-port band-pass filter.

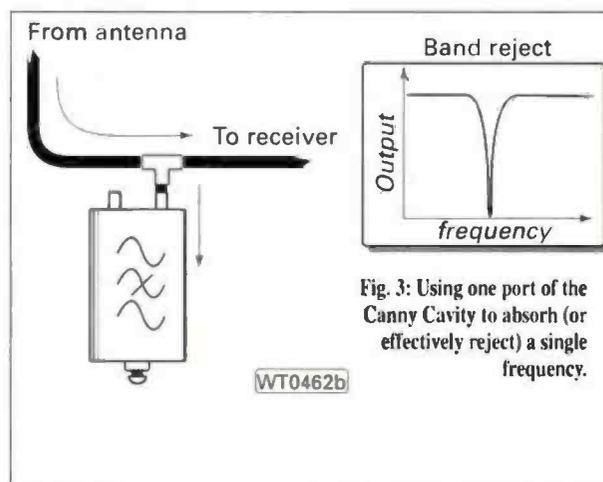


Fig. 3: Using one port of the Canny Cavity to absorb (or effectively reject) a single frequency.

and quick to construct. To obtain a filter Q factors of thousands, two or more cavities may be placed in series.

If you are going to construct a repeater, you may use all-copper or brass construction with internal silver plating. These steps will make the cavity more robust, as well as minimising losses, increasing the Q and aiding long-term stability.

Unusual Uses

There are some unusual uses for the project! For example: A diode detector on the output of the filter will recover a.m. signals. If the filter is tuned slightly off-frequency f.m. signals are detected due to 'slope detection'.

A simple audio frequency amplifier and speaker connected to the diode detector will reproduce sufficiently strong audio. This could form the basis of a simple a.m./f.m. transmitter monitor or even a local repeater monitor, if you should live sufficiently close to a repeater.

Do not try to fit an r.f. pre-amplifier inside the cavity unless you want to create an oscillator! But you can create a relatively stable signal on the v.h.f. and u.h.f. wavebands. There's plenty of metalwork to dissipate heat, so moderate powers

can be obtained without undue frequency drifting.

Narrow band frequency modulation can be applied by means of variable capacitance diode. No difficulty should be experienced getting an oscillator to oscillate within the cavity.

Galvanised Dustbin

I've also employed a galvanised steel dustbin and variable capacitor to obtain a filter for 28.05MHz. This enabled me to operate on the c.w. segment of 28MHz and eliminate interference from a close neighbour who was, I think, using a little more than the regulation 4W on Citizens Band!

In the case of impractical sizes, the copper tube inner may be much thinner and coiled into the space available. But I'm not going to go into that now...perhaps another article some time?

So go on then open up a tin or two and make yourself a 'Canny Cavity' filter. It's easier than you think!

PW

Table 1

| Frequency Band(MHz) | Inner length (mm) | Loop Size (mm) |
|---------------------|-------------------|----------------|
| 1200 - 1300 | 51 - 55 | 10 x 5 |
| 420 - 450 | 120 - 130 | 5 x 12 |
| 140 - 150 | 350 - 390 | 60 x 30 |
| 70 - 75 | 700 - 780 | 100 x 50 |
| 50 - 53 | 1500 | 120 x 60 |

Table 1: These are the various dimensions for the 50 to 1200MHz bands. See the text for how to calculate the dimensions for other frequencies.

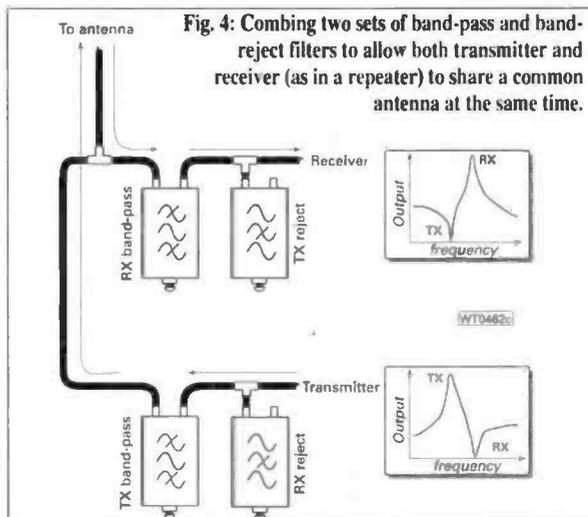


Fig. 4: Combing two sets of band-pass and band-reject filters to allow both transmitter and receiver (as in a repeater) to share a common antenna at the same time.

RADIO

Compiled by Zoë Crabb

1997/8

If you wish to have your Rally featured in Radio Diary, all you have to do is to put together as much information about the Rally as possible, ie. date, location, time, who to contact, etc., and send it to Zoë Crabb at the PW Editorial Office.

*Practical Wireless & SWM in attendance

December 14: The Leeds & District Xmas Radio & Computer Rally is to be held at the Pudsey Civic Centre (Dawsons Corner). All the usual traders will be there, there will also be a talk-in, a licensed bar and disabled facilities, etc. Further information from **John Mortimer** on (01943) 874650 (Bookings Manager), **Gordon Ryder** on 0113-255 0626 (Rally Manager) or from **Malcolm Robertson** on 0113-225 3379 (Club Secretary).

***December 14:** The Verulam Amateur Radio Club will hold its annual rally at the Watford Leisure Centre, Horseshoe Lane, Garston, Watford, Hertfordshire, from 1000 to 1600. The Leisure Centre is located off the A405 near junction 6 of the M1 and junction 21A of the M25. Attractions will include trade stands, Bring & Buy, grand raffle, cafe, licensed bar and free car parking. Morse tests will be available. For further details call (01923) 262180 or for trade information call (01923) 265572.

1998

January 18: The Oldham ARC Mobile Rally is to be held at the Queen Elizabeth Hall, Civic Centre, West Street, Oldham,

Lancashire. Doors open at 1100 (1030 for disabled visitors). The event features all the usual traders plus a Bring & Buy stall. Morse tests are available on demand and there is a talk-in on S22 via GB4ORC, commencing at 0730. Mobile Contact prize up to 1400. There will be refreshments and free parking available. (01706) 846143 or 0161-652 4164.

January 25: The Lancastrian Rally is to take place at the Lancaster University. Please note that this Rally is now under new management and will be run under the auspices of the Central Lancashire.

Amateur Radio Club. There will be the usual traders, Bring & Buy and ample parking space is available on the campus. Admission is £1.50 and should you require further information, contact **Jim GUGVA** on (01772) 621954.

February 1: The 13th South Essex Amateur Radio Society Radlo Rally will take place at the Paddocks, Long Road, Canvey Island, Essex. This is one of the biggest and best rallies in Essex, (the Paddocks is situated at the end of the A130). Doors open at 1030. Features include amateur radio, computer and electronic component exhibitors, a Bring & Buy, RSGB Morse testing on demand (two passport photos required), home-made refreshments, free car parking with space outside main doors for any disabled visitors. Admission is £1. **David G4UVJ** on (01268) 697978.

February 1: The Harwell Amateur Radio Society will be holding its second indoor Radio & Computing Rally at the Harwell International Business Centre, 1 mile west of the A34, between Oxford and Newbury. Talk-in on S22. Doors open at 1030 (1015 for any disabled visitors). There will be trade stands, special interest groups, Bring & Buy, craft exhibitors, bar and refreshments and

ample car parking with spaces for disabled visitors. Admission is £1, children free. **Arthur G0KOC** on (01235) 815399.

February 8: The Kidderminster Radio & Electronics Fair is taking place at the Kidderminster College, Hoo Road, Kidderminster, Worcs. Doors open 1000 to 1500 and admission is £1.50. There will be all the usual traders, plus a Bring & Buy, Flea Market, Food and Drinks and a talk-in on 145.550MHz. **John G8MGK** on (01527) 545823 or mobile on (0860) 147954 or **Tony G4ALT** on (01562) 69652 or mobile on (0860) 902165.

February 15: Northern Cross Rally to be held at Thomas Park Athletics Stadium, Wakefield, South Yorkshire, just out of town on the Horbury Road. Easy access from M1 junctions 39 & 40. The event is well signposted and talk-in will be on 144 and 430MHz. Doors open at 1100 (1030 for disabled visitors and Bring & Buy). Details from **Peter G0BQB** on (01924) 379680 or mobile on (0976) 834938. Internet on rally@waveg.demon.co.uk Web page at <http://www.waveg.demon.co.uk/rally/>

***March 7/8:** The London Amateur Radio & Computer Show will be held at Lee Valley Leisure Centre, Picketts Lock Lane, Edmonton, London, N9. Doors open 10am to 5pm each day. There will be trade stands with over 100 exhibitors, a Bring & Buy, RSGB committee and book stands, on-demand Morse tests, talk-in on 2m and 70cm, Special Interest Groups, disabled facilities, bars, catering, ample free parking and lectures. Adults £3, pensioners/under 14s, £2. (01923) 893929.

March 8: The Wythall Radto Club are holding their 13th Annual Radio Club Rally at Wythall Park, Silver Street, Wythall, near Birmingham on the A435, just two miles from junction 3 of the M42. Doors open from 10am to 4pm and admission is just £1. There will be the usual traders in three halls and a large marquee, bar and refreshment facilities on site plus a Bring & Buy stand. Talk-in on S22. Contact **Chris G0EYO** on 0121-246 7267 evenings and weekends,

FAX on 0121-247 7268 or E-mail at gleyo@compuserve.com

March 15: The 'Norbreck' Amateur Radio, Electronics and Computing Exhibition by the Northern Amateur Radio Societies Association is to be held at Norbreck Castle Hotel, Exhibition Centre, Queens Promenade, North Shore, Blackpool. Doors open at 1100 (disabled access from 1045). There will be over 100 trade stands, club stands, Bring & Buy, RSGB stand and book stall, construction competition, amateur computer stands and free car parking at the hotel, bus from extra car park. There is also wheelchair access to all the exhibitor stands. Radio talk-in on S22. Admission is £2. OAPs £1 and under 14s free. **Peter Denton G6CGF** on 0151-630 5790.

March 29: The Pontefract & District Amateur Radio Society Component Fair is to be held at Carlton High School. The venue is 300 yards from the Carlton Community Centre. Car parking will be at the school as usual. The venue will be signposted from the major roads. There will be a talk-in on 2m. For unlicensed visitors, **Nigel Ferguson G0BPK** can be contacted 0900 to 1400 on (mobile) (0411) 420409 for directions. Doors to the fair open at 1100 (disabled visitors will be admitted at 1030). Once again all traders will be on the ground floor. The bar and tea room (tea room open for early visitors) will be on the first floor. Morse tests will be conducted. Admission will be by prize programme. Contact **Nigel G0BPK** on (01977) 616935 in the evening or on (01977) 606345 during the day, or E-mail at g0bpk@iol.com Traders please contact **Colin G0NQE** on (01977) 677006.

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

The Editorial staff of PW cannot be held responsible for information on Rallies, as this is supplied by the organisers and is published in good faith as a service to readers. If you have any queries about a particular event, please contact the organisers direct. Editor

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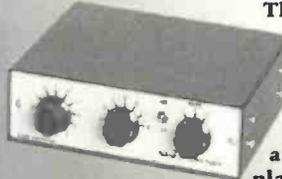
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| ECC95 | 12.00 | PL36 | 3.00 | 6BR7 | 4.00 | 12B7A | 7.00 |
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| EF40 | 4.00 | UCL83 | 2.00 | 6GK6 | 4.00 | 5763 | 6.00 |
| EF86 | 10.00 | UF89 | 4.00 | 6J5G | 6.00 | 5814A | 5.00 |
| EF91 | 2.00 | UL41 | 12.00 | 6J5M | 4.00 | 5842 | 12.00 |
| EF193/4 | 2.00 | UL84 | 3.00 | 6J7 | 3.00 | 6072A | 6.00 |
| EL33 | 15.00 | UY41 | 4.00 | 6J85A | 27.50 | 6080 | 6.00 |
| EL34 | 8.00 | UY85 | 2.00 | 6J85C | 27.50 | 614FB | 15.00 |
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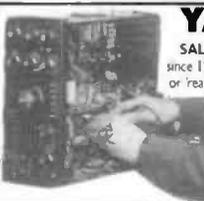
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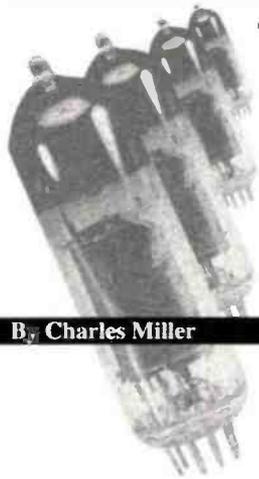
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W Valve & Vintage

B. Charles Miller

The warm smell of valved radios, wax polish, and the presence of shiny cabinets and Ebonite panels tells us it's Charles Miller's turn to look after PW vintage 'shop'. And this month Charles continues the fascinating story of Doctor Loewe's special valves.

Good day to you my friends and 'customers' and welcome to 'Valve & Vintage'! Last time we met in the 'shop' I looked at Dr. Loewe's fascinating multiple valves of the late 1920s. This time I'm delving a little deeper!

Although the 'multiple valves' might not have been such a runaway success as he'd hoped. However, the good doctor persisted and carried on making further examples right through the 1930s.

The later efforts had 4V heaters for use in mains powered sets. But, initially at least, they weren't otherwise very different from his originals.

In three valve types he repeated the idea of having three triodes with all the coupling components built in. But after this he began quietly to drop the idea.

Dr. Loewe's next effort, a double tetrode, had only a grid feed condenser to one section. This had to be connected up externally, plus a decoupling condenser from the anode of the other section to its cathode.

For his next trick, Dr. Loewe produced a type with two tetrodes and a diode, for use in superhet receivers. They contained only the decoupling condenser for one of the tetrode's anode.

The good Doctor attained the pinnacle of his multiple-valve career - and also ended it - with a double-pentode-triode type. This was again for use in superhets and contained no internal components at all.

The Loewe Company itself used the valves in some very stylish receivers. But no-one else was particularly interested and by the end of the 1930s Loewe multiple valves were more or less a memory.

Would the lack of interest mean the end of the multiple valve as we knew it? Not likely! This was because the principle (in modified form) had now been taken up by most other valve manufacturers.

Back To 1927

To find out the 'whys and wherefores' I'll have first to turn the clock back to 1927 and the introduction of the screen grid valve. And as I mentioned in an earlier episode, prior to this the only way you could amplify high frequency radio signals was to use triodes, which were unstable and gave only low gain.

However, Edwin A. Armstrong had found a way around the instability with his then new-fangled superhet. Here most

of the amplification was carried out at the fairly low frequencies more suited to triodes, but even then the stage gain per valve barely attained double figures.

To obtain anything like a decent performance those early superhets used anything up to eight triodes, which put them way out of the reach of the average listener. Not only that, they were tricky to operate and likely to cause interference with neighbouring sets.

The arrival of the highly sensitive screen grid, with its stage gain of 500 or more, made possible simple, stable three or four-valvers. These could easily outperform the superhets and thus knocked them out virtually overnight.

Five years on, new factors had arisen in the broadcasting scene which reversed the situation and brought back the

users were hard-put to distinguish between the services.

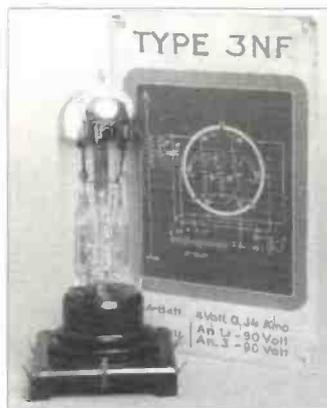
There had also been an enormous increase of broadcasting stations (many of them high-powered) in Europe as a whole. This when combined with the Regional scheme had created a situation where high selectivity in a receiver had suddenly become essential.

The only way to achieve higher selectivity was to increase the number of tuned circuits in a receiver, which could most easily (and most controllably) be obtained in the superhet. Not that this saw off the screen grid valve though! For the moment it was still the only effective means of handling high frequencies and it was pressed into service to do work not previously expected of it.

In a superhet all incoming radio frequencies have to be converted to a single intermediate frequency. This was achieved by 'beating' (heterodyning or 'mixing') them with frequencies produced by a local oscillator.

Set designers found that the screen grid valve could be persuaded to operate as a self-oscillating frequency-changer. And although it was far from ideal, it proved sufficiently effective to allow them to put superhets into production and into the shops.

No one was kidding themselves, however, that using a screen-grid valve could be anything more than a temporary solution. An alternative method was to use a separate triode as local oscillator with a screen grid valve as mixer, so why not incorporate the two into one 'bottle'? But in fact, something better came about!



Charles Miller says Doctor Loewe's 'multiple valves' really started something!

Big Defect

Ever since it had been introduced, set designers had known that the screen grid valve, for all its good performance, did have a big defect. It showed up when the anode voltage moved outside certain limits (up or down) so that some of the electrons drawn to it travelled too fast for safety; in fact some of them bounced right back again and hit the screen grid.

The effect is called 'secondary emission' and the screen grid objects to the mis-treatment and shows its displeasure by drawing excess high tension (h.t.) current. This in turn upsets the anode and causes it promptly to go 'on strike' and refuse to draw any current at all! The result? - no sound from the set.

To get over the secondary emission problem another grid was added between

superhet. This time they came to stay.

For a start, the BBC had brought in a new scheme which replaced the previous low power local stations with a smaller chain of high-power 'twin-wave' stations, each of which broadcast both a 'Regional' and 'National' programme from two separate transmitters working on different wavelengths.

Poor Selectivity

Although the 'Regional' and 'National' wavelengths were as widely spaced (frequency-wise) as possible, old-fashioned sets with poor selectivity...suffered. Their ability or otherwise to tune in a required station and reject others on adjacent frequencies - often left much to be desired and the

the screen grid and the anode. This was designed to act as a shield between them and to suppress the secondary emission electrodes by bouncing them back whence they came.

By one of those occasional strokes of genius which illuminated the valve scene this new grid was given the title the 'suppressor grid'. Following on the usual method of borrowing from the Greek for numbering the total of electrodes in a valve, this new type with five was called the pentode.

You might not think that the term pentode could cause dissent. But Mullard, which introduced the pentode in 1929, considered it had a monopoly of the name!

Old habits die hard, and once again the law courts witnessed high-powered - and highly paid - lawyers arguing the issue in front of a judge. He must have wondered what all the fuss was about!

Meanwhile, other valve manufacturers couldn't make pentodes - they could only make five electrode valves. After about three years of this the word went forth that anyone could make a pentode.

How much all the nonsense cost Mullard is a matter of guesswork. But it's noticeable that Mullard's later introduction of six electrode (hexode), seven electrode (heptode) and even eight electrode (octode) valves did not prompt any more legal actions.

Another Improvement

Whilst all the 'in fighting' was going on yet another improvement was being made to both the screen grid and - (er ... mustn't use the word pentode!) - five electrode valves.

The sensitivity of the screen grid sometimes was a mixed blessing. It was fine when the listener wanted to hear weak, far-off stations but it could be a problem on 'locals' because it was very difficult to control its gain.

The amount of negative grid bias could be increased a little to make a tiny amount of difference but beyond a certain well-defined point the anode current cut off altogether, again silencing the set. Touchy things, these screen grids!

Eventually it was discovered that if the control grid was wound, not nice and symmetrically but a bit 'higgledy-piggledy' it would react sensibly to changes in negative bias by varying the amplification factor of the valve in sympathy.

Again the Greeks had a word for it, the amplification factor that is,

which was only one letter, 'mu'. Not surprisingly valves with the new type of control grid were called variable-mu types. With the variable mu types it became possible for the first time to have really effective gain controls in domestic receivers.

Pentodes, too, could be made to have variable-mu characteristics and its superiority over the screen-grid led to the first real frequency-changer valve. This was made by Mazda, consisting of a triode and a pentode in one envelope. Called the AC/TP (guess why?), this valve needed more electrode connections than any used so far and a special nine-pin base plus top-cap was developed for it.

Once introduced the AC/TP was an immediate success. Other valve manufacturers hastened to emulate it or even to improve upon the idea.

The method of mixing the local oscillations with the incoming r.f. signals in the triode-pentode was to use common grid or cathode coupling. Neither of these ideas was entirely satisfactory, and a better method was to fit yet another grid in the mixer section, making it a hexode.

In practice the new 'injector' grid was coupled internally to the grid of the triode section and thus no external coupling was required. Oddly enough, with all the extra bits and pieces, the triode-hexode could be mounted on only a standard 7-pin base.

Revival Of Diode

The superhet also brought about the revival of the very first type of valve - the diode. The large amount of amplification possible in the new sets was simply too much for the usual triode grid leak or anode-bend detectors of the day to handle without the risk of distortion, so back came the faithful old diode.

Suitably dolled-up in early 1930s 'clothes', the diode was still basically the same as when Fleming had patented it 30 years before. It seemed a pity to have to devote an entire valve base just to so simple a device so Mullard decided to incorporate it into the same envelope as a screen grid valve.

Mullard made the one type of valve capable of i.f. amplification and detection. This, the SD4, was not a success because being a non-variable-mu type it was obsolete almost as soon as it appeared, but it had at least pointed the way forward.

High Sensitivity Problems

By now the high sensitivity of the

superhet had shown itself to be causing new problems. Receivers were now capable of bringing in a wide variety of stations of varying signal strength, and the listener could find themselves alternately straining their ears and then being blasted by sound as they tuned along the dial.

The notion of having automatic volume control (a.v.c.) to keep the sound output of the set reasonably constant whatever the strength of the station was not new. In fact it had been tried back in the mid 1920s but had failed because the valves available then simply were not suitable.

Now however, the variable-mu valves overcame the previous problems and set designers hastened to incorporate a.v.c. systems. In these a portion of the i.f. signal - which varied with the strength of the incoming signal - was rectified and turned into grid bias for the first two or three valves.

The a.v.c. system called for the services of another diode and the obvious answer seemed to be to put it and the detector diode together into one envelope. In the event, hardly had double-diodes started to appear when someone came up with an even better idea!

Since the normal practice was to follow the detector with a triode amplifier, why not bung the latter into the same 'bottle' as well? So the double-diode-triode was born, and it was a type that continued, with the triode-hexode, to be made right up until the end of the valve era. For a short while a triple-diode-triode was produced for more sophisticated a.v.c. systems but this fizzled out quite quickly.

Output Valves

Meanwhile, valve designers had been turning their attention to output valves types as well. The early pentodes, although capable of giving a good amount of sound output, were not particularly sensitive and needed to be preceded by an a.f. amplifier (usually the triode section of the double-diode-triode I've just mentioned).

The technical way of quoting the sensitivity of a valve is by using a mutual conductance figure. Simply speaking, this refers to the amount of change in milliamps of the anode current for a change of one volt in the grid bias, usually abbreviated to 'milliamps per volt' or just Ma/V.

A typical low-sensitivity output pentode such as the Mazda AC/Pen had an Ma/V figure of 2.5. Another expression of the period was to call

this a 'low slope' valve.

By the middle 1930s valve designers had been able to develop output pentodes with Ma/V figures as high as 10. Called 'high slope' valves, these were sensitive enough to be able to work straight from the output of a diode detector without the need for a triode in between.

The high slope types enabled valve makers, to produce double-diode-pentodes in which all the jobs, of detection, output and a.v.c. rectification could be carried out by one 'bottle'. This in turn made it possible to produce what were called 'short' superhets.

The 'short' sets which, apart from an h.t. rectifier, needed only three valves. These included a triode-pentode or triode-hexode frequency-changer, a pentode i.f. amplifier, and a double-diode-pentode detector cum output cum a.v.c. valve.

The idea was taken up enthusiastically by cost-conscious radio manufacturers and one in particular, Ultra Electric, made the short superhet its staple design for the next 20 years. Multiple valves were here to stay.

Something Wrong?

At this stage a new reader might be pardoned for thinking that there's something wrong here. If multiple valves meant that fewer were needed in receivers, weren't the valve makers cutting the ground from under their own feet?

Well...the reply I've got to say no! Those of you who have been following this little saga from its beginning will be aware that right from the start commercial advantage had driven valve research and manufacture forward and you may be sure that this underlying principle had not changed.

The profit margins on the valves the manufacturers did sell amply enabled them to live in the style to which they had become accustomed. And in my next epistle I'll turn the spotlight on the means used by manufacturers in the sacred cause of keeping up retail prices!

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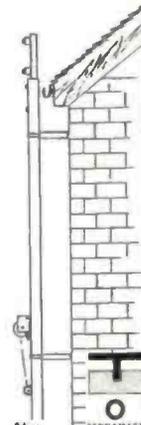
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HF FAR & WIDE

Leighton Smart GWOLBI presents his compilation of your h.f. band activities. And with conditions improving Leighton suggests you could 'miss the action' if you don't switch on!

October has been a month of surprises, both weather-wise, and radio-wise. We've been enjoying both fine weather, and some exceptional propagation conditions of late, with all h.f. bands indicating signs of vast improvement.

The bands above 21MHz have rapidly improved over the last few weeks. And even 28MHz has been providing contacts to the Americas and even Australia and Japan.

As winter approaches, the DX on the h.f. bands should be even more interesting for our readers. So let's hope that the cold weather doesn't affect your antennas!

I've received a telephone call this month asking for some help. It was from **Peter Wilkinson G0VXN** who requires QSL details of P29DC. Can any of our readers help Peter? He is QTHR, or can be called on Preston (01772) 679462.

Spratly Island

Some news now direct from **Don Field G3XTT/NK1G** regarding the Chiltern DX Club's expedition to the Spratly Islands next February. The Spratly Islands are a small group of islands situated between Vietnam and the Philippines, and they have been a favourite location for a number of DXpeditions, due to their remote nature and have also been claimed by Malaysia, Vietnam, China, the Philippines and other countries!

Nevertheless, the Chiltern lads (and lasses!) are a hardy and adventurous bunch. They plan to be operating from the islands between the 12th and 24th of February 1998.

The DXpedition team is expected to include G3NUG, G3OZF, G3SED, G3WGV, G3XTT, G4JVG, G0OPB, K5VT, VK2BEX, 9M2DM (G3NOM), and 9M2SU, making it a real multi-national event!

The callsign to be used will be 9M0C, and operating will be around the clock, to make the most of all band openings. The station location will be Layang Layang, also known as Swallow Reef, which has been developed by Malaysia as a sub-aqua diving resort.

Layang Layang is in Zone 26,

one of the rarest zones on the lower bands and therefore in great demand amongst I.f. enthusiasts. A Web page is available regarding the DXpedition at <http://members.aol.com/spratly98> with up-to-the-minute news.

All h.f. bands will be activated from Layang Layang, using s.s.b., c.w., and RTTY. The 50MHz band will also be used, so it should be an interesting one for the v.h.f. gang too!

It seems the Chiltern gang may be filling in their Spratly QSL cards for the next ten years! They are still looking for sponsorship and support, so for more information contact the Web page, or Don Field on 0118-972 4192. E-mail: g3xtt@lineone.net Good luck leveryone, and don't forget to listen out for my QRP will you!

Next comes news from **John Noble** of Rainham in Kent, who has sent in a QSL of the Pitcairn Island DXpedition in 1990, which he obtained from the wife of **Jim Russell G3OKQ**, while on holiday earlier this year.

Jim G3OKQ was responsible for the radio link at the Pitcairn expedition site. John also sent a photo of the rebuilding of the jetty and the accommodation at Bounty Bay, Fig. 1.

Pitcairn was the island where the mutineers from the ship fled after the mutiny on HMS *Bounty*. John, didn't get around to meeting Jim himself, as his wife Noreen couldn't drag G3OKQ away from his beloved radio!

Your Reports

Now it's time for your reports and I'm starting with the 1.8 and 3.5MHz bands. Firstly it's down to the Isle of Sheppey in Kent, and **Ted Trowell G2HKU**.

Ted admits to not being too active this last month. Nevertheless, he reports working EA9/DL2NBU (Ceuta and Mellila, North Africa) on both the 1.8 and 3.5MHz bands at around 0500UTC.

Yours truly GWOLBI has been trying his luck on 1.8MHz low power DXing in between 'ragchewing,' and notched up

contacts with EW7FC (Ukraine) at 2234, DL2MUV (Germany) at 2345, as well as OH6HJF (Finland) at 0021UTC using 10W c.w.

Meanwhile, keen QRP'er **Eric Masters G0KRT** in Worcester Park, Surrey, admits to concentrating on college work quite a bit of late. Despite this, he lists 5W QRP c.w. contacts on the 3.5MHz band with Novice station 2E0ANC, GW4LZP, and M0AJT, all in the RSGB's Slow Morse Contest, at around 2000UTC. Later came a contact with PA3FGI (Netherlands), all using an Index Labs QRP Plus 5W transceiver.

Last but certainly not least comes our very own Editor **Rob G3XFD** who took time off from working on *PW* to work an interesting QRP station on '80'. Rob tells me that he (working a QRO 3W on his Alinco DX-70) worked **Pat GW0VMR** on October 20 when that station in Wrexham was running 200mW!

Rob gave Pat a 579 report. And not quite believing his ears got him to repeat the transmitter power input details. "I've often worked and heard 'milliwatters' on 14MHz" says Rob "But GW0VMR is the lowest power station I've worked on 3.5MHz". So, well done Pat from Rob and myself - thing must be looking up on the h.f. bands now mustn't they?

Another station worked by G3XFD, on November 1st, was **ON5FF/A** (Oscar November Five Flanders Fields), this time operated by John near Ypres, not far from the infamous 1914-18 battlefields. The special commemorative callsign is always active on the run-up to the 11th day of the 11th month remembering the fallen both the First and Second World Wars.

The 7MHz Band

Talking of QRP, it has been the order of the day on the 7MHz band for **Sean Gilbert G4UCJ** of Milton Keynes, "Not" says Sean "through necessity...but for the sheer fun of it!"

Seems that Sean and his pals at the Milton Keynes Amateur Radio Club have been using powers as low as 45µW (that's 45

microwatts!), and claim to have made contact over a distance of 4.8km - equal to 150,000 miles per Watt of output power. Sean says their real aim is to break the million miles per Watt record (if there is one?). Anyway it seems that the MKARC are having fun experimenting, and that's what it's all about eh?

Sean's log shows 5W c.w. contacts on the 7MHz band with OH0BH (Aaland Island) at 0015, TA2/OK1MM (Turkey) at 2322, CO2OR (Cuba) at 2352, SV8/DL8KWS (Corfu Island) at 2352, K0RK (USA) at 0028, and TK/DL4FF (Corsica Island) at 0717.

Meanwhile, down in Skewen, West Glamorgan, **Carl Mason GW0VSW** has been building a new radio shack, and is awaiting a new h.f. antenna. For now, he's been using a half-sized G5RV dipole with the ends folded. "Looks like a vertical" jokes Carl. Well, as long as it works, mate!

Carl's 7MHz offering includes c.w. contacts with CO2PE (Cuba) at 0041, FG/F2HE (Guadeloupe) at 0052, LX/DL40CM (Luxembourg) at 0828. And finally he managed an s.s.b. contact with DX3LG (Greenland) at 2102UTC.

'Early Bird' Ted G2HKU reports two c.w. contacts on the band, with 9Y4/PA3EWP (Trinidad) and CL8VP (Cuba) both at around 0500UTC.

Meanwhile back in Milton Keynes, transmitting amateur and s.w.l. **Charlie Blake M0AIJ** says that he's been spending some time on the broadcast bands of late. However, his amateur band reception log for 7MHz shows reception of ZL2SQ (New Zealand) working lan G4YSM and 8P60A (Barbados) working F5VBY in France at 0608UTC.

Also logged were HJ1RRL (Colombia) working Kevin G0OMS at 0603, ZP6ZPA (Paraguay) in contact with 9A4XX in Croatia at 0507. Charlie then heard XE1IRO (Mexico) working F5VBY in France at 0622UTC.

The 14MHz Band

Up to '20' now, and the 14MHz band that has been attracting some

attention lately. It's been open in some cases right through the night to varying degrees, and has provided some interesting DX for our reporters.

In his monthly propagation report, Don McLean G3NOF of Yeovil says "Conditions have greatly improved on the h.f. bands with all open to north America - 14MHz has been open on the short path most days between 1400 and 1700 to Asia and Australia, with African countries heard around 1600.

"On 21MHz, this band has been providing the short path to Asia and Australia between 1300 and 1600. African and north American stations have been heard between 1500 and 1700. The 18MHz band has been open to Asia between 1000 and 1500 on the short path together with a few Australian and New Zealand stations coming through. And 24MHz has also been opening to Asia on the short path from around 0900, but the openings have been short with fading.

On 28MHz, African stations have been heard during the afternoons together with a few north and south American stations. However, there have been days when things have been patchy on all bands".

Don's long list of contacts on 14MHz includes s.s.b. contacts with AP2JZB

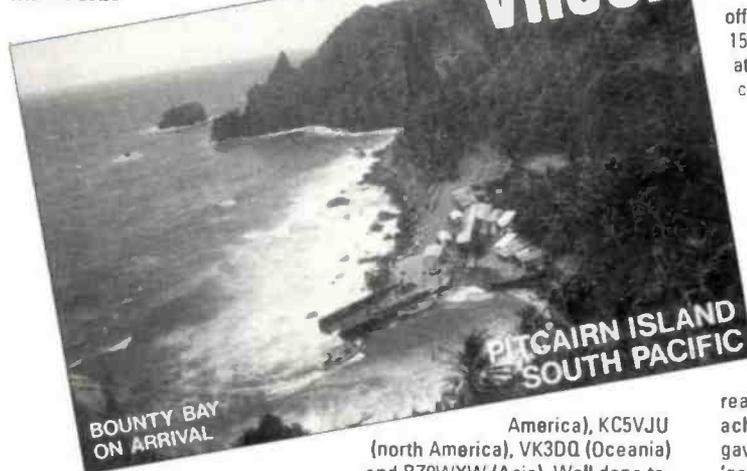


Fig. 1: Jim Russell G3OKO's QSL card used when operating as VR6JR from Pitcairn Island (see text).

(Pakistan) at 1548, VK4JT (Australia) at 1437, VU2PAI (India) at 1727. Also worked were HS1NGR (Thailand) at 1713, 9V10M (Singapore) at 1714, ZV8C (Brazil) at 2332, FR5HA (Reunion Island) at 1650 (QSL via 173 Evariste De Pasney, 97421, La Riviere, Reunion). Finally there was XU2C (Cambodia) at 1907 QSL via 7L1MFS, and 3V8BB

(Tunisia) at 1657UTC.

John Constance G0VGD of Aylesford in Kent has been having his own personal QRP DXpedition, to Dijon in France. He used a 10W Kenwood TS-120V and a single band 14MHz whip antenna.

John worked as F/G0VGD/M while on holiday and logged s.s.b. contacts with 9H1DE (Malta), R3/WA2NZA (Moscow, Russia) at 1900, VE3DBB (Canada) at 2050. Also logged were UA9XMC (Asiatic Russia) at 1730, GM5VG/P at 1740, TA0/DJ8QP (Turkey) at 1815 and Fred G0EHQ in Worcester at 1040, and Alan G4NBY at 1100UTC.

Sean G4UCJ has been 'QRPing' on 14MHz this month, as part of his low power experiments. His log shows 5W c.w. contacts with K8CW (USA) at 2218, UX1LL/AM 5km above Dneprov City at 1441, VE3LGG (Canada) at 2244, CU2BJ (Azores Islands) at 2147 and UK8IF (Uzbekistan) at 1813. Also worked were FY5YE (French Guyana) at 2046, VK3DQ (Australia) at 0713, and RZ9ZWXW (Asiatic Russia) at 0725UTC.

Incidentally, Sean has now worked QRP Worked All Continents on the 14MHz band - with an indoor antenna! His contacts are EA/DL2VBU (Africa), LY2PU (Europe), FY5YE (south

America), KC5VJU (north America), VK3DQ (Oceania) and RZ9ZWXW (Asia). Well done to you Sean! This is no mean feat with an indoor antenna! Just goes to show what can be done with the most basic of set ups.

The 18 & 21MHz Bands

Don G3NOF has been working lots of 'juicy DX' on the 18MHz band this time around by the look of his log. His s.s.b. contacts here include AP2KSD (Pakistan) at 1047, C56/JA10EM (Gambia) at 1747, DS5USH (People's Republic of North Korea) at 1116, J88CT (St.

Vincent Island) at 2145, KB2FB/DU7 (Philippines) at 1110, KH2/JP1UEE (Guam) at 1056, and SU3AM (Egypt) at 1558UTC (QSL via DL1FCM).

Meanwhile, up on the 21MHz band, Ted G2HKU sent out his c.w. to SV1CU/SV8 (Corfu) at 1500, and HF0POL (South Shetland Islands) came in at 1800UTC.

Charlie Blake M0AIJ has been spending a little more time on the transmitting side of late. His log for the 21MHz band includes contacts with TA2LZ (Turkey) at 1550, 5A1A (Libya) at 1141, SV8/G0IXC on Skopelos Island at 1347, EK4JJ (Armenia) at 1325 JW0M (Svalbard Island) at 1340, WB4GQA (USA) at 1431, and finally K0DK in Boulder, Colorado, at 1523. "I'm fast becoming a fan of 15 metres" says Charlie! (And why not eh!).

Finally for the 18 and 21MHz bands comes Eric G0KRT who had his first transatlantic QRP contact on s.s.b. with N4UH (USA) at 1435, as well as UT11A (Ukraine) at 1450UTC. Well done on the QRP 'phone contacts Eric!

The 28MHz Band

Finally, a very brief 'peep' at dear old 'Ten' now. First comes Ted G2HKU with a single c.w. contact with EA8AVN (Canary Islands, north Africa) at 1800.

Secondly there's Don G3NOF offering ZS6BXN (South Africa) at 1542, and FH5FB (Mayotte Island) at 1526. Signs of good things to come we hope!

Signing-Off

Well that wraps it up for this month, and now it's signing-off time. Thanks for all your information and your support. You'll be pleased to hear that I've been told over the air recently by a few newly licensed amateurs that reading your reports and achievements in 'HF Far & Wide' gave them the encouragement to 'go for it, pass the RAE and Morse Test, and to get on the air themselves. There can be no better recommendation than that I reckon!

Well done to all of you! Keep up the good work! Happy Christmas and New Year and as usual, reports and information (and photos!) by the 15th of each month to: **Leighton Smart GW0LBI, 33 Nant Gwyn, Trelewis, Mid-Glamorgan CF46 6DB, Wales. Tel: (01443) 710749, FAX: (01443) 710789 (9am - 6pm).**

PW Listening & Operating Watch List: All times in UTC

Charlie Blake M0AIJ listens: 0500 - 0700 on 7.061MHz s.s.b. with an NRD 525 receiver and sloping wire antenna.

Steve Locke GW0SGL operates: 1100-1500 most days around 14.180MHz s.s.b. using a Kenwood TS-940 and a TH7 beam antenna, normally beaming to other continents.

George Woods G3LPT (Suffolk) operates: an open Net on 29.570 f.m. every weekday morning except Monday at 0830.

Don McLean G3NOF operates: 1030 Saturdays on 3.685MHz on the ISWL Net or 1030 Sundays on the Yeovil ARC Net 3.665MHz s.s.b. using a Kenwood TS-950 & trapped dipole antenna.

John Wheeler G0IUE monitors: 28.5MHz s.s.b. every evening between 1700 and 2200 regardless of conditions using an Icom IC-706 and a 2-element TET tri-band beam antenna.

Mr F. Steele RS88763 monitors: 3.5 and 7MHz every day of the week at various hours. (Can I have details of your equipment, and specific listening times please, Mr Steele?)

Leighton Smart GW0LBI operates: Most Sundays (and some weekday evenings) at around 1000-1300 on 1.933 or 1.949MHz s.s.b. using a FT-747 transceiver and a long wire Marconi antenna.

Rob Mannion G3XFD listens and operates: (weekdays & weekends) 1800-1830 3.7MHz 100W s.s.b., & 3.530 and 3.560MHz QRP c.w. using an Alinco DX-70 transceiver and long wire antennas. Also at 2200-2300 on 3.702MHz or either 3.560, 7.025MHz (c.w.). Occasionally on 7.025MHz c.w. between 0100 - 0200.

Sean Gilbert G4UCJ operates: around 0700 to 1100 and 2100 to 0000 7 days a week on 14MHz and 7MHz c.w., using a FT-307 and Alinco DX70 Transceivers at 5/25W output and a G5RV dipole antenna in the loft space.

Terry Ibbitson G0VTI operates: each evening between 19.00 - 20.00 on or around 7.020MHz c.w., or 14.035MHz c.w. using a Ten-Tec Scout at 50W.

END

BITS & BYTES

Mike Richards G4WNC rounds-up the month's computer news but starts off with details of his new E-mail address.

Please note that I've just changed-over to British Telecom's (BT) Internet offering, so those of you that use E-mail and my Web site need to make a note of the new details. I will be running both the new and old sites in parallel for a while, but I expect the Pipex site to shut down in February.

I'm not changing because of a problem with Pipex, it's just I can get a better price from the BT offering. In fact the Pipex service has been really good with excellent network availability and good transfer speeds. Let's hope I don't regret the change!

Software Radio Library

With the dark winter nights now upon us it's the time of year that many amateurs retreat to the shack to do some serious hobbling. If you're into computing it's now that you want to play around with a few new programs and maybe try your hand at some of the more sophisticated aspects of our hobby.

While the Internet is a great source of information and software there are always problems with slow downloads, and with families complaining they can't use the telephone and the size of the 'phone bills themselves. Fortunately there is a solution where you can browse through hundreds of megabytes of radio related software and information with download speeds of 200kb/s and greater without any 'phone bills!

So, what's the answer? Simple, get your hands on the latest **Public Domain and Shareware Library (PDSL) Ham Radio Library CD-ROM!** The latest release features over 4000 programs and files amounting to more than 620Mb of information - this should last you until the spring comes!

In fact, there's so much information it's a virtual encyclopaedia of radio. To make sure the disk is accessible by as many systems as possible the main interface uses a DOS based program.

The use of DOS means that you should be able to access the CD-ROM with the most basic of systems. This is great because lots of the software on the disk has fairly modest system requirements so you really can make good use of the CD-ROM even if you don't have the latest all singing and dancing Pentium with elephantine memory capacity!

Moving around the main DOS menu

proved to be very easy and the function of all the controls were self evident. To start with you are presented with the high level directory structure.

Digging down to the lower levels was simply a case of moving the highlighted cursor to the required directory and pressing **Return**. You can keep doing this until you reach the required program files. Moving back up to the higher levels is equally as simple and just requires use of the **Escape** key.

To speed things-up when looking through some of the larger directories you can use the simple search facility. You simply press **F5** and enter the required text and the menu system automatically moves the first occurrence of the search string.

If you want to look for more instances of the search string you just hit **F6**. It really was very simple to use.

Other Benefits

One of the other benefits of using a DOS based menu system is that it is also very quick, making it easy to flit around the disk at will. If you'd rather operate with a paper index there is a text file included with a full index of every file on the disk.

Needless to say the text file is a large file of around 220kb. This works out at around 68 A4 pages even if you reduce the print size down to a just about readable 6 point! However, I found a hard copy of the file list to be very useful when deciding just what software to try next.

Once you've found the required file PDSL have made the installation and running just about as straightforward as possible. If it's one of the many text files you want to view this can be done from within the menu system with no transfer to your hard disk at all.

If you want a printed copy of the file you will have to use a separate text editor as the menu doesn't include a print option. If it's a program you want to review then there are two basic options depending on whether or not the program has been stored in compressed form.

If the file is a ZIP file then the menu system will automatically run the built-in decompression software and ask you where you would like the un-zipped copy of the files to be stored. If on the other-hand the program is a self contained executable file then you can run it from the CD-ROM to try it out and

copy it to your hard disk later, if you find it useful.

The only snag you might encounter is with files that have been stored as a self-extracting archive. If you try and run these from the CD-ROM they will usually fail with an error message when they find they can't write to the CD-ROM. The solution is to copy them to your hard drive first.

So, I've perhaps whetted your appetite but what can you find on the CD-ROM? Well it's really just about everything shareware there is. The PDSL *Ham Radio* collection is there in its entirety including my five disk reader's offer set.

There's a huge library of just about every Packet radio and BBS package that was ever written. I also found an incredible selection of amateur radio utilities and some really quite advanced maths and propagation tools.

If you want to design your own antenna from l.f. through to microwaves then there's a program here to help. There's even a load of amateur based 'clip art' so you can spice-up those home made QSL cards.

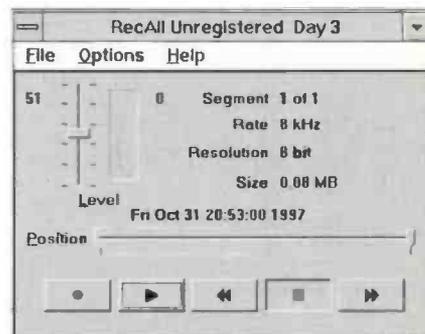
Overall the CD offers a really excellent selection of radio related programs that should appeal to just about any amateur with a PC. The full title of the CD-ROM is *Libris Britannia Series 6 RF, Antennas & Ham Radio Library*. To order your copy contact PDSL at **PO Box 131, Crowborough, Sussex TN6 1UL. Tel: (01892) 663298**. My thanks to PDSL for supplying the review copy.

Best Ideas Simple

You know how with all the best ideas you wonder why you didn't think of it because it seems so simple. Well, the latest software to come my way falls into that category.

The software is called *RecAll* and is a wonderfully simple Windows software package that will have a special appeal to all types of radio listeners. The program is just a simple sound recorder that uses a standard sound card to record audio signals from the microphone input of the card. The real trick is the inclusion of automatic switching. One of the set-up options is to set the program to automatically start recording whenever a signal is detected on the microphone input.

ReCall main screen with Time Stamp.



I know the idea sounds really simple but just imagine how powerful it is for monitoring radio channels with low utilisation. If you wanted to check for activity on the 50MHz (6m) calling channel, rather than sit there like a 'lemon' waiting for a signal you could just set-up *RecAll*, connect the microphone input to the auxiliary output of your receiver set the squelch and let it get on with it.

You could then come back later and playback all the activity without the long pauses. Just to really put the icing on the cake *RecAll* even time stamps each recorded sample. To get a copy for yourself you need to visit <http://www.sagebrush.com/~sells>

Special Offers

If you'd like a copy of Hamcomm/JVFX, etc. I've arranged a very special offer with the Public Domain and Shareware Library (PDSL). They have put together a library set of all five disks for just £12, all inclusive.

Using PDSL also makes ordering simpler as they accept all the usual credit cards so you can order by 'phone - you don't even have to write a letter. Please direct all orders and enquiries about this disk set to PDSL Winscombe House, Beacon Road, Crowborough, Sussex TN6 1UL. Tel: (01892) 663298 and request library volume: **H008739abcde**.

The software is available as a set of five disks as follows: IBM PC Software (1.44Mb disks): **Disk A** - JVFX 7.1, HAMCOMM 3.1 and WXFAX 3.2; **Disk B** - DSP Starter plus Texas device selection software; **Disk C** - NuMorse 1.3; **Disk D** - UltraPak 4.0 and **Disk E** - Mscan 1.3 and 2.0.

Well I've run out of time and space for this month, so until next time Merry Christmas and keep your computing news and views coming to me **Mike Richards G4WNC, PO Box 1863, Ringwood, Hants BH24 2ZD** or via E-mail to: mike.elaine@btinternet.com Don't forget you can visit my Web site at: <http://www.btinternet.com/~mikespage>

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VHF REPORT

This month David Butler G4ASR reports of an upsurge in ionospheric propagation and unusual Sporadic-E openings on the 50 and 144MHz bands.

Recently I reported that a panel of solar experts have made a prediction that solar cycle-23 (the new cycle which we are just entering) should be a large cycle. What they are predicting is that the solar flux (and consequent sunspot numbers) should be very high around the peak of the cycle.

The increase in solar activity has a direct effect on certain propagation modes such as F2-layer, trans-equatorial propagation (t.e.p.) and aurora. Whether or not the peak will be very high can only be conjecture at this time but there is some 'folk lore' regarding solar cycles that may give us a clue.

The first 'clue' is that the odd numbered cycles are always higher than the previous even numbered cycle. The second is that the shorter and the steeper the rise from sunspot minimum to maximum, the higher the peak.

It's still a bit too early to compare the rise of cycle-23 with other cycles but the indications are looking favourable for a high maximum. The panel of solar experts expect the peak to occur sometime between June 1999 to January 2001, probably around March 2000.

Although 2000 is only two years away you can expect to see some dramatic propagation changes occurring on the 50MHz band on the run up to the maximum. On the 144MHz band you'll also notice a sharp increase in the number and quality of auroral openings.

What surprised me, and no doubt others, was a sudden surge in activity on the 50MHz band during October. Sporadic-E (Sp-E) openings were recorded on many days and these conditions were so intense that on one occasion an Sp-E opening was also reported on the 144MHz band.

Some good trans-equatorial propagation (t.e.p.) events to central Africa also occurred on the 50MHz band giving a taste of what is to come in future years. Two auroral openings were reported on the 144MHz band and on higher frequencies there were periods of enhanced tropospheric propagation which kept the u.h.f. and s.h.f. operators happy. All-in-all it was a remarkable month and hopefully a sign that ionospheric conditions are really beginning to pick up at the beginning of the new solar cycle.

Sporadic-E

Although one Sp-E opening on the 50MHz band was recorded on October 2 the main period of activity commenced on October 12 when 14 days of openings were recorded in a 17-day period. According to your reports Sp-E contacts during October were made with stations located in CN, CT, EH, EH6, EH9, ES, F, I, IS, IT, OK, SP, S5, YU, 9A and 9H. As you can see these countries are located predominantly to the south and south-east of the UK.

No real DX of any note was worked from the UK via Sp-E but a very unusual event was noted in Italy. On October 8 at 1800UTC the station of I5MXX (JN53) was calling CQ and got a reply from K3RRE. The North American station peaked S7 for a few seconds before disappearing into the noise.

Five minutes later the station of K1DT was heard calling CQ, signals being very weak around S3 with much fading, but lasting for over two minutes. Unfortunately he wasn't able to copy the complete I5MXX callsign and no contact was made.

The propagation mode was probably some form of E-layer backscatter as I5MXX was beaming towards South America (240°) with his large 4 x 9-element Yagi array. On switching to his smaller (I) 4 x 4-element Yagi system directed to North America all signals completely disappeared.

During October the maximum usable frequency (m.u.f.) reached 100MHz on at least four occasions but didn't quite make it up to the 144MHz band in the UK. However, there was a Sp-E opening on this band between Switzerland (HB9) and Italy (I) to Portugal (CT) and Spain (EA) on October 19.

The opening was a very rare event as it is normally expected that all traces of Sp-E propagation on the 144MHz band would have disappeared by early August. Certainly I have never recorded an opening in Europe so late in the year.

The first reported contact took place at 1342UTC between I4JED (JN54) and CT4QP (IM59) over a path of 1740km. Some 20 minutes later, at 1402UTC the station of Claudio I4XCC (JN63) made s.s.b. contacts with CT1DMK (IN50), CT1DYX (IN51) and EB1ENP (IN62).

Luigi IW5DAN (JN53), running a TS-790E transceiver and 4 x 10-element DJ9BV Yagis reported working CT1DNF (IN50), CT2GKT (IM59) and EB1FIF (IN52). In Switzerland Chris HB9DFG (JN37) was surprised to hear EB4EUB peaking 59 but couldn't attract his attention.

Fortunately HB9DFG did make it with EB4EQZ (IN80) a few minutes later at 1407UTC. While all this was happening the 50MHz band was really humming with many contacts being made from the UK to stations in F, I, IS0 and IT9.

Trans-Equatorial Propagation

Last month I mentioned the need to pay special attention to the 50MHz band during the September/October period for DX openings across the (geomagnetic) equator. What is important to remember is that at this early stage in the solar cycle the existence of 'European' E-layer activity is essential for connecting you up to the main t.e.p. zone that lies across the equator. And as I've just mentioned there were a considerable number of days during October when the E-layer was sufficiently ionised to allow this to happen.

Openings via t.e.p. during September to V51 (Namibia) and 7Q7 (Malawi) were very weak and therefore it was very pleasing to observe the enhanced conditions during October. Although there was an opening between southern Europe and central Africa on October 1 the first opening in the UK was reported on October 2.

At the QTH of Ken Osborne G4IGO (IO80) both 7Q7RM and the beacon 7Q7SIX (KH74) were heard between 1701-1804UTC. Ron Macfarlane 7Q7RM (ex-GM3EAK) was 59+ for most of the opening and even the low power beacon peaked 579 for some time.

Ken reports that 7Q7RM could only work stations situated in southern England, the Channel Islands and the south Wales area. Ron confirms that this was his first opening to the UK since October 1996.

At the station of Stuart Reeve G1HHO (IO90) an s.s.b. contact was made with 7Q7RM at 1740UTC.



Fig. 1: The 24GHz dish antenna in use by Peter Day G3PHO/P.

signals peaking 57 both ways. Stuart uses an FT-650 transceiver and Datong speech processor, 100W and a 3-element MET Yagi at 6m above ground.

Stuart also mentions that he heard 7Q7RM for over an hour after his contact but working very few stations. He was pleased to get a QSL card back very quickly via G0IAS, the QSL manager for 7Q7RM.

The next t.e.p. event into the UK took place between 1545-1800UTC on October 15. Many stations throughout England, including G0JHC (IO83), G3FPQ (IO91), G4OBK (IO94), G4VPD (IO92), G6YIN (IO93) and G8KRT (IO80) reported working the station TR8CA (JJ40) located in Gabon. He also worked GJ4ICD (IN89) and stations located in France, Italy and Portugal.

Towards the end of the event, around 1730UTC, Ron 7Q7RM came on the band and worked a few stations in southern England. The V51VHF beacon (50.018MHz) running 50W to a ground plane antenna was heard by G4IGO between 1759-1846UTC.

The third t.e.p. event of the month occurred on October 19 and lasted for over three hours. The first report came at 1445UTC when G6YIN (IO93) heard V51KC (JG88) calling CQ on 50.110MHz. Other stations heard during the event included the beacon V51VHF (JG87), TR8CA and a new station TR8XX.

For much of the afternoon and evening UK stations were reporting intense Sp-E conditions on the 50MHz band. Later in the evening, at 2200UTC, Geoff Brown GJ4ICD heard

the Brazilian station PY5CC but no contact was made. By the way, all this took place on the day that the unusual Sp-E opening also took place on the 144MHz band.

I've only mentioned the UK openings but of course there were other events within the continent and t.e.p. events weren't only restricted to the Europe-Africa path. All around the world similar paths were opening up such as Australia to Japan and the Caribbean to South America. And it wasn't all on the 50MHz band.

So, here's a very small taster of what was happening in other areas of the globe. On October 1 the station of WP40 (Puerto Rico) was heard by LU1DMA (Argentina) on 144.200MHz.

The 50MHz station of VR2IL (Hong Kong) worked VK8AN and VK8RH (Australia) on October 3 and JH4JPO (Japan) worked VK8VF. A new station operating from Ethiopia ET3SID (KJ99) worked 9H1AW (Alan GW3LDH) and 9H1JN (Maureen GW8ZCP) on October 8. By the way, the home call of ET3SID is G4CTQ and he is using an FT-736R transceiver.

Peter PY5CC (Brazil) heard EH8BPX (Canary Islands) on the 50MHz band at 2237UTC on October 11. On the following day PY5CC made a contact on the 144MHz band with 8P6ER (Barbados) and A22BW (Botswana) worked into Italy on the 50MHz band.

The Ascension Island beacon ZD8VHF (50.032MHz) was heard in France on October 15 and WP40 tried to contact PY5CC on the 144MHz band on October 16. Although each station could hear each other they couldn't make any sense of the distorted s.s.b. and c.w. transmissions.

The first South America-Europe contacts on the 50MHz band took place on October 17 when PP1BG (Brazil) heard CT1HB (Portugal) and worked CT3FT (Madeira Islands) and EH8BPX. On October 18 PY5CC joined the action by working CT1AL, CT1HB and EH1YV (Spain). He also heard the Portuguese beacon CS1ASP (50.030MHz).

At 2338UTC on October 21 N8ZJN (USA) worked CX9DK (Uruguay) on 50.110MHz and on the following evening D44BC (Cape Verde) worked PP1BG and PP1CZ. Oscar CO20J (Cuba) heard YS1ECB (San Salvador) peaking 55 but the QSO on October 23 was not completed.

On October 24 a number of French and Italian stations worked 9G1BJ (Ghana). The QSL manager for this station is believed to be G4XTA.

Keep a lookout also for 9G1YR who is expected to be active very soon. Doug ZP6CW (Paraguay) reports working HP3XUG (Panama), TI4JHQ and TI5KD (Costa Rica) and YV4DYJ and YV5MM (Venezuela) on the 50MHz band on October 26. Phew, I think that's enough!

The autumnal t.e.p. peak has now disappeared but you have time to make plans for the next peak which will occur around the spring

equinox between late February and the end of March. If the geomagnetic conditions are favourable you might even catch the first opening this cycle to Australia and the Far East.

Auroral Openings

Two auroral back-scatter openings occurred during October. The first event, on October 1 between 1600-1730UTC, was quite good and even reached up as far as the 144MHz band.

Stations located in northern England and Scotland made the most of this opening working stations in DL, LA, OH, OZ, PA and SM. Among the DX stations active during this opening (all on c.w. of course!) were LA0BY (JO59), LA4YGA (JO48), LA8WF (JO59), OH2BNH (KP20), SM00FP (JO89), SM4HF1 (JP70), SM5BSZ (JO89) and SM7BOU (JO66).

Ray James GM4CXM (IO75) was active between 1445-1554UTC working 20 stations in G, GM, DL, LA, ON, PA, SM and SP. His best DX was SP2FAX (JO83) at 1446km, others worked included G0NNF (IO92), G4AFJ (IO92), G4RGK (IO91), LA0BY (JO59), LA2PHA (JO38) and SM6LWH (JO67).

At the QTH of Eltje PA3CEE (JO33) a total of 21 stations were worked between 1514-1722UTC. Most stations were in the range 800-900km, the best being OH2BNH (KP20) at 1338km. Eltje runs 400W into a pair of 16-element F9FT Yagis at 22m above ground level.

Chris HB9DFG (JN37) was very pleased to hear the aurora as it is a very rare event at his southerly QTH. At 1622UTC he contacted GM0NAI (IO75) 55A both ways over a 1220km path. Unfortunately that was the only signal that Chris heard despite running an antenna group of four 7-element Flexa Yagis. Incidentally, 1220km may not sound much but it's at the maximum limit for a north-south auroral path.

Around every QTH there's an oval shaped 'boundary fence' which dictates the (theoretical) maximum distances you can work. It's approximately 1000km in the north-south direction and 2000km in the east-west direction.

The second auroral event in the UK occurred on October 10, approximately 36 hours before the fabulous run of Sp-E and t.e.p. openings. The first phase was observed at 1740UTC when Chris Deacon G4IFX (IO94) heard the 50MHz Lerwick beacon GB3LER (IP90) go auroral peaking 41A. This faded out fairly quickly being replaced by another phase between 1900-2000UTC.

The events were fairly weak, appearing only on the 50MHz band. However, a later phase between 2215-2330UTC was more intense and produced some c.w. activity on the 144MHz band. Among the stations reported were LA0BY (JO59), LA3BO (JO59), SM4SCF (JO69), SM5BSZ

(JO89), SM5EFP (JO79) and SK5EW (JO79).

Tropo Conditions

Reports are still coming in that mention the good tropo conditions during September. David Dodds GM4WLL reports that he was active during the 144MHz RSGB Trophy contest on September 7 from a site in Borders region (IO85).

As the contest coincided with an IARU contest there was a considerable amount of DX to be found. David's furthest distance worked was F5KAR/P (JN09) at 785km, other DX including F6KPL (IN99), PA6NL and PI4SHB/P (JO21), OT7M (JO10), TM1C, TM2K and TM20X (all in JN09).

Incidentally the special prefixes QT and TM are Belgium and France respectively. Other stations that GM4WLL considered worthy of note included G0MSA/P (JO00), G4ADV/P (IO70), G4IGO (IO80) and G6ISY/P (IO90).

David remarks that everything worked using 100W to an 8-element Yagi at 6m above ground level, operated from the front seat of his Ford Escort. He makes the point that it isn't necessary to join a large contest group and run very high power to a BBC Daventry lookalike on a mobile tower!

Good results are possible with basic equipment and a good portable location. Actually this is very true. You don't need to run high power and large antennas provided all you want to do is have a bit of fun working the DX contest stations (who by the way ARE running QRO and big antennas!).

A few days later, on September 17, GM4WLL was on the air again from the same site participating in the third round of the c.w. cumulative contest. During the two and a half hour session he made 10 contacts, many over distances greater than 450km. His best DX during the session was PA0GHB (JO11) at 645km.

David reports that the c.w. cumulatives are not very well supported and can only assume that operators are apprehensive of using c.w. in a contest. He remarks that there is nothing really to fear in the use of Morse.

David's c.w. is quite rusty, made worse by using an old 'up and down' key balanced on his knee in the car. However, he has been impressed by the consideration and courtesy shown by every entrant.

According to a spokesman from the VHF Contest Committee the 144MHz c.w. cumulatives are under threat of cancellation next year. So, why don't you dig out your Morse key and support the event?

Ela Martyr G6HKM (JO01) has sent in a report covering all bands from 50MHz through to 1.3GHz. At the time of writing (mid-October) Ela has worked 46 countries, 47 counties and 162 squares on the 50MHz band since the beginning of the year.

Two new all-time countries have recently been worked, R1MVI (Malay Vysotskij Island) and 5A28 (Libya) on September 7. Other DX contacts made on this band include ER5AA (Moldova), HB0/HB9QQ (Liechtenstein) and TF3VET (Iceland) in August and TR8CA on October 15.

On the 144MHz band a total of 21 countries, 56 counties and 74 local squares have been worked during 1997. A meteor scatter contact was made with LA0BY/P (JP41) on August 12 and Sp-E contacts with LZ1UF and LZ1KWT (Bulgaria) on August 14.

The good tropo conditions on September 21-22 found OK1KJT/P (JO60), SP1E0I (JO73), SP2MKO (JO93), SP4MPB (K003) and other stations in OL and OZ.

During the same period, tropo contacts were made with OF8LC (JO53), OZ7UHF (JO56) and SM7ECM (JO65) on the 430MHz band and SM7FMX (JO65) on the 1.3GHz band. During the 430MHz contest on October 4-5 Ela worked four Swiss stations (JN37/JN47) and LX/DK2FR/P (Luxembourg), a fairly rare country on this band.

And finally news of activity on the 24GHz band (that's 24,000MHz by the way!). Peter Day G3PHO reports that his 50mW of wide-band f.m. does as well as others using narrow-band s.s.b. or c.w. especially if portable sites are carefully chosen.

Using an ex-BSB 350mm off-set fed dish with rectangular feed horn (shown in the photograph, Fig. 1) he made a number of contacts during the October 24GHz cumulative contest. Three contacts were made with G4MAP/P (IO82) when Peter G3PHO/P operated from different locations with path lengths of 80km and 102km. The stations of G3FNO/P and G8AYY/P were also worked but a contact with G3UYM/P failed despite the path being line of site.

Deadlines

That's it again for another month but before I go I would like to wish everyone a very Happy Christmas, especially to those who have contributed to the column throughout the year. If you have any news, views, comments or photographs please forward them to reach me no later than **Sunday December 21**.

My address is **Yew Tree Cottage, Lower Maescoed, Herefordshire HR2 0HP**. You can also contact me via Packet radio @ **GB7MAD**, the UK DX Cluster @ **GB7DXC** or E-mail via **davebu@mdlhr1.agw.bt.co.uk**. Alternatively you can telephone me on **(01873) 860679**.

END

SCENE USA

This time Ed Taylor NOED turns his attention to the use of the v.h.f. and u.h.f. bands by North American amateurs.

As you might expect, the v.h.f. and u.h.f. bands in the USA are bigger than those in Europe! So, Americans don't normally have to hunt for a frequency to chat on 'two metres' f.m., and there is less friction between Packet stations and other band users than we sometimes see in the UK.

Because much of the country is sparsely populated, occupancy in many areas is low. Large towns such as Denver, where I live, have quite respectable levels of activity.

However, if you travel 200km away, especially to the East or West, you are likely to find the bands above 30MHz relatively empty. There are simply very few people in these vast areas, and consequently, few radio amateurs. Any that do live there could have no locals to talk to, and may have trouble with such mundane activities as connecting to the DX cluster.

In the UK you become accustomed to travelling around and being within range of a repeater most of the time. In North America, a similar situation exists in towns, where there are plenty of repeaters.

Outside towns you may have to search for contacts. There are exceptions, but check locally if you are visiting with a hand-held and wish to make contacts.

Band Allocation

Look at Fig. 1a to see the US allocations on the v.h.f. and u.h.f. bands. The six lowest frequency bands are in diagram form, and the higher bands are listed in the table, Fig. 1b.

It's interesting to note that the only bands where there are statutory mode restrictions are 50 and 144MHz. The bottom 100kHz of each band is reserved for Morse only, and the rest may be used for any mode. The power limit is 1500W p.e.p., with a lower restriction on Novice Licensees.

You will see from the diagram that all licence classes except Novice are allowed on all v.h.f./u.h.f. bands, which (I think) creates rather a strange situation. Anyone not concerned with h.f. working only needs a Technician licence (which is not a very high technical standard).

In fact, significant parts of the syllabus for the higher classes (General, Advanced and Extra) contain material which is very relevant to a v.h.f. or u.h.f. operator. But there is no incentive for Technicians to try for a higher licence, unless they become interested in the h.f. bands.

Let's visit the bands in ascending order. I'll start with 50MHz which a useful 4MHz wide instead of 2MHz. This is an exclusive allocation in North America.

Although TV is still broadcast on v.h.f., Channel 1 was never used, so 50MHz is a band of long standing. There's room for all modes, with repeaters, beacons and Packet, as well as the usual s.s.b. and c.w.

A fascinating aspect of 50MHz, which it shares with the 28MHz band to some extent, is that it exhibits characteristics of both h.f. and v.h.f. Many types of propagation can be experienced, sometimes in combination.

Amateurs in Europe can look forward to many transatlantic contacts on 50MHz as we move into the new sunspot cycle. This should be a good opportunity for Class B licensees, and their equivalents elsewhere, to start preparing equipment and antennas, and start making 'ham' radio friends abroad!

The 50MHz band is a favourite with US amateurs chasing the v.h.f./u.h.f. Century Club award (VUCC), which is run by the the US national society, the Amateur Radio Relay League (ARRL). This calls for a certain number of contacts with different four-digit locator squares (or 'grids' as they are usually called in the USA).

On the 50 and 144MHz bands, 100 grids are required. Since there are over 300 American grids, this may not seem too difficult. However, remember the size of the USA, some 5000km wide, and the fact that many of the grids have no amateurs living in them whatsoever. Earning this award is not as easy as it seems!

Double Sized Band

The 70MHz band is a British invention, and does not exist in North America. So, let's get straight

on to 144MHz and what a joy it is! With a bandwidth of 4MHz, there's room for lots of repeaters, Packet, f.m. and s.s.b.

Just imagine how much difference another 2MHz of bandwidth would make in Europe. There are still some capacity bottle-necks in large US cities, but it's usually no problem to find a frequency.

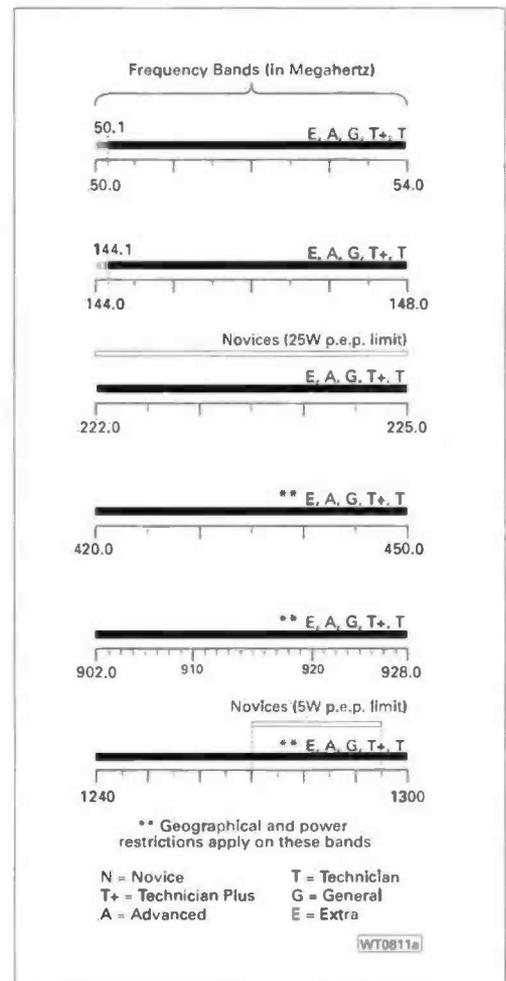
About half of the 144MHz band is allocated to repeaters, in three separate sections. The offset between input and output frequencies is usually 600kHz, as elsewhere, but the output may be higher or lower than the input frequency. This depends on which part of the band is being used, and the proximity of other repeaters.

The system was originally set up regionally, so spacing between channels varies from state to state. Most areas started using 30kHz, but this has in some cases been reduced to 15 or 20kHz.

Because there are many repeaters, amateurs will generally check before operating in a new part of the USA. This can be done by consulting the ARRL's *Repeater Directory* or visiting one of the Web sites showing repeater locations and frequencies.

For the USA repeater listings, check www.artscipub.com/repmain.shtml

Fig. 1a/b: The American v.h.f. and u.h.f. band allocations.



All licensees except Novices are authorised to use all modes on the following frequencies:

| | |
|------------------|------------------|
| 2300 - 2310MHz | 2390 - 2450MHz |
| 3300 - 3500MHz | 5650 - 5925MHz |
| 10.0 - 10.5GHz | 24.00 - 24.45GHz |
| 47.0 - 47.2GHz | 75.5 - 81GHz |
| 142 - 149GHz | 241 - 250GHz |
| all above 300GHz | |

WT0811b

set up a repeater without formality.

As a result of this lack of official control, most cities have dozens of repeaters, with wide coverage. Many are available without tone access, and the use of a tone-burst to open a repeater has never been required.

There are a few repeaters which are 'closed', that is, they are only available to certain individuals or club members. Some allow 'phone-patch', where access to the telephone system is available. My advice is to consult the locals before trying to use them!

Since there is no official control, any bizarre combination of frequencies could theoretically be used. This doesn't happen, because regional co-ordinators oversee the usage of frequencies.

In a dispute, a 'co-ordinated' repeater will be given legal preference over one which is 'non-co-ordinated'. Practically speaking, amateurs normally conform to the rules, as they do with the voluntary band plans.

Bands Across The Sea

There are a couple of bands which are only available in Region 2 (North and South America). These are at 222MHz (one-and-a-quarter metres) and 902MHz (33cm).

Unfortunately, occupancy on 222 and 902MHz is rather low, and these parts of the spectrum must be top of the list for commercial concerns looking for more space. The 222MHz band used to be 5MHz wide, but the US government reallocated 2MHz of this to other users. The under utilisation of 222MHz meant that amateurs couldn't readily argue they needed a large band.

The usage of 222MHz is comparable to the 144MHz band. There are allocations in the band plan for c.w., weak signals, s.s.b. and f.m. including repeaters.

The Packet system uses the band both for end-user access and also for network interconnection. On 902MHz, the band is shared with other services, and there are geographical prohibitions which discourage widespread use.

Let's now consider the 420MHz (70cm) band, which is quite popular, as it is in the UK. It's shared with government and other services, and there are restrictions on certain sections in some parts of the country (sounds familiar!)

Given that the natural reaction of new Technician licensees is to buy a hand-held, perhaps for 144 and 420MHz, there are usually several repeater conversations to be found at any time. There is amateur television on 420MHz, with many areas having cross-band repeaters, using 1240MHz (or sometimes 902MHz) for the other channel.

As you will see, most of the u.h.f. bands are similar to those in

Europe. However, I would say that 420MHz is the highest frequency band at which you might normally expect to get a reply to a weekend CQ in most parts of the USA.

Above 420MHz, activity is low, and experimenters have lots of room to play. There are pockets of activity



Fig. 2: Jay K0GU inspects his splendid four by 17-element 144MHz array which he uses for moonbounce.



Fig. 3: Doug W0AH has a fine selection of v.h.f. and u.h.f. antennas.

using high-speed Packet, spread spectrum, digital transmission, and other specialised modes. But 'run of the mill' QSOs are fairly sporadic, except for on contest weekends.

Commercial Spectrum Space

Commercial organisations such as TV broadcasters, cellphone companies and land/mobile services are well aware of the low activity on some of the amateur bands. The 'other users' are seeking spectrum space for their rapidly increasing requirements, including satellite and 'wireless' operations.

Naturally, they are looking at those frequencies apparently

abandoned by amateurs. Some are in radio frequency prime locations just waiting to be properly utilised, such as the portion of 222MHz already lost.

Added to this, the US government (among others) has a policy of auctioning parts of the

radio spectrum to the highest bidder. Naturally, commercial concerns have plenty of money to further their cause, and they bid against each other for the most useful frequencies. These supplements to tax revenue are well-liked by the administration, after all, they are virtually getting something for nothing!

American amateurs are learning to become vigilant, although panic is not appropriate at the moment. A recent scare about the Low-capacity, Low-Earth Orbit satellites (Little LEOs) seems to have been

averted, but you can see why the ARRL is concerned, when you learn that the satellites already use 137-138MHz and 148-149.9MHz, plus some space in the 400MHz band. Paradoxically, European amateurs may be in a better position for a while. Because the continent is divided between many nations, there is less likelihood of a takeover of our

bands by commercial entities.

Organisations such as satellite operators are usually interested in covering large land areas, and are discouraged by having to negotiate with many governments. Still, many organisations would be happy with bits and pieces of amateur bands in different countries, so there is no room for complacency. The ARRL is on constant watch for hostile moves, and European societies would be well advised to emulate this.

Moonbounce Activity

One area where activity is increasing is moonbounce. American amateurs are becoming much more interested in making contacts by bouncing signals off the moon.

Often called Earth-Moon-Earth (e.m.e.), moonbounce would seem to present insuperable difficulties. After all, the round-trip distance is

three quarters of a million km, which is a roundabout way of making a contact at perhaps 8000km! However, technology is advancing to the state where components can be fairly easily obtained, and a skilled amateur can make up an EME station at reasonable cost.

The most popular bands for moonbounce activity in the USA are 144 and 420MHz. On these bands, the path loss, representing the amount of attenuation a signal suffers on its long trip, is going to be at least 250dB. This sounds daunting, but it can be overcome.

As you would expect, high effective radiated power (e.r.p.) must be used. This dictates the need for an amplifier of several hundred watts plus a multi-element beam.

A major advantage of e.m.e. work is that antenna height has little effect on results. You need enough room to clear the ground, and preferably the surrounding buildings when the moon is low in the sky.

It's possible to achieve good results from a suburban location, which is important to radio amateurs everywhere, not just in the USA. Since antennas are quite low, they are easier to put up and work on. Check Fig. 2 where Jay K0GU is standing on the boom of his e.m.e. array.

Of course, the antenna has to be rotated in two directions (elevation and azimuth). It must be tilted as well as being able to scan the horizon in the traditional way.

The calculations needed to track the moon's position have been incorporated into several computer programs, and some operators couple their two rotators to the computer output. Most make adjustments to azimuth and elevation manually every ten minutes or so, which is quite adequate.

There is a surprising amount of e.m.e. activity in contests. When I talked to Bill KORZ here in Colorado, he told me he had worked 57 moonbounce stations on 420MHz in one weekend. Most of these were Europeans, who have historically been more active in e.m.e. But Americans are clearly planning to catch up!

There is also interest in using 10GHz, which has extra challenges as far as path loss is concerned, but where dish antennas have enormous gain and can be relatively small.

My thanks go to Doug Allen W0AH, Jay Kesterson K0GU and Bill McCaa KORZ for their help with this 'Scene USA'. That's all for now so, 73, 'Happy Christmas and New Year' and keep writing to me Ed Taylor N0ED, PO Box 261304, Denver, Colorado 80226, USA or E-mail at EdTaylor@compuserve.com The deadline for April is the middle of January.

END

Due to the fast turn around of popular secondhand items, readers should check on availability of advertised stock. In other words...if you spot something you fancy...don't delay or you could miss it!

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KENWOOD TS-711E 2m all mode transceiver £595
YAESU FT-226R 2m/70cms all mode base station transceiver £695
YAESU FT-8000R 2m/70cms FM mobile transceiver £299

VHF/UHF TRANSCEIVERS HANDHELD

ALINCO DJ-F1E 2m handheld transceiver £119
ICOM IC-P4E 70cms handheld transceiver £169
ICOM IC-W21E3 2m/70cms handheld with dry cell cases £199
ICOM IC-M11 VHF Marine handheld transceiver £219
KENWOOD TH-28E 2m handheld transceiver £199
YAESU FT-470R 2m/70cms handheld transceiver £199

SHORTWAVE RECEIVERS

DRAKE RBE Base station receiver £695
ICOM IC-R72a2 Base station receiver 100KHz 30KHz £599
ICOM IC-R71a4 Base station receiver with remote control £525
ICOM IC-R70 Base station receiver £449
LOWE HF-250h2 High specification HF receiver £449
Panasonic RFB-65 Portable shortwave receiver with SSB £109
ROBERTS RC-818 Portable shortwave receiver with tape deck £119
SANGANE ATS-803A World Band Radio £89
SONY ICF-7600DS Portable digital shortwave receiver £79
YAESU FRG-7700 Base station HF receiver with memory unit £279

SCANNERS MOBILE / BASE

REALISTIC PRO-2034x2 66-88, 108-174, 380-512, 806-960MHz £99
REALISTIC PRO-9200 66-512MHz with gaps £145
YAESU FRG-9600x3 60-903MHz all mode base receiver £269

SCANNERS HANDHELD

AOR AR-200x2 50KHz-1300MHz
AM/FM/WFM £139
FAIRMATE HP-2000E 0.5 - 1300MHz
AM/FM/WFM £139
ICOM IC-R10 Handheld scanner £195
REALISTIC PRO-50 66-512MHz with gaps handheld scanner £49
SONY PRO-80 x3 HF receiver £139
UNIDEN BC100XL 66-88MHz, 118-174MHz, 406-512MHz £69
WIN 108 Dedicated airband receiver £109
YUPITERU MVT-7100x3 25-1300MHz Scanner WFM/FM/AM £169
YUPITERU MVT-7100 0.1-1300MHz Scanner WFM/FM/AM/USB/LSB £199

LOWE ELECTRONICS 01629 580800

HF TRANSCEIVERS
Icom IC 706 Mk1 HF transceiver with 2m and 6m £650
Icom IC 728 HF transceiver £550
JST135 HF Transceiver £975
Kenwood TSS0 Mobile HF Transceiver £550
Kenwood TSS30S HF Transceiver £495
Kenwood TS820 HF Transceiver £395
Yaesu FT747GX HF Transceiver £400

DATAKOMMS

Kantronics KAM Multimode TNC £185

VHF/UHF TRANSCEIVERS

Alinco DJ500E Dual Band Handheld £249
Alinco DJ560 Dual Band Handheld £199.00
Alinco DR599 Dual Band Mobile £425.00
Icom IC24ET Dual Band Handheld £269
Icom ICW2E Dual Band Handheld £249
Kenwood TH205E 2m Handheld £159

Kenwood TH78E Dual Band Handheld £290

Kenwood TM732E Dual Band Mobile / detachable front panel £380
Kenwood TR2500 2m Handheld £140
Yaesu FT290R 2m Multimode £250.00
Yaesu FT470R Dual Band Handheld £259
Yaesu FT2200 2m FM Mobile £289
Yaesu FT4700RH Dual Band Mobile with detachable front £375

HF RECEIVERS

Lowe HF225 HF Receiver with all accessories £345
Lowe HF225 Europa HF Receiver £450
Sony ICF5W55 World band Portable £225
Lowe HF150 Portable HF Receiver £295
GrundigYB217 Portable receiver £95

SCANNERS

AOR AR1080 Handheld £169
AOR AR2001 Base Scanner without PSU £159
AOR AR2700 Handheld Scanner £160
AOR AR2800 Base Scanner with SSB £195
Icom ICR1 Handheld Scanner £199
Yupiteru MVT7000 Handheld Scanner £200
Yupiteru MVT7100 Handheld Scanner £225
Yupiteru VT225 Airband Scanner £180
Yupiteru VT125 Airband Scanner £150
Yupiteru MVT5000 Handheld Scanner £180

Items are held at various branches, please contact our Mallock branch for further details on 01629 580 800

SOUTH EAST COMMUNICATIONS (REP OF IRELAND) 00353 51 871278

HF TRANSCEIVERS:

Kenwood TS850sat with extra filters £995
Yaesu FT1000MP/DC demo £1699
Icom IC737A auto ATU etc £899
FT990DC boxed mint with auto ATU £1099
Kenwood TS680s HF+6m base/mobile transceiver £649
Kenwood TS50s also AT50 auto ATU £699

VHF/UHF TRANSCEIVERS:

Kenwood TM702E 2m/70cms 25 watt mobile £269
Yaesu FT51R top spec hand held £299
ADI 146 50watt 2m demo £199
Kenwood TH78E 2m/70cms handi £199
Alinco DR150E 50watt mobile £199
Alinco DR112E 25watt 2m mobile £150
Yaesu FT726R 2m/70cms multimode base £649

SHORTWAVE RECEIVERS:

AOR 3030 boxed mint as new £329
AOR 7030 boxed mint as new £549
Kenwood R5000 the Rolls Royce receiver £649
Yaesu FRG8800 0-30mhz mint £349
Yaesu FRG7700 again 0-30mhz mint £289
Lowe HF225 plus FM and keypad boxed £349
Lowe HF150 boxed with keypad £299
Realistic DX394 boxed as new £139
Sony SW55 as new, a bargain at £199
Sony PRO80 0-225mhz ssb £199
Sangean ATS818 portable rx £129

SCANNERS BASE/MOBILE:

Icom IC-R7100DC 25-2000mhz base demo £899
AOR 3000 0-2036mhz £399
Icom ICR7000 25-2000mhz £699
AOR 3000A demo £599
Realistic PRO 2035 £249
AOR 8000 0-1900mhz boxed etc £249
Yupiteru MVT7100 0-1650mhz £199
Bearcat 3000alt 25-1300mhz £169
Icom ICR10 latest hand held £249

STATION ACCESSORIES:

Diamond DL-1000 dummy load £109
Diamond SX100 swr/pwr meter £79
Vectronics VC300DLP 300watt tuner £99
MFJ 948E 300watt tuner mini £89
MFJ 259 antenna analyzer £189
ALL PRICES ARE STERLING

NEVADA 01705 662145

AMP UK HUNTER 600W £925
ALINCO DJ-S41C - 70cms £389
ALINCO G-5 Handle £235
AOR 3000 £495
AOR 3000A £575
AOR 7030 £599
ATLAS 350XL HF £299
BNOS 160W 2m Amp £199
DRAE 24A PSU £79
DRAKE R8A £825
DRAKE R8E £750
HOWES CTU9 ATU £39
ICOM IC-71E + R/control £550
ICOM IC-725 £595
ICOM IC-W2E £199
ICOM IC-728 £629
ICOM R-72 £675
ICOM IC-7000 £595
JIL 400 BASE £185
JST 100 COMPLETE £499
KENWOOD TH-215E £145
KENWOOD TM-241E £2250
KENWOOD TM-451E £299
KENWOOD TR-751E £425
KENWOOD TS-440s £825
KENWOOD TS-680s HF+6m £625
KENWOOD TS-850 SAT £1299
KENWOOD TS-950 Digital £1495
LOWE AP 150 £155
LOWE HF 225 + Extras £425
PALSTAR KH6 + Extras £139
PHILLIPS D2999PL RX £135
RACAL RA17 £139
REALISTIC 2036 £179
REALISTIC PRO-50 £69
SANGANE ATS-803A £85
SATCOM P40 (PAIR) £149
SENTEC 20M HANDIE £195
SONY SW77 RX £249
STANDARD C500 £185
STANDARD C800 £189
TEN TEC OMNI VI S.O.B. £1999
TIMEWAVE DSPs from £99
TOKYO HC-200 ATU £99
TOKYO HL-1KGX AMP £799
TRIO AT-200 ATU £175
TRIO AT-230 ATU £189
TRIO JR-599 RX £125
TRIO 120V 10W HF £259
TRIO 120S 100W HF £325
W9-GR DSP IL £185
YAESU FT-110 HF Amp 100W £169
YAESU FP-707 20A PSU £139
YAESU FRG 7700 + MEM £239
YAESU FRG 9600 £379
YAESU FT-11R £169
YAESU FT-107M 100W £425
YAESU FT-208 + EXTRAS £179
YAESU FT-221R 2m BASE £299
YAESU FT-290 L £245
YAESU FT-290 II £325
YAESU FT-411 + EXTRAS £189
YAESU FT-470 + ACCS £225
YAESU FT-650 24-54MHZ £699
YAESU FT-707 £349
YAESU FT-727 £169
YAESU FT-747 FM £475
YAESU FT-757 AT £225
YAESU FT-900 AT £825
YAESU FT-990 DC as new £1249
YAESU 23cm unit for FT736R £349
YUPITERU MVT 7100 £215

MULTICOMM 2000 01480 406770

HF TRANSCEIVERS
ICOM IC-706DX £679, ICOM IC-720A + £399, ICOM IC-720A £345, ICOM IC-725 £575, ICOM IC-726 £695, ICOM IC-775DSP £2,225, KENWOOD TS-441S £599, KENWOOD TS-441SAT £649, KENWOOD TS-520 £225, KENWOOD TS-520 £225, KENWOOD TS-820 £325, KENWOOD TS-690 S £825, YAESU FT-1000 MP AC £1,499, YAESU FT-101B £140, YAESU FT-101E £195, YAESU FT-757GX £399, YAESU FT-840 (MINT) £599, YAESU FT-840 £599, YAESU FT-840 £625.

VHF/UHF TRANSCEIVERS

ALINCO DR-510E £255, FT-51 DUAL BAND HANDIE £265, ICOM IC-2350 £329, ICOM IC-251E £289, ICOM IC-290E £249, ICOM ICW-21ET £199, KENWOOD TH-78E £199, KENWOOD TH-79E £299, KENWOOD TR-751E £375, STANDARD C-156 £125, TRIO TR-780 £479, TRIO TS-700G £245, YAESU FT-10R £129, YAESU FT-211 £185, YAESU FT-23R £110, YAESU FT-2500M £299, YAESU FT-290R £210, YAESU FT-3000M £335, YAESU FT-480R £300, YAESU FT-480R £325, YAESU FT-480R £350, YAESU FT-51-R £289, YAESU FT-727R £199.

SHORT-WAVE RECEIVERS

AOR 7030 £629, DRAKE SW-2 £379, DRAKE SW-8 £399, ICOM ICN-72E £450, JRC NRD-525 £650, KENWOOD R-2000 £335, KENWOOD R-2000 £369, RACAL RA17 £139, REALISTIC 2036 £179, REALISTIC PRO-50 £69, SANGANE ATS-803A £85, SATCOM P40 (PAIR) £149, SENTEC 20M HANDIE £195, SONY SW77 RX £249, STANDARD C500 £185, STANDARD C800 £189, TEN TEC OMNI VI S.O.B. £1999, TIMEWAVE DSPs from £99, TOKYO HC-200 ATU £99, TOKYO HL-1KGX AMP £799, TRIO AT-200 ATU £175, TRIO AT-230 ATU £189, TRIO JR-599 RX £125, TRIO 120V 10W HF £259, TRIO 120S 100W HF £325, W9-GR DSP IL £185, YAESU FT-110 HF Amp 100W £169, YAESU FP-707 20A PSU £139, YAESU FRG 7700 + MEM £239, YAESU FRG 9600 £379, YAESU FT-11R £169, YAESU FT-107M 100W £425, YAESU FT-208 + EXTRAS £179, YAESU FT-221R 2m BASE £299, YAESU FT-290 L £245, YAESU FT-290 II £325, YAESU FT-411 + EXTRAS £189, YAESU FT-470 + ACCS £225, YAESU FT-650 24-54MHZ £699, YAESU FT-707 £349, YAESU FT-727 £169, YAESU FT-747 FM £475, YAESU FT-757 AT £225, YAESU FT-900 AT £825, YAESU FT-990 DC as new £1249, YAESU 23cm unit for FT736R £349, YUPITERU MVT 7100 £215

SCANNERS

AOR 3000A £550, AOR AR-2000 £115, AOR AR-2700 £145, AOR-AR-5000 £1,050, ICOM ICR-1 £259, ICOM ICR-7000 £575, REALISTIC PRO-2039 £139, YUPITERU MVT-7000 £160, YUPITERU MVT-9000 £325, YUPITERU VT-125 MK-2 £125

ACCESSORIES

AEA PK 900 £299, CB-MASTER 7A PSU £29, DAIWA 12-AMP PSU (MINT) £50, DAIWA CNW-727 £145, ERA MICRO-READER V-2 0 £90, ERA MICRO-READER V-4 0 £125, ERA RS-232 £125, HOKA CODE 3 VS 0 £499, ICOM AH-3 £225, ICOM IC HP-1 £29, ICOM IC SP-3 £60, ICOM IC SP-3 £60, ICOM RC 12 £35, JPS NIR-10 £160, KENWOOD TL-922 £995, MFJ 1278-B £225, MFJ 447 £39, MICRO NTA £50, MIZUHO AX-1 £45, MAIL MM2000 £49, MOMENTUM NCL-1000 £199, SEM VHF TRANSNATCH £25, SEM HF-CONVERTER £25, SEM BANDMATCH £89, SEM WIDE-BAND PRE-AMP £25, TONNA A-550 £125, TV-1000 RTTY DECODER £40, UNIVERSAL M-7000 £479, VARIOUS FILTERS from £20, YAESU FRT-7700 ATU £50, YAESU FRV-7700 HF CONVERTER £50, YAESU MID-1 MICROPHONE £50, YAESU SP-5 £65, YAESU SP-901 £59, YAESU SP-901 £55, YAESU YD-14 £60, YAESU YH-1 £1R.

PLEASE MENTION TRADERS' TABLE WHEN ENQUIRING ABOUT ANY ITEMS ON THESE PAGES!

Traders' Table

YOUR GUIDE TO SECOND-HAND EQUIPMENT

ARC EARLESTOWN 01925 229881

HF TRANSCEIVERS

| | |
|---|------------|
| Yaesu FT-840 + FM | £550 |
| 2 x Icom IC-765 plus speaker | from £1500 |
| 2 x Yaesu FT-757GX1 + boxed | £TEL |
| Yaesu FT-980 | £799 |
| Yaesu FT-102 + FC-102 | £475 |
| Yaesu FT-101ZD MkIII + FC-902/FCV-901R incl 2m/6m | £799 |
| Icom IC-735 boxed | £525 |
| Yaesu FT-902DM + SP-901/SPC-300 ATU | £499 |
| Yaesu FT-747 + FC-700 boxed | £TEL |
| Kenwood TS-830M + | £375 |
| Yaesu FT-102 | £375 |
| Yaesu FT-101Z | £299 |
| Yaesu FT-902 | £250 |

MOBILE/BASE VHF/UHF TRANSCEIVERS

| | |
|------------------------------------|-----------|
| Kenwood TS-700S | £450 |
| Kenwood TM-742 + 10m module as new | £625 |
| Icom IC-229 - boxed | £225 |
| Icom IC-290D | £300 |
| Kenwood TM-255E boxed VGC | £TEL |
| Yaesu FT-230 | £175 |
| Icom IC-271H + 100W internal PSU | £550 |
| Icom IC-2410H boxed | £TEL |
| Yaesu FT-290R + linear | £TEL |
| 2 x FT-290R1 | from £200 |
| Yaesu FT-290R11 + accessories | £35 |
| Yaesu FT-290R11 FL-2025 | £375 |
| Kenwood TR-751 - boxed | £350 |
| Icom IC-251E | £TEL |

RECEIVERS/SCANNERS

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|--|-----------|
| ICOM IC-R71E boxed | £599 |
| 2 x Kenwood R-1000 boxed | from £200 |
| Regency MX-7000 | £TEL |
| AR-2500 | £275 |
| Drake R-8E | £699 |
| Low HF-225 | £250 |
| Sony PRO-80 | £150 |
| Yaesu FRG-9600 - HF converter | £350 |
| Yaesu FRG-7 | £140 |
| Icom IC-R7100 boxed | £TEL |
| AOR AR-3000A | £550 |
| Sony SW-55 mint condition | £TEL |
| AOR AR-2800 boxed | £199 |
| Grundig Satellite 500 + IC-FAX 1/Dating AD-270 | £175 |
| Kenwood R-5000 + VHF converter | £750 |
| Icom IC-R100 - mint condition | £275 |

HANDHELDS

| | |
|----------------------|------|
| Kenpro KT-22 | £80 |
| Alinco DJ-160 | £150 |
| Kenwood TH-21 | £99 |
| Icom IC-4E | £115 |
| Standard C-528 boxed | £199 |

MISC.

| | |
|---|------|
| SDU-5000 Spectrum Display Unit - as new | £599 |
| AT-230 - box | £175 |
| MFJ-1278 Packet Unit + Software | £225 |
| Dating ASP (wired for Kenwood) | £50 |
| MML-144 - 100-3 + boxed | £TEL |
| Tokyo HL-160V linear | £175 |
| Icom SP-20 speaker | £75 |

SHORTWAVE SHOP 01202 490099

HF TRANSCEIVERS

| | |
|--|--------|
| Icom IC751 - 100W HF | £545 |
| Icom IC725, Inc AT150 - VGC | £645 |
| Kenwood TS950SDX - The Ultimate HF Set | £1,695 |
| Kenwood TS680S - HF & 6M | £695 |
| Kenwood TS770D - Latest HF with DSP | £1,050 |
| Kenwood TS450S - 100W HF & WARC | £695 |
| Kenwood TS140S - 100W HF | £325 |
| Kenwood TS120S - 100W HF | £295 |
| Tri TS530SP - 100W HF | £395 |
| Tri TS330SP - 100W HF Narrow CW Filter | £395 |
| Tri TS130S - 100W HF & WARC | £325 |
| Tri TS120V - 10W HF - Ideal Novice Set | £275 |

VHF/UHF

| | |
|--|------|
| AKD 7003 Channelised 3W 70cms Mobile | £125 |
| Alinco DR510 - 2M/70cms Mobile LED Display | £275 |
| Icom T7E Compact Dualband Handheld | £195 |
| Icom IC215 - 2M Channelised FM | £85 |
| Icom IC2E - 2M Thumbwheel H/Hand | £75 |
| Icom IC20A - No 1750Hz | £85 |
| Kenwood TH22E - 2M H/Hand c/w Keypad | £185 |
| Kenwood TS711E - 2M Multimode Base | £325 |
| Kenwood TM 733 - 2M/70cms Mobile | £399 |
| Tri TR9130 - 2M Multimode Base | £350 |
| Yaesu FT228RD 2M Multimode Base | £395 |
| Yaesu FT290R11 - 2M M/mode Mobile | £325 |

RECEIVERS

| | |
|--|-----------|
| AOR 7030 Acclaimed HF RX - Ex Demo | £645 |
| Icom R71E - General Coverage Receiver - Mint | £495 |
| Icom R71E - Gen Cov RX with ALL OPTIONS | £595 |
| Icom IC-R72 - General Coverage RX | £595 |
| III. SX400 - Base Scanner - Mint | £165 |
| IRC NRD 525 with VHF and UHF | £595 |
| Low HF125 - HF Gen Cov RX | £225 |
| Low HF150 - HF Gen Cov RX - Mint | £325 |
| Yaesu DX200 Ham Band Receiver | £65 |
| Realistic Pro-2006 - 400Ch Scanner (Choice of Two) | From £165 |
| Signal R532 - Airband Receiver | £135 |
| Sony Air7 Air and Marine Rev (Choice of two) | From £145 |
| Sony ICF Pro80 - SW and FM Broadcast | £135 |
| Yaesu FRG8000 with VHF (Choice of two) | £495 |
| Yaesu FRG7700 - General Coverage RX | £295 |

MISCELLANEOUS

| | |
|--|------|
| Capco 1KW ATU | £125 |
| Diawa CNA 1001 - Auto ATU | £145 |
| Diawa AF-606K Active Filter Unit | £85 |
| Diawa PS3041 - 30A Psw | £95 |
| Emotator 10ST5 - Heavy Duty Rotator - VGC | £185 |
| Global AT2000 - RX ATU - New - No Box | £79 |
| Kantronics KAM - Multimode TNC | £165 |
| Kenwood SP950 - Deluxe Matching Speaker | £85 |
| Kenwood PS51 - Matching PSU (R50 etc.) | £125 |
| MFJ 407B - Keyer | £49 |
| MFJ 259 Twin Meter Aerial Analyser with case | £195 |
| Microset R432-90 - 90W 70cms Amplifier | £349 |
| Optoelectronics 3000 - Frequency Counter | £100 |
| Optoelectronics 3000A - Frequency Counter | £120 |
| Tokyo Hy-Power HC400L Deluxe ATU | £145 |
| Tokyo Hy-Power HX240 - 2M->HF Transverter | £145 |
| Tono G550 Data Unit | £90 |
| Yaesu G500A Elevation Unit - VGC | £165 |
| Yaesu G250 Rotator | £95 |

Please call for our latest Used Equipment List and details of our Sell-On-Behalf Scheme.

PHOTO ACOUSTICS 01208 610625

SHORTWAVE RECEIVERS

| | |
|--|---------|
| Trio R600 Shortwave receiver | £215.00 |
| Yaesu FRG-100 Shortwave receiver | £375.00 |
| Grundig Yacht Boy 206 portable receiver | £79.00 |
| Sony ICF-7600 portable receiver | £58.00 |
| Siemens RK-702 portable receiver | £49.00 |
| Low HF-250 Receiver c/w FM/AMS & speaker | £499.00 |
| Realistic DX-394 Receiver | £189.00 |
| Icom IC-R70 Receiver | £449.00 |

SCANNERS

| | |
|----------------------------------|---------|
| AOR-3000 wideband scanner | £499.00 |
| Icom IC-R1 handheld scanner | £169.00 |
| AOR-2000 handheld scanner | £149.00 |
| Fairmate HP-100 handheld scanner | £149.00 |

HF TRANSCEIVERS

| | |
|--|---------|
| Kenwood TS-850S | £899.00 |
| Icom IC-720A c/w PSU | £479.00 |
| Yaesu FT-890AT | £689.00 |
| Icom IC-735 | £549.00 |
| Icom IC-745 with internal AC PSU | £489.00 |
| Icom IC-751 | £589.00 |
| Yaesu FT-757GX | £499.00 |
| Yaesu FT-707 80 - 10M transceiver | £299.00 |
| Alinco DX-70T HF + 6M | £580.00 |
| JRC JST-135 transceiver c/w matching PSU | £999.00 |

VHF/UHF

| | |
|------------------------------------|---------|
| Yaesu FT-4700 dualband mobile | £279.00 |
| Kenwood TM-701 dualband mobile | £299.00 |
| Alinco DJ-580E Dualband handheld | £219.00 |
| Alinco DJ-F1 2M handheld | £159.00 |
| Kenwood TH-75E 2m/70cms handheld | £229.00 |
| Kenwood TM-431E 70cms mobile | £239.00 |
| Trio TS-770E 2m/70cms Base station | £469.00 |
| Yaesu FT-50R 2m/70cms handheld | £229.00 |
| Kenwood TH-42E 70cms handheld | £189.00 |

OTHER ITEMS

| | |
|-----------------------|--------|
| PK-88 Packet terminal | £89.00 |
| FL-2 Audio Filter | £89.00 |
| FX-1 GDO meter | £39.00 |

SMC GROUP 01703 251549

HF TRANSCEIVERS

| | |
|-----------------------------|-------|
| PX TS450SAT Kenwood HF 100W | £899 |
| PX HL7000B Tokyo HF L/amp | £899 |
| PX FT747GX Yaesu HF 100W | £425 |
| PX FC700 Yaesu Man ATU | £109 |
| PX FT767GX Yaesu HF 2+6mtr | £1099 |
| PX FT102 Yaesu HF 100W | £425 |
| PX IC737 Icom HF 100W | £1060 |
| LX FTONE Yaesu HF 100W | £675 |
| LX FT890AT Yaesu HF 100W | £1250 |
| LX IC-706 Icom HF + 2/6m | £779 |
| LX FT7B Yaesu HF 50W | £235 |
| AX FT990 Yaesu HF 100W | £1650 |
| AX IC765 Icom HF 100W | £1699 |
| RX FT980 Yaesu HF 100W | £625 |
| RX FT101 Yaesu HF Valve | £260 |
| RX FT757GX Yaesu HF 100W | £495 |
| RX FT747GX Yaesu HF Mobile | £450 |
| RX FT107M Yaesu HF 100W | £275 |
| RX TS520 Kenwood HF 100W | £260 |
| RX TS440SAT Kenwood HF 100W | £750 |
| RX IC726 Icom HF 100W | £850 |
| RX IC761 Icom HF 100W | £995 |

VHF/UHF TRANSCEIVERS

| | |
|-------------------------------|-------|
| PX FT4700 Yaesu 2mtr/70cm | £329 |
| PX FT2700 Yaesu 2mtr/70cm | £279 |
| PX FT290R11 Yaesu 2mtr port | £375 |
| RX FT736R Yaesu 2mtr/70cm | £1299 |
| PX FT51R Yaesu 2mtr/70cm | £325 |
| PX IC3201E Icom 2mtr/70cm | £309 |
| PX C5800 Standard 2mtr m/mode | £259 |
| LX DJ580E Alinco 2mtr/70cm | £245 |
| LX TH21E Kenwood 2mtr port | £100 |
| AX FT790R Yaesu UHF port | £310 |
| AX TM-732E Kenwood 2mtr/70cm | £525 |
| RX DJ160 Alinco 2mtr/70cm | £155 |
| RX DJ560 Alinco 2mtr/70cm | £335 |
| RX FT8500R Yaesu 2mtr/70cm | £575 |
| RX FT212RH Yaesu 2mtr FM | £175 |

RECEIVERS

| | |
|--------------------------------|------|
| PX DX-394 Realistic HF Gen. RX | £225 |
| PX R2000 Kenwood HF Gen RX | £375 |
| PX FRG7700 Yaesu HF Gen RX | £295 |
| PX AR8000 AOR Scanner | £299 |
| PX AR2800 AOR RX M/base | £359 |
| PX AR1500ex AORScanner | £225 |
| PX AR3030 AOR HF RX | £399 |
| PX HF150 Low HF Gen RX | £375 |
| PX FRG100 Yaesu HF Gen RX | £395 |
| PX MVT8000 Yupiteru Scanner | £269 |
| PX SW-7600 Sony Portable RX | £139 |
| PX PRO2032 Realistic B/Scanner | £149 |
| LX ICR-72 Icom HF RX | £675 |
| LX FRG00 Yaesu HF RX | £425 |
| AX PRO-80 Sony S/wave RX | £120 |
| AX 2001D Sony S/wave RX | £169 |
| RX HF225 Low HF Gen RX | £385 |
| RX AR1500 AOR H/H Scanner | £165 |
| RX ICF-7600 Sony Port RX | £120 |
| RX NRDS35 JRCHF Gen. RX | £850 |
| RX FRG9600 Yaesu Base Scanner | £240 |

PX = Chandlers Ford HQ 01703 - 251549
RX = Reg Ward 01297 - 34918
AX = ARE London 0181 - 9974476

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PLEASE MENTION TRADERS' TABLE WHEN ENQUIRING ABOUT ANY ITEMS ON THESE PAGES!

DATA DIARY

In his bi-monthly column Roger Cooke G3LDI rounds up the latest in data mode news.

Good news - *DATACOM* wins National Club Section of *PW* magazine competition! The British Amateur Teledata Group's (BARTG) magazine *DATACOM* has won the *Practical Wireless* (National Club Section) Club Spotlight Magazine Competition. *DATACOM* scored 43 points out of a possible 50 making it the highest scoring national society magazine.

The *DATACOM* magazine is published four times a year and contains information and articles of interest to all amateur data communication enthusiasts. The

Members@bartg.demon.co.uk or by visiting the BARTG web site at <http://www.bartg.demon.co.uk>

Popular BBCs

The ubiquitous BBC B is really still a very popular computer for data comms. I have had several letters in response to the publicity given in previous columns, and it would seem to be a good idea to attend car boot sales as a possible source of these machines.

I was recently told that three

'Beeb Babe' is **Bill Douglas G0DVW**. Bill also says there has been a lot of interest shown in the BBC B, and he uses a variety of programs, including TNCV304, TNC304M, PK232, Kangaterm and one called Enigma.

Bill also uses his BBC for music, graphics and other data modes and is acquiring a Versaterm terminal unit. He has added a blue background to relieve eye-strain.

Bill says that there is often a BBC B available from **Chris Richardson**, of **8-Bit Software**, at a reasonable sum. Bill is pictured in **Fig. 3**, and his station is shown in **Fig. 4**. Both Stan and Bill can be reached at **GB7GFD.#42.GBR.EU**.

Another of the original Beeb Babes has re-surfaced! It's **David G13MMG**, of Bangor and his full hierarchical address is **G13MMG @ GB7TED.#63.GBR.EU**. David runs AMRAC 3.03M Software on his BBC B.



Fig. 2.



Fig. 1.

BARTG held its annual rally at Sandown Park in September. This year, as a new feature, Datastream 97 was introduced.

Datastream 97 was a series of lectures which were all very well attended. They included Data Comms for the Beginner by **Steve Jelly G0WSJ**, Advanced Data Comms by **Chris Lorek G4HCL** and Satellite Data Comms by **Richard Limebear G3RWL**.

There was also a question and answer session with BARTG, and the DCC represented on the panel, during which some very interesting topics were discussed. If you were there, look at **Fig. 1** and you may be able to pick yourself out of the audience. This was taken at one of the lectures.

For more information about BARTG please contact **Bill McGill G0DXB** who is QTHR. He may also be contacted at **G0DXB@GB7WRG**, by E-mail at

BBC B machines, with monitors and disk drives all sold for £1, an unbelievable bargain! I don't think it possible to better this as a starting price introduction into Data, but if you can better it, let me know!

The amateur I have chosen to write about in conjunction with the BBC B is **Stan Casperd G3XON**. Stan is shown in **Fig. 2**, sitting on a memorial seat to **G2NM**. Yet another



modes and bring in some form of regulation.

Relying on self-regulation is not enough, and this is manifested in the amount of QRM to be found on the beacon frequency of 14.100MHz. Stations are operating within 1kHz of this frequency and sometimes it is totally impossible to hear any



Fig. 3.

Beacon Frequency QRM

Packet has been on h.f. for years now, trying to live with RTTY, Amtor, Pactor and Clover, all data modes in a very small segment. There has long existed a need for an adequate band-plan to take into account all the data

beacons at all. I don't think ignorance can be used as an excuse, as it's a globally accepted beacon frequency and has been for some years.

Separating the various data modes would also be a good idea. Allowing Packet to mix it with RTTY and Amtor with Pactor is making tempers shorter and not allowing the beacons to be used for propagation studies, which was their original intention. However, it would be a brave soul who tried to rectify the situation now, after so many years of a free-for-all!

That's all for this time so, 'Happy Packeting' from me Roger G3LDI @ GB7LDI. Keep your news coming to me QTHR, Tel: (01508) 570278 or via E-mail to mtaylor@uk.mdiss.com

Fig. 4.

END

BROADCAST ROUND-UP

This month Peter Shore has more from the world of broadcasting, with reports of lots of station schedules to get you listening.

Find that there is little better in life than settling down on a long, cold winter evening and scouring the bands to see what's on the air. Particularly enthralling is the prospect of hearing stations on medium wave that during the summer become far less easy to hear.

Many frequency engineers take advantage of the better night-time propagation that winter provides, and you'll find that there are more frequencies to choose from and more transmissions to catch.

Voice Of Russia

Take the **Voice of Russia**, for example. It is currently using no fewer than four medium wave frequencies during the evening period, with three of those on simultaneously during a peak one hour block mid-evening.

The complete Voice of Russia English schedule for European audiences is: 0400-0600 on 693kHz medium wave (m.w.); 0600-1000 on 693 and 1323kHz m.w.; 1200-1300 on 693 and 1323kHz m.w.; 1300-1600 on 1323kHz m.w.; 1700-1800 on 4.92, 5.94, 5.965, 6.13, 7.125, 7.18, 7.44, 9.89, 9.765, 9.775, 9.88 and 15.40MHz plus 1143, 1494 and 1467kHz m.w.; 1800-1900 on 6.13, 7.18, 7.44 and 9.89MHz plus 1143 and 1467MHz m.w.; 1900-2000 on 4.92, 5.94, 5.965, 6.13, 7.18, 7.44 and 9.89MHz plus 1467 and 1494kHz m.w.; 2000-2100 on 4.92, 5.94, 5.965, 6.13, 7.18, 7.44, 9.82 and 9.89MHz plus 1467 and 1494kHz m.w.; 2100-2200 on 5.94, 5.965, 7.17, 7.18, 7.32, 7.44 and 9.89MHz plus 1467, 1494 and 1540kHz m.w.; 2200-2300 on 5.94, 5.965, 7.105, 7.125, 7.18, 7.205, 7.32, 7.36, 7.44 and 9.89MHz plus 1467 and 1494kHz m.w.

At 2130UTC each day there is a short newscast from **Radio Slovenia** in Ljubljana on 918kHz. The bulletin is in English and then in German, and slots into the station's usual Slovene language domestic output. The programme is principally aimed at tourists in Slovenia, and at those thinking of choosing the country as a holiday destination.

Station Activity

Back to the short wave bands now, and Kol Israel, the **Voice of Israel**, is on the air with English at: 0500-0515 on 7.465, 9.435 and 17.545MHz; 1130-1135 on 15.64 and 15.65MHz; 1500-1530 on 9.365 and 12.08MHz; 1645-1655 on 9.435 and 11.605MHz and 2000-2025 on 7.465, 9.365, 9.435 and 15.64MHz.

Current recommendations from **Nigel Holmes**, the Frequency Manager at **Radio Australia** for listeners in Europe to the Melbourne station's English service are now down to just two frequencies. Try 1330-1700UTC on 11.66MHz and from 2130-2300UTC on 11.695MHz. Both these transmissions are directed towards Asia and are from the station's 100kW short wave transmitter.

The **Voice of Turkey's** TRT service is on the air in the northern hemisphere winter with English at: 0400-0500 on 7.30, 9.685 and 17.705MHz; 1330-1430 on 9.63 and 15.29MHz; 1930-2030 on 5.96 and 6.175MHz; 2130-2230 on 7.20MHz and 2300-2400 on 6.135 and 9.655MHz.

Awaiting Result

Swiss Radio International (SRI) is currently awaiting the result of a government-sponsored inquiry into its effectiveness. The Berne Ministry of Communications has asked a research consultancy to investigate whether SRI's broadcasts are reaching the right audience by the right means. The report is expected to be published in early 1998, and is likely to affect the station's transmission strategy from the start of the summer period.

The SRI station can be heard in Europe with English programmes at: 0500-0530 and 0630-0700 on 5.84 and 6.165MHz;

1100-1130 on 6.165 and 9.535MHz; 1300-1330 on 9.535 and 6.165MHz and 2000-2030 on 7.41 and 6.165MHz.

Schedule News

Radio Tirana continues to broadcast from Albania, a country which only last Spring was in the middle of a bout of ferocious civil unrest. Tune in to English today: 0245-0300 on 6.115 and 7.16MHz; 0330-0400 on 6.14 and 7.16MHz; 1945-2000 on 6.035 and 7.135MHz and 2200-2230 on 6.025 and 7.135MHz.

Radio Thailand has use of a

Radio Mongolia has English three times a day, including: 1200-1230 on 12.085MHz for Asia and the Pacific; 1500-1530 on 9.72 and 12.085MHz for South Asia and 1930-2000 on 9.72 and 12.085MHz for Europe.

The Sri Lanka Broadcasting Corporation has been noted in English on 5.975MHz in Europe at 1900UTC. The transmission comes from the Northern England Skelton short wave station in Cumbria which carries **BBC World Service**, **Radio Canada International**, Voice of America and **KBS Radio Korea** programmes.

The Skelton site is now owned and operated by Merlin Communications, the management buyout company formed of former BBC World Service transmission staff at Bush House.

Swiss Radio International are currently awaiting the results of a government inquiry into its effectiveness (see text).



500kW transmitter at the **Voice of America's** Udon Thani site. English can be heard at: 0000-0030 on 9.68MHz (for Africa); 0030-0100 on 11.905MHz (for North America); 0300-0330 on 11.89MHz (for North America); 0530-0600 on 15.115MHz (for Europe); 1230-1300 on 9.81MHz (for Asia); 1400-1430 on 9.53MHz (for Asia); 1900-2000 on 9.535MHz (for Europe) and 2030-2045 on 9.535MHz (for Europe, followed by a 15 minute programme in Thai for European listeners).

That is all for this month's look at international broadcasting via the short and medium wave bands. Until the same place in PW next month, enjoy your listening and have a Merry Christmas and Happy New Year!

END

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The Publishers of *Practical Wireless* also wish to point out that it is the responsibility of the buyer to ascertain the suitability of goods offered for purchase.

BARGAIN

b a r g a i n

Compiled by Zoë Crabb

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19 Set MkIII + p.s.u., control box, headset, cables, vehicle mounting rack, fully working, no mods. £325. Canadian remote control unit for 19 Set. £25. Eddystone 358X, original p.s.u. and set of coils in box. Trevor on (01274) 824816.

Alicon DJG5E hand-held 2m/70cm (144/430MHz) TX/RX wide-band scanner, case, ext. mic., mag mount, car aerial, 6ft collinear, mint, £300. Cash lot. Also AKD HF3 150-30MHz s.w. RX, a.m. i.s.b., u.s.b., mint, £130 cash. Nick. Hants. Tel: (01420) 475573 evenings.

Alicon DX70T, two months old, as new, general coverage TX/RX, boxed, receipts, etc., £620 no offers. Tel: (01472) 316276.

Alicon DX70TH h.f. 6m (50MHz) transceiver, Alicon EDX1, manual tuner, both few weeks old, boxed with manuals, will not split sale due to lack of PP cost £850, bargain at £550. Tel: Barnet (0181) 440 9130 evenings or weekends.

AOR 7030 receiver with fitted enhancements, mint, boxed, with remote, manual and AOR made leads for recording and data. £625, no offers please, might take excellent broadcast hand receiver in part ex. Bill. Boucommouth. Tel: (01202) 430043.

AOR2001 scanner with p.s.u., £140. Yaesu FRG7 h.f. receiver, £140. Yaesu FRV7700 v.h.f. converter for FRG8800/FRG7700 h.f. receivers, £35. All in good condition and good working order, postage extra. Allan on (01491) 835652 evenings or (01252) 350247 daytime.

Argonaut QRP transceiver by Ten-Tec, s.s.b., c.w., 10-80m (3.5-28MHz), very good, in original box, £250, inspect and collect. Clive G4NVX, Hereford. Tel: (01432) 343309.

Butternut compact beam, 14-21-28MHz, £145. FT57A CTCSS FT-690II board, new, £30. FT-757707 external relay box, £25. GS065 alignment bearing, new, £35. Diamond X30 collinear, new, £40. PRO64 scanner, £75. Tel: East Anglia (0468) 756762.

C11/R210 complete station inc. mobile racks, £350. GRC-9 complete station, £180. KW77 RX, £55. Collins 32V1 TX, £85. ET-4336 h.f. TX, complete, £200 or swap for mil gear, wh.y? Ben, Wores. Tel: (01562) 743253.

Camper Nickelson receiver R7020 solid state general coverage, s.s.b., c.w., cal, £150. ITT Mackay marine receiver 3010.C valves, cal and s.s.b., excellent condition, rack model, £250. Icom 7000 v.h.f., u.h.f., plus h.f., remote, like new, £600. B40-D SP, manual, sensitive, £60. FRG-7700 + FRV7700 + FRT-7700, £275. Tel: Middlesex (0181) 813 9193.

Capco Roller inductor, £25. Two Capco high power variable capacitors, £10 each, plus aluminium case, all brand new, project not completed by silent key, approx. half price, no splits. G8AYK, Burnham-on-Sea, Somerset. Tel: (01278) 784570.

Drake R-4B T-4XB, g.w.o. with p.s.u., manuals, plus spare valves, £325 o.v.n.o. Geoff on (0802) 700966.

Eagle TT145 transistor and diode test meter, complete with box, leads and instructions, tests for leakage, current, etc., condition like new, little used. £25. Tel: N. W. London (0181) 205 9074.

Eddystone 358X 870, 870A, 750, EC10 x 2, scrap 7700 for spares, some others, ask, some separate spares and other sets! Collection advised owing to weight. Peter,

Surrey, Tel: (01372) 454381 or (0374) 128170 anytime.

Eddystone 358X receiver, p.s.u. and nine coils, repainted new valves, £50. TRIX (1960b7) mono valve amp and v.h.f./a.m. short wave (inc. handspring) tuner in rack cabinet, £40, buyer collects. John. Rochdale. Tel: (01706) 657920.

Eddystone 870A, EB35, 840C, all in g.w.o. just serviced 870A, mint, £85. EB35 power pack, battery pack, original f.m. aerial, £100. 840C just serviced, £90. Roberts R827, never used, £120. Tel: (01928) 561246 anytime.

Eddystone B40C short wave receiver, mint condition, collector's item, £150 o.n.o. Tel: (01482) 654915 after 6pm.

ERA BP34 c.w., s.s.b., a.m. filter, with power pack, £15 plus postage. Tel: 0191-526 7902.

ET-4336 h.f. TX, 350W, v.g.c., £200. Collins 32V1 ham band TX, £85. KW77 RX, £55. GRC-9 complete station, 2-12MHz, 15W a.m./c.w., £180. 19 Sets from £80. Need good 62 set? Ben, Wores. Tel: (01562) 743253.

Four valve battery portable radios, 40-50S Ever Ready, Vidor, Bush, Philips, Pye, Amphone, 90F, £130, may split. Bakelite radios DAC90, £90. Masteradio, £100. Ultra, £60. 60S transys peridio Zenith 880, £55. Tel: (01928) 561246 anytime.

FRG-7 comm RX, looks like new, completely overhauled two years ago and still in v.g.w.o., c/w digital counter unit, £150. Alex, Kent. Tel: (01732) 864920.

FRG-7 communications receiver in very good working order, £95, postage extra. Graham G1HFH, S. Yorkshire. Tel: (01709) 842503.

FRG-7, c/w digital read-out, boxed, manual, g.w.o., buyer collects, £95. John G8PKN QTHR. Tel: Oxon (01235) 224592 anytime.

FT-530 dual-band hand-held, high power battery case, charger, as new, original package, £280 o.n.o. Tel: (01246) 823112.

FT-747 12V transceiver, covers long wave/30MHz, c/w mic., £330 o.n.o. Would exchange with v.h.f. receiver, covering ham and marine. GW3COI, Abersoch. Tel: (01758) 712675.

FT-980CAT, SP980, FC75AT, VC300DLP-a.t.u./d-load, MFJ704LPF, Hy-gain tri-band vertical, prefer to sell complete, offers around £875, but will consider split, offer also includes G5RV + coax and feeders, etc. Steve on (01482) 795646.

Grundig YB500 world receiver RDS90, 90 ROM memories, 40 programmable memories, i.s.b., u.s.b., f.m. stereo with headphones, excellent receiver in mint condition, £79 o.n.o. Tel: Falmouth (01326) 340574 day or evenings.

Iheaterite Explorer, one owner, mint, £625. Create 5-ele tri-band Yagi, £300. TS-700, boxed, good condition, £210. 4CX1000A valve, £100. Tel: (01974) 251420.

Heathkit TX, model DX-40U, v.f.o. model DXVF-U, Eagle (bug) key, model KY-102, £160 the lot. Tel: (01485) 520903.

Hitachi music centre SDT7785, 30W per channel amp, four band radio cassette, turntable, pair Celestion Ditton speakers, all v.g.c., except fault in turntable drive, complete with teak cabinet and speaker stands, £150. Tel: Surrey (01372) 458146.

HMV valve radiogram, upright rosewood cabinet, offers. Cossor valve radio, offers. Elac (Electric Acoustic Industries), loudspeaker, 1950s cream cabinet, 12 x 10in high, offers. Tel: 0181-851 9796.

10X crystals for 3.5 and 7MHz c.w., suitable for valve TXs, £3 each. G3MCK, not QTHR. Tel: Oakham (01572) 756444.

1C-275E 2m (144MHz) all-mode base station, 25W, built-in p.s.u., £650. Versatower EW45 wall mount, parallel and right angled drop brackets, dismantled ready for collection, £375. Icom PS55 20A p.s.u., £90. Simon G4TVR, Solihull. Tel: 0121-745 8222.

1C751A TX/RX, general coverage, manuals, boxed, matching speaker, all in mint condition, £500. 'MAM' transceiver 28 to 144MHz, fault on p.a., £20. Dave on (01443) 683912.

Icom 280E 2m (144MHz) f.m. transceiver, 144, 148MHz with Icom mobile remote cable and bracket kit, v.g.c. with manuals and boxes, £80, will post if you can't collect. Peter on (01623) 722330 after 5pm.

Icom 900E multi-band system with 2m (144MHz) and 70cm (430MHz) modules, all boxed, fibre optic connections and remote head, also desk mic., ideal for large vehicle, marine or discrete installation, £270 o.n.o. Paul, Midlands. Tel: 0121-220 4290.

Icom IC-740 transceiver, Icom AT-150 auto antenna tuner, Icom IC-PS20 power supply, mint condition, complete with boxes and instructions, £450. Tel: West Midlands (01562) 515305.

Icom IC-AT160 auto a.t.u., £200. Icom PS55 p.s.u., £100. Yaesu MD1 base mic., £60. Realistic HTX 100 28MHz s.s.b./c.w. TX/RX, £135. G2250 rotor, £75. AR40 rotor, £65. Hdury rotor, £150. 2m (144MHz) 9-element X Tonna, £40. Tel: Watton (01953) 884305.

Icom IC745 f.m. and c.w. filters, PS15, £550. IC2511 45W f.m. mobile, £100. Both with boxes. KW1000 amplifier, £225. G3XPO, Kent: (01303) 892128 evenings.

Icom ICR71E receiver, boxed, mint with remote and f.m. unit, £500, may exchange for h.f. transceiver, Datong AD270 active antenna, £50. Diawa receiver, a.t.u., £25. Tel: (01937) 844197.

Intertan Realistic DX394 receiver, 150kHz to 30MHz s.s.b., a.m., a/c mains or 12V d.c., as new with handbook and box, £140. Tel: London (0181) 785 9325.

J-beams, 70cm (430MHz), 14-element parabean, £10, 8/8 slot, £15. Morse tuition record, £5. Buyer collects. G8AHE, Birmingham. Tel: 0121-458 2406.

Kent Morse Tutor and Morse tapes, all as new, £40 the lot. Tel: (01745) 852691.

Kenwood TS-120V inc. manual, excellent working order, can be seen or heard working, 10W max, so great for QRP, Novices, mobile. £200 o.v.n.o. Ray, Nr. Bristol. Tel: (01934) 743787 evenings.

Kenwood TS-1408 and power supply PS-430 amateur bands, transmit and general coverage receive, g.w.o. and nice condition, sold together, £525. No packing so buyer collects or would deliver (reasonable distance). G4MNB, Swindon. Tel/FAX: (01793) 826325.

Kenwood TS-1408 with c.w. filter, mic., SP430 speaker, boxed, good condition, £500. Kenwood TW4000 with mic., mobile mount, duplexer, £200. Sony AN1 wide band antenna, £35. P510n organiser LZ64,

£25. Tony G4KHT, QTHR. Tel: Hull (01482) 843457.

Kenwood TS-4408, recently overhauled by Kenwood agent, new p.l.l. board fitted, perfect working order against original spec., fitted a.t.u., voice synthesiser unit, 270Hz c.w. filter, £500. G0VZZ, Canterbury. Tel: (01227) 464157.

Kenwood TS-50, power supply, a.t.u., all very good condition, little used, £800. Buyer collects. Joe G4YLS on 0121-556 3859.

Kenwood TS-570D, boxed, mint c.w. filter, matching d.s.p. desk mic., £1200. MFJ mag loop, never used outdoors, mint, £200 o.n.o. Chelcom 80m (3.5MHz) vertical, £60. 6m (50MHz) vertical, £15. Tel: Evesham (01386) 48056.

Kenwood TS-930 power supply board, brand new, £45. MC60 mic with stand, £20. TS-930 matching speaker, offers. Heath AG4U audio signal generator with manual, £35. DCPS PS304II, new, boxed, £75. G4EKL, QTHR.

Kenwood TS-9408, £1150 o.n.o. TS-9405, has a.t.u. build inside, must sell, and new filters, not a mark on the set, condition as new. Tony Boylan, 21 Callan Bridge Park, Armagh, Northern Ireland. Tel: (01861) 511257.

Larkspur C11 transmitter, mint condition, with p.s.u., R210 receiver, a.t.u., J-Box, top and bottom trays, all cables, headset, etc., fully working station, £475. Wanted 18 Set, 19 Set or 22 Set, part-ex considered. Tel: W. Yorks (01274) 824816.

Learning Morse? Finding it difficult? Just the solution you need - Morse Tutor. Will run on DOS, Windows 3.1 and Windows 95, will run on any PC from 286-Pentium, £15. Mr P. J. Lewis M0A1PE, 115 Toberoney Road, Dervock, Ballymoney, Co Antrim, N. Ireland BT53 8BS.

Low HF-125 receiver with manual, little used and in superb condition, £195. Neville, Kent. Tel: (01634) 408961.

Low HF-150 stack, as new, made up of receiver, key pad, p.s.u., pre-selector, extension speaker and filters, three tier rack, manuals, £495. Steve, Derby. Tel: (01332) 550647.

Mains p.s.u., 260V to 230V, 32V to 410V, current meter to 250mA voltage, £20. Volt Meter to 400V, heavy, locals only, variable output, advance sig. gen., r.f. 30kHz to 32MHz, £15 local. GRBSK, 290 Priory Road, St Denys, Southampton.

Marconi marine 'Sentinel' RX (Eddystone 1004) with manual, £80. Marconi Salvor III TX in rack, £50. Yaesu FT-301 relay box, £10. Quad II audio amp and control unit, £80. Pete, Glos. Tel: (01452) 741036.

Maxon SMX4150 p.m.c. transceiver, hi-band v.h.f., and Motorola GP300 hand-held v.h.f., the pair, £200. Tel: Grimsby (01472) 827829.

Microset RU-20 amplifier with pre-amp, brand new, £65. Yaesu MD1 base mic., £55. FTV144 2m (144MHz) module, brand new, £85. DRAE 3-way switch, 'N' type, £20. FT57A CTCSS board for 690/290, etc., new, £30. Tel: Norfolk (0468) 756762.

Microwave Modules 432MHz 100W linear amplifier for 70cm (430MHz), model MML 432/100, 10W in, 100W out, good working order. £125. Michael Watkins G0NBB, Whitstable. Tel: (01227) 266460.

Net Set PRO46 hand-held scanner, 100 channels, 30,000 frequencies, a.m. plus f.m., 60 to 960MHz inc. airbands, 2m (144MHz), 70cm (430MHz), etc., as new, with

handbook and box, etc., £85. Tel: London (0181) 785 9325.

NRD-525, boxed with manual, excellent condition, £600. Vinc on (01487) 823879.

Old HMV radiograms, 1931, £125. 1936, bureau style cabinet, £175. Valve radios, around 1953, HMV, £35. Murphy, £12. McMichael, £15. Murphy console, £35. All in good working order. Tel: Derby (01332) 700658.

Oscilloscopes Cossor model 1035, Soliton CT316 type 13A 105/831 all valve models, reasonable, to clear. Tel: (01666) 823338.

Polar weather satellite receiving station, spectrum comms receiver, Timestep PROsat card, software and leads, crossed dipole aerial, £200. Icom AT100 auto a.t.u. with leads, £200. Collect or pay postage. Steve MOARZ, Northampton. Tel: (01604) 32478.

Pre-war HMV radiograms, model 521, 1931, £125. Model 581, 1936, bureau style cabinet, £175. Both working well, 1939 EKCO table radio, push buttons inoperative but manual tuning works well. £25. Tel: Derby (01332) 700658.

R7020 with full handbooks and circuit, £100. Racal RA17L, £100. RA98 sideband adaptor, £50. Datong v.f.o. converter, £25. Maplin 500MHz frequency meter, £50. Want Sony 2001D. Tony, Worcester. Tel: (01905) 641759.

Racal RA1772, excellent condition, £525. Marconi sig. gen. TF2002, g.w.o., with manual, £75. HP oscilloscope 50MHz, g.w.o., transit case H/B, £135. Racal 125MHz counter, £20, g.w.o. Wanted Manual Racal counter 9904. Tel: (01502) 715419 evenings.

Racal RA17L comms receiver, 30kHz to 30MHz, is big, permission needed for bedroom use, £125. Robin on (01449) 740788 or E-mail: robin.taylor@btinternet.com

Racals 17 & 17C, Kenwood R600, PRO2006, Codar AT5 & p.s.u., AR88LF, Eddystone 770R, several Eddystone 1990R/3 p.s.u. panadaptor, Heathkit HW101 p.s.u., some Racal/HIRO spares, will swap part-ex, after Racal 1772. Eric, Lincs. Tel: (01254) 705544/760300.

Radcom back issues, Dec 1973, May 1975, July 1975, May 1976, Sept 1981, Mar 1985, Jan 1986, Aug 1988, Nov 1988, Dec 1988, offers. Tel: (01206) 241032.

Radio Spares line voltage conditioner, cost new over £500, model 208.361, excellent for line transient suppression, r.f.i. filtering, 3% stability, accept. £250 plus carriage, wt 21kg or buyer collects. G4EKL, QTHR.

Realistic base scanner, v.h.f./u.h.f., excellent condition but has noisy volume control, hence, £50. Medium duty rotor, £65. 9-element cross Tonna, £40. Diamond X30 dual band collinear, brand new, £35. Tel: Norfolk (0468) 756762.

Realistic PRO2025 scanner with p.s.u. and unused antenna, £650 the lot. Also SMC S45L1, £50. Tristan G7JRD, Lincs. Tel: (01507) 604347.

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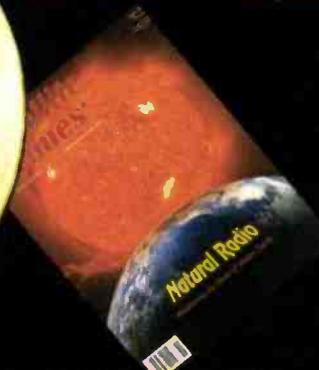
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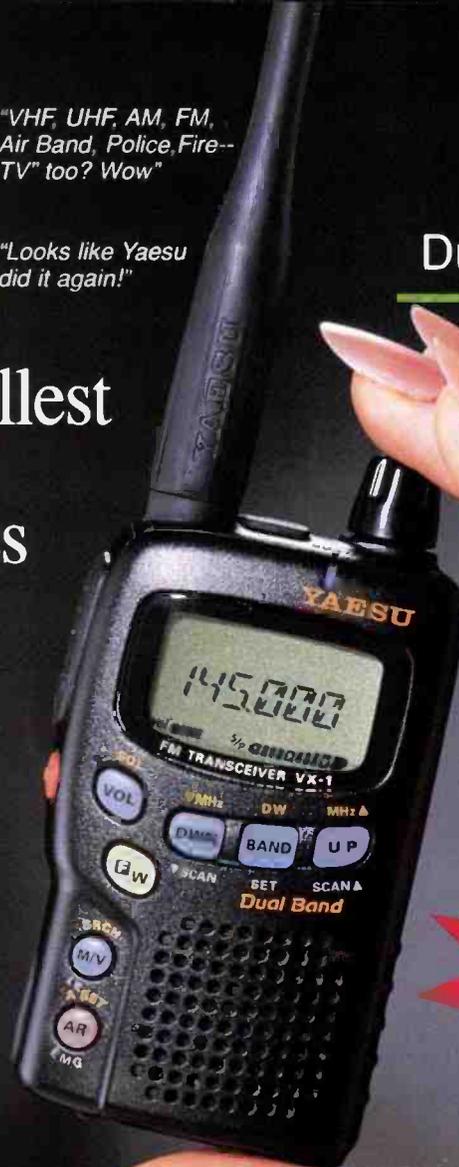


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