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**£1499**

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- \* 25 / 12.5kHz Steps
- \* 20 Memory Channels
- \* Wideband Receive
- \* Uses 6 x AA cells (not inc.)

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**£69.95**

CTCSS

Repeater Shift

Digital Display

12.5 / 25kHz Step

20 Memories

230mW Output

Uses 2 x AA

**Offer Ends 31/10/99**

**ICOM IC-T8E**

- \* 6m / 2m / 70cm Handheld
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- \* 25 / 12.5kHz Switchable
- \* 123 Multifunction Memories
- \* CTCSS & 1750Hz Tone
- \* Programmable Features
- \* Ni-cads & AC charger

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**ICOM IC-Q7E**

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- \* CTCSS Encoder
- \* Rx. 30kHz - 1309MHz FM / AM
- \* 200 Multifunction Memories
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- \* Runs from 2 x AA Cells

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- \* Wideband Rx. FM WFM & AM
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**KENWOOD TM-V7E**



- \* 8 Frequency Steps & 280 Memories
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**ICOM IC-2800H**



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**Phone**

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- \* Colour TV Screen
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- \* 50W 2m 35W 70cm & Remote Head Unit

**ICOM IC-207H**



**£369**

- \* 2m / 70cm
- \* 50W / 35W
- \* 180 Memories and 7 Tuning Steps
- \* Detachable Head Unit / Clear Display
- \* Microphone, Mounting Bracket etc.

**KENWOOD TH-D7E**



**£289**

- \* 2m & 70cm Handheld
- \* 6W Output on 13.8V DC
- \* CTCSS & 1750Hz Tone
- \* Built-in Packet Modem
- \* 200 Alphanumeric Memories
- \* DTMF Keypad & AM Airband
- \* Ni-cads & AC charger

**KENWOOD TM-G707E**

**£279**

- \* 2m and 70cm
- \* 50W and 35W
- \* Full CTCSS
- \* 180 Alphanumeric Memories
- \* Detachable Head with Amber Display

**YAESU FT-8100R**



**Phone**

- \* 2m and 70cm
- \* 50W and 35W
- \* Wideband Rx AM & FM 208 Memories
- \* 7 Tuning Steps DTMF Remote Front panel
- \* Very compact, supplied with all hardware.

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Collect your **second coupon** towards your very own copy of the **PW Callsign Directory CD** offer.

## 14 WHAT IS A?

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## 16 EVERYONE'S A WINNER!

**Rob Mannion G3XFD** puts all who entered this year's **PW Club Spotlight Magazine Competition** out of their misery and presents this year's winners and runners up!



## 22 GET GOING ON MICROWAVES

This month sees the third part in the 'Get Going On Microwaves' series brought to you by **David Butler G4ASR**. Due to popular demand, the series has been extended to include a **FOURTH** part which will be published in next month's **PW**!

## 26 RADIO BASICS

**Rob Mannion G3XFD** suggests some ideas for your workshop - now that you've built some test equipment!

## 32 AUDIO ASPECTS OF AMATEUR RADIO

**Gordon King G4VVF**, our regular 'Looking At' author, brings you an interesting article on the subject of the 'Audio Aspects Of Amateur Radio' which he suggests is often sadly neglected!



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**Jim Brightman G0JXN** describes the final stages of the 'Sentinel' power/s.w.t. meter project.

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**Richard Newton G0RSN** reviews the new PMR-446 radios from Alinco - the new DJ-SR1! Ever wondered just what these new licence free radios have to offer? Well, you need look no further ...



## 44 DISABILITY & THE RADIO AMATEUR

**Paul Essery GW3KFC** tells us about REMAP and how this voluntary organisation helps the disabled. You can benefit and help too!

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## 56 ELECTRONICS-IN-ACTION

**Tex Swann G1TEX** has an update on the Morse Stager project as well as some information on an item which he came across at the Leicester Show this year!



## 58 ANTENNA WORKSHOP

**Peter Dodd G3LDO**, after reviewing the MQ-2 antenna in the August 1999 **PW**, found he could make it perform better! Read this month's 'Antenna Workshop' to find out how.



## 60 VALVE & VINTAGE

The very neat piles of 1950s and 1960s **PW**s on the vintage wireless 'shop' counter tell us that the man in the brown dust coat is **Phil Cadman G4JCP** and it is his turn to man the 'shop' this month.

## 64 INDEX 1999

Missed an article this year and haven't a clue which issue it was in? Don't panic, the 1999 Index is a list of all the articles which we've published this year - from January to December 1999!

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**76 RadioScene**  
 Chris Edmondson returns with more anecdotes from 'Down Under'...



**WIN! An Alinco DX-70TH - courtesy of Nevada. Starting in the January 2000 PW!**



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## ALINCO DJ-G5EY

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- Full Duplex ie. simultaneous receive VHF/UHF
- Spectrum channel display
- Optional extended receive including Airband 108-173.995MHz 400-511.995MHz 800-999.990MHz
- Over air cloning
- Cross band repeat
- Up to 5W RF output
- 100 memories

£289.00

## ALINCO DJ-SR1

New PMR 446 Radio

Lightweight and small enough to fit in a shirt pocket - it is no toy! It has the performance to achieve maximum range on the new PMR 446 allocation with outstanding clarity on both received and transmitted signals. The 'flip-up' antenna provides both convenience and optimum efficiency.

£119.00

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- 39 CTCSS codes per channel
- 20 memories
- Memory scan
- Battery level indicator
- Switchable Hi/Low power
- Speaker/Mic jack
- Monitor (open squelch) key
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### OPTIONAL ACCESSORIES

BC10 .....Drop in Charger.....£29.95  
NBP A1 .....NiCad Pack.....£12.95

## THE LATEST ALINCO DX-70TH

100W HF Transceiver plus 100W on 6 mtrs

Rob  
Mannion's  
63XFD  
favourite  
radio?



£699.00

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- TX - all HF + 6mtr
- RX - general coverage 150kHz - 30MHz 50MHz - 54MHz
- SSB, CW, AM, FM and digital modes
- 100 memories
- Detachable faceplate and remote mounting kit available
- Speech processor standard
- Narrow filters fitted as standard
- 100W output on HF & 6mtrs

- Selectable 4 stage RF gain 20dB to +10dB
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- Excellent RX sensitivity
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- Length: 2.7 metres

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£219.95

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- Call cloning facility
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### FOR DJ-V5

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EMS-47 .....Speaker mic with volume control.....£19.95

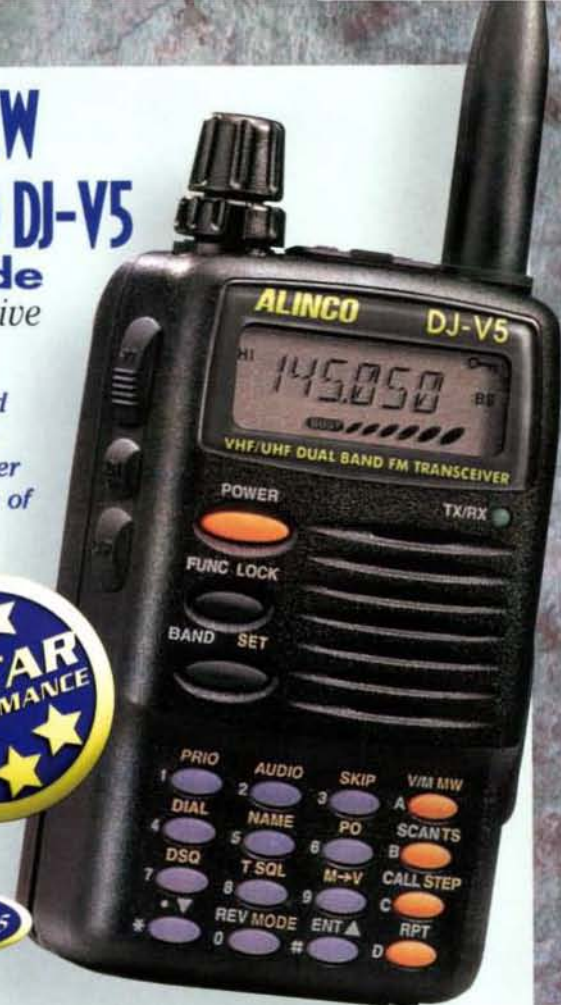
EMS-51 .....Miniature type speaker mic.....£24.95

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A Dual Band  
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**PLUS** Scanner  
for the price of  
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- Expandable Receive Range, (76 - 999MHz)
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- 200 memory channels plus two call channels
- 4 scan modes  
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PROGRAMMED SCAN - Scans channels programmed in memory for dedicated frequency range.  
MEMORY SCAN - Scans memory channels  
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## THREE REVIEWS!

**Richard Newton** reviews  
the new **Yaesu FT-90R**  
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courtesy of **Yaesu UK Ltd.**

**Katherine Taylor 2E1HFX**  
reviews **SIX** pieces of  
144MHz equipment  
suitable for the Novice  
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**AT-600** hand-held; the  
**Hora C-150** and the  
**C-408** hand-helds; an **AKD**  
**2001** transceiver, an  
**Alinco DJ-V5** and finally  
an **Alinco DJ-195!!**

**Rob Mannion G3XFD**  
reviews the **Carlton**  
**receiver kit** from **Lake**  
**Electronics** which had to  
be held over from last  
month's magazine due to a  
packed issue!

## EVEN MORE ON MICROWAVES!

After discussions with the  
Editorial department, it  
has been decided that the  
'Get Going On  
Microwaves' series be

extended to a fourth and  
final part in which **David**  
**Butler G4ASR** brings you  
information on where to  
obtain components, kits  
and surplus equipment for  
use on the microwave  
bands.

## ANTENNAS-IN- ACTION

**Tex Swann G1TEX** has  
more antenna related  
news, reviews and projects  
for you next month.

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favourites including:

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Carrying on the Practical Way  
Keylines  
**Looking At...**  
News  
Radio Scene  
Valve & Vintage  
**Antenna Workshop**

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\* Contents subject to  
change

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**A**s I write this - the last of this year's 'Keylines' (of the 1999 volume anyway), I'm thinking back to the 'Leicester' show at Donington Park in mid September. It was my intention to write a little on my experiences, however, I was spurred into action again by the letters from **Howard MOCMG** and **Keith M1ADQ** which appear in this issue's 'Letters' pages.

Both readers commented on the 'new look' and very 'open' PW Publishing Stand at the show and that they didn't see me 'on duty' during the show ... even though Keith M1ADQ apparently saw me several times 'off' the stand. Well, as many of you already know ... **I was there**, but many (so it seems from your letters, E-mails and telephone calls) did not see me because of the newly provided 'come and sit with the Editor' facility.

My colleagues involved with the show had designed a totally new stand with its 'open' and inviting presentation. This worked extremely well for everyone else involved. However, even though I had a 'personalised' section of the stand where readers and other visitors could come and chat with me - after all, for some people it's the only time we might be able to meet during the year - because it was 'screened off' from the main part of the stand many readers walked by the stand and assumed I wasn't there.

(Those that did enquire were brought to me and got the full benefit of the 'personalised space' away from the hustle and bustle of the main stand where we could chat. And, in this respect, the new lay-out worked very well indeed).

Even though I was dismayed at missing so many of you, I realise that there are tremendous benefits for everyone by carrying on with the new design. All we've got to do is to work out a way of clearly indicating I'm 'in position' so to speak! Several suggestions of large 'cut-outs' of G3XFD (similar to the famous beer adverts on TV) have been volunteered.

So, for the 2000 show at Donington Park remember to look

out for me at the end of the PW stand - and if you can't see me ... ask and we'll meet up! I'll be delighted to meet you there.

## Lighting & Ventilation

The large enclosed and windowless design of the Donington Exhibition Hall requires efficient lighting and ventilation, particularly with all the hot air (from us and the equipment!). Firstly, however, as the show settles down to the new venue and we get used to it, I feel sure that the somewhat inadequate lighting **will improve**. I hope so because various spotlights being used by nearby exhibitors certainly dazzled me at times!

Secondly, and much to my surprise, I've found that the new venue seems to suffer the same ventilation problems as the old Granby Halls - until the air-conditioning systems come 'on line' that is. My feeling is, because of the windowless nature of the building and that the side roller door shutters are mostly kept closed - that it's a necessity for the air-conditioning to be kept on all the time, which wasn't the case (in my opinion) during this year's show.

When I spoke to the organisers (easy to spot and talk to as they're dressed in the now-traditional 'Leicester' show maroon jackets) they were aware and acted on the problem. However, (even though I'm a dedicated 'Non Smoker' myself) I don't think the suggested 'No Smoking' ban would work because the organisers would not be able to enforce a ban on smokers - who'll manage to indulge whenever and wherever they can! No, I think the answer has to be the following request to the organisers - Air Condition and ventilation on 'Full Blast' next year please!

## Older Style Components

My Editorial in 'Keylines' on the topic of 'Traditional Components Disappearing?' in the October issue has brought an interesting

response from readers - including the letter from Ian Johnson ('Star Letter'). However, although most of the letters and E-mails received on the subject gave me much encouragement - that from **Mike Turnbull G7PWL** who lives in Whitley Bay, Northumberland was most re-assuring and helpful!

In his letter to me in September - after he'd read 'Keylines' - Mike, our helpful reader was not only able to give me good news regarding the manufacturer of 'traditional' style resistors - he had even contacted the company's UK Sales Manager on my behalf! (Thanks Mike!).

The result is that I now have a letter - originally sent to Mike Turnbull - from **Ken Adamson of Welwyn Components**. In the letter Ken Adamson says: "Rest assured, Welwyn still manufactures hundreds of millions of wire ended resistors here in Bedlington (Northumberland). Whilst there is an undoubted move towards surface mounted circuits, there are still many electronic equipment manufacturers producing through-hole printed circuit boards and this is expected to continue for many years to come".

The friendly letter from Ken Adamson ends with an invitation to Mike suggesting that I would perhaps like to visit the factory and see for myself. And I can tell you that the invitation will be taken up next year and I hope that both Mike G7PWL and myself will be able to visit the Welwyn factory in Bedlington and eventually present an interesting and informative article in PW not long afterwards!

So, watch this space readers, and if you know of any other UK-based manufacturing of 'traditional' components - make sure you let me know. Thanks again to Mike and everyone who responded. It's not all 'doom and gloom' is it?

## RA Press Releases

As many readers will be aware, for many years I've been working very hard to convince the Radiocommunications Agency of the need to provide Press Release information - especially those on licence revocations and criminal court case proceedings - with enough information for our readers. I've always regarded the need for full information to be of paramount importance, because otherwise scant information based press releases can lead to PW and other magazines to be just 'notice boards' for Government Departments so that they can be 'seen' (by other Departments perhaps?) to be doing their jobs.

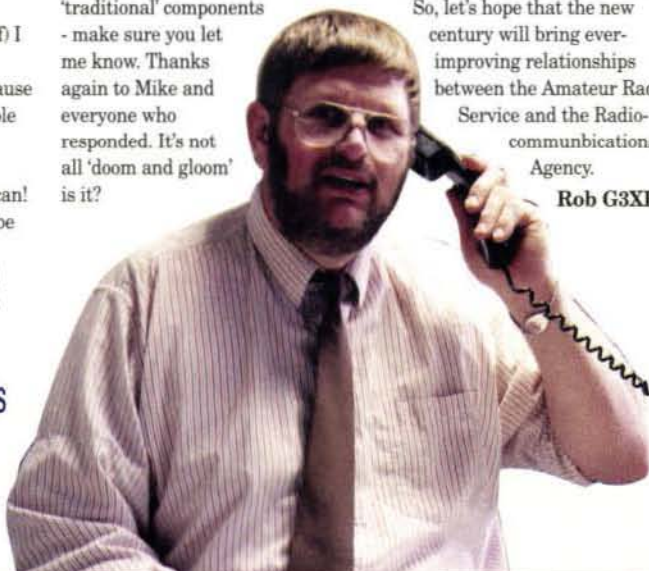
It's taken a long time (and I write this from personal experience as I was a Civil Servant myself in the past) to convince the naturally conservative (or do I really mean 'secretive'?) Government Departments to 'work with us'. However, last month's RA Press Release (page 13 under the heading 'Swindon's Breaker Baker Silenced' should be seen as a real 'breakthrough'.

However, despite the 'breakthrough' I think has been made by the press release - we've now got to convince the RA's Press Office and Legal Dept. to speed things up. I say this because surely there's no reason why it should take from **June until September** to issue a press statement (that's the time it took for the statement involved to work its way through the 'system').

Well done RA - although I think **you could still do better**, but at least you do seem to be listening to what we're all saying in our attempts to 'work with you'.

So, let's hope that the new century will bring ever-improving relationships between the Amateur Radio Service and the Radiocommunications Agency.

**Rob G3XFD**



ROB MANNION G3XFD CONGRATULATES THE RA BUT SAYS 'THERE'S STILL WORK TO BE DONE'





COMPILED BY ROB MANNION



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.

## Scarcity Of Older Components??

Dear Sir

I have just read the Editor's comments ('Keylines' November) on the scarcity of the older style components. I have been in the electronics trade for over 20 years, over that time I have been at the sharp end of the trade, both in the manufacturing field and in the repair side.

The small outline type components have been creeping up on us for over 15 years. I first came across them at Marconi Instruments in St. Albans, Hertfordshire.

At first they caused many problems, the main way of soldering then was a vapour phase process using an inert fluorocarbon liquid. This was heated to over 200°C. The circuit board was lowered into the vapour, as it condensed, the special solder melted and flowed. The substance was called Fluorinert and cost over £50 per pint.

The main thing that could happen was that the resistors would lift at one end because of the solder paste not melting at both ends at the same time. (This was called tomb-stoning).

After some time they went over to an infra red reflow system. The basic drawbacks are that they are very fragile, many circuit boards had to be re-laid out because as they were heated, they distorted, when they were fixed in place the components cracked.

Ask anybody who repairs video cameras about the electrolytics used. They have a very nasty habit of leaking all over the circuit boards.

So far I have found Farnell Components to stock many of the traditional type of components. They will supply anybody and you can phone up and pay by credit card or open an account very easily. They are on Tel: 0113-263 6311 (sales) or FAX: 0113-263 3411 (24 hours). Canal Road, Leeds LS12 2TU. Delivery is free and they keep the best range of resistors to be found anywhere. I have used their service and can recommend them without any hesitation at all. Their catalogue covers everything you could ever need.

The other people who can often supply that hard to find item are Cricklewood Electronics of Cricklewood, London. Even Maplin do a bigger range of components than ever before. Tel: (01702) 554000 ... they still supply mostly the wire ended components.

If you really get stuck, try me on Kidderminster 750971 after 7pm. I have many rare components from my days as a repair person. Yours sincerely from (a new subscriber).

Ian Johnson  
West Midlands

Editor's reply: Thank you Ian for an interesting letter. Please see 'Keylines' editorial for further comments.

## Saint Gabriel... Already on Frequency!

Dear Sir

With reference to Adrian Soane's letter in the October *PW* about a Patron Saint for Radio Amateurs. I am writing to inform you that there is a Patron Saint for radio operators, St. Gabriel (the messenger angel) which is celebrated on the 29th September (the same day as St. Michael, Patron Saint of parachutists) by the French Army Signal Corps.

From 1980-1995 I served as a radio operator/telegraphist in the French Foreign Legion and wherever we were based or serving we worked closely with the French regular army signal corps, and every year the Legion radio operators would be invited to join them for the Fete du St Gabriel.

The day would start with a cross country running competition followed by a church service later in the morning. Lunch began with a toast to St. Gabriel and to all radio operators killed on active service, lunch usually continued for the rest of the day with large amounts of good French wine being drunk and a jolly good time being had by all.

I hope this sheds more light on the subject.

73 from Phil Measom  
G0ZZZ/F5PEH  
London

## Not Christians?

Dear Sir

With reference to the subject of religion in our hobby. The October issue of *PW* had a rather nice letter from Adrian Soane M0ABY suggesting that Max Kolbe SP3RN be made Patron Saint of Amateur Radio.

Well, I can imagine that there were thousands of radio operators who gave their lives for the freedom of the human race and who were not Christians and who would certainly have abhorred the idea of Amateur Radio groups adopting a Christian symbolism as patron.

Why did Adrian not suggest Mercury as a symbol? After all, lots of us wore that in our cap badges so that the Adrians of this world could feel free to proselytise their own religious myths and cause even more divisions in the human communities. Yet that attitude is not the outcome when it is the other way around. It appears that 'sleekit beasties' are more respected than the genuine 'evolved' non-religious truly natural human beings who wish to communicate with each other free of the ancient scourge of insidious mythologies.

Robbie GM4RAI  
Wick

## Becoming A Radio Amateur

Dear Sir

I have to agree totally to Mel Gardiner's letter in the October issue of *PW*. I first became aware of Amateur Radio in the late sixties but didn't take the RAE until 1998.

First of all, how does one become a Radio Amateur? You have to sit an exam, that's OK, but you can only sit or take the exam on two occasions in the year - the second Monday in May or the first Monday in December. This, however, is about to change in the near future.

I had to wait 57 days between sitting the exam and going on air - this hobby is all about communication, I think! Anyway, I assume, like most Radio Amateurs, I was thinking about the 12wpm Morse exam. Not anymore, often making well over 300 contacts on 6m in Europe. I began to wonder why I could to these stations on 6 but not on the other bands I could hear them on. Does having the ability to understand Morse make one a better operator? I don't think so.

Regarding the risk of Amateur Radio looking 'fuddy duddy' - take a look at the front cover of the October 1999 edition in the top right hand corner is a photograph of the Belgian operator ON6UG smiling and holding a small dish for microwave use. Step back for a moment, take a look at this magazine cover on a shelf in the newsagents.

This image doesn't help to promote or encourage new blood into the hobby. It's images like these that give the hobby a 'fuddy-duddy' image. There is a communications revolution taking place right now. If Amateur Radio doesn't wake up and change soon, then it will fade into the background of its own QRM.

Matthew McLauchlan  
Fife

Editor's comment: The smiling, somewhat younger face of ON6UG was deliberately chosen for use on the front cover in October because he WAS smiling - something of a rarity in Amateur Radio photographs where the rather 'stiff' Victorian image still prevails! Perhaps readers would like to suggest an image we can project if the photograph demonstrating obvious enjoyment of the hobby is not suitable?

## Pace-Maker Advice Please!

Dear Sir

As a regular reader of *PW* over the years, I have particularly appreciated both the technical items and the views and experiences of your correspondents. I have recently been fitted with a Pace-maker and am seeking reassurance that it is safe to continue to operate my equipment which is run at all times, barefoot.

There must be many amateurs who have faced this problem who would be happy to share their experiences and



professionals who would know the limitations necessary.

May I, through the auspices of your columns, seek the information I require in the hope that I can renew my active participation in what has been a fascinating hobby for me over the years. Thank you.

**Les Ward G4XGC**  
**16 Fishers Close**  
**Blandford Forum**  
**Dorset**  
**DT11 7EL**

**Editor's comment:** Les does not state what form or model of pacemaker he has. However, I have no doubt that other readers in the same situation may well have had specific instructions and can help. (Please write directly to Les).

## Compulsory Logging

**Dear Sir**

I would go along with the thoughts expressed by **Walter Farrar G3ESP** ('Letters' August PW) concerning compulsory loggings. What might be more useful would be the accurate maintenance of a station diary indicating times of station opening and closing, experiments and results of transmissions made, alterations to antennas, etc.

This would leave time to fill in QSL cards if required at the time of contact. I don't recall seeing much in the way of a log being kept in the 'Old Timers' shacks that I visited in the late 1940s early 1950s - plenty of fag packets around!

But concerning log books and QSLs and reference to the letter (October 'Letters') from **Adrian Soane M0ABY** regarding SP3RN. I wonder if any real 'Old Timer' logged SP3RN and perhaps retains a QSL card? A QSL card from a Saint - well, that would be something!

**Richard Pattinson GW3KVX**  
**Powys**

## Calling 'CQ' With Pergola MkII

**Dear Sir**

Shortly after reading the article by **Dick Pascoe G0BPS** in the October 'Antenna Workshop', I was watching a gardening program where they were building a pergola.

There were the usual upright poles in two parallel rows with connecting pieces along the top. Instead of the usual wood cross pieces, they used copper tubing, with end caps to prevent wind noise. As I watched, I thought what a good way to hide a log periodic!

Yours sincerely

**John Haliburton GM4AQO**  
**Fife**

**Editor:** Interesting idea - however, please don't tell the 'Tabloid' press if your greenery wilts in the presence of r.f. transmissions!

## Scanner Help Needed!

**Dear Sir**

I have a problem that I think your readers can help me with. I have recently purchased a Realistic PRO-2039 scanner. The question is, though the set works quite well on its telescopic antenna, would there be any improvement by using an outdoor antenna at a height of twenty feet? If the answer is 'yes' then another problem rears its ugly head. How do I fit one? Obviously, with an outside antenna, I shall have to use coaxial cable which requires an earth. Is there an adapter that one can fit in the antenna socket to accept coaxial cable, or will I have to open the thing up, cut a hole in the back and fit a SO239 or BNC socket and connect to the existing antenna point and to earth? If I have to do this, how and where please? I live in the country about one and a half miles from Rainham and four miles from Chatham in Kent. Hoping someone can assist.

**John Noble**  
**1 Meirscourt Farm Cottages**  
**Meirscourt Road**  
**Rainham**  
**Kent ME8 8PJ**

## Future Of The Hobby & The PW 'Leicester' Show Stand

**Dear Sir**

It was good to meet the Editor on his visit to the South Normanton Club in North Derbyshire earlier in the year. (It is important to remember the 'South' bit - just 'Normanton' is miles away - as G3XFD found out when he got lost on his visit to us!)

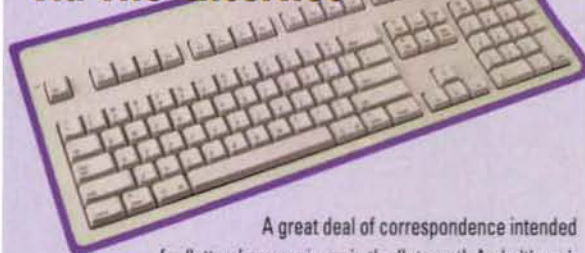
Funnily enough, I did exactly the same thing about 30 years ago when travelling down from Yorkshire for the first time for a job interview! (I got it and have been in the area ever since).

I didn't see the Editor on the stand at Castle Donington, in fact the whole stand looked a bit sparse - there seemed to be only one person there, whose face I didn't recognise from the magazine. Perhaps I was too early? I was there virtually first thing Friday.

Incidentally I have also followed the 'Great Morse Debate' with tremendous interest and now that the dust has settled it is apparent that with regard to Morse, there are three self evident truths.

In no particular order, these things are: 1). Even in the Millennium, Morse is (and will remain) a very variable efficient and cost effective mode of

## Letters Received Via The 'Internet'



A great deal of correspondence intended for 'letters' now arrives 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! All letters intended for publication on this page must be clearly marked 'For Publication' (on the letter itself). **Editor**

communication. 2). There is no justification in retaining it as the access/qualification to h.f. 3). The only people who knock it are those who can't do it. Whether the present and further planned licence changes will increase recruitment to the hobby is a moot point.

Whether a general 'dumbing down' throughout the whole of society - the transformation of whole generations into 'button pushers' who have little understanding of the technology behind the buttons they press and/or increasing use of E-mail/the Internet, will eventually kill the hobby, remains to be seen, though may be likely after a couple of generations - that is tomorrow.

What will, however, bring about the end of the hobby long before then, a totally and unnecessary premature demise, is the apathy if too many of today's licensed amateurs. I read that there are some 15 000 of us in the UK. My current callbook listings run to some 180 pages of small print.

Regardless of licence class, where are they on the air? On 2m, 4m, 6m ... All too often these bands are just barren wastelands of white noise. Most of us have noticed this. You can bet your life "others" have. When these bands are taken from us, that will be the death knell of our hobby. It will be too late then to bleat about "the Council", "M5s", "the Internet" or "dumbing down". There will be no one to blame but us - who are really the dumb ones?

**Howard M0CMG**  
**Nottingham**

**Dear Sir**

I attended the Leicester Rally on Friday 24th September arriving there about 20 minutes prior to opening time. I saw your good self (Editor) arrive and enter the building but I am sure that you entered a time warp (shades of 'Counting Up From The Millennium').





I passed by the *Practical Wireless* stand purposely about 12 times in order to have a word with you but you seemed to have completely disappeared off the face of the earth - or at least the show. I kept my eyes peeled as I walked about but you were nowhere to be seen perhaps partaking in some of that 'Irish Whiskey'?).

I hope that you enjoyed the Leicester Rally as much as I did Rob and I hope to catch up with you at some other rally in the future!

**Kevin Wells M1ADQ  
Derby**

**Editor's comment: Please see 'Keylines' editorial for further comment on the 'Leicester' show stand.**

## Things Aren't What They Used To Be?

**Dear Sir**

Hardly a week goes by without a Class A, Class B operator, or a main agent, local Amateur Radio shop bemoaning the fact that "fings ain't what they used to be"! Yet the answer is in their hands!

Open *PW* or any other magazine and what do you see? "Price Match", a radio touted at £700 can now be had for £600. Enquire as to what the receiver is really worth, question the painfully obvious "ring" and you are told to go to "Manyfunken" or any other place up the road!

I realise only a tiny percentage of amateurs or s.w.l.s have expertise of services or broadcasting training and the complexity of surface-mount rigs demands a staffed service - department of, if not qualified mechanics, those who know an amateur's problems and good eyesight!

I would never deny a retailer a legitimate mark-up, but some practises leave a nasty taste in my mouth. I hear of

a now disgruntled s.w.l. who bought a very fine receiver for, say, £1400 from a "we give service" dealer and went away happy. But not for long, the next issue if an esteemed journal had the same receiver advertised for less than a grey pirates advert of a few weeks previous!

I have a lovely old Drake with, I think, 100 memories (never use them) but now I am convinced that I will never get my M0, learn to fly or brew good mead unless I get latest kit with 400 memories! Oh, sorry, something dropped on the mat - 1000 memories!

Telephone calls to Drake in the States cost me less than ringing English dealers! I've got a fine old Edison phonograph and don't want to pay 8p per minute to hear 'Greensleeves' or Radio One when telephoning UK dealers! You can just imagine the fuss amongst sales persons at the other end "Hey Brian, this man was in Royal Corps of Signals" - "Tell him our Engineer's on leave".

I am afraid that I have, like an ancient wire-recorder, a long memory and can remember not so many years ago when a rig with wrong repeater shift or "Echo-Charlie rocks" in a new transceiver wasn't uncommon. My wife's research takes her from Matlock to Axminster via Cambridge, so duty-driver often has a statutory break at most appropriate places. Sure, there are bad apples, but also a lot of good ones.

I would advise any amateur or s.w.l. to subscribe to *PW* or *SWM* for a year before making any major investment. His/her local radio club or RAE centre will no doubt have a loan set meantime.

There is a lot to be learnt from a £10 '9R59 and after driving a Trio R600 (you

## Suffering A Stroke - Long Term Memory

**Dear Sir**

I was very interested in the experience of Neil Barrowman GM0LTQ ('Long Term Morse Memory', 'Letters' *PW* November). When I had my major stroke in 1993 it was I that was concerned with my long term memory! I have always kept a Morse tape to keep up my speed, a lot easier than trying on the bands. I got my wife to bring into the hospital our tape recorder and my tape.

The Consultant was most amused to find me one morning with a single piece earphone and a tape recorder. He was most interested to know what I was listening to as I was just about managing to write at the same time.

I was able to read the Morse but my speed had dropped but it did not take many days to recover it. The Consultant thought it was a wonderful way of checking and helping the long term memory. Morse was of course obligatory for the first year of being licensed so I had no problem remembering the code.

Incidentally, on the subject of buying *PW* ('Keylines' November issue), the only reason I don't take out a subscription is that we give all the business we can to our Village Shop - to lose it would be a disaster. Whenever we have moved house one of my first jobs has been to place an order for *PW* with a local shop. I've never had a problem getting my copy in over 50 years!

**73 de Ron G3DSV.  
Exeter**

see I read *SWM* as well) I wonder why I need 100 memories anyway. A great hobby is in danger of dying out if we let this mind-game played by dealers of appliances get us down. Lord Jesus said "Let innocent throw the first brick" or in today's parlance - first 7700 mains transformer.

Forty years ago *PW* and *SWM* would have got all parties down to the King George V club boxing ring! Public address provided by Signals veterans, First Aid by Canadian girl with a damp sponge - referee: F. J. Camm.

**John Gomer  
Colchester**

## More On Morse (And Motorways???)

**Dear Sir**

Thinking about 'The Great Morse Discussion' has given me the answer to another national problem which is somewhat parallel to ours: 'Congestion on Britain's Roads'!

Motorists should be divided into two classes, A and B. The B class would, as at present, be required to pass the current driving test but, to become an A class motorist, it would be necessary to take a course in car maintenance and be proficient at dismantling an engine, decoking the cylinders, grinding valves, adjusting the carburettor or injectors, etc.

Having obtained a 'Maintenance Certificate', the A class motorist would

be entitled to drive on any road, but the B class motorist would not be permitted to use a motorway and would be limited to the old A roads. This would, at a stroke, relieve the congestion on the nation's motorways, the M25 and M6 in particular. Those with an A licence to use motorways would have a prefix on their number plate, M5, etc.

There may be some drivers who have no interest in motor mechanics or are unable, for health reasons or lack of time, etc., to delve into the works of their vehicle. They may consider the system unfair but this would be irrelevant since the object of the exercise would not be to produce better motorists but to relieve congestion on the roads.

Learner or novice drivers would be relegated to "B" roads unless they had

passed the maintenance examination when accompanied by an A class driver, they could use a motorway, in the left hand lane only, at speeds of less than 30mph.

There are a few minor details to be ironed out but, given the will of the authorities, my scheme could be in place by the 1st April 2000, in time for the summer holiday traffic.

This scheme is, of course, intended as an interim measure pending the take-over by commercial interests of all roads when, in order to provide dividends for shareholders, motorists would pay for the privilege of using any road on a sliding scale from motorway down to byway.

**R C Perry G7CQD  
Hereford**





COMPILED BY JOANNA WILLIAMS

## Headline News

### Svetlana Announces UK Company As European Distributor

**Svetlana Electron Devices Inc** have announced the appointment of **PM Components Ltd**, based in Kent, England, as their new "full-service, stocking distributor serving all of Europe". The Press Release which we received at the *PW* Offices states that PM Components combine vacuum tube experience and technology "in a full range of services to many of the biggest names in the music business, both in guitar amplification and high-end audio".

What with PM Components' tube testing, grading and matching and their technical support and consulting, they are a "perfect complement" to Svetlana's product line, Svetlana claim. Svetlana ask people to contact PM

Components for additional information and pricing, stating that they are confident that their customers will receive the "ultimate in value and customer service".

**PM Components Ltd**



can be reached at:  
Tel: (01634) 848500,  
FAX: (01634) 848676.  
Unit A, Jenkins Dale  
Industrial Estate,  
Chatham, Kent ME4 5RT.  
E-mail:  
[p.m.comp@lineone.net](mailto:p.m.comp@lineone.net)  
Or why not visit PM  
Components' Web site:  
[www.pmcomponents.com](http://www.pmcomponents.com)

### New Svetlana Y644

**Svetlana Electron Devices** have also told *PW* about the new **Y644 Tetrode** which, they tell us, is "identical mechanically" to the 4CX250B. However, the Y644 is electrically very different - the "Cossor CGR1020 v.h.f./u.h.f. ground/air communications system was originally developed to use the Y644 by ECI in the United States",



Svetlana say. Fully qualified by the British Ministry of Defence (MoD) for the CGR-1020, the Svetlana tube is being used extensively by the MoD and is currently available from Svetlana distributors - no doubt PM

Components Ltd will be able to help.

### New Mini Beam ZX Yagi!

Nevada has been in touch with *PW* to tell us all about the brand new **ZX Yagi - Mini 1020 h.f. beam antenna**. Ron Ebersson of **ZX Yagis** in Holland, Nevada tells us, has been manufacturing "top class" beams for European DXers



for a number of years and the Mini 1020 h.f. beam was designed and built at Nevada's request, they state.

Ron has produced this mini beam for Radio Amateurs with small gardens! The antenna covers the 14 (5.5dBi gain), 21 (5.7dBi gain) and 28MHz (6.50dBi gain) bands and has a boom length of just 2m and a maximum element length of 5m - so Nevada says.

This new Mini 1020 HF Beam costs as little as **£193** and Nevada say that they have been appointed **exclusive distributor** of these antennas. If you are interested and would like to know more, Nevada say that they will provide more information on receipt of an s.a.e. Send any requests to Nevada, 189 London Road, North End, Portsmouth PO2 9AE. Tel: 0239-266 2145. FAX: 0239-269 0626. Or why not visit their Web site: [www.nevada.co.uk](http://www.nevada.co.uk)

unit for almost two years for overseas distribution only but this model is now available in the UK. But that's not all, it now comes with additional features originally specified by the European distributors.

The HF4E, available through Waters & Stanton and badged under the Nasa brand (an associate company to AKD), has tighter s.s.b.

filtering, is switchable to a.m. mode, has a backlit display and, AKD state, is capable of driving an active antenna via internal circuitry.

The receiver comes equipped for connection to a computer and is supplied with selected software. Please contact Waters & Stanton for further information on Tel: (01702) 206935. FAX: (01702) 205843. Spa House, 22 Main Road, Hockley, Essex SS5 4QS. E-mail: [info@wsplc.demon.co.uk](mailto:info@wsplc.demon.co.uk) or visit their Web site: [www.waters-and-stanton.co.uk](http://www.waters-and-stanton.co.uk)

### New PC-Based Oscilloscope!

**Vann Draper Electronics Ltd** have sent *Practical Wireless* information on a new PC-based oscilloscope from **Beta Instruments**. In fact ... *PW* have been lucky enough to secure one for review and **Tex Swann G1TEX** will be reviewing it in the next *Electronics-in-Action* pages so keep your eyes peeled for that review **COMING SOON!**

In the mean time, here

### Nasa Communications Receiver Hits UK Market

Hertfordshire based **AKD** have sent *Practical Wireless* a press release concerning the **Nasa communications receiver, Model HF4E**. They tell us that they've been manufacturing this







COMPILED BY JOANNA WILLIAMS



is a little bit of what you can expect. According to the paperwork which comes with the software, it is a "must have for the electronics professional of today" and says that you can: "Control all the instruments from your PC!"

The main specifications are: Windows 95, 98 or NT; available instruments include oscilloscopes, spectrum analysers, arbitrary waveform generators, function generators, signal registrators and voltmeters and is available in English and Spanish language forms.

Available models are the SCP-201 which has one input channel and costs £159 and the

SCP-202, has two input channels and costs £199. For more information, please see the review in a future issue.

Also new from Vann Draper is the

**Grundig MV100 Millivolt Meter** which is an audio frequency millivolt meter "with additional features allowing the automatic measurement of distortion, harmonic distortion and levels including: rectification, rms, peak and quasi peak, plus noise and interference voltages with a frequency range of 5-88kHz".

For more information, please contact Vann Draper directly on Tel: 0116-277 1400. FAX: 0116-277 3945. Unit 5, Premier Works, Canal St, South Wigston, Leicester LE18 2PL. E-mail: sales@vannndraper.co.uk or why not visit their Web site: www.vannndraper.co.uk

## Lightweight Switched Mode Power Supply

**Waters & Stanton (W&S)** have been in touch with *PW* to tell us all about the brand new **Samlex SEC 1223 23A lightweight switched mode power supply**. W&S go on to say that they have been appointed exclusive distributors of this power supply.

This brand new power supply is very compact, W&S say and measures around the same size as the Icom IC-706 and the Yaesu FT-100 (two rigs which W&S the power supply is most likely to be used with). Lighter than the IC-706 itself, the press release states, this little power supply costs £89.95 and W&S say that they are already selling well.

If you would like to learn more about the Samlex SEC 1223, then please contact Waters & Stanton direct on Tel: (01702) 206935. FAX: (01702) 205843. Spa House, 22 Main Road, Hockley, Essex SS5 4QS. E-mail: info@wsplc.demon.co.uk or visit their Web site: www.waters-and-stanton.co.uk



## Beyond Electronics?

The new **Maplin** catalogue is now out and is in a "new look" format, Maplin claim. The new catalogue, dated "Sept 99-Feb 2000", contains over £60 worth of vouchers which can be used on Maplin orders.

It has been increased to include 1600 pages with the addition of over 1500 new products and no less than 2000 price reductions. Once again, the catalogue is available in both the traditional paper version and on CDROM. The CDROM has "comprehensive" search facilities, pricing is in Sterling and Euros along with product pictures and technical specifications.

To obtain your copy please telephone **Maplin: (01702) 554000** or call into one of their many stores nationwide. The paper version costs £3.99 (order code CA20) and the CDROM only £1.95 (order code CQ04). You can also purchase copies from branches of W. H. Smiths.



Internet at: **www.mec.dk** For more information please contact **Quiller Electronics Ltd, 2 Paisley Road, Bournemouth, Dorset BH6 5EU. Tel: (01202) 436755. FAX: (01202) 421255.**

## London Amateur Radio & Computer Show

Although *Practical Wireless* will not be doing a 'London Show Special' for the show which takes place in November, we would like to mention a little bit about what can be expected at this year's November event.

**Bernie Godfrey of Radio Sport Ltd** says that there will be a Morse Test on demand stand where you will need two passport sized photos (there is a photo booth on site), photographic identification and the test fee.

There will also be a Bring & Buy stand run by the Southgate ARC. People wishing to partake will be asked for £1

registration fee per item and when an item is sold the Club will deduct 10% commission (less the £1 registration fee). Bernie tells us that unsold items must be claimed by 1545 on the last day, otherwise they are auctioned for Club funds.

There is an on-site

## A Thing Of The Past

News now from **Quiller Electronics Ltd** who tell us that "Faulty switches caused by overheating during the soldering process are now a thing of the past". The solution they have come up with are **MULTIMEC** switches manufactured in PBT which they say is more resistant to heat than conventional plastic materials.

The mechanical lifetime of such switches, they tell us, is more than ten million operational cycles and actuator travel is 1mm. Accessories, Quiller state, include buttons and bezels in a variety of colours, extended height or illumination.

A complete engineering catalogue is available on the





camping ground which interested parties can contact on 0208-4566 666. The show takes place on **Saturday 27 November** and **Sunday 28 November 1999**, 1000-1700 both days. For other details please contact **Radio Sport** on Tel: (01923) 893929. 126 Mount Pleasant Lane, Bricket Wood, St. Albans, Herts AL2 3XD.

## Antique Catalogue?

For those readers interested in the Vintage aspect of Amateur Radio, the new year 2000 'Antique Electronics Supply' catalogue



has recently fallen on to the *PW* news desk.

The catalogue contains a number of interesting vintage components including valves of all shapes and sizes. To get your hands on a copy please write to 'Antiques Electronic Supply', 6221 S. Maple Avenue, Tempe, AZ 85283, USA. Or why not visit their Web site at: [www.tubesandmore.com](http://www.tubesandmore.com)

## Mainline Component Catalogue

Mainline Electronics have been in touch with *PW* to tell us all about their new catalogue/magazine which is available from November.

Mainline Electronics are a well-established

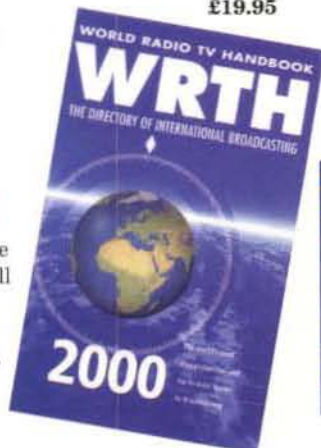


distributor of radio components, etc., and they tell *PW* that due to continued expansion they have set up a new surplus sales division and produced the catalogue (of which you can see the front page of the draft copy here).

The catalogue will contain the variety of "high quality manufacturer excess items" which they have on offer along with prices. A new company has been formed to deal with this side of the business called **Mainline Surplus Sales**. For further information, please contact **Mainline Surplus Sales** on Tel: 0116-277 9717. FAX: 0116-247 7551. PO Box 235, Leicester LE2 9SH. E-mail: [sales@mainlinegroup.co.uk](mailto:sales@mainlinegroup.co.uk)

## World Radio In 2000!

The new **World Radio TV Handbook (WRTH)** for 2000 is out now. You can purchase a copy from the *PW* Book Store for a mere **£19.95**



## Haydon's 'Ham' Hamper

**Mike Haydon** of **Haydon Communications** has sent *PW* information on the products which they will have on the Haydon stand at Picketts Lock this November.

Firstly, Haydon say that they will have the new **Garmin GPS-III+** on sale. With its loadable Mapsource CDROM for enhanced detail along with the PC download facility (PC lead supplied) and their 'TracBack' feature which will quickly navigate you home without the need to store "Waypoints".



Haydon will be selling the GPS-III+ for **£329 including VAT**.

Also on their stand this November will be the **Motorola TA-200** which, Mike says, is the very latest in licence-free handhelds and which is so easy to use "a child could show an adult..." he says.

Haydon's Christmas special on the Motorola at Picketts Lock will be **£150 for a pair (including VAT)**.

Finally, they will also have the **Q-Tek Triton antenna** on show and for sale which is proving to be a very popular antenna - Haydon say they ran out of them on the second day of the Leicester Show! The antenna covers 50, 144 and 430MHz with four elements and has a boom length of only 1.13m with the longest element measuring only 2.96m in length. The Q-Tek Triton will be selling for **£69.95 (including VAT)**.

Any further details can be obtained from **Haydon Communications** on Tel: (01708) 862524. FAX: (01708) 868441. Unit 1 Thurrock Commercial Park, Purfleet Industrial Estate, London Rd, Aveley, Essex RM15 4YA.



(including P&P on orders placed before Christmas Day).

Other new titles available from the *PW* Book Store include: **Passport To World Band Radio 2000** which will cost only **£15.50 (including P&P on orders placed before Christmas Day)**;

**RSGB Yearbook**, £14.50 (including P&P on orders placed before Christmas Day); **RSGB Radio Communications Handbook Volume 17** for £28 (plus P&P).

To order please telephone Michael or Shelagh on (01202) 659930.

'News Extra' can be found on page 45...

## Web Watch

PM Component's Web site: [www.pmcomponents.com](http://www.pmcomponents.com)  
Nevada's Web site: [www.nevada.co.uk](http://www.nevada.co.uk)  
Vann Draper's Web site: [www.vanndraper.co.uk](http://www.vanndraper.co.uk)  
Waters & Stanton Web site: [www.waters-and-stanton.co.uk](http://www.waters-and-stanton.co.uk)  
Complete MEC engineering catalogue: [www.mec.dk](http://www.mec.dk)  
Antique Electronic Supply Web site: [www.tubesandmore.com](http://www.tubesandmore.com)

FOR A FREE MENTION ON THESE PAGES SEND YOUR NEWS & PRODUCT INFORMATION TO THE NEWSDESK TODAY!





# VMOS FET?

This month Ian Poole G3WYX considers the question: 'What Is A ... VMOS. FET'? Ian says that the vertical metal oxide silicon field effect transistor (v.m.o.s. f.e.t.) is widely used and here he explains why it's so popular ...

The v.m.o.s. f.e.t. (for brevity, v.m.o.s.f.e.t. will be written as v.f.e.t.) is widely used for a variety of applications where medium powers are required. In Amateur Radio they find widespread use in QRP transmitters, being able to develop 3W or more from a small and inexpensive package.

When v.m.o.s. devices were first introduced, they outperformed bipolar technology in many respects, making the design of amplifiers much cheaper and easier. Since their

introduction, v.f.e.t.s have become firmly established as a useful radio frequency device.

## Problems Overcome

The v.f.e.t. is able to overcome many of the problems that prevented f.e.t.s from being used in power applications. Their new structure enabled much higher powers to be handled than was previously possible with bipolar transistors of an equivalent size and cost.

The reason for the great improvement lies in the

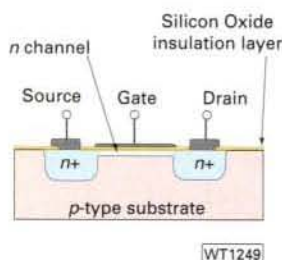


Fig. 1: Structure of a traditional m.o.s.f.e.t. (depletion mode).

structure of the device. To show the advantages of a v.m.o.s. device, a traditional m.o.s. device is shown in Fig. 1. Here it can be seen that the gate separates the drain and source. Current flows horizontally between the source and drain, controlled by the potential on the gate. As the current only flows through a relatively small area, resistance values can be high, reducing the efficiency of the device.

The v.f.e.t. uses a different structure as shown in Fig. 2. The most striking point about the new device is the 'V' groove in the structure that is the key to the operation of the device.

It can be seen that the source is at the top of the device and the drain is at the bottom. Instead of flowing horizontally, as in the standard f.e.t., the current in this device flows vertically giving the device its name - **vertical metal oxide silicon (v.m.o.s.)**.

The device uses two connections for the source and, accordingly, there is a much larger area through which the current can flow. This reduces the ON resistance of the device allowing it to handle much higher powers than conventional f.e.t.s.

The gate consists of a metallised area over the 'V' groove and this controls the current flow in the p-region. As the gate is fabricated in this way it means that the device retains the exceptionally high input resistance typical of the m.o.s. family of devices.

The main drawback of the v.f.e.t. is that the structure is more complicated than a traditional f.e.t. and this makes it slightly more expensive. However, when the improvements in performance are taken into account, this is a small price to pay.

## Great Interest

The advantages provided by the V-groove structure make these devices of great interest to Radio Amateurs. Their high current handling capacity makes them very useful in r.f. driver and power amplifier stages.

The structure also leads to

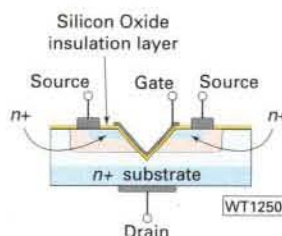


Fig. 2: Structure of a v.m.o.s. f.e.t.

very low values of internal capacitance. In particular, the gate drain feedback capacitance is very low. This makes them very stable when they are used at h.f. and even v.h.f., simplifying circuit design and construction. The fact that little stabilisation is required also improves their

efficiency making them even more attractive.

The devices are very robust. Many bipolar designs are very sensitive to levels of v.s.w.r. But, although less sensitive in this respect, designs using v.f.e.t.s should still be treated with care, they are able to withstand much higher levels of reflected power. In some instances, levels of 20:1 may be tolerated without damage.

One problem encountered with many devices is that it's difficult to use them in parallel because one device tends to take all the power and becomes overloaded. This is not so with v.f.e.t. When their temperature rises they tend to turn off. This means that current can be shared between several devices without the need for external circuitry.

Finally, impedance matching is much easier than for many other devices. They present an almost constant input impedance regardless of the output conditions. This means that once the input circuit has been adjusted it can be left regardless of any adjustments made to the output.

## Widest Use

The v.f.e.t. finds widespread use in amateur circuits. They are widely used as drivers in a number of transmitters and they are also very popular with QRP enthusiasts where they provide an ideal output device in a QRP transmitter. Here a cheap device is capable of providing a few watts of power, sufficient for making contact on the h.f. bands around Europe and further afield with a good antenna.

In another application, v.m.o.s. f.e.t.s can be put to good use in active antennas. One of the problems encountered in the design of these antennas is that, as they are untuned, the active device has to tolerate high signal levels whilst maintaining linearity. In this case, the high power handling capability of the v.f.e.t. makes them ideal for use and many circuits have been designed successfully using them in this application.

That's all for this month's 'What Is A?' Next time I'll be back to tell you about Gallium Arsenide ... until then, why not visit my Web site:

[http://website.lineone.net/~ian\\_poole](http://website.lineone.net/~ian_poole)



# ANTENNA RANGE from MOONRAKER

## HB9CV 2 Element Beam 3.5 dBd

70cms (Boom 12")	£15.95
2 metre (Boom 20")	£19.95
4 metre (Boom 23")	£27.95
6 metre (Boom 33")	£34.95
10 metre (Boom 52")	£64.95

## Halo Loops

2 metre (size 12" approx)	£12.95
4 metre (size 20" approx)	£18.95
6 metre (size 30" approx)	£24.95

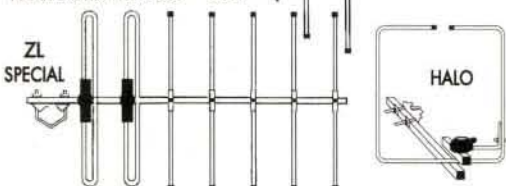
## 1/2 Wave Vertical Fibre Glass (GRP) Base Antenna 3.5 dBd (without ground planes)

70 cms (Length 26")	£19.95
2 metre (Length 52")	£22.95
4 metre (Length 92")	£34.95
6 metre (Length 126")	£44.95

## G5RV Wire Antenna (10-40/80 metre)

All fittings Stainless Steel

	FULL	HALF
Standard	£22.95	£19.95
Hard Drawn	£24.95	£21.95
Flex Weave	£32.95	£27.95
PVC Coated Flex Weave	£37.95	£32.95



## BEST QUALITY Antenna Wire

The Following Supplied in 50 metre lengths  
 Enamelled 16 gauge copper wire £9.95  
 Hard Drawn 16 gauge copper wire £12.95  
 Multi Stranded Equipment wire £9.95  
 Flex Weave £27.95  
 Clear PVC Coated Flex Weave £37.95

## Mounting Hardware ALL GALVANISED

6" Stand Off Bracket (complete with U Bolts)	£6.00
12" T & K Bracket (complete with U Bolts)	£10.95
18" T & K Bracket (complete with U Bolts)	£14.95
24" T & K Bracket (complete with U Bolts)	£16.95
1 1/4" x 5' Heavy Duty Aluminium Swaged Poles (set of 4)	£19.95
1 1/2" x 5' Heavy Duty Aluminium Swaged Poles (set of 4)	£29.95

## Vertical Fibre Glass (GRP) Base Antennas

SQ & BM Range VX 6 Co-linear: Specially Designed Tubular Vertical Coils individually tuned to within 0.05pf (maximum power 100watts)

BM100 Dual-Bander	£29.95
(2 mts 3dBd) (70cms 6dBd) (Length 39")	
SQBM100* Dual-Bander	£39.95
(2 mts 3dBd) (70cms 6dBd) (Length 39")	
SM200 Dual-Bander	£29.95
(2 mts 3.5dBd) (70cms 6.2dBd) (Length 62")	
BM200 Dual-Bander	£39.95
(2 mts 4.5dBd) (70cms 7.5dBd) (Length 62")	
SQBM200* Dual-Bander	£49.95
(2 mts 4.5dBd) (70cms 7.5dBd) (Length 62")	
BM500 Dual - Bander	
Super Gainer	£49.95
(2 mts 6.8dBd) (70cms 9.2dBd) (Length 100")	
SQBM500 Dual - Bander	
Super Gainer	£59.95
(2 mts 6.8dBd) (70cms 9.2dBd) (Length 100")	
SM1000 Tri-Bander	£49.95
(2 mts 5.2dBd) (6 mts 2.6dBd) (70cms 7dBd) (Length 62")	
BM1000 Tri-Bander	£59.95
(2 mts 6.2dBd) (6 mts 3.0dBd) (70cms 8.4dBd) (Length 100")	
SQBM1000* Tri-Bander	£69.95
(2 mts 6.2dBd) (6 mts 3.0dBd) (70cms 8.4dBd) (Length 100")	

\*SQBM1000/200/100/500 are Stainless Steel, Chromed and Poly Coated. Full 2 year Warranty on these Antennas.

## Yagi Beams

All fittings Stainless Steel

2 metre 4 Element (Boom 48") (Gain 7dBd)	£19.95
2 metre 5 Element (Boom 63") (Gain 10dBd)	£34.95
2 metre 8 Element (Boom 125") (Gain 12dBd)	£44.95
2 metre 11 Element (Boom 156") (Gain 13dBd)	£65.95
4 metre 3 Element (Boom 45") (Gain 8dBd)	£39.95
4 metre 5 Element (Boom 128") (Gain 10dBd)	£54.95
6 metre 3 Element (Boom 72") (Gain 7.5dBd)	£49.95
6 metre 5 Element (Boom 142") (Gain 9.5dBd)	£69.95
70 cms 13 Element (Boom 76") (Gain 12.5dBd)	£54.95

## Crossed Yagi Beams

All fittings Stainless Steel

2 metre 5 Element (Boom 64") (Gain 7.5dBd)	£64.95
2 metre 8 Element (Boom 126") (Gain 11.5dBd)	£84.95
70 cms 13 Element (Boom 83") (Gain 1.5dBd)	£54.95

## ZL Special Yagi Beams

All fittings Stainless Steel

2 metre 5 Element (Boom 38") (Gain 9.5dBd)	£31.95
2 metre 7 Element (Boom 60") (Gain 12dBd)	£39.95
2 metre 12 Element (Boom 126") (Gain 14dBd)	£65.95
70 cms 7 Element (Boom 28") (Gain 11.5dBd)	£24.95
70 cms 12 Element (Boom 48") (Gain 14dBd)	£39.95

## Mobile HF Whips (with 3/8 base fitting)

AMPRO 160 mt	£49.95 (Length 7' approx)
AMPRO 80 mt	£18.95 (Length 7' approx)
AMPRO 10/12/15/17/20/30/40 mt	£15.95 (Length 7' approx)
AMPRO 6 mt	£15.95 (Length 4.6' approx)

## MAG MOUNTS

TURBO MAG MOUNT (7") 3/8 or S0239 £14.95

## TRI-MAG MOUNT

(3x5") 3/8 or S0239 £39.95

## COAX

RG58 BEST QUALITY STANDARD per mt	35p
RG58 BEST QUALITY MILITARY SPEC per mt	60p
BEST QUALITY MILITARY SPEC MINI 8 per mt	85p
RG213 BEST QUALITY MILITARY SPEC per mt	£1.10

All Prices Plus £6.00 P&P per order.



MOONRAKER (UK) LTD. UNIT 12, CRANFIELD ROAD UNITS, CRANFIELD ROAD, WOBURN SANDS, BUCKS MK17 8UR. TEL: (01908) 281705. FAX: (01908) 281706.

# C.M. HOWES COMMUNICATIONS

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



## Build Your Station in Easy Stages!

### DC2000 SSB & CW Receiver Kit

Great for the beginner as well as the experienced QRPer. Plug-in band system. DC2000 Kit: £22.90 (one band module included). Extra band module kits: £7.90 each, from 160 to 10M. HA22R hardware (pictured top left): £18.90.

### TX2000 QRP Transmitter Kit

5W CW RF output (adjustable) on 160 to 20M bands, about 1W on 10M. Plug-in band filter. Very clean signal. Use with Rx and linking module for transceiver. TX2000 Kit: £24.90 (with one band filter). Extra band filter kits: £6.90 each. HA23R hardware pack (pictured lower left): £16.90.

### LM2000 Linking Module

Fits in receiver to link to transmitter. Side-tone, muting, IRT, CW filter. Kit: £16.30

Total to build this QRP Station: £99.90 (plus postage)



An easy-to-build low power (QRP) station



### Multiband SSB Receiver

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

## Enjoy the fun of home built equipment with HOWES KITS!



### Audio Filter - £29.80!

Clean up your reception!

- Reduce noise and interference! • Sharp SSB / Speech filter with faster roll-off than IF crystal filters! • 300Hz bandwidth CW filter • Printed and punched front panel • All aluminium case
- Simply connects between radio and external loudspeaker or headphones •
- Suits receivers & transceivers • ASL5 Kit plus HA50R hardware: £29.80

### ACCESSORY KITS

AA2 Active Antenna. 150kHz to 30MHz	£8.90	DFD5 Digital Frequency Counter/Readout	£54.90
AA4 25 to 1300MHz Active Antenna	£19.90	MA4 Microphone preamp (suits AT160)	£6.20
AB118 118 to 137MHz Active Antenna	£18.80	SPA4 Scanner Preamp. 4 to 1300MHz	£15.90
AT160 80 & 160M AM/DSB/CW Transmitter	£39.90	ST2 Morse Side-tone/Practice Oscillator	£9.80
CSL4 Internal SSB & CW Filter for our RXs	£10.50	SWB30 SWR/Power Indicator, 30W 1-200MHz	£13.90
DCS2 "S Meter" for direct conversion RXs	£10.90	XM1 Crystal Calibrator, 8 intervals + ident	£16.90
CBA2 Counter Buffer (fit to Rx to feed DFD5)	£5.90		

(optional hardware packs are available to suit many of the above kits, please enquire)



### Top Value Receiving ATUs

CTU8: covers 500kHz to 30MHz. Efficient, flexible "T match" circuit. S0239 sockets. Improve your antenna performance!

Factory Built: £49.90. Kit (including case and all hardware): £29.90.

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

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

HOWES KITS contain good quality printed circuit boards with screen printed parts locations, full, clear instructions and all board mounted components. Sales, constructional and technical advice are available by phone during office hours. Please send an SAE for our free catalogue and specific product data sheets, or you can browse this information on our Internet Website (URL at top). UK delivery is normally within seven days.

73 from Dave G4KQH, Technical Manager.



# Practical Wireless & Kenwood UK Club Spotlight Magazine

## Everyone's A Winner!

On behalf of the adjudication team, Rob Mannion G3XFD presents the results of the 1999 PW & Kenwood Club Spotlight Magazine Competition. And, as you'll soon realise - the standard of entries was very high with some superb entries from both 'local' and 'national' clubs.

Welcome to the 1999 Competition results article. Without exception the PW & Kenwood UK Club Spotlight Magazine Competition judging panel - **Dave Wilkins G5HY, David Barlow G3PLE** (whose original idea started the competition) **Jim Bacon G3YLA, Tex Swann G1TEX, Jamie Donaghy M0CLI** and myself thought that the standard of entries was very high indeed. Well done everybody!

With seven 'National' entries, striving to win the **Bert Newman G2FIX Memorial Trophy** ('Bert's Bell') and 13 'Local' category entries, aiming to win the magnificent 'Spotlight' trophy, the annual competition is thriving. The judges were particularly pleased to have a good number of 'National' entrants - and we welcomed that from **The Irish Radio Transmitter's Society (IRTS)** for the first time and we were very pleased to have the Benelux QRP Club, based in Holland, joining us for a second time.

Without exception - and there were some truly excellent magazines entered this year - the standard was very good indeed and I would like everyone to realise that this also included entries from truly 'one man' band produced magazines. So, whatever you think about your 'solo' produced magazine ... don't think it won't stand a chance of winning a prize!

### Reluctant To Enter?

Occasionally I'm approached by club magazine Editors who have been reluctant to enter because "Our magazine is only produced on a photocopier and there's only one person compiling it each time". In reply, I encourage them to enter and explain what the adjudication panel is looking for.

The adjudicators aren't just looking for 'glossy' magazines - professionally produced and 'finely polished'. No, with their expertise the panel of judges

know that 'fancy wrapping' could hide a disappointing surprise inside. I can say this because we all know that it is possible to unwrap a delightful looking chocolate from its wrapper ... only to find we don't like the flavour when we eat it!

So, we look further and more carefully into what's on offer from each entrant because the most ordinary looking publication can turn out to be an excellent magazine. This is why all magazines that are entered into the competition stand a good chance of winning - even though they may lack the gloss of some of the other entrants.

As the competition



becomes a regular annual event for those that enter, it's very pleasing indeed for the judges to see that some of the comments and suggestions from the previous year's competition have been 'taken on board' by the Editor of the magazine involved. And to highlight this, I'm pleased to share with you an encounter I had with one of the 1999 'National' category entrants, when he approached me at this year's 'Leicester' Show at Castle Donington.

The magazine Editor involved had received the letter I'd sent out to all the entrants, informing them who had won and the number of points that had been awarded to the individual entrants. He approached me and expressed surprise that "My magazine has done so well this year, especially after I've seen a copy of the winner's magazine".



We managed quite a long chat together and I was delighted to learn that he'd been to see this year's winner of the 'National' category. However, I pointed out that the adjudication panel had seen graphic evidence of his (the Editor's) efforts to improve the use of various typefaces and not to have the main body text in 'bold' (this had been commented on by all the judges last year). The Editor had then taken this suggestion on board and the result this year was a magazine that was easier to read and much more pleasing to the eye. That's why his magazine had achieved good results this year against an ever-improving standard of entry.

### Assessing The Entries

I think it's now time to explain just what the judges are aiming to do in assessing the entries, which we try to make as fair as possible. In doing this, I hope I'm answering some of the occasional questions which come my way.

Firstly, in the evaluation process, each judge will read the accompanying 'covering' letter which has to be provided by each entrant. This, in accordance with the rules, asks the entrant to state what category the club is entering under, what the club is, how many people are involved in producing the magazine, how it's printed, published and distributed and how many copies are involved.

Additionally, we ask the entrant to inform us what - if any - sponsorship is involved with their magazine, this gives the judges a good idea of what money is available for producing the magazine ... an important pointer when comparing one magazine against another. Again, this criteria is why it's possible for any magazine entering the competition to stand a good chance of winning on overall merit rather than just overall spending!

Incidentally, the 'covering letter' tends to be a fascinating read! And when reading them it's surprising to see (even with the magazines produced by the larger clubs) how many are 'one man band' production teams!

All the judges are either active in the Amateur Radio 'Club Scene' or have had extensive experience of clubs in the past. Several - including myself - have also been Editors of club magazines themselves. This experience, plus the interest the panel have in our hobby and the

Fig. 1: Hilda Rusbridge, Sister of the late G2FIX (accompanied by her daughter Vicky and Son-in-Law Gerry (who made the trophy) presenting the 'Bert Newman G2FIX Memorial Trophy' ('Bert's Bell') to members of the Remote Imaging Group, the 1999 National Category winners at the 'Leicester' Show at Donington Park on Saturday 25th of September.





# zine Competition 1999

journalistic aspects of Amateur Radio, is then used to evaluate each individual entry.

Obviously, each judge has their own likes and dislikes and a 'feel' for certain articles and style. This will be clearly indicated by each judge's personal comments (the comments from each adjudicator are clearly attributable to the individual) on the adjudication result sheets which are sent to each entrant after the magazine carrying the competition results has 'gone to press'.

Without fear of giving anything away and influencing next year's entrants - I can tell you that (obviously) *PW* reflects my own 'style' and interests in the hobby itself. As Editor of *PW* it's impossible not to influence a magazine that's been part of your life for so long without having some effect!

In rounding off this section of the results article I would like to remind everyone entering the 2000 contest to remember this: Do not produce a magazine with the sole intention to enter the contest! Instead we ask you to enter a magazine that's been produced **for your club members by your best efforts**. By doing so you'll be creating something very special and it will be a publication that reflects your club, and its activities in the best light possible. And if you do win one of the categories of the *PW* & Kenwood Club Spotlight Competition - it will just add a little more polish to your own trophy - your club magazine itself!

Finally, to emphasise the wonderfully friendly atmosphere which has grown around the competition, I must mention the spirit of co-operation that is developing between the various club magazine Editors. This has been clearly demonstrated by individual Editors writing to the winners of the two categories to ask for copies of the magazines involved.

I'm pleased to say that it's a good indication of the nature of the people involved that the requests have been answered by friendly and immediate responses. Actions like this make me feel proud and give me much hope for the continuing success of our hobby in the future!

## National Category

As mentioned earlier in this article, there were seven entries in the 'National' Category this year and the standard was exceptionally high. The adjudicators, as previously mentioned were delighted to receive an entry from the **Irish Radio Transmitters' Society (IRTS)** the National Society for the Republic of Ireland, along with entries from the **British Amateur Television Club (BATC)**, the **Royal Air Force Amateur Radio Society (RAFARS)**, the **British Amateur Radio Teledata Group (BARTG)**, the **Radio Amateur Invalid & Blind Club (RAIBC)**, the **Remote Imaging Group (RIG)** and finally, last but not least - the **Royal Signals Amateur Radio Society (RSARS)**.

For the 'National' category only, I took the decision to award marks out of 60 instead of 50 as in previous years so the panel of judges could include both *PW*'s Tex Swann G1TEX and the Salisbury Club's Secretary Jamie Donaghy M0CLI. This was because, in previous competitions, Tex has 'stepped down' to allow the 'guest' judge (for the 'National' category only) from the Salisbury Club to take his place.

The Salisbury Club provide a 'Guest' adjudicator as part of the continuing remembrance of Bert Newman G2FIX. Bert - a great character - was a famous campanologist (Bell Ringer) and it seems very appropriate that his family provided the bell-shaped

trophy. It was also made by his niece's husband! We were also pleased to have an entry to the competition from RAFARS - for whom Bert G2FIX often acted as their 'Net' controller on 3.5MHz.

## National Winners

The outright winners this year in the

'National' category were the **Remote Imaging Group** whose superb *RIG Journal* attained a magnificent 59 points out of a maximum of 60. With the majority of its members being active Radio Amateurs, the RIG group caters for the specialist reception of remotely taken images (hence the name!), particularly from satellites.

The comments taken from the adjudication sheets make interesting reading!

**Jamie Donaghy M0CLI's** comments on the A5 sized magazine (which has a full-colour stiff cover) were: "Tremendous production, cannot fault it in anyway. Hard to believe its an amateur effort as it engenders quality and professionalism from cover-to-cover". **Score 10 out of 10.**

**Dave Wilkins G5HY** (who commented that he's an ex-member of RIG) said: "A superb national magazine, very professional in every way. This might make me renew my subscription"! **Score 10 out of 10.**

**David Barlow G3PLE** commented: "Read all through cover-to-cover, joined RIG (since). Superb production - fantastic value for money for members. I nearly stole the copies - but thought that perhaps the other judges ought to see them"! **Score: 10 out of 10.**

**Jim Bacon G3YLA** said: "What a great journal! Alright, I'm a bit biased on the subject matter, but this is very professionally produced magazine, both editorially speaking and in production. Very well done"! **Score: 10 out of 10.**

**Tex Swann G1TEX** said: "Excellent feel of quality production with full page colour pictures but full width columns making it a harder to read magazine. Full of information for those interested in this specialist subject. Good Technical read". **Score 9 out of 10.**

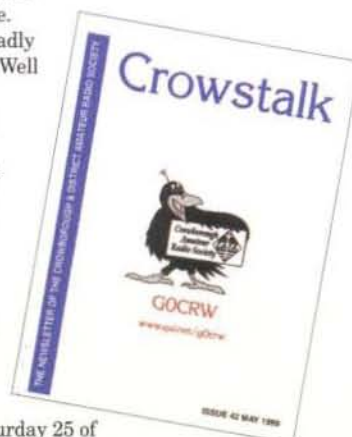
My own comments were: "Even bearing in mind that this is a professionally printed publication - the ethos of a 'club journal' is still there. Even the best printed journal can be badly let down by poor editorial - this is not! Well done RIG! **Score 10 out of 10.**

Traditionally the Remote Imaging Group have attended the 'Leicester' show for many years - and I've always enjoyed visiting their stand at the old Granby Halls site in Leicester which, although in the same hall as the *PW* stand, was located in a far corner away from us. However, at the Donington Show, RIG were very close to our new stand and it was easy to arrange things for the presentation to take place. (See Fig. 1).

The presentation took place on Saturday 25 of September and, once again, 'Bert's Bell' was presented to the winners by **Hilda Rusbridge**, sister of the late Bert G2FIX. However, this year although the younger element of the 'Newman' clan weren't able to come - I'm pleased to report that **Vicky Amos** (Bert's Niece) and her husband **Gerry** (who had made the trophy) were both there to see the trophy presented.



Fig. 2: Dave Wilkins G5HY of Kenwood (UK) presenting the *PW* & Kenwood Club Spotlight Trophy to members of the Crowborough & District Amateur Radio Society, who were also winners in 1998.





## At-A-Glance National Category 1999

Points out of a possible 60

**Winners:** Remote Imaging Group (*RIG Journal*) 59 points

**Second:** The British Amateur TV Club (*CQ TV*) with 54 points

**Joint Third:** The Irish Radio Transmitters' Society (IRTS) *Newsletter* and the Royal Signals ARS *Mercury* (both with 52.5 points)

**Followed by (in order of points scored):**

**51.5 points:** Benelux QRP Club

**50 points:** Royal Air Force ARS

**49.5 points:** British Amateur Radio Teledata Group

**48.5 points:** The Radio Amateur Invalid & Blind Club

"... on behalf of all the Judges, I thank you for your efforts in 1999 and look forward to 'uncorking' your entries for 2000. Good luck everyone!"

Incidentally, last year's winner - the Benelux QRP Club - very kindly presented Hilda with yet another beautiful Edam cheese straight from Holland courtesy of Robert van der Zaal PA9RZ. So, everyone went home happily!

## Other Comments

It seems appropriate to include some comments on the other entrants' magazines for the benefit of readers

(however, all entrants will see their adjudication sheets.

David G3PLE said (Of the *IRTS Newsletter*) "How nice to see photographs of the EI calls I have worked many times - good news value - deserves encouragement and like myself the Editor has Multiple Sclerosis, so I appreciate his difficulties".

Jamie M0CLI commented (on the *BATC CQTV magazine*) "Excellent in every way, let down by 'clip art' - but still up there with the best of them for content and overall presentation, adoption of an A4 format a big improvement".

Commenting on the *Royal Air Force Amateur Radio Society QRV* magazine Tex G1TEX said: "A great deal of historical information in this magazine, Keeping the 'memories' alive. It can be 'hard going' at times due to the layout - but an excellent read none the less".

My own comments on *Mercury*, the *Royal Signals Amateur Radio Society* magazine provide encouragement for the Editor: "What an improvement on last year! New two-column, non-bold typeface and 'crisp clear presentation excellent. Well done Editor! With a little more technical content it would be perfect. A winner next year?"

Of *Nieuwsbrief - the Benelux QRP Club magazine* (based in Holland) Jim Bacon G3YLA said: "Once again a fine set of magazines from Holland - the ideal Amateur Radio 'special interest' read".

Commenting on the *British Amateur Radio Teledata Group's Datacom* magazine Dave Wilkins G5HY (a former member of BARTG) said: "Another very professional magazine. The only limitation is the small number of actual contributors".

Finally, we'll end up with Tex G1TEX's comments on

*Radial*, the magazine produced for members of *The Radio Amateur Invalid & Blind Club*: "Although a little simple in format it reflects the amount of 'love' which has gone into producing the magazine. Covers the subject with good use of pictures and even the odd useful project".

## Local Category Winners

The winners of the 'Local' Club Magazine section were - as last year - *The Crowborough & District ARS* from East Sussex. Scoring 43.5 points out of a possible 50 their entry *Crowstalk* drew comments such as: "I like the clear

format" (G5HY), "Well produced newsletter, some professional touches, good use of colour (G3YLA), "I liked this last year and still do" (G3PLE). "A good mix of articles, well laid-out, clear and clean" (G1TEX). My own comments were "Superb magazine - but more technical articles needed".

Again the C&DARS managed a good turn out to receive the 'Spotlight' Trophy, which was presented by Dave Wilkins G5HY at the 'Leicester' Show at Donington on Saturday 25 September (see Fig. 2). It was when G5HY, G1TEX and I (as the only members of the adjudicating panel present) were congratulating the Crowborough 'team' that we heard from them that other entrants had asked for copies of *Crowstalk*. And even though it means the pressure is really 'on' for 2000 - it's a clear demonstration of the good natured competition that the C&DARS gladly supplied the magazines to next year's possible competitors!

## Pursuit Hotting Up!

When I read through the adjudication panel's comments I could clearly see the pursuit is 'hotting up' and *Crowstalk* may have a run for its money next year! So, let's look at the comments from the adjudicators:

Commenting on the *Cockenzie & Port Seton* entry (42.5 points) G5HY said "Full of news, some very good lay-out touches".

On the *Colchester ARC* entry (42 points) G3PLE said "With some adjustment this could be a winner". And on the *Worthing & DARC* entry (also with 42 points) I said "What a wonderful 'one man' effort - even prints his own front covers!"

*Cray Valley ARC's* entry (39.5 points) got "A nicely 'balanced' newsletter" comments from G3YLA. While *Oldham ARC's* entry (39 points) received "Clear lay-out and good mix of contents" from G5HY.

*Echelford ARS's* entry (38.5 points) drew comments including "Information on front and back pages excellent, good original articles" from G1TEX. The *Bromsgrove & DARC* entry (38.5 points) attracted praise from G3YLA who said "A nice clear newsletter - nice to find a list of members and content details".

On the *Otley ARS* (West Yorkshire) entry (36.5 points) I commented: "This magazine is coming in leaps and bounds. Don't change it Editor - but keep polishing". Reporting on the *East Yorkshire* (Formerly North Ferriby) *ARS* (36.5 points)

G3YLA said: "I like the 'club' atmosphere of this newsletter. It has some nice uses of colour/graphics - just enough".

*Warrington ARC's* entry (35 points) drew comments including "A very accomplished newsletter...with a wide range of interesting articles" from G3YLA. On the *South Dorset ARS* entry (34 points) I said "A friendly, informal and informative little 'one man' effort. Well done Editor".

Finally, with 33.5 points, comes the *Farnborough & DARS* (Hampshire) entry. And although it earned the lowest score - bearing in mind it is a very new magazine, I think I must end up (to encourage all entries with comments from all the adjudicators).

"Well printed and neat" (G5HY), "Well printed, deserves support from members" (G3YLA), "New product with potential" (G3PLE), from myself "A 'lusty' and promising youngster - what a wonderful effort from the Editor". And finally, from G1TEX (obviously a wine connoisseur!) comes "A 'young' magazine - but showing a good range of articles ... at an 'early stage' of development. Will improve with age and will be high in the rankings next year".

With Tex's words of encouragement ringing in my ears (and 'fizzing' in the wine glass!) on behalf of all the Judges, I thank you for your efforts in 1999 and look forward to 'uncorking' your entries for 2000. Good luck everyone!

PW

## At-A-Glance Local Category 1999

Points out of a possible 50.

**Winners:** Crowborough & District ARC *Crowstalk* with 43.5 points.

**Second:** Cockenzie & Port Seton Newsletter with 42.5 points.

**Joint Third:** Colchester Radio Amateurs and the Worthing & District ARC with 42 points.

**Followed by (in order of points scored):**

**Cray Valley ARS** with 39.5 points, **Oldham ARC** with 39 points, followed by the **Echelford ARS** and also the **Bromsgrove & DARC**, both with 38.5 points. Then came **Otley ARS** together with **East Yorkshire** (Formerly North Ferriby) both earning 36.5 points. Next came **Warrington ARS** with 35 points, **South Dorset ARS** with 34 points and **Farnborough** (Hampshire) & **DARS** with 33.5 points.



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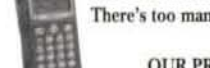


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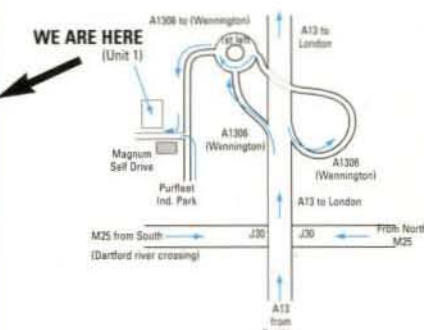
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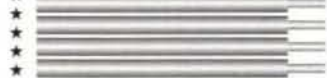
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# Part Three Of Our Introduction To Microwaves Series...

## Get Going On Microwaves!



This month sees the third part in the 'Get Going On Microwaves' series brought to you by David Butler G4ASR - our regular 'VHF Report' columnist ... and due to popular demand, the series has been extended to include a **FOURTH** part which will be published in next month's *PW*!

In Part 2 of 'Get Going On Microwaves', I took a look at the development of Amateur Radio microwave equipment in the UK and I described the two fundamental ways of assembling components at these frequencies. One method is to build sub-assemblies in, or around the waveguide section and then bolt these together to form a complete r.f. system. I mentioned that, as the physical size of waveguide is related to frequency, this method of construction is usually only to be found on the 10, 24 and 47GHz bands.

The other technique is to dispense totally with waveguide components and to build everything on a printed circuit board (p.c.b.) either as r.f. sub-assemblies or as a complete package. This method is very popular and it's now possible to buy ready-made systems or complete component kits for use on all bands between 1.3 to 75GHz.

### Various Options

In the third part of this series, I'm going to be taking a look at the various microwave bands and exploring the various options you have for the different transmission modes you can use.

First up I'll start with the 1.3GHz band and, although not strictly a microwave band in the context of this article, it does possess many of the characteristics which can be found on higher frequencies. The permitted communication modes on this band include Morse, telephony, data, Slow Scan TV (SSTV) and Fast Scan TV.

Fortunately, equipment that covers all of the modes mentioned is readily available. Base station transceivers such as the **Icom IC-970**, **Kenwood TS-790E** and **Yaesu FT-736R** all have options allowing multi-mode operation on the 1.3GHz band. The IC-970 also has a unit for the 2.4GHz band and a wide band adapter for Amateur TV (ATV) usage.

There are even hand-held units, such as the **Icom IC-T81E** (quad band) and **Yaesu FT-911**, which provide f.m. simplex and repeater operation. However, if you can't justify buying a complete stand-alone transceiver, then you could consider obtaining a transverter. These units provide a lower cost alternative and are often a high(er) performance way of getting onto the band.

The diagram, **Fig. 1**, shows a typical narrow band (c.w./f.m./s.s.b.) system that can be built on a microstrip p.c.b. As you can see, it's no different from a single-conversion up or down-converter that is often used on the h.f. or v.h.f. bands.

In the example shown, a stable crystal controlled local oscillator (l.o.) source at 1152MHz is mixed on the transmit path with an intermediate frequency (i.f.) signal from a 144MHz transceiver. The resultant output, at 1296MHz, is then amplified before being passed to the antenna. Similarly, the receive signal, at 1296MHz, is amplified in a low noise amplifier (l.n.a.) and then mixed with the l.o. signal to produce the 144MHz i.f. signal which is then passed to the driving transceiver for demodulation.

Transverters are fully linear, so whatever mode your driving transceiver uses (c.w./f.m./s.s.b.), it will also be available on the 1.3GHz band. In common with transverters for other bands, the output frequency range is normally arranged to cover only the narrow band c.w. and s.s.b. sections of the band. Therefore, a transverter for the 1.3GHz band will usually have an output between 1296-1298MHz, corresponding to a driving source of between 144-146MHz.

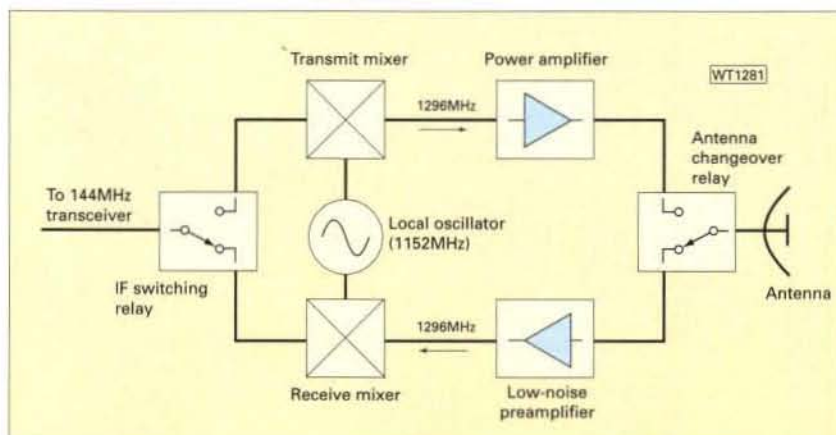
However, in the UK, the 1.3GHz band is some 85MHz wide and also supports communications for repeaters, satellites, Packet radio, other digital modes and ATV. Some manufacturers have recognised this fact and provide a second switchable crystal thus allowing the transverter to be used additionally for repeater or satellite operation, but not both.

### Amateur TV

There has recently been a large increase in the number of stations becoming active in Amateur TV (TV) communications on the 1.3GHz and other microwave bands. Limited allocations on the 430MHz band has resulted in many operators moving up to higher frequencies in search of wider bandwidths.

Most of the amateur video transmissions are transmitted in colour using frequency modulation (f.m.) with an associated sound sub-carrier (s.s.c.), normally 6MHz above the video carrier frequency. However, you can't use a 1.3GHz transceiver to transmit ATV as the f.m. modulator in the base station is designed

Fig. 1: Diagram of a 1.3GHz transverter. (See text).





specifically for audio frequencies.

In practice, ATV colour transmissions require a dedicated transmitter with a video modulator bandwidth of 10MHz or more. Because of the wider bandwidths involved with ATV, the received signal needs to be quite strong for perfect copy. This is very similar to the effect noticed between an f.m. telephony signal and a narrower s.s.b. signal.

At the frequencies involved with 1.3GHz, it's difficult to generalise about distances that can be achieved but under normal conditions, with a few watts and a beam antenna, you'll probably contact stations around 30-50km away. To overcome this limitation a number of ATV repeaters have been installed at elevated locations throughout the country.

In October 1999 there were 26 such units licensed for the 1.3GHz band in the UK. The principle is the same as the voice repeaters that you find on the 144MHz band with the exception that, instead of a 600kHz repeater shift, it's a whopping 60MHz!

One advantage of this wide frequency spacing is that you can monitor your signal whilst transmitting through the repeater. Transmitters, because of their wide bandwidth requirements, need to be specifically designed for television use. They can be obtained either as a ready made unit or as a kit from specialist sources, details of which I will give you next month.

You can build your own modulator/transmitter from component parts but I would not recommend this if you are inexperienced in either TV or microwave techniques.

## Satellite Receivers

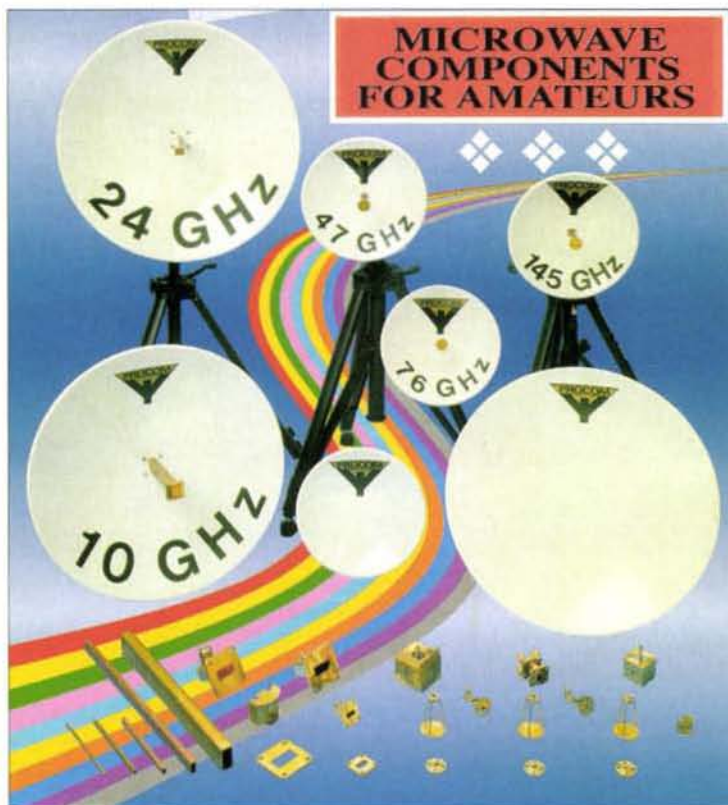
The constraints for receivers are very similar to those for transmitters except here you have one more option to consider. Surplus set-top satellite receivers can be modified and will provide a very low cost introduction to ATV reception on the 1.3GHz band. Although you won't need the dish antenna or low noise block (l.n.b.) down converter these units will be worth keeping for future experiments on the 10GHz band.

Satellite receivers tune over the frequency range - 750-1750MHz - and thus cover all the UK allocated ATV sub-bands which lie between 1243-1325MHz. In theory, all you need to do is connect an antenna to the satellite receiver and then tune it to the appropriate frequency. The unit will then provide i.f. amplification and demodulation of the local ATV signal.

But please don't rush off and plug an antenna into your satellite receiver as you'll only damage it! Most receivers are designed to power the external l.n.b. with a d.c. voltage (+17V) up the coaxial cable. Unless you wish to power an external pre-amplifier (recommended) via the coaxial cable, this voltage needs to be internally disconnected or an adapter called a 'd.c. block' fitted in series with the cable.

The overall sensitivity of a domestic satellite set-up is actually determined by the performance of the l.n.b. located at the front-end of the system. The set-top box can actually be quite insensitive and possess a poor noise figure without any significant loss of overall system performance. You will need to increase its sensitivity by placing a 1.3GHz low-noise amplifier ahead of the receiver.

One other point to note is that the deviation of ATV transmissions is about half that used for direct-to-home (d.t.h.) satellite carriers. One consequence, therefore, of using a satellite receiver to pick up ATV signals, is that the level of the demodulated video will be lower. This is the same effect you get when receiving a reduced deviation (12.5kHz channelling) f.m. telephony signal in the old 25kHz system. To compensate for this you only need to turn up the audio gain. Similarly, when using a satellite receiver you



turn up the video gain control.

Both systems are prone to adjacent channel interference though because of the unnecessary use of a wider bandwidth. Because of this no satellite receiver can ever be as good as a receiver designed specifically for ATV.

One option I would recommend is that you try to obtain a surplus professional receiver, sometimes known as an integrated receiver decoder (i.r.d.). Many have a facility to switch off the l.n.b. voltage and also provide a selection of video bandwidths and audio sub-carrier frequencies. Having said that, many operators DO use domestic satellite receivers and they really are an inexpensive way to get started on microwaves.

Some examples of Procom satellite dishes for the microwave bands.

## Forgotten Bands?

Now I'll take a brief look at systems available for the 2.3GHz, 3.4GHz and 5.7GHz bands. These are the 'forgotten bands' and, although activity is relatively low, there are now a number of UK amateurs developing equipment for both terrestrial and satellite communications.

Apart from the **Icom IC-970**, which has an optional unit for the 2.4GHz band, I'm not aware of any commercial transceiver available at these frequencies. The only units I know of are narrow band transverters available either as a complete module or in kit form from specialist s.h.f. suppliers.

There is also, if you know where to find it, surplus terrestrial and satellite communication equipment which can form the basis of a microwave transmitter or receiver. One such module is the **Drake 2880** microwave down converter designed for TV distribution service in the band 2400-2700MHz.

The Drake 2880 unit is ideal for use as a 2.4GHz receiver front end for the amateur satellite service. It is very compact, easily modified and can be located at the antenna (Yagi or dish) to receive various amateur satellites including Phase 3D when it gets launched.

Incidentally, I made mention of these brand new, but surplus, down converters in my 'VHF Report' column some time last year. However, as with all things surplus, the source eventually dries up, so please don't ask me



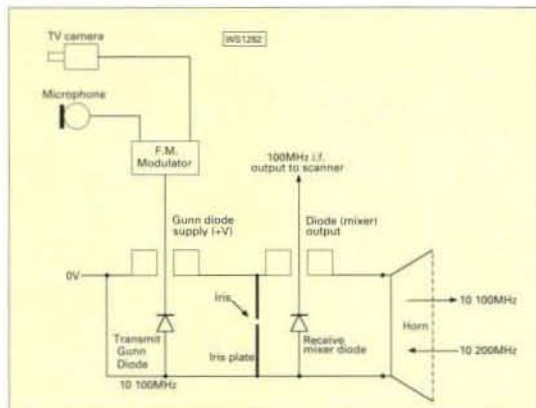


Fig. 2: A simple 10GHz transmitter/receiver using the Solfan module. (See text).

sensitive 3.4GHz receiver and a high power 5.7GHz transmitter but not the matching transmitter or receiver!

## The 10GHz Band

Now I'll take a look at the 10GHz band. This is probably the **most popular** of all the microwave bands. Indeed, it's quite likely that there are more UK operators on this band than all the other microwave allocations put together. Because of this there is an abundance of ready made transverters, kits and surplus equipment that can get you going on the band.

One of the simplest ways to get going on the 10GHz band, and I really do mean simple, is to use a Doppler radar surveillance unit commonly found inside burglar or intruder alarms. One such unit is the **Solfan module** and these can be obtained at radio rallies, flea markets or from various electronic dealers and traders.

The module already operates on, or near, the 10GHz band and usually comes complete with its own antenna, a small horn. Surplus units cost about £5 and with the addition of a simple modulator board (£15 or less) you can make a system capable of transmitting and receiving both video and audio signals.

The diagram, **Fig. 2** shows a typical set-up using the Solfan module. The heart of this transmitter/receiver is the in-line doppler module. (You can also find surplus twin side-by-side cavity modules but these are much less effective than the 'in-line' type of module). The r.f. module is a 10mW Gunn diode and a mixer diode separated by an isolating iris plate mounted within the waveguide cavity.

I described the principle of this type of transmitter/receiver last time (Part 2) but it's worth briefly mentioning again. With one station transmitting on 10.100GHz and the other station transmitting on 10.200MHz, the receiver i.f. frequency for both stations will be the difference, which in this case will be 100MHz. This can be picked up on a standard f.m. broadcast radio

where you can get one! On this theme it's worth keeping a look out for surplus satellite communication equipment.

One point to note, though, is that the fixed satellite service (at C-band) has a down-link (receive) allocation around 4GHz and an up-link (transmit) allocation around 6GHz. Using surplus equipment it's quite easy to make a

lower the l.o. frequency of the l.n.b. by approximately 800MHz. This can be achieved by changing the dielectric resonator or 'puck' inside the unit.

Another possibility is to buy the latest generation l.n.b. which has a l.o. frequency of 9.75GHz. Then by using a 500MHz frequency shifter (such as the ADX unit) it is possible to tune the 10GHz band on your satellite receiver. If you don't want any of this complication you can obtain an l.n.b. from specialist sources that has already been converted for use on the 10GHz band.

Surprisingly, perhaps, it is also possible to convert a surplus l.n.b. into a low-power transmitter. Although the output may be no more than 15mW this will be sufficient for local contacts.

## Directional Antennas

For the lower microwave bands, 1.3GHz and 2.3GHz, a directional antenna such as a Yagi is most acceptable. These can either be with straight elements or a loop Yagi with circular elements. If an omni-directional antenna is required, this could be a simple whip for vertical polarisation or an Alford Slot for horizontal polarisation.

On higher frequencies, from 3.4GHz and up, a dish antenna becomes more practical. This can be a conventional centre-fed (prime focus) parabolic dish or an off-set fed satellite dish. As you move up in frequency for any given size of dish the beamwidth progressively becomes more narrow. If you choose too large a dish at s.h.f. it will be impractical to line up on other stations.

For use on the 10GHz band, a dish of between 300-600mm in diameter will be easy to manage, 450mm being a good compromise. At 24 and 47GHz you may only need a dish around 300mm in diameter.

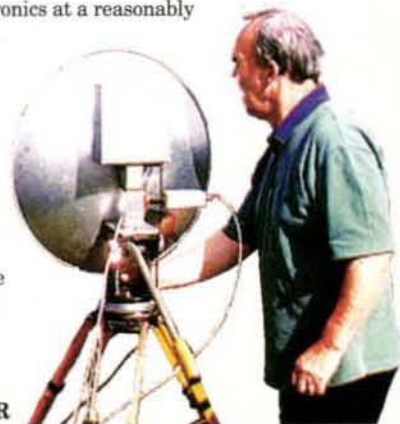
## Coaxial Feeder

At v.h.f. and u.h.f. frequencies it is conventional practice to locate all equipment in the shack and connect it to the antenna via coaxial feeder. On the microwave bands this may not be acceptable, due to the high attenuation of cable at these frequencies. One alternative is to mount the receive pre-amplifier, transmit amplifier and switching system right at the antenna to keep losses to a minimum.

Another method is to use two antennas, one for receive with an integral pre-amplifier and the other for transmit with a co-located amplifier. This saves on providing an expensive coaxial transmit/receive relay. It may also give you a better system performance when using modes such as ATV repeaters where the input (transmit) frequency is at 1248MHz and the output (receive) frequency is 60MHz higher at 1308MHz.

However, even this method may not be entirely satisfactory and it might be necessary to mount everything at mast-head. Many microwave operators do just that but you do need to ensure you have a waterproof box and possibly have some method of maintaining the electronics at a reasonably constant temperature.

If you use a transverter in this configuration then you only need to run one thin coaxial cable up the mast to provide a feed for the i.f. drive. You'll also need to provide a cable for the d.c. supply and switchover (p.t.t.) arrangement.



73 David G4ASR

## Next Month

Next month (after discussion with the Editorial staff, it has been decided that 'Get Going On Microwaves' be extended to include a fourth part!) I'll be rounding up the series by giving you details of where to obtain components, kits and surplus equipment for use on the microwave bands.

I'll also provide information on specialist clubs, organisations, newsletter and Web sites. In the meantime, if you have any questions relating to microwave construction please feel free to contact me. My details are shown in the 'VHF Report' column towards the back of this magazine. Until next month ...



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# RADIO BASICS

Now that we've built the beginnings of a set of really basic test equipment 'tools', Rob Mannion G3XFD suggests some ideas for a suitable workbench. And he's got some really 'practical' ideas for those really dark days of Winter!

Now that we've built the 'basic' items of simple test equipment, I think it's a good idea to think about a suitable bench to work on. The idea for this edition of 'Radio Basics' has come from two sources: readers (particularly students living away from home) asking for advice and the fact that my own office/workshop is no longer available as I'm preparing to move into a new home very soon.

It's gratifying indeed to hear from so many new readers - especially those who are still at school or college. Despite this however, it's rather unfortunate that I, with my experience and enthusiasm for the 'Radio Basics' series, have forgotten the difficulties faced by the newcomer to the hobby - especially if they've

not got the full understanding of fellow students and landlords, parents, partners or pocket-money (or student's allowance) purse-string holders!

## Portable Bench Design

During the 'Leicester' Show at Donington, and recent visits to the Hull and East Yorkshire Clubs where I talked to readers and Novice Instructors, I've realised that the "where can we carry on our hobby" question is often left unanswered. The problems suffered by others was brought into sharp focus recently when my own office, equipment and most of my large quantity of 'stores' collected over many years was packed away, awaiting my move to a smaller, more manageable house.

I was then left with a problem, especially as I still had the practical prototype projects to build for 'Radio Basics'. Fortunately, I remembered the excellent portable 'A Table Top Project Bench' written by Vic Flowers G8QM and published in the December 1992 issue of PW.

I built two of Vic's designs to be used by the members of the school radio club I was then organising. A further 20 or so were then built by the boys in their carpentry lessons!

The diagram, Fig. 1 (reproduced from the original article) which, together with Fig. 2, provides an excellent idea of what can be done. And even if you don't want to strictly follow G8QM's design\* - it will give you many ideas of your own.

*\*As we've sold out of the December 1992 magazines, I've asked the PW Book Service to provide photocopies of the article (which gives full constructional information) and*

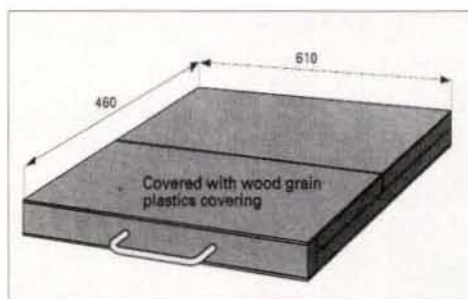


Fig. 2: The G8QM table-top work bench folded up and ready for transport. The unit can be used on a table-top, from the rear of an estate car or for extra versatility from a Black & Decker 'Workmate' (see text).

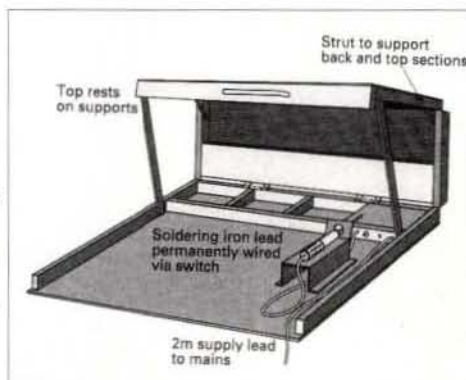
*these are available for £2 including P&P. Please ask for the 'Radio Basics' 'Table-Top Bench' Reprint.*

## Latest Version

Bearing in mind that I'm unlikely to be into my new home and 'set up' much before February of 2000, I'm incorporating some new ideas into my latest version of the G8QM bench. The whole unit's power supply - lighting and everything else - is to be provided by (in my case) a Watson 20A standard 13.8V power supply rather than direct from the mains.

By adopting the '12V' d.c. power supply approach I can make the portable bench much more versatile. For example - I'll be able to take it in the back of my car and along with my portable tool box I'll have a real 'field day' emergency repair facility. Along with the small 12V 'high intensity' incandescent lighting

Fig. 1: Originally published in the December 1972 issue of PW, G8QM's 'table-top' work bench project has proved very successful for use when space is at a premium or for 'field work' (see text).



bulbs I plan to use (available from motor car accessory shops) and the 12V 'Antex' soldering irons I've always preferred to use - I'll have an extremely versatile unit. Additionally -

remembering that my own parents were never very keen on my use of 'mains' electricity when I was a schoolboy - the low voltage power supply provides extra safety.

## Tool Box Storage

Once you've got a portable table-top workbench which, incidentally, I've used in conjunction with a 'Black & Decker 'Workmate' (remove the workbench from the top of the 'Workmate' and you've immediately got somewhere to saw and prepare printed circuit board material, etc.) you need to consider storage.

In recent years there's been a veritable explosion in the availability of strong storage boxes. My wife Carol suggested I buy some of the (meant for groceries of course!) very reasonably priced plastic boxes with lids and handles from Sainsburys. I did, and they're excellent for radio components.

I also bought one of the very large 'multistack' type of tool-boxes with carrying handles and small wheels (when packed up and ready for transport with their 'shopping trolley' folding handles they almost look like the modern suitcases with wheels, so familiarly seen at airports). Even so, they're light enough for me to carry up the stairs to my office.

The multiple trays and (very) large storage boxes provide more than enough storage and if I ever need to bring the box into the PW office to complete a project - everything is to hand.

So, in rounding off the final 'Radio Basics' for 1999 I suggest that you (even if you don't have storage problems ... they'll still be immensely useful) treat yourself with several storage boxes. Then, either point the family at Halfords, or any of the large DIY stores or motor car accessory shops as suitable sources of Christmas presents. Radio enthusiasts need not be difficult people to buy Christmas presents for ... especially when their needs are known! Cheerio for now and carry on enjoying the hobby!

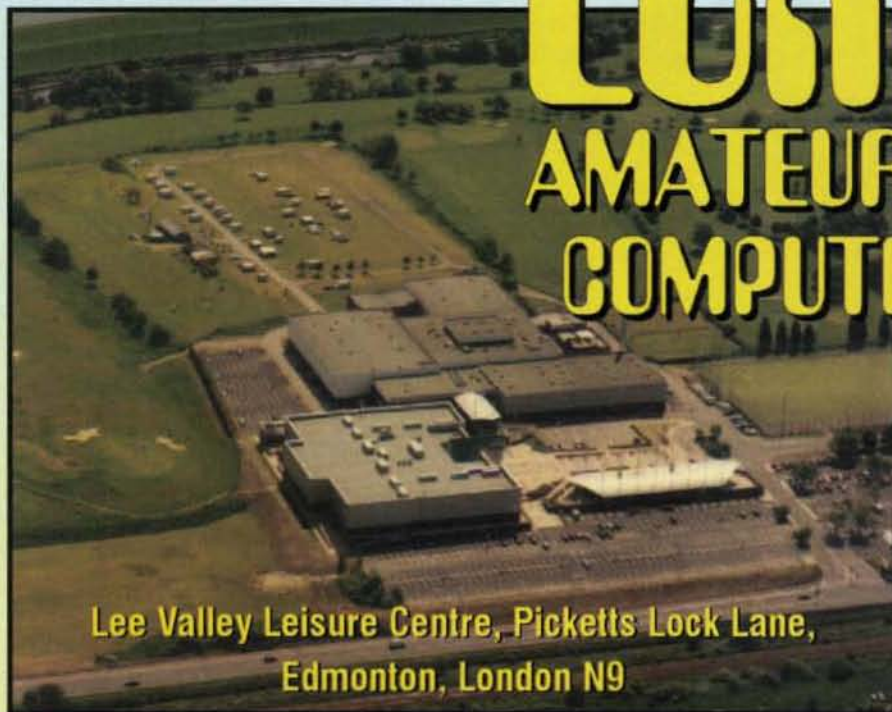
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**f r e e m a r t**



# THE PW PERSONAL ORDER FORM

Roger Hall G4TNT – PW's Advertising Manager – describes how we're launching the PW Personal Order Form service to help readers buy with extra confidence from advertisements in this magazine.

**M**any readers will have noticed how the battle for their custom has become more intense as the popularity of the hobby has declined. Fewer amateurs buying less equipment means there are now some great deals to be had but it also means that some dealers may try to cut corners when it comes to honouring their commitments. Also, as the real cost of Amateur Radio equipment has fallen and the competition for your custom has increased, some of the smaller shops have either gone out of business or been swallowed up by the bigger companies. In some areas, it's almost impossible to find a local shop and now the trend is towards mail order purchasing.

This, in itself, is not a bad thing but it does mean you'll probably be buying from a shop you've never visited and from a salesperson you've never met. So, how do you know who to trust with your money? You could go on air and ask about the dealer you're thinking about buying from, but the risk is that there may be one or two vociferous individuals who will be happy to tell the world about their grievances while the majority of satisfied customers just keep quiet. The same is true of the Internet. The various radio related newsgroups are a good place to ask but, again, you may not get a representative (or honest) selection of answers.

The truth is, there is no real way of telling beforehand how your transaction will be handled, how well the equipment will perform or whether it will go wrong. All you can do is to take reasonable precautions before you buy and know what to do if the worst happens. This is where we aim to help. First of all, take a look at the Top

Ten Tips in the Buyer's Guide box. If you follow those guidelines before you buy, you'll have minimised the chance of something unforeseen cropping up and you'll be prepared should the worst happen and you have to return the goods.

Secondly, whenever you order goods from an advertisement in PW, make sure you use the Personal Order Form that will be printed in every issue from now on. Call around your list of potential suppliers first and then post or FAX them this form when you place the order. It has been carefully laid out to help you make sure you've not forgotten anything and it will act as written confirmation of the deal. If you post it, don't forget to keep a copy! If you have placed the order over the telephone, still send them the form with ORDER CONFIRMATION written across it.

The vast majority of transactions are trouble free but, if you are one of the unlucky ones who does have a problem, here's what you should do. Write to the supplier enclosing a copy of the order form and the advertisement (you did keep them, didn't you?) and outline your complaint. The letter should be accurate and brief but should also contain the details of any

telephone conversations you've had with the company. It's always a good idea to make a note of the date, time and the name of the person you're speaking to whenever you call a company.

If the supplier fails to resolve the matter to your satisfaction, contact us and we will be happy to take up the case on your behalf. Just write (no 'phone calls please) to **Roger Hall, Advertisement Complaints Dept., PW Publishing Ltd., Arrowsmith Court, Station Approach, Dorset BH18 8PW** enclosing copies of all relevant paperwork and we'll take it up with the supplier. We have helped many readers in the past and almost always succeeded in putting matters right but this has been on an *ad hoc* informal basis. Now that we have formalised this process, we can only accept complaints **if the original order was placed on the PW Personal Order Form** to show you bought from an advertisement in PW and not from one in another magazine. Also, the order must have been for goods that were advertised in this magazine (**but not in Classified or Bargain Basement advertisements**) and not for goods that did not appear in the advertisement. Not only will we help you to pursue your claim, we will also publish in the magazine a selection of the complaints we receive and the responses from the advertisers. This

will help other readers when it comes to deciding where to buy from and who they prefer to deal with.

We also intend to publish rulings from the Advertising Standards Authority. When we get complaints about the content of advertisements, some of which come from readers and some from other dealers, we refer them to the ASA whose job it is to decide whether the advertisement is legal, honest, decent and truthful. They then make an impartial ruling in favour of either the complainant or the advertiser. Up until now, we've just asked those concerned to comply with the ruling but now we're going to publish those rulings in the magazine so that readers can see for themselves how advertisements are judged.

We hope our Personal Order Form, along with our offer to take up complaints on your behalf and the publishing of complaints and ASA rulings will make it easier for you to make an informed choice when it comes to parting with your money. You should also look out for buying advice in future issues of PW where we will be bringing you features on your rights when buying and returning goods, the pros and cons of buying 'grey' imports and many other topics that will allow you to buy with extra confidence from advertisements in PW.

## Buyers Guide Top 10 Tips

- 1: Telephone first to confirm the price and details are as in the advertisement. Dealers often have to send in copy up to 8 weeks before the magazine is published and prices and availability can change in that time.
- 2: Ask if it's a parallel/grey import or if it came from the authorised UK importer.
- 3: Ask if it is the full UK specification and if it has CE approval.
- 4: Ask about extra charges (delivery, VAT etc.) and find out the final, all-inclusive price.
- 5: Ask about their return/refund/repair policy for faulty goods and if they have a restocking fee for the return of non-faulty items.
- 6: Ask for a written quotation if it's a large order.
- 7: Make a note of all calls and who you spoke to and keep copies of all paperwork.
- 8: Pay by personal credit card whenever possible as the card company has insurance to cover all transactions above £100 and you will almost certainly get your money back from them should something go wrong.
- 9: Check everything as soon as it arrives. Open all the boxes and check that you have been sent everything exactly as ordered. If there is a problem, contact the supplier immediately.
- 10: If a problem develops later, write the supplier a concise and accurate letter outlining the problem and asking them how they intend to rectify it. If that fails, write to us with copies of all relevant paperwork and we'll take it from there.









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Icom IC-706 MkII	£252
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 Kenwood TS850S - In good working order. Was £695 **now £675**  
 Kenwood TS690SAT - Very nice HF and 6m rig. Was £695 **now £675**

## VHF/UHF equipment

Icom IC271H - Excellent mains powered 2m rig. Was £450 **now £425**  
 Icom IC471H - Lovely condition 70cms multimode. Was £450 **now £425**

Our non-sale stock can be seen on our website. Point your browser to <http://www.armstrong.demon.co.uk> or ring us and we'll send you a copy in the post. Our stock is in a constant state of flux so please phone first to check availability before ordering. Don't forget that we offer 3 months warranty on all of our used equipment.

We would like to wish all of our customers old and new a very Happy Christmas and a peaceful, prosperous and DX filled New Year. We look forward to meeting you all again at most most of the major rallies (and some of the smaller ones too!) in the Millennium year.

# Merry Xmas and Happy New Year everyone!

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It is advisable to use Copper based Anti Corrosion Compound No. 1 on all connections.

**Practical Wireless SD-610 review August 1995.**

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**"SD-610 erected and operational in just over two and a half hours"**

**"excellent performance"**

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SD-42	40/20/15/10m	2 Trap	55ft	£97.45
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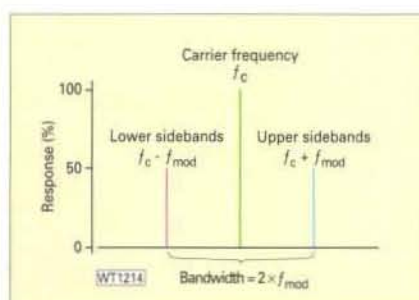


# An Area Often Sadly Neglected...

## Audio Aspects Of Amateur Radio

Gordon King  
G4VFFV, our  
regular  
'Looking At'  
author brings  
you an  
interesting  
article on the  
subject of the  
'Audio Aspects  
Of Amateur  
Radio' which he  
suggests is often  
sadly neglected!

Fig. 2: The lower and upper sidebands produced by a carrier amplitude modulated with a pure single tone. The bandwidth required is twice the modulation frequency and for 100% modulation, each sideband is half the amplitude of the carrier. (See text).



Looking back to the early days of Amateur Radio, before the serious advent of the single sideband (s.s.b.) suppressed carrier (J3E) mode, amplitude modulation (A3E) was the prime 'phone mode. At this time, detailed attention was commonly directed to the audio and modulator section of the transmitter.

A popular scheme for obtaining amplitude modulation (a.m.) in pre-transistor days was called anode or plate modulation. Here, the final stage (the power amplifier or p.a.) of the transmitter, normally operating in Class C, had (superimposed upon its direct-current anode potential) an alternating potential that varied in accordance with the information carried by the audio signal derived from the microphone.

The superimposition of the audio upon the r.f. carrier wave was achieved by an audio power amplifier, known simply as the modulator, which could be operated in Class A, Class AB or Class B. The input to the modulator was obtained from the speech amplifier, which was an audio amplifier of often considerable merit, following the principles of the day for high audio quality (before the term 'hi-fi' had been coined!). A skeleton circuit of the idea is shown in Fig. 1.

### High Audio Power

Remarkably high audio power was required with the a.m. type of modulation. For example, if the requirement had been to modulate fully (100%), a 400W carrier produced by a Class C power amplifier running with an efficiency of, say 66%, then the d.c. input power would have had to have been in the order of 606W, with the modulator power half of this - some 303W.

The carrier power, was generally more modest than suggested. But even so, for full and low distortion modulation, the audio finals in home-brew transmitters of the day might have sported such valve types or equivalents as the 6V6, 6L6 or even the 807 in Class AB or Class B push-pull.

Great pride was taken over transmitting speech of the highest possible quality and for this to be demonstrated, home-brew or even commercial communication quality receivers - often with external loudspeakers - were adopted by many stations. The fidelity and depth of the reproduction was a joy to the ears, often competing well with a.m. broadcast stations of the time.

The A3E mode hasn't completely vanished from our bands. You can still sometimes hear a net of some of the 'less-young' enthusiasts adopting this mode, perhaps, on top band or 3.5MHz when and where spectrum space might be in less demand!

The chief disadvantage of the anode modulated Class C amplifier method was the large audio power required for full modulation. The audio section of the transmitter was often equally bulky and complicated as the r.f. section, adding significantly to the demands of the power supply unit which, again, was a remarkable piece of kit.

Provided the modulation level could be reduced (and it often was), the audio power demand was increased and the audio

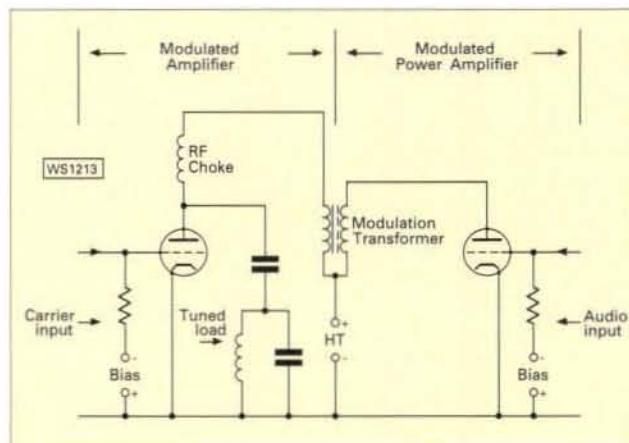


Fig. 1: The anode modulation scheme from the valve era, when remarkably high power audio amplification was required to provide full amplitude modulation. (See text).

quality of transmission enhanced. Nevertheless, the method was the most widely used and had the advantages of relative simplicity, good linearity and fidelity and high anode efficiency.

Other methods of A3E were in use, some requiring significantly less audio power, such as control grid and suppresser-grid modulation but the next milestone was really single sideband suppressed carrier J3E. It's well known, of course, that A3E requires double the band space of J3E for a given modulation frequency or spectrum.

Thus, if the modulation is a high-quality voice spectrum from, say 30Hz-6kHz or more (including overtones), then A3E requires a band space of 12kHz or more while J3E can get away with 6kHz or so. This is because all the information is carried by one sideband, so the other is redundant and can be suppressed. In addition, the mode saves over two-thirds in power because of the suppression of the carrier.

The audio in the one sideband is recovered by combining that sideband with a locally generated signal whose frequency is within five to ten cycles of the original carrier frequency. This wasn't very easy to accomplish accurately in days past, but nowadays of course, it's common practice with contemporary circuits and electronics.

In passing, it is also interesting to note that a double sideband suppressed carrier (d.s.s.c.) arrangement would require the locally generated signal to have, not only the exact frequency of the original carrier, but also to be phase coincident.

### Frequency Modulation

Although the original idea of frequency modulation (F3E) was germinated before the 1920s (and more seriously considered around 1925 by the late Major E. H. Armstrong), it wasn't until the middle of the 1950s before it was used for serious high quality broadcasting. This is the form now known as wideband f.m. (w.b.f.m.).

Frequency modulation was then experimented with and eventually adopted by transmitting amateurs in the early 1970s. It was found that remarkably good speech quality could still be achieved with f.m. over a significantly restricted

Continued on Page 34...



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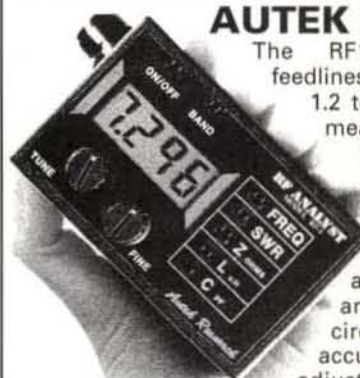
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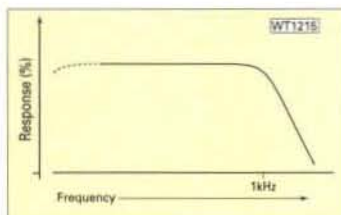


Fig. 3: With a pure tone modulation frequency of 1kHz, the audio passband must also extend to 1kHz to avoid audio attenuation. When there are harmonics and overtones then the response must exceed 1kHz to maintain fidelity.

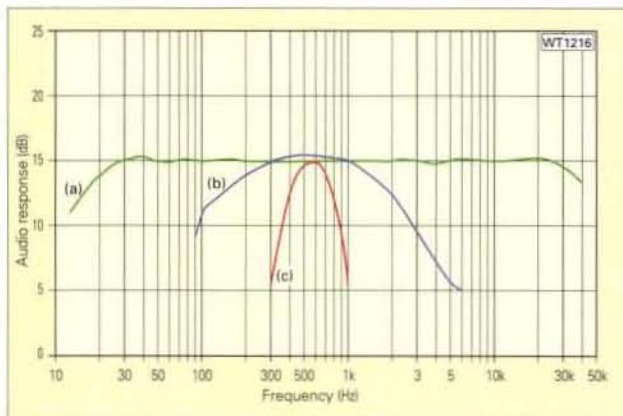


Fig. 4: A series of audio frequency responses (a) wideband corresponding to the hi-fi system, (b) limited response suitable for communication quality and (c) limited response suitable for Morse communication.

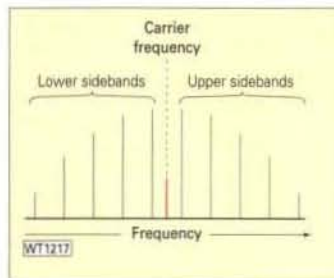


Fig. 5: Multiple sidebands of f.m. where the modulation is 400Hz tone and the deviation 1kHz.

bandwidth than that required for wideband f.m. broadcasting. This is narrowband f.m. (n.b.f.m.).

## Pair Of Sidebands

With a.m., a single pure audio frequency modulating the carrier gives rise to a pair of sidebands - one each side of the carrier with a displacement from the carrier equal to the modulating frequency.

For example, a 1kHz pure tone modulating a 1MHz carrier would have one sideband at 1MHz **minus** 1kHz (0.999MHz) and another at 1MHz **plus** 1kHz (1.001MHz). The amplitude of the sidebands is governed by the modulation level. For 100% a.m., each sideband is half the amplitude of the carrier (Fig. 2).

Now, for this 1kHz signal to be handled with maximum fidelity, the receiver must pass both sidebands without attenuation. Hence, the receiver's r.f./i.f. bandwidth must be at least two times 1kHz (or 2kHz).

The audio stages must also have a flat response up to 1kHz (Fig. 3). We've already noted that, for the J3E mode, the r.f./i.f. bandwidth need only approximate the modulation frequency.

Of course, the resulting audio modulation invariably extends beyond 1kHz, even for relatively poor quality speech, so sidebands or a single sideband of substantial amplitude approaching 5 or 6kHz could well be produced, especially when the modulation level is high. Even so, it's surprising how small a bandwidth will accommodate

intelligible or communication quality speech.

In the early days, there were far fewer signals occupying the amateur bands than there are today, so there was much less pressure on spectrum space which is one of the reasons why, in bygone days, we could enjoy the luxury of full-blooded a.m. with almost studio quality fidelity!

Although we have reduced spectrum space by around half by using the J3E mode, we still often find the band cluttered such as to demand the use of filters or bandwidth reducing expedients to reduce adjacent frequency interference and sideband splash. The pen chart responses in Fig. 4 compare the audio bandwidth required of a super quality hi-fi system with that of a mediocre quality speech circuit in, say, J3E mode.

The much narrower bandwidth which is adequate for A1A mode is also revealed. It is clear, of course, that we wouldn't be able to accommodate many super quality audio circuits on the h.f. bands, but that the possibility is there to carry many more Morse circuits without interference, given adequate receiver selectivity!

## Spectrum Space

The greater the spectrum space that's available within an amateur band, there's a greater corresponding number of transmissions that can be accommodated without mutual interference. The v.h.f. and s.h.f. bands are typical bands with lots of 'elbow room', which is why it has been possible to adopt the F3E mode in these bands. Such a wide band mode, of course, would be totally out of the question in any of the h.f. bands.

Now, while the a.m. modes yield a pair of sidebands (or a single sideband) per modulation frequency, f.m. produces a series of pairs of sidebands. These are separated from the

carrier by one, two, three, etc., times the modulation frequency.

Just a single pure modulating tone, for example, requires a bandwidth greater than a mere two times the frequency of the modulation, depending upon the deviation which, to some extent, has a similarity to the depth of a.m.

## Either Side Of Carrier

As the multiple sidebands spread out either side of the carrier wave, so their amplitudes fall (Fig. 5). Deviation is a measure of the amount by which the carrier is caused to vary above and below its mean frequency as a function to the **amplitude** of the modulating signal (the amplitude of the carrier, of course, remaining constant with f.m.).

With broadcast f.m., the maximum deviation is 75kHz, but with narrow band f.m. (n.b.f.m.), it's much more limited, in the region of 2.5-3kHz in our bands, to reduce the spread of sidebands. This has worked well with our 25kHz f.m. channels, but with the introduction of narrower f.m. channels an even lower deviation will be necessary to avoid adjacent channel interference on a busy band.

The **rate** at which the carrier frequency is caused to change by the deviation corresponds to the frequency of the modulating signal, while the **ratio** of the deviation to the modulation frequency is called the **modulation index**.

## Capture Effect

The f.m. mode also has an interference limitation advantage over a.m. as well as enhanced fidelity, along with another valuable feature called the **capture effect**, where only the strongest of co-channel signals results in an audio response. Provided the wanted signal is around two times stronger (depending on the deviation) than any unwanted signals on the same (or near) frequency, means the latter fail to produce an audio output of any significance.

There's no equivalent with a.m. Here, the wanted signal needs to be a greater number of times stronger than a co-channel one not to be troublesome. However, the effect has maximum advantage with wideband f.m. where a greater deviation is feasible, such as with radio and TV-sound broadcasting. Nevertheless, on the amateur bands, its attribute can be detected during a tropospheric lift - particularly on repeaters!

## Microphone Source

The microphone is generally the source of the audio signal and. In the very early days before the advent into Amateur Radio of the moving coil or dynamic microphone (one of today's most popular transducers), the carbon-granule microphone which was originally developed for telephone applications, commonly played a part. (See Fig. 6).

In simple form, the unit consists of a small insulated enclosure containing carbon granules which are in electrical contact with electrodes, one at each end. One electrode is fixed while the other, which is free to move, is mechanically coupled to a diaphragm.

Sound waves impinging upon the diaphragm exert a varying pressure on the granules, thereby changing sympathetically their contact resistance across the two electrodes. A voltage applied across the electrodes in series with the primary of a transformer becomes modulated with the sound waves and a corresponding audio signal appears across the secondary of the transformer. The disadvantages of this are poor frequency response and high noise level (the typical 'frying bacon' sound!).

Next, there's the moving coil microphone. This works rather like a moving coil loudspeaker in reverse. Sound waves impinging upon a shaped diaphragm cause a coil attached to it (and free to move within a strong magnetic field) to move minutely to and fro in sympathy.

A small e.m.f. is thus produced across the coil, upon which is modulated the audio information. When the output impedance is low, a step up transformer is used either internally or externally to increase the impedance to a suitable value for coupling to the input of the audio amplifier.



Instead of a moving coil and diaphragm, some microphones employ a corrugated ribbon suspended between the poles pieces of a powerful magnet, called the **ribbon microphone**. Because both faces are exposed to the sound waves, it works on the pressure-gradient principle, whereby the ribbon responds to the **difference** in pressure between the waves arriving between the two faces of the ribbon.

A transformer generally used to connect the ribbon's e.m.f. to the amplifier. This type was very popular in broadcasting for many years.

Other microphones which find their way to the front ends of amateur modulators include the **crystal microphone** and the **electrostatic microphone**. The former makes use of the **piezo electric effect**, whereby varying pressure applied to substances such as quartz, Rochelle salt and some ceramic elements produces an electrical output.

If the pressure results from sound waves impinging upon a coupled diaphragm, then the output is a corresponding audio signal. The latter is sometimes called a **capacitor microphone** because the diaphragm (made of metal foil or metal-sprayed plastic) forms one plate of a capacitor. The other plate at the rear is slotted, for pressure equalisation and rigid. When the diaphragm vibrates in the sound field minute changes in capacitance occur across the plates. A potential of around 60V is applied through a high resistance which charges the capacitance.

Because the charge remains constant, the minute changes in capacitance result in an audio voltage across the plates. This, being of high impedance, is fed to a field effect transistor and thence to the modulator circuits of the transmitter.

## Electret Microphone

The Electret Microphone is a development of the electrostatic or capacitor microphone, whereby the polymer plastic film forming the actual diaphragm is initially subjected to a strong electrostatic field. When the field is removed an electrostatic charge remains on the diaphragm.

The effect is akin to the magnetism retained by a piece of steel after a strong magnetising field to which it has been subjected is removed, leaving a permanent magnet. The same result as the electrostatic or capacitor microphone is thus achieved, but without the need for a polarising voltage.

There's still the requirement, of course, for a high impedance f.e.t. head amplifier, which is sometimes built into the microphone. This may be powered by a small 1.5V battery which, owing to the very low current drain, will provide several thousand hours use.

Alternatively, the battery and matching transformer, where required, can be obtained in a separate unit, leaving the microphone proper as a remarkably small capsule, which is capable of outstanding audio quality and sensitivity.

It is important to bear in mind that the frequency response of any microphone, especially at the treble end, can be significantly affected by the loading impedance. Some microphones are endowed with an impedance matching switch, which should be set to suit the microphone input impedance of the transmitter. A 'tone' switch may also be fitted, which might merely provide switched degrees of treble cut!

## Thermal Noise

The amount of circuit or thermal noise (background hiss) is a function of the circuit bandwidth. If the bandwidth is basically unfiltered (wide), then the output is referred to as **white noise**, analogous to white light which is composed of all the colours (frequencies) of the light spectrum.

When the circuit bandwidth is restricted or filtered, then the noise is no longer 'white'. In fact, with a 6dB/octave treble roll-off we will be hearing **pink noise**. The thermal noise which we hear from our speakers and 'phones is certainly not white - more like pink, despite what one may hear over the air!

By restricting the audio bandwidth, the fidelity is bound to suffer, but since Amateur Radio is not hi-fi then this doesn't matter much, provided intelligibility isn't impaired. In fact, it

might be improved because of the reduced thermal noise with the decreased bandwidth. This is a function of the **noise power bandwidth**.

In other words, the more we close the window (reduce the bandwidth), the less noise we allow in! Each time the bandwidth is halved, the noise power falls by 3dB.

Moreover, a less wide audio passband will also attenuate those audio components (whistles, sideband, splash, etc.), which would otherwise cause severe QRM. The plot of pen chart traces in Fig. 8 show a restricted audio passband at (a) which would be suitable for J3E mode and another at (b) which might be too narrow for reasonable quality speech but just about right for Morse A1A. Compared with the 'flat' response also shown, the thermal noise in (a) would be about 10dB less and in (b) about 15dB less, while the noise in (b) is about 5dB less than that in (a).

Audio filters based on passive inductor/capacitor (L/C) configurations have been used with good success even when a receiver is equipped with narrow-band c.w. or s.s.b. i.f. filtering, especially when the filter is located at the **front** of the i.f. strip. This is because the audio filter reduces the power of the noise actually produced by the i.f. circuits themselves. However, when the filter is located at the **end** of the i.f. strip, the addition of an audio filter is unlikely to be so spectacular.

The bandwidth of a filter (e.g. the bandpass response) is a frequency range between the -3dB points at each side of the response characteristic. For example, in Fig. 8, the bandwidths of (a) and (b) respectively, are approximately 2kHz and 700Hz.

Quite accurate tailoring of the LC values of passive filters is necessary to achieve the required parameters. These, are the mid-band frequency and input and output impedances in particular and compromises are generally necessary, such as the use of input and output matching transformers and careful component selection.

(This kind of filter also suffers insertion loss. The latter is eliminated while the former are rendered less critical by the use of active audio filters).

These are significantly more popular than the passive types and are more readily adapted to home brewing, though they can be obtained commercially. Early species used a pair of transistors per 'element' but nowadays of course, it is the i.c. which represents the core component.

Finally, just a final word about the response of audio circuits to r.f. Although such circuits are **certainly not designed with r.f. in mind**, in the shack, (especially with **outside end-fed antennas and any type of indoor antenna**), the residual r.f. level might well be high enough to enter the filters, microphone channel or even the speaker circuits and impair their operation. This is where some sort of r.f. detecting device can pay dividends.

The best plan, of course, is to reduce the shack's r.f. level. But it may also be necessary to employ r.f. filtering at both the input and the output, taking the conventional form of r.f. chokes and capacitors along, possibly with ferrite beads and toroids.

PW

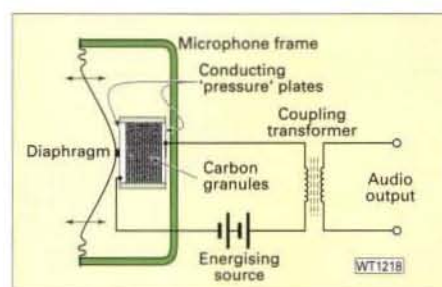


Fig. 6: Basic features of a carbon granule microphone, showing the coupling transformer. (See text).

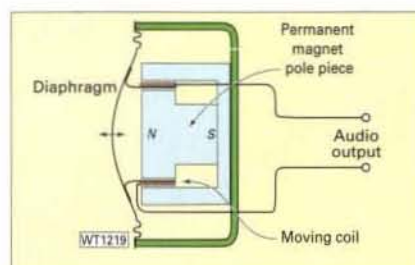


Fig. 7: Basic features of the moving coil microphone, which is one of the most commonly used in Amateur Radio.

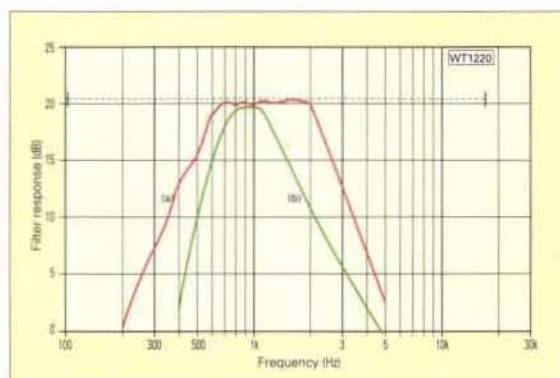


Fig. 8: Audio bandpass responses at (a) and (b) of approximately 2kHz and 700Hz between their half power (-3dB) points, suitable for s.s.b. and c.w. working. These also illustrate the noise power bandwidth relative to the 'flat' response also shown. (See text).



**Geoff Brown****Southampton**email: us at [amateur@smc-comms.com](mailto:amateur@smc-comms.com)**023 8024 6222****ORDER HOTLINE 10am - 10pm (orders only)****0797 107 7317** mobile phone

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# Watching Over Your Power Levels

## The PW Sentinel Part 2

In Part 2 of his article, Jim Brightman G0JXN describes the final construction and assembly of the PW 'Sentinel'. With this project 'on duty' in your shack you'll be equipped with a useful h.f., v.h.f. power/s.w.r. meter and modulation monitor!

Welcome to Part 2 of the 'Sentinel' project. Next in line for building the project is the metering circuit and while the components in the sensor modules are critical, the components in the d.c. part of the project can be from the junk box. The meter does however need to be a 100 $\mu$ A movement.

Similarly, the few components could be mounted on a group board. But I decided to use a small piece of Veroboard, fixed to the meter terminals, for neatness and to provide an easy mounting for the preset potentiometers.

You'll require a piece of 0.1inch spacing Veroboard 24 holes wide by 12 holes high. The 4mm holes for the meter terminals do not align with the punched holes so, if you don't have a drill stand, a little careful needle file work may be called for.

Wire the switches (adjusting wire lengths to suit the case used) and the **Reference** potentiometer and connecting leads to the board as a complete sub-assembly before mounting the board and front controls. It's much easier that way!

### Assembly Stage

For the assembly stage of the 'Sentinel' I'll remind readers that I've provided full details, which are available for the advised s.a.e., in the October issue of PW\* (and thank you for the response, everyone who has contacted the PW offices and myself directly at home. It's good to see such interest in a project such as this!)

However, to help anyone who is planning to build the project from the circuits and information given here I'll provide some basic guidance gained from building the prototype.

**\*Note:** Please see end panel regarding instructions how to obtain the suggested p.c.b. and Veroboard layouts and other instructions. **Editor.**

### Nickel Plated

To start off on the assembly tips, it's important to note that many u.h.f. socket solder 'spills' are nickel plated and they can be difficult to solder. It's therefore worthwhile tinning them before assembly. Fit both sockets ensuring that they are well tightened.



The PW 'Sentinel' Meter.

Check that the screws bed down into the recommended die-cast box as the distance between the screws in the spacer is very small. Any inaccuracy in the preparation of the spacer or the countersink drilling may cause them to touch. (If they do, simply file the screws down slightly).

Fit the feed-through capacitors C2 and C4 with the nuts on the outside of the box. While they need to be tight, take care not to over tighten as the screw threads may strip. Also, if the wire ends are bent, don't be tempted to straighten as you will almost certainly break the ceramic.

To reduce the possibility of any flash-overs in the transformer the top of the windings are sealed with a dab of epoxy resin. Ensure that it flows around the sleeving of the first winding starts and into the pvc insulation both at the front and back of the winding.

While you have the epoxy resin to hand, apply a small dab to L1 and L2 to secure them to the p.c.b. This will prevent them from rattling and the wire fracturing if subjected to prolonged vibration.

### Wrap Around

The case is a simple two-piece wrap around assembly designed to be made with minimal facilities. I made the prototype with the aid of a 'Workmate' bench, two short pieces of angle iron, some scrap 16s.w.g. aluminium for packing pieces and of course a short piece of wood to cushion the hammer blows.

The cover has a lip to improve the frontal

Fig. 1: Rear view of the prototype.





## Help Line

Jim has a small quantity of copper foil for the transformers. Anyone wishing to avail themselves of this (free of charge) or have any technical queries (s.a.e. please) to **Jim Brightman G0JXN, 35 Perrysfield Road, Cheshunt, Hertfordshire EN8 0TQ** or Tel: **(01992) 468204** at any reasonable time weekdays.

appearance, or you could fit a length of plastic trim instead. A strap, ties the front and back together to improve the rigidity.

I decided to provide a separate front panel rather than label the chassis directly as it's easier to label a small flat panel, it hides the bottom chassis bend and the switch and pot location holes. The panel markings which may be made with 'dry print' lettering with a little care.

## Final Assembly

For the final assembly, I recommend that you fit the meter first but leave off the nut that secures the strap until later in the assembly. Then fit the meter circuit board to the back of the meter with the terminal screws. You will be able to gain access to the screws through the socket holes in the back panel.

Next fit the switches and potentiometer with the front panel in place. When tightening the toggle switch take care not to damage the panel paint.

Cut the spindles to length and fit the knobs. Fix the modules to the back panel with self tapping screws and connect the leads from the meter board to the feed-through capacitors.

Fit and connect the phono socket and finally fit the strap with the meter fixing nut and the earth stud. Then fit a solder tag under the earth stud but do not connect the earth terminal wire as this is used in the calibration process.

## Calibration Process

The calibration process is relatively straightforward. The voltage on the module input for a given power may be calculated by transposing the power formula  $P = V^2/R$  i.e. for 200W r.m.s. the voltage is 100V RMS.

Since we know that the spur loss is 20dB ( $\div 10$  voltage) the spur voltage will be 10V RMS. When rectified by the detector the peak voltage will result

i.e.  $10 \times \sqrt{2} = 14.14V$ . (Less the volt drop across the diode of course).

If we introduce a d.c. voltage in the detector circuit, this will simulate an r.f. signal as far as the detector is concerned and this can be used to calibrate the power ranges.

Furthermore the voltage drop across the diode will be 'calibrated out', since it will be present during the calibration process.

To calibrate the 200W r.m.s. range a d.c. supply of 14.14V is required and for the 800W p.e.p. range a d.c. supply of 28.28V is required. Ideally a variable bench supply of about 30V would be used but if not available something like a 10k $\Omega$  potentiometer strung across a across a 30V supply will suffice.

However, if the supplies are a problem the shack 13V p.s.u. can be used to calibrate at a power less than full scale deflection (f.s.d.). A 13.8V d.c. supply would be equivalent to  $13.8/\sqrt{2}$  r.m.s., i.e. 9.76V. The equivalent voltage at the input to the sensor would therefore be 97.6V and the power  $97.6^2/50$ , i.e. 190.5W. Check the voltage on your p.s.u. and redo the arithmetic if it's not exactly 13.8V.

More important than the p.s.u. is the voltmeter that's used to measure the calibration voltage since this will decide the accuracy of the power ranges. Ideally this should be a digital voltmeter but failing this a reliable analog instrument can be used.

Set the PW Sentinel mode to **RMS** and set the preset potentiometers: **R17** and **R18**\* fully anticlockwise. Set the supply voltage to 14.14V or note the voltage of your fixed supply and calculate the equivalent power.

*\*(See Fig. 1 on page 37 of the October 1999 PW).*

Connect the negative supply line to the earth stud and the positive line to the earth wire that goes to the meter circuit board. Adjust **R18** for an indication of 200W or the power you have calculated.

Reset the mode switch to **PEP** and adjust the supply voltage to 28.28V or note the voltage of your fixed supply and calculate the equivalent power. Adjust **RV1** for an indication of the 800W, this will actually be the 200W mark as the p.e.p. range is  $\times 4$ , or the power you have calculated. This completes the calibration process.

Disconnect the power supply and connect the meter circuit board earth wire to the earth stud solder tag. Slide the chassis into the case from the back, fit the fixing screws in the bottom and fit the rubber feet. Then you really will have a useful monitor units - and you'll have 'home-brewed' it yourself!

PW

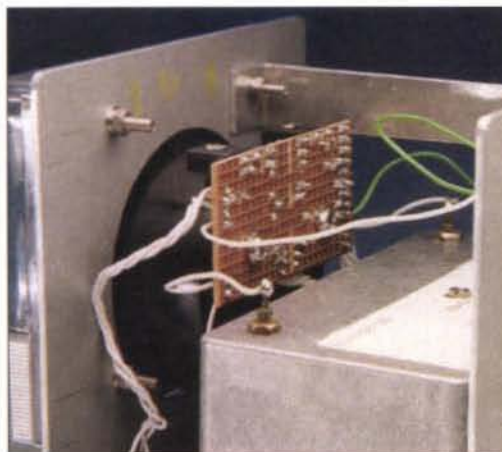


Fig. 2: For convenience the metering circuit components can be mounted on a Veroboard. This can then be attached to the rear of the meter (see text).

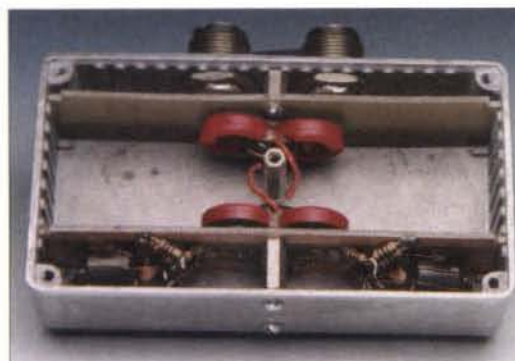


Fig. 3: For effective and efficient operation the r.f. transformer circuitry, dimension and assembly methods are critical. The Author provides comprehensive advice on this aspect (see 'Building The Project' information panel on this page).

## Building The Project - Help From PW

As I stated in the October issue of the magazine, it's often the case with the more advanced constructional projects, that we do not have enough Editorial space within *PW* to provide the very comprehensive and detailed instructions for some projects, as in the case of this example provided by Jim Brightman. However, we do have copies of the author's own p.c.b. drawing and assembly information which will be included in the information pack prepared by the author.

So, for those who are interested in building this very interesting and useful unit and wish to follow Jim Brightman's 'Heathkit' style 'step-by-step' approach, all the extra information we have to help you complete the project is available free from the *PW* Editorial offices in Broadstone by sending a large (A4 sized) self-addressed envelope with two 1st Class stamps. (Readers outside of the UK - including Ireland) are asked to write to me (or E-mail me) for further advice. Incidentally, all feedback generated by projects such as this, **help us to evaluate the interest there is for similar ideas** and this is very useful information indeed!

**Rob Mannion G3XFD, Editor.**



# Licence Free Low Power UHF Transceiver

## The Alinco DJ-SR1

Richard Newton G0RSN, with a little help from his family, reviews the new PMR-446 radios from Alinco - the new DJ-SR1! Nevada kindly loaned PW two radios and we set Richard loose on them. Ever wondered just what these new licence free radios have to offer? Well, you need look no further ...

Fig. 1: Back of one of the Alincos showing where the 3 x AA cells (or rechargeable batteries) are placed. You can also make out the PTT and MONI buttons. On the right-hand side of the Alinco in the picture, you will see the antenna in the folded down position.

The Alinco DJ-SR1 is a u.h.f. f.m. transceiver and it operates on the new, licence free, 446MHz band. The radio itself looks very professional and comes supplied with a belt clip, hand strap and a basic, but informative, information leaflet.

The radio is **clearly not designed** for the Amateur Radio market, rather it is aimed at short range family or business use and replaces the now defunct **Short Range Business Radio (SRBR)** which was licensable and operated on and around 461MHz. Although still being used, the SRBR system will be phased out over the next few years.

The beauty of 446MHz is that it is truly licence free! The transmitters are only allowed very low power - a maximum of 500mW - which is quite adequate for line of sight communications over about a mile or around a factory/business complex. Obviously, however, terrain will take a considerable toll at these power levels and frequencies.

### What Does It Offer?

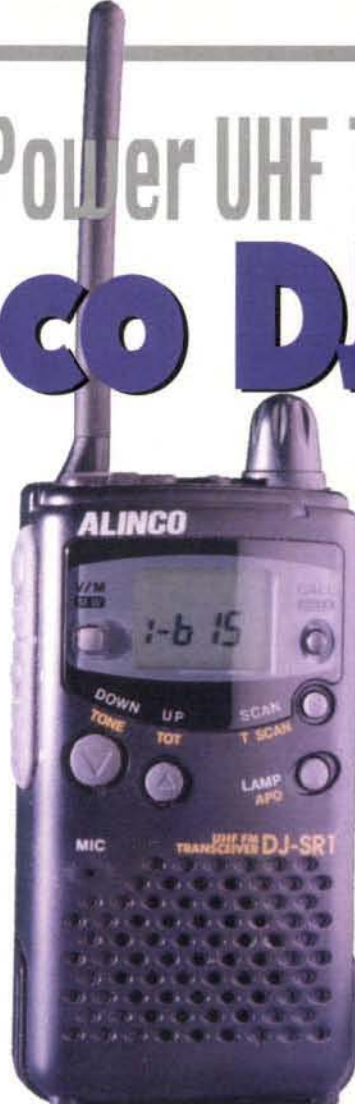
So, what does the Alinco DJ-SR1 have to offer its operator? Well, in answer, I have to say, I was amazed at the build quality and functions that I found on this little radio. It is cheap to run, working on 3 x AA cells or optional rechargeable batteries. (See Fig. 1). Something that I didn't expect to see was an external power connector, but there is one and it's positioned on the top of the radio next to the Speaker/Mic sockets. (See bottom of page, far right).

The radio requires 5.5V\* of external power and anything above this will have a rather adverse effect. Also, the information supplied with the radio warns against using external power when normal alkaline batteries are being used.

*\*Optional EDH-18 cigar lighter adapter with built-in noise filter and regulator available.*

### Fixed Antenna

One of the conditions of licence free operation is that the radio has got to



The Alinco DJ-SR1 PMR-446 licence free, low power, u.h.f. transceiver.

have a fixed antenna. The Alinco has got a rather neat way of giving the best of both worlds. The 'SR1 has a long, thin helical antenna that pivots and can be folded down along the side of the unit. (See Fig. 1). In this position the radio will receive quite well, but transmission is not advisable.

The antenna then swings up and gently locks at a right angle to the radio. This means the radio can be leant on its side with the antenna vertical. Useful perhaps if you have external power and a speaker/microphone connected, the radio could be clipped onto a desk and operate as a would-be base station. Gentle pressure then overcomes the lock and the antenna continues up to the normal position.

### Impressive Array

This neat little hand-held PMR-446 transceiver comes with an impressive array of functions. The licence free radios have eight frequencies

allocated to them which include the following:

- Channel 1: 446.00625MHz
- Channel 2: 446.01875MHz
- Channel 3: 446.03125MHz
- Channel 4: 446.04375MHz
- Channel 5: 446.05625MHz
- Channel 6: 446.06875MHz
- Channel 7: 446.08175MHz
- Channel 8: 446.09375MHz

This Alinco, like most other radios on the market, then increases the usefulness of these frequencies by the use of CTCSS tone squelch. The DJ-SR1 has full CTCSS ability using 39 CTCSS codes.

The 'SR1 has a user-friendly way of selecting the CTCSS codes and they are all given an alphanumeric code. For example, tone squelch 131.8 is assigned A07. If you have a radio set to operate on channel one, using the tone squelch 131.8, then the display would read 1-A07, channel two with the same tone would read 2-A07 - and so on. To save configurations, an operator can save channel and tone information in one of the radio's 20 memories!

The radio also has tone alert functions, a **MONI** button which will defeat the CTCSS so that you can monitor the channel and hear everything that is going on. In fact, the DJ-SR1 allows you to disable





the CTCSS altogether - although this isn't a particularly good idea. The 'SR1' also has a TX/RX indicator i.e.d and will scan memory channels as well!

## Energy Saving Functions

Energy saving functions are included in the package - such as **Auto Power Off Timer** and a **Transmit Time Out Timer**. The radio can also be set to **Low Power transmit**, though I'm not certain what this is, as the book doesn't indicate any technical information on this feature.

The attention to detail on this little radio is also illustrated in its ability to scan incoming CTCSS tones. This feature is especially useful if the person you are communicating with has another make and model of '446 radio that doesn't display the tone squelch it is using. Just get your friend to transmit, set the CTCSS tone scan to off and wait for it to find the matching tone for you!

There are extended controls to the radio. The key beeps can be toggled on and off, as can a beep which the radio emits after every PTT press. It can be set to show memory channel numbers only and the lamp can be set to either default to on or off when you turn the radio on.

The little Alinco DJ-SR1 looks good in its high impact black plastic casing and well labelled controls. The easy-to-see display is back lit with its green lamp and you are ready to talk to someone. So, how would the Alinco DJ-SR1 fair on air? Read on and find out ...

## On Air

I thought that I would employ the hardest test 'on air' first. This meant using the one control I haven't mentioned as yet, the **LOCK** key. This locks all controls except PTT, LAMP and ON/OFF.

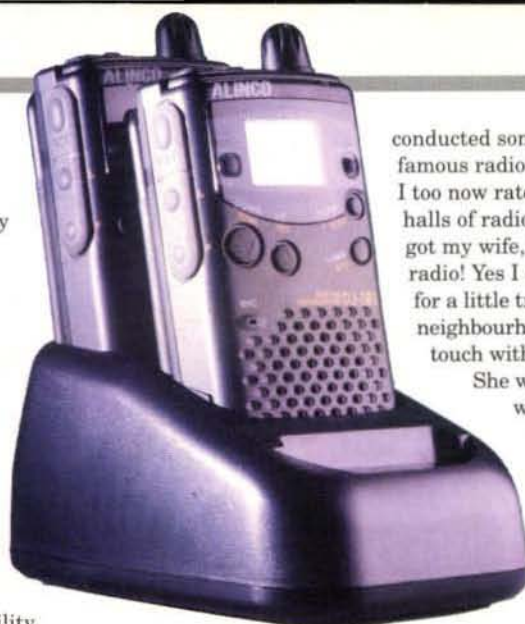
I set the radios (Nevada loaned me two radios) up and attached two speaker microphones (Icom ones worked fine) and handed them over to my two in-house experts - **Thomas**, aged six years and **Oliver**, aged four.

My sons had a whale of a time and were able to wander all over the house and through the garden and stay in perfect contact on low power. They even had a QSO with their Grandad, Terry G7VJJ, what fun they had!

The display on the Alinco DJ-SR1 includes a four-segment 'S' type meter, which wasn't very accurate but served as a good indicator. I had also noticed that the audio quality of both transmitted and received audio was very good indeed. So, it was time for a bit of 'DX'!

## Great Times

As we all know, there have been great times in the history of radio and I often visit the Sandbanks peninsular at Poole which, as some of you may know, is where Marconi



conducted some of his most famous radio experiments. Well, I too now rate myself in the halls of radio pioneer fame! I got my wife, Diane to use the radio! Yes I did - honest! I went for a little trip around the neighbourhood and kept in touch with Diane at home.

She was able to tell me what she wanted from the shops and I was able to co-ordinate the kettle - what a team! The 'DX' was thanks to my father-in-law Terry G7VJJ who

assisted me with an experiment. He remained indoors and I went mobile, I headed away from his location and managed to keep contact for just over a mile. This was with buildings and trees around, in town, with Terry in the house and me in a car. Needless to say ... I was very impressed!

## Final Use

The final use we put the radios to was a house-to-house intercom. Normally, Terry and I use the 433 or 145MHz amateur bands for keeping in touch from his house to mine. We only live a few hundred yards away from each other and it's a bit of fun.

However, it's only Terry and myself who can use it, as we are the only ones licensed. This was not so, though, while I had the Alinco DJ-SR1s to play with. We even got Diane talking to her Mum, Barbara on the radio! The signal between the two houses was great, in fact we were able to use low power on occasions.

I'm sure that there are 101 uses for these new radios, limited only by the individual's imagination. I'm certain that they will be well-used by young and old alike.

The Alinco DJ-SR1 is simple enough to appeal to those who just need a radio to communicate, but have no interest in Amateur Radio whatsoever. The radios are also, however, ideal for those who have an interest in radio but want a no hassle, relatively low cost way of trying radio out before they embark on either the Novice or full RAE!

What better way to practice your operating procedure for the Novice exam? You never know - it may even encourage new people to the hobby?

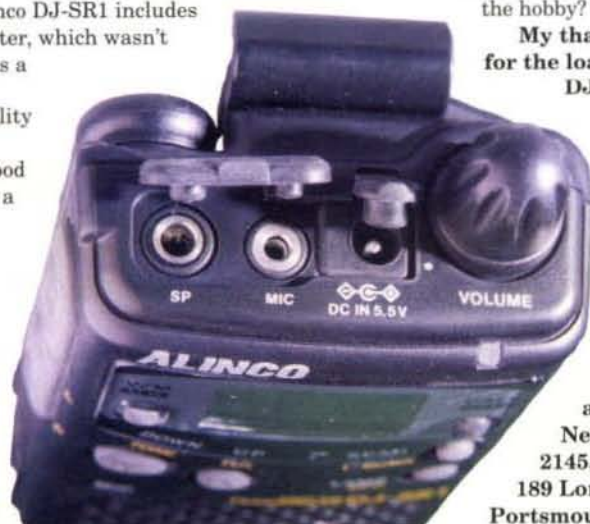
**My thanks go to Nevada for the loan of the two Alinco DJ-SR1s and the BC-10 twin quick**

**charger.** (See photo at the top of this page). The Alinco DJ-SR1 costs £119, the optional BC-10 costs £29.95 and optional EDH-18 costs £27.95. More information is available from

Nevada on Tel: 0239-266 2145, FAX: 0239-269 0626, 189 London Rd, North End, Portsmouth PO2 9AE. **PW**

The two Alinco DJ-SR1's sitting inside the BC-10 twin quick charger (optional extra - see text).

**"I'm sure that there are 101 uses for these new radios, they will be well-used by young and old alike."**



The external power connector (which Richard didn't expect to see!) is on the left-hand side of the volume control (far right). You can also see the speaker and microphone connectors (far left).

**RICHARD GORSN EMPLOYS HIS TWO YOUNG SONS TO HELP HIM REVIEW THE NEW PMR-446 RADIOS FROM ALINCO.**



# SRP TRADING



## Antenna Rotator AR-300XL

Max load 60kg (with support bearing). 360 deg rotation in approx 65 sec. (cable not supplied). Support

bearing optional extra.

**£49.95** FREE P&P

Optional Support Bearing £14.95.

## MAYCOM AR-108

• Full civil airband • Covers 108-136.975MHz (AM) & 136-180MHz (FM) • 99 memory channels • 5kHz, 10kHz, 12.5kHz, 15kHz, 25kHz & 1MHz steps • Dual channel watch • LCD display with signal meter

**SPECIAL OFFER PRICE £69.95 + £5 P&P**

ALSO AVAILABLE

• PSU charger **£8.95** • Professional earpiece **£8.95** • Airbander micromag **£19.95** • In-car adaptor **£8.95** • BNC to SMA antenna adaptor **£5.00** • 2 AA nicads **£3.00**

**AR-108 + all above accessories for £109.95 + £10 P&P**



## DX-394 Shortwave Communications Receiver

150kHz to 30MHz AM,

USB, LSB, CW digital receiver with 160 memories.

**£199.99. £99.99 + P&P.**

## Sangean AT-909

Portable short wave receivers are always popular and if there's one with long wave, medium wave and VHF coverage as well, we can guarantee it will be popular. That's why the AT909



caught our eye. It has over 300 memory channels and will also auto-scan, looking for stations. It has narrow and wide filters for AM reception and also has SSB facilities with a superb "slow tuning" rate in this mode. We've had nice reception of Shanwick and Volmet but don't expect miracles on 80m! The FM section also has RDS built-in so you can identify stations on the large clear LCD screen. **£129.99 + £5 P&P**

## Gold Peak 1300

1300mAh Nickel Metal Hydride (NiMH)



AA size rechargeable cells. No memory effect. Over twice the

capacity of Nicads. **£2.00 + P&P.**



## Synchron SX-144/430

2m/70cm cross needle direct reading SWR/1000W power meter. **£39.95** inc P&P.



## Comtel COM-212

Covers 66-88, 137-174 & 406-512MHz. FM, 30 memory channels + 1 priority channel, lock-out function, 2 sec scan delay, built-in charging circuit, flexible antenna. **£49.95 + £5 P&P.**

## PRO-2042 Base Scanner



1000 channel AM/FM/WFM (switchable) scanner. Covers 25-520MHz and 760 to 1300MHz. **£299.99**

**£179.99 + £10 P&P.**



# 1686 Bristol Road South, Rednal, Birmingham B45 9TZ

Opening times: Mon-Sat 9.30am to 5.15pm. We are Kenwood, Yaesu, Icom, & Alinco dealers.

Call Richard (G6ORA) or Mary (MOBMH) on

TEL: 0121-460 1581, 0121-457 7788 FAX: 0121-457 9009

## SRP Mini-Mag 2/70

2m/70cm dual band mobile antenna featuring super strength mini-magnet (only 30m diameter) c/w miniature coax and plug.

**£19.95** FREE P&P.



## Silver Diamond

Four band discone. TX 6m, 2m, 70cm & 23cm, 200W, RX25-1300MHz. Stainless steel construction.

**£49.95.**

**£29.95**

+ £5 P&P



## WM-918 Electronic Weather Station

allows the measurement and display of weather data. Displays indoor/outdoor temperature, relative humidity, dew point, wind speed, wind direction, wind

chill, barometric pressure and daily & accumulated rainfall. Four weather symbols show you a weather forecast: sunny, partly cloudy, cloudy and rainy. Memory for highest/lowest temperature, relative humidity, dew point temperature, maximum wind speed, minimum wind chill, daily and accumulated rainfall. Weather alarm warns you of high and low temperature extremes, rate of rainfall, wind chill, wind speed and drops in pressure.

**£179.95** inc. P&P.



Free IBM PC compatible software kit worth £29.99.

Offer ends 15th December, 1999.

## Fairhaven RD-500VX

**£799.00** incl. P&P + free wideband discone & long wire kit.



## GRE Wideband Scanner Pre-amp

Improves reception 100-1000MHz by up to 20dB, variable gain control, powered by 9V PP3 battery or DC adaptor fitted with BNC adaptors. **£49.95.**

**£19.95** + £3 P&P. (30 pieces only).



## Micro "Stealth" Discone

RX25-1300MHz. Small and unobtrusive, suitable for portable use. **£29.95.**

**£14.95** + £5 P&P



## DC-AC Invertors, 12V DC in 240V AC out

150W version	(for notebook computers, etc.)	<del>£39.99</del>	<b>£29.95</b>	+ £5 P&P
300W version	(for small power tools, etc.)	<del>£59.99</del>	<b>£49.95</b>	+ £5 P&P
600W version	(for medium power tools, etc.)	<del>£129.99</del>	<b>£99.95</b>	+ £10 P&P
1000W version	(for large power tools, etc.)	<del>£159.99</del>	<b>£129.95</b>	+ £10 P&P
2500W version	(for most purposes, etc.)	<del>£499.99</del>	<b>£419.95</b>	+ £15 P&P

## Deluxe G5RV

Half-size antenna (40 through 10m) **£12.00** + £3 P&P.

## Deluxe G5RV

Full-size antenna (80 through 10m) **£15.00** + £3 P&P.



# Amateur Radio & Disabilities?

## No Problems!

Paul Essery  
GW3KFE  
explains that,  
with some  
special  
adaptations, 'a  
little help from  
friends' and  
special  
organisations set  
up for the  
purpose -  
Amateur Radio  
operating for the  
disabled is not a  
problem!

There are, unfortunately, just about as many forms of disability as there are disabled people. For the 'normal' things, the Health and Social Services facilities come into play. However, the disabled person wanting to take up Amateur Radio often needs specialised help which the 'system' just isn't geared up for.

In practice the RAE or NRAE pass is often the easy bit as organisations such as the **Radio Amateurs' Invalid & Blind Club\* (RAIBC)** will have teaching aids, so all the prospective student has to do is to provide the enthusiasm. Although, with some disabilities, it may mean two or three club members working together to provide extra help.

**\*Further details from: Hon. Treasurer/Membership Sec. Shelagh Chambers, 78 Durley Avenue, Pinner, Middlesex HA5 1JH.**

When the time for sitting the RAE comes, it's best to discuss in detail with the RAIBC how the exam is to be taken especially if 'mobility' is a problem. There are various ways in which the test can be administered, for example, a verbal examination taken in the candidate's home may be needed.

On the Morse side, again RAIBC may yield ideas for the tutoring. When the test time looms, special arrangements can be made with the RSGB Morse Test Service, again perhaps involving a test

Fig. 1: A drawing board, re-engineered by the West Midlands REMAP to help an architect who could not reach to the top of the board to work. The modification provides an extra surface, on rollers, so that the user can simply roll the drawing down to where it can be reached without losing registration.

at the candidate's home. Remember: The exam/test is traumatic enough even for many able-bodied candidates!

### Confidence & Encouragement

For the disabled, who often lack self-confidence, it's so much more likely that they will unconsciously undermine their own chances. Encouragement is the word, and lots of it!

To help, you should organise things as early as possible so whoever is to do the test or invigilate the exam can familiarise themselves with the problems they face and what must be done. It can be traumatic for the examiner too! And, of course, an invigilator's flutters can transfer to the candidate like lightning!

### After The Examination

Having taken (and passed of course!) the examination - it's time to look at the realities. To get on the air, interests, depth of pocket and so on must be considered.

To spend a wad of money on say, an h.f. rig only, to find later that the interest has shifted to 'nattering' on v.h.f. is sad. So, I advise that you try (if you're the new operator), or persuade the disabled beginner you're helping - to start with simple gear until the real interest has emerged.

### Needs Vary

The needs of the disabled person vary: they can be simple, such as lifting the operating desk up enough to let wheelchair arms clear the underside so the owner can reach the controls of the rig. Then comes the more-difficult one-off adaptation of a rig for use by someone with a specific disability.

Other areas which might need to be looked at include the station log-keeping, modification to a microphone's send-receive switch and arranging for a key that our new Radio Amateur can actually use.

**You may have no problem** with a key or microphone that insists on wanting to 'walk' when in use, but it may well be very different for a disabled friend. For this one the answer is so simple - scrounge a bit of 'Slip-Not' from the Occupational Therapist (OT) or Physiotherapist and sit it under the key(s). Slip-Not will hold the key in place nicely and when it begins to feel as though it is dusty and losing its grip, a quick rinse in soapy water makes it like new again.

However, there's a bit more psychology here too: 'phone operation can improve the speech of a person with a disability. On the other hand I know of a licensed amateur who combines a hearing disability resulting in a very narrow frequency range with severe tinnitus. For that amateur, communication





with anybody else involves the other operators using Morse, though he himself can speak after a fashion, having learned before the hearing problem hit him 50 years ago.

## Antenna Erecting

In most places the antenna-erecting expertise exists in the local club and the RAIBC have already been mentioned. So, where else can you turn for help in this area? To assist, let's take a look.

Throughout UK there are groups ('panels') of people from the **Rehabilitation Engineering Movement Advisory Panels (REMAP)** who are there to help. This voluntary organisation (Registered Charity No. 1000456) exists to apply design and engineering expertise to solving problems a disabled person (and disabled Radio Amateur) might have.

Each Panel combines the skills of the caring professions, (Occupational Therapists, physiotherapists and so on), with those of professional engineers and others with needed skills. So, with this expertise the Panel can make sure that the engineered solution will not harm the user and that it meets current safety requirements and so forth.

There are already some Radio Amateurs serving in REMAP nationally and at local level and of course more are welcome. On the user's side, Panels have been able to help various Radio Amateurs overcome their disabilities and get on the air.

You can contact the National Organiser, **Eur-Ing J J Wright, 'Hazeldene' Ightham, Sevenoaks, Kent TN15 9AD. Tel: (01732) 883818.** Scottish readers can contact REMAP (Scotland) by way of **John Golder at Maulside**

**Lodge, Beith, Ayrshire KA15 1JJ. Tel: (01294) 832566.**

Either the addresses provided will give you the name telephone and address of the Chairman and Secretary of your nearest Panel. And, if you are in Powys, you can contact me, **Paul Essery GW3KFE**, personally on - **TEL/FAX: (01686) 628958.**

## Free Of Charge

Financially, REMAP local Panels deliver technical aids or modifications to the client completely free of charge. Panels, though, are always pleased to receive donations from ANY source to assist their work. Such donations may be in cash, or by way of materials or access to workshop processes.

For all practical purposes each REMAP panel is autonomous, so the precise details of how they operate vary, but I can assure you they ALL could use some help!

Not an engineer? But got a good workshop and a good pair of hands? Perhaps you can also make things to someone else's design, or take a share in a joint project. Not an engineer and wouldn't know how to make anything? Don't worry, all local Panels need help from fund-raisers, administration, photographers and many other skills. Try them and see ... you won't be turned away!

PW



Fig. 2: A photograph from the Worcester REMAP panel show simple and complex items which together enable their severely disabled young owner to write, draw or colour as desired. Similar engineering approaches are used to help disabled Radio Amateurs with hand/arm disabilities to operate their radio equipment.

NO PROBLEM, WITH A LITTLE HELP FROM MY FRIENDS!

## Extra!

COMPILED BY ROB MANNION G3XFD

### Mark Makes His Mark As Young Amateur 1999

**Mark Haynes 2E0APH** from Harlow in Essex truly made his 'mark' when he became 'Young Amateur of The Year' 1999 at the ceremony held at the RSGB's HF Convention at Old Windsor on Sunday 10th of October. Mark - who had been 'runner up' in the jointly sponsored Radio Society of Great Britain and Radiocommunications Agency Award two years ago - greatly impressed the Judges with his achievements. Mark's activities, ably supported by his father **Keith G3WRO**, include Novice instruction at the Harlow & District ARS where he and his father are both members, Morse tuition, contest operating and public speaking on

the Amateur Radio hobby.

Presented with his award by the RA's Chief Executive **David Hendon**, in the presence of **RSGB 1999 President Hilary Claytonsmith G4JKS**, families, friends and other assembled guests, Mark also made a short speech outlining his hopes and plans for the future of the hobby.

**Rob Mannion G3XFD**, Editor of *PW* comments: "I've had the great pleasure of working Mark on 144MHz when I was on my way to East Anglia in September and to say that this young man is a gentleman on the air is an understatement. He's truly a great ambassador for our hobby. I'm also proud to say that he's a *PW* author - having had his article 'The Story of A Novice - A Whole New World In Two Years' published in the December 1998 *PW*."

'Runner Up' in the 1999 Young Amateur competition was **Daniel Keene G7GIK** from Four Marks near Alton in Hampshire, who enjoys Packet radio and repeater operation. The other finalists included **Jonathan Constable 2E0ATF** and **Kate Glover M1DRB**, both from Sussex.

The RSGB have preliminary announced the fact that the 1999 Young Amateur of The Year Award will probably be the last in the present format. News of changes will be announced during 2000.

### Fresh 'ZN414' Chips From Kanga!

Despairing constructors lamenting the loss of the long-established ZN414 'one chip' radio integrated circuit need worry no longer because *PW* has learned that 'Fresh Chips' are now available from **Kanga Products!** The good news wrapped in a plastic bag (not newspaper!) came from **John Fletcher G4EDX**, who recently acquired Kanga Products, when he presented *PW* Editor **Rob Mannion G3XFD** with a new MK484 i.c., an (almost) direct replacement for the very popular ZN414. The 'fresh chip' arrived at the G-QRP Club's Rochdale QRP Convention on Saturday 23rd of October and proved very popular with the keen 'home brewers' attending the 'traditional rally' which forms the heart of the long-established convention!

John explained that: "The Ferranti ZN414 was a ten-transistor t.r.f. receiver integrated circuit supplied originally in a TO-18 case and later in a TO-92 plastic package. It was the heart of a simple a.m. receiver and for years it was a popular subject for projects in electronics magazines. For many enthusiasts the ZN414 must have been their introduction to receiver construction. Sadly the ZN414 is no longer made but the MK484 is now available as a replacement".

Kanga Products have the MK484 available for **£1 (plus 50p P&P any quantity)** and in the comprehensive details, complete with circuit, the slight pin-out differences in the three-lead component are clearly illustrated in the diagram provided. Further details from: **Kanga Products, Sandford Works, Cobden Street, Long Eaton, Nottingham NG10 1BL. Tel: 0115-967 0918. Fax: 0870-056 8608. E-mail to sales@kanga.demon.co.uk or look up their Web site: http://www.kanga.demon.co.uk**



Young Amateur of The Year 1999, **Mark Haynes 2E0APH** (centre) with RSGB President **Hilary Claytonsmith G4JKS** (left) and **David Hendon**, Chief Executive of the Radiocommunications Agency (right). On the far right of the photograph are Mark's proud parents. 'Runner Up' for 1999 - **Daniel Keene G7GIK** is shown to the left of **Hilary G4JKS**, together with his equally proud parents.



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To celebrate the end of 1999, we have re-introduced the buy now pay later scheme. It's simple! PAY NOTHING for 6 months has finished you can pay the balance in full WITH NO INTEREST CHARGES whatsoever. Alternatively you can pay in 36 months (or 48 months) until the amount has been settled at 24.9% APR. You can still buy at a discounted price from your favourite retailer.



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Total value £2400

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An excellent SSB & CW HF Transceiver with superb DSP features.

RRP £999 Transceiver only

#### Package deal:

- TS-570DGE HF Transceiver
- SP-23 Matching Speaker
- MC-60A Deluxe Desk Microphone
- YK-88SN-1 SSB Filter or YK88C-1 CW filter
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Total value £1340

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### TM-V7E

Dual band 2/70, 35/50W mobile transceiver with blue display

RRP £649.95

ML&S £449 or PAY NOTHING FOR 6 MONTHS, then pay £449 with NO INTEREST, or pay £18.95 for 36 months at 24.9% APR

### TH-D7E

The only handheld in the world with a built in 96k packet model built-in.

RRP £319.95 or PAY NOTHING FOR 6 MONTHS then pay £319.95 with NO INTEREST, or pay £13.50 for 36 months at 24.9% APR

### TM-G707E

Twin band 2/70 35/50W mobile, one band at a time!

RRP £349.95 PAY NOTHING FOR 6 MONTHS then pay £349.95 with NO INTEREST, or pay £14.77 for 36 months at 24.9% APR

### FT-100

The UK's best selling all band HF/VHF/UHF mini transceiver.

RRP £1249 Transceiver only

#### Package deal:

- FT-100 160m-70cm Transceiver
- FC-20 Automatic Antenna Tuner
- Samlex SEC1223 Base PSU

Total value £1554

ML&S £1410 PAY NOTHING FOR 6 MONTHS then pay £1410 with NO INTEREST or pay £59.50 for 36 months at 24.9% APR

## YAESU

### FT-847

In a league of its own, the only 160m-70cm all mode base station available.

RRP £1699 Transceiver only

#### Package deal:

- FT-847 HF-UHF Base Station
- FC-20 Automatic Antenna Tuner
- MD-100 Desk Mic
- Samlex SEC1223 base PSU
- Yaesu YF-115S02 Collins SSB Filter

Total value £2217

ML&S £1999 or PAY NOTHING FOR 6 MONTHS then pay £1999 with NO INTEREST or pay £84.36 for 36 months at 24.9% APR

### FT-1000MP/AC

Needing no introduction, it's good enough for G3NUG it's good enough for me!

RRP £2399 Transceiver only

#### Package deal:

- FT-1000MP/AC DSP HF Transceiver
- SP8 Matching Desk Speaker
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Total value: £2757

ML&S £2350 or PAY NOTHING FOR 6 MONTHS then pay £2350 with NO INTEREST or pay £99.17 for 36 months at 24.9% APR

### FT-920AF

Often over shadowed by the FT-1000MP, the newer design FT-920 sports HF & 6 metres in one neat package.

RRP £1499 Transceiver only

#### Package deal:

- FT-920AF HF + 6M Transceiver
- SP8 Matching Desk Speaker
- MD-100 Desk Mic
- GSV-3000 25-30A PSU

Total value: £1920

ML&S £1699 or PAY NOTHING FOR 6 MONTHS then pay £1699 with NO INTEREST or pay £71.70 for 36 months at 24.9% APR

### Quadra VL-1000

The ultimate buy once only 1kW HF+6M Linear.

RRP £4690

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### FT-90

The smallest lightest micro 2/70 transceiver in the world. Even has a remote head!

RRP £419

ML&S £389 or PAY NOTHING FOR 6 MONTHS then pay £389 with NO INTEREST or pay £16.42 for 36 months at 24.9% APR

### VX-5R

Killed the competition stone dead. A full feature 6/2/70 Handie with Lithium battery & 5 Watts as supplied.

RRP £359 Handie Only

#### Package deal:

- VX-5R 6/2/70 Handie with 5W as standard
- ADMS-1E Programming software
- CN-3 BNC Adapter
- CSC-73 Soft Case
- FBA-23 Empty Cell case
- SU-1 Barometric Pressure Sensor Unit

Total value £450

ML&S £399 or PAY NOTHING FOR 6 MONTHS then pay £399 with NO INTEREST or pay £16.84 for 36 months at 24.9% APR.

### VR-500

A bit late but you should know you always have to wait for the BEST. The smallest best performance Handie Scanner from Yaesu, who else?

RRP £299

Handie Scanner only

#### Package deal:

- ADMS-3 Programming software
- FNB-59 500mA Ni-Cd pack
- NC-60U Wall charger
- CSC-72 Soft Case
- Delivery next day

Total value: £409.00

or PAY NOTHING FOR 6 MONTHS then pay £409 WITH NO INTEREST or pay £17.26 for 36 months at 24.9% APR

**Look!**

- NO DEPOSIT
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- INTEREST FREE PERIOD OF 6 MONTHS

# CALL: 0208 566 1120

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NG for SIX MONTHS (not even a deposit). Before the SIX  
ely, at the end of six months, pay monthly (up to 36  
avourite dealer and get INTEREST FREE CREDIT!

## ICOM

### IC-706mk11G

Set the trend for a shack in the box, 160m-70cm, all mode does everything (almost).

RRP £1249.99 Transceiver only

### Package deal:

- IC-706mk11G
- Samlex SEC 1223 Base PSU
- AT-180 ATU
- FL223 SSB Filter

Total value: £1780

ML&S £1580 or PAY NOTHING FOR 6 MONTHS then pay £1580 WITH NO INTEREST or pay £66.68 for 36 months at 24.9% APR

### IC-746

A brilliant performer with HF, 6M and 2M as standard, 100W right across the range.

RRP £1699.99 Transceiver only

### Package deal:

- IC-746 HF/6/2 100 Watts
- Samlex SEC 1223
- SP-21 Matching Desk Speaker
- FL-223 SSB Filter
- SM-8 Desk Microphone

Total value: £2042

ML&S £1740 or PAY NOTHING FOR 6 MONTHS then pay £1740 WITH NO INTEREST or pay £73.43 for 36 months at 24.9% APR

### IC-775DSPmk11

The only current 200W Base Station machine available today. Excellent DSP and PSU, ATU as standard.

RRP £2999.99 Transceiver only

### Package deal:

- IC-775DSPmk11 200W with built in PSU & Tuner
- SP-20 Base Speaker with filters
- IC-SM8 Desk Mic
- FL223 SSB Filter

Total value: £3333

ML&S £2675 or PAY NOTHING FOR 6 MONTHS then pay £2675 WITH NO INTEREST or pay £112.89 for 36 months at 24.9% APR

Limited offer, please call first!

### ICR-2E

The small & economic scanner for your pocket from Icom.

RRP £149.99

ML&S £149.99 with free scanner book and postage.

### IC-756PRO NOW IN STOCK!!

The latest model from ICOM to compete with the FT-1000MP. 32 bit DSP ensures top level noise reduced HF operation.

RRP £2399.99

Call for latest deals on this fantastic new yr 2000 product.

### Special deal:

- Top trade in values on good clean IC-756 originals.
- All IC-756Pro's sold this month are offered with the original FIVE YEAR WARRANTY as standard.

## STOP PRESS!



### Calling all FT-900 owners!

Wish you bought the internal ATU for your FT-900 when it was available? We have 5 ATU-2 pieces only, brand new at only £225. Once sold there will be no more.

### Calling all FT-8500 Owners!

We have got a handful of YSK-8500 remote head kits.

Retail was £59, give us £25!

### ● The new Cushcraft Mini Beam

#### New from Cushcraft MA5B Compact HF Multiband Beam Antenna

Cushcraft's newest compact multiband HF antenna provides 5-bands in a package small enough to mount onto a small mast. The MA5B is a design that does not sacrifice ruggedness, performance and power handling for its size and ease of installation. Lightweight rotator will easily turn assembly.

- Five HF bands
- 10, 12, 15, 20m
- Power rating 1.2kW
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- Sidelobe att. 25dB
- VSWR 2:1
- Longest element 5.2m
- Tuning radius of 2.7m
- Boom length 2.2m
- Boom diameter 3.8cm
- Wind surface .3m<sup>2</sup>
- Weight 12kg

MA5B, 5-Band Multiband Beam Antenna £289.95

### ● Samlex SEC-1223 PSU

Around the same size as an IC-706, this fantastic new PSU is a must for the shack, IOTA use, or indeed anywhere small compact 13.8 is required. Ideal for use with the FT-100, FT-848, IC-706, IC-736 etc.

- Voltage out: 13.8 DC
- Current: 23-25amps
- Cooling: Internal heatsink & fan
- Input: 240V (or 110 with int. modification)
- Dimensions: 57 x 177 x 190mm
- Weight: 1.45kg

Only £89.95 inc. VAT

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# Counting Up From The Millennium!

Most of us are somewhat tired of the various 'count downs' to the coming 'Millennium'. However, for this issue, the last for 1999, Rob Mannion G3XFD is presenting the final 'counting up' from the Millennium! Rob is letting his imagination run wild with 'cuttings' of imaginary Amateur Radio 'news' items which (might) appear in the magazine in future years. They're intended to be thought provoking, sometimes controversial and interesting but above all ... totally imaginary!

## Elderly Amateur Arrested For Dangerous Driving

An elderly disabled Amateur Radio enthusiast has made 'headline' news in the tabloid news-disk pages recently, so our News Desk Editor, Daniel Daire, has discovered. In his report Dan writes: "The Radio Amateur Involved, one **Rupert Bernhardt Mannion** is an 86 year-old severely disabled motorised 'buggy' bound enthusiast who has been causing 'chaos' (sic) according to the tabloid press - by driving his battery-powered conveyance without due care and attention - having run down several customers in his local Sainsbury-Tesco store in Ferndown, in the Wessex Region of the Federated English States (FES).

"It appears that despite being warned by the local Community Police Sub-Contractors Wessex-Pol, Mannion had insisted on continuing to drive his 'buggy' while talking on his Amateur Radio 'mobile' equipment. The incident became so serious that the nearest full-time Policeman had to be called in to handle the case, rather than the local Sub-Contractors. This meant the officer had to travel from East Anglia where he'd been called to deal with a particularly heinous Motoring Offence.

### A Practical Wireless Connection?

Unconfirmed reports - from the notoriously unreliable tabloid disk press - also state that Mannion, who (allegedly) still insists on using the callsign G3XFD (which is illegal as it pre-dates the break-up of the original United Kingdom and the formation of the FES) claims some connection with *Practical Wireless*. This - if true - might have repercussions as such irresponsible PIPs (Privileged Infirm Persons) could be seen to be doing much harm to our hobby while driving their 'buggies' and trying to operate their illegal high power (yes ... more than the EMC regulation 10W p.e.p. limit!) transceivers at the same time!

Dan Daire continues: "From my investigations it appears that 'G3XFD' - as he insists it must be - has run down several supermarket customers and the excessive power levels from his transmitter have also caused several other wheelchair and 'buggy' users to lose control of their conveyance as the transmissions affected the electronic controls. One (reportedly) shot into reverse as Mannion passed by

and deposited its rider into an ornamental fishpond outside the store and another accelerated into the fish counter ... ending up amongst a fresh delivery of Spanish Squid!

"Finally" (says our Newsdesk Editor) ... "The whole sorry story is compounded by the fact that it appears Mannion has been operating his whole Amateur Radio hobby from his especially adapted PIPs bungalow **without the permission** of the Neighbourhood Inspection Council Electorates (NICE)! This (so he claims) is because he had been living in the bungalow since 2000, before the advent of the FES.

So, here we have the possibility of a truly major offender bringing our hobby into dis-repute! I can say this because it also appears that 'G3XFD' is using **analogue superhet receivers** which are



capable of radiating their 1 milliwatt local oscillator signals more than 10 metres! And none of his Amateur Radio equipment has been vetted and passed (by the local NICE committee) to their satisfaction.

No doubt we'll hear more about this rather cantankerous (obvious from his behaviour!) PIP - but in this our Centenary Year - it's rather unfortunate that the irresponsible actions of such a long 'serving' Radio Amateur could bring a disproportionate amount of bad publicity to the hobby. It's a great pity that we don't have Memory-Disk records of PW from before the year 2010. If they were available - we'd probably be able to dismiss 'G3XFD's' claimed connection with PW as a pure figment of his own (narrow-minded and one-tracked) imagination!

(News Report and comment from the October 2032 PW newsdisk).

## Radio Net On 6.5MHz An Overwhelming Success

The newly introduced 'RadioNet' licence free radio-linked International computer service based on 6.5MHz has taken the UK and the EU by 'storm'. Based on computer-transceiver units the system has proved beyond doubt that users previously limited by the original telephone-based 'Internet' systems land-line costs and availability limitations, now have greater freedom at no cost!

Now, once the user has bought a **Government Catalogued High Quality (GCHQ)** approved computer-transceiver (no licence required) and erected the simple antenna, they'll be ready to join the 'Internet Of The Air' at no cost whatsoever, apart from the initial and running costs of the equipment. Additionally ... no training is required to set up the radio link!

Based on each individual system providing a 'cell', the 6.5MHz system provides free radio-linked computing message services throughout Europe and around the World. The thousands of individual units 'report' via the 6.5MHz common frequency to a 'server' transmitter located in each region. No on-off switch is provided as each system must be 'on' to pass traffic to and from others units as part of the cell. However, the encrypted messages can only be 'opened' and 'read' by individual readers they are being sent to.

Success of the system was guaranteed once the necessary International short-wave radio links were set up. These, in the same way as the regional 'server' provider's transmitter-receivers, are 'sponsored' by major computer manufacturers who - in return for providing the free high power stations in each region are allowed to 'tag on' advertising and sales information to every message radiated in their area.

However, it's not all good news! There are reports of computer interference to the newly-extended '40 Metre' Amateur Band which starts at 6.7MHz, from badly adjusted GCHQ computer-transmitters. But you can be sure - PW will watch developments of this network (and GCHQ equipment) very closely on behalf of readers!

(News report from PW, August 2003).

Please direct any correspondence or comments to the PW office in the correct year - remembering to add the relevant space-time-warp code.



# short wave magazine

## NOVEMBER SHORT WAVE MAGAZINE

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### BROADCAST SECTION

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## Info In Orbit Special

### Weather Satellites - Getting Going

It all started during a lunch hour ... yes, that's when Lawrence Harris first heard about weather satellites. But it took a further 15 years before he found the opportunity to re-investigate them.

### 'Info' Readers' Pictures

Lawrence shares a few more of the pictures submitted by 'Info In Orbit' readers.

### Info In Orbit

Lawrence's regular monthly column.

### OKEAN-O Satellite With A Mission

Recent bursts of telemetry from OKEAN-O may have been the first heard from this type of satellite by some newcomers to WXSAT monitoring. Lawrence takes a look at its instrumentation, which helps explain the unusual images that we may see during the coming months.

### WXSAT Reception Competition

Competitive image acquisition was the theme of the recent RIG mailing list contest. However, Lawrence forgot to set-up his gear. Read all about the winning entries.

## Also This Month

Philip Mitchell explains how to become an expert weather forecaster for a minimum outlay, by utilising a wealth of data transmitted via h.f. radio teletype.

Paul Swansbury gathers with like minded devotees and discusses various radio wish lists. Did they come up with a dream receiver? Read 'Radio - Technology Pull or Market Push' and find out.

Joe Carr K4IPV takes a final look at 'Passive RF Parts You Can Use'.

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Practical Wireless, December 1999

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# Carrying on the Practical Way



Heading photograph: What's G3RJV 'leading up to' and what's in the box? Read this month's offering to find out!

*"The siren waits thee, singing song for song"*

Walter Savage Landor 1775 - 1864,

As is usual at this time of year, the Rev. George Dobbs G3RJV has a special offering for you which he says are "two little circuits for after the Christmas pudding" (provided you can keep awake of course)! But first comes the usual appropriate quotation ...

**O**n the whole, Christmas traditions should be left untouched, **however new they are**. I say this because, in recent years, I've offered a couple of little circuits each Christmas to relieve the tensions of the festivities and to provide an escape route to the workshop! Over-filled with food and weary of the social obligations, the radio constructor can retire to the workbench saying "I am just going to make a little novelty for the children (or grandchildren!)".

For this month I've provided a novelty circuit with a more useful circuit thrown in to justify the exercise. So, gather up the bits for these circuits before the shops and mail order companies close for the ever-longer break and prepare yourself for a little Christmas peace in the workshop.

## The Pole-Check

The 'Pole-Check' is a useful little circuit, which has been around in some form or other for many years. It's simply two leads coming from a small container (I use a 35mm film canister - see Fig. 1) that may be used to check the polarity of a circuit or a power source. Each of the leads has a light emitting diode (l.e.d.) mounted at the point where it enters the container.

When the leads are applied across a circuit or a power source, one of the l.e.d.s will light to show that the adjacent lead is connected to the **positive (+)** side of the circuit. It's very simple ... a lighted l.e.d. shows a positive lead.

The circuit is shown in Fig. 2. The whole thing comprises of just four diodes, two l.e.d.s and a resistor and works as follows:



Fig. 1: The 'Pole Check' project built into the top of a 35mm film canister (see text).

Imagine that the probes are connected to a voltage source of unknown polarity. If probe 1 is connected to the positive side of the voltage, diode D1 will conduct passing current to l.e.d. 1, through the resistor (a current limiter for the l.e.d.) and D3 provides the completed path, l.e.d.1 will light.

If probe 2 is connected to the positive side, the conducting path will be via D4, l.e.d. 2, the resistor and D2. In this case l.e.d. 2 will light. It's as simple as that!

The heading photograph shows my prototype and as I've already mentioned - I used the 35mm film canister to hold the minimal electronics although a smaller container would do the job. The probes are two clip leads that enter the lid of the canister with an l.e.d. placed close to each lead. The placement of the leads and the l.e.d.s must follow the circuit: probe 1 next to l.e.d. 1 and probe 2 next to l.e.d. 2.

The only thing likely to go

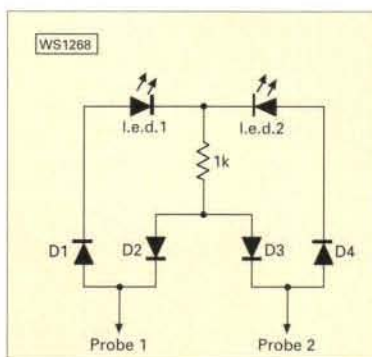


Fig. 2: Circuit of the 'Pole Check' circuit which, although being extremely simple ... will prove useful in the tool-box (see text).



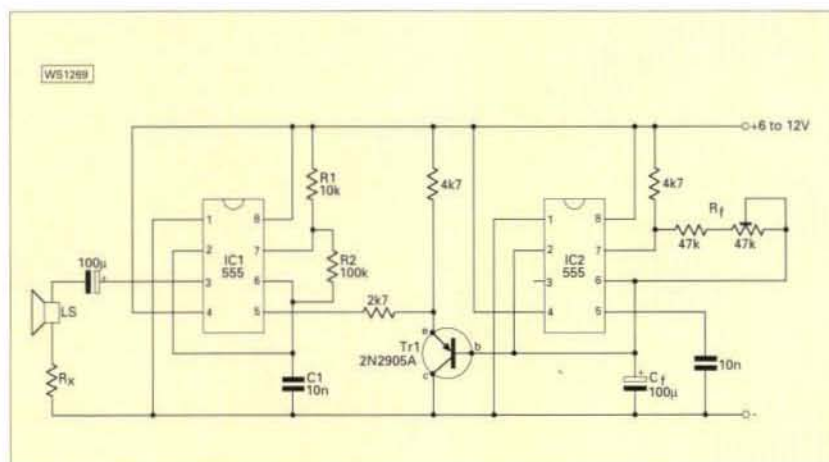


Fig. 3: The 'Siren' project circuit which G3RJV suggests could be used as 'justification' for disappearing into the workshop!

wrong with the building of this circuit is (ironically!) failure to get the polarity correct! The diodes and the l.e.d.s must be mounted as shown in the circuit diagram. (Fig. 1 shows the polarity of the diodes and the l.e.d.s.).

The circuit suggests the 1N4001 for D1-4. In fact, I used 1N4005 diodes because I have a lot of them. The l.e.d.s are standard red types. The circuit is fine for use up to 12V and ideal for keeping in a car toolbox to check those complex wiring harnesses.

## The Siren

The diagram in Fig. 3 shows the 'justification circuit' I've mentioned. This project provides the ideal excuse for being in the workshop!

In fact, the project is a wailing siren sound generator (see picture in Fig. 4), which should prove popular with children. It produces a rather alarming sound that's easy to vary and customise to the youngster's taste and could also be used as an alarm.

The circuit is built around two 555 timer chips (the 555 was probably the first and is still the most popular timer chip). The device is often operated in an astable mode where it's re-triggered to work as a free running oscillator; the trigger connection on pin 2 is connected to the threshold connection at pin 6. (It can run in a monostable mode, where an input pulse to pin 2 triggers a timed output).

A control voltage input, at pin 5, allows the output frequency to be modulated. This is the facility used in this circuit to produce the wailing effect.

The integrated circuit, IC1, is wired as an astable oscillator with a frequency of around 800Hz. The output is a square wave and the frequency is determined by the values of R1, R2 and C1. Ideally the value of R2 should be at least three times the value of R1. The output is coupled via a capacitor from pin 3.

There's enough output to drive a small loudspeaker but the total d.c. resistance presented to the output should be in the order of 80Ω. If, as in my case, an 80Ω speaker was not available, a series resistance, Rx, can be used to make up the total resistance. (The volume will not be very high but

probably high enough for the potentially unpleasant sounds this circuit can emit!).

## Lower Frequency

The second 'chip', IC2, is another astable oscillator running at a much lower frequency. This provides a ramp voltage to modulate the 800Hz oscillator. The slow waveform at Cf feeds a pnp emitter follower transistor, which modulates IC1 via the 2.7kΩ resistor. This produces a slow

frequency modulation of the signal generated by IC1.

The overall wailing effect depends upon the frequency of this modulation. There is some advantage in offering a range of 'undesirable' sounds and this range could be achieved by altering the values of either Cf or Rf, which control the frequency of IC2.

Since the value of Cf is the more difficult to vary, I arranged for the value of Rf to be made up from a fixed resistance and a pre-set potentiometer wired as a variable resistance. The values shown seem to produce a useful range of sound effects. This is an area where the individual constructor can play and perhaps gain the approval of the recipient of the unit!

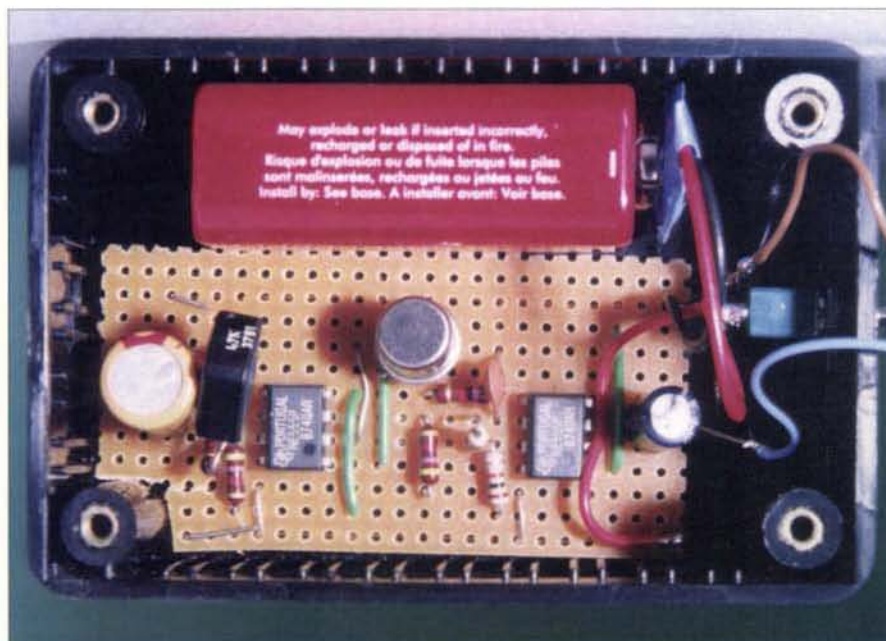


Fig. 4: The 'Siren' circuit can be built into a simple ABS plastic box and could be used a part of a 'shack' burglar alarm circuit (see text).

I built my version of the circuit on perf-board and mounted it in a small ABS box with a small speaker, a PP3 battery and a switch. Individual constructors could no doubt find more novel and appealing (apalling perhaps?) ways to mount the circuit. It may even fit inside a toy or one of those small PC speaker cases. Possibly the most important thing is to find someone who will take it away from you!

So - have a peaceful Christmas and a very happy new Millennium!

PW



# RADIO DIARY

**November 14:** The Great Northern Hamfest is to be held at the Metrodome Leisure Complex, Queens Road, Barnsley, near to town centre, less than two miles from junction 37 M1 motorway, just five minutes walk from the train and bus stations. Doors open at 1000 and admission is £2. The venue is all on one level with excellent disabled facilities. There will be the usual trade stands, component and specialist interest groups and a large Bring & Buy. Morse tests on demand, from 1200 till 1500 (don't forget to bring two passport photos and the appropriate fee with you). Talk-in on 145.550MHz. **Ernie G4LUE** on (01226) 716339 or (0836) 748958 between 1800 and 2000.

**November 14:** The Midland Amateur Radio Society are holding their 11th Radio & Computer Rally at Stockland Green Leisure Centre, Slade Road, Erdington, Birmingham. Doors open at 1000. There is a large free car park, free hampers draw, trade stands, local clubs and special interest exhibits. For trader information call **Norman G8BHE** on 0121-422 9787 or for general information, call **Peter G6DRN** on 0121-443 1189.

**November 14:** The Bishop Auckland Radio Amateurs Club (BARAC) Rally will take place at Spennymoor Leisure Centre. Please note this is a venue ideally suited to both trader and disabled, as it boasts good parking and easy access to a large ground floor. There will be the usual radio, computer, electronics and Bring & Buy stalls, as well as catering and bar facilities. Morse tests are available on demand. As you can imagine, there is a lot to do within the confines of the leisure centre, for those of the family not interested in radio. Doors open 1100 (1030 for disabled access) and admission is just £1, under 14s free of charge if accompanied by an adult. Talk-in on S22. **Keith M0BLN** on (01388) 601401 or (0374) 417660.

**November 15:** South Normanton & District ARC are holding their Mini

Radio & Electronics Equipment Fair at New Street Community Centre, South Normanton near Alfreton, Derbyshire starting at 1800. Easy access from the M1, J28, or the A38. Everyone welcome, refreshments available. Limited number of tables available, strictly on a first come, first served basis so early booking is essential. Further details from (and to book tables) **Russell Bradley G0OKD** on (01773) 863892 or E-mail **Duncan Walters G4DFV** on: [tesla@cwcom.net](mailto:tesla@cwcom.net)

**November 21:** The West Manchester Radio Club are holding their Red Rose Rally at Horwich Leisure Centre, Horwich, Bolton, off J6 M61. Doors open 1100, 1030 for disabled visitors. Admission by programme, which costs £1.50, £1 for OAP on the door. There will be the usual stands, plus refreshments and a Bring & Buy. **Don Aitchison G3BSA** on (01942) 871620.

**November 21:** The Bridgend & District Amateur Radio Club are holding their 13th Radio & Computer Rally at the Bridgend Recreation Centre, Bridgend, Mid-Glamorgan. Doors open from 1030, admission is £1.50. All the usual radio and computer traders, licensed bar, Bring & Buy, refreshments, family attractions and free parking. Plenty of room for visitors to mingle and browse, signposting will be from junction 35 of the M4. Talk-in on 145.550. More details from **Maurice GW0JZN** on (01656) 864579, FAX: (01656) 864579.

**November 27/28:** The London Amateur Radio & Computer Show is to be held at the Lee Valley Leisure Centre, Picketts Lock Lane, Edmonton, London N9 0AS. The Lee Valley Leisure Centre has modern facilities, well illuminated halls, extensive free parking and easy access by roads.

**December 4:** The Rochdale & DARS are holding their traditional radio rally (yes, on Saturday!) at St Vincent de Paul Catholic Church Hall,

Caldershaw Road, off the A680 Edenfield Road, approx two miles west of Rochdale. Follow the orange arrows from M62 J 20. Doors open 1100 (1045 for disabled visitors). There will be refreshments and a rest area. **John G7OAI**, evenings, on (01706) 376204.

**December 8:** West Kent Raynet will be holding their quarterly meeting at the Castle Room in the Angel Centre in Tonbridge. The meeting will start from 2000 and any Radio Amateurs who are interested in learning about West Kent Raynet and its activities will be welcome. Food will be available. Further details from **Colin G0UCH** (QTHR) on (07930) 903664 or E-mail: [colin@gouch.force9.co.uk](mailto:colin@gouch.force9.co.uk)

## 2000

**January 23:** The Lancastrian Rally will be taking place at Lancaster University. Routes from south - leave M6 off at J33, routes from north - leave M6 off at J34. opens at 1100, 1030 for disabled visitors. Entrance fee is £1.50. There will be a Bring & Buy, Morse tests on demand - two passport photos required. Licensed Café on site. For booking details contact (01772) 621954.

**January 16:** Oldham ARC will be holding their rally at the Queen Elizabeth Hall, Civic Centre, West Street, Oldham, Lancashire. Doors open 1100, 1030 for disabled visitors. Event features the usual traders and a Bring & Buy stall, Morse tests available on demand. Talk-in on S22 via GB4ORC, commencing 0730. Refreshments and free parking will be available. Details: (01706) 367454. E-mail: [m1cvt@netcomuk.co.uk](mailto:m1cvt@netcomuk.co.uk)

**February 6:** The 15th South Essex Amateur Radio Society are holding their Radio & Computer Rally at the Paddocks, (situated at the end of the A130), Long Road, Canvey Island, Essex. Doors open from 1030 and features include Amateur Radio, Computer & Electronic components exhibitors, Bring & Buy, RSGB Morse

testing on demand (two passport photos required). There will also be home-made refreshments, free car parking with space outside main doors for disabled visitors. Admission is just £1. More information from **Brian G7HIO** on (01268) 756331 before 2100 please.

**February 6:** Harwell Amateur Radio Society will be holding a Radio & Computing Rally February 6, 1030-1530, at the Harwell Science & Engineering Centre located just off the A34 between Oxford & Newbury. Signposted from A34, Talk-in on 145.550MHz. Further details from **Ann G8NVI** on (01235) 816379 or on <http://www.hamradio.harwell.com>

**February 13:** The Northern Cross Rally is to be held at Thornes Park Athletics Stadium, Wakefield, in one large hall, just out of town on the Horbury Road, easy access from M1 J39 & 40 - well signposted and with talk-in on 2m and 70cm. Doors open 1100 (1030 for disabled visitors and Bring & Buy). Details from **Roy G0TBY** on (01924) 893321 (combined telephone and FAX number).

**March 19:** The Norbreck Amateur Radio, Electronics and Computing Exhibition, organised by the Northern Amateur Radio Societies Association (NARSA) at the Norbreck Castle Exhibition Centre, Blackpool. Don't miss the largest single day exhibition in the country. **Peter Denton G6CGF** on 0151-630 5790.

**March 19:** Bournemouth Radio Society's 13th annual sale at Kinson Community Centre, Pelhams Park, Millhams Rd, Kinson, Bournemouth. Doors open 1030 and close at 1630. Talk-in from G1BRS on 2m (144MHz)/S22. Amateur Radio and computer traders, clubs and specialised groups, excellent refreshments, admission £1. Details from **Olive** or **Frank Goodger, 66 Selkirk Close, Merley, Wimborne, Dorset BH21 1TP**. Tel: (01202) 887721.

**April 16:** Swansea ARS will be holding their annual show in the Swansea Leisure Centre on the A4067 Swansea-Mumbles coast road. Doors open 1030-1700 and attractions include: trade stands; Bring & Buy; local interest groups; full catering & licensed bar. Admission is only £1, child 50p. Further details from **Roger Williams GW4HSH**, Show Secretary on Tel: (01792) 404422.

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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# ELECTRONICS IN ACTION

**H**ello and welcome to the last Electronics-in-Action (E-i-A) for this Millennium. I'm not going to worry about any millennium bug, whatever name it's given, I intend to hibernate over the holiday period, stocking up only on batteries for the toys that the grandchildren will surely get in Santa's sack.



Let me look at a few books for your library so that you have something to read over the coming festive time(?). A compilation of four year's worth of 'Technical Topics', the column written by **Pat Hawker G3VA**, in *RadCom* (The Journal Of The Radio Society Of Great Britain) is now available as a 'stand-alone' book: *Technical Topics Scrapbook (1990-1994)*. The A4-sized book has over 300 pages all solidly packed with comments, feedback, ideas and small circuit details covering all aspects of the hobby of radio.

Presented in chronological order (from January 1990 to December 1994) the pages are printed in the same format as they originally appeared in *RadCom* and make very interesting reading. It's possible to follow a thread of comments, or ideas, as they were printed, but I cannot put this book into a particular category, as it covers so much of

interest. This is an excellent book that reflects, from a small time window, the range of topics covered by Pat Hawker in his column that has appeared continuously in *RadCom* for the last 41 years.

## Work Cut Out

The compilers of *Technical Topics Scrapbook (1990-1994)* must have had their work cut out when they came to creating the index covering all 48 issues of a column that could take any direction, and frequently did. This book is an absolute must for any radio shack!

The second book I have from our 'Bookstore' this month is from Ian Sinclair. *Practical Electronics Handbook (Fourth edition)* has over 430 pages so it isn't a light book covering many topics in the eleven chapters and four appendices. This book is more of an 'aide-memoire' than a teaching book, the first four chapters dealing with passive and active discreet components, typical circuits and linear integrated circuits (i.c.s).

Most other chapters would perhaps be more relevant to those dealing with digital electronics and

computing as they cover: digital i.c.s, microprocessors, digital signal transfer, digital to analogue (D-A) conversions and computer use in design and manufacture. The final chapter covers hardware and practical work. This book is a good reference book for anyone interested in more generalised electronics.

Another reference book that I found in the Bookstore is *Electronics Hobbyists Data Book (BP396)* by Robert Penfold. There are six chapters in this smaller format book, but

there's much varied information in its' 240+ pages. Chapter one covers general circuits types.

Chapter two, a shortish chapter covers the various coloured and numerical codes used to indicate values on many components, chapter three covers operational amplifiers, chapter four covers logic i.c.s with chapter five covering many other semiconductors. The final chapter, six, covers other miscellaneous data. This is a very good value general data book at the price of £5.95.

## My 'Tuppence'

The final book this month was profiled last month, but I'm unashamedly throwing my 'tuppence' in, because I feel this is a superb book.

*The Man Who Invented The Twentieth Century*. Subtitled 'Nikola Tesla, Forgotten Genius Of Electricity', the hard-backed book from Robert Lomas, really is a very good read and really lives up to its sub-title. Like many I had heard of Tesla but I had failed to appreciate just how far in advance of his contemporaries he really was.

Nikola Tesla was interested in the 'wireless' transmission of electrical power rather than of signals, and so failed miserably to appreciate what Marconi had grasped (or was to grasp several years later). While Tesla was lighting his workbenches with radio wave driven (wireless) fluorescent lights and using multiple tuned circuits to transmit power, by wireless means, to specific circuits, radio signals via wideband spark transmissions had only just begun.

My own favourite 'story' from this well researched book is when Tesla demonstrated ultra low audio frequencies to Samuel Clements (pen-name - Mark Twain) with disastrous personal results for Clements. I feel rather saddened by my own lack of knowledge before I picked this book up (and found it difficult to put down again) and read it. This book redresses our 'mis-laying' the knowledge of Nikola Tesla and his inventions. Highly recommended.

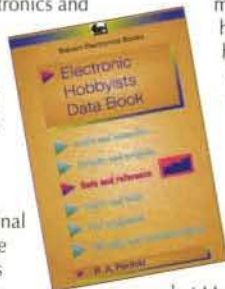
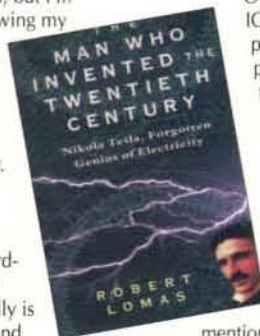
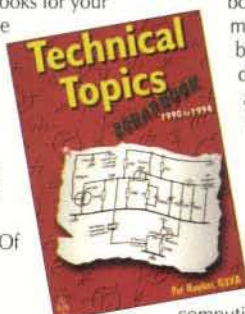
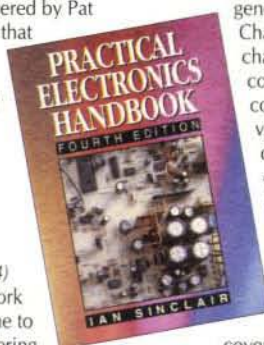
## Stager Update

I'd better put on the sack-cloth and ashes first this month to bring you an update to the Morse Stager project that I presented in the October 1999 E-i-A column. A letter from **George Fisk** says 'I expect that you will have noticed that the circuit diagram (of the Morse Stager, shown on p60 of the October 1999 PW. Ed.) shows IC2 as an LM741, while your prototype unit uses what you probably intended the diagram to show, an MC1458'.

To be honest George, I hadn't spotted that one, otherwise it would not have been there. I used the parameters from the '741 'Op-Amp' data sheet, but forgot to change it when I came to drafting out the circuit diagram. As George mentioned I did use the '1458 type of dual Op-Amp i.c. which contains two '741 similar units. George also mentions two capacitors, that were shown on the p.c.b. overlay but not actually on the circuit diagram.

The two capacitors referred to are the two items shown with dotted lines near ICs 3 and 4 on Fig. 4 (p.61 Oct '99 PW). These two capacitors were 'designed in' to give more gain and audio output from the two LM386 audio amplifiers if needed, which they weren't! George also referred to my comments about a high level of 'white noise' that could be present in the earpieces of the headphones, suggesting that the units might be unstable at ultrasonic frequencies.

The 'Zobel network' (a capacitor resistance series pair in the output







**Fig. 1: A tuning unit 'discovered' at the Leicester show. See text.**



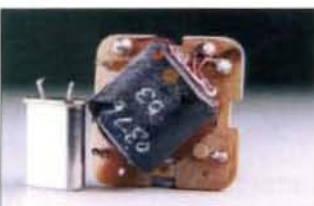
**Fig. 4: Two high quality capacitors were also recovered from the tuning unit.**



**Fig. 6: The boom is made from a section of an old telescopic antenna, split to form a holder for the microphone insert.**



**Fig. 2: One each of the coils and impedance transformers that were found in the unit of Fig. 1.**



**Fig. 3: A closer shot of the 9:1 impedance transformer alongside a 14.318MHz crystal from a computer motherboard.**



**Fig. 5: A home-made boom microphone is easier to make than you think. See text for more details.**



**Fig. 7: A piece of thin foam can finish the job of, looking a little more 'professional'.**



**Fig. 8: Two small 'P'-clips form the mount for the microphone boom, allowing the microphone to be positioned for best effect.**

circuit) that George suggested would cure any instability. However, I didn't find any instability in the units that I've built, my comments were more in line with the wideband noise that can exist on a radio transmission and especially those that are channelled toward the ear with the high pass filter inline. This predominance of the higher audio frequencies in one ear alone would, I feel, lead to a reduction in hearing capacity in that ear if the unit was used for long periods at a high level.

## Volume Level Warning

My warning about audio volume level is especially true if you are struggling to 'winkle' out the weakest signals from amongst the noise and whistles. It is often on this type of signal, that you have the audio level higher than normal. One other suggestion that George made, was about the unit's usefulness to those with a hearing impairment. I will have to look into further and let you know in a later column.

Another topic that I shall have to cover as well is the subject of capacitors in power supplies. This idea was triggered by a letter from **John Gomer G8UNZ**, in which he said "I've just spent half an hour with a new licensee discussing power

supplies and how all the power goes into the electrolytic (capacitors) on peaks - so, needing large terminals. The concept of 'Ripple-rating' of capacitors is not taught apparently..".

I've discussed the same idea myself at talks about power supplies that I've given to my local radio club, at which I've shown what I consider to be suitable power supply capacitors (about the size of a small coffee jar with large heavy screw terminals). Then, on opening up a commercial 20-25A unit, showing only a few small inadequately sized capacitors that may be fed from a very 'meaty' transformer. But that's another session.

## Leicester Show

At the recent Leicester show I had only a few short periods to 'wander' around the show for myself and one of the few items I found (and bought) was the unit shown in **Fig. 1**. The item of **Fig. 1** was marked as a tuning unit for the 'Clansman' series of military radios. I have to admit I'd not seen this particular unit before, but it was so 'pretty' that I bought two of them for £3 each.

On stripping the unit down I recovered two 12.5-turn coils on a white g.r.p. former. I'd thought at first that the formers were ceramic, but I was wrong! The coil was some 28mm diameter and covered a length of 34mm. Using Wheeler's formula (shown here) for calculating the approximate inductance meant I had to convert these values back into

imperial (inches) as I have not yet found a completely metric version of the formula.

$$L_s = \frac{a^2 \times N^2}{9a + 10l}$$

Where:

$L_s$  is the inductance (in  $\mu H$ )  
 $a$  is the radius of the coil  
 $N$  is the number of turns  
 $l$  is the length of the coil

In Wheeler's formula (shown above) all measurements are in inches and the answer given should be accurate to within a few percent. I'll look for a metric version of this formula, but using the formula given, indicates an inductance of around  $2.4\mu H$ . The photograph of **Fig. 2** shows one of the coils along with a 9:1 impedance (step up or step down) transformer. This transformer was one of a matched (but physically mirrored) pair that you can see in **Fig. 1**.

The Photograph of **Fig. 3** shows one of the 9:1 impedance transformer with a small crystal that I 'rescued' from a computer motherboard (at 14.318MHz it will make a good signal marker for the 14 and 28MHz bands). The other interesting components I recovered from the tuning unit were a pair of precision trimmer capacitors shown in **Fig. 4** (alongside the same crystal from **Fig. 3**).

## Home Brew Boom

On a recent visit a (non-Radio Amateur) friend commented on a home brewed boom microphone headset that I was using. The microphone was mounted on an old pair of headphones, shown in **Fig. 5** that I've had for many years and was very simple and cheap to make. The microphone boom came from a section of an old broken telescopic antenna. And to prepare it to take the electret microphone insert, I split and opened out an end of the tube as shown on **Fig. 6**.

The microphone insert with a suitable coaxial cable soldered to the contacts is fitted onto the 'flat' at the end and glued into place with a quick setting epoxy resin glue. To create the 'wind-shield' over the insert I folded a thin sheet of open cell foam material over the insert and bound it tightly with cotton thread immediately behind the insert. To hold this winding in place, I painted it with fishing rod varnish.

After this had dried, I carefully cut the excess foam material away, as shown in **Fig. 7**, before putting a bend in the tube very carefully. This bend brings the microphone to a more natural position in front of the mouth when in use. But to get a 'three dimensional movement' capability was somewhat more difficult, until I hit on the idea of using two 'P'-clips as shown in **Fig. 8**.

To complete the headset, I used a length of dual coaxial cable recovered from another pair of headphones that were damaged. The cable from the tip of the 3.5mm plug connection is used to feed both earpieces, the other other cable from the ring of the plug is used to feed the coaxial insert. The reason I have chosen to use this connection scheme is so that I can continue to use the headphones with any piece of equipment that uses a 3.5mm socket for audio output. If the output is stereo, I only heard the one channel, but I've noticed no other problems.

## And Finally.

And finally before I close down for this month, I must mention that by the time you read this **Mainline Electronics** should have a number of the **Jackson Brothers** Variable capacitors, variable drives and standoff insulator back in production. Great news for the hobby after they almost disappeared altogether before Mainline stepped in to rescue them. For more information contact Mainline Electronics at **PO Box 235, Leicester LE2 9SH Tel: 0116 277-7648 or FAX: 0116 247-7551** or by E-mail to **sales@mainlinegroup.co.uk**

See you next time.

*TEZ*



# Antenna Workshop

## Modifying The MQ-2 Antenna

Peter Dodd  
G3LDO, after  
reviewing the  
MQ-2 antenna  
in the August  
1999 PW, found  
he could make it  
perform better!

**T**his Antenna Workshop discusses the methods of re-designing the antenna using the existing four MQ-2 element loading clusters. I must emphasise that this is **not a project for beginners**. You will also need a dip meter to check the resonance of the elements (see *The Antenna Experimenter's Guide*).

In the August 1999 edition of *PW* I reviewed the MQ-2 antenna, a compact two-element beam for the 14, 18, 21, 24, 28 and 50MHz bands. The antenna uses end loading separate inductance and capacity 'hats' at the ends of each element for each of the bands.

One of the spokes in each of the capacity hats is constructed so that the resonant frequency of the antenna may be set at a specific part of the band. A general view of this antenna is shown in **Fig. 1**, and was originally published in the August review.

In my review of the MQ-2, I mentioned its lack of directivity on 14MHz and the difficulties in trying to

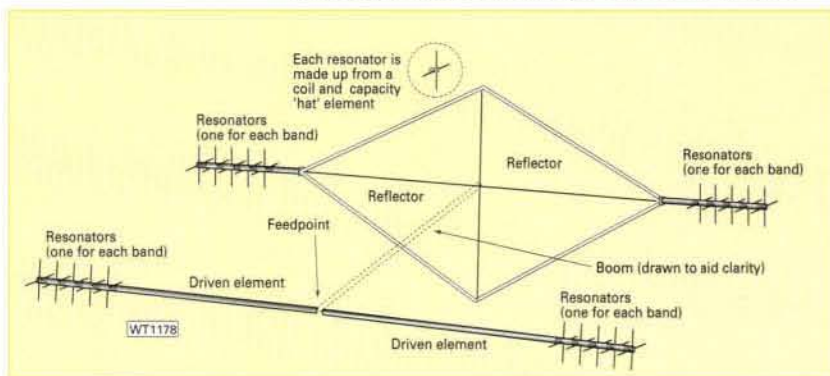


Fig. 1: Mechanical layout of the MQ-2 Antenna. Each loading assembly comprising a separate set of inductance and capacity 'spokes' for each band. One spoke in each set is constructed so that its length can be varied, allowing a degree of tuning for each band.

match the antenna to the feeder on all the bands. Now a very similar antenna to the MQ-2, the G4MH Minibeam (designed many years ago), also uses similar inductive and capacitive end loading.

The G4MH minibeam designed for the 14, 21 and 28MHz bands has the parasitic element director (rather than the reflector of the MQ-2). In spite of some of limitations of the MQ-2, I felt that this configuration had promise so I bought the review model with a view to modifying it.

### Computer Model

My first task was to make a computer model (using *EZNEC*) and compare it with the real antenna to test the modelling technique. Because of the antenna's

complexity only a single band antenna was modelled. The display, **Fig. 2**, shows the model of the antenna's free-space polar diagram modelled at 21MHz).

The performance of the antenna was optimised by altering the reactance value of the inductors. The length of one of the spokes is adjusted in the real antenna but altering the inductance was more convenient in the computer model.

My computer model agreed with the real thing, showing the antenna performance is certainly quite acceptable for a small beam when correctly adjusted. I now had reasonable confidence in the computer model of the antenna, that it would be suitable for looking at other configurations employing element end-loading. So, how important is the diamond shaped reflector of the MQ-2?

The MQ-2's reflector structure is quite complex. And there were, I believe, problems in the early models with the quad reflector distorting due to the differing expansion coefficients of the insulating and metal sections when subject to large variations in temperature.

### Further Investigation

To carry out further investigation, I built a simple model (in the computer) where the end capacity loading is simplified by replacing the four spokes with two spokes (each twice the length of the original ones). The purpose of this makes it easier to manipulate the element spacing and configurations.

In the modelled polar diagram shown in **Fig. 3**, I've replaced the quad reflector with a simple straight element. The polar diagram shown is very similar to that shown of the original MQ-2, make it appear that the extra complexity of the quad reflector is not justified. The differences can be put down to optimisation - you can go for greater gain at the expense of reduced front-to-back ratio.

The next step was to try the parasitic element as a director. All the literature I have and computer modelling programs I have tried, suggest that a normal close spaced Yagi beam (0.11) has improved performance if the parasitic element is tuned as a director. The cubical quad is an exception.

The result of using the parasitic element as a director is shown in **Fig. 4**. I have repeatedly tried to improve this model with optimisation but this is the best that could be achieved. Although the performance of both antennas is quite acceptable at 21MHz and above, the same cannot be said for when the antenna is used on 14MHz.

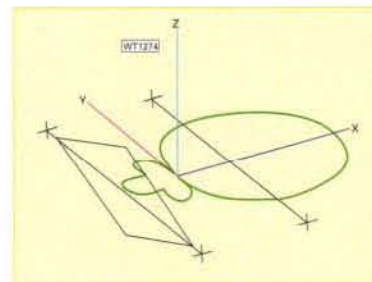


Fig. 2: Polar plot of the computer model (using *EZNEC*) of the MQ-2. The free-space polar diagram is for 21.2MHz with its polar diagram and the X, Y and Z co-ordinates superimposed.



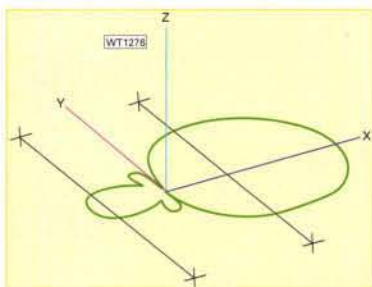


Fig. 3: Simplified model where the end capacity loading is modified (see text). The reflector is replaced with a simple straight element and the performance (free-space gain 5.2dBi, F/B 13.5dB feedpoint impedance 21Ω) is very similar to that shown in Fig. 2

the spacing had been increased, so I decided to lengthen the elements by about 0.9m. This increased the average feed impedance nearer to 50Ω. But the 'down side' is that the inductance of each of the loading assemblies would have to be reduced.

## Elements lengths

The element lengths were changed from 3.6m to 4.49m and the boom length from 1.37m to 2.1m. In practice this means replacing most of the metalwork in the antenna. The original element tubing diameter is 25.4mm outside diameter. The loading assembly at the ends of the elements have been machined to 22mm to fit inside this tubing.

Because of the increase in size and weight of the new antenna, I felt there was a need for slightly larger diameter tubing. So, I used 30mm tube for the centre sections of the elements. The original tubing was used for the end sections of the elements, telescoping into the new section and other the ends still with the loading assembly.

The reflector and driven elements are the same length but the driven element is cut in the centre so that it may be fed directly with coaxial cable. The original centre insulator is 150mm square and the element is fixed to the insulator using a U-clamp and a nut and bolt, and supported for only 70mm of its length. A more rugged driven element centre section was designed and is shown in the photograph of Fig. 6.

The new centre section comprises a thick aluminium rectangle plate approximately 100mm x 200mm. The insulated elements (with thick pvc insulation) are fixed to the plate with exhaust clamps.

Now comes the tricky bit. As I mentioned earlier the inductance of each of the loading assemblies needs to be reduced to compensate for the extra element length. This is achieved by removing one

The poor response of the antenna on 14MHz is quite understandable as the element spacing is a mere 0.08λ. By increasing the spacing between the elements to 0.1λ on 14MHz the performance is dramatically

improved. In addition I increased the length of the elements slightly (the reason for this is described later). The computed polar diagram is shown in Fig. 5.

The computer model indicated that the feed impedance was still rather low even though



Fig. 6: Driven element centre insulator section. The elements are insulated from the plate and the U-bolts with thick PVC insulation, which is taped to the elements before fixing in place.

turn from each of the five coils on each of the loading assemblies.

## Silicone Sealant

The coils are covered in a layer of silicone rubber sealant. The end of the coil is unsoldered from the bus and one turn removed by pulling the wire through the sealant. The excess wire is then cut off and the insulation scraped from the end, and the wire re-soldered to the bus bar. When all the coils have been modified the elements can be tested.

Fix the driven element loading assemblies (marked DE) to the end of the driven element complete with its centre insulator. Connect a shorting wire across the feedpoint. You could make loop of this shorting wire to couple the dip meter. Mount the element at least 1.5metres above the ground away from large metal objects.

Adjust the spoke lengths for resonance dips at 14.2, 18.1, 21.2,

24.9 and 28.5MHz. You might have to remove more than one turn from a coil. When this is done, remove the driven element loading assemblies and fit the reflector loading assemblies (marked R) to the end of the test element.

Resonate the reflector element to 13.9, 17.9, 20.85, 24.5 and 27.5MHz. Remove the loading assemblies and the link/loop from the driven element. Seal the damage to the sealant on the coils with clear silicone rubber sealant.

The antenna can now be

assembled and tested. The instructions on the original MQ-2 suggest fine tuning the reflector to obtain minimum s.w.r. but, as you can see in Fig. 7 the s.w.r. at the design frequency is very low anyway.

## Big Improvement

The modification to the MQ-2 has made a big improvement to the 14 and 18MHz bands. In the higher

frequencies there is no noticeable improvement in gain or front-to-back but the improvement in the impedance bandwidth on all bands is most marked. The antenna has been in use for several weeks now and has weathered several storms without any problem.

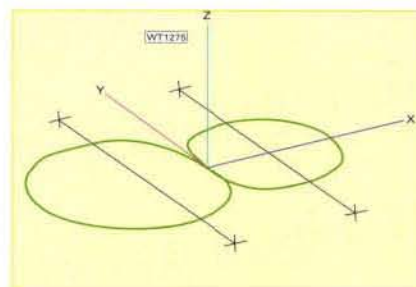


Fig. 4: The parasitic element tuned as a director. Free-space gain 4.1dBi, a marked reduction in performance compares with Fig. 2 and Fig. 3.

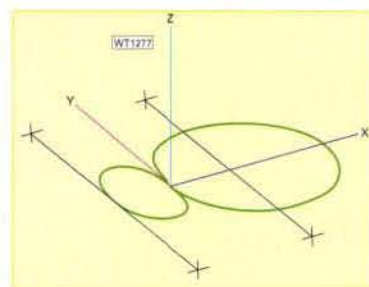


Fig. 5: The modified MQ-2 showing its performance on 14MHz. Free-space gain 4.6dBi, F/B 16dB, feed impedance 47Ω.

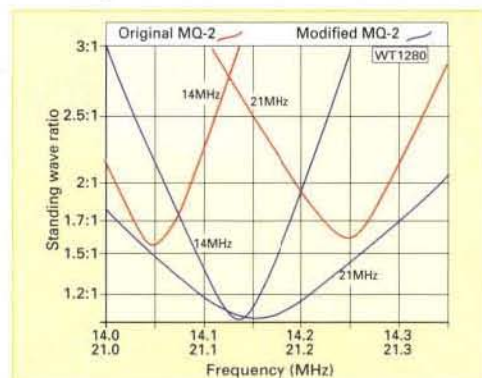


Fig. 7: Plots (s.w.r.) of the MQ-2 before and after modification. The original MQ-2 was resonated to the CW section of the band.

PW





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and 1960s PWs  
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counter tell us  
that the man in  
the brown dust  
coat is Phil  
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in the 'shop'.

Autumn greetings and welcome to my final column of 1999. From the letters I've received it seems my mention of tape recorders in the September column revived fond memories for many of you. Keep your capstans turning, there'll be more soon! Back to radio now and Jürgen Bittner E-mailed me (from Bavaria!) asking whether I'd heard of a company called **Magneta Time Co. Ltd** of Leatherhead, Surrey. He tells me he has one of their rather unusual radios.

Jürgen's set has no model number, just the serial: T0/2702. We both think it may have been for public address use because it has a metal case and a microphone input. Oh ... and the push-pull 6V6GTs used in the circuit seem rather excessive for the small, built-in loudspeaker. I'd not heard of this company before and I can't find any mention of them in my reference books.

Anyone know anything about the Magneta Time Co. or their products? Or how one of their sets got to Bavaria? No doubt someone out there in 'PW land' will tell us!

## Construction Time

Winter approaches and inclement weather returns (in the UK at least) and 'construction time' is just round the corner. Time to put away the garden tools and reach for the soldering iron. And to get you 'in the mood' I've found an interesting 3.5MHz transmitter project, **Fig. 1**, which was first published in the March 1953 issue of *Practical Wireless*\*.

\* **A Midget 12W Amateur Station. T. W. Dresser, page 134, March 1953.**

It's typical of dozens of circuits published between the late 1940s and the mid 1960s. Updating such circuits shouldn't be much of a problem but there are a few points to watch for. I'll use this particular circuit to illustrate what I mean.

Please note, although the 1953 circuit has been redrawn for reproduction, it is a faithful copy of the original. (Indeed, it still has the same mistakes!).

## Older Circuits

Whenever you decide to update an older circuit, take the time to redraw it. As you do, write the value and rating of each component next to its circuit symbol. Those of you who prefer the modern notation can convert the values at this time.

For instance, 0.01 $\mu$ F becomes 10nF; 270(Ohm) becomes 270R.

Pay particular attention to the voltage rating of capacitors. If in doubt, those capacitors which have no explicit voltage rating **should be rated at 150% of the expected h.t. voltage.**

Be prepared to modify the circuit too! It may need additional components - often on safety or EMC grounds (in other words ... much better R.F. filtering!) - and check for errors and omissions.

In older power supplies I think metal rectifiers are bad news so you should substitute a silicon rectifier. Even better, use a bridge circuit like the one shown in **Fig. 2**. Unfortunately, silicon rectifiers give a higher h.t. voltage than metal rectifiers, so you may need to add a high-wattage resistor in series with smoothing choke L8. Work out the value by a mixture of Ohm's Law and old-fashioned trial and error.

Although the h.t. voltage, as measured across C18 **whilst transmitting**, should be between 250V and 300V, use at least 400V working capacitors for C18 and C19.

At switch-on, before the valves draw current, the h.t. will reach the peak voltage of the h.t. secondary winding and that could be in the region of 400V. Unfortunately, new 16 $\mu$ F/400V electrolytic capacitors are quite rare; you may have to settle for 47 $\mu$ F/400V.

The original circuit shows no fuses, so put a 1A fuse in series with the primary of T3 and a 250mA time-delay fuse between the rectifier and the positive terminal of C19. Building the power supply in a separate metal case is a good idea.

In the transmitter section the grid choke, RFC1, can be any small receiving type of 1mH or more. However, the anode choke needs to be a little more robust.

Ideally, RFC2 should be a transmitting type, but these are difficult to get hold of. Try two miniature 470 $\mu$ H types in series as an alternative. In any event, RFC1 and RFC2 should not be physically the same. If they are - and have similar resonant frequencies - the valve may happily oscillate without a crystal. Not good!

You really ought to use old, physically large crystals. For example, the 10XJ and FT243 types. Modern miniature crystals can be damaged by the (relatively) high currents in the grid circuit of these single-valve transmitters. A 10k $\Omega$ , 1W resistor across the key jack is a good idea too.

As an essential safety measure, put a radio frequency choke in parallel with the loading capacitor C5. Use one similar to RFC2 if possible. If C2 breaks down, the h.t. will then flow to chassis and blow the h.t. fuse.

Whenever you use a valve transmitter which has a traditional pi-tank output, make sure a choke, such as I've advised, is present. If it isn't, fit one! You do not want 250V d.c. (or more) on your antenna!

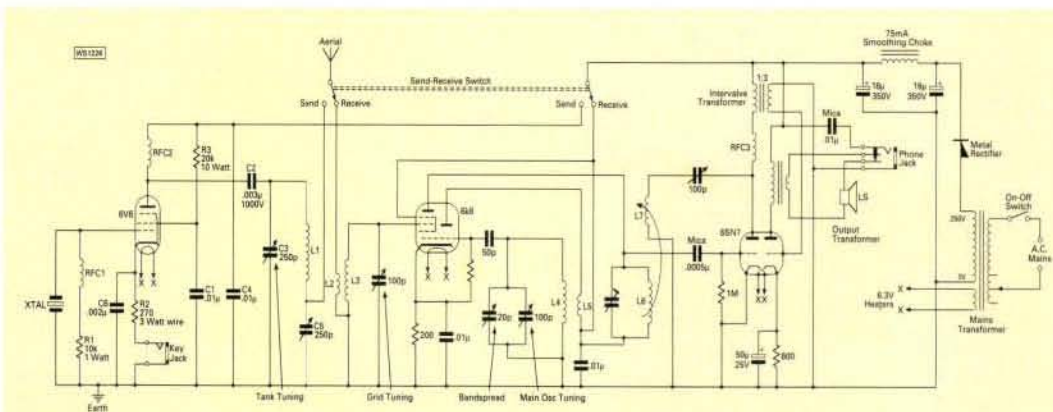
Incidentally, the value of C5 seems on the low side; I'd try 500pF or more. A broadcast tuning capacitor with its sections in parallel will be ideal.

## Superhet Receiver

The receiver is quite interesting and it's actually a superhet with a regenerative detector. As the set is intended for c.w. operation, the detector is set **and left** at the point of oscillation.

With a single valve regenerative receiver, leaving the detector running 'past the threshold' would be unacceptable

**Fig. 1: The original transmitter-receiver project circuit (complete with 'vintage' errors!) from the March 1953 issue of PW. (For comments on the highlighted sections, see text).**





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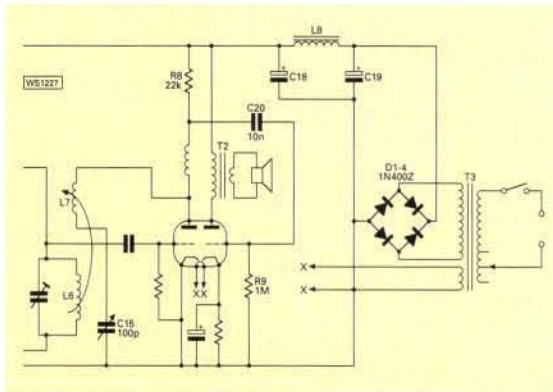


Fig. 2: Phil G4JCP recommends using a modern bridge rectifier in the power supply of the 1953 design (see text).

adjust the feedback capacitor (C15 in Fig. 2) as the receiver is tuned over the band.

I wonder whether you've spotted that the triode grid resistor has no value? Rather than just guess, try to find a similar circuit and use the value given there. I've found 47k $\Omega$  to be a common choice. Incidentally ... moving C5\* to the other side of L7; that's simply so that one side of the capacitor is at chassis potential.



Fig. 3: Photograph showing the (very neat-looking) 6V6GT one-valved transmitter, from an article incorporating a classic design and published in the December 1997 PW (see text).

\*The 100pF reaction capacitor on the anode of the 6SN7 valve.

Another omission is the value of the trimmer connected across L6. The original article implies that the combination of this capacitor and L6 should resonate at 1.6MHz. To help ... Wheeler's formula for single layer coils gives an inductance of 40 $\mu$ H for L6. That means the required parallel capacitance is 250pF. This is a bit large for a trimmer, a (fixed) 220pF silvered-mica capacitor would be better (It's not as though the 1.6MHz i.f. is critical).

The detector stage uses an inter-valve transformer in its anode circuit. As these are difficult to get hold of nowadays I've modified the stage to use ordinary resistance-capacitance coupling, see Fig 2. Unfortunately, this won't work as well as

transformer coupling and you may find there's insufficient gain for a loudspeaker when receiving weak signals.

I've also dispensed with the 0.01 $\mu$ F mica capacitor (connected to the 'phone Jack) which is there to drive high-impedance headphones. Modern headphones are low impedance and need to be connected to the output transformer's secondary. (A surplus 240V to 6V, 3VA or 6VA mains transformer will do

due to oscillator radiation. But here, the frequency changer effectively isolates the detector from the antenna.

Additionally, as the detector is tuned to a fixed frequency (about 1.6MHz), there's no need to continually

if you haven't got the real thing).\*

\* See E-i-A August 1999 for details of an output transformer from Isoplethics.

By the way, this capacitor is shown connected to the h.t. end of the output transformer's primary instead of the 6SN7's anode. This is clearly a mistake. After all, who wants to listen to the ripple on the h.t. supply?

Always remember, mistakes in circuit diagrams are not uncommon and the circuit you're trying to build just might contain one. Always try to follow the operation of the circuit as you redraw it. If anything looks wrong, either try to correct it yourself, or get advice. Don't end up discarding an interesting project just because of a drafting error.

## A 6V6GT Transmitter

About a year ago I received a letter from **John Smith G4KJJ**. He kindly included some photographs of a little single-valve transmitter he'd built to a classic old design, written by **Richard Marris G2BZQ** and published in the December 1997 edition of *Practical Wireless*.

The transmitter and its associated power supply are shown in Fig. 3. It's appropriate to include it here because the circuit of John's transmitter is very similar to the transmit section of Fig. 1.

John's method of construction illustrates an approach I tend to favour - building functionally separate parts of a circuit on separate chassis. In John's case it was simply a case of building the transmitter on a chassis and the power supply inside a small metal enclosure.

Looking at Fig. 1, it's clear that the receive, transmit and power supply sections could easily be split from each other and built on separate chassis.

Of course, you could simply build the receiver and power supply sections. Or even use the receiver with a different transmitter and/or power supply.

Part of the fun of home construction is in 'borrowing' bits of circuitry from different published designs and putting them together to create something more personal. It can be much more satisfying (and educational, particularly if you run into problems) than building a straight copy.

However, it usually pays to keep the layout of each section similar to that of the original design. Don't go asking for trouble!

There are other, more practical reasons for favouring the 'building block' approach. For instance, small, functionally separate units are easier to work on than one large chassis. And you can get each bit working properly before moving on to the next stage. This helps with fault finding as there's less to go wrong at any one time; very useful if you're a beginner.

There is one other reason - you can't easily get hold of large chassis these days! Fortunately, you can always bolt two or more small chassis together. The composite chassis is then quite strong and the internal walls provide excellent screening. You can also use plain aluminium boxes, but I find the larger sizes rather flimsy for valve projects.

If you do decide to build the entire circuit on one chassis, it's still advisable to adopt the stage-by-stage approach. But do complete the metalwork and fit the transformers, valve holders and other major items at the beginning.

Well, that's all for this year. And whether you consider the year 2000 to be in this Millennium or the next, my feet will remain firmly planted back in the days when valves ruled the airwaves! Remember, keep sending your comments and letters to me either via the PW offices, via E-mail to [phil@oldpark.demon.co.uk](mailto:phil@oldpark.demon.co.uk) or direct to 21, Scotts Green Close, Scotts Green, Dudley, West Midlands DY1 2DX. Happy New Year!

PW

### Coil Details for 1953 PW project:

The coil details given in the original article were incomplete. The following may need some experimentation.

**Transmitter pi-tank:** L1 - 35 turns, 22 s.w.g. (0.71mm), close wound on a 1.25in (32mm) diameter former.

**Receiver i.f. coil:** L6 - 48 turns, L7 - 21 turns, 32 s.w.g. (0.28mm) close wound on a 0.75in (19mm) diameter former.

**Receiver grid coil:** L2 - 10 turns, L3 - 36 turns, 22 s.w.g. (0.71mm), close wound on a 1.25in (32mm) diameter former. Wind L2 over the earthy end of L3.

**Receiver oscillator coil:** L4 - 19 turns, L5 - 9 turns, 22 s.w.g. (0.71mm), close wound on a 1.25in (32mm) diameter former. Wind L5 over the centre of L4.



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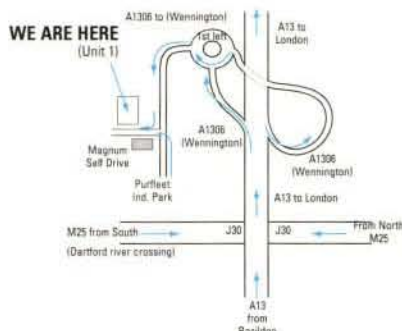


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**VX-5R**  
£269



**FT-1000MP**  
OUR PRICE: £1799  
SRP: £2599  
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£65.03. APR 19.5%



**FRG-100**  
£369



**FT-840**  
£569



**FT-8100** £339

ATAS-100 ANTENNA £199  
FC-20 AUTOTUNER £199

**G-800SDX**  
£389



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£599



**DJ-G5EY**  
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**DR-610**  
£399



**DR-150**  
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NEW

**DJ-V5**  
£195



**DR-605**  
£345



**TS-570DG**  
OUR PRICE: £799  
SRP: £995



**TMI-G707E**  
OUR PRICE: £259  
SRP: £399

## KENWOOD



**TH-D7E**  
OUR PRICE: £269  
SRP: £299



**TH-G71E**  
OUR PRICE: £225  
SRP: £299



**TS-780E**  
OUR PRICE: £1399  
SRP: £1995



We have been busy shopping to find you the best deal around.

We see parallel imported cars and motorcycles, why not radios? And at the end of the day the whole point is to offer better prices to our customers without sacrificing service. As we are part of the EEC, industry throughout Europe is now accepted and encouraged it seems that if we take the time to look around, we can find prices that are significantly lower than the same units which are offered here. I can understand that you may be worried about after sales support and service and I can reassure you that we have two fully qualified RF engineers working for us to ensure the fastest turn around of repairs possible. With the Yen being strong against the Pound, UK importers are putting huge increases on prices. We intend to offer you the lowest prices around for the foreseeable future. Do you ever ask yourself, why do our competitors not advertise a true price? There is either a line through it or no price at all and please feel free to phone around companies that offer prices match and see if they really can.

### PART EXCHANGE

We urgently require your treasured set. We buy outright for cash. Alternatively, use your old equipment as a deposit on finance for a new or used set.

### OPENING HOURS

Monday - Friday 9.00-5.00pm, Saturday 9.00-2.00pm.  
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WE NOW CAN OFFER YOU A COMPETITIVE FINANCE PACKAGE WITH NO DEPOSIT.  
Multicomm 2000 is a licensed credit broker APR 19.5%. Written quotations are available upon request.

### FINANCE EXAMPLE. APR 19.5%

Cash Price	No deposit	Balance for finance	36 months @	Total finance price
£289.00	£00.00	£289.00	£10.45	£376.20





# SALES HOTLINE 01480 406770

**NO DEPOSIT FINANCING AVAILABLE  
USED EQUIPMENT URGENTLY WANTED!**



## SGC



**SG-2020**  
Brilliant HF QRP  
transceiver

**£569**



**SG-231**  
**£289**



**SGC-237**  
**£289**

**SGC  
POWER CUBE**  
Compact  
500W  
transistorised  
linear



**£775**

## SUPER SALE **MFJ** SUPER SALE



**MFJ-989C**  
3kW HF  
ATU  
**£245**



**MFJ-962D**  
1.5kW HF  
ATU  
**£199**



**MFJ-969**  
300W HF  
ATU  
**£129**



**MFJ-949**  
300W HF  
ATU  
**£99**



**MFJ-948**  
300W HF  
ATU  
**£89**



**MFJ-945**  
300W HF  
ATU  
**£75**



**MFJ-941**  
300W HF  
ATU  
**£89**



**MFJ-934**  
Ground  
+ ATU  
**£149**



**MFJ-931**  
Artificial  
Ground  
**£65**



**MFJ-748B**  
DSP  
unit  
**£169**



**MFJ-906**  
6 meter  
ATU  
**£68**



**MFJ-901**  
HF  
ATU  
**£65**



**MFJ-815**  
HF + 6  
SWR  
**£55**



**MFJ-817**  
VHF/UHF  
SWR  
**£59**



**MFJ-812**  
VHF  
SWR  
**£29**



**MFJ-921**  
VHF  
ATU  
**£55**



**MFJ-924**  
UHF  
ATU  
**£55**



**PRO SET**  
**£99**



HC-4 Insert DX .....£25  
HC-5 Insert HQ .....£25  
Foot switch .....£25  
Adapter leads .....£10  
INCLUDING HC4 or HC5 INSERT



**PRO-MICRO**  
**£79**

**LOADS OF MFJ STOCK**

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



HF2V	80 & 40	£189
HF6V	80 - 10	£225
HF9V	80 - 6	£269
HF5B	20 - 10	£339
TBR-160S	160 kit	£89
CPK counterpoise kit		£99
STR-II	Radial kit	£89



### MOBILE ANTENNAS

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

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Website: <http://www.multicomm2000.com> E-mail: [sales@multicomm2000.com](mailto:sales@multicomm2000.com)



This month sees the last of the 'Book Profiles' aimed at providing you with a library of books concentrating on the last Century in radio. The books on these pages will make excellent Christmas presents for loved ones, friends and family alike. If they are interested in nostalgia then why not invest in an early Christmas present?

This time around we look at books which would be of interest to the Vintage collectors among you. The various books on these pages contain information on old radios of varying types, shapes and sizes.

The Editorial team hope that you enjoy reading these 'Book Profiles' half as much as the Editor enjoyed 'leafing' through the books themselves.

TELEPHONE, FAX, E-MAIL OR USE THE ORDER FORM ON PAGE 90

# Book PROFILES

## Shortwave Receivers Past & Present

Third Edition  
Fred Osterman

Shortwave Receivers Past & Present claims to be your "comprehensive guide to over 770 shortwave receivers manufactured in the last fifty-five years". This book contains information and pictures on numerous table-top general coverage sets, as well as amateur, short wave and speciality receivers.

This (American) book covers the period from 1942-1997 and an example of some of the information which is given in the book includes: receiver type; features; specifications; accessories; availability; variants; reviews; size and weight; cost when new as well as used values plus much more. This information is available on sets from Ameco to Yaesu.

The book claims that it will be of interest to both shortwave listeners, Amateur Radio operators and radio collectors alike though it feels like it will be of more interest to the shortwave listener. Useful Reference Source.



## Communications Receivers - The Vacuum Tube Era: 1932-1981

Fourth Edition  
Raymond S. Moore

This soft-backed book, in reality is more of a catalogue of receivers - with brief details and a short history - than a true book.

The copy of Communications Receivers - The Vacuum Tube Era: 1932-1981 that we are profiling here is the new Fourth Edition - straight from the USA.

In the book Raymond S. Moore discusses the 'History Of The Communications

Receiver' and also contains 'Tables' of valve receivers from the 'vacuum tube' era, in which the author gives the specifications on these receivers with pictures of each one (where pictures were available).

A fascinating read for



anyone who would like to learn more about the valve era and the many, varying types of receivers which were available over that era - from Hallicrafter, Collins and Hammarlunds to Lafayettes and military receivers (very useful for the collector).

It's well worth reading for the section on Hallicrafters equipment alone, but the associated text is somewhat disjointed at times with a jerky 'notebook' style. Another problem is that the reader can be misled by thinking that the illustration above or below the text is actually the equipment under discussion ... which sometimes it isn't! **Recommended.**

## Transistor Radios - A Collector's Encyclopedia and Price Guide

David R. Lane  
& Robert A. Lane

"Transistor Radios: A Collector's Encyclopedia and Price Guide covers 2200 radios. listed alphabetically by manufacturer" the book states. Some of the manufacturers included are:

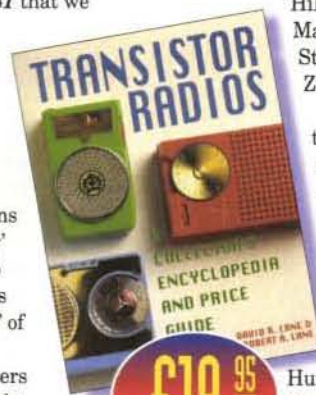
Admiral, DuMont, HiDelity, Magnavox, StarLite and Zenith.

There are transistor radios of all shapes and sizes in this book. Some of the Editorial favourites include a "Tobacco

Humidor", a "Tropicana Orange" complete with straw,

"Superman Exiting Phone Booth", a "Star Explorer" in the shape of a UFO and a "Snoopy On Doghouse" ... not to mention the hundreds more to be found in this book.

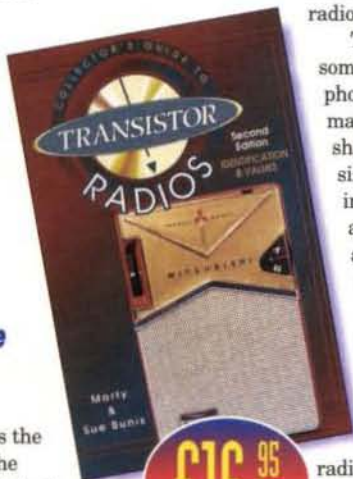
Most in this book must be very collectable items and Transistor Radios - A Collector's Encyclopedia and Price Guide would be an interesting read to those of you whose main





interests lie in all things transistor! It also contains collector's tips which, they claim, will help you to locate radios and determine their values.  
**Recommended.**

**Collector's Guide To Transistor Radios**  
**Second Edition**  
**Marty & Sue Bunis**



**£16.95**

The book tells the reader that the authors of this book - Marty and Sue Bunis - have been radio collectors for a number of years. They have a particular penchant for the novelty transistors and the small pocket-size transistors from the 1950s and early 1960s.

In the introduction to their book, the couple look at such aspects as price and availability, style and size, nostalgia and historical significance and case condition. Once again, as with *Transistor Radios - A Collector's Encyclopedia and Price Guide*, the transistor sets are mentioned in alphabetical order under their manufacturer, i.e. Acme and Admiral through to Zephyr and Zohar. There are also a number of Motorola transistor radios in this book.

There doesn't appear to be as many pictures of novelty radios in this book as there are in the some other books on the same subject ... there are, however, some interesting radios which come hidden inside a book of all things - the **Crosley JM-8GN "Magic Mood"** radio!  
**Recommended.**

**Collector's Guide To Antique Radios**  
**Fourth Edition**  
**Marty and Sue Bunis**

Another collector's book from the same couple who wrote and put

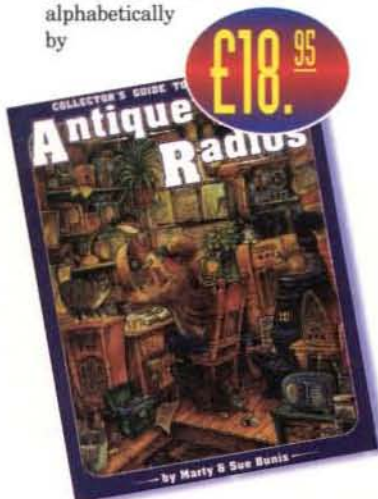
together *Collector's Guide To Transistor Radios*. This book focuses its attentions on a broader range of antique a.m. and a.m./f.m. radios.

There are some interesting photographs of many different shapes and sizes of radios including an awful lot of a.m. a.m./f.m. radios made with wood. These include an **Acratone** radio in the "Cathedral" style radio dated 1938 and an **American Bosch 200-A "Treasure Chest"** table set dating from 1932.

This is clearly a must-have book for those of you who are avid collectors of antique a.m., a.m./f.m. radios. The information in this book includes names, dates, descriptions and valuations of many antique a.m. a.m./f.m. radios.  
**Recommended.**

**Guide to Old Radios - Pointers, Pictures and Prices**  
**Second Edition**  
**David & Betty Johnson**

"This second edition of *Guide to Old Radios: Pointers, Pictures and Prices* contains more than 3300 listings with updated prices, organised alphabetically by



**£18.95**



**£19.95**

manufacturer; 350 photos and illustrations which document the evolution of both radio and broadcasting; and two additional chapters on the heyday of radio". At least that's what is said on the back cover of the book.

The authors, we are informed in the book, are antiques dealers who specialise in radios and 78rpm records, so who better to write a book all about vintage radios and their values? Their book also mentions (and gives prices of) associated items such as amplifiers, speakers, test equipment and repair manuals.

Not all of the photographs are in full colour, but there is no doubt that this book will have all you need when hunting down those vintage collector's items. The format this book takes is to start from "early crystal sets through the development of nickel-iron batteries to the use of electricity". This book comes  
**Recommended.**

**Turn to page 86 for the quickest and most comprehensive radio book service in the UK.**

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## ANTENNAS

**R-6000**  
MULTIBAND  
VERTICAL  
£259



<b>R-7000</b>	40-10.....	£289
<b>R-6000</b>	20-6.....	£259
<b>X-7</b>	20-10.....	£425
<b>A3S</b>	20-10.....	£299
<b>MA5B</b>	20-10.....	£275

FULL RANGE OF COMET ANTENNAS  
IN STOCK AT DISCOUNTED PRICES



**X-7**  
HF DELUXE BEAM  
£425



## RECEIVERS



**ICOM IC-R75E**  
Short wave  
receiver  
£615



**YAESU FRG-100**  
Short wave  
receiver  
£369



**DRAKE R-8B**  
Short wave  
receiver  
£929



**JRC NRD-545**  
Short wave  
receiver  
£1199



**AOR AR7030**  
Short wave  
receiver  
£669



**AOR AR5000**  
SW/VHF/UHF  
receiver  
£1099



**ICOM IC-R8500**  
SW/VHF/UHF  
receiver  
£1099



**ICOM PCR-100**  
SW/VHF/UHF  
receiver  
£199



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



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



**AOR AR-8200**  
SW/VHF/UHF  
scanner  
£349



**DJX-10**  
SW/VHF/UHF  
scanner  
£259



**IC-R10**  
SW/VHF/UHF  
scanner  
£225

**NEW**



**MVT-3000mkII**  
SW/VHF/UHF  
scanner  
£325



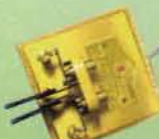
**MVT-7100**  
SW/VHF/UHF  
scanner  
£199



**VIBROKEYER  
DELUXE**  
£139



**ORIGINAL  
DELUXE**  
£169



**IAMBIC  
BRASS RACER**  
£75

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ONLY A  
SMALL  
SELECTION  
OF OUR CW  
EQUIPMENT



**BENCHNER  
BY-1**  
£69



**BENCHNER  
BY-4 GOLD**  
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# SALES HOTLINE 01480 406770



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USED EQUIPMENT URGENTLY WANTED!**



**ICOM IC-729**  
HF + 6  
"Mint"  
**£399**



**ICOM IC-728**  
HF 100W  
"Mint"  
**£375**

**USED  
EQUIPMENT  
ESPECIALLY  
DRAKE &  
COLLINS WANTED**



**ICOM IC-725**  
HF + 6  
"Mint"  
**£399**



**ICOM IC-725**  
HF 100W  
"Mint"  
**£369**



**YAESU FT-726**  
2/70 BASE  
MULTIMODE  
**£445**



**KENWOOD TS-480**  
2/70 BASE  
MULTIMODE  
**£449**



**ICOM IC-751**  
HF 100W  
BOXED  
**£349**



**ICOM IC-251E**  
2 MTR. BASE  
MULTIMODE  
**£369**



**ICOM IC-735**  
SEVERAL  
FROM  
**£375**



**JRC JST-135DX**  
HF 100W  
Plus extras  
**£475**



**HEATHKIT SB-200**  
HF LINEAR  
**£395**



**YAESU FT-767GX**  
HF/6/2/70  
CTCSS/ATU  
**£675**



**ICOM IC-970A**  
2/70 BASE  
MULTIMODE  
**£1199**



**YAESU FT-736**  
2/70 BASE  
MULTIMODE  
**£650**



**ICOM IC-2KL**  
500W LINEAR  
PLUS ATU  
**£799**



**KENWOOD TS-940SAT**  
HF DELUXE PLUS  
AUTO TUNER  
**£699**



**YAESU FT-990**  
VERY LATE MODEL  
"MINT CONDITION"  
**£725**

## USED EQUIPMENT WANTED

## USED EQUIPMENT

## USED EQUIPMENT WANTED

HF TRANSCEIVERS	
Heathkit HW-9	QRP rig, mint
Icom IC-706 MkI	Boxed, as new
Icom IC-706 MkII	Boxed, as new
Icom IC-725	Boxed, as new
Icom IC-726	As new
Icom IC-728	HF + 6, as new
Icom IC-730	Boxed
Icom IC-735	+ CW filters, mint
Icom IC-751	Boxed, as new
Icom IC-781	Great performer
JRC JST-135DX	What a fabulous set, 150W out
Kenwood TS-830S	Boxed, CW filter
Mizuh	Mint condition
Satcom 400	80m QRP rig, as new
Tentec Century/22	CB base
Yaesu FT-201	In travel case, mint, boxed
Yaesu FT-757GX	Rare HF set, very clean
Yaesu FT-757GXII	Late model
Yaesu FT-767GX	Boxed
Yaesu FT-840	6 / 2 / 70, boxed
Yaesu FT-847	Mint, boxed
Yaesu FT-920AF	Ex-display
Yaesu FT-ONE	Four months old
	Very clean and tidy

VHF/UHF TRANSCEIVERS	
AKD 2001	2 mtr mobile, ex-display
AKD 6001	6 mtr mobile, ex-display
Alan CTE-145	2 mtr hand-held
Alinco DJ-180	2 mtr hand-held
Alinco DJ-180	Dual band hand-held
Alinco DJ-C1	2 mtr hand-held, ex-display
Alinco DJ-C5	70cms hand-held, ex-display
Alinco DJ-C5	70cms hand-held, boxed as new
Icom IC-207H	Ex-display
Icom IC-2350H	Dual band ex-display
Icom IC-2AT	Boxed, as new
Icom IC-32E	+ Extra battery
Icom IC-251E	Multimode base
Icom IC-251E	Multimode base
Icom IC-251E	Multimode base
Icom IC-W21E	As new, dual band
Icom IC-W2E	Dual band hand-held
Kenwood TH-26E	Boxed, as new
Kenwood TH78E	Dual band hand-held

Kenwood TH-D7E	Four weeks old, mint
Kenwood TM-251E	2 mtr mobile
Kenwood TM-251E	2 mtr mobile
Kenwood TM-451E	70cms mobile, mint
Kenwood TM-733	Dual band, deluxe set
Kenwood TM-751	VHF multimode
Kenwood TS-780	Great 2/70 base rig
Standard C-500	Dual band with large battery pack
Standard C-510A	Small hand-held
Standard C-5900	Triband mobile, boxed, mint
Trio TR-7200G	Mint, boxed, one owner from new
Yaesu FT-203	2 mtr hand-held
Yaesu FT-203	2 mtr hand-held
Yaesu FT-230	Boxed, mint
Yaesu FT-2500M	Boxed, as new
Yaesu FT-290	Great multimode
Yaesu FT-290	With 30W linear, boxed, mint
Yaesu FT-290R MkII	+ Linear, as new
Yaesu FT-3000M	2 mtr mobile, boxed, mint
Yaesu FT-690 MkII	As new
Yaesu FT-690 MkII	As new, with linear
Yaesu FT-790 MkII	With linear
Yaesu FT-726	As new, 6/2/70, great value
Yaesu FT-736	As new, 2/70 + SAT

ACCESSORIES	
AEA PK-232MBX	TNC decoder
AEA PK-232MBX	TNC decoder
Baycom	TNC
Darwa CN2002	2.5kW auto ATU
Diamond SX-200	SWR PWR mtr
Diamond SX-40C	VHF/UHF SWR PWR mtr
Eddystone	Base speaker
ERA BP-34	Morse key, snail type
ERA Micro Reader	Band pass filter
ERA RS-232	CW + RTTY decoder
Heathkit SB-200	Display
Icom BC-35	As new, just serviced
Icom BM-71E	Charger
Icom SM-6	Charger
JRC accessories	Desk mic
JRC NVT-56	Most in stock
Kantronics KPC-6	Desk mic
Kent Keyer	TNC, boxed, mint

Kent Keyer	Speaker
Kenwood SP-230	Auto tuner, boxed, mint
Kenwood AT-250	Display
Kenwood DVS-230	Microphone
Kenwood MC-50	Desk mic
Kenwood MC-60	Phone patch unit
Kenwood PC-1A	Speaker mic
Kenwood SMC-31	Speaker mic
Kenwood SMC-34	Tuner TU-4
Lake QRP	HF/VHF SWR + power mtr
Maldol HS-260	Noise bridge
MFJ	Multiple DC outlet box
MFJ 116	Machmaker for tuners
MFJ 212	VHF linear
Microset RV-45	RTTY to TV converter
M. Modules MM-2000	MML-144/30/LS
M. Modules	Bench PSU 0-25V
Minoreg 500MA	Linear for dual band hand-helds
Mirage BD-35	VHF / UHF SWR pwr mtr
Nissai RS-402	TX complete packet station
Patcomm Tiny-2+	Desk mic
Protel	Dualband antenna
SMB J	Dualband antenna
SMB V	Desk mic, as new
Sure 444	Desk mic, as new
Sure 444	Standard deluxe key
Vibroplex	Top end DSP filter, pro built
WOGR	Desk mic
Watson WM-308	2W in - 50W out linear
Watson WS-2090H	Antenna switch
Yaesu FAS-4	Small speaker
Yaesu FSP-2	Desk mic
Yaesu MD-100 A8X	Mobile bracket for FT-290II
Yaesu MMB-31	Charger
Yaesu NC-18C	Charger
Yaesu NC-27C	Headset
Yaesu YH-2	

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You should state clearly in your advert whether the equipment is professionally built, home-brewed or modified.

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.

## For Sale

**486 DX33 colour monitor**, mouse, keyboard, 'Ham' software, *AMI-PRO*, Windows 3.1 DOS, Epson L2400 dot matrix printer, £175. Vibroplex Vibro keyer, 1960s, rare brown base, £45?? G3KHz electronic single paddle, £30. Tel: (01494) 530018.

**Altai rotator** with top bearing, £40. 3-6m 6m (50MHz) beam, £30. 6m HB9CV beam, £15. 2m (144MHz) 7-ele beam, £25. Nissei s.w.r./p.w.r. meter, 1.8-150MHz, £15. Will accept £100 for the lot! Or exchange for 2m transceiver/receiver. Tel: G1BAA on Wolverhampton (01902) 326182.

**Amphenol coaxial relay**, very high quality silver plated n-type connectors 26V coil, works at 13V, £15 each. Ex-equipment greenpar n plugs for RG58, £1 each, 30 available. Tel: Stroud (01453) 883519.

**B300P** 400 all band linear amplifier, £80. RAMA 550 frequency counter, £30. CTE/CB pre-amplifier, £30. A Sinch horn/speaker, 37. Tel: Bryan (01788) 860550.

**Black Star signal generator** 0.1Hz-500kHz, £90. Lake 13.8V 1.5A p.s.u., £32. RS battery charger, 1A lead, dry fit voltages 2, 4, 6, 8, 12, £50. Cable CW1308 70m, 20 pair, £70. All mint. o.n.o. Tel: Phil on West Midlands (01902) 843447.

**Collins filter** i.s.b. CF 455kHz. Wanted: Eddystone 940 or 830/7, good condition only please. For sale: Veller TCP station, £18. Telegquipment D32 oscilloscope, £35. Solaratron true RMS meter, £20. Inspect/collect please. Tel: Peter 0141-649 2328, anytime.

**Cushcraft A45** h.f. beam, good condition, £90, buyer collects (new beam is £450). Full assembly data. Tel: Richard on Uxbridge (01895) 270772.

**Czech receiver R4-1** a.m./s.s.b., 1.5-12.5MHz p.s.u., £80. Global a.t.u.s. AT-1000, new, £20. AT-2000, new, £20. 19 sets from £150. BE-201 with p.s.u., £80 various other military sets for trade. Tel: Ben (01562) 743253. E-mail: g4bxd@compuserve.com

**Eddystone 640**, £75. 680X, £100. Dressler ARA60 active h.f. antenna, unused, £95. Philips TV, colour bar generator, £15. MFJ a.t.u. for i.w. to s.w. listening, £15. Tel: (01245) 381961.

**Eddystone 940 receiver**, £150. Eddystone 730/4 receiver, £150 a.v.n.o. Both very nice condition and g.w.o., prefer buyer to collect inspect or RV by

appointment due to weight. Tel: Jim McGowan M1CUC on Essex (01708) 340304.

**Eddystone S640**, clean condition, £69. Canadian 19 set, p.s.u. variometer, wavemeter, control box, headset and leads, working order, £295. HRO with one coil, £49. WSC12 p.s.u., £25 KW Viceroy and manual, £35. Farnell dual p.s.u., £15. Tel: Trevor (01274) 824816.

**Ekco AD75 radio**, 1940 with round Bakelite case, complete and in excellent condition with perfect bakelite case, not working, needs minor attention, accept £395. Tel: Bournemouth (01202) 292645.

**Ex G3GZI** (Silent Key) Kenwood TS-850S, AT230 and EP900 p.s.u., £450, no splits. demonstration if required, carriage at cost, or collect. Tel: David 0117-967 6381, anytime.

**F1-Cord 202** reel-to-reel tape recorder 1960s model for spares or repair with carry case and power pack, collectors item, offers, please collect. Tel: Chester (01244) 310267.

**Farnell ES30 p.s.u.**, £10 o.n.o. Zenith data systems 45 oxen 486DX50 PC has 12Mb RAM HDD + FDD manuals, monitor, Win3.11, Y2K OK, good condition, just £45 o.n.o. Multi 2700FDK 2m (144MHz), 15W multi-mode, includes lots of extras, only £225 o.n.o. Tel: Simon G7WXX on Telford (07803) 205627 (24 hours) or (01952) 604822 (evenings).

**For sale or exchange:** CR100/7 with Codar preselector, boxed, Drake R8E, HF-225, Uniden Bearcat XLT-2500, boxed. Wanted: JRC NRD-535. Tel: (01978) 756330.

**For Sale:** Tri 9R-54D valve communication receiver, g.w.o., £35 plus carriage, covers 1.6-30MHz in four switched bands. Tel: John (01634) 233058.

**FRG-100 receiver** with keypad, mint, £240. 18-18 J-Beam, 430MHz, £12. Sandpiper mobile antenna, 3.8-144MHz, £50. Sandpiper traps, 7.1MHz, £12. Tiny 2 Packet modem, £60. Homebrew linear, 14MHz, 400W, £50. Tel: (01740) 651938.

**FT-690R MkII** 6m (50MHz) multi-mode transceiver, c.w., batteries, CTCSS, case, charger, £230 o.n.o. 6m base vertical, £20. Tel: Dave on Bedford (01525) 630259, evenings.

**FT-690R MkII** plus 10W clip on linear amplifier, 6m (50MHz), box and manual, £320. FC-20 auto a.t.u. for FT-847 as new, £150. Exchange for AT-230 a.t.u., FT-290 R1, £95, all plus P&P. Tel: Terry

G4QXD on Hitchin (01462) 435248, after 6pm.

**Grundig 2100** satellite radio fair conditions. Multi-band radio, v.h.f. med and weather, slight cabinet damage, £12. Saisho R7000 digital pocket portable radio four wave, £12. Tel: Chester (01244) 310267.

**HF mobile linear amplifier** wide band, solid state, 200W output, 13.8V d.c. supply, will negotiate price around £150. Contact: J G Dowse, 5 Tennyson Close, Sandilands, Sutton-on-Sea, Lincs LN12 2TL.

**Hundred radio & TV valves**, new and boxed. Also 100 used old valves, all tested OK, offers. Tel: Don Edwards (01945) 465995.

**IC-706 MkII DSP**, mint, boxed, £525. 30A p.s.u., £50. Avair s.w.r. meter, £30. 2m (144MHz) bandpass filter, £50. Offers accepted. Tel: (01672) 512867.

**IC-T8E triple band** hand-held, new, unused, unwanted gift including BP-199 battery 6V, 700Mag Ni-Mh 2W out (5W with 13.5V), charger BC-02-UK, 12V, 300mA, 'rubber duck' antenna with, receives n./w.b.f.m., a.m., guaranteed 5th July 2001, £225 o.n.o. including carriage. Tel: John GAYSS on Scarborough (01723) 863137, evenings and weekends.

**Icom IC-207H** remote head microphone, dual control, never been used mobile, radio mint condition, boxed, manual, £190, plus postage. Tel: Vinc (01487) 823879.

**Icom IC-706 MkI** car kit and cables, c.w. filter, all boxed with manual, as new condition, £500 o.n.o. Tel: Jon on Bristol 0117-909 3834, evenings & weekends.

**Icom IC-706 MkII DSP**, £580. AT-180 matching a.t.u., £180. Palstar PS-30m p.s.u., £70. All boxed and in excellent condition, will accept £800 for the lot, buyer to collect or pay carriage. Tel: Bob G08MB on Stafford (01785) 824330.

**Icom IC-735** h.f. transceiver recent service by Castle Electronics in v.g.c. suit new licence holder as first h.f. transceiver, manual and original packing, £375. Tel: Brecon area (01874) 623815.

**Icom IC-735** mobile with matching PS55 p.s.u., excellent, £500 o.n.o., boxed, manuals, Mosley classic beam with G400 rotator, g.w.o., £220 o.n.o. The lot for £675! Tel: Tony GW4ZWN (01407) 832197.

**Icom IC-746** including remote control software & cable, hardly used, v.g.c., £900 o.n.o. Tel: Ron G1OKD on Chippenham (01249) 461277.

**Icom IC-PCR1000**, all mode computer controlled receiver, warranty, June 2000, £200. Lowe HF225 receiver, synchronous a.m./f.m. board and keypad, £250. Pac-com Tiny 2 1200 baud TNC, £75, all with handbooks, etc. Tel: Shaun G8VPG (QTHR) on Bristol (01225) 873098.

**JRC NRD-525** with CFL-232 & 218 filters fitted, complete with manual & box, mint condition, £450 o.n.o. Icom ICR-7000 complete with manual & box, mint condition, £450 o.n.o. Tel: David (01788) 574099.

**K40 antenna** dedicated for 10 f.m. on new boot lip mount, £25. Contact: J G Dowse, 5 Tennyson Close, Sandilands, Sutton-on-Sea, Lincs LN1 2TL.

**Kantronics Kam** all mode decoder with latest version 9 KAGOLD software, excellent, complete with manuals, etc., probably best suited to s.w.l., £230. Tel: W. T. Johnston on Bournemouth (01202) 855910 for details.

**Katsumi element key EKIS0** twin paddle, variable speed and tone control box, like new, £55. Wanted: Schurr twin paddle key. Tel: Ray (01743) 245896.

**Kenwood R2000** excellent condition, as new, fitted v.h.f. unit inc. d.c. operation kit, instruction manual. Two 20 ft aluminium poles and v.h.f. antenna, £250. Tel: York (01904) 632604.

**Kenwood TH-26E** 2m (144MHz) hand-held, soft case, charger, etc., boxed. A c/w headset for mobile/portable use, £95, carriage paid. Tel: Dick (01245) 256416.

**Kenwood TM-251E** 2m (144MHz) mobile transceiver, boxed, as new, £200. Icom IC-T8E tri-band hand-held, boxed, as new, £200. Tel: Tony G4KHT (QTHR) (01482) 843457.

**Kenwood TM-V7E** the one with the blue display, true dual-band 50W 2m (144MHz)/35W 70cm (430MHz) with remote mount kit can deliver anywhere in south east, £350. Tel: Steve on Reading (01189) 210526.

**Kenwood TS-850SAT** 500Hz and 250Hz filters SP31 filtered speaker. Watson 25A p.s.u., nice condition, £800, prefer buyer collects (Central Scotland). Tel: GM4NTX (01324) 825914.

**Kenwood TS-850SAT** transceiver auto a.t.u., c.w. filter, M80 desk mic,

Kent key, Microset 13, 5V, 35A PS?? CobWebb 7-30MHz antenna, all mint, with boxes, inspect/collect, £1050 cash, no splits. Tel: Terry G0NSA on Kettering (01536) 392870, evenings only please.

**Lafayette model KT340** g.c. receiver, 0.55-30MHz in four bands, last item of Silent Key sale, £30. Tel: Ian (01507) 490582 (24 hour answerphone) or mobile (07930) 920460.

**Lowe HF-125**, excellent condition, keypad, a.c. adapter, user manual/guide, boxed, £145. Tel: Peter on East Herts (01992) 465428.

**Marconi CR100/2** receiver, 60kHz-30MHz with manual, ex MOD, R210 receiver, 2.0-16.0MHz, v.g.c. with circuits, etc. Reasonable offers please, also assorted transformers and p.s.u.s, state requirements. Tel: David on north Kent (01634) 220747, anytime (leave message if necessary).

**MC80 v.h.f. & u.h.f.** tested and working, u.h.f. tuned to 70cm (430MHz) with circuit diagrams, £15 each. Tel: Jason (01306) 711611.

**MFJ mobile tuner** MFJ-945D, £50. 2m (144MHz) ZL special, never used outside, crossed Yagi 7-ele, £20. BA tap and die set 08A-88A, £8. Diawa filter AF606K, £30. Diawa keyer DK210, £35. Kenwood grid-dip meter, £35. Tel: Eric G4IHF on Blackpool area (01253) 726685.

**MFJ-901 a.t.u.**, cost £65, will sell for £35. Zetagi?? power reducer, £20 o.n.o. Wanted a.t.u. MFJ-969?? or similar. Tel: (01283) 221870.

**MFJ-969** 'Roller Coaster' antenna tuner, cross needle metering of s.w.r., peak or average power with manual in 'as new' condition, £80 including P&P, no offers. Tel: Durham 0191-389 2822 or (0961) 580999 (mobile).

**Motorola MC micro** 32 channels, synth, 2m (144MHz), £45. A 70cm (430MHz), £35. Cushcraft RS, £75. Pair Icom U11 six channel synth, working 70cm with base chargers, £140 the pair. Tel: Rob G0UOO on (0410) 350687 (near Folkestone), anytime.

**Murphy B40D** g.w.o., £35. B40B (loctal valves) working, restoration project, £25. Will take £50 for both, collect only. Tel: Neil G8UUL on Uxbridge (01895) 230006.

**MX294 synthesised** 4m (70MHz) transceiver, 25-4000?? output, professionally converted, 32 channels, vertical antenna, £50. BC221 c/w original charts, mains power pack, £25. Capco SPC 300 a.t.u., £80. Tel: Martin G3ZZS on Plymouth (01752) 216455.

**New Sangamo** 19 set voltmeter, £10. Voltmeter by Weston, £5. Tel: Syd Fenwick G3AIO (01892) 822836, 28 Gimble Way, Pembury, Kent TN2 4BX.

**Old wireless** TVs, record players, fifties battery portable radios, valves and bits, offers to Walsall district. Tel: (01922) 414031.

**Panasonic DR-49** digital short wave receiver, s.s.b., CAL??, first class world band radio, very sensitive, excellent performance, £140. FRG-7, like new, £100. CODAR CR-70A, g.c., a.m., s.s.b., ae?? trimmer/fast slow tune valves, £37. Ralmer 117 v.g.c., £100. Tel: 0181-813 9193.

**Racal 117E**, excellent condition, recent overhaul by Racal specialist costing £90, will take £125. Lowe SRX-100 0-30MHz digital receiver, boxed as new, £75. ERA Microreader boxed with manual, £45. Tel: Jim on Sheffield 0114-237 3330.

**Racal RA-17**, £75. Eddystone 640, £75. Eddystone 840A, £75, all good condition and good working order. Tel: Suffolk (01379) 384760.



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# RadioScene

## VHF REPORT

REPORTS & INFORMATION BY  
THE LAST SATURDAY OF EACH  
MONTH.

DAVID BUTLER G4ASR  
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THIS MONTH DAVID BUTLER  
G4ASR HAS DETAILS OF AN  
ATTEMPT TO CROSS THE  
ATLANTIC ON THE 144MHz  
BAND AND DESCRIBES  
MICROWAVE OPERATION  
FROM HILL-TOPS.

In 1995 the Irish Radio Transmitters Society (IRTS) announced that a pair of Waterford Crystal cut glass vases, called the Brendan Trophies, would be awarded to the first two stations to establish two-way communication across the Atlantic Ocean on the 144MHz band and rising to the challenge the station of Bill Ward GM0ICF recently decided to make an attempt at achieving such a unique contact.

Between June 26 to July 2, he operated the station 2S0ICF/P located at a lighthouse on Ardnamurchan Point, the most

westerly point on the British Isles mainland. The other station, VO1AA, was located over 3350km away at Cabot Tower, St. John's, Newfoundland.

Originally, Bill's plan was to use a pair of 17-element Yagis, but lack of manpower meant that the antenna system was restricted to a single Yagi. Jim Fisher GM0NAI loaned his Discovery amplifier (3CX800 p.a.) and it ran faultlessly all week, providing 400W at the antenna. In total, Bill operated the station for 55 hours spread over the six day period.

Unfortunately, nothing was heard in either direction, but Bill wasn't down-hearted. He mentioned that the whole exercise was quite hard going but it might have been worse. It could have rained EVERY day! All the gear performed without so much of a hiccup, even with all the water in the tent.

Bill mentions that groups making future attempts should be certain they have sufficient people to share the workload as listening to white noise for hours at a time can be rather demoralising. He also suggests that tests are arranged with a similar enthusiastic group of people able to assemble a high power 144MHz station - if no-one tries then we will never know what can be achieved.

Those of you looking to make the first terrestrial 144MHz contact across the Atlantic Ocean might be heartened by the news that the station of W1LP/MM (DL51), located off the Mexican coast, recently contacted the Hawaiian station

KH6EME (BK29) over a distance of around 4754km. Both stations also attempted a trans-Pacific contact on the 430MHz band with partial success.

Steve K0XP mentioned on the [vhf.dx.discuss](http://vhf.dx.discuss) Internet newsgroup that it is thought that there are equivalent tropospheric ducts spanning the Atlantic Ocean from the Azores/Spain/Portugal/northern Africa across to Bermuda and other Caribbean islands. Nobody seems to have taken those possibilities seriously enough to make a concerted, long-term effort to find and use these long distance paths.

He also mentions that there's a north-south marine duct along the North American east coast and south-east to Bermuda caused by the weather system termed the Bermuda High. Again, no-one seems to have investigated the possibilities, possibly because of the lack of serious weak-signal v.h.f./u.h.f. activity on the islands. The only time this duct gets noticed is when someone using an f.m. repeater or simplex operation stumbles across it.

Steve further reports that the Hawaiian duct across the Pacific Ocean was well known by aircraft pilots long before it was spanned on the amateur v.h.f. and u.h.f. bands. He remembers hearing of Second World War ferry pilots reporting its existence over 50 years ago. Similarly, there have been occasional reports by aircraft pilots of Atlantic Ocean ducts. Steve suggests that someone should try to track down such reports for

further analysis.

Prompted by Steve's news group report, Peter Taylor G8BCG (ex-H44PT) managed to dig out some details from the 'Extended Range VHF Symposium' held at the Royal Geographical Society, London, in May 1963. The event, sponsored by International Aeradio Limited (IAL), reports that ... "On a number of occasions San Francisco (SFO) has worked flights near Honolulu (HNL) and at least once has ramp-checked a flight on the HNL field.

"SFO is probably the worlds best known extended range v.h.f. station. It is probably also the number one spreader of 'troposcatter fever', a malady which leads us to disregard the meteorological factor and expect a similar equipped station anywhere in the world to turn out a similar performance".

Peter mentions that the symposium papers cover extensive testing of Pacific Ocean paths. From the UK there were papers covering the route from Malta to Johannesburg, including reference to then unnamed (t.e.p.) trans-equatorial propagation.

So, it's all been done before and forgotten! Who will be first to span the Atlantic Ocean on the 144MHz band? Peter reckons it will be two f.m. stations, possibly mobile, in the right place at the right time. Although he thinks high power transatlantic beacons are a good idea these will only be useful for a limited number of enthusiasts. Peter suggests that well sited f.m. repeaters are a more likely source of alert although sadly this won't happen because of incompatible IARU band plans.

## MICROWAVE STATIONS

For some years, the microwave stations of Julian Rolfe G4UET, Jim Gale G4WYJ and Peter G4ZXO have participated as a team operating in various



Fig. 1: The 10GHz dish and 144MHz antenna at the station of G4ZXO/P.



Fig. 2: The 10GHz dish at the station of G4UET/P.





**Fig. 3: Transporting the equipment to the top of Ditchling Beacon.**



**Fig. 4: 1.3GHz Yagi and 2.3GHz Quad Loop Yagi.**

microwave contests and all of the regular 10GHz cumulative events. On this latter band, the group are fortunate to have two separate systems.

The equipment assembled by G4ZXO consists of a DB6NT transverter and matching low-noise amplifier (l.n.a.) using a high electron mobility transistor (h.e.m.t.). The antenna he uses is an ex-Halifax aircraft forward-facing radar dish, 750mm in diameter and fed with a waveguide double-dipole feed. On transmit, a DB6NT solid-state amplifier runs 10W output.

In practice, this system enables regular portable contacts to be made with stations up to 400km away. A power of 10W output on the 10GHz band is quite high power and special precautions have to be taken to look after the safety of the team and the sensitive receive equipment.

Because of the higher field density in front of the antenna the dish is located on top of a 4m, high guyed pole, as shown in the photograph, **Fig. 1**. Care must also be taken with the l.n.a. as the h.e.m.t. device is more sensitive to r.f. overload than a normal GaAs f.e.t.

In practice, the device will be quite happy with input leakage powers of up to 10mW, but higher levels could cause catastrophic damage. To avoid

high levels of r.f. from reaching the pre-amplifier, a special changeover relay designed for use at microwave frequencies is used.

It should be noted, at this point, that many of the small relays with SMA connectors available on the surplus market are unsuitable for powers above a few watts. As Peter is running 10W output the isolation of the relay should be better than 30dB to prevent damage to the pre-amplifier.

Isolation (sometimes called crosstalk) is the amount of signal that you can measure at the unused (receive) port compared to the used (transmit) port of the relay. With 10W being applied to a relay with 30dB isolation a level of 10mW will be present at the receive port. This is uncomfortably close to the upper limit that the h.e.m.t. can handle and an isolation of around 35dB or better is preferred.

At the 10W level it is also useful to utilise a relay that has tell-back contacts and interlock these with the transmit/receive control. This will prevent any r.f. being transmitted until the relay has changed over properly.

The equipment used by Julian G4UET runs less power than the G4ZXO system but, nevertheless, it is still very competitive. It consists of a

G3WDG/G4DDK transverter kit with the addition of a 1W solid-state p.a. and a h.e.m.t. low-noise pre-amplifier.

The receive pre-amplifier (designed by G3WDG) has a very low-noise figure and is intended for high performance tropo or moonbounce (e.m.e.) applications. It uses a well-proven and reliable Fujitsu FHX06 h.e.m.t. device providing a gain of 12dB and a noise figure of 1dB.

As the system is used for weak-signal DXing (c.w. or s.s.b.), Julian uses an SMA microwave connector at the input of the pre-amplifier. Any other type of connector would be far too lossy at these frequencies. For e.m.e. applications where the ultimate in low-noise performance is required the pre-amplifier can be built using a waveguide input arrangement. This method eliminates the loss (around 0.2dB) of one SMA/Waveguide transition.

The transmit amplifier uses a Mitsubishi MGF2430A GaAs f.e.t. device and, although is capable of running a little more power output, it is throttled back to ensure that the expensive transistor has a long and happy life!

Julian uses a 450mm parabolic antenna (the famous PW dish!) with a Procomm reflector feed. The entire transverter system is located at the back of the dish and mounted on top of a small ex-Navy tripod as shown in the photograph, **Fig. 2**. With this arrangement, portable contacts are regularly made over paths of 275-300km.

#### NEW PORTABLE QTH

In previous years, the G4UET, G4WYJ and G4ZXO team had operated from Firlie Beacon (JO00) but this year they have been trying a new portable QTH on top of Ditchling Beacon (IO90). Unlike Firlie, where access can be made by vehicle, Ditchling Beacon requires a completely different approach.

The highest point of the hill-top requires a pair of sturdy legs and a means of carrying all the equipment up a steep incline. To assist in this task, a cart made out of the portable mast with a set of wheels has been constructed, (see **Fig. 3**). This cart is used to get all the kit, including a 100 Ampere/Hour battery and a bank of four Yuasa 12V sealed lead-acid cells to the top. (I think they should get an award just for the effort!).

The first 10GHz cumulative contest entered by the group this year took place on Sunday May 30. Two stations, G4UET/P and

G4ZXO/P, were set up on the 10GHz band with a separate 144MHz station for liaison purposes. Most of the microwave contacts are normally pre-arranged on 144.175MHz, the UK microwave talkback calling frequency. Stations in mainland Europe also use 432.350MHz and you may occasionally hear schedules being arranged on this frequency.

The contest got off to a good start with both stations making six contacts in the first hour. At 1100UTC, a French station - F6DPH/P - called in on the talk-back frequency. The computer (essential for beam-heading calculations) showed him to be located 482km away.

Peter G4ZXO tried first with his higher power and, following an alignment of the dish, an s.s.b. contact was made 59 both ways. Julian G4UET then made contact receiving a 57 report and in the process beating his personal distance record for the band.

One of the more recent contests entered was the multi-band IARU event held on October 2-3. On the 1.3GHz band they used a Microwave Modules MMT1296 Mk I transverter driving two Mitsubishi p.a. blocks to 35W output into a 23-element Yagi.

For the 2.3GHz band a G3WDG transverter was used in conjunction with a DB6NT p.a. running 4W into 40-element Quad loop Yagi. (These antennas and the mast-head units are shown in the photograph, **Fig. 4**). A Yaesu FT-290R with replacement Mutek front-end board was used as the driving transceiver for both bands.

Talk-back, 100W and a 7-element Yagi on the 144MHz band and 100W and a 19-element Yagi on the 430MHz band was also provided. Running high power talk-back on the v.h.f. and u.h.f. bands is becoming more of a necessity these days. With path lengths increasing on the microwave bands, upwards of 500km, it is becoming more difficult to liaise on lower frequencies.

A power of 10W and a ZL-Special on the 144MHz band is not good enough anymore. Indeed many operators are now reporting that long distance contacts can be made at good strengths on the 10GHz band with nothing being heard on the 144MHz or 430MHz bands.

#### DEADLINES

That's it again for this month's 'VHF Report'. Last month I gave full details regarding the Leonids meteor shower which will provide extraordinary conditions



# RadioScene

on the v.h.f. bands in less than one week's time.

Don't forget to be in the shack between 2300UTC on Tuesday November 16 and 1200UTC on Wednesday November 17. Please let me know what you heard or worked on any of the v.h.f. bands during this period.

Forward any details to the address and by the date given at the top of the column. Alternatively you may find it more convenient to make a simple telephone call.

**THANK YOU FOR YOUR LETTERS AND GOOD LUCK WITH THE DX. SEE YOU AGAIN NEXT MONTH.**

73 David G4ASR

## HF FAR & WIDE

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THIS MONTH LEIGHTON SMART GW0LBI BRINGS YOU NEWS OF POOR CONDITIONS ON THE HF BANDS AND, ONCE AGAIN, HIS REGULAR REPORTERS FROM AROUND GREAT BRITAIN SHARE THEIR VARIOUS CONTACTS WITH YOU.

I'm sure that I'm not alone in hoping that the demise of summer will bring the hoped-for improvement in propagation conditions on the high frequency bands! For the past few months, reports have generally indicated that, although long-range DX has been worked on all (or most) days, conditions have been more or less rather poor.

Those who were about during previous near-sunspot peaks have all lamented that they have remembered conditions being rather more productive at this part of the cycle. Well, with fingers crossed I'm hoping that as the winter draws in, conditions -

particularly on the 24 and 28MHz bands - will come into their own again, with strong signals well into the hours of darkness! Time will tell I suppose!

## PROPAGATION REPORT

A brief report on propagation now from the ever-watchful **Don McLean G3NOF** in Yeovil, who says: "Things have been very patchy this month, with even the low frequency bands being dead sometimes. In my opinion, things are not as good as they were this time last year.

"It seems that 14MHz has again been the most reliable band, with Australia and New Zealand coming in between 0500 and 0900UTC most days, along with African countries at around 1600-1900UTC.

"The 18 and 21MHz bands were patchy on most days this month, although Pacific

countries were heard over the North Pole between 0800 and 0930UTC on 18MHz and Asia came in on the short path most days on 21MHz between the hours of 0900 and 1800UTC.

"The 24 and 28MHz bands were the most unreliable this month, although some Asian signals were heard on 24MHz between 1000 and 1600UTC, signals were not strong and prone to deep and rapid fading. On the 28MHz band there were days when nothing at all was heard. On some days Africa was heard around 1400-1800UTC, but were very prone to heavy fading."

## YOUR REPORTS

On that rather melancholy note of Don's, I'll delve into your reports, starting with the 3.5 and 7MHz bands. First comes **Sean Gilbert G4UCJ** of Milton Keynes who, using 30W of c.w. into a HF6 vertical antenna, lists a single 3.5MHz contact with UP4L (Kazakhstan) at 2327, while 7MHz brought in ZS6Z (South Africa) at 2213UTC and a switch to 3W QRP gave him a contact with TI4CF (Costa Rica) at 0005UTC.

Also using low power on 3.5MHz this month was **Eric Masters G0KRT** (see Fig. 1) of Worcester Park in Surrey, who

hooked up with LA2PKA (Norway) at 1903UTC, using c.w., while on QRP s.s.b.

Eric managed a nice contact with G0AOZ, who was using a miniscule 500mW p.e.p. on a very noisy 'eighty metres'! Eric's 7MHz list includes c.w. contacts with RA9FU (Asiatic Russia) at 2007UTC and EC1DNE (Spain) at 0845UTC.

## THE 14MHz BAND

Judging by reports, 14MHz was the best band this month, often staying open all night. **Ted Trowell G2HKU** (see Fig. 2) from the Isle of Sheppey in Kent spent quite a bit of time here, using 70W of c.w. to hook up with JV1LS (Mongolia) QSL via W3DOX, 5B4/G3ZEM (Cyprus) and JH4JNG (Japan) at around 1500UTC.

Operating at 1700UTC brought him a contact with the unusual call 3XY1B0 (Guinea) QSL via F5XX and at 2000UTC came W6CYX (west coast USA) and JA4DZ (Japan). After dropping power to 5W, Ted later worked 5A1A (Libya) at 1900UTC!

Meanwhile, Sean G4UCJ reckons that 14MHz was quite productive for his low power operation. His 3W log for this band includes c.w. contacts with HP1AC (Panama), J35WJM/VP9 (Bermuda) and LU4DD (Argentina), all at around 2300UTC, while AT0VLH (India) was worked at 1829UTC and 9V1XE (Singapore) at 1840UTC.

## THE 18MHz BAND

'All s.s.b.' is the preferred method for **Don McLean G3NOF** of Yeovil in Somerset and using this mode he lists some nice 18MHz DX contacts with A45XM (Oman), HU4A (El Salvador) QSL via EA4URE, T24DX (Tuvalu Island), QSL via EA4CP, XE1VNX (Mexico), 4S7HBG (Sri Lanka) QSL to DL3ROB, 9M6AAC (Sabah, Malaysia), VP5/WB8VTK (Turks & Caicos Islands) and UA0FF (Asian Russia).

Also active on 18MHz was **Carl Mason GW0VSW** of Skewen in West Glamorgan who used 80W and a half-sized G5RV antenna on the band. Carl's s.s.b. reached out to KP4IX (Puerto Rico) QSL via WP4MIM at 0822 and VA3GA (Canada) at 1600UTC. Switching to c.w. Carl lists his contacts with EK0W (Armenia) and VK5CRS (Australia) at around 0700UTC, while at 1042UTC EL2WVW (Liberia) was worked.

## THE 21MHz BAND

Despite the patchy conditions and heavy fading, the 21MHz



Fig. 1: One of the 'HF Far & Wide' reporters: **Eric Masters G0KRT** using his QRP plus rig, now busy with his studies.



Fig. 2: **Ted Trowell G2HKU** - another of the regular reporters.



band seems to have thrown up quite a few gems this time around. All-c.w. man, Ted G2HKU, used 70W to work 3B9FR (Rodriguez Island, south Indian Ocean) and VQ9GB (Chagos Island) QSL to K7GB, as well as ZX4C (Brazil), LU9GBR (Argentina) and 5B4/G3VMW (Cyprus), all at around 1500UTC.

Carl GW0VSW offers all s.s.b. contact with D44BC (Cape Verde Islands) and HC5AI (Ecuador) at 1500UTC, while 1600UTC brought in A92GJ (Bahrain) and VE3/GW4WSU (Canada).

Using mainly s.s.b. on 21MHz was Eric G0KRT who lists 100W contacts with RU9CZD (Asian Russia) at 1800UTC and AA2KD (USA), LU6FF (Argentina) and PY2YU (Brazil) at around 2000UTC - the last two being new countries and a new continent for him on 21MHz.

Don G3NOF worked a long list of countries on 21MHz of which includes D44BC (Cape Verde Islands), HS0AC (Thailand), JT1CO (Mongolia), Y11EE (Iraq), 5H3US (Tanzania), OD5PN (Lebanon) and 457AB (Sri Lanka).

#### THE 24 & 28MHz BANDS

One thing's for sure, our reporters really are hard working operators! The two highest bands were the poorest of the lot this month, yet they still seemed to be able to dig out the DX there.

Sean G4UCJ mentions his 30W c.w. contact on 24MHz with EZ8AQ (Turkmenistan) at 0930UTC and a 3W QRP contact with K1ZZ/VY2 (Canada) at 1912UTC, while Ted G2HKU lists c.w. contacts with 5X1P (Uganda) YB5QZ (Indonesia) and 4X1VF (Israel) all at around 1500UTC on the 24MHz band.

Finally, to 'tie up the ribbons' this month, Don G3NOF offers his s.s.b. list including HI3/DL1GKG/P (Dominican Republic), SU9ZZ (Egypt), VP8LGT (Falkland Islands) and 9J2A (Zambia).

#### SIGNING OFF

Once again, despite the less than impressive conditions, it's clear that there is DX out there to be worked. Sometimes it simply means being in the right place at the right time, but more often it means that the amateur has to study prevailing conditions, familiarise themselves with conditions and parts of the world expected to be heard at certain times of the day, as well as keeping a watch on the propagation beacons, which themselves are an excellent

indicator of what to expect.

So, successful operation on the h.f. bands is not all as simple as it seems! Thanks again to all reporters for their time and effort in making the column a success.

**AS USUAL, REPORTS, INFORMATION AND PHOTOGRAPHS (I'D LIKE TO PUT A FACE TO THE NAMES!) BY THE 15TH OF THE MONTH. DETAILS AT THE TOP OF THE COLUMN.**

*Leighton GW0LBN*

## FOCAL POINT

### REPORTS & INFORMATION TO:

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**THIS MONTH GRAHAM G8EMX FOCUSES ON THE NEW MILLENNIUM & WHAT IT MIGHT BRING FOR THOSE AMATEURS WHO ENJOY ATV. HE ALSO SPEAKS A LITTLE BIT ABOUT THE BATC RALLY FOR THE YEAR 2000 & BRINGS YOU AN UPDATE ON SOFTWARE MENTIONED IN THE OCTOBER 'FOCAL POINT'.**

The world is about to enter the new millennium. Every branch of human achievement is anticipating the major developments that the 21st century may bring. Within the world of electronics and communications, that has to mean the change from analogue to digital technology which, in so many instances, is already here.

Digital computing has been around for many years already - digital sound storage and reproduction has virtually replaced the vinyl disk and digital radio broadcasting has been available for some time now.

Digital broadcast TV has arrived too, but this has been a relative latecomer to the outgoing century. Perhaps this can only heighten how complex a technical development digital TV has been, apart from the decisions on standards and compression that had to be discussed and finalised.

Is it any great surprise, then

that (for the first time) the Amateur TV (ATV) tradition of following or sometimes being ahead of broadcast techniques, no longer holds? To appreciate why, let's have a reminder of why the world's technology is replacing analogue 'waves' by digital 'bits'.

#### NATURAL WORLD

The natural world produces analogue information - every sight and sound is a stimulus of infinitely varying intensity. But it has not been possible to convert these into an electrical form then record, store, transport or reproduce that stimulus without altering its original form, every step of the way. That distortion may be extremely small, but is always there, together with any random noise that is picked up or generated along the way.

But a number is a number. In very simplistic terms, if 100 pulses are put into a line, then 100 recognisable pulses will emerge. If 100 pulses are recorded onto a disk, the reproduction system will find 100 pulses. The number that goes in, precisely comes out.

So, if an analogue signal is encoded into as many pulses as possible, (or has been decided upon), then those many pulses will be what the listener or viewer will get. The more pulses the system uses, the more accurate to the original analogue the reproduced signal will be. Digital systems also allow data to be compressed which creates space for extra services.

The massive challenge for broadcast digital TV has been the vast speed and quantity of pulses needed to represent a high definition, moving image. Plus the computing power necessary for compression, error correction, storage and the final conversion back to analogue for the domestic TV picture.

So, is an amateur digital TV system early in the 21st century too large a mountain to climb? At the moment I know of no practical method of digitising a

fast-scan picture that would be within most amateur budgets and, arguably, there's no absolute need for ATV to 'go digital' at all - amateurs could use, or continue to use, whatever system they wished.

The pressure for more channels to deliver more viewer choice and inter-activity has been the other major 'driving force' behind broadcast digital TV. Substantial compression can be achieved within digital systems, fitting more channels into a finite radio spectrum, so a digitally - compressed ATV system would certainly be an advantage on the 432-440MHz amateur band. The world of amateur TV can only wait for developments which, one day in the 21st century, will surely arrive.

#### STATE OF PLAY

Meanwhile, at the end of the 20th century, I will summarise the 'state of play' for ATV in the UK. At my most recent count there are seven, 10GHz (3cm) ATV repeaters and 25 1.3GHz (24cm) ATV repeaters available around the country - with 436MHz continuing to carry some simplex ATV.

Membership of the **British Amateur TV Club (BATC)** is fairly stable at around 2000 members, who receive the Club's quarterly A4 magazine **CQ-TV**, which, incidentally, came second in the recent **PW Club Spotlight Magazine competition**, 'National' section. Congratulations should go to **CQ-TV Editor, Ian Pawson!**

The BATC's first rally in the 21st century will be at a fresh venue. For the past few years the Club has arranged its ATV rally at the Sports Connexion near Coventry, but has now received an offer to hold its 2000 rally at Bletchley Park, near Milton Keynes.

Bletchley Park may be familiar to you as the (now famous, but then top-secret) code-cracking centre during the Second World War, where the



**Fig. 1: Views of the ATV demonstration at Bletchley Park, venue for the BATC's rally next year (2000!).**



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claimed unbreakable German 'Enigma' code was broken with 'Colossus', a huge, valved, early computer!

Today, Bletchley Park is a cryptography museum, with a rebuilt Colossus machine and, according to news items, may be preserved for the nation. Also within the complex is an ATV demonstration station, run by **Dave McQue** and it is thanks to Dave that the BATC has decided to move venue. The provisional date for the BATC rally is **April 8, 2000**, but 'Focal Point' will remind you again!

## TESTCARDS ON COMPUTERS

In the October 'Focal Point' I was playing with a piece of computer software called *PCATV*, which generates testcards on a computer or TV screen and I eventually registered my shareware copy to enable all the facilities.

The registering process allocates a number to the user which, when entered, fixes that copy of the programme to your callsign, in my case **G8EMX**. Everything was fine, until I tried to add /P to the call. After all, I want to use this at a repeater site! But no, the software would not allow any changes to the call after registration (logically enough I suppose).

A phone call to the software's author, **Robin Stephens G8XEU**, soon fixed my problem. Robin explained how to remove the original registration, then he assigned two more registration numbers for **G8EMX/P** and /A.

Robin explained: "This was not a programme fault, many customers have requested this facility so it will be added to subsequent modifications to the programme, to allow for callsign modifications". Mine had been the '03' version and '04' would be available in a few weeks time, so probably available when this is published.

My computer was running *PCATV* into a TV monitor at the BATC's Shuttleworth convention. When the 'On' icon is clicked in the 'select output' screen controlling the computer's video card, the vision output is switched from the computer's monitor to the TV set at 625 lines.

All fine, everything working OK! Then, some while into the

day, the 'On' icon appeared 'greyed out', which all *Windows* users will recognise as indicating 'not available'. What on earth had happened?

I could leave the answer until the next millennium, but as this may spoil your celebrations, I discovered that the cable carrying video into the monitor was disconnected.

Simply reconnecting the cable (which had been used for other things) enabled the icon and a test card appeared on the TV once again. The video card apparently 'looked for' a 75Ω termination! Ah, computers are weird, but wonderful!

**HAVE A VERY HAPPY CHRISTMAS & A BRILLIANT P5 MILLENNIUM PARTY, WHEREVER YOU CHOOSE TO BE! SEE YOU AGAIN IN THE NEXT CENTURY!**

*Graham Hankins G8EMX*

## AUSSIE ORACLE

**LETTERS & REQUESTS FOR TOPICS YOU'D LIKE COVERED TO ME PLEASE.**

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**THIS MONTH SEES THE RETURN OF OUR AUSTRALIAN REPORTER, CHRIS EDMONDSON VK3CE AND THIS TIME HE TELLS YOU ABOUT HIS BIG MOVE TO THE GOLD COAST AS WELL AS SOME NEWS OF AN AUSTRALIAN 'REMEMBRANCE DAY' CONTEST!**

**G**'Day from the depths of winter in tropical Queensland, VK4. My name is **Chris Edmondson VK3CE**, Editor of *PW*'s opposite number in this part of the world - *Radio & Communications*. Winter? Who's kidding whom? The average daily temperature at this time of the year here is 22°C ... probably pretty close to your summer temperatures!

First things first, I must

apologise most profusely to you, the readers and to poor Rob and the team at *PW*. My quarterly column was supposed to appear in the **September 1999** magazine, the deadline for which coincided almost to the day with our big move from Melbourne, Victoria, to the Gold Coast - the best part of 2000km to the north. Somehow I managed to write the column and, on the day before we packed all the computer gear away for the journey, dispatched it via the Internet to the *PW* offices.

Right now, I guess the column is passing the planet Pluto on its way to the *PW* office outpost. Yes, it took the **long** route. One day it might actually arrive back in the UK ... I sometimes wonder about all the Internet mail which simply goes missing. I mean, where does it go? What really happens to it? If you think about it, you could probably come up with some pretty funny explanations for lost mail. The scary part is that they're probably all true!

## WHAT'S HAPPENING IN OZ?

So, what's been happening in Oz? The short answer is ... not all that much - and plenty, if that makes sense. The bands have been good at times, yet appallingly bad at other times, but there's been plenty happening to keep the interest up.

In August each year, one of Australia's biggest contests hits the air. In truth, I'm not much of a tester. Part of it is simply that I don't have much time free to enjoy my hobby. But once a year I make sure that I have the time - so it was last weekend (as I write).

The **Remembrance Day Contest (RD)** pits state against state and is hotly contested right across the country, as well as in ZL and P29. On h.f., the aim is to work as many stations as possible in a 24 hour period and all contacts must be with stations in other call areas. But on v.h.f. and u.h.f., that's simply not practical ... and that's where the fun starts.

Above 50MHz, the RD has no geographical limitations, so contacts are permitted within your own call area. As the aim of the contest is to get as many point-scoring contacts as possible - and because you may re-work stations on v.h.f. and u.h.f. after two hours have elapsed - the whole thing becomes quite comical. Every two hours you re-work the people you worked to start with!

Special computer-based log-keeping programs put lists of stations on your screen that you

may re-work and, seeing the honour of your state is at stake, participants get pretty keen to amass as many points as possible. It would be fair to say that the RD is Australia's most popular contest, by far.

## CUT A LONG STORY...

To cut a long story short, I seem to have moved my family and station to a rather good v.h.f./u.h.f. location. In fact, it's a corker! We enjoy unbroken views for some 270°, taking in all of the Gold Coast and Queensland's capital city, Brisbane. We are very elevated here at about 600m (a.s.l.) and, as we are close to vertical cliff drops on three sides down to sea level you might imagine that we get out pretty well.

Not that we could be sure of that until the actual day of the contest. As late as two hours before the RD started, my new house had no antennas up at all! An official government radio inspector friend turned up to admire the view and check out our new 'digs'. "Right", he quipped, "I'm going to inspect your station! Ah, hang on a tick, mate, where are the antennas?" He asked.

"In there", I replied with a long face, pointing at the garage.

"But how the devil can you go in the RD without any antennas up?" He quizzed, using a remarkable amount of logic. I muttered something about the tower still being on the ground and all the beams dismantled and packed away after the move from Melbourne (even I had to bow to logic and make sure the children had clothes to wear first!) and how much I'd wanted to be on the air for it ... and the next thing you knew we had an antenna up in the sky - using nothing more than a few plastic cable ties to hold it vertical!

After me saying that it should be a pretty good v.h.f./u.h.f. site, I then had to prove it! It's obviously a bit too early to be sure, but I have the sneaking suspicion that I won the VK4 section of the contest by a fairly substantial margin. So, it just goes to show that a little imagination and a well-equipped tool kit can do wonders in a pinch!

## VAST AUSTRALIA

We have talked in the past about how vast Australia really is and I recently had the mind-numbing opportunity to find out first-hand. Something like 98% of Australia's total population lives within 50km of the sea and almost all of the population lives on the fertile eastern seaboard and a little corner of southern





**Fig. 1: Chris VK3CE's antenna which was very quickly set up for the 'Remembrance Day Contest' - with nothing more than a few plastic cable ties holding it vertical!**

Western Australia (VK6).

I needed to transport the two family cars up here as a part of the move, but my wife is rather timid behind the wheel. This meant I had to drive up both cars. While Jenny and the children flew here, I drove up in our 'family' car, the archetypal Aussie outback vehicle, a Toyota LandCruiser.

The coast road I chose was choked with holidaying Brits, all of whom seem to favour large white van things with **'BRITZ IN AUSTRALIA'** festooned gaudily in about eight places. That, presumably, is to help them blend in with the scenery.

Having arrived in one piece and presented the keys to the new car to my wife (who went out in it the next day and put a big dent in it - thank you so much!) I then flew back to Melbourne to repeat the drive in my own car. Now this is where things started to get interesting ...

No sooner had I arrived back in Melbourne than the cellular phone rang to tell me that my uncle in Adelaide had suffered a pretty major stroke and that I should head over very soon if I wanted to see him again.

So out came the maps and a new route back to VK4 was plotted: Melbourne to picturesque Victor Harbour, 80km south of Adelaide, then up to Broken Hill NSW, through Wilcannia and Cobar to Dubbo, then up the Newell Highway to

Goondiwindi, across the Great Dividing Range at Warwick, then along a motley collection of back roads to the Gold Coast.

Simple - except for two small details: first, it's a flaming long way and second, I had a magazine to produce and only a couple

about 200km north from the City of Churches that I realised how isolated the place really was. The land was absurdly green, but there wasn't a tree to be seen, not anywhere.

In fact, the further north I went the fewer things I saw, other than - and don't laugh, I'm serious - emus, eagles, kangaroos (lots of them!), wild horses and camels ... and one lone, solitary, ridiculously silly, goat. That introduced pest was trotting down the middle of the highway, 100km from the nearest town and quite oblivious to me hurtling by at Warp Factor Two.

Around sundown I reached the border between South

Australia and New South Wales. Astride the border is a little town called Cockburn, which was obviously named by a bloke having a **very** bad day. I stopped at the local police station for a chat and it turned out that the constable behind the desk was the only South Australian policeman for more than 100km in any direction!

I ended up

stopping there for an hour or so, sipping on a coffee as the sun dipped below the horizon and having a good old Aussie yarn. "Whatever you do, mate", he drawled, "you must NEVER drive these roads at dawn or dusk and take it very, very easy at night time. Otherwise you'll hit a kangaroo, dead set".

The policeman's four wheel drive was interesting. About ten radio transceivers inside, covering everything from h.f. to a microwave satellite telephone (the normal cellular phones aren't much good out there). So he played with my new BMW M5 while I played with his radios. An ideal arrangement!

#### EFFECTIVE COMMUNICATIONS

Effective communications are not just recommended in this part of the world, they're **essential**. Absolutely essential - your life depends on it. Many of the roads in the outback are infrequently travelled ... and that's an understatement. Some of them would be lucky to see one vehicle per day ... and still they could be classified as



**Fig. 2: The famous plastic cable ties in question!**

of days available to make the trip! Could I afford so major a detour? Well, my uncle was a pretty special bloke and no way was I going to miss what may well be my last opportunity to pay him my respects.

Just before dawn the next day I headed west from Melbourne. I arrived 800km away in Adelaide late morning, visited my Uncle for a fleeting couple of hours, then headed north.

The trip from Melbourne to Adelaide takes you through (well, past) one main town - Ballarat - but these days the highway bypasses Ballarat so I guess even that doesn't count. But the important thing is that you could stop no more than every 40 or 50km for a drink and fuel if you want to.

Broken Hill, where I stopped for the night, is some 600km north of Adelaide, but it was when I had gone no more than

'highways'!

The satellite telephone may take the romance out of communications, but the system is utterly reliable, right across the continent and up to 200km out to sea. It's based on a geostationary satellite running at around 1600MHz and the car-mounted phones run 3W. I suppose it goes without saying that you keep well away from the antenna ...

So far, there's only about 10 000 of them in service, but the numbers are increasing and one of the reasons for this is that they're downright cheap. Not only to buy, but also to use. About \$1 a minute buys you a call to anywhere in the country, with no cost to receive calls. Compare that to the Iridium system. In this country, it costs something like \$12 (almost £5) per minute just to **receive** a call, and the handsets cost three times as much as those for our Mobile Satellite system!

So, I thanked the nice constable and headed further north in the dark ... very slowly! In the next 50km I must have swerved five or six times to avoid kangaroos. They just bounce out from the side of the road, totally oblivious to the oncoming cars. There were a few quite interesting moments, I can tell you ...

I watched the partial eclipse of the moon (a fortnight before your total eclipse of the sun - I was very jealous!) then headed for bed at Broken Hill, a surprisingly large town in the middle of nowhere based on the mining industry.

The next morning dawned bright and clear (they always do in Broken Hill, it gets about two inches of rain a year ... a **good** year!) and, once the sun was high enough for the kangaroos to have gone to bed, I continued for Queensland. On the first day I had covered a whopping 1340km and Adelaide was the only city I had passed through ... and my average speed for the day was about 120km/h.

**Nothing** can prepare you for what lies beyond Broken Hill, because **nothing** is the operative word. It's quite incredible. There's a speed limit on NSW roads, but the police don't reckon it's worth enforcing it out there. You'd go to sleep from boredom after the first couple of hours.

I had initially suspected the pleasant policeman just wanted to award me the 'Twit Of The Week' Award for blatantly disregarding the speed limit, but after quite a few cars had passed at around 150 to 200km/h or so, I was starting to wonder. When the road train - in this case a monstrous prime mover hauling



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three 15m trailers for an all-up weight surely well over 100 tons - pulled out with blazing lights and blaring horns to overtake me at around 140 km/h, I finally got the message. For the next three full hours I sat at between 200 and 250km/h, slowing only for three tiny towns in a full 770km stretch!

I don't know how to describe the desolation to you. It certainly isn't a sandy desert or anything, but there are only sparse bushes to be seen and they're rarely more than a foot or two high. The road is straight and flat, there are three stretches of that road which remain ribbon straight for 100km or more and all there is to relieve the monotony of it is a very good music system in the car and a radio to listen to.

## RADIO IS KING

Out here, despite the availability of the satellite phone, h.f. radio is king. Just about everybody uses one. You get the message of how far away from a town you are when you realise that the people in every car passing in the opposite direction (and one maniac on a pushbike!) wave to you as they pass. Despite the amazing distances, it's a very close-knit community out here.

The German car was remarkably at home in the outback. You see, on that second day, in a shade under 12 hours, I covered a phenomenal 1670km, a total for the two days of 3010km. I guess I don't need to tell you that's some 500km further than London to Moscow - and I had only covered a little bit of Australia's south-east corner.

Next time we meet I'll tell you a bit more about the quite unique communications environment in Australia - and try to convince you to come and visit us in this extraordinary red land of contrasts.

UNTIL THE NEXT TIME I'M IN  
PW - A WARM 73 FROM ...

Chris Edmondson VK3CE

## DATA SCAPE

NEWS, VIEWS & PICTURES TO:

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THIS MONTH SEES ROGER COOKE G3LDI TAKING A LOOK AT MORE ISPs, A NUMBER OF DIFFERENT WEB SITES OF USE TO THE RADIO AMATEUR AS WELL AS NEWS OF INTEL'S NEW PENTIUM III PROCESSOR.

It seems strange to state that this will be my last column of this century, but that is a fact that cannot be changed. I wonder just what the next century has in store for us?

When you think just what has been achieved in communications in the last 100 years, it would be nice to be around to sample the year 3000 and see just what is in store. For certain, I shall not be writing this column!

However, if we don't make proper use of the frequency spectrum that we have at present, the very future of Amateur Radio is at stake. A couple of old-timers (not yet born!) will probably be saying "It's radio Jim, but not as we knew it!"

Seasons greetings to all my readers and may the new millennium bring all that is best to Amateur Radio.

## FREE ISPs

The latest listing of free Internet Service Providers (ISPs) lists over 150 companies - users are spoilt for choice now and it won't be long before the ubiquitous free telephone calls will follow. Several ISPs are offering free access, but these can be fraught with conditions that need to be read carefully before signing up.

One of the latest ISPs that has come to my attention is the Greatscape site at [www.greatscape.com](http://www.greatscape.com) and (Fig. 1) shows the introductory page

of their Web site. You can retain your BT connection, friends and family and also obtain 10% discount on all calls made.

Could this be the start of the slippery slope to our free local calls? Pay them a visit and judge for yourself. (I have a few friends who have already signed up).

## SHORT URL

Ever wished the visitors to your Web site didn't have to type in a long line of impossible to remember address information? Well, Fig. 2 shows the front page of the QSY.TO Web site: [www.qsy.to](http://www.qsy.to)

If you register with this site, all your users will have to type is 'qsy.to/g9xxx' and that's it. If you have a Web site, this one is well worth a look. It's completely free and you can sign up on-line. You can E-mail them at: [info@qsy.to](mailto:info@qsy.to)

## DIRECT CONNECTION

Internet service provider Direct Connection has an Internet access service for people who are blind or visually impaired. The service provides software that works with the user's screen reader and voice synthesiser, as well as specialised technical support.

The Login account costs £13.50 a month, which they state is a saving of £10 on regular, text-based accounts. If this were so, I would have thought there would be few nowadays willing to spend £23.50 per month on an Internet connection!

With the number of free ISPs around, even £13.50 seems quite steep to me, especially when aimed at such a group. Bear in mind I'm only the messenger, so don't shoot me!

You can telephone Direct Connection on Tel: (0193) 626000 or visit their Web site at: [www.dircon.net](http://www.dircon.net)

## RECENT RUMOURS?

Recent rumours of the demise of BARTG have been greatly exaggerated! Nothing could be further from the truth! These rumours occurred as a result of BARTG announcing that they would not be holding their annual rally in 1999.

The new data mode, PSK31 is causing quite a stir in the data field at present and the BARTG magazine *Datacom* covers all aspects of data, including this new mode, which is included in the award scheme offered by the group. So, if you're interested in



Fig. 1: The Greatscape Web site at: [www.greatscape.com](http://www.greatscape.com)



Fig. 2: The QSY.TO Web site at: [www.qsy.to](http://www.qsy.to)

any form of data, be it an old Creed 3x, or the latest PSK31 or Pactor II, then you will find lots to interest you in the magazine.

The UK membership to BARTG is £12 and you can find out more by writing to the Membership Secretary Bill McGill G0DXB at 14 Farquhar Road, Maltby, Rotherham, South Yorkshire, S66 7PD. BARTG's first bi-annual AGM will be held in May 2000 at a venue in Derby. Visit their Web site at: [www.bartg.demon.co.uk](http://www.bartg.demon.co.uk) See Fig. 3 for their front page.

## CORNER THE MARKET

Intel is looking to corner the market from competition such as Cyrix and Advance Micro Devices (AMD), with its Pentium III micro-processor, code-named Katmai. By doing so, it hopes to give the industry the most powerful multimedia-enabled chip.

Katmai is a Pentium II chip with 70 new instructions added on. Intel has dubbed them Katmai New Instructions (KNI) and they give the software industry a new architecture to handle Integer SIMD and Floating Point SIMD.

SIMD stands for Single Instruction Multiple Data and is a technique whereby a microprocessor can easily handle complex data types, such as voice, audio, 3D images, video and so on.

The new Pentium III will arrive in speeds of 450 or 500MHz, this puts the chip at the top of the pecking order in terms of raw performance. The new chip is a super-fast microprocessor designed to handle data types easily and cheaply.

Its price is being kept secret





Fig. 3: BARTG's Web site as found at: [www.bartg.demon.co.uk](http://www.bartg.demon.co.uk)



Fig. 4: ATM's Web site, where you will find information on the *LookC Pro* software, can be found at: [www.atmltd.co.uk](http://www.atmltd.co.uk)

at present, but Intel wants you to believe that Pentium III and KNI give the ultimate in terms of quality images flowing down the Net to your PC. In other words, the best thing you could buy for the Internet.

The concept of video, voice, 3D and other such complex data types arriving from a Web site down a modem does not inspire confidence. I have enough problems with pure E-mail data myself, so I can imagine what frustration this would provide!

However, Intel claims that users want quick download of such rich content as I have described, quicker access to the Web and so on - enter KNI technology. The idea is to make it easier for computers based around a Pentium III chip to display this rich content. In time, this may very well be the case - MMX is, after all, a de facto standard now and with Intel's marketing clout, it looks likely that KNI will eventually have a huge effect on Web site development.

#### LARGE MARKETPLACE

In 1998, it was estimated that in Europe alone, 59 million users would be connected to the Net by 2000. Such a large marketplace cannot be ignored and the industry has been forced to improve the quality of the data being served up to these users.

One of the first KNI-enabled computers on the market is the **Dell Dimension XPS T computer**. This computer is aimed at the consumer sector and with a launch price of **£1599** is very competitive.

For this price, Dell will provide a 500MHz computer

with 128Mb of memory, 12.9Gb DVD drive, high-performance TNT video card with 16Mb of memory, Iomega ZIP drive, 17 inch colour monitor, 56Kb modem and ADA 80 speaker system. The XPS T is a fairly large tower computer, well engineered and sleek. The drive bays at the front have a 3.5 inch floppy, DVD (Digital Video Disk) drive and the ZIP drive in place.

Having just visited the Donington show, I was quite surprised to see a Pentium III 400MHz computer with 13Gb drive, 128Mb of memory, plus other bits and pieces - all for £775. Prices are reducing remarkably quickly.

#### HAPPY BIRTHDAY!

The Internet has just celebrated its 30th anniversary! Today's global Internet has its roots in the **Advanced Research Projects Agency Network (Arpanet)**, a project funded by the US military in 1969, which aimed to interconnect computers across a common, Packet-switched network.

The original network consisted of four machines, they were Honeywell DDP-516 minicomputers with 12K of memory, connected by 50Kbps leased lines. The system has grown somewhat since then, however, it was not until 1972 that E-mail was developed.

#### WEB ENABLED SECURITY?

Take a look at [www.atmltd.co.uk](http://www.atmltd.co.uk) (Fig. 4). *LookC Pro* is the world's first Web enabled security system, giving you access to remote live viewing and recorded video event monitoring via a secure server on the Internet.

The system is hosted in an ordinary PC, using the *LookC Pro* hardware you can interface standard, low-cost CCTV cameras and security system sensors such as PIR's (passive infra-red detectors), door contacts and pressure mats. When a sensor is triggered by an intruder the system can perform seven automatic responses which are pre-selected by the user.

Amongst these responses are the Telepaging and Web Uploading functions. The Telepaging function will call you up on your mobile phone and simply tell you in plain English

## Web Watch

Greatxscape Web site: [www.greatxscape.com](http://www.greatxscape.com)  
 QSY.TO Web site: [www.qsy.to](http://www.qsy.to)  
 Direct Connection's Web site: [www.dircon.net](http://www.dircon.net)  
 The BARTG Web site: [www.bartg.demon.co.uk](http://www.bartg.demon.co.uk)  
 ATM Web site: [www.atmltd.co.uk](http://www.atmltd.co.uk)

which site the intruder has broken in to, which camera *LookC* is recording from and whether or not it has activated the alarm bells followed by a Web address.

Using any Web browser and your account password, you can take a look at the recorded video event copy which has been uploaded to a secure server on the Internet. You can replay and step through the video event frame by frame and also have a live view on screen of the site in question at the same time. So, for the first time the user is empowered to co-ordinate any intrusion as it happens with visual feedback and unlike the security guard the system doesn't fall asleep.

Users can install the system on their own PCs and set up the cameras and sensors to catch criminals, wildlife, pictures of the kids, people at the door, or just about anything.

The hardware is accompanied by very extensive software which allows you to schedule behaviour 24 hours a day, seven days a week, arming itself when you have forgotten, disarming itself before you wake up.

You can replay any event by just picking out a date on the calendar and choosing it from that day's event list by camera, by time or all of them and just sit back and watch. You can freeze them, have hardcopy, or make a JPEG file for E-mailing to friends, police or anybody.

Whilst you're in the house or the office you can have the assurance that *LookC* will call out the friendly name of the triggers if you want it to over the local loudspeakers. For example, it could say "Someone at the door" or "Someone in the shop" when the

appropriate trigger is activated. All you have to do is type the names you would like *LookC Pro* to announce.

This is the ultimate in security, as the pictures can be on the Internet in an instant, available from any part of the world. I think it is suitable mostly for commercial premises, as the cost, at **£499 plus VAT**, is quite high. However, it certainly does give personal protection and peace of mind and it is difficult to quantify that in money!

I suspect that it could be very high on the list of commercial business premises as a security feature. If you're interested in such a system, get in touch with **Bob Golightly** at **ATM** who will be pleased to arrange an installation!

Fig. 5 shows a picture of the *LookC Pro* Security pack, containing a PCI controller card, an external patch panel, lead, manual and software.

#### APPEAL FOR SOFTWARE

I am not sure how many people still use the Amiga 500+, but I received a call from a **Mr. Hill**, who is looking for some amateur related programs, plus *Navtex*, etc. If you know the source of such programs, please give him a



Fig. 5: The *LookC Pro* Security pack: containing a PCI controller card, an external patch panel, lead, manual and software.



Fig. 6: This year's Norfolk ARS BBQ.



# RadioScene

ring on (01772) 732688. He is not licensed yet, but is quite keen.

## FOURPACK BULLETIN

The latest bulletin received from the Fourpack group tells about the latest node for Worcester - GB7WR which will be sited at Ronkswood. Access for users will be on 144 and 430MHz. A 1296MHz link will provide feed to GB7GLO and a second link is under discussion to link to the DX Cluster in Gloucester. The node will be configured to give automatic routing and will only allow one connect per callsign.

The group are looking for alternative accommodation for meetings and were inundated by volunteers to check out the local hostels for a suitable room. I wonder why!

## NORFOLK MARDLE

Now for some Norfolk 'Mardle' (East Anglian for 'gossip'). The station of GB7TLH which is run by **Dirk Koopman** is closing down the BBS operation but keeping his own Cluster software running under his Node. Users are emigrating to either GB7LDI or GB7VLS.

This year's Norfolk ARS BBQ went very well (see Fig. 6), with **Fred Wyatt VE7PL** and wife **Jean** attending from Victoria, British Columbia. Next event will be on the last Sunday in June 2000, as usual.

*Roger G3LDT*

## BROADCAST

REPORTS & INFORMATION TO ME PLEASE:

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C/O PW EDITORIAL OFFICE  
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IN THIS MONTH'S COLUMN, PETER SHORE FOCUSES MAINLY ON THE NEW WINTER SCHEDULES OF VARIOUS RADIO STATIONS FROM AROUND THE WORLD. HE ALSO BRING YOU

## NEWS ABOUT THE WORLDSpace SATELLITE SYSTEM AND DETAILS OF WHERE YOU CAN RECEIVE DETAILED INFORMATION ON SHORT WAVE TRANSMITTERS, ANTENNAS AND MORE ...

Radio across Africa was revolutionised on the 19 October when the **WorldSpace satellite system** was launched at an event in Johannesburg, South Africa. WorldSpace sent its first satellite into orbit a year ago, but hasn't been able to launch its commercial service until recently because of the lack of receivers and an absence of content - and without these two vital elements, the project cannot succeed.

Originally conceived as a radio service to bring education and information to millions of people in the developing world, WorldSpace is now targeting the more affluent African middle class. It's delivering a range of radio channels including, for example, the output of the Kenyan Broadcasting Corporation, East FM - an Asian station in Kenya - and a number of channels from CNN and Bloomberg. International broadcasters are represented through English and multi-lingual channels provided by World Radio Network.

WorldSpace's satellite signals are transmitted in L-band (1452-1492MHz) and although the footprint is supposed to cover Africa with three beams (East, West and Southern Africa), in reality the signal is well received in northern Europe. Receivers, costing around US\$250, are on sale from four manufacturers - Hitachi, JVC, Panasonic and Sanyo (see Fig.1, Fig. 2 & Fig. 3).

## TRANSMITTER DOCUMENTATION PROJECT

Back on the ground, if you want to know about short wave transmitters, antennas and more, check out the **Transmitter Documentation Project (TDP)**. Run by **Ludo Maes**, a Belgian expert in the field, TDP catalogues just about all the equipment in use by broadcasters around the world and is a unique resource about high

## Web Watch:

TDP Catalogue Web Site: [www.transmitter.org](http://www.transmitter.org)  
Radio Havana Cuba's Web site: [www.radiohc.org](http://www.radiohc.org)

frequency transmission.

For the last few years, TDP information has been available in print. But now, the information is being made available exclusively over the Internet. As Maes says, it's just too expensive to produce and mail the print version. Go to: [www.transmitter.org](http://www.transmitter.org) to connect with everything you always wanted to know about short wave transmitters but were afraid to ask!

What TDP doesn't tell us is which stations around the world are Y2K compliant - and it will be interesting to see if imbedded chips in transmitters and antenna switching devices continue to function after the 1 January 2000. If you're intending to scour the bands at midnight UTC on 31 December 1999 and you discover that a broadcaster suddenly goes off the air, let me know. I'll be offering a special bug-free prize to anyone who can confirm that a broadcaster has not managed to get it right!

I believe that most major broadcasters will have taken care to ensure all their systems are Millennium compliant and that includes Scandinavian broadcasters **Radio Sweden** and **Radio Denmark**. Here are the new schedules from these two stations for the current winter period:

**Radio Sweden in English at (all times are in UTC):**  
1430-1500 on 13.80MHz  
1830-1900 on 6.065 plus 1197MHz medium wave  
2030-2100 on 6.065 plus 1197MHz medium wave  
2230-2300 on 6.065, 7.325 and 1197MHz medium wave

**Radio Denmark, exclusively in Danish, operates (all times are in UTC):**  
0930-0955 on 13.80, 15.175MHz  
1030-1055 on 15.735, 21.49MHz  
1130-1155 on 13.80, 21.49MHz  
1230-1255 on 13.8, 15.735, 18.95, 21.755MHz  
1330-1355 on 9.59, 13.80, 18.95, 21.755MHz  
1430-1455 on 15.705, 18.95MHz  
1530-1555 on 13.80, 15.705, 15.735MHz  
1630-1655 on 13.80, 15.735MHz  
1730-1755 on 7.485, 11.56, 15.705, 18.95MHz

1830-1855 on 5.96, 7.485, 15.705, 18.95MHz  
1930-1955 on 7.485, 9.94, 13.80, 15.705MHz

In the preceding half hour from the top of the hour, **Radio Norway** in Norwegian is on the air. Radio Denmark's use of out-of-band 18.95MHz is interesting. The channel is directed to North America and Greenland - let me know if you receive it well there or elsewhere in the world.

There is a new E-mail address for Radio Denmark: [rdktek@dr.dk](mailto:rdktek@dr.dk)

**Radio Budapest's** winter schedule is as follows (all times are in UTC):  
2000-2030 on 6.625 and 7.165MHz  
2200-2230 on 6.025MHz  
2230-2300 on 3.975MHz  
0200-0230 on 9.835MHz  
0330-0400 on 9.835MHz

**Africa No. 1** in Gabon has French music and news daily on short wave - and a growing number of local f.m. relays in west Africa (all times are in UTC):  
0500-0700 on 9.58MHz  
0700-1600 on 9.58 and 17.63MHz  
1600-2100 on 9.58 and 15.475MHz  
2100-2300 on 9.58MHz

**Radio Havana Cuba** is on the air with English at (all times are in UTC):  
0100-0500 on 6.0, 9.82 and 11.705MHz  
0500-0700 on 9.55, 9.82 and 9.83MHz  
2030-2130 on 13.75MHz  
2230-2330 on 9.55MHz

The station has a Web site: [www.radiohc.org](http://www.radiohc.org) and E-mails can be sent to [rhc@radiohc.org](mailto:rhc@radiohc.org). Traditional mail goes to **Radio Havana Cuba, Box 6240, Havana, Cuba**.

That's all for this year in the 'Broadcast' section of *Practical Wireless*. I hope that you have a wonderful holiday season and enjoy the New Year - compliant or not!

UNTIL NEXT MONTH, GOOD LISTENING - FROM FROM A BUG-FREE COLUMNIST!

*Peter*



Fig. 1: The JVC receiver which will receive WorldSpace satellite signals.



Fig. 2: The Panasonic receiver which will receive WorldSpace satellite signals.



Fig. 3: The Sanyo receiver which will receive WorldSpace satellite signals.





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**BOOK  
of the  
MONTH**

## RSGB Yearbook 2000 Edition

Treat yourself to a copy of the very latest *RSGB Yearbook* for Christmas! It claims to include 60 000 callsigns - both UK and Ireland listings, with every address checked & updated. The 2000 Edition of the *RSGB Yearbook* also contains a 144 page information directory - according to the front page of the Yearbook.

We all know how useful these books are. The *PW* Editorial staff have their very own copy (when they can drag it away from the Editor) here at the *PW* offices and, we're afraid to say, the 2000 Edition is already a 'well-thumbed' copy!

As a special offer this month, the *PW* Book Store are offering the 2000 Edition of the *RSGB Yearbook* for just **£14.50** including P&P (UK only). Orders should be in by New Year's Eve please.

To order please either use the form on page 90 or call the Credit Card Hotline on (01202) 659930 and quote **PW 12**.

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