

THE UK'S BEST SELLING MAGAZINE FOR AMATEUR RADIO ENTHUSIASTS

# practical Wireless

JULY 1994 £1.90

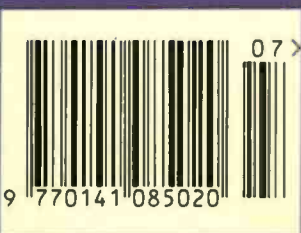
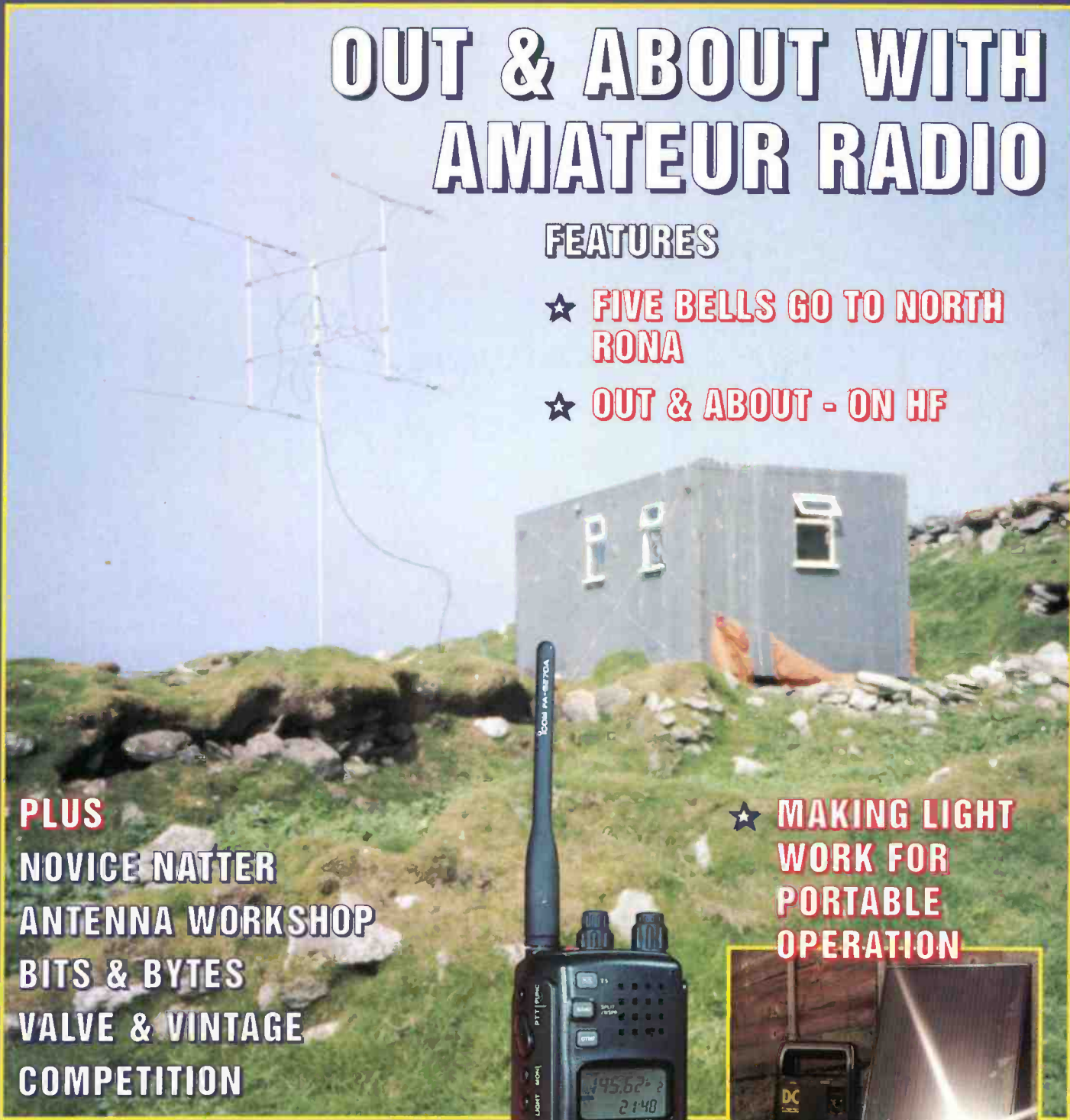
## OUT & ABOUT WITH AMATEUR RADIO

### FEATURES

- ★ FIVE BELLS GO TO NORTH RONA
- ★ OUT & ABOUT - ON HF

PLUS  
 NOVICE NATTER  
 ANTENNA WORKSHOP  
 BITS & BYTES  
 VALVE & VINTAGE  
 COMPETITION

- ★ MAKING LIGHT WORK FOR PORTABLE OPERATION



REVIEWED  
 THE ICOM IC-T21E  
 144MHZ  
 HAND-HELD  
 TRANSCIVER

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**MOBILE PRICES SLASHED**  
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- FT-11R 2M ~~£239~~ **£Phone**
- TH-22E 2M ~~£239~~ **£Phone**

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- TS-850**
- TS-450**
- TS-50**

**ICOM**

- IC-736**
- IC-737**
- IC-707**
- IC-767**

**YAESU**

- FT-1000**
- FT-990**
- FT-890**
- FT-840**

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Pocket VHF/UHF SWR/PWR meter. 144-440MHz (60W) **£34.95** **FREE P&P**



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- (ALL FREE DELIVERY)
- MFJ-259 HF Analyser ..... **£249**
  - MFJ-1786 HF Super Loop **£299**
  - MFJ-921 VHF Matcher..... **£89**

JUST A FEW - FULL RANGE AVAILABLE

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"BEST SELLER" INCL'S:- NICADS/CHARGER ETC. ~~£449~~ **£379**

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THE ULTIMATE! An AR-3000A in a handheld

**£Phone**



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8-1300MHz incl's Nicads/Charger ~~£369~~

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  - TSB-3302 144/70CM, 4.5/7.2dB (1.7M) **£64.95**
  - TSB-3303 144/70, 3/6dB (1.1M) ..... **£39.95**
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  - TSA-6001 Duplexer (+Coax) 2/70 ..... **£24.95**
  - TSA-6003 Duplexer (Sockets) 2/70 ..... **£19.95**
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- \*Converts Mobile to base

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- MT-3302 H/Duty Hatch/Trunk Mnt ..... **£24.95**

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  - CX-401N 4Way (N type) (1kW) ..... **£49.95**
  - CX-201 2Way (SO-239) ..... **£16.95**
  - CX-201N 2Way (N type) ..... **£21.95**
- ALL ABOVE (DC-1GGz RATED)



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  - NB-50R 144MHz (1-5 I/P) 50W O/P ..... **£89.95**
  - NB-100R 144MHz (1-5 I/P) 100W O/P ..... **£129.95**
- ALL LINEARS INCLUDE LOW NOISE GaAs FET PREAMPS

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**SEE YOU AT THE STAFFORD RALLY**

**14 Novice Natter**  
Elaine Richards G4LFM has news of a Novice course, special event stations and QSL collecting.

**20 Review - The Icom IC-T21E 144MHz Hand-Held Transceiver**  
Coiln Redwood G6MXL takes the opportunity to review a newly introduced hand-held transceiver from Icom.



**22 Five Bells Go To North Rona**  
Chris Phillipson G8UJ shares the adventures of the Five Bells Group during their Scottish DXpedition to the island of Rona.

**26 The PW Top Band Tourer Transmitter Receiver**  
Keen constructor Clive Hardy G4SLU shows you how to build a simple



crystal controlled  
1.8MHz  
a.m. rig.

**30 Review - Making Light Work For Portable Operation**  
Tex Swann G1TEX reviews a versatile portable power supply system.

**32 Out And About - On HF**  
Peter Barville G3XJS passes on some tips on how to get the most out of portable h.f. operating.

**33 Simple Indoor Antenna**  
Vic Westmoreland G3HKQ has an idea for a cheap and easy to make h.f. antenna.

**36 "Please Sir - What's Amateur Radio?"**  
Derek Pearson G3ZOM promotes Amateur Radio to the young.

**37 The PW Jubilee 14MHz SSB Mobile Transceiver Part 5**  
The Rev. George Dobbs G3RJV puts the finishing touches to his mobile transceiver.

**41 Equipment Specifications - The Mysteries Explained**  
Ian Poole G3YWX continues with his look at noise factors and figures.

**43 Back To The Drawing Pin Board - A Field Strength Meter**  
Steve Ortmayer G4RAW shows you how to build a meter for measuring the strength of an r.f. field.

**59 Book Reviews**  
Rob Mannion G3XFD reviews two unusual and interesting books.

## Other Regular Features

- |  |                     |
|--|---------------------|
| 68 Advert Index                              | 9 Editor's Keylines |
| 54 Antenna Workshop                          | 50 HF Bands         |
| 59 Arcade - All PW Services under one roof   | 12 News '94         |
| 64 Bargain Basement                          | 53 Packet Panorama  |
| 46 Bits & Bytes - The Computer In Your Shack | 15 Radio Diary      |
| 58 Broadcast Round-Up                        | 10 Receiving You    |
| 16 Club News                                 | 48 Valve & Vintage  |
| 9 Competition                                | 56 VHF Report       |

## Staff

**EDITORIAL & ADVERTISEMENT OFFICES**  
Practical Wireless  
Arrowsmith Court  
Station Approach  
Broadstone  
Dorset BH18 8PW  
(0202) 659910  
(Out-of-hours service by answering machine)

**CREDIT CARD ORDERS**  
(0202) 659930  
(Out-of-hours service by answering machine)  
**FAX** (0202) 659950

**Editor**  
Rob Mannion G3XFD  
**Art Editor**  
Steve Hunt  
**Layouts:** Richard Gale  
**Technical Projects Sub-Editor**  
NG ("Tex") Swann G1TEX  
**Production/News**  
Donna Vincent

**Editorial Assistant**  
Zoë Shortland  
**Advertisement Manager**  
Roger Hall G4TNT  
PO Box 948  
London SW6 2DS  
071-731 6222  
Cellphone (0850) 382666  
**FAX** 071-384 1031

**Advert Sales and Copy (Broadstone Office)**  
Lynn Smith (Sales), Ailsa Turbett (Production)  
(0202) 659920 **FAX** (0202) 659950

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Published on the second Thursday of each month by PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW. Tel: (0202) 659910. Printed in England by Southernprint (Web Offset) Ltd. Distributed by Seymour, Windsor House, 1270 London Road, Norbury, London SW16 4DW. Tel: 081-679 1899. Fax: 081-679 8507. Telex: 8812945. Sole Agents for Australia and New Zealand - Gordon and Gatch (Asia) Ltd., South Africa - Central News Agency. Subscriptions INLAND £22, EUROPE £25, OVERSEAS (by ASP) £27, payable to PRACTICAL WIRELESS, Subscription Department, PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW. Tel: (0202) 659930. PRACTICAL WIRELESS is sold subject to the following conditions, namely that it shall not, without written consent of the publishers first having been given, be lent, re-sold, hired out or otherwise disposed of by way of trade at more than the recommended selling price shown on the cover, and that it shall not be lent, re-sold, hired out or otherwise disposed of in a mutilated condition or in any unauthorised cover by way of Trade, or affixed to or as part of any publication or advertising, literary or pictorial matter whatsoever. *Practical Wireless* is published monthly for \$45 per year by PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW, UK Second Class postage paid at Middlesex, N.J. Postmaster: Send USA address changes to *Practical Wireless*, c/o Permit to post at Hackensack pending. The USPS (United States Postal Service) number for *Practical Wireless* is: 067075.

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MONTH

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HL37V5X	2M Linear, 0.5-5W in 20-35W out variable gain preamp.....	£109	B
HL62V5X	2M Linear, 5/10/25W in 50W out preamp.....	£235	C
HL36U	70cm Linear, 6/10W in 25/30W GaAs FET Preamp.....	£155	B
HL63U	70cms Linear, 10/25W in 50W out GaAs FET Preamp.....	£259	B
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HL130U	70cms Linear, 3/10/25W ip auto select 120W out Rx Preamp.....	£485	C
<b>TRANSVERTORS</b>			
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TSA6001C	144/430 duplexer Nskt - PL259 + N plug.....	£25.50	B
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## MOBILE

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TSM1312	144/430 3.0/5.5dB 50W 0.89m.....	£26.95	B
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price ..... **£314**
- AR8000 New model from  
**AOR** price ..... **£TBA**
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SMC price ..... **£379**
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SMC price ..... **£565**
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SMC price ..... **£355**
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### LOW LOSS COAXIAL CABLE

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Free UR67 Coax with every HF Transceiver

### RECEIVERS HF



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- R5000 SMC price ..... **£899** D
- R71E SMC price ..... **£985** D
- R72E SMC price ..... **£769** D
- FRG100 SMC price ..... **£499** D

\* includes FREE PA11C and PSU worth £39 ★  
Carriage A=£2 B=£5 C=£7.50 D=£12.50 E=£16.50

### HANDHELD



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- FT415 SMC price ..... **£259**
- FT815 SMC price ..... **£299**
- FT811 SMC price ..... **£269**
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IC2GXE SMC price ..... **£220**

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- ICW21ET SMC price ..... **£435**
- TH22 SMC price ..... **£209**
- TH28 SMC price ..... **£265**
- TH48 SMC price ..... **£309**
- TH42 SMC price ..... **£239**
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### VHF BASE & MOBILE



- IC275H SMC price ..... **£1239**
- IC281H SMC price ..... **£359**
- IC3230H SMC price ..... **£529**
- IC2700H SMC price ..... **£739**
- IC820H SMC price ..... **£1699**
- FT736R SMC price ..... **£1449**
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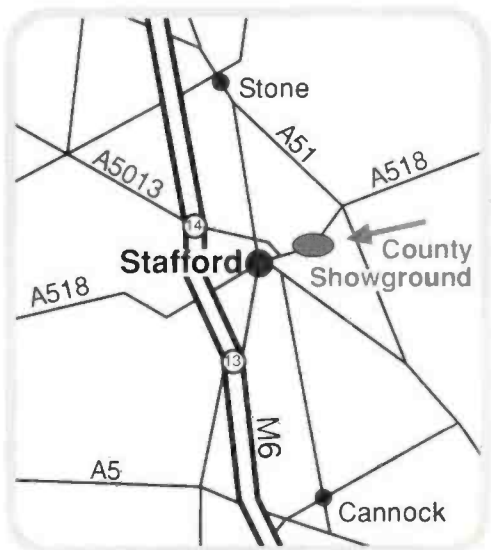


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TM-551E 23cm FM Compact Mobile Transceiver, 70cm Receiver, Packet connector, 10W	P.O.A.	D
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TH-22E 2m FM Hand Portable, 5W output with 9.6V Nicad	P.O.A.	C
TH-42E 70cm FM Hand Portable, 5W output with 9.6V Nicad	P.O.A.	C

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FT-840 100W Compact HF All Mode Transceiver w/MH-1B8 Hand-held Microphone *FM Unit Optional	P.O.A.	D
FT-747 100W Cost-effective HF Transceiver w/Narrow CW filter w/MH-1B8 Hand-held Microphone *FM Unit Optional	P.O.A.	D
FT-650 24/28/50MHz All Mode Transceiver (13.8V DC) w/MH-1B8 Hand-held Microphone	P.O.A.	D
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IC-728 HF All Band, General Coverage Rx, 12v	P.O.A.	D
IC-707 HF All Band, General Coverage Rx, 12v	P.O.A.	D
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IC-275H 2m Transceiver, SSB/FM/CW, 100W 12v	P.O.A.	D
IC-281H 2m FM mobile, 50W 84 memo 12V	P.O.A.	D

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IC-4SRE 70cm FM Hand Portable + Wideband Rx.	P.O.A.	D
IC-4GXE 70cm FM Hand Portable incl Nicad/Charger	P.O.A.	D
IC-4GXET 70cm FM Hand Portable incl Nicad/Charger	P.O.A.	D
IC-481H 70cm FM Mobile, 35W, 2840 Memo, 12v	P.O.A.	D
IC-475H 70cm Transceiver, SSB/FM/CW, 75W, 12v	P.O.A.	D

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IC-W21ET 2m/70cm FM Hand Portable incl Nicad/Charger	P.O.A.	D
IC-X21ET 70/23cm FM Handportable incl Nicad/Charger	P.O.A.	D
IC-3230H 2m/70cm FM Mobile, 45W/35W, 30 Memo, 12V	P.O.A.	D
IC-2700H 2m/70cm FM mobile 50W/35W 120 memo 12V	P.O.A.	D
IC-820H 2M/70cm all mode Transceiver 45W/35W 12V	P.O.A.	D
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IC-R7100 25 - 2000 MHz Receiver	P.O.A.	D
IC-R100 Wideband Receiver	P.O.A.	D
IC-R72E General Coverage Receiver with Stand By Battery	P.O.A.	D
IC-R71E General Coverage Receiver	P.O.A.	D
IC-R1 Handportable Receiver	P.O.A.	C

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IC-UX59 50 MHz Band Unit, 10W	P.O.A.	B
IC-UXS92 144 MHz SSB Band Unit	P.O.A.	B
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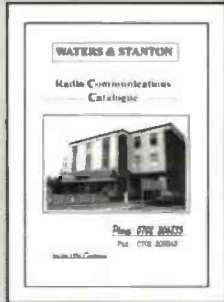
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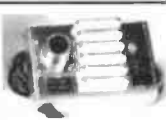
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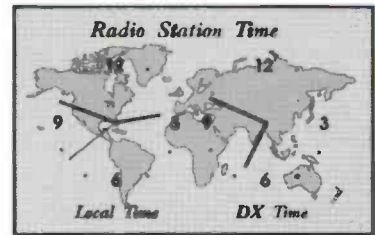


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# EDITOR'S keylines

Workshop' author, Peter Dodd G3LDO, has recently taken up a new job which will not allow him to contribute to *PW* for the foreseeable future.

Hopefully, Peter G3LDO will be able to write for *PW* again when work permits and we look forward to that time. However, in the meantime, the editorial team have come up with an idea. The idea is that we carry on with the popular 'Antenna Workshop' column, but have a team of authors writing on a regular basis during the year.

Our new team of authors, each concentrating on their own particular speciality, will produce one, two or three articles a year. In this way the editorial team feel we can help provide an interesting and varied selection of articles and projects for you the reader.

In the coming months we intend

to bring you a continuing selection of projects, ideas and up-dates on antennas. We also hope to introduce more authors and their work on antennas to you. In this way, together we can share the fascinating world of the antenna whether it be down on 1.8, up on 144MHz or even on the microwave bands.

Club visiting as many as you know, takes a high priority with me. I really enjoy coming to meet the clubs where our friends gather.

The benefits for the Editor of *PW*, visiting clubs are many. Firstly, I get to meet many readers who don't visit shows. I also get to see old friends and make new ones. Primarily however, I get some extremely valuable feed-back on what you think of the magazine and what we can do to provide what you require.

On several recent club visits it

has become obvious that my decision (based I must admit, on space limitations and feed-back from readers) to return 'Packet Panorama' to its former bi-monthly appearances, was a mistake.

During my club visits in different parts of the country, readers have asked that I re-consider my decision and find space for 'Packet Panorama' on a monthly basis.

My mind was made up to try and find space for a monthly helping of 'Packet Panorama' when many of our American readers approached me on the subject at the Dayton HamVention in late April.

So, after discussing the future of packet radio in the magazine, the editorial team agree that we should re-instate 'Packet Panorama' on a monthly basis as soon as possible. This we intend to do from the September issue of *PW*, allowing Roger G3LDI to recover from his 'World Tour' and prepare lots of interesting items for his keen readers.

Regards to you all from the Editorial team and myself.

*Rob Mannion G3XFD*

**A**ntennas and related items are very popular subjects in *PW*. As such, the editorial team regard the publishing of 'Antenna Workshop' and other antenna articles to be of prime importance.

Readers made it very plain in our survey last year that they want more antenna projects and articles. This is what the editorial team intend to do. We do listen!

Bearing in mind what I've just mentioned regarding the subject, it's with regret that our regular and much respected 'Antenna

## COMPETITION CORNER spot the Difference



Worthington our worthy cartoonist has entered the spirit of our theme this month. Hope he's got his 'wavemeter' handy! See if you can spot the differences.

*There are 12 differences to mark on the bottom version of the cartoon this month, good luck.*

### FIRST PRIZE:

A year's subscription to *Practical Wireless* or a £20 book voucher.

### SECOND PRIZE:

A six month subscription to *Practical Wireless* or a £10 book voucher.

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VOUCHER

Entries to reach us by Friday 22 July 1994.

Send your entry (photocopies acceptable with corner flash) to: **Competition Corner, Spot The Difference Competition, July 1994, PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW.** Editor's decision on the winner is final and no correspondence will be entered into.

Name .....

Address .....

.....  
.....  
.....

COMPETITION CORNER  
July 1994

Send your letters to the editorial offices in Broadstone. They must be original, and not duplicated in any other magazine. We reserve the right to edit or shorten any letter. The views expressed in letters are not necessarily those of *Practical Wireless*.

# RECEIVING *you*

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.

## Poorly Served

**Dear Sir**

I agree largely with the contents of the letter written by Bob Taylor G1WEX and published in your April issue.

Newcomers to the hobby of amateur radio are poorly served in the matter of equipment projects in the v.h.f. bands compared with the h.f. user. For the latter, numerous articles appear for receivers, transmitters and transceivers which can be built into very satisfactory equipment. Not only does this allow entry into the h.f. field at a low cost, it is instructive and gives satisfaction to the person who wants to advance their knowledge and to operate equipment which they have made themselves.

Contrast the above position with that facing the newly licensed Class B amateur. They are confronted by a multitude of 'black boxes' and literature which appears to be content to restrict itself to reviews of such equipment. Hence, the new amateur is faced with the prospect of a large capital outlay before he can begin to exploit the limited potential of the v.h.f. bands. An unfortunate outcome of this situation is that an amateur is conditioned to think in terms of purchased equipment. If later he moves into the h.f. bands, he is likely to continue the practice of restricting his activities to operating manufactured equipment.

I would advocate strongly a much increased number of technical articles covering the design and construction of equipment for use in the v.h.f. bands. This can be relatively simple as most amateurs are not concerned with the compactness and complexity of commercial hand-held equipment. They would be perfectly contented with a few watts of r.f. out of a box sitting on their operating bench.

**T. R. Rennie  
Herts**

## Callsigns

**Dear Sir**

May I please comment on GW3KJWs very interesting article in your February issue.

Firstly, calls in the G2, 5 and 6 series were issued at random until June 1936 after which time, all new calls were in the G8 'plus two' series.

At the same time Scotland was assigned the prefix GM (GW for Wales followed a few months later). My callsign G8RF was issued on July 1 1937. The G8 now through to G8WZ, these were G8X, Y or Z calls issued to amateur stations and it has

been suggested that calls in the groups were issued to industrial experimental stations. This may explain the present call G8ZK, noting the QRA of that station. The G8 plus two calls were followed by G3 plus two (my first loggings Boxing Day 1937) and G4 plus two in December 1938 and I think that I am correct in saying that the G4 calls had reached R series by September 1939 (from my log). Calls in the old 2, 5 or 6 series could be issued during the period, but I think one had to ask for an old call! Post-war it was of course, G3 plus three and the next

series was to be M3 plus three we were informed, but as it turned out, in 1970 it was G4 plus three and of course G0.

I note some out of sequence calls in my most recent callbook, e.g. G2OWB, G2WAU plus one or two G4 calls after the R series.

It would be interesting to know when these calls were issued. Finally, as regards EI calls, my only surviving call book (1936) listed just 40 EI stations dotted between E12 - E19, no logic there! So, unless you know differently! 73

**J. R. Raby G8RF  
Staffs**

## Eddystone Receivers

**Dear Sir**

I have to agree with the gentleman about the *PW* special issue on the Eddystone Receivers (John G0AKN). I also like equipment dating from 1930s to the early 1970s, basically anything that uses valves.

I have a small collection of valved equipment, they comprise of my pride and joy, a fully working AVO CT160 Valve Tester, AVO CT38 Multimeter (which I am in the process of mending) and an American Telephone and Telegraph Co. Frequency Meter BC-221-AH.

I would like to see more history of equipment covered by *PW*. Say every two months, you could have a special just on Pye, then two months later Phillips (now the parent company of Pye), then AVO, Storno, Tait, and RCA to name but a few. If these specials could be pulled out then you could file them away for further reference and also include some technical details,

e.g. circuit diagrams and unit (rig) identification, it will help a lot of people who are in the process of restoring equipment from the hey days.

Photocopies of the original manual costs a lot of money from the actual manufacturers, e.g. Pye Westminster W15AM Home Office Motor Cycle Version manual costs £25 for photo copies from Phillips who bought Pye. The manual is only 50 pages of A4, so, as you can see, it is very expensive and incidentally, I only paid £10 for the Westminster.

My second point is I've only been a 2E1 for two years and have been reading *PW* for the same amount of time. I would like to air my view that all practical DIY transceivers seem to be on h.f. Why? As the majority of h.f. users probably have a little black box that they use on a regular basis, I see no point in putting h.f. designs in *PW*. I furthermore say if you replace all the h.f. designs (with all due respect to Rev. Dobbs G3RJV) with 70, 430MHz and 1296MHz DIY designs, you will have all the new Novice and full amateurs more active on these bands. New amateurs are always short of money and cannot afford to buy a cheap handy which are around the £200 mark, never mind affording a base station.

For the people wondering why as a Novice I bought a W15 a.m., I am a radio operator in the Air Training Corps and certain RAF p.m.r. frequencies still use amplitude modulation.

**Mubdi Choudhury 2E1BXW  
Manchester**

**Editor's reply:** There are some interesting v.h.f. projects on the way Mr Choudhury and we hope you'll enjoy the challenge of building your own equipment very soon.

## QSL Cards

**Dear Sir**

I was very interested in the article in your February issue concerning QSL cards which have now become rarities. He mentions the BAOR DL2 callsigns. I was the first British amateur operating in Berlin soon after we entered the city and had the callsign D2AH. As I recall, I used a converted German tank transmitter with very low power. I have a couple of dozen QSL cards, mostly UK, which are, of course, 'one-offs'.

If any collector is interested in having them, a call to (0733) 61521 will save them from the waste paper bin.

All good wishes to you and *PW*.

**Gilbert Davey  
Peterborough**

## 'Old Timers' Stories

Dear Sir

Since recently obtaining my A licence I seem somehow to have gravitated to the 3.5MHz band and consequently I have enjoyed several rag chews with some 'old timers'.

The anecdotes about the 1930s and 40s are a delight to listen to and it occurs to me that this wealth of information and stories about those largely informal days will be lost in the next ten to 20 years.

Is it possible for *PW* or some other able writer to collect some of these wonderful stories and put them together to produce what I believe could be an amusing and informative book?

**R. Seabourne G0UHN**  
Isle of Wight

**Editor's reply:** A good idea Mr Seabourne, let's be hearing from you 'old timers' - we'd love to hear your stories!

## ★ ★ ★ ★ STAR LETTER ★ ★ ★ ★

### Packet Panorama

Dear Sir

I've just read the May issue of *PW* and I noted that 'Keylines' said that 'Packet Panorama' is to appear in alternate issues.

As a regular reader and keen user of packet, I feel that some comments from me are in order to express to you my feelings about the change.

I am surprised that you are reducing the packet content of *PW*. This means that, of the major commercial magazines, only one will now run a regular monthly column about packet. I am surprised that you're letting a competitor get a lead on you by default.

I see that 'Packet Panorama' went from two pages in alternate issues (last appearing in the November 1992 issue), to one page each issue as of the February 1993 issue. This meant that Packet Panorama always had twelve pages each year. The new change, to one page in alternate issues, means that you will only have six pages of packet each year. This is fair enough if G3LDI cannot supply you with enough copy for twelve pages but, given the prominence of packet in the UK, I would expect this to be unlikely.

Please bear in mind there are an estimated 15 000+ packet users in the UK. This equates roughly to a quarter of the amateur population. Surely this must place packet at the top of the popularity list for data comms modes?

If G3LDI is able to supply you with a page of Packet Panorama for each issue, then please reconsider your decision. Please give him a page in **EACH** issue.

Lastly, I must state that this letter consists of my own views as a reader of *PW*. I am not writing in my capacity as secretary of BARTG. On the other hand, I will say that BARTG produces a magazine of 80+ pages of data comms each quarter so I know there is considerable interest in data comms and in packet in particular.

**Ian Brothwell G4EAN**  
Nottingham

**Editor's reply:** Ian's letter sums up his feelings and the thoughts of many others. The editorial team have discussed the decision and we all now agree that 'Packet Panorama' will continue on a monthly basis as from the September 1994 issue. Perhaps in future more Packet users will fill in their questionnaires or keep us informed of what they want in future! I'm sorry my decision caused so much trouble but it was based on feedback from readers.

## Regulations

Dear Sir

Ref: Compliance of DTI/RA Regulations. To comply with the DTI/RA Regulations it is a requirement that licensed radio amateurs carry out station harmonic and frequency tests 'from time to time'.

Over the several years that I have been licensed I have made many enquiries as to exactly how this should be done to comply with these regulations, and when discussing this with other licensed amateurs, it would appear that there are many different interpretations of how this should be done.

For the checking of frequency accuracy, it is commonly accepted that a frequency meter or crystal calibrator is a requirement.

For the checking of harmonics, should the check be made with the absorption wave meter at the radio, somewhere along the feeder, or at the antenna?

In view of these differing opinions, could this be a suitable subject for an article by one of your more knowledgeable contributors?

**Glenn Loake G0GBI**  
Chairman of the Bedford & District ARC  
Bedford

**Editor's reply:** This idea fits into the 'Antenna Workshop' coverage Glenn and I have no doubt that other readers will find it of interest. I have outlaid our future plans for 'Antenna Workshop' in this month's 'Keylines' editorial.

## Licence Fee For Teenager

Dear Sir

Could you explain to me why it is that my 14 year old son who passed his exams and Morse tests to become a full class A amateur and has to pay £15 for his licence.

When a Novice under the age of 21 gets his or her licence free of charge. I think this system of doing things is very unfair indeed. It's not just my son, but countless other youngsters who have worked very hard indeed to obtain their full A or B licence.

My son, like the others I've mentioned, is not old enough to support himself, so I think that the free licence should be extended to all youngsters under the age of 21, not just the privileged Novices.

Please don't think that I'm anti-Novice or anything like that, in fact, I think that it is a great idea and should be encouraged. Well, so should moving up the ranks to become a full class A or B be encouraged and this is one way of doing it. My son's call-sign is GW0ULC if you feel that you need to check this letter out.

**D. P. Kirby GW0PLP**  
Dyfed

### Crystal Set

Dear Sir

Can you please suggest a supplier of a crystal for a crystal radio. A few months ago you suggested Vintage Wireless Co. Ltd. of Bristol but this company is no longer in business and the former proprietor is unable to help.

Thanking you in anticipation.  
**P. P. G. Spencer**  
France

**Editor:** Can anyone help Mr Spencer?

Send in your news, photographs and product information to Donna Vincent at the editorial offices in Broadstone.

# NEWS

## '94

Partners at home and in amateur radio. Clarice Saunders G0TVS with her husband Stanley G7AET, pay tribute to everyone who helped introduce them to the hobby.

### Saunders Success

Despite all sorts of obstacles, Clarice Saunders is now G0TVS. Following her success, this determined lady wants to pay tribute to her friends in amateur radio and also encourage others to persevere. So, it's over to you Clarice:

"I became a radio amateur purely by accident. It started when my husband, Stanley said 'I want to be a radio amateur'. I replied "amateur radio...whatever's that"? Patiently, Stanley tried to explain, but I didn't really understand.

So, we explored the possibility of attending evening classes and found a class at the local College. I found it very difficult to understand, let alone take notes, and I must admit that I fell asleep several times!

Stanley plodded on, but unfortunately was unable to sit the exam owing to illness. Also at that time we decided to retire from our farm in Oxford and move to Christchurch. Stanley's inter-

est was rekindled by meeting several radio amateurs in the area. They informed us that RAE classes were being held at Poole Logic's shop, in nearby Poole.

We went along one Friday evening to try and find out more about the classes, where we met Paul G1CSC, who was just starting a new class. Paul said "Come along then, you might as well have a go". As we walked through the door I realised that I was the only female in a class of about 20!



A month later I went to the Clayesmore Morse Festival weekend on the 27th March 1993 to take the test. I failed again but it was here that I met G3XFD and his friend John Goodall G0SKR.

With G3XFD's encouragement and John's stories of how he became a radio amateur to inspire me, we carried on. At this time, I had the privilege of speaking to Roy Clayton G4SSH, the Chief Morse Test Examiner, who also encouraged me to keep trying.

Vernon G2DYY told me that when he was learning the Morse code (he had just got his late father's callsign), he had been greatly helped by a friend Gerald G0JIC. Gerald had heard how disheartened I was and said he would like to help me if I was willing and I immediately took up his offer.

In the middle of June I took the Morse test again and this time passed. So, here I am with my chosen callsign G0TVS. I'm really grateful to Gerald and his wife Sheila for all the kind help, together they make a wonderful team.

Also, I must thank Norman G0TMZ, who had just got his A licence and helped with extra lessons. Also, I mustn't forget Les G4XGC and his wife Barbara G0TND for their continued support.

We have made many new friends who have shown us such kindness and care it has been overwhelming. Stanley and I are looking forward to meeting them on the air with both 'phone and c.w. And, Stanley is now beginning to learn the code!

All this from a lady who had originally said "amateur radio... whatever's that"?

**The PW team wish Clarice and Stanley every continued success with their pursuits in Amateur Radio.**

### Youngest Honorary Member?



**There's not much happening on the bands so I think I'll have a nap.**

The Guildford & District Radio Society has awarded five week old Steven Croucher Honorary Membership of the club. Steven's parents Peter G4YPC and Ruth G0NRJ met at the Guildford Club. They got married in 1991 when Peter was Chairman and Ruth Secretary, and the wedding almost turned into

a club activity, with over 30 members attending.

Steven is shown in the photograph aged only three days, trying to grasp an understanding of how the p.t.t. works. Peter and Ruth hope to encourage Steven to be one of the youngest Novice Licencees as he grows older.

Stanley passed the RAE exam at the first attempt and was issued the callsign G7AET. Unfortunately, due to the pressures of organising our new home, I failed, but persevered and finally passed at my second attempt, gaining the callsign G7BKS.

Together we joined the local radio club at Christchurch. Then some of the other members suggested that I should now learn Morse code.

So, using all the methods available to me, including books, tapes, Morse tutor, etc., I began to learn the code. To my surprise, I began to enjoy it and wanted to take the test.

Although I failed, I must at this point thank the test examiner Stewart Dade G3HJZ who was sympathetic and considerate. It was this and later experiences that made me all the more determined to go on.

## Prize Winners



**Lucky winner Jan GOLUT with his prize SG-2000, his XYL Gaby and PW's Editor Rob Mannion G3XFD.**

Mr Jan Lutterot GOLUT from Bristol was the lucky winner of the SGC Special Prize Competition which *PW* ran in the October to December 1993 issues.

Jan and his wife Gaby were recently invited to the *PW* editorial offices to collect Jan's prize of the SGC SG-2000 h.f. mobile transceiver and to meet the team. Jan has since informed *PW* that he is busy reading through the SG-2000 handbook and says he has noticed a subtle difference between the SG-2000 and his 26 year old Yaesu FT-101!

The second and third prize winners of the SGC competition were **David Smith G1FYX** from Lancashire who won the Jones Morse Key and **A. K. Whillock G4ZLX** who will receive *PW* free for two years with his prize subscription.

The *Practical Wireless* editorial team would like to congratulate all three winners and express thanks to every reader who took the time and trouble to enter the competition.

## International QRP Day

International QRP day is to be held on June 17 this year. To coincide with this event GB2SM, based at the Science Museum, Kensington, London will run at internationally accepted QRP power levels over the weekend July 17 - 19th 1994.

The station will be operational at QRP power levels from 1100 to 1600 on Friday June 17 and will concentrate on the 7 and 14MHz bands. Over the Saturday and Sunday (18th & 19th) the GB2SM station will be operational at the same times as on the Friday but the emphasis will be shifted to the 3.5, 21 and 430MHz bands.

Morse and 'phone operation will also be taking place if conditions allow.

Friday June 17 is an under '9s' day at the Science Museum and so it is hoped to be able to place a great deal of emphasis on the Novice Licence scheme.

## Amateur Software Callbook

The first UK Amateur Radio Callbook has been produced for the PC by G0LOV & G4LUE Amateur Software. The data for the callbook was purchased in April from the Radiocommunications Agency and is therefore very up-to-date.

The UK callbook is supplied on 3 x 1.44 3.5in disks and requires DOS 3.1 or above and 15Mb of hard disk space to run. The program is simple to install and use, is menu driven and can be used to carry out searches on addresses, post-codes and towns. Also contained on the program is UK repeater data, a nodes list and Packet mailboxes.

If you would like a copy of the UK Amateur Radio Callbook for the PC it will cost you £11.50 including P&P and is available from **J. Bailey, 8 Hild Avenue, Cudworth, Barnsley, South Yorkshire S72 8RN.**

## Oops - PW Leaps Forwards

The Editorial pen unfortunately slipped again in the June issue of *PW*.

The volume number that appears at the head of the contents page jumped forward by one making the volume number 71, when it should in fact read 70 (we like to work ahead, but not that far!). The Editorial team apologises for any inconvenience caused by this slip up.

## Fun Day

The RAF Sealand Radio Club GW4RAF is holding a Fun Day on June 26 1994 to celebrate its 70th Anniversary. The club will be setting up under canvas on RAF Sealand's airfield to operate the Special Event Callsign GB2RAF.

The RAF Club Station GB2RAF will be operational on h.f and v.h.f and 50MHz from early morning on June 26 and possibly during the evening of the 25th. All equipment for use on the day has been donated or loaned by suppliers. Special QSL cards have been produced for the event and will be available through the bureau only.

During the Fun Day there will be plenty of attractions to suit the whole family including the first flying display to take place at RAF Sealand since 1983.

For more information about the RAF Sealand Fun Day '94 contact **Sqn. Ldr. Peter O'Connell** on (0244) 288331 Ext. 7572.

## Club Security

With vandalism on the increase, many people are looking for extra security for their premises. This also applies to radio shacks and club premises.

The ultimate in security protection is Closed Circuit Television (CCTV). A complete CCTV system comprising of monitors, video recorders and operating staff can be very expensive and impractical for premises such as club houses and shacks. However, Albion Security Products (ASP) have developed the **Crimestopper**. Designed as an effective deterrent against theft Crimestopper costs a fraction of the price.

The Crimestopper range of dummy CCTV cameras has been designed for use with warning signs to advertise that your property is protected and hopefully discourage the potential thief, causing him/her to move on. Each Crimestopper CCTV camera is identical to a real camera, has a high intensity flashing light, adjustable wall mounting bracket and ASP say they can be installed in minutes.

For more information on the Crimestopper range contact **Albion Security Products, Unit 3, The Townsend Centre, Blackburn Road, Houghton Regis, Bedfordshire LU5 5BG. Tel: (0525) 378649.**



## Cushcraft Antenna Dealership

The *PW* Newsdesk has recently received the news that Waters & Stanton Electronics of Essex have been appointed sole distributors in the UK for the Cushcraft range of h.f. and v.h.f. antennas and beams.

The dealership appointment was made at the recent Dayton HamVention, Ohio, USA. During the HamVention several new and revised antenna models were announced by the Cushcraft Corporation, and these will form part of the range that Waters & Stanton Electronics will be handling.

A copy of the latest Cushcraft catalogue is available to dealers and customers from **Waters & Stanton, Spa House, 22 Main Road, Hockley, Essex SS5 4QS. Tel: (0702) 206835/204965.**

# NOVICE *natter*

*In this month's Novice Natter, Elaine Richards G4LFM looks at Special Event Stations and QSL collecting but starts off with news of a Novice Course.*

**Elaine Richards G4LFM, PO Box 1863,  
Ringwood, Hants BH24 3XD.**

**Michael Stott GONEE** has dropped me a line to tell me about a Novice Course that is being run at the Science Museum in Blandford Street, Newcastle. It's a 10 week course aiming for the exam - don't worry, Michael says there's a good, cheap restaurant in the Museum!

The course runs each Saturday, starting at 10am, for three hours. If you're concerned that you may not be able to concentrate without food for that length of time - don't worry, Michael says there's a good, cheap restaurant in the Museum!

If you're interested in attending the course, contact Michael on **(0661) 832020** or send an s.a.e. to **Wellview, 12 Castle View, Ovingham on Tyne, Northumberland NE42 6AT.**

## Special Event Stations

Before I give you the details on a Special Event Station I've been sent, I thought I would take a look at exactly what Special Event Stations are and why people run them. The why part of the question can be a little hard to answer even after I've helped with a couple of them.

Special Event Stations tend to be very hard work before, during and after the day in question and sometimes you wonder if it was ever worth it! Usually people put on Special Event Stations from some kind of public event so that they can demonstrate to the public at large what amateur radio is all about.

Of course, it's also a chance to get on the air with an unusual callsign and often with gear you haven't got access to at home or perhaps with better antennas. The organisers of the event will often get an appropriate callsign such as **GB8VBP** - for Verwood Brownie Pack during Thinking Day on the Air or **GB3RN** for the Royal Navy stations, often operated by the

Royal Naval Amateur Radio Society. Also, someone has usually organised special QSL cards to be printed and these get sent out to every contact made.

## Making It Work

Once all the gear has been transported to the venue, then the fun of making it all function begins. Once the event opens to the public, that's when the hard work really starts.

There are always people watching what is going on and they often ask questions like 'Oh, Ham radio, that's like CB isn't it?' The difficulty is trying to explain what amateur radio is all about in two minutes before they get bored and wander away.

Filling in all the QSL cards is hard work too, as there can be a lot of cards to send out. If you have a station that has been set up in an usual location as well then that can often make it more attractive to QSL card hunters and DXers.

If you get a chance to become involved with a Special Event Station - and they're very popular during the summer months - then do so. They're often hard work but can be very rewarding.

I worked with a local Brownie pack for several years during Thinking Day on the Air. It's great to see young girls (between seven and nine years of age) holding a QSO and then meticulously filling out a QSL card - often hand drawn and coloured, striving for their communicator badge.

**Robert Aley 2E1AXZ** from Cambridgeshire has written with details of a Special Event Station. On July 3, **GB4NWC**

(**Neale-Wade College**) is being run for the second year at the Neale-Wade Community College in March, Cambridgeshire.

**Robert and John Hammond G0FLP** are organising it and they have several aims for the station. These are: (a) to promote amateur radio in the community, (b) to help the schools PTA raise money during their summer fayre to buy equipment for the school, (c) to recruit new students for their Novice course and (d) to spend a whole day operating without anyone moaning!

They will be using a variety of bands from h.f. to v.h.f. and u.h.f. using c.w., 'phone and packet. So, if you hear **GB4NWC** on the air - talk to them, it could be one of their newly licensed Novices on the air and a few more contacts will do wonders for their confidence. I hope the day goes really well.

## QSL Cards

I've had another couple of letters this month about QSL cards. **Philip Smith 2E1CRW** wrote saying that when stations are sending QSL cards back to short wave listeners, if they don't note down the full details of the QSO - i.e. both stations call signs who took part in the QSO that the listener heard, then that card isn't valid for any awards.

Philip's news was something I wasn't aware of, mainly because I've never tried to go for any awards. But I would like to hear details of what awards are available at the moment, especially if there are any set up for the Novice in particular.

I've also heard from **Wolf**

**Harranth OE1WHC** who is the curator of the QSL Collection. This is a voluntary organisation who collect and file QSL cards from all over the world.

The QSL Collection has more than half a million QSL cards on file at the moment but they don't have any UK Novice QSL cards. They aren't looking for blank cards, but ones that record a real QSO between stations.

You can send them a duplicate card written out to their listener station **OE1-000QSL**. You can either send your cards via the bureau or direct to: **QSL Collection, c/o Radio Osterreich International, A-1136 Wien, Austria.**

## On Offer

I've recently received a note from **Mr Henshels** in Nantwich who says he has a spare copy of *Out of Thin Air* available if someone in his locality wants it. I can't recommend the book enough and they're hard to come by as it's out of print at the moment. If you're interested, please drop me a line with your name and address and I'll forward them onto Mr Henshels so he can draw one out of a hat.

Also many thanks to **Bob Jackson** in Canterbury who wrote with the offer of some equipment to help out 16-year-old **Owen Dewberry**. I've put the two of them in touch.

I've also been able to put 15-year old **Stuart Andrew 2M1BCA** in touch with **Michael Rowntree** who had the short wave radio on offer. Stuart goes to Paisley Grammar School and they have recently started up a radio club but have a severe shortage of equipment. If anyone else has any equipment you think the school could use, please drop me a line. I've sent Stuart the Wood & Douglas 50MHz pre-amp I mentioned in the May issue, so hopefully it won't be too long before the club is up and running.





Fig. 1: A FAX picture decoded by John Smith using the JVFAX program (see text).

## Loose Ends

Noel Moore wrote to me with a useful tip. He got fed up with pulling out the soldering iron plug, only to find out it was actually the computer plug - again! So he's labelled all the 13A plugs in the shack with sticky labels which should stop that problem happening any more.

So far, I've sent out nearly 100 copies of JVFAX - to destinations all over the UK as well as the USA and Canada! I was pleased to hear back from John Smith in Co. Carlow, Ireland with details as to how he got on. He built the comparator from the details on the disk and then using his Sangean ATS-893A with the internal antenna fully extended and his Epson PC AX3 running at 25MHz he managed to hear and decode FAX signals that ranged from poor to very good results. The picture shown here in Fig. 1 was decoded at 1447 on April 1.

John hasn't had any luck with SSTV yet, but it's early days. You could try listening around 14.230MHz or perhaps 7.040 and 21.340MHz especially on Sunday mornings - often from about 10am onwards.

Philip Smith raised an interesting point in his letter, why is it that Novice Licensees under the age of 21 don't have

to pay for their licence but those over 65 do? Whilst Philip appreciates that the Novice licence was primarily set up to attract the youngster he feels that perhaps the encouragement could be extended to those on State pensions.

## Answers and Winners

Next the answer to last month's language teaser, **Terima Kaseh untok QSO** says **Thank you for your QSL in Malay**. I'll announce the winner next month.

Finally, I've picked a winner for the Scanmaster stand and it's Robert Aley from March. I had several really good replies, so I'll try grovelling to the Editor and see if I can rustle up some runners-up prizes for R.T. Irish, Andrew Longdon, N. Tree and Noel Moore (six month subscriptions to **Practical Wireless** go to all four runners-up. Ed.).

That's all the space I'm allowed to fill for now, next month I'll have another technical competition and I want to start looking at some of the amateur radio organisations you can join.

*Elaine G4LFM*



## Radio Diary

**\*June 12:** The Elvaston Castle National Radio Rally will be held at the showground of the Elvaston Castle Country Park, situated five miles south east of Derby. This is the 25th Radio rally and should be the most spectacular to date. **Keith Ellis G1ZLQ** on (0332) 662896.

**June 12:** The Royal Navy Amateur Radio Society is holding its annual rally on the sports field HMS *Collingwood*, Fareham, Hants between 10am and 5pm on Sunday. This site, with its easy road access and good car parking, is a splendid successor to the previous venue. Trade stands, Bring & Buy, flea market, local repeater and radio clubs and also a large arts and crafts exhibition. There's a full range of entertainment for all the family along with refreshments. Talk-in on 144 and 432MHz to guide visitors from the nearby M27 (leave at junction 11 and follow the A27 towards Fareham). **Clive Kidd G3YTQ** on (0705) 3327621 daytime or (0329) 234143 evenings.

**June 19:** Denby Dale & DARS Annual Mobile Rally will be held at Shelley High School. **Phil G4FSQ** on (0484) 644827.

**June 19:** The 5th Belfast Radio Rally is to be held in the Chimney Corner Hotel, 630 Antrim Road, Glengormley. Starting at 12noon, there will be a Bring & Buy, the usual trade stands and attractions, with a chance to have a drink or a meal in the hotel restaurant. Entrance fee is £1, accompanied children only 50p each. **D. Caldwell** on (0232) 471370.

**June 19:** The Newbury and District Amateur Radio Society are holding a car boot sale at Acland Hall, Cold Ash, Nr. Thatcham, Nr. Newbury, 9am to 3pm, free admission and parking, talk-in GB4NBS S22. For more information contact **George** on (0488) 682814.

**\*June 24-26:** Ham Radio '94 Friedrichshafen, Germany. The largest amateur radio show in Europe and well worth a visit. The Flea Market alone is worth the journey and Friedrichshafen, situated on the Bodensee - Lake Constance to the English - and within easy reach of Austria and Switzerland, is a fantastic area for a holiday.

**June 25 & 26:** The Wrexham ARS Mobile Rally and Boot Sale together with Shropshire Astronomical Society's Star Party is being held in conjunction with the Clwyd Veteran and Vintage Machinery Society's 18th Annual Steam Rally at the Plassey, Eyrton, Nr. Wrexham. Doors open 10am to 5pm. **Ian Wright GW1MVL** on (0978) 845858.

**\*June 26:** The 37th Longleat Amateur Radio Rally is being held at Longleat House, Warminster, Wiltshire. £2.50 admission for adults, £1.50 for pensioners and 50p for children. There will be a large trade show with 180 stands, a large Bring & Buy, and craft fair. **Shaun O'Sullivan GBVPG** on (0272) 860422 (office hours) or (0225) 873098.

**June 26:** The Norfolk Raynet Barford Rally will be held at the Village Hall, Barford on B1108 Norwich-Watton Road. Doors open 10am, there will be trade stands, a raffle and refreshments. Free car parking and talk-in on S22. Further details from **Bill G4TWT, QTHR**, (0603) 427008.

**\*July 23:** HAMfest-UK. A new event for Amateur radio, s.w.I. and computer enthusiasts will be held at The County Showground, Weston Road, Stafford off junction 14 M6. Large trade presence, free parking, lectures, Bring & Buy, special interest groups, Morse testing and flea market. (0923) 893929.

**July 3:** The 5th York Radio Rally will be held in the Tattersall Building, York Racecourse, Knavesmire, York. Doors open 10.30am, admission £1. Ample free parking, amateur radio, electronics and computers, arts and craft, Morse tests, licensed bar and cafe, talk-in on S22. **Dave Moreland G7FGA** on (0904) 790079.

**\*July 9:** The Cornish Radio Amateur Club are holding their annual rally at Penair School, Truro. Doors open at 10.30am. There will be an official Morse test (by R5GB), hot snacks, free parking and talk-in on S22. **Ted Kier G1DTA** on (0872) 222605.

**July 10:** The Horncastle Amateur Radio, Electronics and Computer Fair is being held halfway between Lincoln and Skegness. The venue will be signposted from the main roads that come from Boston, Louth, Skegness and Lincoln. There will be a large sports hall with traders from all over Britain, free parking, Bring & Buy, Talk-in on S22. Still only £1 entry, same as the last three years. **Tony Nightingale G6CZV** on (0507) 522482 or packet message to **G6CZV @ GB7LNX**.

**July 10:** The Sussex Amateur Radio and Computer Fair will be held at the Brighton Race Course. Doors open 10.30am to 4pm. There will be trade stands, a Bring & Buy stall, picnic area and refreshments, car parking and a free shuttle to Brighton sea front. **R. C. Gornall G7DME** on (0273) 501100.

**July 17:** The 11th McMichael Rally and Car Boot Sale will be held at the Haymill Youth and Community Centre, Burnham Lane, Slough (near Burnham railway station). The event starts at 10.30am, admission is £1.50. There will be free parking on the site and a talk-in is available on S22. **Neil G0SVN** or **Roy G4XYN** on (0628) 25952.

**July 24:** Colchester Radio Amateurs will be holding their 26th Radio & Computer Rally (including car boot sale) at St Helena School, Colchester. **G3FJJ** on (0206) 851189.

**July 24:** The 1st Humber Bridge Amateur Radio Rally is being held at the Freightliner Exhibition Centre. Easy access off the M62, one mile from the Bridge on the Clive Sullivan Way, 2nd exit. Doors open at 11am (10.30am for disabled visitors). There will be a Bring & Buy, refreshments and a talk-in on GB1HBR. There is parking for over 700 cars. **R. Towler, Secretary** on (0482) 837042.

**July 31:** The Rugby Amateur Transmitting Society are holding their 6th Annual Amateur Radio Rally at the BP Truckstop on the A5, 3 miles east of Rugby and just 4km north-west from Junction 18 of the M1 motorway. Doors open at 10am, admission is £1 per car and facilities include a good cafeteria and toilets. Talk-in on S22 by **GB6CBS**. **Peter** on (0455) 552449.

\* Practical Wireless & Short Wave Magazine in attendance.

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

# CLUB news

## Avon

**City Of Bristol Group.** Last Tuesdays, 7pm. New Friends Hall, Purdown, Bell Hill, Stapleton, Bristol BS16 1BG. June 21 - Home-brew Transceivers, 26th - Longleat Rally. **Dave Bailey G4NKT** on (0272) 672124.

**North Bristol ARC.** Fridays, 7pm. Self Help Enterprise, 7 Braemar Crescent, Northville, Bristol. RAE & Morse tuition available for members. June 10th - The Latest In Kits, 17th - Relax & Chat, 25th - Home Constructor's Boast. **Tony G4ROX** on (0272) 513573.

**Shirehampton ARC.** Fridays, June 17 - Longleat Rally Preparations, 26th - Longleat Rally. **Ron Ford** on (0272) 770504.

**South Bristol ARC.** Wednesdays, 7.30pm. Whitchurch Folkhouse Association, Bridge Farm House, East Dundry Road, Whitchurch, Avon BS14 0LN. June 15 - Test Your Absorption Wavemeter, 22nd - Preparation For The Longleat Rally, 26th - Longleat Rally, 29th - Home Construction (Judging) For Trophy, July 6 - 10 Metres Activity Evening, 13th - DIY Crystal Set. (0275) 834282.

## Bedfordshire

**Shefford & DARS.** Thursdays, 8pm. Church Hall, Amphil Road, Shefford, Bedfordshire. June 16 - VHF NFD Planning, 30th - Pedestrian DF Hunt And Final Planning For VHF NFD, July 14 - Barbecue. **Paul G1GSN** on (0462) 700618.

## Berkshire

**Maidenhead & DARC.** The Red Cross Hall, The Crescent, Maidenhead, 7.45pm. June 21 - 2m Fox Hunt, July 2/3 - VHF Field Day At Coombe Hill, 7th - Mellish Reef DXpedition by John G3WGV. **Neil G8XYN** on (0628) 25952.

## Buckinghamshire

**Aylesbury Vale RS.** 1st & 3rd Wednesdays, 8pm. Village Hall at Hardwick. June 15 - Discussion Evening, July 6 - RAIBC by Shirley Ray. **Martyn G4XZJ** on (0296) 81097.

## Cheshire

**Stockport RS.** 2nd & 4th Wednesdays, 7.45pm. Room 14, Dialstone Centre, Lisburne Lane, Offerton, Stockport, Cheshire. June 10 - A Beginners View of TCP/IP by G0UDC. **Jim France G3KAF** on 061-439 4952.

## Clwyd

**Wrexham ARS.** Maesgwyn Community Centre, Maesgwyn Road, Wrexham. June 21 - Rally Final Preparations, 25/26th - Wrexham ARS Mobile Rally. **Ian Wright GW1MVL** on (0978) 845858.

## Derbyshire

**Buxton Radio Amateurs.** Lee Wood Hotel, Buxton, 8pm. June 14 - Quiz Night, 28th - Night On The Air, July 12 - Bring & Buy Sale & JOTA Discussion. **Derek Carson G4IHO** on (0298) 25506.

**Erewash Valley ARG.** Thursdays, 8.30pm. The Ancient Druid Public House, Cotmanhay Road, Ilkeston. June 30 - Talk On WAB by Kate G0FEZ. **Graham Beech G0KBN** on (0602) 327540.

## Devon

**Appledore & DARC (Devon).** 3rd Mondays, 7.30pm. Appledore Football Clubroom. June 20 - Talk On Microwave Techniques by Bill James G6XM. **Reg Lyddon G4ETJ, QTHR** on (0237) 477301.

**Exeter ARS.** 2nd Mondays, 8pm. The Moose International Centre, Blackboy Road, Exeter. June 13 - Surplus Sale, July 11 - Ians Talk. **Ray Donno** on (0392) 78710.

**Plymouth RC.** Tuesdays, 6.30pm RAE class, 7.30pm Morse class, 8pm club activities. (As from June for the summer, meetings will be fortnightly). The Basement, The Royal Fleet Club, Devonport. June 21 - Business Meeting (PRC Rally Facts) Natter Night. **F. P. Russell G7LUL, G3 Fleet Street, Keyham, Plymouth PL2 2BU** on (0752) 563222.

**Torbay ARS.** Fridays, 7.30pm. ECC Social Club, Highweek, Newton Abbot. June 17 - Monthly Meeting, July 3/4 - VHF Field Day At Haldon Forest. **W. Hipwell G3HTX** on (0803) 526762.

## Dorset

**Dorset Police ARS.** The Dorset Police ARS will now be holding regular monthly meetings, at Force HQ on the first and third Thursdays of every month, at 7.30pm. Membership is open to Police Officers, serving and retired, civilian employees, Special Constables and their immediate family. The club welcomes contact from other local clubs. June 16 - The 2nd Annual DPARS BBQ, 19th - PW VHF Low Power Contest, 26th - Longleat Rally, July 3 - VHF Field Day (continued into the 4th), 7th - Visit To Rampisham. Further info from **PC915 Richard Newton at Ferndown Police Station** on (0202) 229351 or (0202) 229342.

## East Sussex

**Crowborough & DARS.** Thursdays, 8pm. Plough & Horses, Crowborough. June 23 - Microwave by Tim G4GVV. **Michael Smith G6UUO** on (0892) 661807.

**Southdown ARS.** 1st Mondays, 7.30pm. Main Hall of the Chaseley Home for Disabled Ex-Servicemen, South Cliff, Eastbourne. Wednesdays (Morse) & Fridays (Novice & RAE), 7.30pm at the clubrooms, Hailsham Leisure Centre, Vicarage Road, Hailsham. July 4 - Club Barbecue At Polgate Windmill. **Bob Fox G7LHX** on (0323) 484282 or G7LHX @ GB7HAS.

## Essex

**Braintree & DARS.** 1st & 3rd Mondays, 8pm. The Clubhouse, Braintree Hockey Club, Church Street, Bocking. June 13 - Club Net - S15 0 145.375MHz - 8pm Local Time, 20th - The Informative Use Of Packet Radio, 27th - Club Net - S15 145.375MHz - 8pm Local Time, July 4 - RAC Rally Car & Video, 11th - Club Net S15 - 145.375MHz - 8pm Local Time. **J. F. Button G1WQQ c/o G4JXG, 88 Coldnailhurst Avenue, Braintree, Essex CM7 5PY** or **Publicity Secretary** on (0376) 327431.

**Colchester RA.** Colchester Institute, Sheepen Road, Colchester. June 16 - RLO And The RSGB by Malcom G3XVV, 30th - Rally Planning by Richard G7BIV, July 14 - Top Band Radio Direction Finding by Philip G0NXH. **Trevor Bradbeer G0URJ** on (0206) 764034.

## Grampian Region

**Aberdeen ARS.** Fridays, 8pm. Queen Mother House, Aberdeen. June 10th - Junk Sale, 17th - 'Wet String' Listening Competition - Round 4, 24th - Fox Hunt, July 1 - Junk Sale, 8th - Building The Yearling - Part 4. **Gordon Stuart GM7PXW** on (0224) 780591.

## Greater London

**Cray Valley RS.** 1st & 3rd Thursdays, 8pm. Progress Hall, Admiral Seymour Road, Eltham SE9. July 7 - Meet The Members '94. **Bob Treacher** on 081-850 1386.

**Crystal Palace & DRC.** 3rd Saturdays, 7.30pm. All Saints Parish Rooms, Beulah Hill, London SE19 (opposite junction with Grange Road). June 18 - Electromagnetic Compatibility. **Wilf Taylor G3DSC** on 081-699 5732 or **Bob Burns G300U** on (0737) 552170.

## Gwent

**Newport ARS.** Mondays, 7pm. Brynglas House, Brynglas Road, Newport. June 11 - General Meeting For Next Island Trip, July 4 - Talk by John Case GW4HWR On PCB Design, 11th - General Meeting. **Pat Pearl GW7MVQ** on (0633) 250017.

## Gwynedd

**Dragon ARC.** 1st & 3rd Mondays, 7.30pm. Four Crosses Hotel, Menai Bridge. June 20 - Demonstration Of The New Amateur Television Repeater by John Lawrence GW3JGA, July 4 - Sale Of Surplus Equipment. **Tony Rees GW0FMQ** on (0248) 600963.

**Porthmadog & DARS.** 3rd Thursdays, 8pm. Harbour Cafe, Ffestiniog Railway, Porthmadog. June 16 - Quiz Night. **Pat Vernalis** (0766) 770546.

## Hampshire

**Andover RAC.** 1st & 3rd Tuesdays, 7pm. Wildern Village Hall. June 21 - Planning For VHF Field Day. **G8ALR** (0264) 773547.

**Basingstoke ARC.** 1st Mondays, 7.30pm. Forest Ring Community Centre, Sycamore Way, Winklebury, Basingstoke. June 26 - 2m Direction Finding Competition: DS185 - Fox Clive G4ODM, July 4 - The Secret Listeners (WW2 Radio Monitoring) by Brian Cannon G8DIU (0256) 25517.

**Farnborough & DRS.** 2nd & 4th Wednesdays, 8pm. Farnborough Community Centre, Meudon Avenue, Farnborough, Hants. June 22 - VHF Field Day Preview & HF Post Mortem. **G8ATK** on (0252) 715765.

**Horndean & DARC.** 1st Thursdays, 7.30pm. Horndean Community School, Barton Cross (off Catherine Lane), Horndean, Hants. July 7 - History Of The Nab Tower by Bernard Green. **Stuart Swain G0FYX** on (0705) 472846.

**Itchen Valley RC.** 2nd & 4th Fridays, 7.30pm. Scout Hut, Brickfield Lane, Chandlers Ford. June 10 - Amateur Radio Astronomy by John Smith. June 10 - Amateur Radio Astronomy by John Smith, 24th - SAREX, The Shuttle Amateur Radio Experiment From Doug Loughmiller K/G0SYX who is ex AMSAT, North America. **Les Kennard G3ABA** on (0703) 732997.

## Hereford & Worcester

**Bromsgrove ARS.** 2nd & 4th Tuesdays, 8pm. Lickey End Social Club, Alcester Road, Burcot, Bromsgrove. June 14 - Construction Competition - 80m RX, 28th - Antenna Construction (2m DF), July 12 -

144MHz DF Hunt. **Mr B. Taylor G0TPG** on (0527) 542266.

**Dacorum AR & TS.** 1st (informal) & 3rd (formal) Tuesdays, 8pm. The Heath Park, Cotterells, Hemel Hempstead. June 21 - 1994 2m Treasure Hunt, July 5 - Construction Of 144MHz Fox Hunt Antennas. **Nicholas Camp G7KFO, 48 Northfield Road, Harpenden, Herts AL5 5HZ.**

**Hoddesdon RC.** Alternate Thursdays, 8pm. Conservative Club, Rye Road, Hoddesdon, Herts. June 9 - First visit of twelve members to Stanstead (London) Air Traffic Control Centre, 23rd - Operating from Tolmers Scout Camp, followed by BBQ And VHF DF Fox Hunt, July 2 - WARE Carnival Special Event Station, followed by VHF National Field Day, 7th - Second visit of remaining members to Stanstead (London) Air Traffic Control Centre. **John G7OCI** on (0920) 466639.

## Humberside

**Goole R & ES.** Fridays, 7.30pm. West Park Pavilion, West Park, Goole, last Fridays at the 'Old George Inn', Market Place, Goole. June 10 - Raynet Talk By G0FBR, 17th - Quiz Night, 24th - Contest Loading, July 1/2/3 - VHF NFD, 8th - Log Fill. **Steve Price G8VHL** on (0405) 769130.

## Kent

**Bromley & DARS.** 3rd Tuesdays, 7.30pm. The Victory Social Club, Kechill Gardens, Hayes, Kent. June 21 - 144MHz Direction Finding Hunt. **Alan Messenger G0TLK** on 081-777 0420

**Dover RC.** Wednesdays. Duke Of York's School, Guston, Nr. Dover. June 15 - Natter Night And Committee Meeting, 22nd - CW by G3ROD, 29th - Natter & Operating Night, July 6 - Novice Evening, 13th - Natter & Operating Night. **Mike Bowers G7NOR** on (0304) 825030.

**Medway AR & TS.** Fridays. Tunbury Hall, Catkin Close, Tunbury Avenue, Walderslade, Chatham, Kent. Visitors & new members welcome. June 10 - RAYNET Video by Alan Stanley G10MH, July 1 - Kent IP Group - TCP/IP by Keith Brazington G4LZV. **Mrs Gloria Ackerley G3VUN, 40 Linwood Avenue, Strood, Rochester, Kent ME2 3TR.** Tel: (0634) 710023.

**Sevenoaks & DARS.** June 20 - Amateur Frequency Measurement by Ray Petri G0DAT. **The Secretary, c/o Sevenoaks District Council, Council Offices, Argyle Road, Sevenoaks, Kent TN13 1HG.**

## Lancashire

**Fylde ARS.** 2nd & 4th Tuesdays, 7.45pm. Blackpool South Shore Lawn Tennis Club, Midgeland Road, South Shore, Blackpool. June 14 - DF Fox Hunt, 28th - Informal. **Eric Fielding G4IHF** on (0253) 726685.

## Lincolnshire

**Grantham RC.** 1st & 3rd Tuesdays, 8pm. Kontak Sports & Social Club, Barrowby Road, Grantham. June 21 - Salford Island - The Great Debate, July 5 - PMR Conversations by John G8WWK. **John Kirton G8WWJ** on (0476) 65743.

## Merseyside

**Liverpool & DARS.** Tuesdays, 8pm. Churchill Club, Church Road, Wavertree, Liverpool. June 14 - GX3AHD On The Air, 21st - RAE Course Planning, 28th - Surplus Sale, July 5 - GB00L Special Event Preparations, 12th - GX3AHD On The Air. **Ian Mant G4WWX** on 051-722 1178.

## Norfolk

**Dereham ARC.** 2nd Thursdays, 8pm. St. Johns Ambulance Hall, Yaxham Road, Dereham. June 9 - Informal, July 14 - BBQ At Joe G7MPQ's. **Mark Taylor G0LJG** on

(0362) 691099.

**Fakenham ARC.** 1st Tuesdays, 7.30pm. Trinity Church Room, Hempton. July 5 - Informal Evening - Antennas. **Dave G4DCJ** on (0485) 528633.

### Nottinghamshire

**Mansfield ARS.** 2nd Mondays, 7.30pm. Polish Catholic Club, off Windmill Lane, Woodhouse Road, Mansfield. June 13 - Evenings On The Air. **Mary GONZA** on (0623) 755288.

**Nottingham ARC.** Thursdays, 7.30pm. Sherwood Community Centre, Mansfield Road, Nottingham. June 9th - Visit To Nottinghamshire Ambulance HQ, 16th - Fox Hunt Number 3, 23rd - Construction/Activity Night, 30th - Talk by Ted G7IVB Entitled A Signal To The Admiralty. **Simon GOIEG** on (0602) 501733.

**South Notts ARC.** Highbank Community Centre, Farnborough Road, Clifton Estate, Nottingham, or Fairham Community College, Farnborough Road, Clifton Estate. June 10 - Open Forum, Members Only/Preparation For Elvaston Castle Rally, 12th - Elvaston Castle Rally, 19th - Special Event Station At Mark Eaton Park Fire Station, 24th - On Air, July 1 - The Development Of RISC Processing & Review of Current Software by Raymond Roulstone G0SOM, 8th - Visit To Nottinghamshire Police HQ Control Centre, 10th - 3rd Foxhunt, 15th - Open Forum. **Julie BROWN G0S0C, PO Box 4, Nottingham NG1 9NE.**

### Shropshire

**Salop ARS.** Thursdays, 8pm. Oak Hotel, Shrewsbury. June 16 - Fox Hunt - Chase 3, 23rd - A Talk On Telephone Systems by G7LID, 30th - National Field Day Preparations, July 7 - Natter Night, 14th - A Visit to Whittington House, British Telecom Oswestry, Shropshire, (members must be at Whittington House for 7pm). **Sheila Blumfield G0SST** on (0743) 361935.

### Somerset

**Yeovil ARC.** Thursdays. Red Cross HQ, Grove Avenue, Yeovil, Somerset. June 9th - A QRP Booster by G3PCJ, 16th - Aerials For Back Gardens by G3GC, 23rd - A Practical Look At Aerial Matching Units by G3CQR, 30th - Club Station On The Air & Committee Meeting. **Cedric White G4JBL** on (0258) 73845.

### Staffordshire

**Bloxwich RS.** 2nd & 4th Mondays, 7.30pm. All meetings are non-smoking. June 13 - Contest Preparation, Feedback From Back-Packer Contest And Final Preparation For FM Contest, 27th - Treasure Hunt. **Rob Briggs G0TDF** on (0902) 722830.

### Suffolk

**Ipswich RC.** Wednesdays, 7.30pm. Rose & Crown. June 15 - Solar Data Forecasts And Propagation by Iain G00ZS, 26th - 1st Sunday Afternoon 2m Fox Hunt, July 6 - Lecture 'Satellites' by Frank G3FJL, 13th - Annual BBQ At Hallowtree Camp Site. **Mrs S. Elden G8HYE.** 124 Larchcroft Road, Ipswich IP1 6PQ. (0473) 742072.

**Sudbury & DRA.** 1st Tuesdays, 8pm. Wells Hall Old School, Great Conrad, Sudbury, Suffolk. 3rd Tuesdays, 8pm. Five Bells Public House, Bures Road, Great Conrad, Sudbury. June 19 - Special Event Station In Halstead, 21st - Natter & Noggins, 25th - Special Event Station At Gt. Cornard Middle School, July 5 - Talk On Propagation by Mike G4GGC, 14th - Special Event Station At Woodhall School. **Tony Harman G8LTY** on (0787) 313212 or **G8LTY @ GB7NNA.**

### Surrey

**Coulsdon ATS.** 2nd Mondays, 7.45pm. St. Swithun's Church Hall, Grovelands Road, Purley, Surrey. June 13 - RIS And Baldock Monitoring Station by Alan Betts G0HIQ, July 11 - Team Quiz Night. **Andy Briers G0KZT** on (0737) 557198.

**Dorking & DRS.** The Friends Meeting House, South Street, Dorking, 7.45pm. June 14 - Informal Evening At The Falklane Arms, Dorking, 28th - Operation Overlord, A 50th Anniversary Presentation by David Ford, July 12 - Informal Meeting At The Wotton Hatch PH, Coast Hill, Westcott, Surrey. **John Greenwell G3AEZ** on (0306) 631236.

**Surrey RCC.** 'Terra Nova' The Waldrons, Waddon, Croydon, Surrey. June 20 - Natter Night. **Berni G8TB** on 081-660 7517.

**Sutton & Cheam RS.** 3rd Thursdays, 7.30pm. Sutton United Football Club, The Borough Sports Ground, Gander Green

## Please send in all of your 'Club News' items to Zoë Shortland at the Editorial Offices in Broadstone.

Lane, Sutton, Surrey. Natter Nights - 1st Thursdays. June 16 - History Of Radar by Eryl Davies, July 2/3 - VHF National Field Day. **John Puttock G0BWW, 53 Alexandra Avenue, Sutton SM1 2PA.**

**The Kingston & DARS.** 3rd Wednesdays, 8pm. Alfriston, 3 Berrylands Road, Surrey KT5 8RB. June 15 - The History Of Camera by Chris Frost G0KEB. **Ray Fuller** on 081-398 1128.

**Wimbledon & DARS.** 2nd & last Fridays. St. Andrews Church Hall, Herbert Road, Wimbledon SW19. June 24 - VHF Antenna. by J. Gale G4WYJ. **George Cripps G3DWW** on 081-540 2120.

### Warwickshire

**Stratford-Upon-Avon & DRS.** 2nd & 4th Mondays, 7.30pm. Home Guard Club, Main Road, Tiddington, Stratford-Upon-Avon, Warwickshire. June 25 - Treasure Hunt & BBQ, 27th - Night On The Air, July 11 - Electronic Building Blocks by Bill Mansfield. **Alan Beasley G0CXJ** on (0608) 82495.

### West Midlands

**Stourbridge & District ARS.** 1st & 3rd Mondays, 8pm. Robin Woods Community Centre, Scotts Road, Stourbridge. June 20 - Early Days Of High Fidelity by Ken Davies G8AAW, 25th - Treasure Hunt by Clive G4IEB and James G7HEZ, Starts At 5pm, July 4 - Portable Operating Evening at Hob Green Primary School. **James French, 2 Pepper Hill, Stourbridge, or via packet G7HEZ @ G87PZT.**

### West Sussex

**Mid-Sussex ARS.** Thursdays, 7.45pm. Marie Place Further Education Centre, Leylands Road, Burgess Hill, West Sussex. June 17 - Windmills Evening, July 1 - Prepare For The NFD, 2/3rd - VHF NFD At The Keymer Post Site, 8th - Preparing Signs For The Rally, 10th - Brighton Rally. **Chris Coward G3YTU** on (0444) 458992.

**Worthing & DARC.** Wednesdays 7.30pm. Parish Hall, South Street, Lancing, Worthing, West Sussex. June 15 - Discussion Evening, 19th - 2m QRP Competition - Chanctonbury Ring, Worthing, 22nd - Discussion Evening, 29th - BBQ, July 6 - DF Hunt, 13th - Radar/Defences - Talk & Slide Show. **G4GPX** on (0903) 753893.

### West Yorkshire

**Halifax & DARS.** 1st & 3rd Tuesdays, 7.30pm. June 21 - Talk by Tony G70KW. **David Moss G0DLM** on (0422) 202306.

**Keighley ARS.** The Ingrow Cricket Club, Ingrow, Keighley, 8pm. June 9th - Natter Night, 16th - Night On The Air, 23rd - Natter Night, 30th - Cameo Evening, July 7 - Natter Night, 14th - Treasure Hunt. **Kathy Conlon G0RLO** on (0274) 496222.

**Spenn Valley ARS.** Thursdays, 8pm. Old Bank Working Men's Club, Mirfield. Alternate Thursdays - 'Noggin & Natter Nights'. June 16 - Annual 2m Fox Hunt, DF Night. **Tony Galvin G0IKD** on (0532) 534437.

### Wiltshire

**Chippenham & DARC.** Tuesdays, 7.45pm. Sea Cadets HQ, Long Close, Chippenham. **John Ainge G4LGG** on (0225) 743352.

**Salisbury R & ES.** Tuesdays, 7.30pm. 3rd Salisbury Sea Scout Hut, St Marks Avenue, Salisbury. June 12 - RNARS Rally, HMS Collingwood, 14th - HF Operating 'B' Licenses Under Supervision, 21st - Construction Evening And Advice Clinic, 26th - 37th Longleat Amateur Radio Rally, 28th - 2m Mobile Fox Hunt, July 3 - RSGB DF Qualifying Event (G2FIX). **David Kennedy G7GWF** on (0722) 330971.

**Trowbridge & DARC.** 1st & 3rd Wednesdays, 8pm. Southwick Village Hall, 8pm. June 15 - Natter Night, July 6 - Inter Club Family Skittles. **I. L. Carter G0GRI** on (0225) 864698.

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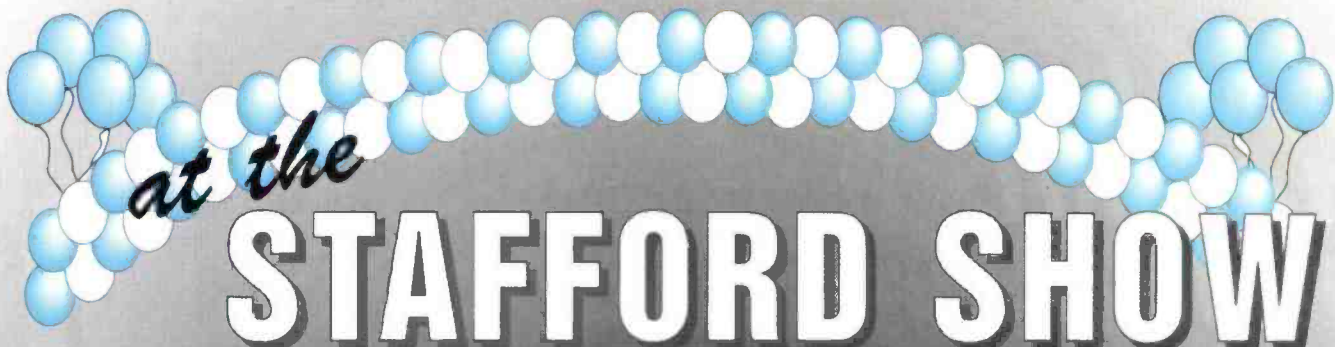
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# The Icom IC-T21E 144MHz Hand- Held Transceiver

Colin Redwood G6MXL hasn't tried operating with a small rig for some while, so *PW* provided him with the opportunity to review a newly-introduced hand-held transceiver from Icom.

When I was given the chance to review the Icom IC-T21E 144MHz hand-held, I wondered what I would be letting myself in for.

A few weeks previously I'd helped a recently licensed Novice try to get to grips with a 430MHz hand-held. It took nearly half an hour including referring to the instruction book just to work out how to get the correct repeater shift selected! I was hoping for better from this Icom rig.

Hand-held transceivers have always struck me as a rather unsatisfactory compromise. Those of the early 1980s, when I was first licensed, were quite heavy and had tiny thumbwheel switches which made operation on the move quite difficult.

In recent years, I've got the impression that facilities and complexity have increased. They've now reached the point where even basic operations are difficult to achieve without referring to the instruction booklet.

## Small Rig

It was therefore with some scepticism that I unpacked the Icom IC-T21E. The model supplied for review came with a short 'rubber duck' antenna and a BP-151 6V 800mAh battery pack.

The lead to recharge the NiCads and power the rig from an external supply was not included with the rig issued for review. I overcame this by making up a lead, terminated in a 1.3mm d.c. barrel plug - a new size for me. The rig seems to have an internal current limit on the charge circuit. Limiting current to about 100mA.

The IC-T21E is very small, and can be held comfortably in the hand, or tucked away in a pocket. Most of the weight is in the battery, which in the event lasted well.

## Antenna Connector

The small antenna is screwed into the top by an SMA connector. "Not another new connector for the shack", was my immediate reaction.

The SMA connectors are smaller than the BNC types used on most hand-helds. I hope the SMA connectors will prove more reliable.

The SMA is not unknown in amateur circles, as they are often being used by microwave operators. Mainline Electronics and Electromail both include these more expensive connectors in their catalogues.

## Receive On UHF

The IC-T21E can also receive on u.h.f. However, I found myself getting quite frustrated at not being able to join in the QSOs on local

430MHz repeaters that I could hear.

I suspect that some IC-T21Es will be traded in after a few months for 144/430MHz dual-band transceivers.

The liquid crystal display on the front is reasonably uncluttered. I also found the battery condition indicator to be particularly useful.

The 144MHz frequency is displayed, usually with the time, except when receiving on u.h.f. when the 430MHz frequency replaces the v.h.f. frequency and the 144MHz frequency replaces the time.

The last two digits of the frequency display are barely a quarter of the height of the rest of the digits. I found this made them quite difficult to read.

## Without Reference

I want to be able to operate a rig without reference to the operating manual. I managed to switch on the rig, and discovered that the volume, squelch and main tuning controls were easy enough to operate.

Switching off was initially accomplished by disconnecting the battery. This I did until I discovered that depressing the red button for a full second was the correct method.

Without the instruction manual, it took me several attempts to get the repeater shift working, although I had to resort to it to find out how to use the 1750kHz tone burst. However, despite my best endeavour, I could not get into the local 144MHz repeater, even when two miles away (line of site).

The Bournemouth repeater has a reputation for being quite strict in its requirements, but I have never had problems with other equipment. I suspect this may have been due to low deviation or microphone gain from the IC-T21E.

## Reports Received

Reports of transmitted audio quality from the IC-T21E on 144MHz were generally complimentary. Although several stations commented on a lack of bass or weak audio unless I spoke very close to the rig. And I also found that I could receive many stations who could not hear me.

In order to conserve battery power, it is helpful to have a low power setting. The Icom designers have provided a number of power settings ranging from full power (up to 6W depending on power supply) down to about 15mW.

## Receive Sensitivity

On 144MHz, receive sensitivity appeared satisfactory. Using the short 'rubber duck' type



antenna, I was able to receive stations several miles away over obstructed paths with no difficulty.

Local 430MHz repeaters were also received well in less than favourable locations. I made a few comparisons with my main 144MHz rig, and was pleasantly surprised at the signals that the IC-T21E managed to resolve.

Given the sensitivity, I was impressed with the apparent selectivity of the transceiver. When connected to a 144/430MHz dual-band vertical antenna at about 11m above the ground, stations on adjacent 25kHz channels posed no problems.

## Transceiver Memories

The transceiver has 100 memories. I doubt whether many would find a use for all of them.

Recalling frequencies previously entered worked well. The facility to scan the memories, optionally excluding certain frequencies, would be of particular use for those in areas of higher 144MHz activity than I usually encounter.

To make best use of the rig, a new user should spend some time reading the Instruction Manual. Having done this, the various facilities such as channel steps, repeater-offset, clock time, auto power-off time, preferred low power setting, and I.c.d. contrast should be set.

## The Complexity

Personally, I can't help feeling that the complexity of modern hand-helds such as this have gone totally over the top. Are things such as a clock, paging facilities, tone calling, and 100 memories really what amateurs are looking for in a 144MHz f.m. hand-held?

Manufacturers seem to be vying with each

other to produce ever smaller rigs. They arrive with ever more features and complexity.

It's interesting to compare this rig with hand-helds of the early 1980s. The new IC-T21E is certainly a lot smaller and lighter, and fits in the hand a lot better.

Tuning is also a lot easier, and receive sensitivity seems better. The provision of many other facilities seems to me a retrograde step.

I think most amateurs could operate rigs of 10 years ago without the aid of the instruction manual. Now it is almost a pre-requisite simply to switch the rig on and off!

Personally, I can't help thinking that there is huge market awaiting the first manufacturer to produce a straightforward compact hand-held without a pocket calculator worth of buttons on the front!

## Summing Up

In summing up, I think that for many amateurs, a 144MHz hand-held will be their first rig. It needs to perform well, not only as a hand-held, but also in the shack for QSOs around the town, or used with a TNC for packet.

Apart from the problem of accessing repeaters, every facility on the IC-T21E I tried worked well. If you are happy that you can get to grips with the facilities you need, then I doubt that you would be disappointed with the performance of this transceiver, particularly when it's connected to a well sited antenna.

My thanks go to Icom UK Ltd., for the opportunity to try the IC-T21E. It's available for £329 including VAT from Icom (UK) Ltd., Sea Street, Herne Bay, Kent CT6 8LD. Tel: (0227) 741741 or from any Icom approved dealer.

After seeing a copy of the G6MXL review Dennis Goodwin G4SOT of Icom (UK) Ltd., sent us the following comments.

I remember the Icom IC-2E very well, I suppose that most amateurs licensed in the 1980s will also. This simple 144MHz hand-held sold millions world-wide and could be recognised in Marine and PMR disguises also.

At the time of its release in 1980, hand-held operation was very limited, and so this model revolutionised 144MHz operating. I could not begin to count how many hand-held models have been released since those days by the various manufacturers, perhaps hundreds. Each new release trying to better the previous model and the competition.

Without change, we stand still, Amateur Radio is unique in the freedom it allows to develop and experiment with radio communication equipment. Radio Amateurs are often at the forefront of technology and therefore require features and functions that are available, for example G6MXL missed the CTCSS scan feature that enables the user to access a repeater using CTCSS if the tone frequency is not known.

It seems impossible to sell a hand-held today if it does not have advanced features. The IC-T21E being a new idea, cheaper than a full blown dual-band, but offering more than a simple single band radio.

The u.h.f. IC-T41E offers Novice operators full use of the 430MHz band with 144MHz receive, perhaps an incentive to go for a G7 call.

Dennis Goodwin G4SOT

## Manufacturer's Specifications

### General

Mode	f.m. (F3E) (✓)
Frequency Stability	±10 ppm (0°C to +50°C)
Tuning Steps	5, 10, 12.5, 15, 20, 25, 30 or 50kHz (✓)
Antenna Impedance	50Ω (nominal)
External DC power	4 - 16V (negative ground)
Usable temperature range	-10°C to +60°C
Dimensions with BP-151	54 x 111 x 35.5mm (projections not included) (✓)
Weight (with BP-151)	315g (✓)

### Transmitter

Frequency Coverage	144 - 145.995MHz
Modulation system	Variable reactance frequency modulation
Frequency deviation	<±5kHz (✓)
Output power (at 13.5 V)	6, 4, 1.4, 1W and 15mW (✓)
Current Drain	(at 13.5V, typical)
	1.8A (@ 6W r.f. out) (✓)
	1.0A (@ 1W r.f. out) (✓)
	90mA (@ 15mW r.f. out) (✓)
Spurious emissions	<-60dB (6W out) <-40dB (15mW out)
Microphone impedance	2kΩ

### Receiver

Mode	f.m. (F3E) (✓)
Frequency Coverage	144 - 146MHz, 430 - 440MHz (✓)
Receive system	Double-conversion superheterodyne
	First i.f. 30.85MHz, 2nd i.f. 455kHz
Sensitivity	<0.16µV on v.h.f. (12dB SINAD) (✓)
	<.22µV on u.h.f. (12dB SINAD) (✓)
Squelch sensitivity	<0.13µV(at threshold) (✓)
Selectivity	>15kHz @ -6dB (✓+)
Selectivity	>30kHz @ -60dB (✓++)
Spurious and image rejection ratio	>60dB (Except half of image frequency) (✓)
(Current Drain)	(at 13.5V, typical)
Rated audio output	160mA
Power saved	8mA (average)
Audio output power	>300mW (at 13.5V, 10% distortion into 8Ω) (✓)
Audio output impedance	8Ω

## What the (✓) means!

When we have a rig in for review in *PW*, we check the rig on our test equipment to see how well it measures up to the manufacturer's quoted specification. The specification figures we feel are important to you, the reader, we check out and highlight with our *PW* (✓).

We use a (✓) sign after a measurement figure, to mean that the reviewed rig matched (within measurement limits) the quoted specification. We use a (✓+) sign to mean the rig bettered the specification by a good margin. The ultimate accolade is a (✓++) sign, meaning the margin was excellent.

G1TEX

The IC-T21E transceiver with its associated flexible 'rubber duck' antenna and battery pack.



# Five Bells Go To North Rona

*Chris Phillipson G8IJC shares some of the Five Bells Group's adventures when they activated the uninhabited Island of Rona off the north west coast of Scotland during 1990.*

"Don't panic but I've broken my accelerator cable on the A1 and I'm going to be late". This was the message that greeted me on the answering machine as I came home from work on Friday July 7 at 4pm.

The message was from John G4NPH who was due to arrive later that evening in Lincoln, on route to Kinlochbervie, Scotland. He was to stay the night and we would load and leave early the next morning to begin the DXpedition to North Rona, an uninhabited island approximately 64km to the north west of Cape Wrath.

During the past few years, the Five Bells Group had been to Shetland, Tiree, Mull, St. Kilda, Ireland, Sutherland and Skye. The group has consisted of Keith G4ODA, Julian G4YHF, John G4NPH, Dave G4YTL, myself G8IJC, David G4DHF and Ian G1DXI. Only the first five were on this trip.

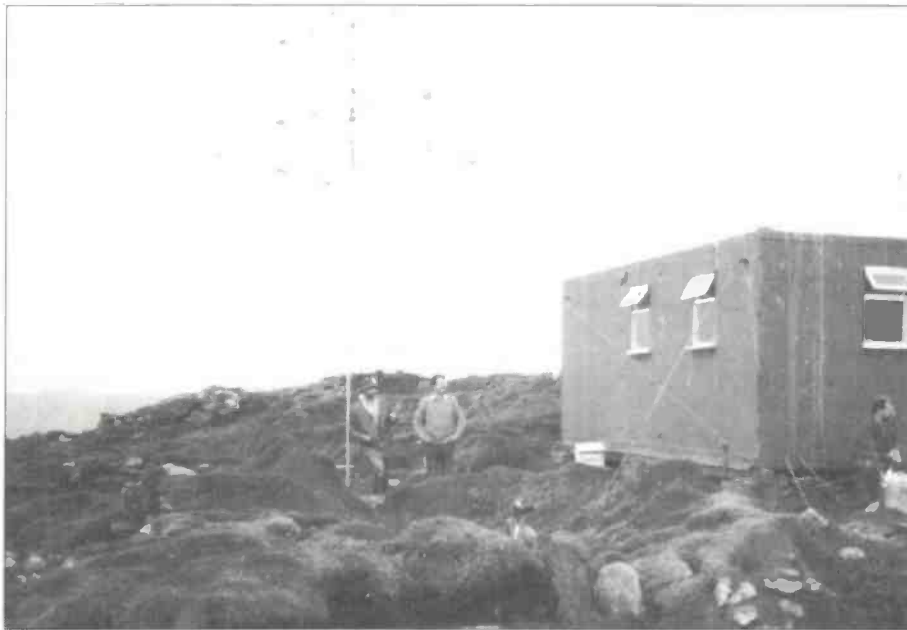
Keith was the prime mover and organiser, while Julian, John and Dave were mainly interested in operating and I took care of the catering.

As we'd been to St. Kilda, we had some inkling of what we were letting ourselves in for on North Rona. Keith got a map of the place and wrote to various people to discover who would be able to grant permission to go there, and what hurdles were going to be put in our way.

Having more information to hand, we met in Sutherland at New Year 1989 to discuss the trip to North Rona. I made a few enquiries and luckily found a boat and skipper at the fishing port of Kinlochbervie in the old county of Sutherland (now officially Highland Region) willing to take us there and back.

I volunteered to go and check out the boat, make definite arrangements at summer half-term, and also make sure the skipper appreciated what we wanted to do. When the time came he plainly thought the whole business rather strange, but was willing to humour us!

John had been in touch with a university which had a temporary cabin on the island. They would be willing to let us use it under strict conditions. This was a major improvement compared to our other tented expeditions and we were very grateful.



**The cabin on North Rona...the ultimate (even if it's not fashionable) goal for the Five Bells Group. Chris Phillipson G8IJC describes the group's adventures getting to and (eventually) off the remote, uninhabited island. Left to right Julian G4YTF, Dave G4YTL and John G4NPH.**

## Survival Issue

We had to take the survival issue pretty seriously, since there was no running water on North Rona. Neither was there a source of food and obviously little in the way of medical assistance should there be an accident.

At this point in the story, Dave G4YTL (a Doctor) made his appearance and saved the day. This was going to be his first trip with us, and he was very keen to come.

The food had to be sufficient to last for at least 13 days in case of bad weather. The only water said to be on North Rona came from several pools where rain water collected and a rock basin at a cliff edge.

As it turned out, only the rock basin actually produced any water. I was pleased I had obtained a microporous water filter, which when used in conjunction with a chlorine contact tank seemed to produce safe water (Despite the complaints about the taste of chlorine).

## Inhabited By Shepherds

A little investigation into the history of North Rona in the local library showed that it had last been inhabited by shepherds. They had died rather tragically, about 100 years ago.

Many years before the shepherds however, the island had been inhabited for a significant period. A village had been built on the only patch of suitable land and this was also the location of the cabin.

The whole area is now considered a

historical monument and consequently we had to be careful not to disturb anything. The island has a flock of sheep, many types of birds (most of them noisy) and also grey seals in profusion.

We packed and were on our way by 2pm. Keith and Dave however were at this stage in Peterborough waiting for Julian and they finally got underway driving overnight and arrived in Kinlochbervie early on Sunday. John and I stopped in a Youth hostel overnight arriving at 2pm the next day.

## Evening Departure

The boat was in harbour but had a diving party on board until the evening. It was 7pm before we could begin loading, after which we retired to the local pub for a meal before casting off at about 11.30pm.

We set out so late because the skipper wanted to arrive at the island at first light. This would give him time to unload and return before Tuesday.

Most of the gear was stacked on deck since the vital parts were waterproofed, and the forecast was good. It was a beautiful evening as we drew away from the quayside, but as we left the shelter of Cape Wrath, the sea got rough.

We finally arrived in the lee of the island about 6am Monday, where the sea was very quiet. It's only possible to land on North Rona in the East Bay, with the wind in the west and a calm sea, since the rest of the island is cliff faced. Even then it's a matter of scrambling on rocks since there's no beach.



# OUT & ABOUT

## With Amateur Radio

**Fig. 1: The DXpedition to North Rona entailed a long drive for everyone in the party, before sailing from Kinlochbervie in Sutherland.**



**Fig. 2: As North Rona does not have a beach, landing equipment and stores can be hazardous and leaving (as the Five Bells Group were to find out) can be even more risky!**



### Tide Just Right

Fortunately, we were in luck and the tide was just right. The skipper prepared a dinghy and John and I went off with the mate to find the landing point.

After a few trips to and fro, we had everyone onshore with the majority of the equipment and stores. The most difficult items were the two 3kVA gas powered generators and the nine Calor Gas bottles.

During the last trip, the outboard failed on the dinghy and Julian and the skipper had to paddle! I then turned to look at the 100m high escarpment that was our next target and over which most of the equipment had to be man handled.

Following the climb, the top of the island was surprisingly lush and green. After 800m we spotted the cabin, perched amid the ruins of the village, surrounded by fulmars.

Our next task was to empty the cabin of the university's stores. We then had to put them in a large army tent we had erected nearby.

We then spent the rest of the day moving the majority of the supplies from the East Bay to the cabin. This was very tiring, especially after a sleepless and seasick night.

Another tent was set-up at the East Bay to protect the remaining gear. The weather continued to be mainly rainy and damp throughout the day.

I finally prepared a meal on our gas stove and we erected our five personal tents. We then (gratefully) crawled into our sleeping bags for the night.

The Tuesday was much the same weather wise. Julian and John struggled up the ridge with the generator, Dave and Keith helped carry it the rest of the way to the cabin on poles.

### On The Air

The remaining essential gear came up that day. After our hard work, a 144MHz station was on the air by nightfall!

The cabin was effectively two small rooms with a corridor between, so one was used as a sitting/eating area and the other as the shack. This enabled the equipment to be kept reasonably protected.

The cabin was about 70m a.s.l., and our

outside toilet (literally) must have had one of the best views in Scotland! What passing fishing boats thought of it is not recorded.

The sea area around North Rona is fairly well fished, and small boats tend to shelter behind the island if bad weather threatens, so there is a variety of traffic in the nearby waters and continuous amusing chatter on the marine band.

### Equipment Used

The equipment used on each band was: FT-225R (144MHz) D400W (3CX800A7 p.a.) 7 (4 x 9-element) Yagi antenna.

On 50MHz we used an FT-736R 25W and a 4-element Yagi. For our 430MHz operations we used an FT-736R at 400W (3CX800A7PA) 7 4 x 17-element Yagi antenna.

The h.f. side was taken care of by an IC-740 feeding into Dipoles. The special event callsign of GB4XT was used.

Our locators were XT71B (IO79CC) and HW83. On 144MHz we were continuously operational from 2121 hours on the 11th to 1136 on the 19th.

There were about 575 contacts on 144MHz, of which 160 were meteor scatter (m.s.). contacts. Of these, 75% were successful, and 2000km was the furthest distance worked.

On tropospheric propagation, the majority of contacts were G and GM. The best tropo DX was DF8VU on c.w., whilst EA4DPE was the furthest via Sporadic E.

There was an opening to the CN and DN squares down a weather front on the 17th with eight contacts in 30 minutes. The first station worked was GM3JJJ on Lewis, closely followed by G4DHF and GM0JOL.

The operating problem causing the most stress was the great number of stations sending **OUR** callsign for long periods, and not their own! The most frequent operators on 144MHz were Dave and Julian.

On 50MHz we were operational from 1340 on the 12th to 21:30 on the 18th. Keith was the primary operator. There were 100 contacts, mostly Sporadic E. to Europe. Contacts to G were by tropo and m.s. (completion in 10 minutes guaranteed!). The furthest DX was SV1DH in KM27 (Greece).

On 430MHz we were operational from 1903 on the 14th to 2108 on the 17th. John was the

main operator. There were a disappointing number of contacts - only 22. The best DX was G3LQR in Norfolk. On h.f. we were operational from 1100 on the 12th to 1748 on the 18th. We took part in the VHF Net on 14MHz, the IOTA net and the 3.5 and 7MHz WAB nets.

### Meal Times

During the expedition we had meals at more or less regular times. The night operators able to prepare coffee and snacks as necessary.

We had the menu more or less laid out before hand, and tried to stick to it. This is because with only two gas rings and a small grill, cooking facilities were limited.

Once the stations were running, the pressure eased somewhat and a routine was established. I filmed some of the activity on video, weather permitting. But radio amateurs make very reluctant actors, so I was reduced to filming wild life.

One memorable event was the launching of John's North Rona 'message boat'. This was a small bright red wooden boat containing a plastics capsule with a message saying when and where it was launched.

The 'message boat' was launched from the south of the island in a westerly breeze. It arrived some three days later in Orkney, where some one wrote to John to tell him of the find.

North Rona has its own lighthouse on the highest point. It's a substantial installation and includes a helicopter pad, but unfortunately it's unmanned.

We had brought some fishing tackle with us to supplement our diet with fish. However, we had reckoned without the Grey seal population who after either catching all the fish, or scaring them away even ate the bait off our hooks with no injuries to themselves!

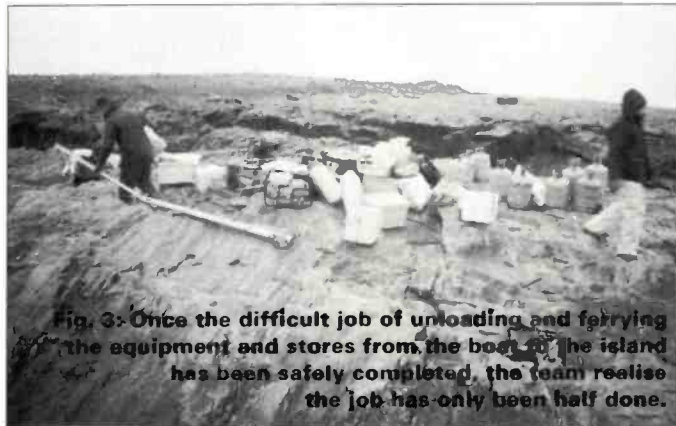
### First Deactivated

On Tuesday, the 430MHz station was the first to be closed down. This station and much other redundant equipment were taken to the East Bay that day.

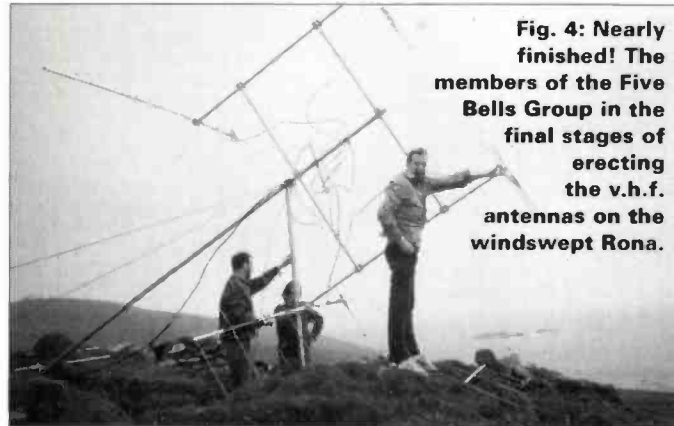
Next day, we disposed of most of the rest of the equipment, except for vital personal gear and tents. The most arduous task once again was the generator.

# OUT & ABOUT

## With Amateur Radio



**Fig. 3: Once the difficult job of unloading and ferrying the equipment and stores from the boat to the island has been safely completed, the team realise the job has only been half done.**



**Fig. 4: Nearly finished! The members of the Five Bells Group in the final stages of erecting the v.h.f. antennas on the windswept Rona.**

Luckily, the second generator had not been needed so we were spared the pleasure of carrying it. The East Bay tent was then packed with equipment for protection from the elements, and was only dismantled just prior to leaving.

We had a marine band radio on which the skipper was to make arrangements with us to be taken off. But the distance of over 70km was too great, and John GM0JOL came to our rescue with a landline call.

Fallback plans had been for Thursday at 5am, and as it turned out, this was adhered to. At 3am on Thursday morning, we spotted the lights on the boat as it steamed towards the island whilst we were still packing tents.

We hurriedly locked up the cabin and trooped off. Arriving in the East Bay, we discovered that the tide was too low to bring in the dinghy and, ominously, the wind was in the east.

### Swell Grew

As we waited for high tide, the swell grew and we began to scout for more sheltered loading points. None were suitable.

When the water was high enough, the swell was formidable, sometimes two metres high. Spray was being thrown around the 3m dinghy, drenching the skipper, who struggled to and fro with some of the lighter equipment, and managed to take off Julian and Dave.

During one of the last trips, a polythene bag was seen to fall from the dinghy and driven by the wind, floated towards a rocky bay nearby. As the bag neared us, Keith became a little agitated, saying that he thought the logbooks were in it!

A minor panic ensued, during which I tried unsuccessfully to fish the bag out of the sea with a line and hook down a 10m high cliff. John eventually volunteered to strip off and be lowered down a steep slope to the sea, and drag the bag out with a pole. Happily, this worked, hence the now well worn phrase 'anybody seen the logbook'?

### Disaster Struck

In the final stages of loading we attempted the heavier loads, when disaster struck. The skipper, struggling to manoeuvre in a heaving dinghy,

suggested that John throw some of the empty gas cylinders onto the boat seats. This was when one cylinder smashed one of the starter battery terminals into the battery causing the acid to escape.

The outboard of course failed to start, and the dinghy had to be paddled back to the boat. The wind was also blowing the boat towards the rocks, so the skipper had a busy time on board, trying to repair the boat and help the mate steer.

Eventually, the skipper abandoned the repairs and in the rising squall opted to return to port with only Julian and Dave on board. Those of us who remained behind should perhaps consider ourselves lucky, since an unnamed amateur managed to cause the 'heads' (the toilets) on board to explode, making the trip rather smelly!

### Three Marooned

On shore, the three of us who had been marooned (myself, Keith and John), started to repack the remaining equipment under canvas. Then we retired to the cabin to catch up on sleep.

Unfortunately, we had not foreseen the eventuality half of the team and gear off, and

**Operating from inside the cabin proved to be far more comfortable than the Five Bells Group's previous tented expeditions.**



half still on the island! We had expected (perhaps) to leave earlier or later than planned, but all together. This meant certain useful bits of kit were heading back to port, like dry clothes!

After some sleep, we made the best of a bad job. Keith and John got the FT-736 on the air using the cabin lead acid battery, and poked up one of the 144MHz Yagis.

John and Keith got in to the Orkney repeater, and spoke once again with John GM0JOL and so contact was established with the group. I spoke with the skipper of the boat via Stornaway coastguard, and we agreed that he would return when we said the wind and weather were good enough. We set-up sked times with the coastguard who were very helpful and concerned.

### News Story

Later that evening, we turned on the broadcast radio to hear the news only to discover that we were a news story: "three radio amateurs marooned on North Rona"! This made our day!

It was Friday evening before we pronounced the conditions right, supported by a good weather forecast. The boat was spotted about 7am on Saturday steaming out of the mist in to the East Bay.

Three rather relieved people then stopped humming the theme tune to the old television series 'Robinson Crusoe' and leapt into action to drag the equipment once more over the rocks!

We had a very easy time loading and soon the island was disappearing into the mist behind us. The trip back was unbelievable! The sea was like a mill pond.

I hope readers will appreciate the difficulties we faced. Notwithstanding the technical problems which I have barely mentioned, and bear that in mind next time they speak to a Dxpediton station, and perhaps be a little more patient whilst waiting for a QSO!

I would like to offer special thanks to all the people, amateurs and otherwise, whose invaluable assistance helped to make the DXpediton a success, particularly: John Lincoln, Sheila Anderson, Jimmie Mackintosh, Ray Collier, Ray Skells and the staff of the Stornaway Coast Guard station.

PW



# HUSTLER - HF VERTICALS - HF MOBILES

## HF VERTICALS

**Ground mounted HF base antennas that work!**

Hustler has been producing HF vertical antennas of unusual electrical performance and mechanical integrity since 1959. Many of those original verticals are still in service after over 35 years of reliable operation.

This exclusive trap design offers the lowest loss possible. A special extrusion process allows Hustler to produce trap covers to an otherwise unattainable close tolerance, assuring accurate and permanent resonance. The highly accurate traps provide top signal reports and consistent contacts.

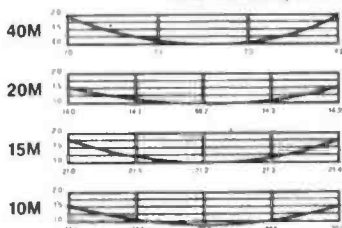
Accurate tuning is made possible by the wide range of tuning flexibility design into the verticals. Not only can you use the normal adjustable tubing to change resonance, but the traps themselves can be field tuned for an additional 2 Mhz shift. This flexibility will enable you to achieve a good vswr even if your installation is not ideal.

All Hustler verticals will easily handle the full legal limit of power and will cover 10-40 meters with a swr of 1.6:1 at band edges 80 meter bandwidth on the 5BTV and 6BTV is 80 KHz under 2 to 1.

A fixed station antenna is only as good as its ability to stay up, mechanical design of Hustler verticals is superior to any. Large diameter 1 1/4 inch corrosion-resistant aluminum tubing is used from top to bottom. The base assembly utilizes a centre tube with a .315 inch wall thickness, unequalled in the industry. The trap coils are wound around solid one inch diameter fibreglass cores and stainless steel clamps permit adjustment without damage to the aluminum tubing.

*"I think the quality of the Hustler Antenna speaks for itself!"*

Tom Rickward, G4ZZN



**"WORKED VK"**

Hustler's 6 Band Vertical Antenna assembled very easily and the SWR adjustments were simple and low figures obtained without too many problems. Compared to my previous vertical, it was simplicity itself.

The Antenna is mounted at ground level without any radials and performs well. Have worked mainland VKs and a VK7. Bearing in mind I am still working and the opportunity is not available to pursue more fully, I am more than happy with the results and again the quality, especially bearing in mind the price.

L.C. Duncan, G0OLK

## HF MOBILE ANTENNAS

If you are serious about HF mobile operations now that the weather is getting better, the Hustler system is the obvious choice. This system offers a wide variety of components, which enable you to customise your mobile installation to fit your present and future requirements. A choice of four different support masts provides an installation solution for every vehicle. A selection of thirteen interchangeable resonators, in high and moderate power levels and varying bandwidth, are available.

**"DXCC ON 20 WITH HUSTLER"**

*Just 100 watts SSB, no ATU worked 161 prefixes achieved 1978-81 all mobile! Often get better reports than other G's home based beams.*

Paul Hurst G3PCT

**"The best antenna there is for HF!"**

I have tested the Hustler HF Mobile with the rated power and have measured the Q factor and it is the nearest to 300 in any antenna I have seen! I have also fed it with inductive and capacitor matching including both to obtain 50 ohms input on 40/80mtr and have a band width of between 50 and 75 kcs compared with other mobiles which had only 10 to 15 kc band width. The best antenna there is for HF!

73, David Hudson, G4W0E

**"RM 20 + TS 50 = PERFECTION!"**

Delighted to find Hustler available again. Now I am sure to get the full benefit of my new TS 50 mobile! Congratulations from an old Hustler fan.

Tony Case G4ZVR



# "ZS6 THOUGHT I WAS IN JO'BURG!"

Dave Hudson, G4W0E

Since using the Hustler I have contacted stations in "India VU2TTC", "Sri Lanka 457RO", "Trinidad 9Y4TD", Africa 9X5GC, KA1V/T5, 3DA0BM, Australia VK7OH, Barbados 3P9EM and the Falklands VP8CGH with signal reports ranging between 5/5 to 5/9, as for 9Y4TD who was surprised when I told him I was mobile due to my signal strength. A station in Johannesburg called me "ZS6BEW" as he thought I was in one of the Johannesburg suburbs, this was when I was in contact with KC9BI we then had a three way contact, not bad from a car don't you think?

As for the antenna, I have tried Inductive coupling and capacity matching as per ARRL handbook mobile section and this was not needed.

The resonators are very well constructed as so the mast which can be used as a 1/4 wave on 6 mtr, the band width is as advertised for each band, "as the instructions state 2.1 swr or better". I obtain 1.5 to 1 and less on 10, 15, 20 mHz but what did surprise me was the band width on 80 mtr as with other antennas. I could only move frequency of about 10 kcs but with this resonator I can move 30 kcs either side of the tuned frequency. Now when I go camping all I take is the required camping equipment and the Hustler antenna which I use with a tri-band adaptor, so I can operate any three frequencies without having to change resonators. The mast is hinged so it can be folded to fit the trunk and apart from that I also use the quick disconnect attachment which I also obtained from Coastal Communications.

To end this letter which sounds like an advert, all I will say to past, present or future mobile operators is, try this antenna and I can tell you that they will not be disappointed with the results and also excellent service from Coastal Communications.

**"Out-performs the competition!"**

After using my Hustler 20m mobile antenna, I had to let you know the super duper results on the first day. Once set correctly, the SWR stayed below 1.8:1 over the whole of the voice section of the band. With the added advantage that the antenna does not sway at any speed, the performance didn't vary during my journey to work.

With 100W input, six different countries were worked, even with conditions being on the low side the first evening. After many years of trying different mobile HF antennas, the Hustler far out-performs the competition. With the low cost and versatility of changing bands, this is the HF mobile antenna of the future.

Tony, G0MBA

## HUSTLER PRICES

4BTV HF Base 10-15-20-40 meters .....	£129.95
5BTV HF Base 10-15-20-40-80 meters .....	£145.95
6BTV HF Base 10-15-20-30-40-80 meters .....	£160.95
RM-10 10m Mobile resonator 150-250Khz bandwidth 400W .....	£15.95
RM-15 15m Mobile resonator 100-150Khz bandwidth 400W .....	£16.95
RM-20 20m Mobile resonator 80-100Khz bandwidth 400W .....	£23.95
RM-30 30m Mobile resonator 50-60Khz bandwidth 400W .....	£24.50
RM-40 40m Mobile resonator 40-50Khz bandwidth 400W .....	£24.95
RM-80 80m Mobile resonator 25-30Khz bandwidth 400W .....	£25.95
RM-10S 10m Mobile resonator 250-400Khz bandwidth 1.5KW .....	£24.95
RM-15S 15m Mobile resonator 150-200Khz bandwidth 1.5KW .....	£26.95
RM-20S 20m Mobile resonator 100-150Khz bandwidth 1.5KW .....	£29.95
RM-40S 40m Mobile resonator 50-80Khz bandwidth 1.5KW .....	£34.95
RM-80S 80m Mobile resonator 50-60Khz bandwidth 1.5KW .....	£45.95
MO-1 Mobile mast 54 inches long, tilts at 15 inches .....	£27.95
MO-2 Mobile mast 54 inches long, tilts at 27 inches .....	£27.95
MO-3 Mobile mast 54 inches long, solid rubbercoated .....	£22.95
MO-4 Mobile mast 22 inches long, solid rubbercoated .....	£19.95

(All masts end in a 3/8 thread, for mounting. Ideal for any strong CB style mount and cable.)  
NB Postage/delivery extra as required.

# COASTAL COMMUNICATIONS

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# The PW Top Band Tourer Transmitter-Receiver



*Keen constructor and QRP operator Clive Hardy G4SLU delights in building equipment in small packages. This time, Clive has come up with a simple crystal controlled 1.8MHz a.m. rig with a superhet receiver using the long established and reliable ZN414 i.c. as the intermediate frequency amplifier.*

The PW Top Band Tourer, is a low power (QRP) crystal controlled 1.8MHz amplitude modulated (a.m.) transmitter-receiver. The transmitter, Fig. 1, produces about 1W of series modulated radio frequency (r.f.) power output with a 13.8V direct current (d.c.) supply.

The project employs a single conversion superheterodyne (superhet) receiver, Fig. 2. When considering the design for the Top Band Tourer, I had the Novice licencee very much in mind.

I wanted a radio that was easy to build, set-up, and operate. It was to be something QRP for local conversation rather than working long distance (DX).

The 1.8MHz 'Top band' a.m. choice presented the best option for several reasons. No frequency multiplication would be required in the r.f. stages. At low power, a.m. can be easily generated without the use of a modulation transformer by using series modulation and an a.m. receiver can be very simple.

Crystal control was chosen to eliminate the frequency stability problems sometimes encountered with a home-brew variable frequency oscillator (v.f.o.).

There are only two single wound coils to wind. Both are in the transmitter output filter and are 30 turns on a T50-2 toroids.

All the other coils are pre-wound and Toko types. A minimum number of tools is required to build the Top Band Tourer. A soldering iron, solder, wire cutters and a trim tool will suffice.

The only essential piece of test equipment is a multimeter. However, a receiver covering the 1.8MHz band and a frequency counter could be useful.

There is nothing new in this world, and readers may well have seen many of the design features of the transceiver in other circuits. All I can say in my defence is that I haven't seen them published in the exact configuration of the Top Band Tourer before!

With so many facilities available in so few components there is a limit to the number of ways that they can be connected to achieve the wanted results.

### The Receiver

Using crystal control for the receiver meant, for ease of operation, a superhet design. A direct conversion receiver will resolve a.m., but the tuning is critical as the local oscillator has to be set to zero beat with the transmitting station.

That requirement means the direct conversion receiver isn't so easy to operate. By using a ZN414 integrated circuit for the intermediate frequency (i.f.) strip it has been possible to design a very straightforward receiver with a very low component count.

The ZN414 is basically an a.m. radio (using a tuned radio frequency amplifier circuit) with over 70dB of gain in a three pin device. In this circuit the usual broadcast band tuned circuit is replaced by one tuned to the i.f.

In this project the front end, crystal oscillator, and mixer act more like a converter than a conventional superhet with a variable local oscillator.

The receiver, Fig. 2, has a double tuned front end and uses the NE602 chip for the mixer and local oscillator. Broadcast breakthrough is always a problem with 1.8MHz receivers and this aspect of the radio received the most attention.

During the development period I tried various front end layouts. Trial and error evaluation has resulted in a front-end which performs well in reducing breakthrough to a very low level.

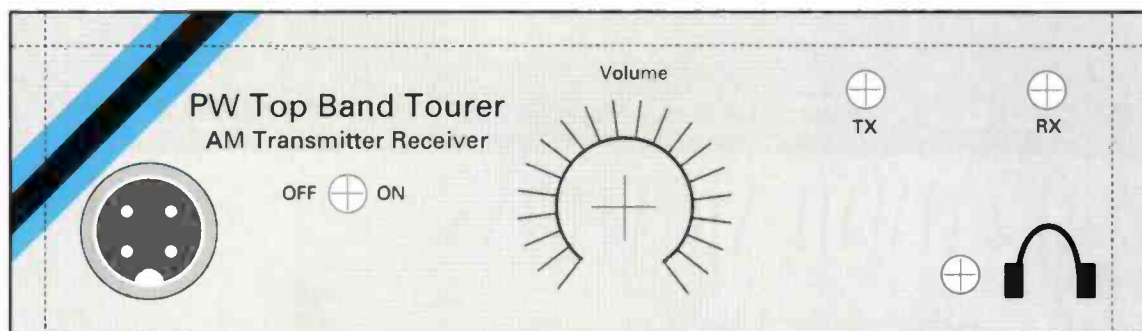
As for sensitivity, on the test bench signals of 1µV (just!) were detectable. Output from the NE602 passes through an i.f. transformer to the ZN414 which amplifies and demodulates the signal.

From the ZN414 the audio is passed via a variable gain control to an LM386 audio chip. This can deliver up to about 400mW into an 8Ω load

In use, there is more than sufficient output to drive headphones or a small loudspeaker. The project is built on double sided p.c.b. which is good practice for all r.f. boards, however low the frequency of operation. Incidentally, the NE612 is a direct replacement for the NE602.

### Early Designs

My early designs used a mechanical or ceramic filter instead of the i.f. transformer. This was to



**A front panel template design for the Top Band Tourer.**

# OUT & ABOUT

## With Amateur Radio

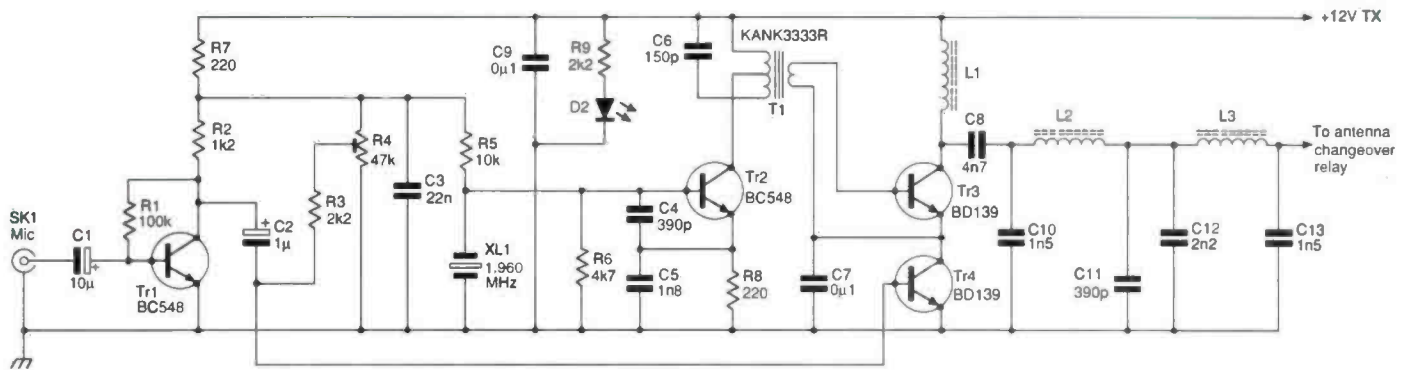


Fig. 1: The transmitter circuit of the Top Band Tourer (see text for notes on modulation system).

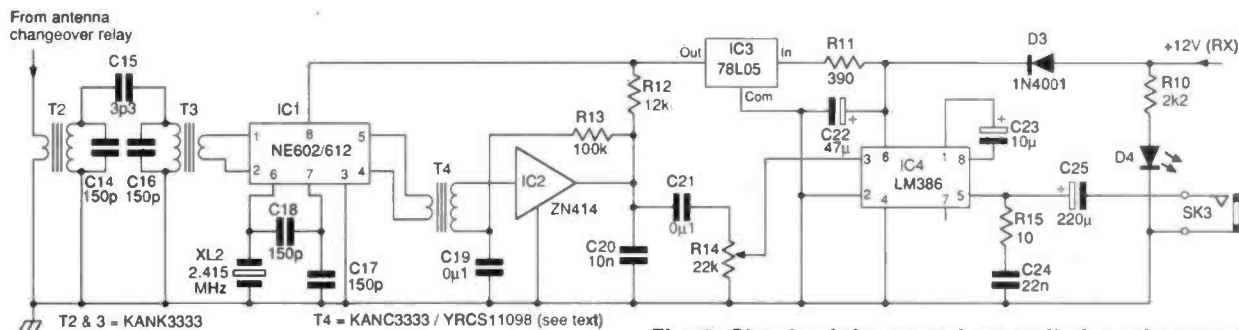


Fig. 2: Circuit of the crystal controlled receiver used on the simple a.m. project. The receiver is based on the long established ZN414 t.r.f. receiver i.c. (see text).

minimize tuning variables, but the sensitivity of the radio, whilst not that bad, wasn't that good either.

When the first p.c.b. version was made the local oscillator overwhelmed the ZN414. This turned its automatic gain control (a.g.c.) fully on and so making the receiver stone deaf!

Unfortunately, it's a truism of electronic design and construction that the first p.c.b. version of any circuit never works. It certainly never works as well as the original cobbled together 'rats nest' prototype, if at all!

By using a transformer instead of a filter in the i.f. strip, I overcame the problem with the local oscillator. It also gave another advantage, an increase in gain.

Although the receiver is a little harder to align with a variable i.f., the advantages of performance outweigh that one disadvantage. I chose a frequency of operation of 1.960MHz as it's the QRP/Novice calling frequency for phone or c.w.

### The Transmitter

The transmitter on the Top Band Tourer is based loosely on the 'Universal QRP Transmitter' from the ARRL's *Solid State Design* book. In this circuit a crystal oscillator using a BC548 transistor drives the BD139 output transistor via transformer coupling.

I found that various small signal transistors were found to be suitable for the oscillator. No doubt, transistors other than the BD139 can be used for the output.

Modulation is achieved by the transistor placed between ground and the emitter of the output transistor. Audio from the microphone is amplified by a single transistor which in turn

drives the modulation transistor.

The modulation transistor changes the current at the emitter of the output transistor. This then varies the amplitude of the output by the audio signal, hence amplitude modulation.

Any low impedance (600Ω) microphone should be suitable, although some microphones are better than others. The performance of a cheap and cheerful standard CB fist microphone was only slightly down on that of a good quality amateur type.

The 5-pole low pass filter on the output has a cut off frequency of 2.4MHz. It produces a clean output with the second harmonic over 40dB down, i.e. less than 100µW, with the third over 70dB down, and other harmonics are too low to measure practically.

Although three pole filters are common in QRP designs, in this circuit the performance of such a filter was inadequate. If I had opted for this approach, additional filtering would have been needed between the radio and antenna.

### Building The Transmitter

It's usual in *PW* to describe building the transmitter first and who am I to break with convention? With this in mind it is probably best to build the crystal oscillator section first, starting with the resistors R5 to 8, capacitors C3 to 6, then Tr1, T1, and XL1.

Fit the relay RL1A, Fig. 3, and diode D1 and make temporary power connections to the board. The diodes D1 and 3 are protection against reverse polarity, but allow the supply voltage to reach the transmitter when it's correctly polarised.

Connecting the push to talk (p.t.t.) line to ground will switch the relay and supply power to

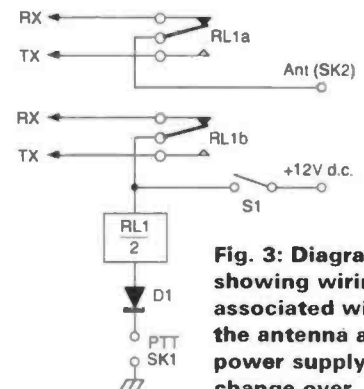


Fig. 3: Diagram showing wiring associated with the antenna and power supply change over relay (see text).

the oscillator. Check the oscillator with either a frequency counter on the secondary winding of T1 or by listening to it on a receiver.

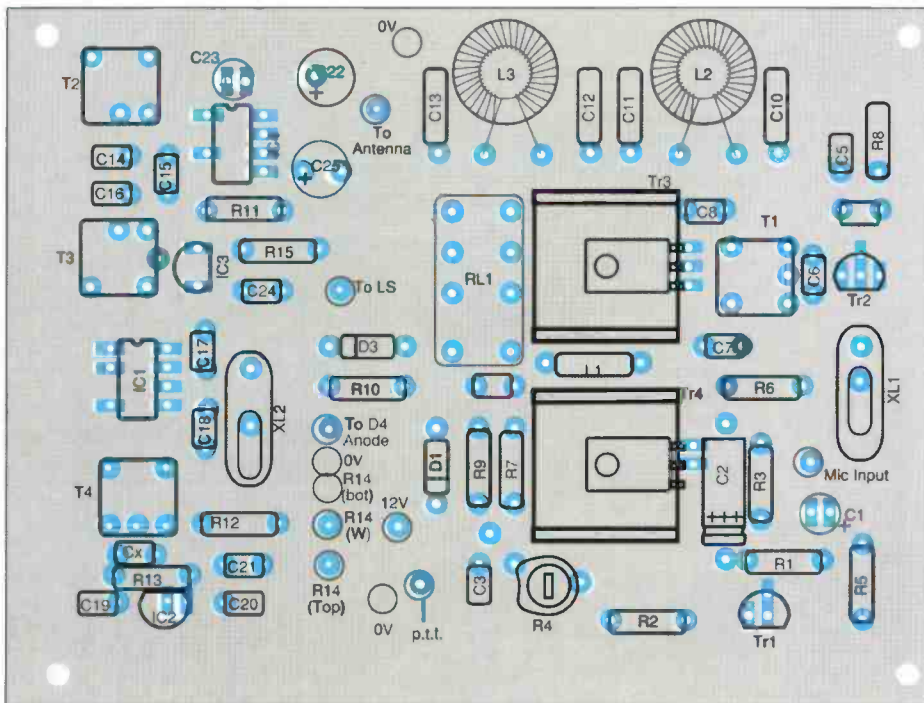
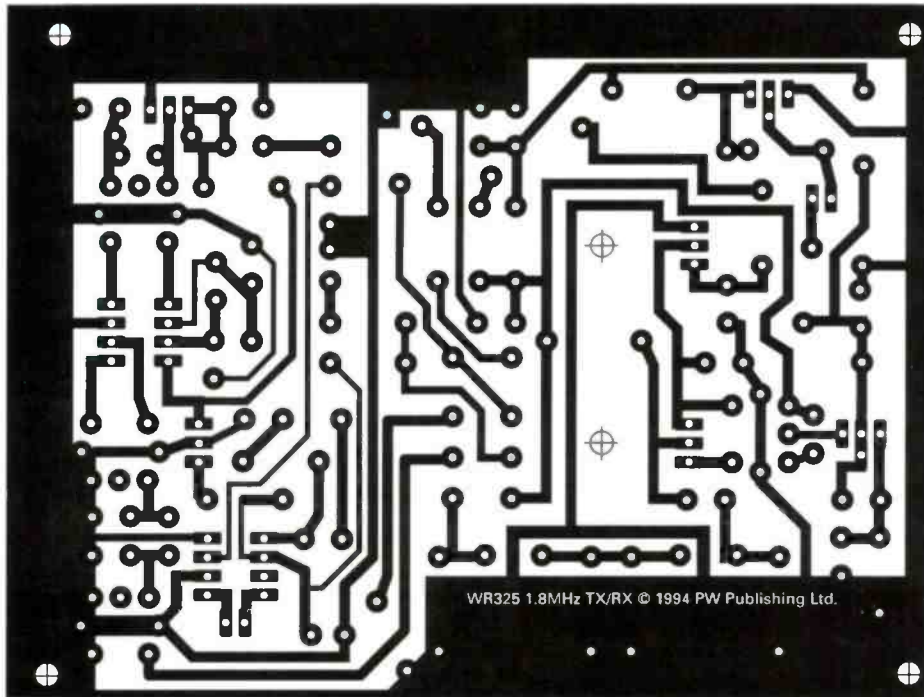
Adjust T1 to ensure the crystal is oscillating on the correct frequency and that it's starting every time. Then you can build the rest of the transmitter.

Ensure the heatsinks are insulated from their transistors with suitable washers. At 1W output the heatsinks are almost redundant, but they provide useful insurance during alignment of the transmitter when the output can reach 4W or more.

When winding the toroids remember, once through the centre is one turn. A prewound choke is specified for L1 to reduce the amount of coil winding. However, this can be made up of 12 turns of 0.25mm 38s.w.g enamelled wire on a small ferrite bead which will work just as well.

# OUT & ABOUT

## With Amateur Radio



**Fig. 4: The p.c.b. and associated overlays for the PW Top Band Tourer a.m. transmitter receiver.**

### Setting Up Transmitter

To start setting up the transmitter, connect a 50Ω dummy load across the antenna and ground points. Two 100Ω 2W resistors in parallel will do.

Set R4 fully clockwise, connect a multimeter set on the 25V d.c. range between the emitter of Tr3 and ground and apply 13.8V d.c. to the board. Ground the p.t.t. line and turn R14 slowly anti-clockwise and the voltage should drop from just below supply voltage to almost zero.

If the voltage can't be varied by turning R14

check that the components are correctly fitted on the board and that there are no dry joints or solder bridges.

As the output transistor is only r.f. driven, the voltage will be zero if the crystal isn't oscillating. If you haven't been able to check the frequency, tuning T1 for maximum output into the dummy load will undoubtedly put the transmitter on frequency.

The power output can be measured using a 1N4148 diode or similar to rectify the r.f. across the dummy load. You can measure the voltage on a multimeter set on the 25V d.c. range.

Now turn R4 fully anti-clockwise and tune T1 for a maximum reading. It should be around 14V, which indicates about 4W output.

Reset R4 for a meter reading of half the maximum voltage reading obtained. This will give a quarter of the maximum r.f. output.

The d.c. voltage between the emitter of Tr3 and ground should be around half the supply voltage. That completes the transmitter for now.

### Building The Receiver

Building the receiver is best done from the audio output stages and working back. So, I advise you to start there with the LM386 chip and its associated components, R15 and C22 to 25.

With power applied and a loudspeaker connected, placing a finger on pin three of the chip should produce a loud buzz. Connect the volume control R14 and fit R11 and the 78L05.

Now check for 5V at the output of the 78L05. You can then fit the ZN414 and its associated components, T4, R12 and 13, C19, 20 and 21. A finger placed on its centre pin should result in several a.m. broadcast stations being heard.

The final stage of the receiver construction is to fit the front end. This includes the i.f. transformer T4, the crystal XL2 and other components around the NE602.

### Receiver Alignment

Now it's onto the receiver alignment. And one way to initially align the receiver is to make use of the automatic gain control (a.g.c.) action of the ZN414.

Temporarily connect the receiver d.c. supply line direct to d.c. input socket so that it continues to operate when the p.t.t. is pressed. Don't forget the dummy load!

Now, with a multimeter set on the 10V range measure the d.c. voltage at the output pin of the ZN414. It should normally be around 1.25V.

Turn the audio frequency (a.f.) gain back to prevent feedback and press the p.t.t. The output from the transmitter will swamp the receiver and the ZN414's a.g.c. will drive the voltage down below 1V.

Next, tune the three receiver coils for minimum voltage. To finally set up the radio it is probably best to enlist the help of another station, unless you have all the appropriate test gear.

### On Air Tests

If all is well, you're now ready to start the on air tests. When the rig is connected to an antenna, if the antenna isn't matched to the output it may affect the power output and modulation.

To balance the r.f. output with the audio drive level, carefully adjust R4 for the best audio quality. This may be done by either listening on a receiver or taking advice from the other station.

No adjustment may be necessary. Power output should remain somewhere around one 1W.

The output transistor seems quite forgiving of seriously mismatched loads. Put it this way, I haven't managed to blow one up yet!

On receive, adjust T2, 3, and 4 for maximum sensitivity. If the other station has a 'black box' set up, be patient whilst the operator works out how to drive it on a.m. You may well end up the

# OUT & ABOUT

## With Amateur Radio

one giving advice on transmitted audio quality!

A suitable box for the PW Top Band Tourer is a Maplin WB2. When mounting the project inside, you can fix the board on stand offs and wire up all the connections to the board.

### Operating Tips

I'll pass on some operating tips now. To start off with a variable i.f. it isn't necessary to have the receive crystal cut to a very specific frequency.

If T4 will tune to 496kHz then a cheap 2.457MHz crystal can be used. It may be possible to use a 2.45MHz ceramic resonator instead of a crystal, thus reducing cost even further.

To obtain coverage of the lower frequencies in the band when using a 2.457 crystal in the receiver requires T4 to be replaced by a Toko RW06A7752EK coil. The capacitor Cx then needs to be fitted to tune the coil to the required i.f. frequency.

Table 1 gives suggested values of Cx for various parts of the band. You might try 1.843MHz, as crystals on that frequency are cheaply available.

Antennas always present a problem on 1.8MHz unless you have a lot of space. With my rig I use a horizontal wire 37 metres long fed by 50Ω coaxial cable, with the outer screen connected to my central heating piping.

My antenna runs about 3m above and parallel to the ground for its entire length. The feed point is in the loft and so it's protected from the weather.

The antenna has an standing wave ratio (s.w.r.) of 1.2:1 at 1.8MHz and 1.5:1 at 2MHz and so I connect it directly to the rig. If you can find the space the antenna works well.

Now, if someone could design a compact (including counterpoise or matching network) self supporting coaxial fed antenna for the band, imagine what we could do!

### Primary Function

In its primary intended function as a round town talk box the Top Band Tourer has been very successful. Reports on audio quality have been very complimentary and the receiver performance is more than sufficient for QRP operation.

It's an ideal portable rig to sneak away on holiday. My XYL won't even notice it in the suitcase!

If anyone out there builds one I'd be interested to hear from you. If you're on packet I'm at GB7SIG, if not, I'll listen out for you on 1.8MHz.

G4SLU

Internal view of the prototype transmitter receiver as built by G4SLU.

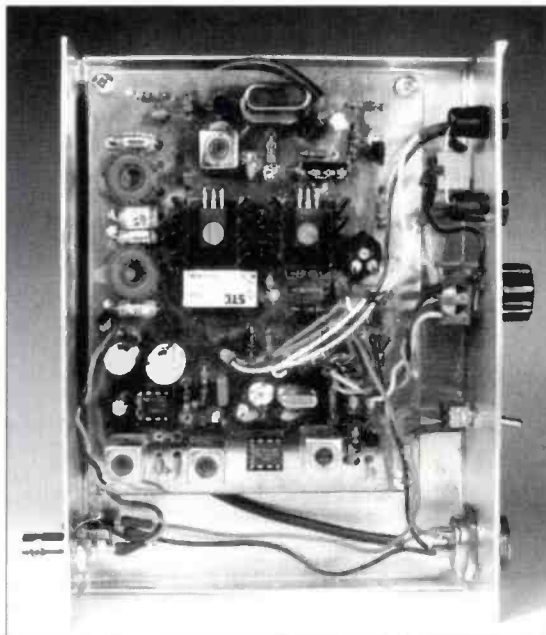


Table 1

Some suggested crystal and component options. Crystal frequencies for transmit and receive. First frequency is that for transmission. Second frequency is that required for reception, to provide correct i.f. The alternative options for T4 are also listed, as are the required values for Cx where applicable.

Transmit. Crystal	Receive Crystal	T4	Cx
1.960MHz	2.415MHz*	YRCS11098	n/a
1.960	2.457MHz	7752	220pF
1.843MHz	2.457MHz	7752	150pF
1.8-1.870MHz	2.477MHz	7752	150pF
1.870-1.940MHz	2.457MHz	7752	180pF
1.940-2MHz	2.457MHz	7752	220pF

\* For i.f. of 455kHz. A ceramic resonator can be used instead of a 2.457MHz crystal.

### Sources & Inspiration

The 'Sudden' receiver by G3RJV *Sprat* (G-QRP Club) 58 p16  
 'Universal QRP Transmitter' from *Solid state Design for the Radio Amateur* by the ARRL  
 'An Experimental AM Transmitter For 1.8MHz'. By GW3MEO *PW* November 1989 p48  
*How To Make Walkie Talkies*. By G3OGR Babani Press  
 The PW Chatterbox. By Rev. G. Dobbs G3RJV. *Practical Wireless* August 1991

### Shopping List

#### Resistors

0.3W 5%

10Ω	1	R15
220Ω	2	R7, 8
390Ω	1	R11
1.2kΩ	1	R2
2.2kΩ	3	R3, 9, 10
4.7kΩ	1	R6
10kΩ	1	R5
12kΩ	1	R12
100kΩ	2	R1, 13

Miniature rotary horizontal mount 10%

47kΩ 1 R4

Rotary 1W 10%

22kΩ 1 R14

#### Capacitors

Miniature disk ceramic

3.3pF	1	C15
150pF	5	C6, 14, 16, 17, 18
390pF	1	C4
1.8nF	1	C5
10nF	1	C20
22nF	2	C3, 24
0.1μF	3	C7, 9, 19, 21

Polystyrene (100V working minimum)

2.2nF	1	C12
1.5nF	2	C10, 13
2.2nF	1	C12
4.7nF	1	C8

Miniature axial electrolytic

1μF	1	C2 (or bead tantalum type)
10μF	2	C1, 23 (or bead tantalum type)
47μF	1	C22
100μF	1	C25

#### Semiconductors

1N4001	2	D1, 3
78L05	1	IC3
BC548	2	Tr1, 2
BD139	2	Tr3, 4
LM386	1	IC4
NE602	1	IC1 (or NE612)
ZN414	1	IC2
I.e.d.s	2	D2, 4 (one red one green)

#### Inductors

47μH	1	L1
KANC3333	3	Tr, 2, 3 (could include an extra one for a T4 alternative)
YRCS11098	1	T4 (if used on design frequency, or KANC3333+Cx)

See text for details of L2/3 winding on T50-2 toroidal cores.

#### Crystals

2.415MHz for the local oscillator (@1.960MHz,) and one 1.960MHz for the transmitter (see Table 1 and text for alternatives)

#### Miscellaneous

Interconnecting wire miniature coaxial cable for both a.f. and r.f., a suitable box to house the project, plugs and sockets and switches to suit, a matched load/power meter or other method of measuring r.f. power. The relay RL1 is a miniature 12V BT (or equivalent) type double pole changeover.

# Making Light Work For Portable Operation

*Rechargeable battery packs provide useful portable power supplies for radio enthusiasts. Here, the PW Technical Projects Sub-editor 'Tex' Swann G1TEX takes time out to describe a system which increases its versatility by including a solar panel charging unit.*



The Innova Electronics Corporation's PowerPack portable battery system tested by Tex Swann G1TEX.

Now that the great British summer is here, many of us would like to take a radio out on a hilltop. Perhaps there are some of you, who would like to try the PW QRP contest, but can't get a vehicle to that choice site you've had your eye on!

Apart from lugging a large vehicle battery to the top of the hill, or listening to the steady (if you're lucky!) roar of a small portable generator, what can be done to provide reasonably portable power?

There's always the option of taking a Rutland wind-driven charger along. These 12 or 24V d.c. generating units are superb, but really need more than two in the team if you intend transporting one easily. But even then, you may want to set up in several places in the course of an afternoon.

## Portable Solar Panel

The portable solar panel and rechargeable batteries made by Innova Electronics Corporation could prove useful for portable operation. With this system I think it's feasible to carry radio, mast, antenna and battery with a recharging unit along with you.

A word of warning though! Let your companion carry the chairs, table, kettle, water

flask, and brewing-up equipment.

The DC PowerPack units are designed as a modular system. So you only need to buy what you need, when you need it.

The system has many separate rechargeable battery units. These battery packs can be charged from a mains unit, rather like those available from portable radios and the like.

For portable outdoor use, you can opt for a solar panel with up to 6W of power available at 12V output, to a power unit to keep the battery topped up.

I've had several of these units to play with over a period of time when the weather has changed from bright sunshine, to torrential rain and hail. Let's face it, little in the way of useful power is to be had from solar panels under the latter conditions!

Before beginning the tests, I'd charged the battery packs from a medium sized mains p.s.u. as one wasn't supplied for review. After that, I used the solar panel to keep the batteries topped up.

## Solar Panel

The solar panel is a 2kg, 460 x 305mm glass panel with a socket bonded to the back. A 1.6m

length of cable, with a cigarette lighter style socket on it attaches to the solar panel.

The rated output of the solar panel is 16.1V d.c. at 400+ mA output. I couldn't achieve these values in my tests. However, the off load output voltage was over 22V and the solar panel was capable of supplying some 350mA+ into a rechargeable battery.

When I first took the solar panel from its very effective packaging, I found only the 1.6m cable with socket. A few minutes later, searching around in the tough reinforcing parts in the pack, I found a short (200mm) double plugged cable. This was ideal for coupling the panel to any device that didn't have a plug lead on it.

## Smallest Pack

The short, double plugged cable means that the solar panel could be used for charging the battery of the smallest (1.5kg, 190 x 80 x 80mm, 3Ah) pack (both of the larger units have a short plugged lead stored in the handle). Using this lead, the solar panel could even keep a vehicle's battery topped up during extensive periods of non-use.

Using the small 3Ah battery pack coupled with a small hand-held rig could make the task of marshalling larger events (such as mobile rallies) easier. At such larger events there are many, mainly fixed control points with a transceiver equipped vehicle parked nearby.

The small battery pack, which has a twist cover over the socket, and a hand-held rig, especially if it has a microphone socket, would become a viable alternative to a mobile rig, on such occasions. A belt clip is a convenient fixture on this battery pack.

The pack and rig combination would last a full day of fairly heavy radio traffic without much need for battery changing. With the rig's batteries alone, some juggling of spare batteries would be needed at some point.



# OUT & ABOUT

## With Amateur Radio

### Bigger Packs

There are other, larger, sizes of battery packs available in the system (2.9kg 250 x 180 x 80mm). These have a 6.5Ah rechargeable battery fitted.

The d.c. rechargeable PowerPack is a little over twice as wide as the small pack. Although it has the same depth as the small pack, a large full width, very comfortable handle means it stands some 60mm higher.

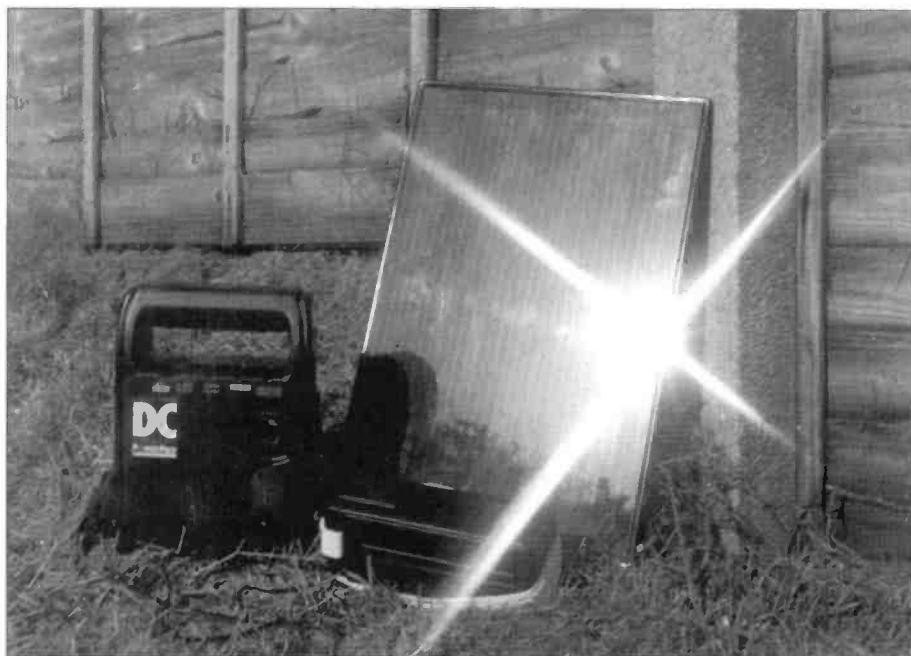
Underneath the handle are three l.e.d. indicators and an on/off switch. The green l.e.d. indicates that power is available, a yellow l.e.d. showing if the unit is being charged, either from a mains unit or the solar panel.

The final, red, l.e.d. comes on to indicate that the unit output voltage is either low, or that the blade type 10A fuse has 'blown'.

### Charger pack

The final unit I had for evaluation, was also a 6.5Ah unit in the same sized box as that previously described. This unit however, has an electronic circuit on board, that may be switched in to artificially raise the output voltage up to 15V. In this mode it may be used to act as a charger unit for other units.

The output current, when operating as a battery unit, is safety limited to 10A with a blade type fuse. When used as a battery charger with a 15V output, the output is electronically limited to 10A.



**The solar panel charging unit provides a useful back up source for charging, even in the British climate!**

The electronic unit also has a switch and three l.e.d.s underneath a broad handle. The switch now has two functions. Switch to the left and it becomes a 12V rechargeable battery unit.

Press the switch to the right position and it then becomes a 15V battery charging unit.

The green and yellow l.e.d.s have two functions, depending on the mode in use. The green l.e.d. now shows, as before, that power is available. Or, when it's acting as a 15V unit, it indicates that power is low and the unit itself requires recharging.

The yellow l.e.d. indicates either charging (of the unit itself) or, that power is being used to recharge another unit. The red l.e.d. then serves to show either that the fuse is ruptured (blown) or that the unit has gone into electronic limit.

### Useful Supplies

In my opinion I think that the PowerPack units and their accessories would make useful portable power supplies, whether it be for clubs or individuals. All units have an interlock

groove with appropriate contacts, down both sides. This feature allows other additional units to be assembled together, increasing the versatility of the system.

Of the additional units, there's a 50W a.c. adapter that may be added, to power mains only units. However, at present, this unit only has a 110V a.c. output suitable for American equipment. (We understand that by the time you read this there will be a 240V adaptor available. Ed.)

Along with a variety of useful clips and straps for other portable equipment, such as video or flood lights, an emergency light is available. This 12V 5W lamp may be operated attached to a battery pack, or up to 15m away via a power cord.

### Versatile System

Various other attachments are to be had to turn these units a very versatile system that would serve almost anybody. You could even run the field day logging computer quite successfully. One of these PowerPacks would make an ideal companion and should run one for the whole of the PW QRP Contest.

My thanks go to Forman Productions Ltd., 62-68 West Street, Dunstable, Bedfordshire LU6 1TA. Tel: (0582) 665718 for the loan of the various items which are available at the following costs: £68.75 for the Solar Panel charger, £38.00 for the 3Ah PowerPack, £42.00 for the 6.5Ah PowerPack and £55.50 for the 6.5Ah PowerCharger PowerPack. All prices include VAT.



# OUT & ABOUT

With Amateur Radio

## Out And About - On HF

I was very fortunate in 1992 to operate h.f. portable from Monaco, a particularly well known and glamorous, location. It also happens to be a fairly rare country in the world of Amateur Radio. Whether operating from a rare location, an unusual WAB square in Britain, or simply a convenient local site, portable operation on h.f. can be tremendous fun.

To ensure a successful operation, some pre-planning is required. And to start off, if you are visiting another country, acquaint yourself with the local licence conditions and make sure you have valid documentation with you.

Modern reciprocal licence agreements make operating abroad much easier than it used to be. However, it's still advisable to check whether local laws affect your plans. This was certainly the case when I visited Monaco. The help and advice I received from **Claude 3A2LF** proved invaluable. Wherever you operate from, remember - you may need permission from the site owner.

### Mobile And Portable

Several modern h.f. transceivers are designed with mobile and portable operation in mind, good examples are the **Kenwood TS-50S**, **FT-890AT** (with built-in antenna matching unit) and the **Ten-Tec Scout**. The modern 12V rigs such as these are ideally suited to installation in a car or caravan, which makes for very easy operating from holiday locations etc. However, you may prefer to use a rig that is not such a drain on the battery - and the bank balance!

I have worked many stations using the **MFJ-9020** single band 14MHz QRP c.w. rig, from some holiday locations such as HB0, SV5, EA6 and 6Y5. This rig is proving a very popular and effective unit which fits easily into a suitcase. Also don't forget the **Mizuho 2W** h.f. hand-held single band s.s.b./c.w. rig (3.5, 7 or 14MHz).

### Back Packing

The only true portable operating is 'back-packing'. This popular pastime (in the United States and Japan) has yet to catch on in this country - perhaps it has something to do with our weather!

**Portable power packs are an ideal solution to power supply problems when operating portable.**



**Peter Barville G3XJS gives you some tips on how to enjoy and organise successful HF portable operating.**

When everything has to be carried, then size and weight become major considerations. Although rigs like the MFJ are small, light and comparatively cheap, you might prefer to build your own equipment. In this way portable operation becomes even more economical, and much more fun.

There are numerous kit manufacturers supplying suitable equipment of various design. Check, for example, the range from **C M Howes Communications**, **Hands Electronics**, **Jandek**, **Kanga Products**, **Lake Electronics**, **Ramsey Kits** and **Walford Electronics**.

Even better - roll your own! Build equipment to the exact size and specification you want. There is an almost endless supply of circuits and designs in the various magazines (including *Practical Wireless* of course!) to help you.

The GQRP Club's quarterly journal, *Spratt* recently published an excellent design for a 7MHz c.w. transceiver (with a 10MHz crystal filter). This c.w. transceiver will fit into a case about 4 x 4 x 2in, can run over 5W output, and can be easily adapted for 14MHz.

### Power Supply

Operating from a car or caravan will generally mean that the power supply is not a problem (until you run the battery flat!). However, operating out of a suitcase or when back-packing probably means having to carry the volts with you.

Sealed rechargeable lead-acid batteries are likely to be the best option, and needn't be too heavy if a small QRP rig is to be used. **Key Solar Panels (of Newport, Gwent)** can supply panels of various sizes which will top-up your battery, or can even be used to run low power equipment (see review of a system for portable power in this issue).



**The Kenwood TS-50S and Ten-Tec Scout 555 are designed with mobile and portable operation in mind.**



The **Mizuho 2W** h.f. hand-held s.s.b. transceiver.



### Antennas

I hesitate to suggest using commercial wire antennas (such as the Sagant single band end fed Zepps), as it is so easy and cheap to construct your own. Single band dipoles could not be simpler to make, and a doublet (a wire top section of almost any length, centre fed with balanced 300 or 450Ω feeder) makes an effective multi-band antenna when fed via a matching unit.

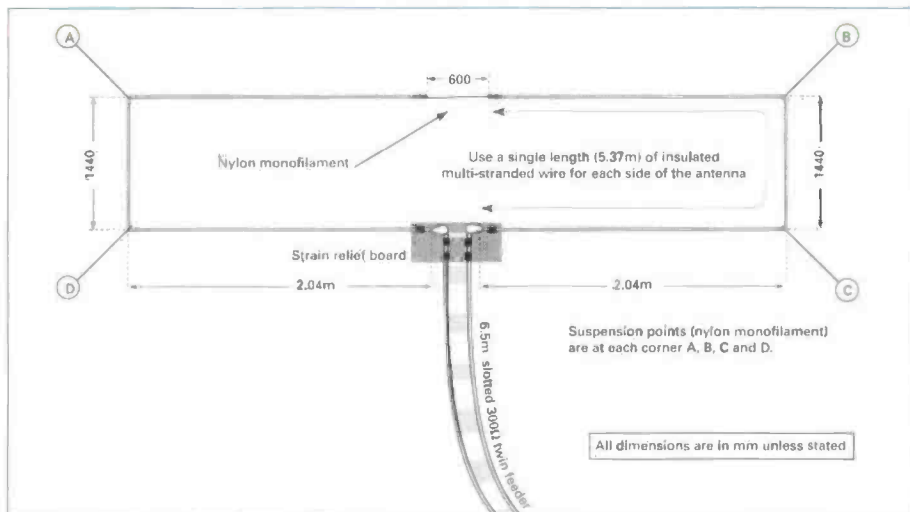
In fact, 'an end fed piece of wire thrown over the trees' will work pretty well! If, however, you are not able to put up an antenna, but have your car with you (as was the case with my trip to Monaco), then a mobile whip (such as the **Hustler**, **G-Whip**, or one of the new **Pro-Am** range) can give surprisingly good results.

Finally, before setting off for lands afar, set up the complete portable station near home and thoroughly test it. Then get out and about, and have some fun! I look forward to working you.

G3XJS

# Simple Indoor Antenna

**Vic Westmoreland G3HKQ, keeps an h.f. antenna in his attic. And although Vic's antenna is cheap and easy to make, he's pleased with the on-air results.**



On moving house, I sadly had to remove my 3-element jaybeam antenna that was mounted 10m above ground. I also had to remove a 43m centre fed antenna and a 2-element wire beam, (some amateurs have an understanding XYL!).

In the garden I had, my antennas had worked well for many years. But I was now moving to a small bungalow with a small triangular corner garden.

I might, in the future, be able to have some sort of beam. And, as gardening is also a great interest, I wanted to get that underway before seeking permission for a beam.

The bungalow seemed great in every respect except for amateur radio. My first foray into the attic left me with the idea where my transmitting antenna would be, for at least the first few months.

## Fair Sized

The fair sized attic is roughly eight metres long and about seven and a half wide. It rises to just over four metres at the apex from just under three at the eaves.

In preparation I fitted a lamp in the attic along with my transmitting gear, a Kenwood 530SP and an Icom 202S. Main operation would be on s.s.b. on a weekly sked with G1ORD and of course c.w. on any available band.

In addition, I also have a WARC band sked with K4KVP fairly regularly. So I erected a dipole for 24.9MHz in the attic, and a halo on a broom handle in the shack for v.h.f.

My shack was a spare bedroom. To check for TVI, a portable colour television was installed and connected by 72Ω coaxial cable to a television socket in the front room about eight metres away.

At my previous QTH, I'd had no TVI problems in 20 years. So not expecting any problems, I put out a quick call on 24MHz c.w.

With the key down, I observed no patterning at all on any of the television channels. There

were just no pictures. The channels were completely wiped out. On s.s.b. later on, there were pictures, but with patterning on all channels.

## Reading Up

The next stage was, of course, to do what I should have done in the first place, and spend time reading up about TVI. Now of course it's called EMC (electromagnetic compatibility, 'noncompatibility' I say!). I also read up about types of antennas that would fit into the attic.

The interference from my equipment seemed to be caused by the feeder cables being too close to the mains supply cables. So, back into the attic I went, (I noted that it seemed easier to climb into after many visits). I tucked the coaxial cable, already fitted with a balun, as far away from the mains cable as I could.

While I was up in the attic, I installed a 28MHz mobile whip. For 144MHz, I decided to use an HB9CV 2-element beam. I followed the same process with these new feeder cables as I'd done with the other cables.

Back into the shack again, I switched on both transceivers. Next in turn I selected a quiet part of the band, and called CQ TVI check.

The XYL (bless her) sat in the room checking the various channels. Eureka! no interference on any channel either on s.s.b. or c.w.

I then spent some time replying to calls on 24.9 and 28MHz. However, results were very poor on s.s.b. and only a little better on c.w.

As expected, on v.h.f. the weekly sked with G1ORD was much improved. Although the 2-element beam had been mounted, and fixed in one direction, several QSOs were made a good number of miles away.

## Antenna Books

Improvements had to be made to the antennas so I sifted through my antenna books for more

information. This time I even checked back through notebooks dating back some 40 years ago.

I've kept amateur radio information since I first become interested in radio all those years ago. Finally, I decided to try a type of centre fed (with 300Ω slotted cable) antenna.

So it was up once more into the attic, as I'd decided to build each leg of the antenna from stranded insulated wire 5.37m long. One end of each wire was soldered to a 6.5m length of slotted cable.

The element wires were taken out in a straight line for 2.04m each side of the feed point. Then bent through 90° running 1.62m down the rafters before turning a further 90° back into an oblong shape. The ends of the insulated wire ending 600mm from each other.

The two ends were connected using strong nylon monofilament. The whole antenna is slung, using more nylon monofilament, from cup hooks screwed into the rafters. The feeder falls at right angles away from the centre of the antenna.

The average height of the antenna is only just about three and a half metres. I'll leave it to the pundits to say what type of antenna it is, but looking at my notes of 40 years ago, my antenna is a Reinartz Loop.

However, in this day and age, the antenna would probably be called a doublet. Whatever it is, the antenna is shown in Fig. 1.

The feeder was connected to a parallel tuned a.t.u. and with this I was able to operate on all bands from 7 to 28MHz including the WARC band. In ten months of operating 'phone and c.w. I've not had any TVI complaints from anyone and my own television receiver and video are clear of interference.

I've kept a fairly regular sked with K4KVP in Wapaca Wisconsin. Looking through my logbook showed KL7, JK1, VY, PY, VU2, UD, VE3, 6 and 7 on c.w. and VO, VE 2, 3, W, and VK7 on 'phone. Some of my contacts were made when there was heavy snow on the bungalow roof.

Don't forget then, the higher the antenna and the more open the area, the better the results will be. If you stick to basic principles of antennas and feeders you'll be surprised at the results you can obtain.

So, if you have a very small garden, as many of us do, try an antenna in the attic, you may be surprised with the results.

PW

# Reasons To Be Cheerful One

**MASSIVE JULY SALE**

The summer months are always quieter than the rest of the year so I thought you couldn't pass by a sale like this one! If you're worrying about the holiday bills, don't worry - for a small fee you can pay a minimal deposit, take the goods away with you and pay for the balance in January 1995!

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The Very Best  
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In association with the distributors, I am pleased to announce a TWO YEAR WARRANTY on all YAESU, ICOM and KENWOOD equipment. In addition, a further 12 months cover is available for a small charge, giving you a total of THIRTY-SIX MONTHS COVER. How's that for confidence?

*Independent Chart July 1994*

## HF TOP TWENTY

	MRP	Sale Price	12 Payments From*	Total Credit Price
Yaesu FT1000	£3499	£2975	only £136.66	£3127.42
Yaesu FT990AC	£2199	£1899	only £87.50	£1999.50
Yaesu FT990DC	£1899	£1649	only £75.00	£1724.50
Yaesu FT890	£1299	£1079	only £49.50	£1133.50
Yaesu FT890AT	£1499	£1279	only £53.33	£1279.46
Yaesu FT840	£879	£769	only £35.00	£804.50
Yaesu FT747GX	£829	£649	only £30.00	£684.50
Kenwood TS950SDX	£3799	£3295	only £150.00	£3447.50
Kenwood TS850S	£1699	£1499	only £68.75	£1574.50
Kenwood TS850SAT	£1849	£1629	only £75.00	£1714.50
Kenwood TS450S	£1399	£1249	only £58.33	£1324.46
Kenwood TS450SAT	£1549	£1379	only £63.33	£1449.46
Kenwood TS690S	£1549	£1369	only £63.00	£1440.50
Kenwood TS690SAT	£1699	£1499	only £68.75	£1574.50
Kenwood TS50S	£999	£889	only £40.50	£930.50
Kenwood TS140S	£899	£799	only £36.66	£839.42
Icom IC781	£4995	£4295	only £195.00	£4487.50
Icom IC765	£2995	£2665	only £121.00	£2784.50
Icom IC737A	£1549	£1379	only £63.33	£1449.46
Icom IC736	£1849	£1659	only £76.25	£1744.50
Icom IC729	£1325	£1175	only £54.00	£1235.50
Icom IC728	£995	£885	only £40.50	£928.50
Icom IC707	£895	£795	only £36.66	£837.42

## VHF TOP TWENTY

	MRP	Sale Price	12 payments From*	Total Credit Price
Yaesu FT736R	£1699	£1325	only £60.50	£1388.50
Yaesu FT290R	£499	£429	only £19.66	£450.42
Yaesu FT5200	£649	£569	only £26.25	£599.50
Yaesu FT2200	£369	£319	Phone!	Phone!
Yaesu FT530R	£499	£399	Phone!	Phone!
Yaesu FT11R	£299	£269	Phone!	Phone!
Yaesu FT41R	£329	£299	Phone!	Phone!
Kenwood TS790E	£1849	£1599	only £73.33	£1679.46
Kenwood TM742E	£829	£729	only £33.33	£764.46
Kenwood TM732E	£689	£599	only £27.50	£629.50
Kenwood TM255E	£899	£799	only £36.66	£839.42
Kenwood TM455E	£999	£879	only £40.00	£919.50
Kenwood TM251E	£389	£349	Phone!	Phone!
Kenwood TM451E	£429	£389	Phone!	Phone!
Kenwood TH78F	£489	£429	Phone!	Phone!
Kenwood TH22E	£239	£209	Phone!	Phone!
Kenwood TH42E	£269	£239	Phone!	Phone!
Icom IC820H	£1699	£1499	only £68.75	£1574.50
Icom IC275H	£1389	£1239	only £56.66	£1299.42
Icom IC475H	£1649	£1449	only £66.66	£1524.42
Icom IC2700H	£829	£739	only £33.33	£769.46
Icom IC2340	£689	£629	only £29.00	£662.50
Alinco DJ580	£499	£389	Phone!	Phone!
Alinco DJ180	£229	£209	Phone!	Phone!

\*With a deposit based on 50% of the DISCOUNTED PRICE.

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AMA-3 200W 13.9 - 30 Mhz	£249.95
AMA-4 100W 1.8 - 4.2Mhz	£399.50
AMA-5 150W 3.5 - 11Mhz	£299.95
AMA-6 150W 6.9 - 24Mhz	£279.95

(E20 Carriage on these items)

### Antenna Tuning Units

SPC-300D Roller Coaster, 300W RMS, 1kW pep	£299.95
SPC-3000D Roller Coaster 1kW RMS, 3Kw pep	£399.95
CFA. Variable frequency antenna	£99.95

And don't forget the high power range of baluns, all ratios.

As Reviewed in  
Radcom July '94



## DIGITAL FILTERS

The full range of Digital Filters including JPS, J-ComW9GR, TimeWave and others are now available. They all fit in line with your A.F. output and are fitted in seconds.

W9GR DSP Multimode filter	£299.00
TimeWave DSP-9 Noise filter	£169.00
TimeWave DSP-9 filter variations	£299.00
JPS NTR-1 Wide band noise & tone remover	£199.00
JPS NFR-7. As above with selectable centre frequency	£279.00
JPS NIR-10. As above with notch filter, removing multiple hets	£169.00

## PACKET & DECODERS

Moving to a larger premises has also enabled us to show off our massive range of new & used datacomms equipment. Here is just some of the range stocked:

AEA PK-900	£549.95	Universal M400	£399.95
AEA PK-232MBX	£385.00	M900	£529.00
AEA PK-88	£169.95	M1200	£399.95
Tiny 2 TNC	£139.00	M8000	£1299.00
KAM	PHONE!!	Momentum MCL 1200	£229.00
KPC-3	£139.00	ERA Microreader	£189.00
MFJ 1278	£339.95		

## MFJ PRODUCTS

Here are just a few examples of their unbeatable range:

NEW MFJ-259 Digital SWR Analyser	£249.00
MFJ-1786 Super Mag. Loop	£299.00
MFJ-949E Antenna Tuner with load	£169.00
MFJ-948 Antenna Tuner	£149.00
MFJ-1278BX All mode Packet controller	£339.95

## NEW AR3030

The AR3030, is the very first in a range of ShortWave receivers from AOR. Using the famous "Collins" filters, the performance over the entire range (50KHz-30MHz) is uncompromised. So get your order in now!



# Antennas Stocked

## THE NEW IMPROVED COBWEBB ANTENNA

The latest design from Steve G3TPW is his new CobWebb antenna, covering 14/18/21/24/28MHz, 1Kw input. Only 8ft x 8ft (when erected), maximum 3:1 v.s.w.r. at band edges, stainless steel fittings and only 6 kilos in weight

## OUTBACKER MOBILE HF ANTENNAS

9561 Outbacker 80-10m 6ft multi band antenna	£189.95
9562 Outbacker (T), as above with TopBand	£219.00
9565 Outbacker Junior, No TopBand, only 4ft	£179.95
9568 Perth 80-10m 7.5ft THE BUSINESS antenna	£199.95
9569 Perth (T), as above, with TopBand. Lovely	£235.00
9671 Sprung Mobile Mount for any of the above	£59.95

## VARGARDA VHF BEAMS

3 ele 6m beam	£85.55	6 ele 70cm beam	£39.00
3 ele 2m beam	£38.35	13 ele 70cm beam	£54.10
6 ele 2m beam	£47.00	19 ele 70cm beam	£76.00
9 ele 2m beam	£61.10		

## CUSHCRAFT ANTENNAS

R7 Vertical, 40-10M now in its mk2 state, it really is a winner	£369.00
R5 Vertical 20-10M, as above, no radials required with this one either	£279.00
A4S 4 ele Beam, for those who take H.F. seriously	£428.00
A3S 3 ele Beam, almost as above!	£349.00
A3WS 18/24MHz 3 ele beam	£275.00
D3W 10/18/24 MHz rotary dipole	£179.00

## VALOR PRO-AM

PHF-160 Enormous 160M Centre Loaded Whip	£54.95
PHF-80 Almost as big 80m Centre Loaded Whip	£24.95
PHF-40 The nuts nuts on 40m, at a mere	£22.95
PHF-20 The way to DX (safely) on 20m	£19.95
PHF-15 You guessed it, the same but on 15m	£19.95
PHF-10 I'll give you one guess	£19.95
AB-5 5 bander 10-80 in one antenna. It works!	£89.95
BB-2 Massive Spring mount for L.F. Whips	£49.95
116-NP gutter mount with 3/8 thread	£6.95
142-ADP Body mount with 3/8 to SO239	£9.95

## THE TAIWAN SYRENE ANTENNA SELECTION

The perfect answer to either a mobile or base station aerial. The quality is at the top but the prices are still some 20% lower than the competition. We now have a full range of mounts. Call in or Mail Order.

### MOBILE RANGE

TSM-1005	2m 7/8th	5.2dbi	1.89m long	£34.95
TSM-1320	2m/70cms	2.1/3.8dbi	0.44m long	£21.95
TSM-1310	2m/70cms	2.1/5.0dbi	0.80m long	£29.95
TSM-1326	2m/70cms	2.1/5.0dbi	0.77m long	£29.95
TSM-1332	2m/70cms	4.5/7.2dbi	1.50m long	£44.95
TSM-1607	2m/70cm/23cms	2.8/6.0/8.4dbi	0.78m long	£49.95

### BASE RANGE

TSB-3002	2m (2 section)	6.5dbi	2.87m long	£44.95
TSB-3003	2m (3 section)	7.8dbi	4.50m long	£69.95
TSB-3303	2m/70cms	3.0/6.0dbi	1.15m long	£49.95
TSB-3302	2m/70cms	4.5/7.2dbi	1.79m long	£69.95
TSB-3304	2m/70cms	6.0/8.4dbi	2.15m long	£89.95

# Just Arrived

If you live in the South, I'm sure you've spotted the "Orange" advertising. It's a personal digital telephone system operating at 1.9GHz. You can make and receive calls just like your home phone and unlike Cellular, there is no monthly rental charge. Billing is in "second" increments and the call charges are between

22 and 38% LOWER than any Cellular phone.

Unlike Cellular, the system is digital so your local scanner enthusiast will not be able to listen in! There are two hand phones available, the Motorola at £249 & the Nokia at £299, including VAT. Both are in stock and part-ex your ham gear is no problem.



If you've been promising yourself, (or your missus), a phone for work or home, (just think of the security if you're by yourself travelling somewhere), the monthly costs start from only £17.63 and include fifteen minutes of calls.

**CALL NOW ON 0973 339339**  
If you want a demo!

orange™

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# Buy From Martin Lynch!

£10 Carriage On All Large Items



# "Please Sir - What's Amateur Radio"?

Imagine the scene, early evening on a hot summer's day, a field on a hillside near Tenbury Wells in Shropshire, the sun beginning to set behind the rolling hills in the distance. The only sounds to be heard are those of 80 energy-filled 12/13 year olds hastily finishing their meals, eager to get rid of this new-found energy on the evening's activities.

"What on earth am I doing here?" was the thought that flashed through my mind, not for the first time that afternoon. Somewhere among the crowd was my wife who had conned er.....suggested that I might like to come along on the second year school camp and demonstrate amateur radio to the pupils (and staff). Now, I thought I had escaped all this when I left teaching after a stretch of 15 years to start my own amateur radio business.

After a long shrill whistle blast, silence reigned and the pupils were told of the plans for the evening: 'Those who are interested in finding out about amateur radio should go with Mr and Mrs Pearson' came the instruction I had been waiting for. There had not been enough time to set up antennas and the like, so I had parked my car at the top of the field.

The equipment I had was a Trio TS-130V transceiver and a G-whip mobile antenna. The idea was to give a general talk/question and answer session, followed by a practical demonstration.

## Worked With Children

Now, if you've ever worked with children, you will know that if one or two decide to do something, then all of their friends have to come along as well! So, there we were, Jane (my wife) and I, heading up to the top of a hill in the dusk of the evening, followed by no less than 20 eager-looking pupils (reminiscent of mother hen and all the chicks!).

It was obvious that all these people were just not going to fit inside a Nissan 'Sunny' Estate, so we headed for one of the minibuses. Once settled, I began asking how many of them had heard of Amateur Radio. I got the usual reply: absolute silence (well, I always did have that initial effect in the classroom).

Then a small, lone voice came from the back of the minibus, 'I have, Sir'. We all turned to see where the voice came from. Its owner, a lad now bubbling with importance, proceeded to tell us about Jamboree On The Air (JOTA) and how the local radio club had taken over the Scout hut, decorating it with pieces of hanging wire called antennas, in order to talk to other groups around the world. One of the girls then joined in: 'The Guides did something similar.....'. I suppose two out of 20 was reasonable; or was it?

The next question, 'Who's heard of CB?', got the expected unanimous affirmative response. Quite an interesting comparison between two hobbies. Perhaps the way in which they had been

*Derek Pearson G3ZOM tells his story of an Amateur Radio session fitted into a school trip aimed at promoting our hobby to the young.*



**Busy building a simple medium wave receiver.**

publicised? Of course, these youngsters had probably never heard of Tony Hancock either!

## Whole New World

Anyway, the next couple of hours were spent talking about this whole new world of amateur radio. I had previously prepared some information and worksheets on various aspects of the hobby, including language, Q-codes, Morse, call signs and log-keeping, to name a few. The various sheets appeared to be well received.

The time arrived for us to migrate to the car and have a listen on the h.f. bands. Turns were taken at attempting to tune into 'Donald Duck' signals which were emanating from the loudspeaker. A strange silence had fallen over the group; 'were they all asleep'?

I gazed around and saw the looks of deep concentration on all the faces. Even the ones peering through the windscreen were fascinated. I heard one of the staff, who had now arrived on the scene, remark, 'Well, I've never seen this lot so quiet'.

## Demonstration Course

Finally, I attempted a few QSOs. The demonstration station course struck, as usual, (somebody's grass-root law, no

doubt). No-one wanted to talk to me. In the end I managed one QSO, which delighted the, by now, half frozen audience, after which we called it a day. Off they all went towards welcome hot drinks, clutching their handouts and murmuring to each other 'diditdidit didit.....'.

The next morning, with no-one around, I put out a CQ on 7MHz and immediately had two replies (I think it's the same law). It wasn't long before some of the youngsters from the previous evening gathered around the car, again with the same look of interest. Perhaps it had been worth freezing half to death on top of a Shropshire hillside after all.

## Follow Up

As a follow up event, I decided to try out a lunch-time radio club, perhaps as a fore-runner to a Novice Licence course. Eight of the pupils who had accompanied me on the hillside now regularly attend the club and have been building a simple medium wave receiver. I have become a registered instructor and intend to offer a Novice course, initially to these youngsters (and Jane).

Having had time to reflect, I can offer the following thoughts: (a) Amateur radio will have to be presented to our youngsters, they will not go looking for it. (b) Introductions to the hobby must be followed up, or the effort will have been wasted. (c) Although the initial response may be very promising in terms of numbers, expect a high drop-out rate; remember, it is still a specialist hobby. (d) If you are intending to operate a demonstration station, check band conditions to make contacts more likely. (e) Those youngsters who had experienced sloppy CB operation were attracted by the more formal etiquette of amateur radio. (f) Only one of the eight regulars at the school club is a girl, despite the fact that half of the original group were female.

With hindsight, a number of things could have been done better, but there is the satisfaction of knowing that a few people know a little about amateur radio. Indeed, some of them now have the opportunity of trying it out for themselves, via the Novice Licence.

G3ZOM

**Derek Pearson and his lunch time radio club.**



## The PW Jubilee 14MHz SSB Mobile Transceiver Part 5

I'm now describing the final stages of the Jubilee transceiver. So, I think it's a good time to mention the original reasons and ideas behind the project.

The Jubilee transceiver was primarily designed as a 'test-bed' and as an expandable project. I've even managed to get one going on 50MHz!

I've not described any methods of frequency display, power amplifier or c.w. mode circuitry. These extras can be added by the individual constructor and they may even be the subject of future articles.

### Power Amplifier Stage

The p.a. stage I used was a Cirkit HF PA kit and I have modified it slightly for the Jubilee. (Send a large A4 envelope, marked 'HF-PA Modifications', to the PW editorial office address for details). Another suitable p.a. stage kit is available from Hands Electronics (see address opposite).

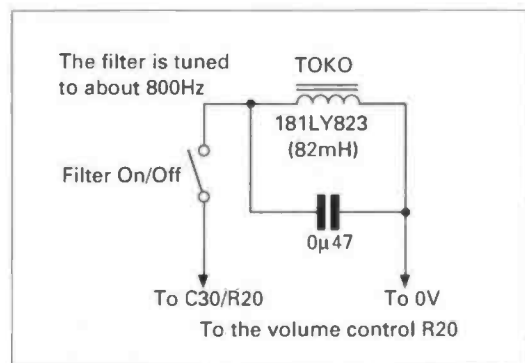
The Jubilee is capable of producing c.w. and I hope to produce an add-on circuit in the future. I'm also hoping to make an automatic gain control (a.g.c.) circuit as an add-on to enhance operation of the project.

### Relay Switching

So, I'll finish up the main constructional phase of the Jubilee by mentioning the basic relay switching circuit (Part 2, April issue of PW) and leaving you with two simple little add-on circuits.

The relay switching circuit published in Part 2 of the Jubilee project, does not warrant its own p.c.b. I recommend that you hard wire this stage of the project onto a suitable area

**Fig. 5.1: An add-on 800Hz c.w. filter suitable for the PW Jubilee (see text).**



of the transceiver. In practice, you'll probably find that the rear panel on the casing will prove to be suitable.

Finally, I have the two add-on circuits. They're both very straightforward and can help increase the versatility of the Jubilee.

The first add-on is for a simple 800Hz c.w. filter, **Fig. 5.1**. It's extremely basic but can help improve c.w. reception when you're working in difficult conditions.

Receiver incremental tuning is another useful facility on any transceiver. With this in mind I've provided the simple modification shown in **Fig. 5.2**. Again, this is a simple project but it can help a great deal. It's particularly useful to incorporate the r.i.t. if you intend to use the Jubilee with c.w. operation in the future.

I hope you enjoy building the PW Jubilee. There's tremendous satisfaction to be had when you build your own equipment. Keep building and keep that soldering iron hot!

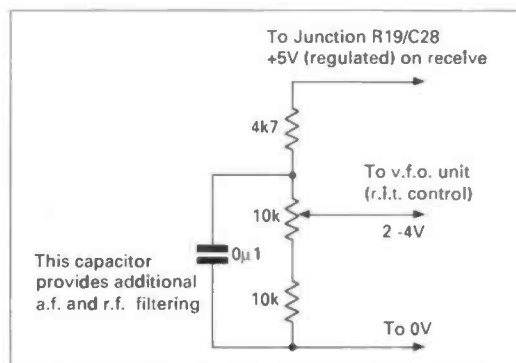
**G3RJV**

*Continued on page 38*

### Kits, Cases & Bits

A case suitable for the Jubilee project is available from **Hands Electronics at 'Tegryn', Llanfyrnach, Dyfed, Wales SA35 0BI. Tel. (0239) 77427**. A kit of parts for the transceiver will also be available along with modules (including a v.h.f. option) to allow the transceiver to be used on other bands. For further details contact Sheldon Hands at the above address.

**Fig. 5.2: A suitable RIT circuit for the Jubilee transceiver (see text).**



In the final part of the Jubilee the Rev. George Dobbs G3RJV describes the finishing touches to his mobile transceiver. This time George provides a shopping list, information on specialist components and drops one or two hints on how versatile the Jubilee will prove to be for its owner.

# Jubilee Part 5

Continued from  
page 37

## Printed Circuit Boards

A set of P.C.B.s for the Jubilee will be available from Badger Boards. Please see advert on Page 67.

## April Issue

Unfortunately, there was a error made on the Jubilee drawing in **Fig. 2.4**, in the April 1994 issue of *PW*. In that diagram, point K of the circuit is shown as being: "From antenna (via changeover)". This should have read "From C35 and filter FL1".  
*My apologies for the error. Editor.*

## Shopping List

### Resistors

#### Carbon Film 5% 0.4W

5.6Ω	1	R21
56Ω	1	R44
100Ω	4	R16, 17, 18, 19
330Ω	2	R29, 30
470Ω	3	R9, 10, 26
1kΩ	5	R2, 3, 4, 5, 41
4.7kΩ	3	R14, 25, 28,
10kΩ	8	R7, 8, 11, 12, 27, 36, 39, 40
27kΩ	1	R15
33kΩ	1	R42
47kΩ	2	R22, 23
100kΩ	5	R31, 33, 34, 35, 38
220kΩ	2	R1, 6
1MΩ	1	R24

#### Miniature Preset

200Ω	1	R43
10kΩ	1	R20
47kΩ	1	R37

#### Rotary 1W linear track

4.7kΩ	1	R13
47kΩ	1	R32

### Capacitors

#### Miniature Ceramic

2.2pF	1	C76
4.7pF	1	C82
6.8pF	2	C58, 60
12pF	3	C56b, 59b, 61b
15pF	2	C74b, 77b
22pF	1	C90
56pF	1	C56a
82pF	1	C59a
100pF	4	C25, 61a, 74a, 77a
470pF	1	C37
1nF	6	C7, 10, 41, 42, 75, 78
10nF	30	C5, 6, 15, 16, 17, 18, 19, 26, 29, 35, 46, 51, 52, 53, 57, 62, 63, 64, 65, 66, 68, 69, 70, 71, 72, 73, 83, 85, 94, 95
100nF	21	C8, 9, 20, 21, 22, 23, 24, 27, 28, 33, 36, 38, 48, 50, 54, 55, 79, 80, 91, 92, 93

#### Close tolerance polystyrene or polyester

27pF	2	C1, 13
150pF	4	C3, 4, 11, 12
390pF	3	C87, 88, 89

#### Miniature preset

2-22pF	1	C84 (or 3-30pF)
3-30pF	2	C2, 14 (or 2-22pF)

#### Variable Jackson C804 type

25pF	1	C86
------	---	-----

#### Electrolytic

1μF	2	C30, 47
2.2μF	3	C39, 40, 45
4.7μF	3	C49, 67, 81
10μF	1	C32
47μF	2	C43, 44
100μF	2	C31, 34

### Semiconductors

1N914	2	D17, 18 (or 1N4148)
1N4148	12	D5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 19
2N2222	2	Tr1, 2
2N3819	1	Tr5
7805	1	IC2
78L06	2	IC5, 11
78L09	1	IC8
BA244	4	D1, 2, 3, 4
BB405	1	D16
BC238	2	Tr6, 7
J310	1	Tr3
LM386	1	IC4
MC1350	1	IC1
MFE201	1	Tr4
NE602/612	1	IC3
SL1640	1	IC7
SL6270	1	IC6
SL6440	2	IC9, 10

### Inductors

1mH	3	L1, 2, 9
K37X830	6	T2, 3, 4, 5, 6, 7, (6.3mm o.d. toroidal cores)
		<b>T1</b> is 5+25t individually wound 0.25mm enamelled copper wire.
		<b>T2/3/4/5</b> consist of 8 turns trifilar wound 0.25mm 932s.w.g.) enamelled copper wire.
		<b>T6</b> is 4+26t individually wound 0.25mm enamelled copper wire.
		<b>T7</b> is 10+2t individually wound 0.25mm enamelled copper wire.
KANK3334	1	L8
KANK3335	5	L3, 4, 5, 6, 7

### Miscellaneous

A suitable power amplifier for the Jubilee is available from Cirket (ref: HF PA order No. 41-00903) or from Hands Electronics (see separate panel). Also required: a suitable box for the whole project, interconnecting wire and coaxial cable, a loudspeaker or headphones, plugs and sockets and control knobs to suit. Crystals 8.9975 and 9.0025MHz plus 9MHz 2.2kHz bandwidth filter. A suitable filter is available from the G-QRP Club. Filter (cost £16, complete with l.s.b. and u.s.b. crystals, inclusive of P&P) and further information from: **Rev. George Dobbs G3RJV, St. Aidan's Vicarage, 498 Manchester Road, Rochdale, Lancashire OL11 3HE.** Suitable relays (as none are mounted on the p.c.b.s).



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DY867	1.50	EL509	10.00	QV02-6	19.50	6R66	2.25	6SS7	3.00
E88CC Mull	8.50	EM34	12.00	QV03-10	5.00	6R66	2.00	6J8A	1.50
E180F	4.50	EM81	4.00	QV03-10 Mull	15.00	6R66	3.50	6V6GT	4.25
E810F	25.00	EM84	4.00	QV03-20A	25.00	6R67	6.00	6X4	3.00
EABC80	1.95	EN91 Mull	7.50	QV03-40A Mull	25.00	6R8A	4.00	6XSGT	2.50
EB91	1.50	EN91 Mull	7.50	QV03-12	10.00	6B57	6.00	12A17	3.00
EBF80	1.50	EV51	3.50	U19	10.00	6BW6	4.50	12A17	3.00
EBF89	1.50	EV86	1.75	UABC80	1.50	6BW7	1.50	12A27	3.00
EBL31	12.50	EV88	1.75	UBF89	1.50	6BZ6	2.50	12AX7A GE.	7.00
ECC33	7.50	EZ80	1.50	UC442	4.00	6C4	1.95	12BA6	2.50
ECC35	7.50	EZ81	1.50	UCH81	2.50	6C5	6.00	12BE6	2.50
ECC81	3.00	GYS01	3.00	UCL82	2.00	6C6A	3.00	12BH7A GE	6.50
ECC82	3.00	G232 Mull	8.50	UCL83	3.00	6C6GA	5.00	12BY7A GE	7.00
ECC83	3.00	G233	4.50	UF89	3.00	6CL6	3.75	12E1	15.00
ECC85	3.50	G234 GE	7.50	UL41	12.00	6CG7	7.50	12HG7 12GN7	6.50
ECC88 Mull	6.00	G237	4.50	UL84	2.00	6CH6	6.00	30FL172	1.50
ECC91	2.00	KT61	10.75	UY41	4.00	6C94	8.00	30P19	2.50
ECC92	1.50	KT66	12.50	UY85	2.25	6D6	5.00	300B(PR)	120.00
ECC95	3.50	KT88	15.00	VR105/30	2.50	6D05 GE	17.50	57Z8	70.00
ECH42	3.50	N78	9.00	VR150/30	2.50	6D06B	12.50	605	50.00
ECH81	3.00	DA2	2.70	Z759	35.00	6E8A	3.50	807	8.00
ECL80	1.50	DB2	2.70	Z803U	25.00	6E85	1.85	811A	15.50
ECL82	3.00	DC3	2.50	Z021	3.50	6F6	3.50	812A	65.00
ECL83	3.00	DC3	2.50	302B	20.00	6G6	4.00	813	27.50
ECL86 Mull	3.50	PCF80	2.00	4CX250B STC	45.00	6H6	3.00	833A	85.00
ECLL800	25.00	PCF82	1.50	5R4GY	6.00	6HS6	4.95	866A	25.00
EF37A	3.50	PCF86	2.50	5U4G	5.25	6J5	3.00	872A	20.00
EF39	2.75	PCF81	2.50	5V4G	4.00	6J6	3.00	931A	25.00
EF40	5.00	PCF82	2.50	5Y3GT	2.50	6J7	4.00	2950A GE	10.00
EF41	3.50	PCF83	2.00	5Z3	4.00	6J86A GE	19.00	5751	8.00
EF42	4.50	PCF84	2.00	5Z4GT	2.50	6J8GC SYL	20.00	5753	10.00
EF80	1.50	PCF85	2.50	6A85	25.00	6L6GC Siemens	4.50	7025 GE	7.00
EF85	1.50	PCF86	2.50	6A86	6.00	6L6GC GE	12.50	7027A GE	17.50
EF86	7.50	PCF87	2.50	6A87	9.50	6L7	3.00	7199	10.00
EF91	1.95	PD500	6.00	6A88	2.00	6L6	20.00	7360	25.00
EF92	2.15	PL36	2.50	6A95	5.00	6K06 GE	22.50	6550A GE	17.50
EF183	3.00	PL81	1.75	6A96	4.50	6L6G	8.50	6883B GE	16.00
EF184	2.00	PL82	1.50	6A97	3.25	6L6GCSYL	12.50	6973	11.00
EL32	2.50	PL83	2.50	6A98	6.00	6L6GCSYL	12.50	6973	11.00
EL33	10.00	PL84	2.00	6A99	9.50	6L7	3.00	7199	10.00
EL34 Siemens	8.00	PL504	2.50	6A99	9.50	6L7	3.00	7199	10.00
EL36	4.00	PL508	8.50	6A99	9.50	6L7	3.00	7199	10.00
EL390	25.00	PL509	6.00	6A99	9.50	6L7	3.00	7199	10.00
EL81	5.00	PL519	6.00	6A99	9.50	6L7	3.00	7199	10.00
EL84	2.25	PL802	6.00	6B7	4.00	6SC7	3.00	786B	12.00
EL84 Mull	6.00	PY81	1.50	6B8	4.00	6SG7	2.50	8417GE	17.50
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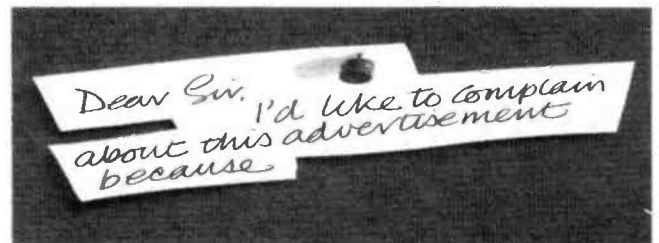
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# Specifications

## - The Mysteries Explained

Ian Poole G3YWX continues with his look at noise factors and figures.

Last month I took a look at noise factor and noise figure. I mentioned that the noise figure is widely used for specifying the noise performance of receivers, receiving systems or parts of systems such as pre-amplifiers. In fact its flexibility is one of the reasons for its widespread use.

### Noise Contributions

Before taking a look at some simple calculations used for finding the complete noise figure of a receiving system, it's worth seeing which parts of the system are the most important from the noise stand-point.

It's probably easy to imagine that the first amplifier in any receiving system is the most important. Any noise that it produces will be amplified by the following stages. In these early stages where the signal levels are much lower, any noise that is produced can easily be of a level similar to the signals.

In the later stages of the receiver set the signal levels will be very much higher. Even the noise produced by a relatively poor amplifier will often not give any noticeable effects.

As a result of the importance of the noise performance of the early stages of the set, many people like to build or add their own low noise pre-amplifiers. This ensures that the best performance is achieved.

### Calculations

Nowadays it's quite a simple matter to calculate the overall noise figure of a system containing a number of different parts. Possibly the most common example for the radio amateur is the addition of a low noise pre-amplifier to a v.h.f. or u.h.f. receiver or transceiver.

It's most likely that all the figures required to calculate a figure for the system will be given in decibels. The first part of the calculation is to convert the figures back into simple ratios. The noise figure will have to be converted back into a noise factor and the

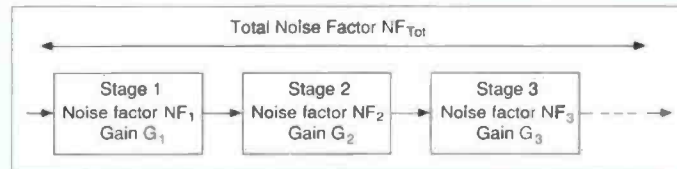


Fig. 1: Noise factor of several stages.

gain as a simple factor by which the input signal is multiplied.

Once the figures are in the required format the overall figure can be calculated using the formula below:

$$NF_{Tot} = NF_1 + \frac{NF_2 - 1}{G_1} + \frac{NF_3 - 1}{G_1 \times G_2} \dots$$

In this formula  $NF_1$  is the noise factor of the stage one and so forth.  $G_1$  is the gain of the first stage etc.

To show how the formula works, let's take the example of a receiver with a noise figure of 3dB. Working back from decibels this becomes a noise factor of 2.

A pre-amplifier with a noise figure of 1dB (noise factor of 1.25) is added to the front end of the set. This has a gain of 10dB (or simply 10 times gain). These figures can now be slotted into the formula so that it becomes:

$$NF_{Tot} = 1.25 + \frac{2.0 - 1}{5} = 1.45$$

This can then be converted back into decibels again to give  $10 \log_{10}(1.45)$  (1.35) i.e. a noise figure of 1.3. This shows that although the noise figure is not quite as good as the pre-amplifier on its own, the overall performance of the receiver has been improved quite considerably.

### Another Factor

Unfortunately another factor has to be taken into account when considering the whole system. This new factor to be considered is the feeder. At frequencies in the v.h.f. or u.h.f. region feeders can introduce a considerable amount of loss.

It may not be unusual for a reasonable length of good quality coaxial cable to introduce a loss of three decibels or more on

430MHz. This will simply degrade the noise figure by the same amount as the losses introduced.

Take the figure 3dB as an example. This would give the overall system a figure of 4.3dB!

To reduce the effect of the loss many people use a preamplifier at the antenna end of the coaxial cable. In our calculations of the previous example this has the effect of reducing the gain of the amplifier by 3dB (or half) to a factor of five. This means that our new noise figure will be:

$$NF_{Tot} = 1.25 + \frac{2.0 - 1}{10} = 1.35$$

In turn this gives a noise figure of 1.6dB. Even though this is not as good as just the receiver with its pre-amplifier on its own, it is a great improvement on the system with the feeder loss included and the pre-amplifier at the receiver end of the feeder.

### More Difficulties

Obviously there are a few more difficulties when using a mast-head pre-amplifier. Power has to be supplied to the remote amplifier as well as a means of putting the amplifier into a bypass position for transmitting. Fortunately this is relatively simple to achieve by passing power up the centre of the coaxial cable and using the braiding for the negative.

When power is present the amplifier is turned on and switched into the circuit. Then when the power is removed the switching returns the amplifier to its bypass state. The amplifier must be placed in a weatherproof container as it will have to live outside very near to the antenna.

In view of the added complexity and the fact that people who go to the lengths of a masthead pre-amplifier will ensure that it is of the highest quality, mean that these amplifiers are normally more expensive than the indoor variety fitted at the receiver end of the feeder. However, the calculations show that the added expense to be well worthwhile if top performance is needed.

PW

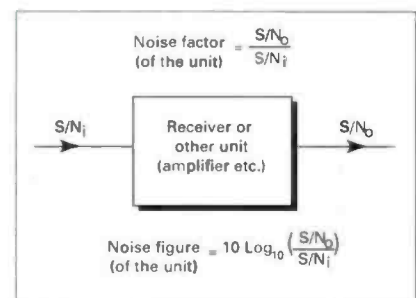
### Apology

A small but significant error crept into the drawing, Fig. 2, on page 36 of the June '94 issue of PW. The fractions in both descriptions of Noise Factor and Noise Figure, were inadvertently turned upside down.

Towards the bottom of column two, in the paragraph beginning 'The noise factor is simply the degradation...'. the statement is correct. However, in the middle of column three, the paragraph beginning 'To illustrate the noise factor...' should now read:

'To illustrate the noise factor expressed in decibels, the signal to noise ratio at the output is 3:1 and at the input it is 2:1. This would give a noise factor of 3/2 and a noise figure of:'

We apologise for the mistakes and for any head scratching they may have caused. Editor



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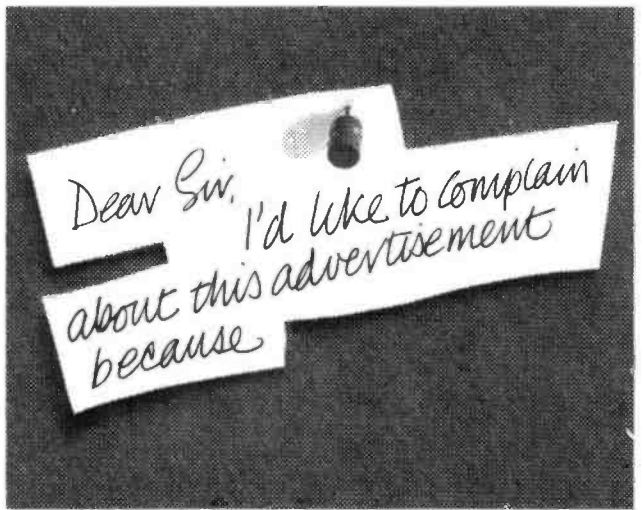
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# Back To The Drawing Pin Board - A Field Strength Meter

Steve Ortmayer G4RAW returns to his drawing-pin board once again. This time Steve's come up with an ever useful project - an easy-to-build meter which can provide relative indications of the strength of an r.f. field.

A field strength meter is very useful to have around the shack. It can be used to give a visual indication of whether that 'magic stuff', r.f. radiation, is present and where it's going.

The field strength meter, despite only providing a relative indication of field strength, can be a big help in tuning antennas to resonance. They're especially helpful when you're adjusting mobile antennas fixed to cars.

The field strength meter can also be used to give an indication of the front-to-back ratio of beam antennas. This can be of great help, particularly when you're setting up a quad-loop antenna.

## Sniff Stages

The field strength meter can be used to 'sniff' r.f. in the different stages of a transmitter. Used as a wavemeter it can search for harmonics in a transmitted signal.

Basically, this field strength meter is just a tuned circuit which can be switched to different bands. The switching is achieved by using a crocodile clip.

Two diodes are used in a voltage doubler mode. These provide d.c. to move a small meter to provide an indication of the relative strength of the r.f. which is present.

## The Method

Let's now take a look at the method of construction I've used for the project. With the drawing-pin-and-board method, the components are laid out to follow the circuit diagram and are soldered to drawing pins pushed into the wood base.

It can be quite difficult to solder directly to drawing pins, so you can make it easier by fixing solder tags under the pins. The

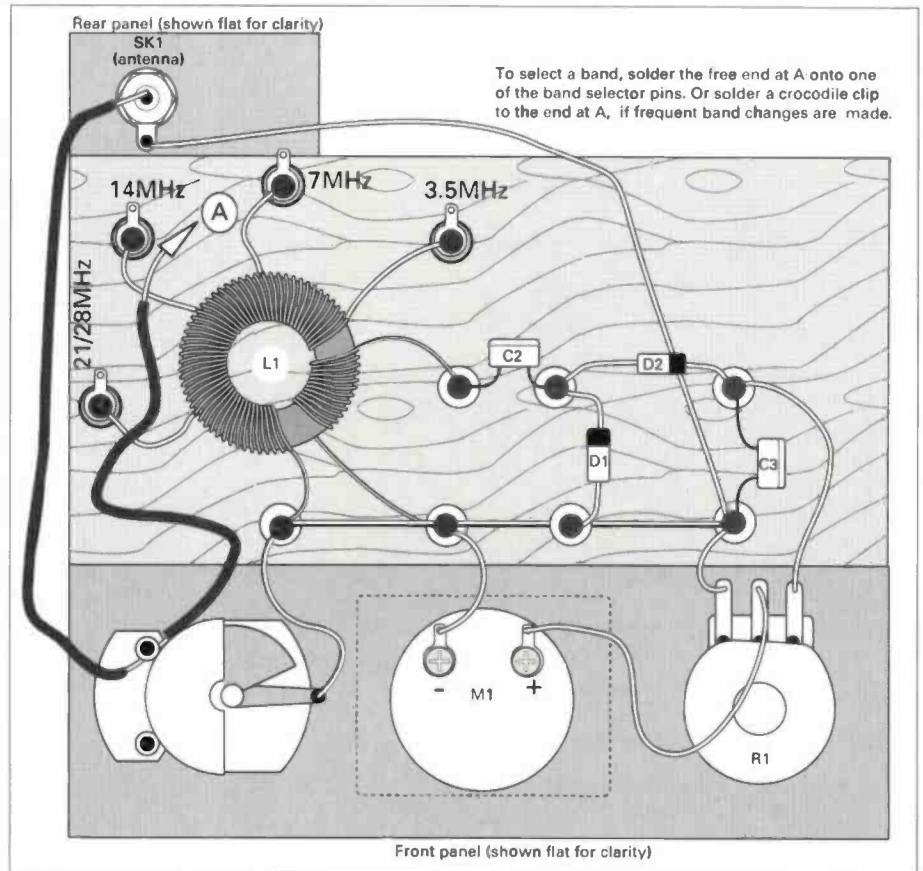


Fig. 1: Diagram illustrating the drawing pin and board method of construction used by G4RAW. (see text for guidance on soldering drawing pins). Although primarily aimed at being a Novice project, the field strength meter can be constructed using a suitable p.c.b. or hard wired to suit individual constructor's requirements. Note: The main front panel and the small rear panel are both shown flat for clarity in the drawing).

component leads can then be hooked onto the tags to hold them whilst they are soldered.

However, one of the advantages of the drawing pin system is that the beginner can learn soldering skills. The drawing pin is exceptionally robust and can take all the soldering you'll likely to throw at it!

The best advice I can give is that you use new (straight out of the packet) pins. As they'll be clean, the drawing pins will be easier to 'tin' with solder.

My advice is that you tin (this means flowing the molten solder all over the round top of the pin) the drawing pin. Once the pin has been tinned, allow it to cool. Because of the large surface area of the drawing pin, this will take up to 20 seconds, so take care and don't burn yourself! **Make sure the drawing pin is cool before you touch it with a finger.**

Once the drawing pin is tinned, you don't need to melt all the solder on the

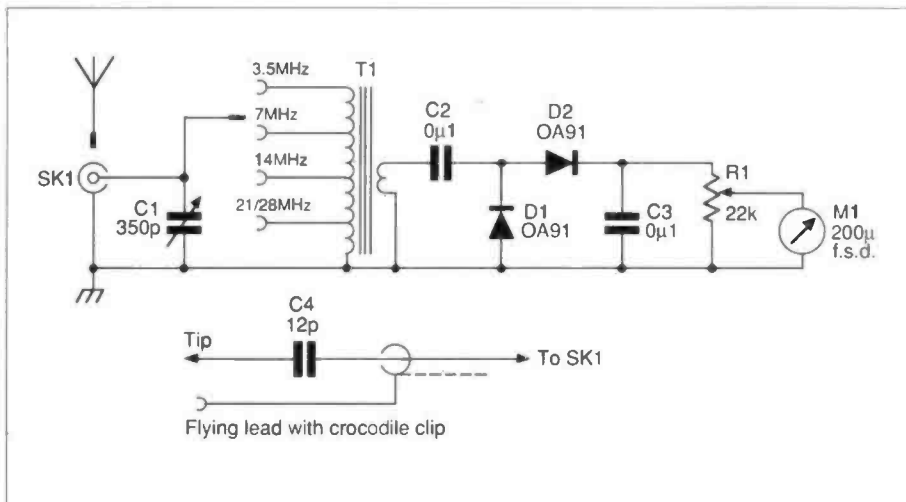
surface to make a solder connection. To make a successful joint, all you need to do is to apply the soldering iron bit on the top of the pin, melt a section of the solder and make the joint.

Soldering with drawing pins takes a little practice for the newcomer, but that's what it's all about! Within a very short time you'll find it's a simple, reliable technique and be able to melt only the solder in the area you require on the drawing pin, leaving connections you've already made untouched. Try it and see.

## Toroids And Taps

The T68-2 toroid is wound with a total of 50 turns. The taps are formed by twisting the wire back on itself at 10, 18 and 36 turns. The secondary winding is five turns of insulated multistrand wire wound over the primary winding.

The wiring can be made up from



**Fig. 2: Circuit of the simple field strength meter constructed by G4RAW using the drawing pin and board method (see text for coil tapping connection).**

22s.w.g. insulated copper wire with some thin flexible wire for the crocodile clip. You can also use a crocodile clip as a heat sink to protect the diodes when soldering them.

The input is through J1. I used a phono socket; and a small whip antenna can be made up or a probe lead with a small capacitor to make direct connections.

A sniffer could be made up from a few turns round a surplus toroid when this is held near the r.f. circuit it should give an indication.

### Testing And Use

When complete and checked, the meter can be placed near an r.f. source. This could be provided by a low power transmitter and the crocodile clip connected to the tapping and the variable capacitor, C1, tuned for a peak.

When I first tried out this simple circuit, I tried the meter as a wave meter by tuning it to 14MHz. I then 'sniffed' at the r.f. from a home-made 7MHz transmitter and adjusted the variable resistor, R1, to give a full scale deflection on the meter.

I was, of course, sniffing the first harmonic of the 7MHz transmitter. I then fixed a simple harmonic filter to the

transmitter and repeated the experiment.

The meter only now deflected half scale as I had effectively removed most of the harmonics by attenuating them with the simple filter.

The FCC in the USA specify that the first harmonic should be 40dB down on the fundamental. I wonder if my simple device had provided a 40dB reduction!

However, even though the field strength meter, used in this mode, is not a precise device, it's a great aid to tuning up. You can at least ensure you are putting the majority of your signal out on the band you wish to use.

When you're tuning up a transmitter, by checking for harmonics (especially the second) you can soon find the tuning positions where (if you did not use the wavemeter) you could be radiating most of your signal on the wrong band.

### Not As Clear

The UK licence is not as clear as the FCC licence in the USA. The British DTI licence says: "the emitted frequency of the apparatus comprised in the station is as stable and as free from unwanted emissions as the state of technical development for

### Shopping List

#### Resistors

Rotary 1W 10%  
22kΩ 1 R1

#### Capacitors

Miniature disk ceramic  
0.1µF 2 C2, 3  
Variable  
350pF 1 C1 (any value around 300-500pF will work)

#### Semiconductors

OA91 2 D1,2

#### Miscellaneous

A small 200µA meter (from an old tape recorder), a toroidal core T62-2, a block of wood offcut, two pieces of p.c.b. material for the front and back panels, various drawing pins, interconnecting wire, a crocodile clip, a suitable plug and socket for the back panel.

amateur radio apparatus reasonably permits".

I operate a simple home-made station, often with parts from scrap equipment. The DTI have recently said that they will re-introduce station inspections for amateur radio. I can't wait to hear their comments on the 'state of technical developments' of my 'home-brewed' gear!

I hope you find this very simple but instructive project to be helpful. It was originally intended as a Novice project, but of course, there's nothing to stop anyone from making up a suitable p.c.b. rather than use the simple prototype approach of the 'Drawing Pin Board' projects.

In fact, I'll be very pleased if you, to quote the Rev. George Dobbs G3RJV, "Keep your soldering iron hot" and build this meter in whatever form you find most useful. Have fun, keep building and enjoy amateur radio!

G4RAW

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The Computer  
in Your Shack

This month Peter Hunter GOGSZ keeps busy by supplying you with printer and batch file information.

# BITS & BYTES

You've certainly kept me very busy after the May issue of 'Bits & Bytes'. Not only have I had lots of enquiries regarding the XT computers, but also (so far!) well in excess of 120 requests for a copy of **Hamcomm**.

A short, important, reminder is needed here. When writing to me with questions that need/require a reply, **you must include a stamped & self addressed envelope for a reply!** After all, my advice and time is completely free! so I can't afford to supply the stamp as well. The s.a.e. request also applies when sending a disk for a program offer, the return address label (or envelope) is just as important as the stamp. So, if you have had to wait a few months for a reply, you now know the reason why, Hi.

## Printer Information

I've received quite a few letters recently asking for printer information. Because of this I've decided to make printers the theme of a complete column (or series of columns) in the near future.

So, if any of you have any strange stories to tell, printer problems, or any printer info, I'll be glad to hear from you. Also, I'm always glad to receive photographs from you.

Any shack and or printer/computer photographs will be put to good use. So, if you need info about hanging a printer on the back of your computer, 'watch this space!'

## Batch Files

Many of you who are new to PCs and without knowledge of batch files, quickly get a bit fed-up. It's a chore having to type in a long string of

commands every time you want to run the same program.

I say PCs because most other computer types such as Apple, Amiga, Atari etc., come with a pre-installed Graphical User Interface (GUI). This is a selection of pictures (icons) on the screen. To use it you just move the mouse pointer to one of the icons, click the mouse button and the program runs.

A GUI is fine if you have no desire to know what the computer is doing, or how it's doing it. Microsoft realised the desire for such 'ease of use' several years ago, which is why they created **Windows™**. But if you want to have some control over what happens then you need to tell the computer what to do. Hence the need for these long strings of commands.

## Program Directories

An example of what I mean is that you may keep all your amateur radio programs in a directory called **Radio**. You may have sub-directories for various categories such as **packet, Morse, logbooks, etc.**, and then have the actual program in their own sub-sub-directories under each heading.

For example, you may have the program **Hamcomm** in a directory called **Hamcomm**, which is in itself in a sub directory called **data**, which is in the **radio** directory. Each time you want to run **Hamcomm** you have to type:

```
cd\radio\data\hamcomm
<Enter>
```

Then, when you have finished using the program, you have to type **cd\** to get back to the root directory.

You can see the problem with this, apart from anything else you have got

to remember **exactly** where the program is. Also, if you get the spelling of **any** of those names wrong, DOS will greet you with the familiar '**Bad command or file name**' and leave you puzzling over what's gone wrong.

Enter the **Batch File method**. By entering all of these commands and names into one short file, and by giving that file a simple and easy name to remember, you save heaps of typing because all you have to type to run that program is the name you gave it.

A batch file can be created with almost any text editor or word processor (though it **must** be saved as an ASCII file (plain text with no other characters) or file word processor command characters). Or, for simple, short batch files, you can just type it at the keyboard.

The important thing to remember is that batch files **must** have the extension **.BAT** otherwise DOS won't obey them. So, to type in a simple batch file at the keyboard for running the **Hamcomm** program, as described above, you would type: **C:\>copy con hc.bat**  
**<Enter>**  
**cd\radio\data\hamcomm**  
**<Enter>**  
**hc <Enter>**  
**cd\ <Enter>**  
**cls <Enter>**  
**^Z <Enter>**

The command '**<Enter>**' means press the enter key, this is **not** something that should be typed in. The first line tells the computer to make a file called **hc.bat** and copy everything that is typed at the keyboard into this file, until we reach the end of the file. The second line tells the computer where to go in search of the required program.

The third line is the command for running the program. The fourth line is not executed until you have finished using **Hamcomm**, this tells the computer to go

back to the **ROOT** directory of your drive. The fifth line says 'clear the screen and leave it blank', and the last line is obtained by holding down the **Control (Ctrl)** key and pressing the letter **Z**, this is the 'end of file' command that tells the computer you have finished typing. This **^Z** can also be obtained by pressing the **F6** key.

After entering the **Ctrl+Z** you will be greeted with the words: **1 file copied**. This lets you know the file was saved successfully. From now on, whenever you want to run **Hamcomm**, instead of a long string of tedious typing, you only have to type **hc <Enter>** and all the work is done for you.

This example is meant to be just that, an example of what can be done. Experiment, and have fun. Let me know the results of your experiments, no matter how long or short, simple or complex. Anything of real interest will be published for the benefit of all.

## New Program

To round off I've just received a program for review, called **SpiceAge for Windows**. It's a circuit design simulator. No time or space for this month, but I hope to include full details in the August issue of **PW**.

That's it for this month, keep the letters, FAXs, packet's and 'phone calls coming, and don't forget the **NEW FAX number. 73 to all, de Peter Hunter GOGSZ, 2 Mayes Close, Bowthorpe, Norwich NR5 9AR. Tel: (0603) 748338, Fax: (0603) 740800 or GOGSZ @ GB7LDI.#35.GBR.EU.**

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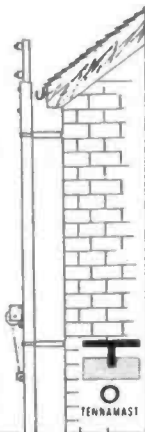
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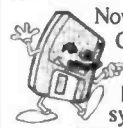
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# Valve &

In this month's column, Ron Ham takes a look at one of his favourite Second World War transceivers - the Canadian 58 set.

Welcome to the world of vintage wireless, hot valves and a warm workshop! I'm continuing my Second World War theme by taking a look at a military transmitter-receiver which is rather special to me.

One of my favourites from the Second World War is the Canadian 58 set, which was made by Addison Industries in 1943 for infantry use, (right) Fig. 1. This set is a compact and well laid out transmitter and receiver.

The 58 set uses six miniature glass valves (1 x 1R5, 3 x 1S5 and 2 x 1T4) which I described in the April issue. It also uses two specials (1299A) with loctal bases. Unusually, permeability tuning is employed by the 58 set for the 6-9MHz range.

Briefly, permeability tuning dates

back to the 1930s (I found a reference in *Wireless Terms Simply Explained*, by 'Decibel', published in 1937). The system was used in a variety of car radios for many years after the Second World War.

To remind you, there's no variable capacitor in the permeability type of tuning. Instead, the wanted frequency is selected by moving an iron dust cores in and out of tuning coils.

### Focal Point

A three-range meter is the focal point of the front panel of the 58 set, with a six-way test switch on its right. This switch enables the operator to test the condition of the power supply and the general workings of the set.

Valve failure would show up



Fig. 1: A trio of Second World War military radio equipment. The 18 set (left), 38 set (centre) and the lesser known Canadian 58 set (see text).



Fig. 2: The Canadian 58 set with its associated back-pack vibrator power supply unit (left).

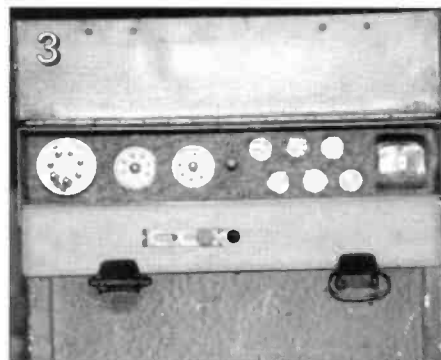
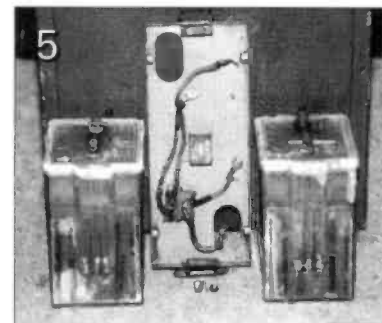


Fig. 3: The 58 set power supply unit (see text) also had room for various spares, including valves.

Fig. 4: The entire 58 set power supply assembly shown removed from the back-pack casing (see text).

Fig. 5: The 58 set used 2V accumulators for primary power. The built-in 'floating ball' hydrometers can be seen on each cell (see text).



among the readings on the test meter. And to allow further investigation, the chassis comes out of the cabinet by first unplugging the large connector on the right of the front panel and then undoing four (two each side) winged screws, shown in Fig. 2.

The meter is calibrated 0-300V which covers the sender (180V) and receiver (90V) HT, 0-3V for the LT (1.5V) and 0-30mA which is adequate to measure the sender (23mA) and receiver (7mA) h.t. current.

The transmitter output is adjusted 'for maximum smoke'. This is achieved by adjusting the output trim knob immediately below the meter.

The receiver volume control and antenna trimmer are on the upper left respectively and the send/receive switch is at the bottom centre between the two main slow-motion tuning dials (RX left, TX right).

The main on/off switch is on the left of the case, Fig. 2, above the power input socket. Operating instructions and the expected meter readings are provided inside the lid.

While the set is stationary, as in Fig. 2, the send/receive switch was

hand operated. When the lid was closed with the troops on the move, it was press-operated by the mechanical arrangement seen in the centre of the lid in both Figs. 1 and 2.

In my opinion, the 58 was another transceiver, just like the 19 and 38 sets, which was ahead of its time. The 58 in Fig. 1 stands next to the 38 and 18 (left) sets, also designed for infantrymen to carry.

### Power Supplies

The power demand by portable valved equipment is considerable. It has to come from a convenient source with a reasonable life.

The 18 set has a combined h.t./l.t. dry battery in the base of the framework under the transmitter. The 38 set has a similar battery kept in a signals-satchel (centre Fig. 1) with a lead between the set and the bag.

Together with the actual sets, were weighty replacement batteries, cases of spare valves and the headsets and microphones. These all had to be carried in additional satchels around someone's neck!

# By Ron Ham Vintage



**Fig. 6:** The control panel on the 58 set enabled the operator to select either 'A' or 'B' or both accumulators by the central switch. They could be charged from a 6V d.c. source via the adjacent 4-pin socket.

Power for the 58 set is derived from a back-pack and/or self-standing vibrator unit, left in Fig. 2. This was driven by a pair of 2V wet accumulators.

Much thought was obviously given to 58's power-pack. For instance, although the lid must open to release the vibrator unit for repairs and the accumulators for replacement, it's also deep enough to carry the spare fuses, valves, and vibrator, Fig. 3.

Compare the area above the latches in Fig. 2 with the same in Fig. 3. There are identical flaps and small inspection holes each side of the unit.

The latter, are marked A and B and are used to see the state of each accumulator, lower left Fig. 2. The power lead to the set comes out via the left-hand flap and the unit control panel is adjusted through the one on the right.

## Pack Combined

The vibrator-pack is combined with the accumulator case, Fig. 4. The individual units are held together by a pair of latches and electrically joined by a 4-pin plug and socket.

Take a look at the base of the socket and the connecting wires which can be seen on the battery container lid in the centre of Fig. 5. The whole power assembly (left in Fig. 4) is slung inside the case on four rubber mounts (top and bottom Fig. 4).

The power assembly is removed from the case by releasing the clips that secure the lower mounts to the case. The upper mounts slide into rests, but it's an awkward job to lift it out.

Be careful, because the case cannot stand up by itself. So, have some help nearby and be prepared to unclip the lower battery unit and separate the two immediately. If you're doing this job take care and avoid contact with the accumulator acid. Do not lay the battery box on its side.

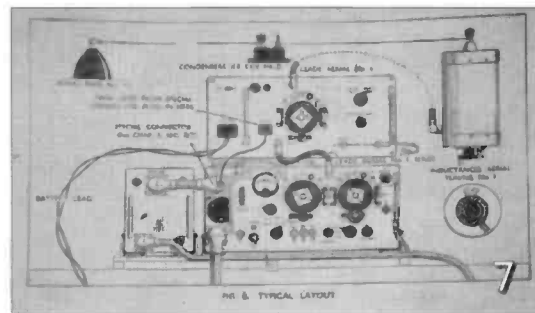
## Battery Box

The top of the battery box, centre of Fig. 5, is retained by four screws. The connecting spades must be removed from the accumulator terminals, two on each, Fig. 5, before they can be lifted out of the box.

The 58 set accumulators were specially constructed with an area designed to protrude through each side of the battery container, centre of box Fig. 4. These areas acted like a hydrometer with three floating coloured balls just visible at the bottom of the cells in Figs. 4 and 5.

Briefly, the hydrometer worked like this: when all three balls were up, the accumulator was fully charged. Two up indicated it was used and all down meant it was flat. The balls could be seen through the A and B windows on the main case.

The battery control panel, left in Fig. 4 and centre Fig. 6, enables the operator to select the A or B or both accumulators by the switch on the vibrator unit and, charge them from a



**Fig. 7:** The RF No. 2 radio frequency amplifier was developed for use with the 19 set. The unit had its own rotary transformer supply unit and employed four 807 valves under the military designation of ATS25 (see text).

6V source by inserting a lead in the adjacent 4-pin socket.

## Two Operators

Two operators were able to use the 58 set. The leads, with the robust 4-pin metal connectors, coming from the power-input plug, Figs. 2 and 6, are for their combined headsets and microphones.

The headphone-microphone set fits comfortably in the palm of the hand. They include an upper lip spacer-bar to ensure the correct distance between the mouth and the microphone.

Finally, there was also a canvas pack of antenna rod sections. This was attached to the back of the lid and, when assembled, plugged into a large block on the rear of the set.

## High Power

Even though they are well known, it's not generally known that a high-power r.f. amplifier was developed for the 19 set to increase the range of its transmitter. The unit, called RF No. 2, used four ATS 25 (807) valves.

The RF No. 2 amplifier had its own internal rotary transformer to produce the required 600V h.t. In use it was connected between a variometer and the antenna input to the main set.

The r.f. amplifier unit stood on top of the main casework, Fig. 7. It was placed in a convenient position for the operator to adjust the central tuning control and the wave change switch. Frequencies bands were selected either by the 2-4.5MHz or 4.5-7.6MHz ranges.

The rotary transformer inside the amplifier was fed from a separate battery. The tuning control matches those on the main set and, like them, can be tuned manually or flicked to a predetermined fixed frequency.

Selecting the fixed frequency was achieved by presetting four

screws in the centre of each control. Then the operator moved a small lever on the right of each tuner between tune at the top and flick at the bottom.

The addition of the RF No. 2 unit meant changing the standard 19 set variometer for Inductance Aerial Tuning No. 1. This also required a special connector between the set and its own rotary-transformer power unit.

## Valve Information

My thanks go to Mr S. C. Tyler for sending some sheets of valve information and one of Bernards circuit books from the 1940s. I could not thank you by post because there was no address on your letter. However, I have passed these goodies on to the Honourary Curator of the Vintage Wireless section at the Amberley Chalk Pits museum.

## Vintage Gremlins

Finally, you may have heard former Second World War radio mechanics and elderly radio engineers (like myself!) refer to the 'gremlins'. Legend has it that these mythical 'bug like' creatures get into, and mess about with) wireless systems.

Gremlins cause great annoyance to the engineers. However, one must have followed me into retirement and taken a fancy to column two of the March 'Valve & Vintage'!

Although I stated (correctly) in the second paragraph that the valves in the 18, 38 and 46 sets have 2V filaments, the last line of the column suggests they have 2.5V filaments which is Wrong. Sorry about that mistake.

I've run out of space and it's time to 'shut the vintage wireless 'shop' once again. But don't forget you can write to me at any time at 'Faraday', Greyfriars, Storrington, West Sussex RH20 4HE.

*Report*

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*Paul Essery GW3KFE says (rather mysteriously) that this month's hint has nothing whatever to do with operating, but could involve elbow grease and a paint brush!*

This is the time of year when you have at least a sporting chance of dropping all the antennas. You could then be giving them and their supports a full service, and a lick of paint as appropriate.

Check your mast guys carefully while everything is down; both the ends and the middle. Old rope can always be used for other purposes, but if a guy 'lets go' for want of a check-over the result can be expensive in more ways than one.

Remember that rope and coaxial cable jackets dislike ultra-violet light. Coaxial feeder is cheap enough; inspect it carefully, and if the braid looks to have gone green, replace it with new and try a better waterproofing technique.

Sleep secure when the wind blows. And you'll be fresh for the fray!

**Question For The Month**

The \$64 question for the month is 'Just what is going on 7MHz?' The noises are being heard over something like a half of the band up in the north of GM.

The noises on 7MHz defy all attempts at decoding. Locally and in GW, signals are showing a meter S9+40.

Are we seeing a recurrence of the parked jammers of the Cold War years? Just what is happening on 7MHz?

**Conditions**

Conditions are still bad, with several spot-less days and coronal holes. There seems to be some sort of solar restructuring going on at the time of writing.

Ted G2HKU, in the Isle of Sheppey summed band conditions up neatly "sounds as though the antenna isn't connected at times"! Still with G2HKU, he

**Angie G0HGA now uses an Icom IC-735 in conjunction with a half-sized G5RV antenna.**

has been fitted with some more plastics parts in hospital, and must hence sell his AMP linear...buyer to remove from the shack, as Ted can't.

On the bands, Ted's been busy at 70W on 7MHz working K8CW and C080H. His 14MHz operation yielded 4K1F for South Shetland. Above 14MHz Ted's HF6 was used, so on 18MHz it dealt with 3B8CF and Y19CW.

Ted's 21MHz operating drew A71CW as 'pick of the pops' and 24MHz yielded ZD8M and HK7AAG, plus EA8AF at the 5W level. Finally up on 28MHz, Ted landed Z21HS and C91J.

Down in Yeovil, Somerset, Don G3NOF found all bands poor, even 3.5 and 7MHz having deep fades.

On 14MHz I note he worked BZ5HAG, and 701AA (who is, I hear, legal) while 18MHz saw PY0FM booked in. Don's 21MHz signals provided the Pratas Is. BV9P expedition, and on 24MHz CN8EC.

Working up on 28MHz Don made it to CX7BF and D3C. On a different tack, G3NOF mentions Yeovil club member 5H3DC is back on-air from Dar-es-Salaam after a year's lay-off. He looks for Gs from 1500 on Tuesdays around 14.150MHz. 5H3DC incidentally is the joint holder of the world air speed record for helicopters, made as far back as 1986

Another to comment on the lousy conditions is Angie G0HGA in Stevenage. Angie now has an IC-735, to a half-sized G5RV, a 14MHz dipole or the top half of a W3EDP against earth. Apart from skeds, this time I see



just two contacts in her report: 4U1VIC operated by PA0SOL and K1RM.

Getting his long-wire up to 19m above ground kept Leighton Smart GW0LBI in Trelewis amused for an afternoon. He was assisted by seven-year old son Dewi and a catapult.

To try his long wire out, GW0LBI used 1W of sideband on 1.8MHz, working EI5HK, G13LFH, GM3DXU who gave Leighton better than 59, G3YXM.

On the c.w. side power at GW0LBI varied from 5W down, for EU3EU, PA0DML for country number 20 on the band, G13LFH again, OK, ON and DJ, EU, EW and EV prefixes by the way are the new ones for Belarus.

**Letter From Dieter**

A nice letter came from Dieter DL2BQD in Schwedt, Germany. Dieter has been in UK, on a teacher's course at Chorley, Lancashire and at Canterbury where he first met PW.

At home, DL2BQD has an FO4, in a residential area where there are five-storey house blocks. So, his antenna is 'relatively' in the clear, and some 20m high.

Somebody must have been working on Dieter, as DL2BQD is a member of the G-QRP Club - Good! In addition he also has gear for v.h.f. and u.h.f.

**News Of Passing**

Hardly had we got over the surprise of the death of Lloyd Colvin, than news comes in of the passing of more of the Greats. Eva

Perenyi PY2PE, died on April 1, after being seriously ill for some months and undergoing treatment both at home and in Europe.

I've heard that Katashi Nose KH6IJ succumbed to a second stroke on April 7. I doubt if there is anyone in the field of DX and particularly contest operating who hasn't worked Nose at some time.

**Rwandan War**

At the time the Rwandan civil war broke out, F6EXV was booked to stay there until the end of May. Fortunately, just as I was posting this month's column to the office...I heard that F6EXV had escaped from Rwanda, but his equipment, personal belongings and logs are believed to be still in Kigali.

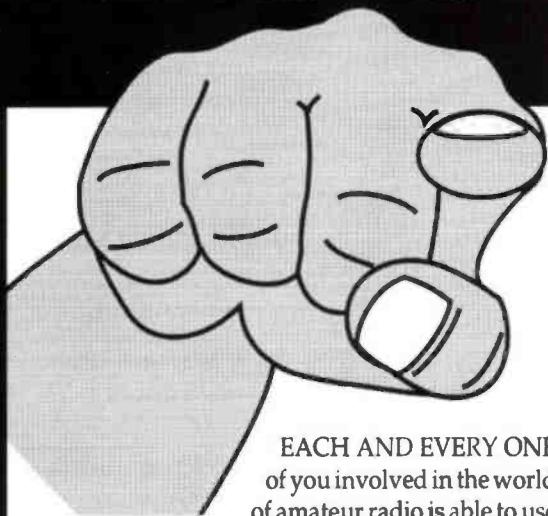
**Convention**

Here's a date for your diary: the HF and IOTA Convention, over 7-8-9 October, at Beaumont Conference Centre, Old Windsor, Berkshire. Further details from: Neville Cheadle G3NUG, Tel/FAX: (0442) 62929.

That's it for this time. Keep active and don't forget to send your reports on the bands to me (by the middle of the month please) at: PO Box 4, Newtown, Powys, Wales SY16 1ZZ.

**E N D**

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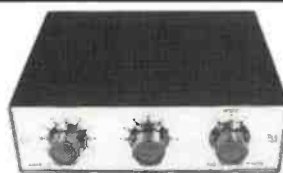
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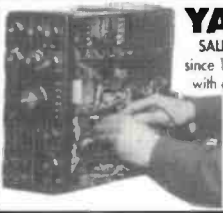
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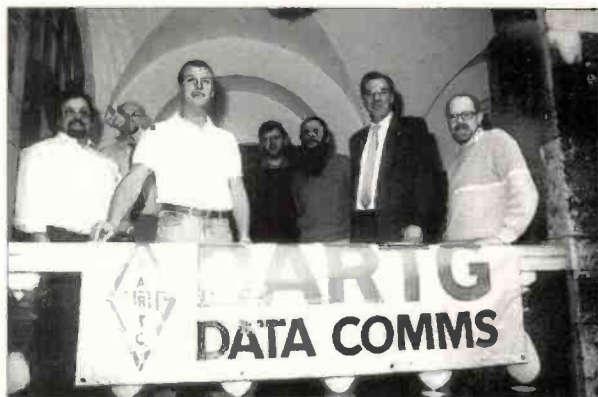
Panorama

PACKET

Fig. 2. AMSAT Symposium in Surrey 1993 seen left to right. Jim G4BDW, Andrew G8TZJ, Sysop of GB7LAN and Jim G3WGM.



Roger Cooke G3LDI, takes his regular look into the world of packet radio.



Unfortunately, due to the recession, Packet Panorama has been dropped to a bi-monthly column.

However, if you feel differently, please feel free to write with your views to the Editor. Either way, it would prove interesting, as all news I receive from quarters such as Siskin, Amdat, readers letters and phone calls and my book sales, seem to indicate that packet is increasing in popularity all the time. Don't just sit there, pick up a pen and write!

*(Editorial Note: Please see references in 'Keylines' and in 'Receiving You'.)*

**BARTG News**

Ian Brothwell G4EAN has now handed over the task of publicity for BARTG to Andy Matheson G3ZYP.

Apparently, Andy took the job with no bribery at all! He has promised the same amount of feedback that I get from Ian at present, so watch this space! As a parting shot, Ian has sent a photograph of most of the BARTG committee. Fig. 1.

**New Partners**

Packet forwarding from GB7LOI has taken on some new partners. Replacing Jim 4X1RU, is Corinne Judah 4X6VT. Corinne operates her radio from the kitchen, keeping an eye on both the BBS and the cooking. I'm not sure which would suffer if the going got tough!

Corinne uses the call-sign 4X1KT, known as the Memorial Gateway and so far, the traffic has flowed quite well, although Corinne's Icom 740 could be better. The rig has to be manually set

with every frequency change, a real pain. Corinne receives help and support from Jim 4X1RU and Ohad 4Z9CHB, a 15 year-old remote sysop.

Replacing Manos SV1IW is Tony SV1GH. This is not a loss, but a gain. Manos now operates as a remote sysop, with further back-up by SV1ML. However, I don't think it's a good idea for many BBSs from one country on to be on h.f. The bands would become crowded with more than three pairs of BBSs on any one channel.

**Deliberate QRM**

My forwarding to America is still suffering deliberate QRM on 14MHz. One pactor/AMTOR station seems to take great delight in jamming forwarding sessions. Even to the extent of assuming my forwarding partner's callsign and then disconnecting me.

Such bad behaviour achieves absolutely nothing and cannot be condoned. I managed to connect to his 'pirated' call and offered to discuss it with him, but he quickly disconnected. If that person reads my column perhaps he, or she, would like to let me know why he objects so strongly?

Packet operation on h.f. isn't going away. If we are causing a problem to an established net of some sort, then we need to talk over solutions, to come to an amicable solution.

**Shareware Program**

The Automatic Packet (Position) Reporting System (APRS) shareware computer program was discussed in the December 1993 issue of *CQ Magazine*. The program, written by Bob Bruniga WB4APR, is capable of producing quite interesting results. It's possible to display a map, in colour, of your local area showing all the BBS and packet stations.

Beacons monitored, are shown as a listing or at the bottom of the screen. If a station moves, that station

can mark his movement on his screen to be seen by everybody else running the program. The program can be used to track the Shuttle during a mission, MIR spacecraft, bad weather patterns, emergency portable stations, etc.

The program is shareware and can be obtained by sending a formatted disk, mailer and for return postage. If you like the program, to register as a user, you send a minimum of \$25 to: Bob Bruninga, WB4APR, 115, Old Farm Court, Glen Burnie, MD. 21060.

**Scottish News**

Ken G0NKZ has sent me some more news from the Highlands of Scotland. The Highland Region Emergency Planning Officer (EPO) has an emergency Mobile Communications Vehicle called, because of the number of antennas, Porkie!

Porkie is a long wheel base LandRover with communications for the Coast Guard, Local Authority. Operation is on voice (u.h.f. & v.h.f.), with a laptop PC on Packet (v.h.f. / u.h.f.), Cell Voice and Cell Fax. With it's all-wheel drive, it's a go-anywhere vehicle and can operate it's radios from its own battery, own generator or local power supply.

The EPO and his deputy, both radio amateurs, with Highland Raynet Groups, operate packet emergency communications from Emergency Operational Centres (EOC) in the seven Highland Regions (Wick, Golspie, Dingwall, Nairn, Fort William, Portree and Kingussie) back to the EOC HQ at Inverness.

Presently in the Highland Region there are three active RAYNET groups (Fort William, Far North, based in Wick/Thurso area, and Inverness) plus other

'interested' amateurs not part of any RAYNET Group. All EOCs except Portree and Kingussie are fully operational.

The Amateur equipment at the EOCs and three nodes have been funded by the EPD. The Packet Network is kept operational 24 hours and is available to all, with only a request that in an emergency non-essential traffic be restricted.

The nodes are set-up the same, using TheNet Plus v2.08B on Tiny-2s. The packet stations, all operating on 144.650Mhz, use Icom IC-V200 rigs, Tiny-2 TNC's and PC's running Procomm software. All stations are identical so if there's an operating problem at one location another will be able to help etc.

From a map you'll get an idea of the size of Highland Region, which includes Oban, Skye, The Uists and Lewis/Harris. With the distances involved and mountains of over 1000m you can imagine the problems trying to form and maintain an efficient network in that terrain. Especially if, like me you hail from Norfolk, where the highest point is just about 100m a.s.l.!!

**And Finally**

This famous phrase, borrowed from newsmongers, takes us to Fig 2, which shows a few of those attending the 1993 Amsat UK Symposium, all of whom are heavily involved with packet too!

See you in two months time.

Happy packeting de Roger, G3LDI @ GB7LOI, QTHR, Tel: 0508 570278

**E N D**

# Antenna Wo

Using a v.h.f. model of a Double-D antenna, I found that it had the gain of a two-element Yagi, provided the elements weren't too close, or folded too far back on themselves, or directly towards each other on the same plane.

Computer analysis of this antenna showed that a gain greater than 5dBi, with a front-to-back ratio better than 17dB was perfectly feasible. It also showed that the results are easily reproducible.

In this session I'll describe how you can make a practical Double-D antenna. The basic shape is shown in Fig. 1, while Table 1 gives the design dimensions in terms of frequency and thus wavelength.

The antenna's shape proved to be a simple and stable mechanical arrangement. As you can see from Fig. 1, the bent elements of the wires can be supported by the mast. This in turn can provide guys to support the element structure. This means that the light-weight structure is quite strong.

You may notice that the driven and reflector elements are the same length. This is because they are spaced quarter of a wavelength apart. (Before you cut these wires to length note the item about element length adjustment later)

The elements themselves are thin covered wire about 1.5mm (16s.w.g.), although this is not critical. The elements are supported on garden canes, similar to those used in quad antenna construction.

The cane spreaders are fixed to the mast using angle aluminium, U-clamps and clips as show in Fig. 2. I use short

sections of garden water hose to protect the canes from the full force of the clips when tightened up. This prevents the cane from splitting.

I've found that the best way to weather-proof canes is to paint them. Ensure that they are clean and dry before applying a coat of primer. If you use an undercoat followed by a good topcoat of paint the canes will stand up to the weather for many years.

The elements are tied and fixed to the canes using plastic tape. Over several years I've not noticed any weather created detuning with canes and plastic covered wire used as described.

The Double-D can also be made into a multi-band antenna. A number of Double-D antennas can be mounted on the same support system. Use the formula in Table 1 to find the various dimensions. The simplest method of combining the feed point turned out to be the best. I simply paralleled the driven elements and fed them with the one coaxial line as shown in Fig. 3.

## More Compact

As a result of experiments to find a more compact derivative of the wire Double-D design, I've developed the antenna shown in Fig. 4. The largest practicable antenna 'wingspan' on the chimney of my house was around four metres. My design was for 21MHz but, using the formula in Table 2, you can make it for any band.

When you make an antenna very small the feed impedance is usually low. Feeding this antenna in the same way as the

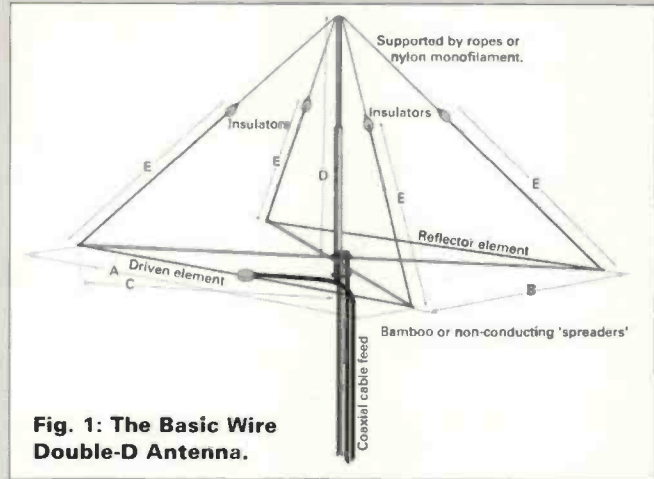


Fig. 1: The Basic Wire Double-D Antenna.

wire Double-D, it would be difficult to get the s.w.r. much below 2:1 (when the driven element is resonant).

One way to improve the matching is to use all metal construction and a matching section, such as a Gamma match. The Gamma match method has been used on v.h.f. antennas for many years now.

Connecting the coaxial cable to the antenna is easy. Connect the screen of the coaxial cable to the screw through the driven element. Then connect the centre of the cable to the Gamma match element. Then weather-proof all the connections.

The overall construction is shown in Fig. 4. The boom is fixed to the mast and the elements fixed to the boom using aluminium plates and U-clamps. There is no need to split the driven element at the feedpoint.

The ends of the elements are 1.5mm insulated wire. Each wire extension has one end stripped of insulation and fixed

to the ends of the metal elements with a clip. The top ends are tied to small insulators. These insulators are then tied to the vertical

support using nylon cord.

The vertical support for the ends of the elements was also used successfully as a 144MHz J-type vertical. I also tried a 28MHz vertical as the centre support but this was not successful due to the interaction between the antennas.

Tests with a local amateur showed a front-to-back ratio of about 2.5 S-points measured on the S-meter of his Drake R4C. (1 S-point = 6dB power).

Although I've given design formula for the Double-D antennas there is no reason why you shouldn't experiment with some dimensions of your own. There are no hard and fast rules regarding the horizontal and vertical dimensions.

## Guide Only

Although dimensions have been given they can only be regarded as a guide. All installations benefit from some tuning and most well known DX operators have spent a considerable amount of time adjusting the antenna for maximum efficiency. Particularly when a new antenna is constructed.

It is almost impossible to reproduce completely any antenna design. All locations have different environments. Different materials and different heights all combine to make systems slightly different.

For example, if you use bare copper wire instead of

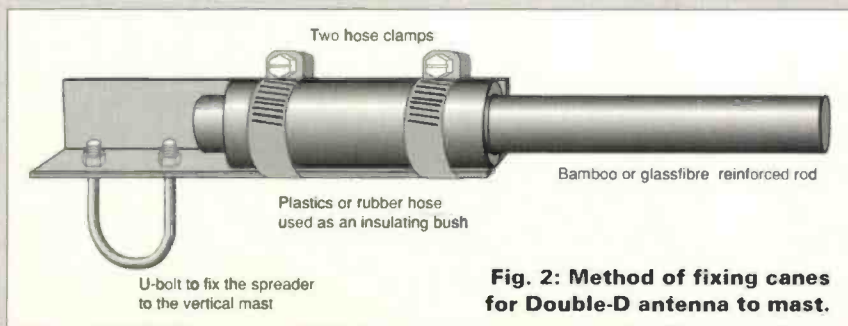
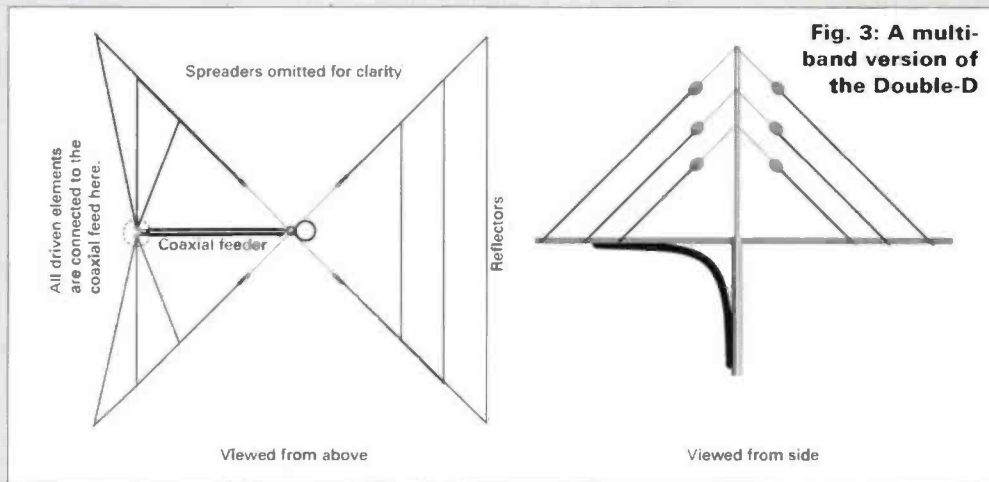


Fig. 2: Method of fixing canes for Double-D antenna to mast.



## Practical Double-D Antenna Designs

Continuing from last month's Antenna Workshop, Peter Dodd G3LDO describes how to build the compact 'Double-D antenna.



**Fig. 3: A multi-band version of the Double-D**

insulated wire for wire elements, you would have to multiply the wire dimension figures, given in the design data by 1.04. This is due to most insulated wire appearing to have a velocity factor of about 0.96.

### Adjust In Location

Ideally, the antenna should be adjusted in location, usually only possible if the antenna is mounted on top of a flat roof. To adjust an antenna the antenna element lengths and feeder matching adjustments must all be easily accessible.

Before an antenna is adjusted ensure that the dimensions of the elements and spacings are

roughly correct, either by checking the lengths with available design data or by measuring resonances with a GDO. Adjust the driven element to the resonant frequency and the reflector to 5% lower than resonance as a starting point.

When measuring the driven element resonance disconnect the feeder and short the feedpoint. When the feeder cable is connected it may cause many very deep false resonances.

### Adjusting Lengths

I find the best way of adjusting the element lengths of these antennas is to make the wire

section of the element too long. Then bend the excess wire back along the element away from the insulator. This excess can be cut off when the adjustments are completed.

To adjust the matching of the antenna to the feeder. When the feeder is connected directly to the element, as in the wire Double-D, alter the length of the driven element.

If a matching device, such as a Gamma match, is used then optimise the matching by altering the Gamma match length and the capacitor by aiming for the lowest standing wave ratio using an s.w.r. bridge.

Adjust the parasitic elements

for maximum front-to-back ratio or maximum gain. Then re-adjust the driven element for the best match to the feeder. These adjustments are more extensively described in detail in the *Antenna Experimenter's Guide* available from the PW Book Service for £8.90 + P&P.

PW

I've enjoyed writing for PW, I hope you've enjoyed it as much as I have. Happy experimenting.

**Table 1**

Design data for the wire Double-D Antenna. Design Data, (length in metres, f is in Megahertz)

A & B	85.90/f
C	60.76/f
D	17.94/f
E	34.25/f
Total element length	1544.15/f

**Table 2**

Design data for metal Double-D (length in metres, f is in Megahertz)

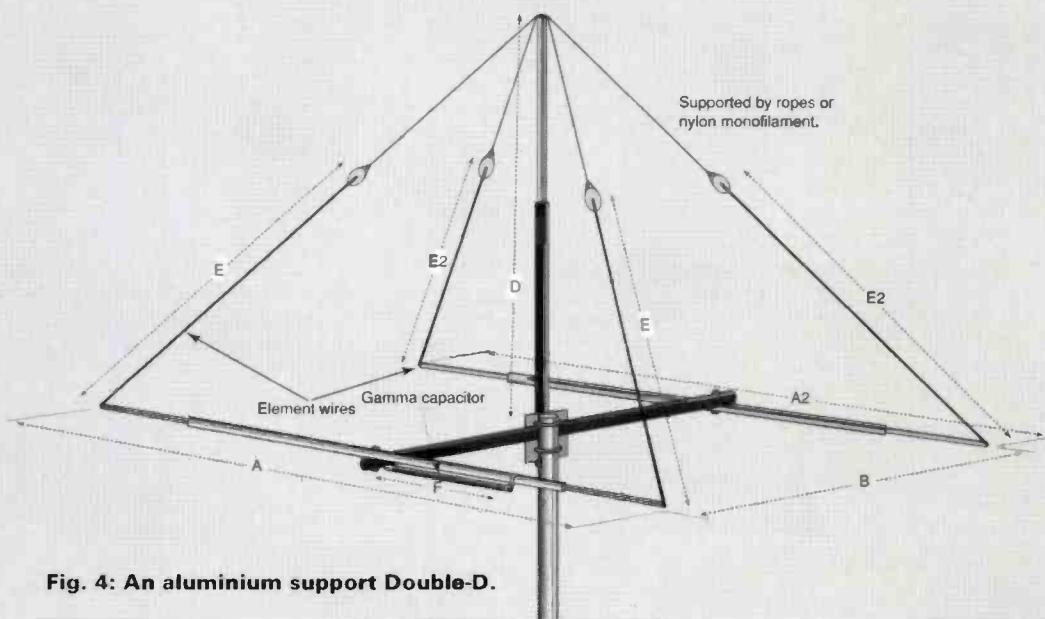
A	77.19/f
B	52.18/f
A2	78.28/f
E2	51.10/f
E	50.00/f
G	18.90/f

### Editorial Announcement.

I am sorry to say that Peter now has a new job which precludes him writing for the magazine. So this 'Antenna Workshop' is to be the last (for the foreseeable future) that Peter Dodd G3LDO will be writing for PW.

However, 'Antenna Workshop' is to continue. Please see 'Keylines' editorial for more of our plans. We thank Peter for all the hard work he's put into 'Antenna Workshop' and wish him all the best in his new job.

Editor



**Fig. 4: An aluminium support Double-D.**

*In this month's column David Butler G4ASR has reports of yet more auroral openings and the first real signs of the summer Sp-E season. David also passes on reports of activity on the 50MHz band, details of some DXpeditions and contests.*

I'll start off with auroral propagation and there's been yet another month full of openings on the v.h.f. bands. In central England events were detected on April 2-6, 9, 11, 13 and 15-17. A total of 11 events only one less than that observed in March.

**Richard Gardner G4WKN** (I092) reports that he didn't work much in the aurora on April 5, but he was expecting it! His auroral calendar shows repeat events every month from November 18 through to April 5.

When Richard wrote to me he surmised that there would be an event on May 1. Well, for the record there was and it was quite good. So far there have been seven months of repeat auroras.

Openings on the 50MHz and 144MHz bands during April were fairly small scale. Stations in central England were able to make contacts into northern England and Scotland.

Occasionally contacts were made into Scandinavia on the 144MHz band. These QSOs were always with the better equipped stations running high power and many Yagi antennas.

### Unusual Opening

An unusual opening occurred on April 17. A few early risers reported hearing beacons fully auroral from 0630UTC.

On the 50MHz band GB3LER and GB3RMK were very good indicators. The opening also extended to the 144MHz band with the beacons of GB3LER, OY6VHF and SK4MPI producing strong back-scatter signals.

An aurora at this time of day is very rare. In fact it's only the second time I've managed to hear one in over 10 years. Interestingly the first early morning event I ever heard was last year.

According to **John Branegan GM4IHJ**, a big magnetic storm had caused the auroral oval edge to be pushed southwards. Its morning location is normally over Greenland but on this occasion it appears to have moved close to the Shetland Islands.

The event also extended to a high altitude giving auroral back-scatter propagation over the UK and other areas of Europe. However, it had actually started some 48 hours earlier.

A Japanese X-ray satellite detected a big coronal mass ejection from the sun on April 14. Material thrown out in this event reached the earth during the evening of April 16. At this time a major magnetic storm began to build up.

Between 2230 through to 0100UTC the v.h.f. bands were effected and some UK operators heard beacons on the 50 and 144MHz bands going auroral. The storm reached its climax between 0600-0900UTC on Sunday April 17.

Unfortunately very few operators were active at this time. At the station of **Dave Ackrill G0DJA** (I093) and a number of contacts were made on the 50MHz band.

Dave worked DK2ZF, OZ3SDL, OZ4VV, SM0CKR and SM7FJE. The event faded out very quickly around 0900UTC. This was probably due to earth spin moving the

UK eastwards away from the edge of the auroral oval.

### Summer Season

The first signs of the summer Sp-E season were recently noted on the 50MHz band. Possibly the first sighting came on April 9 when **Darrel Moody G0HVQ** (I081) heard the S55ZRS beacon (50.014MHz) at 1053UTC.

On April 16 at 1215UTC the OH9SIX beacon (50.067MHz) was heard at the station of **G0DJA**. Both of these openings exhibited classic pre-auroral enhancement. This is a phenomena whereby an impending magnetic storm can create an enhancement of the E-layer.

A brief Sp-E opening, for example, may then be followed a few hours later by the expected auroral event. An opening to Italy occurred on April 18 from 1830UTC. It was a short event lasting no more than 30 minutes.

A longer opening to the same area was reported on April 25. Between 1245-1345UTC stations located between the south coast up to northern England were working into I, S5 and 9A.

The best period for Sp-E on the 144MHz band is always during the months of June and July. Peaks in activity tend to be between the hours 0900-1200UTC and 1500-2000UTC. The evening openings are generally stronger and last much longer.

### Bulgarian Club

One of the DX stations to look out for this year is the Bulgarian club LZ1KWT. It's named after **Wasil Terziev LZ1AB**, the first v.h.f. radio amateur in Bulgaria. The photograph, **Fig. 2**, shows the Bulgarian contest group with a pair of 16-element F9FT Yagis in the background.

The other photograph, **Fig. 1**, shows **Christo LZ1DP** operating the club station.

The equipment at LZ1KWT consists of an FT-736R driving a 1kW amplifier. This p.a. uses a pair of Russian GU74B valves. A muTek GaAs f.e.t. low noise amplifier is located at the antennas.

### The 50MHz Band

Now I'll turn to news of activity on the 50MHz band. This is especially topical now that the Sp-E season has started.

**Pierre Pasteur HB90Q**, reports that the Swiss authorities have made revisions to their 50MHz permits. The good news is that stations in some parts of Switzerland are now authorised for 24-hour operation. The new permits allow a maximum power of 10W e.r.p.

A review has been made of 50MHz permits in Germany. All class B licensees (highest grade) can now transmit in the band 50.080MHz to 51.0MHz. A further review will take place at the end of 1994.

French stations are not allowed to operate below 50.200MHz. Because of this, 50.210MHz has been designated as a French calling frequency and activity area. It's hoped this will increase the number of QSOs between France and other countries. This restriction also previously applied to stations in Andorra. The only active 50MHz permit holder in the principality C31HK is now allowed to operate between 50 to 52.0MHz.

Two Russian stations have received 50MHz permits to run from May 10 to November 1. **Oleg R3VHF (LO16XG)** has a 50W transmitter and a 5-element Yagi. He is awaiting permission to put a beacon on 50.043MHz.

The station of **Andy RA3TES (LO15JW)** runs 15W to a dipole. Any QSLs for either stations go via R3VHF. Incidentally, Oleg can often be heard on the v.h.f. net, on

**Fig. 1: Christo LZ1DP at the controls in the LZ1KWT club shack.**



14.345MHz, during most weekends. Look out also for the station of Alexander RA6YY. He is situated in the town of Maicop in locator square LN06.

A number of stations from the former Soviet republics are expected to be active this summer. **Nodir EY8MM** passes on the news that extra class licence holders in Tadjikistan (ex-UJ) are now allowed to operate on the 50MHz band.

The Ukrainian station **UU8JJ** (ex-UB) has an FT-690 transceiver. He's likely to operate portable from various locations in the Crimea. Another Ukrainian station hoping to be QRV soon is **Alex UR5FEP**. He is located in KN56 and received a number of European beacons last summer. His QSL address is **PO Box 321, 270000, Odessa, Ukraine**.

A few stations are now active from the Belarus Republic. One new station is **RC2WBH** located in KO45. Incidentally you can get an award if you work two v.h.f. stations located within the City of Minsk. Send a copy of your log and 5 IRCs to the **Minsk Radio Club Award Manager, PO Box 469, Minsk, 220050, Belarus**.

New regulations have been introduced in Estonia (ES) and Latvia (YL). All Estonian class A and B licence holders are allowed to use the band 50 to 50.5MHz. Holders of CEPT licences can operate in ES within this frequency range. Class A licensees can also operate between 50.5 to 54.0MHz but they must obtain a special permit. Power output is set at 400W on s.s.b., 100W on c.w. and 50W on f.m. (I don't really understand the logic behind that. Perhaps someone could enlighten me!).

All Latvian Class I licence holders now have access to the band 50.0 to 52.0MHz. Power output is limited to 50W. Look out for the stations of **YL2DX** and **YL2MB**.

## Rumoured Stations

It is rumoured that a number of stations will be active from the middle-east area this summer. Callsigns to look out for include **HZ1AB**, **OD5SK** and the Iraqi Radio Amateur Club in Baghdad.

And of course, don't forget about the UK Six Metre Group expedition to Jordan. The station of **JY7SIX** will be active until June 26.

## Angelo On Guernsey

**Angelo DC9KZ** will be QRV from the Island of Guernsey (IN89) between June 3-20. He will be active on the 144MHz band with the call sign **GU/DC9KZ/P**. Equipment includes a Drake TR7 transceiver and an SSB Electronics LT-2S transverter. This model features a low noise GaAs f.e.t. first stage giving an overall noise figure of around 1dB.

A double balanced Schottky mixer operating at 50mW local oscillator power extends the dynamic range performance on the LT-2S. The transverter gives 20W linear output and drives a Commander II amplifier. This p.a. uses a 3CX800-A7 triode. The all important antenna will be an 11-element DL6WU 'Flexayagi'.

I've received further news about the Cyprus expedition which I mentioned last month. **Dave Court OZ3SDL** will be active from **Latsi (KM65FA)** in the north-west corner of the island. He will be QRV from June 30 to July 12 using the call sign **5B4/G3SDL**.

The Ministry of Communications and Works in Cyprus have given permission for Dave to operate between 50.0 to 50.5MHz. Additionally they have also assigned him a 12.5kHz channel block centred on 70.2MHz. This is used nationally in the UK as the s.s.b./c.w. calling frequency.

On this band he expects to be using a transverter and a 4-element Yagi. He may run higher power if an amplifier can be borrowed. Look out for **5B4/G3SDL** on 50.093MHz (beacon), 50.110MHz (calling only), 50.135 and 70.200MHz ( $\pm 6.25$ kHz).

A problem that will be encountered when working the UK-5B4 path on the 70MHz band is one of QRM. Some eastern European countries still allocate f.m. broadcast services in this band. The interference from these wide-band f.m. stations can easily swamp a weak narrow-band signal.

Some 13 years ago on June 7 1981 while operating as **GW4ASR/P**, I worked **5B4AZ**. This was at a distance of 3475km and set a Region 1 record which still exists today. The station of **5B4AZ** was running about 10W output into a dipole antenna.

I can particularly remember the difficulty listening for my report in amongst all the broadcast

noise. Definitely a case of having excellent i.f. filters fitted!

At 50MHz the path should open regularly during periods of Sp-E propagation. At 70MHz however sufficient ionisation may only occur five or six times during the summer season.

The path length is fairly long, in excess of 3000km, and signals will not necessarily be strong. It may be useful to monitor the beacon **5B4CY** on 70.114MHz. It runs 15W e.r.p. from a 4-element Yagi beaming towards the UK.

The best day for a shot at a QSO on the 70MHz band will be when 50MHz propagation has been particularly intense. Possibly just before or after an opening on the 144MHz band. But above all it's really a case of being in the right place at the right time!

## Contest News

Although it's not strictly a contest, *The 50MHz DX Bulletin* is running a DX Marathon this summer. According to the Editor **Victor Frank K6FV**, the intention is to encourage investigation into long distance Sp-E propagation.

The marathon will be held during the period 0000UTC on June 18 through to 0000UTC on July 18. Brief details are as follows: Frequency band 50 to 54MHz. Distances under 4500km do not count for points but can be used for multipliers. Distances between 4500 to 9000km count as two points. A one-way QSO (heard or cross-band) counts as one point.

The log should include date, time, call sign and frequency of station heard or worked. Multipliers are locator fields, (for example) **I081MX** counts as 10. Scoring is contact points + 1 multiplied by locator fields. All logs should be sent to **K6FV** by August 31.

Further information can be obtained from **Dave Ackrill G0DJA**, 104 Durkar Lane, Crigglestone, Wakefield, West Yorkshire **WF4 3HY**. Please include a stamped addressed envelope.

## And Finally

And finally, don't forget that the *Practical Wireless* 144MHz QRP contest takes place on Sunday June 19. It runs between 0900-1700UTC. The rules were published last month.



**Fig. 2: Bulgarian radio amateurs Christo LZ1DP, Rumen LZ1JH, Savi LZ1UK and Krasi LZ1KQ (see text).**

One of the biggest events in the contest calendar is the RSGB v.h.f. field day. This year it's being held on July 2-3 and runs for 24 hours from 1400-1400UTC.

The field day covers the bands between 70MHz to 1.3GHz. Other societies in IARU Region 1 also hold national contests to coincide with v.h.f. field day. Some of them also include the 50MHz band as part of the contest.

So, that's it for another month. Please let me know about all those Sp-E contacts you've been making. Send your letters to me at **Yew Tree Cottage, Lower Maescoed, Herefordshire HR2 0HP**. I can also receive messages via packet radio @ **GB7MAD** or at my DX cluster **GB7DXC**. Alternatively you can telephone me on **(0873) 87679**.

**E N D**

Round-up

This month Peter Shore has news of more international broadcast schedules along with an interesting report on some American stations.

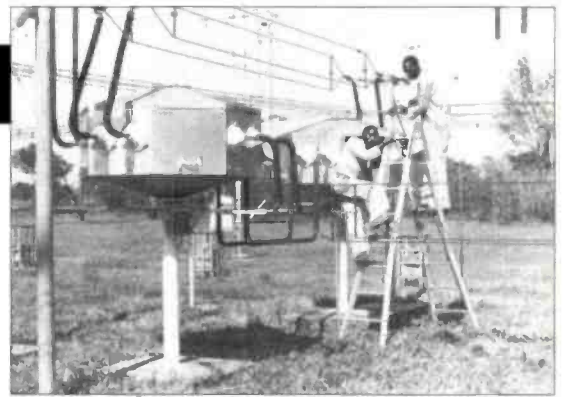


Fig. 2: Deutsche Welle have been forced to evacuate their staff from the Kigali station in Rwanda (picture shows maintenance staff working at Kigali on the feeder system) and seek alternative transmitters (see text).

# BROADCAST

Fighting between Rwandan government troops and rebel forces in Kigali and the rest of Rwanda forced the closure of Deutsche Welle's relay station and the evacuation of its 11 expatriate staff back to Cologne during April. The relay station served east, central and southern Africa, with programmes in English, Portuguese, French and Swahili. Now, extra transmissions have been added from Sines in Portugal, Malta and direct from Germany to make up for the loss.

Peter Senger, Head of the SW Frequency Department at Deutsche Welle, told me that the station is also investigating hiring time on other transmission facilities to make up for the loss of the two 250kW transmitters at Kigali. These might be at Channel Africa's Meyerton site, which has 500kW transmitters, or Africa Number 1 in Gabon.

Radio Netherlands, the Dutch international station based in the media-town of Hilversum, is about to undergo a radical reorganisation. Several of the station's shortwave services are to stop, including French to Africa, Arabic to the Middle East and North Africa and, most surprisingly, Indonesian to Asia. This last decision strikes me as curious as there are still large shortwave audiences in the huge number of Indonesian islands, and Radio Netherlands is consistently one of the most popular international broadcasters there.

The Radio Netherlands station is going to concentrate on European services, with the possibility of a German language programme in addition to English and French. For the time being, you can try tuning into Indonesian from Holland: 1130 on 17.655, 15.47, 13.70, 12.005MHz via Tashkent, Vladivostok and Madagascar; 2130 on 9.59, 7.365, 7.285 from Madagascar and Tashkent; English to Europe is at: 0830 on 9.895 and 5.955; 0930 on 9.895 and 5.955; 1130 on 9.65 and 5.955; 1530 on 13.70 and

5.955MHz and via the World Radio Network on Astra.

Radio Bulgaria reduced its English language output at the beginning of April. European audiences can now tune in at 1900 on 11.72 and 9.70 and at 2100 on 11.645 and 9.70MHz. Both broadcasts last one hour.

Radio Ukraine International broadcasts English to Europe at 2100 for an hour on 12.03, 11.705, 7.285, 7.24, 7.15, 6.09, 6.02 and 4.825 and at 0000 on 12.03, 11.72, 9.86, 9.685 and 7.285MHz.

## Splash Out

If you want to splash out on a brand new shortwave set to take away on holiday this year, then take a look at the latest offering from Grundig, the Yacht Boy 400. Retailing at a not inconsiderable £130 it offers continuous, digitally tuned shortwave, as well as long wave, medium wave and f.m., with reception in stereo via headphones.

The Yacht Boy has a digital clock with alarm, sleep function and two time zones. An external socket allows a separate 8 metre long antenna to be connected, so it is ideal for travelling.

A b.f.o. enables reception of single sideband signals, too. There are 40 memory channels provided, and these can be assigned to any waveband. So, if you want to store 20 local f.m. stations, you can, or if you need to assign 38 shortwave frequencies to memories, you can do that as well.

Overall, the Yacht Boy 400 is a pleasant little set, in direct competition with the Sony ICF-SW7600 (at around £170) and the Panasonic RF-B45 (about £140 without stereo on f.m.). It works well on shortwave and f.m., with good sensitivity.

Still on receivers for a moment, Mr M. Allen has written from Sheffield asking about the Sangean ATS606 that I mentioned at the end of last year. He wants to know where it can be bought.

Currently it is sold on mainland Europe under the Siemens brand name, and I had a chance to play very

briefly with the radio in Berlin last summer. My spies tell me that it may be introduced in the UK under a different brand name in the late summer of this year. Watch this column for news of its arrival!

## More Broadcast News

Radio Thailand beams English to Asia at 0500 on 11.905 and 9.655MHz and again at 2300 to 0430 on the same frequencies. Drop me a line at the PW Editorial Office in Broadstone if you manage to catch this station.

An April edition of the top businessman's weekly magazine, *The Economist*, highlighted the Latin language programmes of Radio Finland. It suggested that maybe the European Union should adopt the

language for all its work. The YLE Radio Finland service transmits the Latin programmes every Sunday at 0455 on 15.44, 11.755, 9.655 and 6.12MHz, again at 1953 on 15.44-usb, 11.755, 9.77, 9.73 and 6.12MHz. If you prefer English, try at 0645 on 11.755, 9.56 and 6.12 and at 1900 on 15.44-usb, 11.755, 9.77, 9.73 and 6.12MHz.

Radio Vlaanderen International (RVI) has joined the satellite age. It can now be heard on Astra 1C, transponder 63 (Filmnet) on 10.921GHz and the audio subcarrier on 7.38MHz. In addition, you can listen to RVI on the World Radio Network on transponder 22.

Radio France International has also joined World Radio Network, with its lunchtime English programme between 1200 and 1300UTC.

## American Stations

Finally a report from Cliff Stapleton on the English Riviera, Torquay in Devon. Cliff writes "It's remarkable how conditions can change so rapidly. Using a Trio R1000 and a length of wire of about 25 metres long on the evening of March 31 between 2000 and 2100 I heard the following American stations:

13.76MHz	WHRI, Noblesville Indiana with SIO 545
13.595MHz	WJCR, Upton Kentucky with SIO 434
13.566MHz	WYFR, Okeechobee Florida with SIO 434
15.42MHz	WRNO, New Orleans with SIO 434
15.56MHz	WYFR, Okeechobee with SIO 434
15.59MHz	KTBN, Salt Lake City with SIO 434
15.61MHz	WWCR, Nashville with SIO 545
15.685MHz	WWCR with SIO 545
21.615MHz	WYFR with SIO 545

Cliff continued "Some of these stations I have never heard before. Although I do not care for much of the religious content of some of them, the country music of the others was quite enjoyable. On Friday evening, April 1, conditions were not so good, with some not heard. On Saturday evening, April 2, all were inaudible. There was nothing but noise! Only a few have been heard since".

Thanks for writing, Cliff, and keep listening. It's one of the wonders and frustrations of shortwave listening that one moment there is nothing, the next the bands are full to bursting of new discoveries.

If anyone else has some amazing stories to tell, do drop me a line. Until next month, bon voyage as you travel the radio dial.

**E N D**

# ARCADE

## The PW Shopping Arcade

Welcome to the *Practical Wireless* 'Arcade'. In this section of the magazine, you'll be able to find all those important services 'under one roof' - just like the shopping arcades you see in the High Street.

Let your eyes 'stroll through' the Arcade every month and you'll find all departments open for business including: The Book Service, PCB Service, Binders and details of other *PW* Services. Make a regular habit of 'visiting' the Arcade, because in future, you'll have the chance of seeing special book offers and other bargains. And don't forget, this Arcade is open wherever you're reading *PW*!

## Services

### Queries:

Practical Wireless,  
PW Publishing Ltd., Arrowsmith Court,  
Station Approach,  
Broadstone, Dorset BH18 8PW.

We will always try to help readers having difficulties with *Practical Wireless* projects, but please note the following simple rules:

- 1: We **cannot** deal with technical queries over the telephone.
- 2: We **cannot** give advice on modifications either to our designs, to commercial radio, TV or electronic equipment.
- 3: All letters asking for advice **must** be accompanied by a stamped self-addressed envelope (or envelope plus IRCs for overseas readers).
- 4: Make sure you describe the problem adequately, with as much detail as you can possibly supply.
- 5: Only one problem per letter please.

## Back Numbers

Limited stocks of many issues of *PW* for past years are available at £2.00 each including post and packing. If the issue you want is not available, we can photocopy a specific article at a cost of £1.50 per article or part of article. Over the years, *PW* has reviewed many items of radio related equipment. A list of all the available reviews and their cost can be obtained from the Editorial Offices at Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW for a stamped self-addressed envelope.

## Binders

*PW* can provide a choice of binders for readers' use. Plain blue binders are available, each holding 12 issues of any A4 format magazine. Alternatively, blue binders embossed with the *PW* logo in silver can be supplied. The price for either type of binder is £5.50 each (£1 P&P for one, £2 for two or more). Send all orders to PW Publishing Ltd., FREEPOST, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW.

## Constructional Projects

Components for *PW* projects are usually readily available from component suppliers. For unusual or specialised components, a source or sources will be quoted.

Each constructional project is given a rating to guide readers as to the complexity.

**Beginner:** A project that can be tackled by a beginner who is able to identify components and handle a soldering iron.

**Intermediate:** A fair degree of experience of building radio or electronic projects is assumed, but only basic test equipment will be needed to complete any tests and adjustments.

**Advanced:** A project likely to appeal to the experienced constructor. Access to workshop facilities and test equipment will often be required. Definitely not for the beginner to attempt without assistance.

## Mail Order

All items from *PW* are available Mail Order, either by post or using the 24hr Mail Order Hotline (0202) 659930. Payment should be by cheque, postal order, money order or credit card (Mastercard and Visa only). All payments **must** be in sterling and overseas orders **must** be drawn on a London Clearing Bank.

## Book Reviews

Rob Mannion G3XFD reviews two unusual and interesting books published by the American Radio Relay League.

**Low Profile Amateur Radio**  
Jim Kearman  
KR1S  
Published By  
ARRL

The full title of this fascinating little American book is *Low Profile Amateur Radio - Operating a Ham Station from almost anywhere*.

The second part of the title is apt, because the book really does go into the techniques of being a 'hidden Ham' as they would coin it in the USA. If you are like me, and have always had a fascination for spy radio equipment, the idea of having a complete h.f. or v.h.f. rig built into a suitcase...this book is for you. With chapters covering specialised equipment (even packet radio enters into it), operating techniques and antennas, the book will be of interest to you whether you are interested in h.f., v.h.f. portable or mobile operations. There is even a mention (and photograph) of an American amateur who works aeronautical mobile from his hang-glider! To sum up: if you are one of those enthusiasts who look at a small box and wonder if you could build a transceiver into it, this book is for you. A highly recommended book.

G3XFD

124 pages. £5.95 plus £1 P&P (UK), £1.75 P&P (overseas) from the *PW* Book Service.

**Your Packet Companion**  
Steve Ford  
WB8IMY  
Published by  
ARRL

Packet radio certainly seems to be the main growth area in amateur radio.

And, although there are many books and guides published about the complex subject of 'amateur radio via computers, I can state with honesty that there are few I could recommend. This American book however, goes to considerable length to explain in the simplest way possible (with good diagrams and photographs) how the radio amateur can get going on packet, how it works and what the various systems are. Chapters include: Assemble your own packet station, Use your computer to chat to other packet users, Get the most out of bulletin boards, Send and receive packet mail, Hunt DX with packet clusters, Using packet satellites, and Exploring advanced networking systems. Altogether, the book is presented in a friendly, informative way and (speaking from the non packet radio enthusiast's point of view) goes a long way to explain some of the mysteries surrounding packet radio.

G3XFD

170 pages. £5.95 plus £1 P&P (UK), £1.75 P&P (overseas) from the *PW* Book Service.

**To order either of the books reviewed here please use the order form on page 65 of this issue or telephone the credit card ordering service on (0202) 659930.**

# BOOK SERVICE

The books listed have been selected as being of special interest to our readers. They are supplied direct to your door. Some titles are overseas in origin.

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Extensively revised & updated (October 1992). Air band radio listening enables you to listen-in on the conversations between aircraft and those on the ground who control them, and is an increasingly popular and fascinating hobby. A new chapter on military air band has been added. The author, an air traffic controller, explains more about this listening hobby. 190 pages. £7.99

### THE COMPLETE SHORT WAVE LISTENER'S HANDBOOK 3RD EDITION

Hank Bennett, Harry Helms & David Hardy

This book is a comprehensive guide to the basics of short wave listening. Everything you need to get started as an s.w.l. is explained in a clear and easily understood manner. Receivers, antennas, frequencies, propagation, Q-codes, etc. are all covered. 294 pages. £17.95.

### DIAL SEARCH 1992/94

George Wilcox

The listener's check list and guide to European radio broadcasting. Covers m.w., l.w., v.h.f. & s.w., including two special fold-out maps. Also includes a full list of British stations, a select list of European stations, broadcasts in English and 'Making the Most of Your Portable'. 46 pages. £4.25



### FLIGHT ROUTINGS 1993

Compiled by T.T. & S.J. Williams

This guide was produced with the sole aim of assisting airband listeners to quickly find details of a flight, once they have identified an aircraft's callsign. Identifies the flights

of airlines, schedule, charter, cargo and mail, to and from the UK and Eire and overflights between Europe and America. 122 pages. £6.00

### FERRELL'S CONFIDENTIAL FREQUENCY LIST 9th Edition

Compiled by Geoff Halligey

Spirally bound, this easy-to-use reference book covers 1.6 - 28MHz in great depth, all modes and utility services, with new reverse frequency listing showing every known frequency against each callsign, who's using what frequency and mode, what's that callsign? These are some of the answers this book will help you find. 544 pages. £17.95

### GUIDE TO FACSIMILE STATIONS

13th Edition

Joerg Klingenfuss

The new edition of this super reference book covers the world's facsimile stations, their frequencies and methods of working. There is a section covering the equipment needed to receive FAX over the radio. To give you an idea of what is available there are many pages of off-air received FAX pictures. 392 pages. £18.00

### GUIDE TO UTILITY STATIONS

12th Edition

Joerg Klingenfuss

This book covers the complete short wave range from 3 to 30MHz together with the adjacent frequency bands from 0 to 150kHz and from 1.6 to 3MHz. It includes details on all types of utility stations including FAX and RTTY. There are 19549 entries in the frequency list and 3590 in the alphabetical callsign list plus press services and meteorological stations. Included are RTTY & FAX press and meteor schedules. There are 11800 changes since the 10th edition. 534 pages. £24.00

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Bill Laver

HF aircraft channels by frequency and band, main ground radio stations, European R/T networks and North Atlantic control frequencies. 31 pages. £3.95

### INTERNATIONAL RADIO STATIONS GUIDE

BP255

Peter Shore

As in 'Broadcast Round-up', his column in PIV, Peter Shore has laid this book out in world areas, providing the listener with a reference work designed to guide around the ever-more complex radio bands. There are sections covering English language transmissions, programmes for OXers and s.w.Ls. Along with sections on European medium wave and UK f.m. stations. 266 pages. £5.95

### INTERNATIONAL VHF FM GUIDE

7th Edition.

Julian Baldwin-G3UHK & Kris Partridge G8AUU

This book gives concise details of repeaters & beacons world-wide plus coverage maps & further information on UK repeaters. 70 pages. £2.85

### MONITORING THE YUGOSLAV CONFLICT

Langley Pierce

A guide to monitoring the Yugoslav radio transmissions of the UN, aircraft and shipping engaged in the civil war in the former Yugoslavia. 28 pages. £4.95

### NEWNES SHORT WAVE LISTENING HANDBOOK

Joe Pritchard G1UQW

A technical guide for all short wave

listeners. Covers construction and use of sets for the s.w.l. who wants to explore the bands up to 30MHz. Also covers the technical side of the hobby from simple electrical principles all the way to simple receivers. 276 pages. £15.95

### POCKET GUIDE TO RTTY AND FAX STATIONS

Bill Laver

A handy reference book listing RTTY and FAX stations, together with modes and other essential information. The listing is in ascending frequency order, from 1.6 to 26.8MHz. 57 pages. £3.95

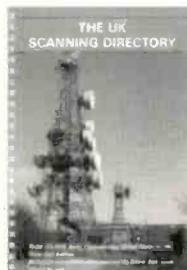
### RADIO LISTENERS GUIDE 1994

Clive Woodyear

This is the third edition of this radio listener's guide. Simple-to-use maps and charts show the frequencies for radio stations in the UK. Organised so that the various station types are listed separately, the maps are useful for the travelling listener. Articles included in the guide discuss v.h.f. aerials, ROS, the Radio Authority and developments from Blaupunkt. 68 pages. £3.45

### SHORT WAVE INTERNATIONAL FREQUENCY HANDBOOK

Formerly the Confidential Frequency List and re-published in April 93, this book covers 500kHz-30MHz. It contains duplex and channel lists, callsigns, times and modes, broadcast listing and times. 192 pages. £9.95



### UK SCANNING DIRECTORY

3rd Edition

This spiral bound book lists over 12000 UK spot frequencies from 25MHz to 1.213GHz. Articles on scanning in the UK. 250 pages. £16.95

### VHF/UHF SCANNING FREQUENCY GUIDE

This book gives details of frequencies from 26MHz to 12GHz with no gaps and who uses what. Completely revised and enlarged (February 1993), there are chapters on equipment requirements as well as antennas, the aeronautical bands, as well as the legal aspect of listening using a scanner. 156 pages. £9.95

### WORLD RADIO TV HANDBOOK 1994

Country-by-country listing of l.w., m.w. & s.w. broadcast and TV stations. Receiver test reports, English language broadcasts. The s.w.l.'s 'bible'. 15.95.

## SATELLITES



### NEWNES GUIDE TO SATELLITE TV

Derek Stephenson

This book, the 3rd edition, is a hard bound volume, printed on high quality paper. The author is a satellite repair and installation engineer and the book covers all information needed by the installation

engineer, the hobbyist and the service engineer to understand the theoretical and practical aspects of satellite reception with dish installation and to how to trouble-shoot when picture quality is not up to anticipated reception. Mathematics has been kept to a minimum. 371 pages. £18.95

### SATELLITE BOOK - A Complete Guide to Satellite TV Theory and Practice

John Breeds

This book deals almost exclusively with television broadcast satellites and is a comprehensive collection of chapters on topics, each written by an expert in that field. It appears to be aimed at the professional satellite system installer, for whom it is invaluable, but it will be appreciated by a much wider audience - anyone interested in satellite technology. 280 pages. £30.00

### SATELLITE EXPERIMENTER'S HANDBOOK

2nd Edition

Martin Davidoff K2UBC

The book is divided into four main sections - History, Getting Started, Technical Topics and Appendices. It provides information on spacecraft built by, and for, radio amateurs. In addition, it discusses weather, TV-broadcast and other satellites of interest to amateurs. 313 pages. £14.50

### SATELLITE TELEVISION

A layman's guide

Peter Pearson

Pictures from space, that's what satellite television is all about. Orbiting satellites, 35000km high, receive TV signals from stations on the earth and re-transmit them back again. This book explains all you need to know to set up your own satellite TV terminal at home, dish and accessories, cable and tuner. 73 pages. £1.00

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John Breeds

A practical guide to satellite television. Detailed guide-lines on installing and aligning dishes based on practical experience. 56 pages. £3.00

### WEATHER SATELLITE HANDBOOK

4th edition

Dr Ralph E. Taggart WB8DQT

This book explains all about weather satellites, how they work and how you can receive and decode their signals to provide the fascinating pictures of the world's weather. Plenty of circuit diagrams and satellite predicting programs. 192 pages. £14.50

### WRTH SATELLITE BROADCASTING GUIDE

1994 edition

Bart Kuperus

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Over 60,000 call signs are listed including EI stations. Now incorporates a 122-page section of useful information for amateur radio enthusiasts and a new novice call sign section. 444 pages. £9.50.

## AMATEUR RADIO FOR BEGINNERS RSGB

**Victor Brand G3JNB**  
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## NOVICE STUDENTS NOTEBOOK

**Book 3 RSGB**  
**John Case GW4HWR**  
This student's notebook is intended to be used in conjunction with the Novice Licence training scheme. It covers making a simple radio receiver, the examination, the Morse test, applying for your licence, how to use the worksheets. 88pages. £5.10.

## AMATEUR RADIO LOGBOOK

**Published by RSGB**  
This standard spirally bound amateur radio log book has 100 pages and is marked out with the format required in the UK. There are columns for date, time (UTC), frequency, power (in dBW), station worked/called, reports, QSL information and remarks. £2.50.

## AMATEUR RADIO TECHNIQUES RSGB

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Anyone who enjoys Pat Hawker's 'Technical Topics' in *Radio Communications* will enjoy this book. An amateur radio manual itself, this paperback book, the 7th edition, can only be bettered by a new edition. A truly excellent reference source with a practical bias. 368 pages. £7.99.

## ARRL HANDBOOK FOR RADIO AMATEURS 1994

This is the 70th edition of this handbook and contains the best information from previous issues. New for this edition is some information on feedback-loop design for power supplies, a new gel-cell charger project, updates on antenna systems and new coverage of baluns, propagation programs are compared and colour SSTV and telephone FAX machines are also covered. Finally there's a new section on 'for the workbench' with new projects for the reader to build. 1214 pages. £18.95.

## ARRL OPERATING MANUAL

Another very useful ARRL book. Although written for the American amateur, this book will also be of use and interest to the UK amateur. Topics covered range from short wave listening through operating awards to repeaters, operating and satellites. 684 pages. £12.95.

## ARRL SATELLITE ANTHOLOGY

The best from the Amateur Satellite News column and articles out of 31 issues of *QST* have been gathered together in this book. The latest information on OSCARs 9 through 13 as well as the RS satellites is included. Operation on Phase 3 satellites (OSCAR 10 and 13) is covered in detail. 97 pages. £5.95.

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A collection of practical ideas gleaned from the

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How does the sun and sunspots affect the propagation of the radio waves which are the basis of our hobby? They affect the ionosphere, but differing frequencies are treated differently. Find out how to use charts to predict frequencies that will be the most profitable. What effect will noise have on the signal? Find out with this book. 116 pages. £3.95.

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## MICROWAVE HANDBOOK RSGB

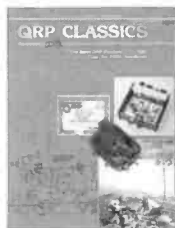
**Volumes 1, 2 and 3**  
**Edited by M. W. Dixon G3PFR**  
This excellent series covers all aspects of amateur radio operation on microwave. Volume 1 looks at components and operating techniques, Volume 2 covers construction and testing, while Volume 3 deals with bands and equipment. Extremely well illustrated throughout, this paperback series provides the growing number of microwave band enthusiasts with an excellent reference source along with a large number of practical projects, hints and tips. Approximately 350 pages (each volume). Vol. 1 costs £9.99, Vol. 2 and 3 cost £14.99 each.

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## PRACTICAL GUIDE TO PACKET OPERATION IN THE UK

**Mike Mansfield G6AWD**  
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## REVISION QUESTIONS FOR THE NOVICE RAE RSGB

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**Published by RSGB**  
This log book is aimed at the short wave listener and includes columns for date, time (GMT), call sign, RST, mode, station calling/working, given/received RST reports, remarks and QSL in and out information. £3.50.

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What is packet radio good for and what uses does it have for the 'average' amateur? What are protocols? where, why, when? Lots of the most asked questions are answered in this useful book. It included details of networking and space communications using packet. 278 pages. £8.95.

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## THEORY

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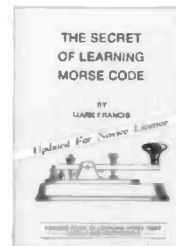
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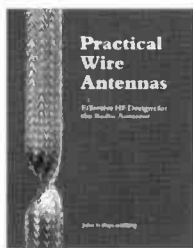
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WR313	10MHz Transmitter	Nov 92	WR287	Morse (Speedbrush)	May 91
WR312	Receiver/Mixer		WR255	Meon-4	May 91
	(Getting Started)	Nov 92	WR285	Scope Probe PSU	Apr 91
WR311	Oscillator BFO		WR284	Scope Probe	Apr 91
	(Getting Started)	Sept 92	WR283	Sudden Receiver	Mar 91
WR310	1.2GHz Pre-scaler	Aug 92	WR282	Repeater Toneburst	Feb 91
WR309	Volt Reg/Divide by 100	Aug 92	WR281	High Voltage PSU	Jan 91
WR308	TTL 1MHz Oscillator		SET	WR263/264-WR276-80	Jul 90
	(Getting Started)	July 92		Marland Transmitter	Sep 90
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	(Getting Started)	June 92	WR275	Low Voltage Alarm	Jun 90
SET	WR303/304/305/306	Apr 92	WR273	Valve PSU	May 90
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Index to Advertisers			
Aerial Techniques .....	51	Radio Sport .....	4
AH Supplies .....	51	RAS Nottingham .....	47
Altron Communications .....	45	Reg Ward Ltd .....	45
ARC Ltd .....	39	Remote Imaging Group .....	52
AS Products .....	17	RSGB .....	42, 51
British Wireless For The Blind .....	40	Siskin Electronics .....	39
Chevet Books .....	17	SMC Ltd .....	2, 3
Circuit .....	18	Spectrum Communications .....	52
CM Howes .....	47	Suredata .....	40
Coastal Communications .....	25	Sussex ARS .....	39
Colomor .....	52	Telford Electronics .....	40
Forman Productions .....	45	Tennamast .....	47
G3RCQ Electronics .....	51	Waters & Stanton .....	6,7
Grosvenor Software .....	52		
Haydon Communications .....	Cover ii		
Holdings Amateur Electronics .....	52		
Icom .....	8, Cover iii		
J Birkett .....	39		
J&P Electronics .....	17		
Jaytee Electronics .....	52		
Lake Electronics .....	51		
Langrex Supplies .....	39		
Maplin Electronics .....	Cover iv		
Martin Lynch .....	34, 35		
Mauritron Technology .....	47, 52		
Photo Acoustics .....	5		
PW Publishing .....	19		
Quartslab .....	42		

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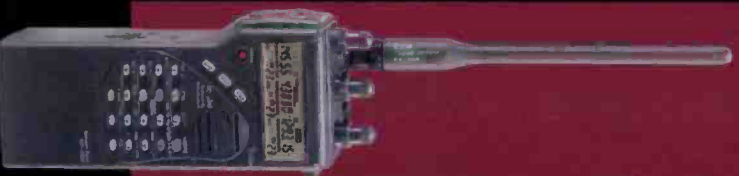
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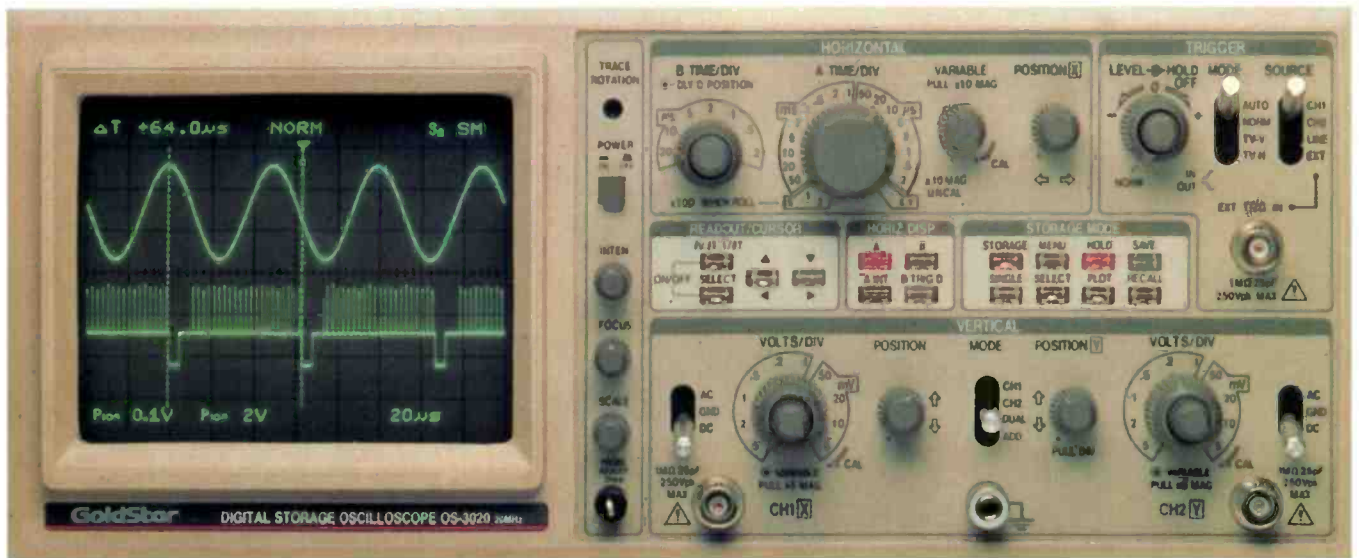


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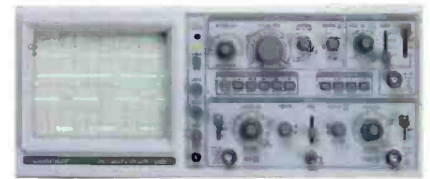
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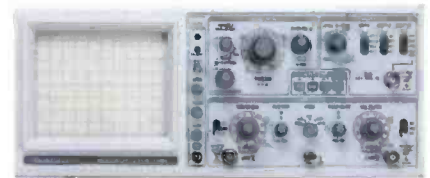
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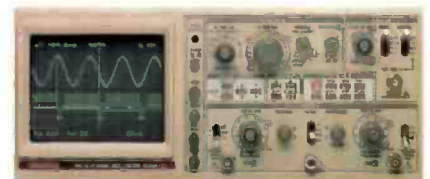
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