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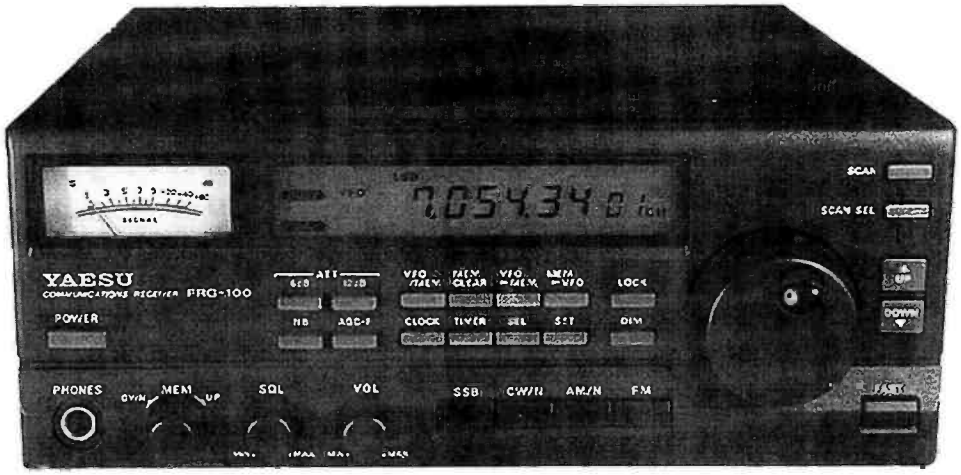
"BEST COMMUNICATIONS RECEIVER 1992": WRTVH

FRG100



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MARCH 1993 CONTENTS

Other Regular Features

Front Cover: Our thanks go to SGC Inc., of SGC Building, 13737 SE 26th St., Bellvue, Washington USA, for the photographs of the SG-2000 h.f. transceiver, which we plan to feature in a future issue.

We apologise, that due to space limitations, the 'Basic QSOs In French' and 'The Mobile Microphone Project' have been held over.

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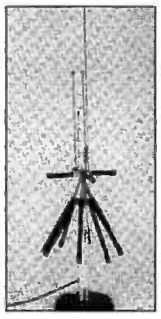

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Steps	5, 10, 12.5 20, 25KHz
Memories	42
Power Output	2.5/1.0/0.3 Watts 5 Watts with 12V DC
Scan	8 Modes
Tones	1750Hz plus DTMF Optional CTSS
Sensitivity	12dB SINAD-15dBu
Size	140 x 58 x 33mm
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Accessories Supplied	Ni-Cad pack, AC charger, belt clip, carry strap, dual band antenna

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It goes without saying that ALINCO offer you all the standard features you expect from a hand-held including dual watch, dual controls, scanning, searching, priority, etc. Of course ALINCO's standard of engineering and reliability is now becoming the envy of its competitors. (They're also pretty envious of ALINCO's prices!) Naturally you get a full 12 month warranty including parts and labour. It's the extra features that really make this a winner.

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Rx	AM 108-143MHz FM 130-174MHz FM 400-470MHz FM 810-995MHz
Steps	5, 10, 12.5, 20, 25kHz
Memories	42
Power Output	2.5/1.0/0.3 Watts 5 Watts with 12V DC
Scan	8 Modes
Tones	1750Hz plus DTMF Optional CTSS
Sensitivity	12dB SINAD -15dBu
Size	140x58x33mm
Weight	410g

Accessories Supplied
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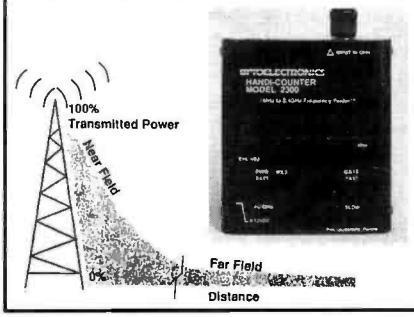

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- ★ Superb Audio
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- ★ 132 x 58 x 33mm

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This year I have some exciting NEW products on demonstration, several by the designers themselves!

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A Lynch + muTek development which gives the standard FT736R the competition performance it deserves. Mike Dorset from muTek, will be present on Saturday at Picketts, to demonstrate the remarkable improvement his design and development team have spent months in the making. If you've got an FT736R, you won't want to use it without the new muTek Front-End Boards! Why not bring your FT736R along for modification - you'll be without it for 10 days, but it's worth the wait! FT225RD's taken in part-ex!

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At last a receiver to give the Lowe 225 a run for its money, the new receiver from Yaesu is already set to break all records for receiver sales. Remember it was Yaesu who bought you the FRG-7 back in the seventies, it had to be the equivalent 'Morris Mini' in sales for the Yaesu Musen Company. Come and see it demonstrated by one of the gang on Lynch's stand!

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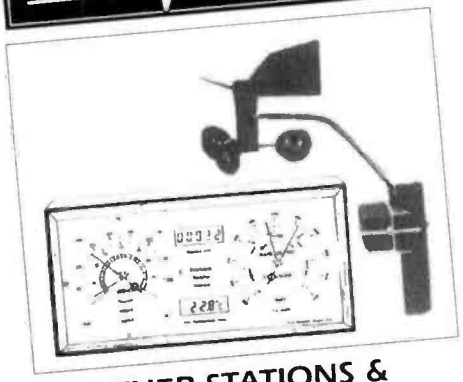

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NEWSFLASH...NEWSFLASH...

NEW HF MINI-MOBILE FROM KENWOOD DUE IN MARCH... PHONE FOR LATEST UPDATE.

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Well, what do yer know... Along comes another Dual Bander from ICOM! This one is very good - it must be, even I can demonstrate it! Don't want all the gizmos on offer by the competition, but want top grade performance at a sensible price? The boys at ICOM have done it and you can buy it on the 10% down - rest in three months scheme, only from MARTIN LYNCH.

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The old ships captain, Tony Dews, won't be at Picketts this year, but his excellent range of Electronic goodies will be. Amongst the selection, will be the superb DM1000 Easy Reader. A self contained unit, the new Easy Reader will convert most of the funny noises on Short wave that you are hearing at present, (but just give you a headache!), into readable text on a video monitor. The DM1000 from Dewsbury, is a state-of-the-art converter that requires a simple Video monitor, (or TV with the optional modulator), a 12V supply and your receiver to instantly give you access to the world of DATA Transmissions - it's like starting SWL'ing all over again! My mate Tony might just pop along to shake a few hands....

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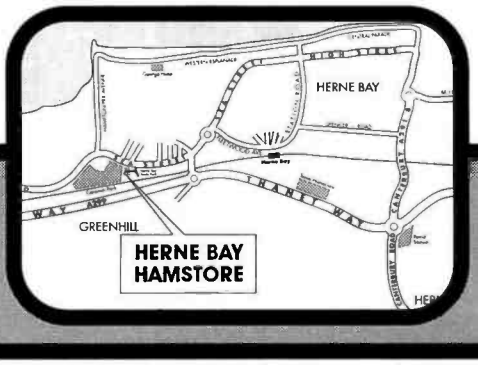

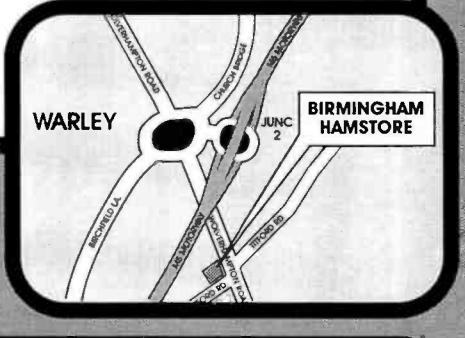

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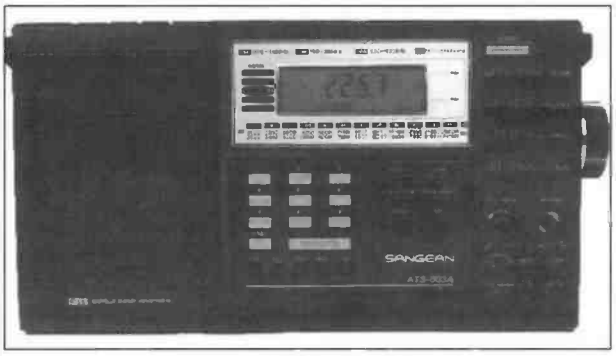

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FT990

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IC765

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TS850

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FT5200R


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Keylines

The amateur radio bands are always under pressure. There's always someone, or some pressure group who would like to use the frequencies allocated to amateurs for themselves.

Many of our frequencies are allocated on a shared basis, and recently, the ever popular 430MHz band has come under pressure. In recent years, '70 cems' has become extremely popular, and nowadays there's a great deal of commercially-made equipment available. Additionally, with the introduction of the Novice licence, there's even more activity on the band.

Unfortunately, apart from the long term military pressure on the band, there's also an increasing demand from private mobile radio and other communication interests. To the p.m.r. lobby, this part of the u.h.f spectrum is very desirable, and it appears that at least one pressure group is determind to obtain part of our present allocation.

So, what can we do about threats to the amateur bands? Obviously, for those who support and belong to the RSGB, the first point of contact will be the society. This, to state the obvious, is where a strong national body helps. With our support, the RSGB and the amateur radio hobby can counter outside attacks.

However, in my mind a single voice, albeit a respected one, can easily be lost amongst many others defending their own cause. Because of this, I suggest that as many 430MHz band users as possible, write directly to the Director of The Radiocommunications Agency in London to object to any planned reduction in the 430MHz allocation.

To illustrate my point about lobbying the relevant authorities, I'll quote an example close to my own heart, namely railways! The term 'lobbying' comes from the practice of various interest groups meeting (to put their point of view across) the individual members of Parliament and respective Ministers of State in the lobby of the Palace of Westminster.

Unfortunately for the railway industry, the people representing their point of view (the railway 'lobby') are heavily outnumbered by those working on behalf of the road transport industry. This means, that when it comes to publicity for and against a particular proposal, the railway's 'voice' can be lost among the many others shouting above it.

With this in mind, I strongly recommend that we all add our voices to that of the RSGB, and to strongly defend any reduction in our frequency allocation on 430MHz. It may come as a bit of a shock to the p.m.r. and other users lobby, that we're not as apathetic as they think we are!

Finally, our front cover tribute last month, together with the very short article on Eddystone Radio aroused so much interest from readers, that I couldn't ignore it! So, I've passed on your comments to Ron Ham, and I've no doubt that Eddystone Radio and their products will soon be featuring in the 'Valve & Vintage' column. In the meantime, to the very many who contacted me, thank you for writing. I had no idea how much interest there would be when we showed the Eddystone 750 on the front cover. If we'd had one for sale, it would have sold many times over!

Rob Mannion G3XFD

COMPETITION CORNER

Wordsearch

Wordsearch rules: Twelve different words have been hidden in the letter grid. They have been printed across (forwards or backwards), up and down, diagonally, but they are always in a straight line without odd letters in between. You can use the letters in the grid more than once for different words. Once you have found all 12 words, mark them on the grid and send it, along with your name and address (photocopies accepted with the corner flash) to our editorial address, marked 'Competition Corner' Wordsearch March '93.

S	Q	X	O	I	L	B	E	B	T	L	V
U	W	X	E	A	M	L	V	N	H	C	D
A	O	D	M	S	I	O	E	F	W	X	A
E	R	B	R	B	C	M	C	T	S	N	Z
V	K	G	O	E	E	I	B	X	T	E	E
L	S	M	V	S	T	A	P	E	A	M	A
A	H	S	A	I	R	A	N	M	I	M	K
V	O	B	W	G	N	N	E	T	Y	Z	N
O	P	X	A	E	A	T	I	P	E	L	J
X	M	I	J	S	N	R	A	A	E	I	O
R	N	R	H	O	A	V	I	G	R	R	R
A	E	L	S	M	V	S	X	B	E	D	W

Name.....

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Twelve Words To Find

Antenna	News
Bargain	Olympic
Basement	Repeater
Maritime	Valve
Maxcom	Vintage
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A year's subscription to *Practical Wireless* or a £20 book voucher.

Second Prize

Six month subscription or £10 book voucher

Send your entry (photocopies acceptable with corner coupon) to: Competition Corner, Wordsearch Competition, March '93, 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. Entries to reach us by Friday 26th March 1993.

Competition Corner March '93

Receiving You

Dear Sir
What an excellent idea it is to run the competition corner. For many months as a *PW* regular, I have completed the competition for fun, but until now have not sent in my entry in for real!

To be honest I don't mind if I don't win, but enjoy the taking part. It's rather like some of our amateur radio contests! One addition in *Practical Wireless* that would not take up much space, would be to print the answer and lucky winners of the competition corner so that the armchair participants can verify their results and the lucky winners can be glorified in print!
Richard Boittier G8CUA
Harlow
Essex

Editor's reply: The *PW* team are pleased you enjoy the competitions Richard. Donna 'Toad' Vincent was literally buried under entries for the Alinco competition as it was so popular. We try to publish the results in 'Newsdesk' (as we did in the January 1993 issue) when space permits, and you'll see them soon. Best of luck!

Dear Sir
Just a little bit of advice to all of your readers, so that they don't have to go through the traumatic experience of courts to get their money back for breaches of contract, by second parties.

Whenever a piece of equipment is deposited with a company for repair or for diagnosis of a fault, make sure all your requests are made clear, and that there are two copies, one for the company and one for yourself. The easiest method of doing this is to make a carbon copy signed by a representative of the company.

If you ask for a fault diagnosis, and the company go ahead and repair the equipment, then they do so at their own volition. Under the law you do **NOT** have to pay for such a repair.

I state all these facts because I paid for a repair that was supposedly done to my radio by one company, and had a receive fault put on the set in the bargain. My original request was for a diagnosis report, estimate as to cost, and no work to be carried out in respect of this fault without my authorisation in writing.

I paid to obtain my radio back into my possession, only to find that the original fault still existed, and that the engineer working for the company had put a receive fault on the set. After nine months of wrangling, letters from the manufacturer, and starting action in the courts for recovery, the company finally settled out of court.

My thanks go to John and Barry at Castle Electronics for finding the fault and eventually putting things to right, and for showing a great degree of expertise. Also to Peter for his great legal mind and the time he gave to bring my case to an end. Be warned!
S. Mayer G0HQH
Newcastle, Staffs

Editor's reply: There's sound advice in your (shortened) letter Mr Mayer. Although radio amateurs are (by the nature of our hobby) aware of repair pitfalls, it's always best to have a written agreement as to what's to happen to your equipment when it needs repairs.

Dear Sir
I was sufficiently annoyed with February's *Practical Wireless* to put pen to paper. I am only an occasional reader of *Practical Wireless,* just buying issues which contain something of particular interest to me.

I have an interest in receivers and in old Eddystones in particular, so when I saw the 'receiving special' label and 'Eddystone receivers' with pictures of a 750 and a 6100, I was pleased to grab it off the newsagent's shelves just as they were closing.

At first I thought that somehow my magazine had the wrong contents, since there was nothing about Eddystone receivers and very little about receivers or receiving at all. However, you did actually mention the Eddystones on the cover and there were a few badly written lines about the present day activities of the company, so I concluded that the contents must be correct.

Surely it is not unreasonable to expect the cover of a magazine to reflect the contents? February's *Practical Wireless* has Eddystone receivers on the cover and contains zilch about Eddystone Receivers! And what about the 'receiving special'? A very general article about building a receiver, also the v.l.f. converter, but nothing more than I imagine would appear in any other edition of *PW.*

Since it induced me, and probably many others to buy the magazine under false pretences, I shall be much more wary of *PW* in future.
A. J. Richards GW4RYK, Montgomery, Powys

Editor's comment: Sorry that you weren't pleased by my cover choice Mr Richards. I felt that as we had a 'receiving themed' issue I just could not let it pass without paying tribute to a famous and long established British manufacturer. However, readers have shown a great deal of interest in Eddystone equipment, and have asked for more. Ron Ham's 'Valve & Vintage' seems the best place to handle it, and I hope readers enjoy the feature when it appears.

Dear Sir
Ref: Code Free A Licences
I have recently been in contact with the Radio Communications Agency regarding the above matter, and having had the information sheet RA148(Rev1) sent to me, it would appear that there is no longer a requirement for any marine radio operator on m.f., h.f., and v.h.f. to be competent in the sending and receiving of Morse code.

Having read this leaflet and had it explained to me in depth by the RA, why do we as amateurs need to take a Morse code test? Is it still to be the old syndrome 'I had to learn so why can't you learn Morse to gain a licence to operate on the h.f. bands'?

In a reply to one of my many letters to the RA, they state that they are looking at a Morse exemption licence, together with the RSGB.

If you feel you would like to gain an (A) licence without having to take a Morse code test why not make your feelings heard in the correct place with the Radio Communications Agency, Amateur Licence Section, Waterloo Bridge House, Waterloo Road, London SE1 8BU to reach them before the 8th March 1993. If you are a member of the RSGB, write to them at Potters Bar and tell them what you want. Someone, somewhere will eventually take notice. Thanks for a great magazine *PW* team.
Brian E. Mould G6FLX
Portsmouth, Hampshire

Editor's reply: Following my comments and invitation to readers in February's 'Keylines', we've had a large postbag on this subject both for and against the idea. We hope to publish extracts from as many as we can in the April issue.

★★★★ Star Letter ★★★★

Dear Sir
I have recently started a Novice course and would like to see a section in *Practical Wireless* about the Novice course, or a Novices corner. Also equipment that is covered by the Novice licence, as most equipment advertised, or put on trial runs by your many authors, are mainly for the people who have passed the RAE. I have been reading *Practical Wireless* for four months and find it lacking in the Novice criteria.

PS: If I do win in the competition corner draw, is there a 430MHz version of the Alinco DJ-180? I am confident to pass my NRAE in March!
Mubdi Choudbury, Manchester

Editor's reply: Thank you for your suggestions Mubdi, and we're already working on the project. Watch this space! Best of luck in the Alinco competition.

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

Dear Sir

I am hoping that this letter may be read by some of your major advertisers. I suggest they should make their pages interesting and do themselves a favour in the process, by giving prices of all goods advertised. Some ignore such minor details, which suggests that 'if you have to ask the price you can't afford it'. Others ask us to 'phone, implying that they dare not print such low prices - do they really expect us to make lots of expensive cross-country calls when we are probably just having a look around to see what is on offer?

My other suggestion, on a similar subject, concerns the penny-wise pound-foolish behaviour of some big companies when asked for information. I recently decided it was time for a new mobile rig, and wrote to the big three importers for details and prices.

One sent me a great bundle of interesting information, one sent a well produced brochure, and one sent a single sheet of paper listing their whole range and telling me practically nothing. No prize for guessing which one I did not follow up!

J. A. Gaukrodger
Ottery St Mary
Devon

Editor's comment: I think the main reason for a some prices being left out by advertisers, is that they fluctuate day-by-day. Another problem is that of the time delay between the advertiser's copy arriving in our office, and it being printed. However, to be fair, I hope at least one of our advertisers will write in reply to you Mr Gaukrodger.

Dear Sir

Soon after I started to dabble in a foreign language, I was given two marvellous pieces of advice which to my sorrow I ignored.

The first advice was that when learning a word in one language, it is almost as easy to learn it in three languages at the same time. If the languages sound fairly different for example, French, German and Spanish, you will be surprised how little confusion there will be.

The second advice was that the younger you are, the easier it is to learn.

DO IT NOW!
J. Wilshaw G3MPX
West Wickham
Kent

Editor's reply: I couldn't agree more, it's a pity I'm not younger!

Dear Sir

You ask what valve projects we would like to see in *Practical Wireless*. Surely an absolute must is the all-time classic receiver, the EF50 t.r.f. RX. Published in *Short Wave Magazine* August 1946 and later *SWM* July 1947 by the late Jack Hum G5UM.

I was serving in the Royal Navy as a Radio Mechanic at the time and built this RX as a 'rabbit', first as an OV1 and then later added the r.f. stage. When I got my license in 1948 it was this RX together with an EF50 crystal oscillator, 6V6 power amplifier and a VS1AA antenna that gave me contacts all over Europe with the odd Stateside contact for good measure.

Using 9W input on 7MHz, c.w. of course! Although I had been building receivers since 1938, this little receiver out-performed anything I had ever built before. The original circuit showed choke output for headphones (which we all used in those days!).

The set would quite happily drive a small loudspeaker. The power supply was made from bits salvaged from a defunct domestic receiver. Incidentally I still have the cuttings from *Short Wave Magazine* giving details.

Ron W. P. Wilson G3DSV
Exeter

Editor's comment: If you've got photographs and details of your receiver Ron, I feel sure readers of 'Valve & Vintage' would like to see them. Ron Ham is looking forward to all your letters and memories dealing with older equipment. So, get writing to him!

Dear Sir

Greetings from slightly wintry Wales, and being mindful of how much reading you have to do, and equally aware of my jerky hand-writing these days, I've resolved to borrow my wife's portable Imperial typewriter a little more often, even though the noise does intrude upon the rustic serenity!

It isn't often I mix radio and religion (despite the etherial similarities) but Amen & Amen to your plea for old short wave receivers. I have been looking around, asking, even advertising the same plea for my various types, both this past year for the Noviciates. Most of the available receiver kits (even George Dobbs G3RJV's *Sudden*) are a bit too daunting for beginners.

When the spirit moves, I've a couple more 'What A Good Idea' items for you, but I promise to type them next time!

Wyn Mainwaring
GW8AWT
Llandeilo
Dyfed

Editorial comment: Thanks for your letter Wyn. A good commercially made receiver (an Eddystone is a dream for some youngsters) is a great boost for those starting off in the hobby. Funnily enough, owning such sets often triggers off the urge to try building one! Your typing and shorter letters are much appreciated, as the old Editorial eyes aren't what they used to be!

New address

***Practical Wireless* and *Short Wave Magazine* have moved to Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW.**
Full details on the contents page.

Newsdesk '93

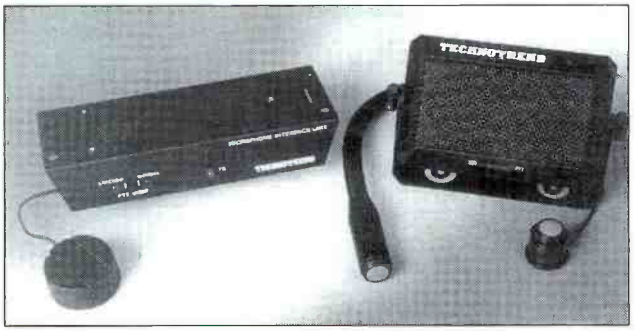
Send your news, photographs and product information to Sharon George at our Broadstone office.

New Hands Free Communication Units

Technotrend Ltd. of Farnborough, Hampshire, England, is offering Vox operated Hands Free and semi Hands Free units for use with Private Mobile Radio and Trunked Radio equipment.

These high quality units are compatible with most radio types without any need for modification to the radio. The easily installed electronics units have been designed to provide clarity of speech and suppression of outside noise. They are supplied with a versatile PTT (press to talk) switch and quality microphone, which have been specifically designed for in-vehicle use. These competitively priced units have applications for professional users such as police, fire, ambulance and public utility vehicles. Distributors are also sought.

For further information, contact **Technotrend Ltd., Unit B5, Armstrong Mall, Southwood Summit Centre, Farnborough GU14 0NR. Tel: (0252) 373242.**



A hands-free communications unit from Technotrend.

Solar-Powered Plant Turner

The new Maplin Plant Turner will support up to 30lbs weight and slowly turn the plant during the day. This will help to promote healthier, well-developed plants, and no more lop-sided plants in the shack.

The small solar panel is attached to a 1m long flying lead, so the cell can be positioned for maximum sunlight. The turntable is 155mm in diameter and has a raised edge. It is finished in two-tone green plastic.

Other possible uses include displays in shop windows or to create an eye-catching display inside cabinets. Bright incandescent light will also operate the plant turner.

Dimensions 161x65mm. Order details: BZ49D Plant Turner, £6.95 (inc. VAT). **Maplin Electronics PO Box 3 Rayleigh Essex SS6 8LR. Tel: (0702) 552911.**

Can You Help?

I have been given a 'Stephens-James Ltd.' MkII multi-tuner for restoration. I have tried writing to them at their Warrington address, but I believe they have ceased trading. Could you possibly ask your readers if anybody could help me with a brochure/circuit description. I will gladly refund any costs incurred. **Graham Williams, 'Alltwen', 44 Mayfield Drive, Buckley, Clwyd CH7 2PN.**

Has anyone a handbook of the Taylor 45D2 valve tester they could loan me, please? Or a copy of a booklet published during the war, entitled *Morse In Seven Days* by Vic Lewis? Will gladly reimburse costs. **Douglas Byrne G3KPO, 52 West Hill Road, Ryde, Isle of Wight PO33 1LN. Tel: (0983) 567665.**

Has anyone any servicing instructions/circuit diagrams for Clarkes Atlas, type A17 radio receiver. **David Maxwell on (0484) 450982 day or (0484) 604546 evening.**

I am trying to locate a copy of technical bulletin DTB4, published some years ago. Buy or photocopy. All expenses would be met of course. **Mr J. McGowan, 20 Keats Avenue, Romford, Essex RM3 7AR.**

Dennis Godfrey G0KIU would like any RAFARS members, or any past or present RAF personnel, to contact him on **(0623) 659514,** with a view to setting up regular meetings in the Nottinghamshire area.

Wanted. Any information, circuit diagrams, etc., or ideas, where I may obtain these for a Totsuko TR2100M 2m s.s.b. transceiver, possibly also marketed as a Shimuzu. All costs willingly met. **Tom Burke G1LXU. Tel: (0472) 602335.**

When contacting manufacturers or organisations in 'Newsdesk', please mention that you read it in *Practical Wireless*

Mains Power In Your Car?

Until now you have had to rely on noisy and expensive generators for 240V power to operate mobile radio communications or computer systems. But now, help is at hand with the Merlin Pro Watt range of d.c. to a.c. inverters. These can be either plugged into the cigarette lighter in your car, or wired direct to the battery, the unit simply and silently converts 12V d.c. power to 240V a.c., allowing you to benefit from mains power anywhere anytime.

Ideal for radio amateur enthusiasts, microwave ovens, TVs, videos, computers, chargers, power tools, etc. This family of inverters consists of four models, the pocket-sized 125i and 200i, which have 125 and 200W continuous output with peak power of 400W. The 800i is rated at 800W continuous and 2000 W peak power. For really big demands, the 1500i delivers 1500W continuous and 3500W peak.

You needn't worry about running down your battery, all units feature a low battery protection circuit which shuts the unit down should the battery voltage drop below 10.7V. They also feature overload and overheat protection.

If you have higher output requirements, Merlin have inverters with power outputs of up to 22.5k\ sinewave or pure s output forms.

Prices are as fol 125i £99.95; 200i £1 800i £338; 1500i £517.75. All prices exclude VAT and carriage at cost.

For more information, please contact **John Hortop on (0491) 613027.**

BBC World Service Television

BBC World Service Television has recently added a new high flying audience to its millions of viewers on the ground for the New Year.

As from 1 January 1993, passengers on all international Lufthansa flights have been able to keep up-to-date with the latest world events with BBC World Service Television. The news will be recorded live off air and dubbed into German. Translations are monitored by BBC World Service's German Service.

The arrangement - made with Cintec Airline News, based in Frankfurt - marks the fourth major in-flight entertainment deal for BBC World Service Television. Currently, Cathay Pacific, British Airways and Royal Brunei also carry the service.

BBC World Service Television is a wholly owned subsidiary of the BBC. It is entirely self-funding. It is currently available in Europe, Asia, Africa, the Middle East and Canada, and aims to be global by the end of 1993. BBC World Service news bulletins are also carried on NTV - Germany's first 24-hour news channel launched in October.

Sweet News From Bulgin

The concise and colourful RITEL range of control knobs now provide perhaps the widest and most comprehensive range on the market.

With diameters from 8mm to 45mm, they're available in four basic colours, and offer a choice of push-fit or collet fixing to suit metric and imperial diameter shafts.

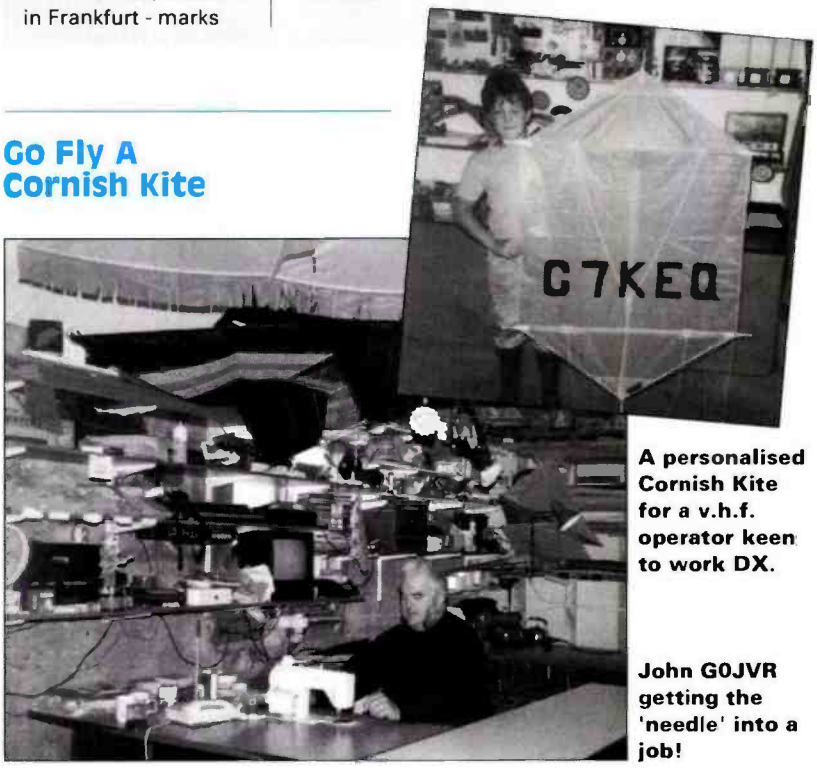
Ritel knobs are styled to match your product or project, and while push-fits come in a selection of matt black or light grey, collet versions are supplied in light grey, dark grey, black or red. Metallised types are also available and the range is further enhanced by wing and arrow shaped types for versatility.

Customisation can be made by using the vast selection of snap-in caps, available in various profiles and colours in a wide variety of marking options.

A full range of accessories, including dials, stators, pointers and nut covers, complete this range.

A. F. Bulgin & Co. Plc
Bypass Road
Barking
Essex IG11 0AZ
Tel: 081-594 5588.

Go Fly A Cornish Kite



A personalised Cornish Kite for a v.h.f. operator keen to work DX.

John G0JVR getting the 'needle' into a job!

As a keen radio amateur as well as a kite manufacturer, John G0JVR of Cornish Kites, enjoys lifting the antenna by means of a kite. The local club GB2GM Poldhu, often use their own kite in conjunction with the permanent antenna systems at Poldhu (which is of course connected with Marconi's early transatlantic tests), for special events such as International Marconi day. The men really enjoy playing radio and kite-flying at the same time, and of course the signal reports are greatly enhanced.

There are kite designs to suit different weather conditions, from the gentlest breeze through to what people in Cornwall call 'bracing'. Cornish Kites have been manufacturing kites for 17 years and are now enjoying a lot of interest both in the UK and abroad from radio amateurs wanting the convenience of a personalised kite for mobile or maritime mobile use.

All kites are hand-made in Cornwall using 100% Spinnaker Nylon, for strength and durability without much weight.

For further information, contact **Cornish Kites, The Workshop, Mullion, Cornwall TR12 7DN. Tel: (0326) 240144.**

Radio Amateur Relief Expeditions

In March 1991, a group of radio amateurs from around the country joined a team of volunteers to travel across Europe to become part of a team of relief workers in Romania. Their help in providing communications between eight projects - hospitals and orphanages and a central store, and also a link back to the UK from the town of Turnu Severin in the Mehedinti area, greatly contributed to the efficiency of the project.

The event made a lasting impression on some of the team and when, in 1992, further projects were arranged in the same area, together with some more interested radio amateurs they returned, and not only provided radio communication, but also became involved in the practical side of the work, in finding equipment, supplies and drugs for the rural medical centres which were being renovated and set up.

As the involvement in these projects became known, more requests for help began to come through, and after a great deal of thought, it was decided to set up an organisation called Radio Amateur Relief Expeditions (RARE), to properly organise and co-ordinate events.

Lead by Dave Davies G0KWY of Swansea and Don Sunderland G6FHM of Shrewsbury and assisted by a retired senior army officer, it's hoped to achieve charity status and to create a database of radio amateurs who wish to help and/or take part in expeditions.

Some of the current projects include, finding specific items requested by Turnu Severin Hospital in Romania. They've also had requests for radios to be used for hostels for the home-less street children in Bucharest; help in setting up a kindergarten in Bucharest; and relief work in Yugoslavia.

The group need your help, and the under-privileged and stricken people also need your help. Members not able to go on expeditions could play an essential part in procuring equipment, etc., and fund raising. (It costs over £1000 to send a wagon to Romania).

The new group also need members who have skills and experiences as well as being radio amateurs - medical, engineering, teaching, building, HGV drivers, etc.

If you feel you would like to join them, please contact **Don Sunderland G6FHM**, sending brief details of your experiences and skills and how you feel you could help.

1 Allfield Cottages
Condover
Shrewsbury SY5 7AP
Tel: (0743) 873815.

New Headquarters For ITC

The Independent Television Commission has signed a long-term lease on new headquarters in London. The ITC will be moving in the summer from their long-established present location opposite Harrod's in Brompton Road, which was also the location for their predecessors the ITA and IBA.

The new building is significantly smaller than the ITC's present building, and reflects the overall reduction in the staffing levels of the Commission and of the number of staff based in London.

The new building at 33 Foley Street, London W1, has been completely refurbished and renovated by the developers and is now re-fitted to meet the needs of the 105 staff who will work there. Interestingly, the new building used to be the headquarters of Worldwide Television News, and it also had an earlier association with ATV, the predecessor of Central Television.

Last December, a further 40 staff moved, or are in the process of moving to King Worthy Court in Kings Worthy, Hampshire, mostly from the old IBA Engineering Headquarters at Crawley Court, Winchester. The Crawley Court location is now the headquarters of National Transcommunications Ltd., the now-privatised former IBA Engineering Division.

Several more staff will be relocated from London during the first six months of 1993 and the total number of ITC staff, including its 12 national and regional offices, is now 190.

Fig. 1: The Yeovil Club Chairman, Derek Alexander G4GVM (left) and Charles Leitch G1XKS busily working on the final setting-up on their Yeovil transceivers, watched over by (left to right) G3ICO, s.w.l. Brian, Yeovil Project designer Tim Walford G3PCJ and G3GC, G4JBL, G7GDY and G3CQR. Photograph by B. F. Hillard.

The Yeovil Club Project

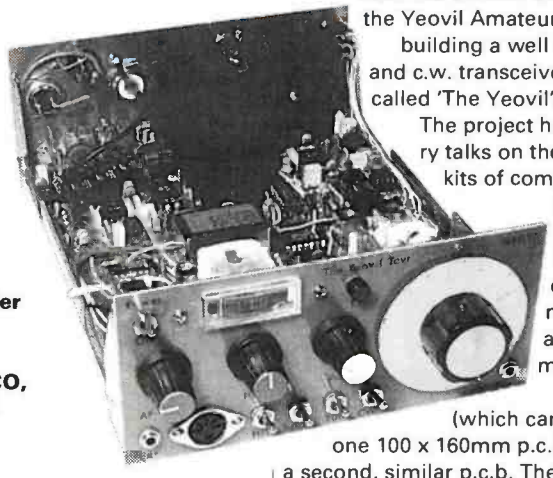


Fig. 2: A close-up view of the completed Yeovil Club Project, providing a good idea of the compact, but uncomplicated nature of the transceiver. A comprehensive 50-page manual has been prepared, so that other clubs may join in the project. Full details are available from Tim Walford G3PCJ. Photograph by B. F. Hillard.

Over the autumn and winter, 14 members of the Yeovil Amateur Radio Club have been building a well specified 10W p.e.p. s.s.b. and c.w. transceiver for 3.5 and 14MHz, called 'The Yeovil'.

The project has consisted of explanatory talks on the theory, and the issuing of kits of components for members to build at home. The project was then backed up by test nights at the club, covering each of the three main blocks of the receiver and two more for the transmitter.

The Yeovil receiver (which can be used on its own) is on one 100 x 160mm p.c.b. with the transmitter on a second, similar p.c.b. The complete transceiver project have cost approximately £110, but spread over several months has eased the burden!

The complete rig consists of a bi-directional superhet with a 9MHz crystal filter with conventional or varactor tuning. The transceiver also has a.g.c., c.w. filter, r.i.t., electronic transmit-receive switching, a push-pull f.e.t. final r.f. amplifier, low-pass filters, antenna matching bridge with semi break-in control, and sidetone for c.w.

Although designed for a 12V d.c. supply, up to 40W p.e.p. can be obtained with higher voltage supplies. A comprehensive manual has been produced so that other clubs might like to try the project for themselves. Full details can be obtained from: **Tim Walford G3PCJ, Upton Bridge Farm, Long Sutton, Langport, Somerset TA10 9NJ.**

Astronaut Becomes Honourary Member Of RSGB

Britain's first astronaut, Helen Sharman, has been made an honourary member of the Radio Society of Great Britain. The honour was bestowed on Helen on January 11 because of her valuable work in interesting schoolchildren in space and radio communications during her flight in the Soviet space station *Mir*, during 1991. The presentation was made by the new RSGB President for 1993, Peter Chadwick G3RZP.

The 3M (UK PLC) company have recently enhanced their range of 2mm board mount sockets and headers.

3M United Kingdom Connectors

The 3M (UK plc) Company have recently enhanced its range of connectors, with the addition of a series of 2mm board-mounting sockets and headers.

The 3M company claim that they offer the widest range of 2mm connectors offered by a single manufacturer. Their series 15 includes right-angle and straight board-mount sockets, low profile, through-board bottom entry sockets, and pin strip headers.

The range of connectors are designed to save up to 38% of p.c.b. space, and 47% of above-board height compared to equivalent 0.1in grid industry-standard products. The connectors are end and side stackable to maximise the use of p.c.b. space, thereby helping to reduce costs.

The connectors are suitable for through-hole and surface mount applications. They incorporate a glass-filled polyester or liquid-crystal polymer body (LCP). The LCP material; withstands the higher temperatures associated with infra-red and vapour soldering techniques.

For further details contact: P. Lindsay Powell at 3M United Kingdom plc, Market Place, Bracknell, Berkshire RG12 1JU. Tel: (0344) 858509.

Club News

Please send in all of your 'Club News' items to Sharon George at the new editorial offices in Broadstone.

Bedfordshire

Shefford & DARS. Thursdays, 8pm. Church Hall, Ampthill Road, Shefford, Bedfordshire. February 25 - Shacklog 3, the new version by Alan Jubb G3PMR, March 11 - Recovery of the Olympus Satellite. **Paul G1GSN on (0462) 700618.**

Berkshire

Newbury & DARS. Wednesdays, 7.30pm. Bucklebury Memorial Hall. February 24 - Mini Lecture night. **(0635) 46241.**

Reading & DARC. 2nd & 4th Thursdays, 8pm. The Woodley Pavilion, Woodford Park, Haddon Drive, Woodley, Reading. February 11 - The Computer In Amateur Radio by John Linford G3WGV, 20th - Help With Girl Guides Thinking Day by G0PUB, 25th - Digital Modes & Equipment , ICS Electronics Ltd., March 11 - Club Quiz vs Maidenhead Club. **Nick Challacombe G0LGG on (0734) 722489.**

Buckinghamshire

Aylesbury Vale RS. 1st & 3rd Wednesdays, 8pm. Village Hall at Hardwick. February 17 - The Oscilloscope & Its Uses by N. Pritchard G8AYM, March 3 - RSGB Video evening. **Martyn G4XZJ on (0296) 81097.**

Cheshire

Mid-Cheshire ARS. Cotebrook Village Hall, Cotebrook, nr. Northwich, Cheshire. February 24 - Pancake night, March 3 - on air night, 10th - talk on CW by Dave G4XUV. **Mike Baguley G7LQD on (0606) 331210.**

Stockport RS. 2nd & 4th Wednesdays, 7.45pm. Room 14, Dialstone Centre, Lisburne Lane, Offerton, Stockport, Cheshire. March 10 - Amateur TV by R. Dexter G0ITP. **Jim France G3KAF on 061-439 4952.**

Clwyd

Wrexham ARS. Maesgwyn Community Centre, Maesgwyn Road, Wrexham. February 16 - Video night - Amateur Television, March 2 - talk. **Ian Wright GW1MVL on (0978) 845858.**

Cornwall

Cornish RAC. Village Hall, Perranwell Station, Perranwell, nr. Truro, 7.30pm. February 15 - Computer Section, March 4 - Power Supplies by Bert G3VWK, 9th - Activities night. **Geoff Bate on (0209) 820836.**

Derbyshire

Buxton Radio Amateurs. Lee Wood Hotel, Buxton, 8pm. February 23 - Video night, March 9 - Fox Hunts explained. **Derek Carson G4IHO on (0298) 25506.**

Derby & DARS. Wednesdays, 7.30pm. 119 Green Lane, Derby. February 24 - Packet Radio by Ed G0INA, the sysop of the GB7BAD & GB7NOT bulletin boards, March 3 - Junk Sale. **Richard Buckby G3VGW on (0773) 852475.**

Devon

Appledore & DARC (Devon). 3rd Mondays, 7.30pm. Appledore Football Clubroom. February 15 - Morse class & construction demo & talk by Bob Short G3GNR. **Reg Lyddon G4ETJ QTHR on (0237) 477301.**

Torbay ARS. Fridays, 7.30pm. ECC Social Club, Highweek, Newton Abbot. February 19 - AGM. **Andy Stafford G4VPM on (0803) 329055.**

Dorset

South Dorset RS. 1st Tuesdays, 7.30pm. Wessex Lounge of Weymouth Football Club. March 2 - Bring, Buy & Barter. **Mike Lenzi G7HNY on (0305) 773860.**

Down

Bangor & DARS. 1st Fridays, 8pm. Winston Hotel, Queens Parade, Bangor, Co. Down. March 5 - Medical Electronics by Jim Brown GI4BXB. **Des Buckley GI3HCP on (0247) 460251.**

Dumfries & Galloway

Wigtownshire ARC. Thursdays, 7.30pm. Community Education Office, Stranraer Academy. **Ellis Gaston GM0HPK on (0581) 2202.**

East Sussex

Hastings Electronics & RC. 3rd Wednesdays, 7.45pm. West Hill Community Centre, Croft Road, West Hill, Hastings. February 17 - Weather Recording by G4ITM, AGM. **G3YYF on (0424) 830454.**

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. February 1 - PMR Problems by Keith G8HGM. **John Vaughan G3DQY on (0323) 485704.**

Essex

Braintree & DARS. 1st & 3rd Mondays, 8pm. Community Centre, Victoria Street, Braintree. February 15 - PMR Conversion - practical G3PEN/G0OEC. **M. J. Andrews on (0376) 327431.**

Chelmsford ARS. 1st Tuesdays, 7.30pm. Marconi College, Arbour Lane, Chelmsford, Essex. February 21 - East Coast AR & C Rally, Clacton-on-Sea, 27th - Rainham Radio Rally, Gillingham, Kent, March 2 - History Of Radar by Stan Woods. **Roy & Ela Martyr G3PMX & G6HKM on (0245) 360545.**

Greater London

Acton, Brentford & Chiswick ARC. 3rd Tuesdays, 7.30pm. Chiswick Town Hall, Heathfield Terrace, London W4. February 16 - WAB by G0HHP. **Colm Mulvany G0JRY on 081-749 9972.**

Clifton ARS . 'Earl of Derby' Public House, Dennetts Road, New Cross, London SE14. February 19 - HF evening, March 5 - Film evening. **Keith Lewis on 081-859 7630.**

Edgware & DRS. Watling Community Centre, 145 Orange Hill Road, Burnt Oak, 8pm. February 11 - Model Rockets by Bob Goss G4CQF, 25th - Morse Training evening, March 11 - Bring & Show evening. **Howard Drury G4HMD on (0923) 822776.**

Silverthorn RC. Fridays, 7.30pm. The Chingford Community & Adult Education Centre, Friday Hill House, Simmons Lane, Chingford, London E4 6JH. February 19 - Preparation evening for Thinking Day on the Air event, 20th - Thinking Day on Air event in association with the Guide & Brownie Troops that meet in Chingford. **Andrew Mowbray G0LWS on 081-529 4489 between 5.30 & 6.30pm weekdays only.**

Southgate ARC. Winchmore Hill Cricket Club Pavilion, Firs Lane, Winchmore Hill, London N21. February 11 - Multi-mode Action on the Air, 25th - Inter-Club Darts Match, March 11 - Rig Check evening by Donald G4DFB. **Brian Shelton G0MEE on 081-360 2453.**

Gwynedd

Dragon ARC. 1st & 3rd Mondays, 7.30pm. Four Crosses Hotel, Menai Bridge. February 15 - A Rough Guide To QRP by Stewart Rolfe GW0ETF, March 1 - St. David's Day Radio Eisteddfod - look out for list of competetive events. **Tony Rees GW0FMQ on (0248) 600963.**

Hampshire

Basingstoke ARC. 1st Mondays, 7.30pm. Forest Ring Community Centre, Sycamore Way, Winklebury, Basingstoke. February 28 - 2m Direction Finding Competition OS185 Fox: Dave G7JZU. **(0256) 25517.**

Horndean & DARC. 1st Thursdays, 7.30pm. Horndean Community School, Barton Cross (off Catherington Lane), Horndean, Hants. March 4 - Control & Communications/First Action First Aid - Hampshire Ambulance Service. **Stuart Swain G0FYX on (0705) 472846.**

Itchen Valley RC. 2nd & 4th Fridays, 7.30pm. Scout Hut, Brickfield Lane, Chandlers Ford. February 12 - Photography Update includes Close-ups & restoring black & white prints by Bob Thomas, 26th - open meeting. **Maurice Cheeseman G1IPQ on (0703) 736784.**

Hereford & Worcester

Bromsgrove & DARC. Fridays. Avoncroft Arts Centre, South Bromsgrove, Worcester. February 12 - Photography. **Joe Poole G3MRC on (0562) 710010.**

Hertfordshire

Cheshunt & DARC. Wednesdays, 8pm. Church Room, Church Lane, Wormley, nr. Cheshunt, Herts. February 17 - natter night, 24th - Amateur TV Repeater talk & demo by Adrian G0OJY, March 3 - Members Forum, 10th - Quiz night hosted by Alvin G1VXD. **Roger Frisby G4OAA on (0992) 464795.**

Dacorum AR & TS. 1st (informal) & 3rd (formal) Tuesdays, 8pm. The Heath Park, Cotterells, Hemel Hempstead. February 16 - Aerial Design part 2 by Mike Goodwin G0NJI. **Dennis Boast G1AKX on (0442) 259620.**

Hoddesdon RC. Alternate Thursdays, 8pm. Conservative Club, Rye Road, Hoddesdon, Herts. March 4 - natter night. **Roy G4UNL on 081-804 5643.**

Stevenage & DARS. Ground Floor Rear Suite, Sitec Building, Ridgemond Park, 7.30pm. February 16 - Practical night - On Air Practice & Procedures, 23rd - The American Experience Take 2 by Tony G0OVO. **Pete Daly G0GTE on (0438) 724991.**

Humberside

Bridlington & DARS . Alternate Thursdays, 7.30pm. Combined Cadet Building at Bridlington Upper School, Bridlington. February 19 - Computer Programming by Keith Goodyear. **Norman Bedford G4NJP on (0262) 673635.**

Kent

Bredhurst T&RS. Thursdays, 8.15pm. Parkwood Community Association, Parkwood Green, Rainham, Kent. **Martin Pearson G7JBO on (0634) 365980.**

Sevenoaks & DARS. January 18 - Semiconductor Manufacture by Eddie Brownlow. **The Secretary, c/o Sevenoaks District Council, Council Offices, Argyle Road, Sevenoaks, Kent TN13 1HG.**

Lancashire

Hesketh ARC. Every other Tuesday. Birkdale, Southport. February 16 - QRP on the air, March 3 - Bring & Buy. **Bernie G7DEM on (0704) 63344.**

Lincolnshire

Grantham RC. 1st & 3rd Tuesdays, 8pm. Kontak Sports & Social Club, Barrowby Road, Grantham. February 16 - ATU's by John G3VSX, March 2 - Fire Prevention in the Shack. **John Kirton G8WWJ on (0476) 65743.**

Lincoln Short Wave Club. Wednesdays, 7.30pm. City Engineers Club, Central Depot, Waterside South, Lincoln. February 17 - Surplus Equipment Auction. **John Riddoch G1TSL on (0522) 750757.**

Spalding & DARS. Fridays, 8pm. The Riverside Centre, The Old Fire Station, Double Street, Spalding, Lincolnshire. February 12 - Communications & Motor Sport by G7HNM. **David Johnson on (0778) 425367 (6-7pm).**

Merseyside

Liverpool & DARS. Tuesdays, 8pm. Churchill Club, Church Road, Wavertree, Liverpool. February 16 - Weather Satellites by G3PDC, 23rd - Surplus Sale, March 2 - Quiz, 9th - Activity night. **Ian Mant G4WWX on 051-722 1178.**

Wirral & DARC. Irby Cricket Club, Mill Hill Road, Irby, Wirral, 8pm. January 20 - D&W, Black Horse, Lower Heswell, 27th - Surplus Equipment Sale. **Paul Robinson G0JZP on 051-648 5892.**

Middlesex

Echelford ARS. Community Hall, St. Martin's Court, Kinston Crescent, Ashford, Middlesex, 7.30pm February 11 - Intruder Watch by J. Cleeve G3JVC, 25th - Construction Contest evening - bring your latest project. **P. Townshend G6PMT on (0344) 843472.**

Norfolk

Dereham ARC. 2nd Thursdays, 8pm. St. Johns Ambulance Hall, Yaxham Road, Dereham. March 11 - Strange Noise on HF explained. **Mark Taylor G0LGJ on (0362) 691099.**

Norfolk ARC. Wednesdays, 7.30pm. The Norfolk Dumpling, The Livestock Market, Harford, Norwich. February 17 - Science For All by Arnold Tomalin G3PTB, 24th - informal & night on the air. **Jack Simpson G3NJQ on (0603) 747992.**

Northants

Kettering ARS. Tuesdays, 7.30pm. Electricity Sports & Social Club, Eksdale Street, Kettering. February 23 - Gas Distribution & Radio Links by a speaker from British Gas. **Len G0RDV (but QTHR as G7EHM) on (0536) 514544.**

Nottinghamshire

Mansfield ARS. Polish Catholic Club, off Windmill Lane, Woodhouse Road, Mansfield. March 4 - The British Repeater Network by G8SSL. **Mary G0NZA on (0623) 755288.**

Nottingham ARC. Thursdays, 7.30pm. Sherwood Community Centre, Mansfield Road, Nottingham. February 11 - Generating your own Power, 18th - construction/ activity/prep for TDOA, 25th - The Lundy Island Dxpedition by Lionel G5LP, March 4 - Forum/Foxunt Forum, 11th - Around the World In 43 Days by G4MHB. **Ian Miller G4JAE on (0602) 232604.**

South Notts ARC. Highbank Community Centre, Farnborough Road, Clifton Estate, Nottingham, or Fairham Community College, Farnborough Road, Clifton Estate. February 12 - construction (Fairham College), 19th - Talk-in/The Secret War by Henry Balen, 26th - on air, March 5 - Talk-in (S22)/ Open Forum. **Ray G7ENK on (0602) 841940.**

Scotland

Aberdeen ARS. Fridays, 7.30pm. 35 Thistle Lane, Aberdeen. February 12 - The Great Morse Debate, 19th - Electrotherapy by Bill GM3FRI, 26th - How I Got Started In Amateur Radio by various speakers, March 5 - Junk Sale. **John GM1TDU on (0224) 706619.**

Dundee ARC. Tuesdays, 7pm. College of Further Education, Graham Street, Dundee. February 16 - construction night, 23rd - A holiday In South Africa by Sam Hall GM2AOL. **George Millar GM4FSB, 30 Albert Crescent, Newport-on-Tay, Fife DD6 8DT.**

Wigtownshire ARC. Thursdays, RAE & Morse, chats, etc. Stranraer Academy, 7.30pm to 10pm. **Ellis Gaston GM0HPK on (0776) 7215 evenings or (0294) 217979 day.**

Somerset

Taunton & DARC. 1st & 3rd Fridays, 7.30pm. The Basement, County Hall, The Crescent, Taunton. Other Fridays informally for station operation, Morse code class, natter. February 19 - Visit to Somerset County Archives. **Mr Lindsay-Smith G3WNI on (0823) 680778.**

Yeovil ARC. Thursdays. Red Cross HQ, Grove Avenue, Yeovil, Somerset. February 11 - Vintage Radio by G7LNJ, 18th - Club project 20/80m Transceiver Theory by G3PCJ, 25th - Don't Be Afraid Of CW by G3GC, March 4 - Club project 20/80M Transceiver Final Testing by G3PCJ. **Cedric White G4JBL on (0258) 73845.**

South Glamorgan

Barry ARS. Alternate Thursdays. Old College Inn. February 21 - Barry Mobile Radio Rally, Barry Leisure Centre. **Ann MacKay GW0SQT, QTHR.**

South Yorkshire

Barnsley & DARC. Mondays. Radio club room & shack, at the rear of the Darton Hotel, Station Road, Darton, Barnsley. March 1 - on the air night, 8th - proposed talk. **Ernie G4LUE on (0226) 716339.**

Suffolk

Felixstowe & DARS. March 1 - radio-related video evening at Orwell Park School, Nacton, Ipswich. **Paul Whiting G4YQC on (0394) 273507.**

Sudbury & DARC. 1st Tuesdays, 8pm. Five Bells Inn, Great Cornard, Sudbury, Suffolk. February 14 - Cambridge Rally, 21st - East Coast Amateur Radio & Computer Rally, March 2 - SAnDRA Club night at the Five Bells, Great Cornard, natter 'n' noggin night, with a raffle. **Colin Muddimer G0PAO on (0787) 77004.**

Surrey

Surrey RCC. Terra Nova' The Waldrons, Waddon, Croyden, Surrey. February 15 - natter night, March 1 - Surplus Sale. **Berni G8TB on 081-660 7517.**

Sutton & Cheam RS. 3rd Thursdays, 7.30pm. Sutton United Football Club, The Borough Sports Ground, Gander Green Lane, Sutton, Surrey. Natter nights - 1st Thursdays. February 18 - construc tional contest, March 4 - natter night, 6th - Annual Dinner at the Sutton United Football Club. **John Puttock G0BWV, 53 Alexandra Avenue, Sutton SM1 2PA.**

The Kingston & DARS. 3rd Wednesdays, 8pm. Alfriston, 3 Berrylands Road, Surrey KT5 8RB. February 17 - SWR Bridges, a.t.u.s, etc., by G. Cripps G3DWW. **Ray Fuller on 081-398 1128.**

Wimbledon & DARS. 2nd & last Fridays. St. Andrews Church Hall, Herbert Road, Wimbledon SW19. February 12 - Vertical antenna adjustment, 26th - The History Of Cameras by Chris G0KEB. **Chris Frost G0KEB on 081-397 0427.**

Warwickshire

Stratford-Upon-Avon & DRS. 2nd & 4th Mondays, 7.30pm. Home Guard Club, Main Road, Tiddington, Stratford-Upon-Avon, Warwickshire. February 22 - Test Equipment evening, Terry Downing G3MXH, March 8 - RF Problems Associated With Motor Vehicles by Tom Dobedoe & Mike Nielsen. **Alan Beasley G0CXJ on (0608) 82495.**

West Yorkshire

Halifax & DARS. 1st & 3rd Tuesdays, 7.30pm. Running Man Public House, Pellon Lane, Halifax. February 16 - Junk Sale - Queens Road Neighbourhood Centre. **David Moss G0DLM on (0422) 202306.**

Keighley ARS. The Ingrow Cricket Club, Ingrow, Keighley, 8pm February 11 - New High-Speed Nicad Charging, short talk by G3RXS, 18th - night on the air GX0KRS GX7KRC, 25th - Visit to West Yorks Fire HQ, March 4 - natter night, 11th - The Sky, The Beauty & The Wonder by Mr Dougherty. **Kathy Conlon G0RLO on (0274) 496222.**

Wiltshire

Trowbridge & DARC. 1st & 3rd Wednesdays, 8pm. Southwick Village Hall, 8pm. March 3 - Direct Conversion RX by G0BBL. **Ian G0GRI on (0225) 864698.**

Club News

Review

I recently had to replace my antique and unreliable oscilloscope. I sourced a suitable surplus oscilloscope, but nearly died of shock when told the price.

What happened to the surplus equipment prices of my youth? So, when *PW* gave me the MX-9000 to review, the first thing to enter my mind was its cost, knowing that the answer might invoke a sharp intake of breath.

The people at SAJE Electronics boast unashamedly, that the price of £399 plus VAT, represents excellent value for money. So, armed with my catalogues I set about checking their claim.

When the instrument arrived, I found an auto-ranging digital multimeter, a 100MHz counter timer, a 0-2MHz function generator and a three rail power supply, at an astounding total price. After checking the specifications, of the items of test equipment I'd sourced, against the MX-9000, I became convinced, that SAJE were right in their claim.

Multimeter Important

The multimeter, to my mind, is the most important item of test gear in any electronic constructor's workshop. The digital multimeter (d.m.m.) supplied with the MX-9000 is a very practical instrument. It's an auto-ranging type, leaving both hands free to hold the test prods in place.

A second feature is a memo button that stores one reading. This reading is used as a reference for following readings, giving a difference-between-two-values reading capability. The controls of the meter are very easy to operate, and the three and half digit l.c.d. display has reasonable visibility at most viewing angles.

Operating the meter is very straightforward. Select the units to be measured via the rotary switch, and plug the test prod in the appropriate sockets, and let the meter take care of the range needed. Changing from a.c. to d.c., or high/low ohms requires only a flick of a switch.

The meter has overload protection (for a limited time), with the exception of the high current range. The low current ranges are protected by a fuse. No standard meter was available to check the accuracy of the unit, but it it compared favourably with my works d.v.m.

I found the two prod type test leads, supplied as standard, adequate. But my personal preference has always been for the option of at least one, preferably both, prods replaceable by an insulated crocodile clip.

Frequency Counters

Being a v.h.f. radio enthusiast can cloud your judgment at times, particularly when it comes to digital frequency counters. Because of this, I found myself wondering why only 100MHz maximum?

The obvious answer is that the MX-9000 is designed and built to a given budget. After talking with a few electronics (only) enthusiast friends, I was convinced that Maxcom had found a good compromise.

The timer section of the MX-9000 counter will obviously come into its own when working on digital circuitry. Especially if you have only a very basic oscilloscope. For people like myself, a pre-scaler would make the MX-9000 counter timer into an instrument that would work on digital and v.h.f analogue circuits.

On test, the sensitivity of the counter was more than adequate and certainly better than the manufacturer's specification. After only a 15-minute warm-up period, the accuracy of the counter when checked against a workshop standard was within ±200Hz at 10MHz and 100MHz.

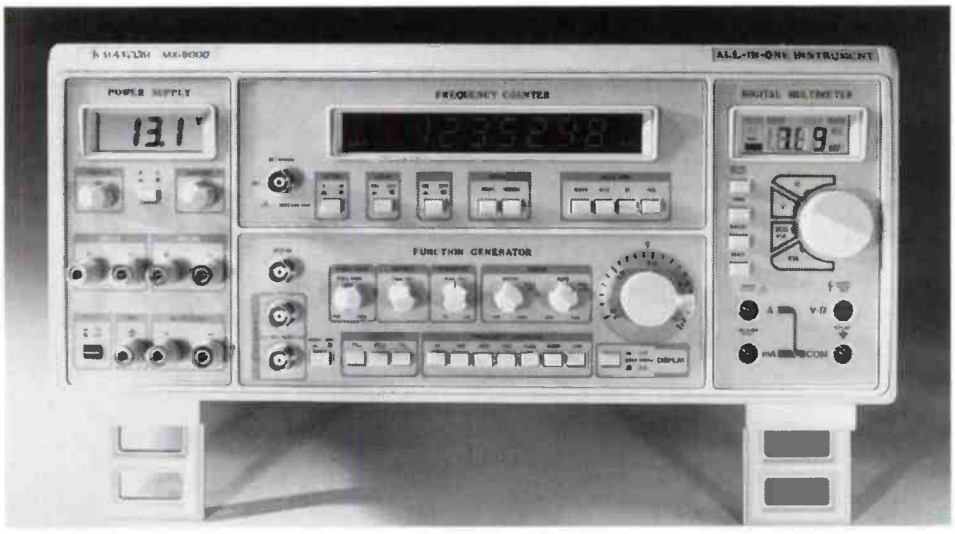
The only problem I had with the counter section was reading the display. I found this to be too dim for stronger workshop lighting. The display is, at best, a strain on the eyes and for long periods could give headaches.

The input (Hi impedance) of the counter is via a BNC socket. It may be linked to read the frequency of the function generator.

A nice touch, is a switchable -10dB pad giving the counter a degree of input protection. A coaxial lead with BNC and crocodile connectors is provided for use with the counter or function generator.

Function Generators

Working in a test house, as I do, makes you appreciate the usefulness of function generators. These are normally used as a means of providing a complex waveform to stimulate systems or circuits under test. The function generator provided in the



Richard Ayley G6AKG, looks at the One Box - Four test Instrument system from Maxcom.

Maxcom MX-9000

MX-9000 would be a very useful addition to our range of test equipment.

The generator in the review model, covers 0.02Hz to 2MHz in seven ranges and provides sine, triangle, skewed sine, ramp, pulsed and square waveforms. The latter at t.t.l. level if required.

Both 50 and 600Ω impedance outputs are provided, with a 2V maximum output under load and more than 3V at the t.t.l. output. The symmetry and d.c. offset of each of the waveforms can be varied by two separate front panel controls.

Useful Feature

A very useful feature of the generator, is that an external ramp voltage may be applied to sweep the frequency of the generator. One use of this feature popped into mind immediately, and that is to use it in conjunction with a 'scope to view the response of audio filters or even receiver i.f. filters. That's the radio amateur speaking again, sorry!

Also provided is an internal ramp generator which will sweep the frequency of the function generator, either logarithmically or linearly over a variable time setting between 20ms and 2s. The level of harmonics for the sine wave output were checked using an audio spectrum analyser, and seemed to be in the order of 5 to 10dBs lower than those quoted.

The feature previously mentioned of enabling the counter to be connected internally to the output of the function generator is helpful. This is because the calibration of the frequency setting dial was less than accurate.

Power Supply

Now it's time to look at the power supply facility. If there ever was such an over-priced section of the market, the bench power supply section must be it.

To my way of thinking, the average bench power supply can be put together by just about any electronics hobbyist worth his salt. There are many good and simple designs available, which makes the price asked for some of the lower specification commercial units scandalous. Because of this, the power supply section of the MX-9000 alone can make the instrument seem good value for money.

The MX-9000 p.s.u provides two fixed supply rails, one of 5V at 2A and the other 15V at 1A and a third rail rated 0-50V, 500mA. This rail is fitted with a current trip control which is very frustrating to use and to my mind needs changing to a current limit.

When the current trip activates, it is necessary to remove the a.c. supply from the MX-9000 to reset it. Which means that apart from upsetting the long term stability of the counter and the function generator, it also puts undue wear on the power switch.

The third rail is metered with its own three and half digital meter, both current and voltage. The accuracy of this display when checked against the d.m.m. section of the MX-9000 showed it to be no more than a rough indication. The rather arbitrary reading given on the current range on the meter, combined with the abrupt nature of the current trip, makes it almost impossible to set the current control with any accuracy.

Either of the two fixed supplies may be used in conjunction with the 0-50V supply to provide either a ±5V or ±15V supply. With the obvious restrictions set by the 0-50V supply.

When overloaded, each of the fixed rails have a current 'fold-back' protecting action. A warning is given though, not to leave it overloaded for an extended period.

I felt that speaking overall, the p.s.u. is just below the standard of the other parts. This is shame, because with little extra work in this area, I felt a much nicer instrument would result.

Construction

The construction of the MX-9000 with its many well located front panel controls, can't help being large. Consequently it's a rather bulky instrument and not easily used outside the lab or workshop. This is a price you pay for having everything in one box. The unit is very convenient, but it may lose some of its versatility and compactness.

After that critisism, I have to say that the MX-9000 is well laid out, both internally and the front panel. To its credit, there are no fancy components used in the construction.

The p.c.b.s are all well made and internal connections are via plugs and sockets, making the removal of internal components for repair very easy. The casing and its internals are made of plated steel, very substantial but rather heavy.

Service information is available from SAJE Electronic. This is one thing colleges and schools will, I'm sure, be glad of, as many carry out service work on-site. It also means that you could modify the awful current control on the p.s.u. Once the warranty has lapsed of course.

Elegant Equipment

The MX-9000 is an elegant item of equipment. The front panel, made of a light grey moulded plastics material, complements the outer two-part wrap-over case, finished in a textured beige paint.

The case had a very sharp back edge, which I found to my cost. I also felt the fold-down plastics front feet could be improved. In testing, I nudged the instrument and it crashed down, making me jump. On closer inspection, it appeared that the legs are not designed to be securely locked into place.

Operating Manual

The operating manual is fairly comprehensive, with a front panel diagram listing all the controls and their function. Each section of the instrument has its own area of the manual describing the operation.

However, I think that the manual was translated into English abroad. Or whoever wrote it, wasn't using his (or her) mother tongue! The manual does lack clarity in some places, leaving you feeling that, you know what they mean (sort of), but you have to try it, just to make sure.

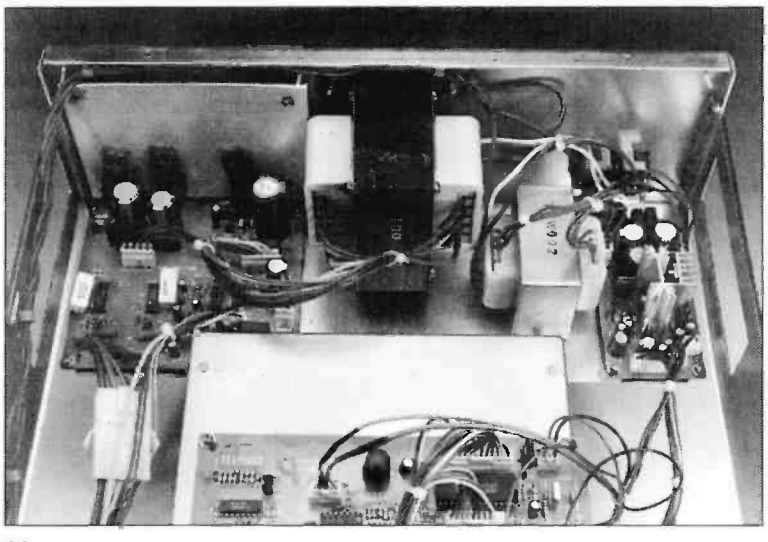


Fig. 1: The power supply section of the MX9000, showing the open method of construction.

In spite of this, considering the complexity of the MX-9000, the manual is not bad. And there is much to be said for the hands-on approach to learn how to 'drive' equipment.

Final Thoughts

Overall, I think the MX-9000 is a very useful piece of test gear and will appeal more to the average electronics enthusiast than the radio amateur. In terms of value for money, it's a very desirable item to anyone with a limited budget.

Perhaps SAJE might like to consider an system aimed at the r.f. enthusiast. Say a fixed +12V/2A supply with a simple r.f./a.f. signal generator and 1GHz counter, plus a 10W h.f./v.h.f. power meter with built in 'sniffer'. Then finish the whole lot of with a basic f.m. modulation meter.

Budget versions of all these instruments have been available for some time, all it needs is someone to glue them together with a bit of forethought. Who knows, for £399, SAJE could have another winner.

Well I can dream, can't I? **PW**

Manufacturer's Specifications

Digital Multimeter
$3^1/_2$ digit large liquid crystal display (l.c.d.) with value hold, and relative measurement facilities.

Basic measurements

Voltage a.c./ d.c.	750V max
Current a.c./ d.c.	10A max
Resistance	2MΩ max

Voltage autoranging (a.c./ d.c.) 10MΩ impedance.

DC -	200mV, 2/20/200V, 1kV ±0.8% (+2 digits) max.
AC -	2/20/200/750V ± 1.5% (+5digits) max.
	Overload protection 1100V d.c. or a.c. peak for 60 seconds.

Current (a.c./ d.c.)

200mA	±1%(d.c.) ±1.5%(a.c.) (+5 digits)
	Overload protection 400mA max (60s fused)
10A	±1.5%(d.c.) ±2%(a.c.) (+5 digits)
	Overload protection 13A max (40s un-fused)

Resistance Autoranging Ω
200Ω/2k/20k/200kΩ 2MΩ
Accuracy ±0.8% (+4 digits)
Overload protection 350V(a.c.) or 500V(d.c.)

Power Supply Section

	Output 1	Output 2	Output 3
Voltage	0-50V	5V fixed	15V fixed
Current	0-500mA	2A	1A
Ripple	1mV max.	2mV max.	2mV max.
Load regulation	0.01%+5mV	40mV	35mV
Line regulation	0.01%+5mV	30mV	30mV
Current limit	500mA adjustable	3A Fold back	2A Fold back
Display	Uses d.m.m. Volts/Amps	On l.e.d.	On l.e.d.

Function Generator Section

Range	0.2Hz - 2MHz in seven 100:1 frequency ranges, with a 10:1(adjustable) mark-space ratio. Sine, Squewed sine, Square, Triangular, Ramp and Pulse output waveforms +t.t.l. level squarewave
Distortion	less than 1% @ 100kHz
Output impedance	50Ω (±10%) and 600Ω(±10%) to 100kHz.
Output level	2-20V p-p no-load
Output attenuator	-20dBs
Internal sweep	20ms-2s adjustable Linear or logarithmic
Sweep width	More than 100:1
External sweep Input	0-10V (d.c.) or ±20V (a.c.)

Frequency Counter Section
1Hz-100MHz eight digits

Resolution	0.1/1/10/100Hz depends on range in use.
Gate time accuracy	10/1s, 100/10ms ±1HZ±1digit±Time bas error
Time base	10MHz clock 5p.p.m (0-40°C) 5p.p.m. per year
Sensitivity	15mV (1kHz- 60MHz) 30mV (60-100MHz)
Input impedance	1MΩ/100pF
Input level	a.c./ d.c. 15V r.m.s. direct 150V r.m.s. with attenuator switched in

Our thanks go to SAJE, for the loan of the review model. They can supply the MX-9000 for £399 plus VAT and carriage from their address at: 117 Lovell Road, Cambridge CB4 2QW. Tel: (0223) 425440. FAX: (0223) 424711.

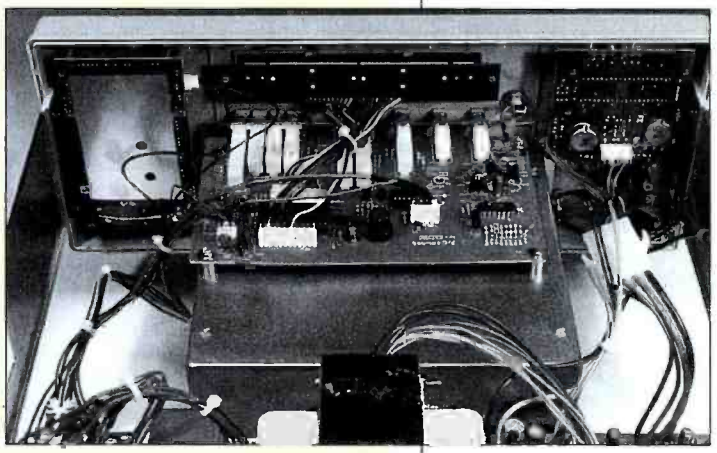


Fig. 2: Looking behind the front panel, the multimeter section on the left of the photograph and the p.s.u. meter on the right. The p.c.b. in the middle is the digital counter module, which is separated from the function generator below, by a metal screening box.

WHAT A GOOD IDEA

Radio amateurs are always full of bright ideas! So, this month G3JDK from Rotherham and G4OYX from Ludlow describe their ideas for a storage system and a simple power supply.

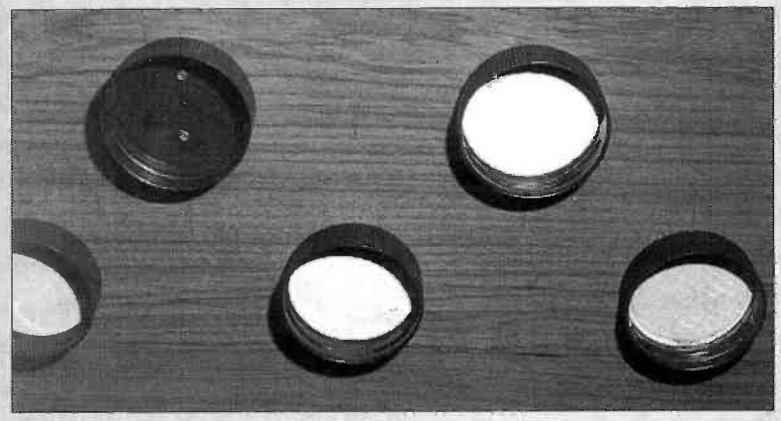


Fig. 1: Fixing the coffee jar lids.

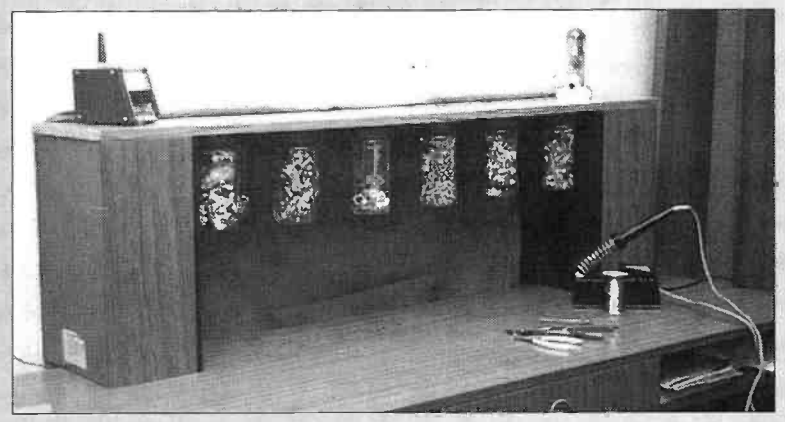


Fig. 2:The jar system in use.

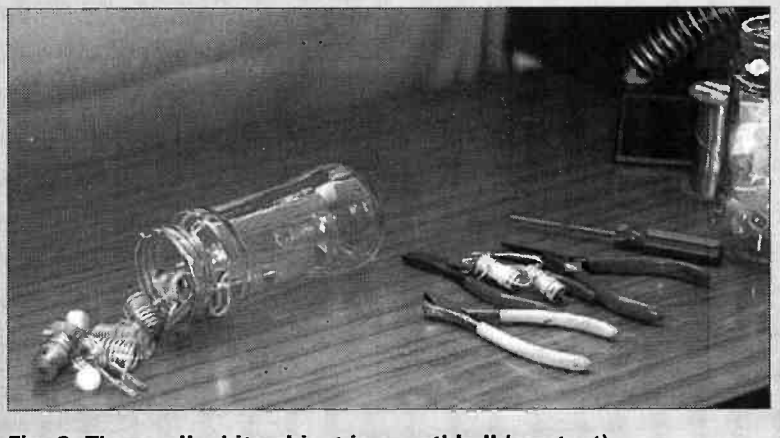


Fig. 3: The small white object is a mothball (see text).

Coffee Break Storage

I like building and repairing all manner of electronics things. And like many readers, I have limited space to do it in. This is almost bearable when actually working on the equipment, a desk makes a suitable work area. But eventually every available flat surface is covered with useless, but absolutely indispensable items.

Every Rally

After nearly every rally, I return home laden with small, hard-to-get items for repairs and modifications that I intend carrying out. But where to put them in the meantime?

Most constructors face problems when it comes to storage of components. More especially if these components are small and fiddley. In the past, many partial solutions to the problem have been tried, including polythene self-seal bags, pillboxes and folded envelopes.

Ideal Solution

All these methods have, for various reasons, been discarded. Cost, availability, and sheer cussedness in hiding small components, in that order. But now I've discovered the ideal solution.

My ideal answer to this problem, is the standard coffee jar. They come in a variety of sizes, have substantial screw-on lids and would only be thrown away otherwise.

If the jars are to contain only lightweight components, then a single hole in the middle of the lid is all that is needed. For heavier items, two holes would be better. Using No.8 woodscrews, fix the lids to the underside of a convenient shelf as shown in **Fig. 1**.

If the number of jars is more than can fit in a single row, then the most used items should be stored at the front. And take care to stagger the rows of jars, to allow you to see all the jars easily.

The photograph of **Fig. 2**, shows my work bench. This should give you a better idea of how it all works, the contents of each jar to be seen with minimum fuss.

Silver-plated

When stored, silver-plated components, such as air spaced transmitter coils and tuning capacitors, sometimes turn black from atmospheric sulphur compounds. My answer to this problem is to drop an old-fashioned camphor mothball into the jar, along with the silver-plated items.

The small white object shown in **Fig. 3** is the mothball, and the addition of one to each jar containing silver-plated items should keep them sparkling clean for a long time.

H. N. Kirk G3JDK, Rotherham, Yorks

Simple Variable Power Supply

There is nothing in electronics that works without a power supply of some sort or other. So it's no wonder that power supplies are one of the most designed and built items.

This is my fixed, but variable, power supply developed for ease of design and building. The p.s.u. is capable of supplying almost 5A with the right components.

The right components are a suitable 5A transformer T1, diodes D1-4, and a heatsink that can dissipate the excess power developed in this type of p.s.u. I've limited the current to just over 3A with a fuse, as I've found that, this in practice is about the maximum current that can be drawn before the system becomes too hot.

Simple Circuit

The full circuit diagram is shown in **Fig. 1**, and as you can see, it really is a simple circuit. The integrated circuit IC1, has all the active p.s.u. control circuitry on board.

The regulator i.c. has a 1.2V output, when the junction of R1 and R2 is taken to the 0V line. With a little bit of mathematics the output can be designed to be almost any value between 1.2V and the regulator's limit of 35V.

Because 1.2V is across resistor R2, 4.5mA must be flowing through it (1.2V/270Ω). This 4.5mA (plus a small amount that IC1 needs to work properly) is also flowing through R1. This current flow holds the 'Adj' pin of IC1 at a voltage above the 0V line.

As the current required by IC1 is quite small, I shall ignore it for this circuit. So assuming only 4.5mA is flowing through R1, a voltage of 12.15V is at the 'Adj' pin of IC1 (with respect to the 0V line). This of course assumes that the circuit is as shown in **Fig. 1**.

Add to this 12.12V, the nominal 1.2V output voltage of the i.c., and we have a combined output voltage of just a little more than 13.4V.

Multi-Output

The unit can be made to produce other output voltages, in the range of 1.2-30V. For the higher voltages, some changes would have to be made to the transformer, diode and filter capacitor circuitry.

Shopping List

Resistors

270Ω	1	R2
470Ω	1	R3
2.7kΩ	1	R1

Capacitors

Mylar 160V		
220n	1	C3
Efectrolytic 24V working minimum		
1µf	1	C2 May be replaced with a tantalum bead type
15 000µf	1	C1

Semiconductors

LM338K	1	IC1
MR751	4	D1-4 A bridge rectifier (50V 6A min could be used)

Miscellaneous

A 100VA 15V transformer, a3.15A fuse and fuse holder, the l.e.d.(D5) is almost any red or green light emitting diode, a suitable heatsink (Maplin FL55K) and box.

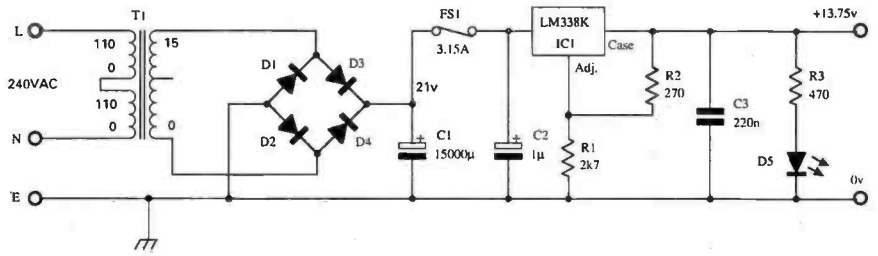


Fig. 1: The circuit diagram of the power supply. Capable of being made to give different output voltages. See the text for more details.

Here is small table to help you acheive the output voltage you need.

Vout	New R1
1.5V	68Ω
3V	390Ω
4.5V	680Ω
6V	1kΩ
7.2V	1.2kΩ
9V	1.8kΩ
12V	2.2kΩ
15V	3kΩ
20V	3.9kΩ
24V	5.1kΩ
28V	6kΩ

This table is not meant to be highly accurate, but just to give an indication of the required resistance to replace R1. At the higher output voltages, you may need to modify the resistance slightly to get a more accurate voltage output.

I hope you find the circuit as useful as I have.

David Porter G4OYX
Ludlow
Shropshire

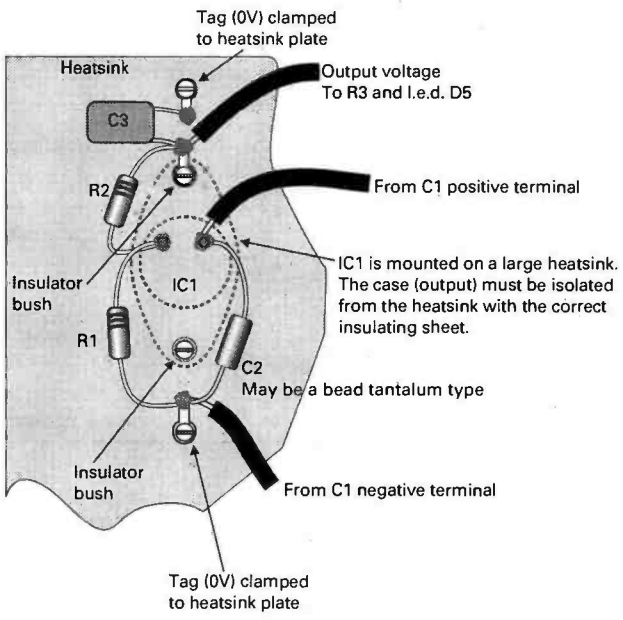
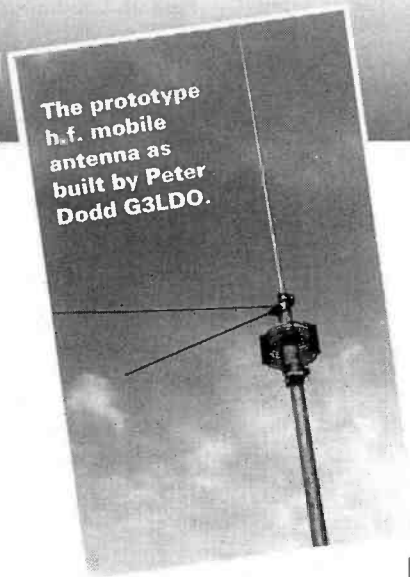


Fig. 2: Diagramatic (pin-side), view of IC1, and most of the other components, mounted on a large heatsink. It is important that the LM338K integrated circuit is insulated from the heatsink.



The prototype h.f. mobile antenna as built by Peter Dodd G3LDO.

This month's 'Antenna Workshop' by Peter Dodd G3LDO, takes the form of a mobile project. Peter says that antennas for h.f. mobile working can be cheap and easy to make, and to prove it he's come up with a very practical antenna.

My particular interest is experimenting with antennas. The constructional practices I'm describing this month, will enable you to construct compact loaded antennas suitable for experimental work.

The design and location of a mobile antenna is the key to successful operation on any amateur band. Because of space limitations on the vehicle, the vertical whip antenna is the most popular antenna regardless of the band of operation.

Easiest To Feed

The vertical whip is easiest to feed if it's at, or near, resonance. Because the greatest practicable length of whip antenna is 2-3m, the antenna must be resonated by the addition of a loading coil.

The loading coil may be placed anywhere in the whip. However, the most efficient and practical location is at the centre (**see ref. ‡1**).

To minimise losses, the coil must be wound using the thickest wire possible. It should be air-wound, with the wide practicable spacing between the turns. The diameter should not be less than half the length of the coil.

The loading coil described in this article, is designed for the higher h.f bands, i.e. 14-30MHz. Despite this, by designing and making larger coils the range could be extended to the lower h.f. bands.

Nowadays, many vehicles have plastics bumpers. Some have no bumpers at all!

So, a method has to be found to mount the antenna directly to the bodywork. If the car has a towing bar, it makes an excellent antenna base mounting point.

The drawings in **Fig. 1** and **2**, show two ways to connect an antenna mount to the rear of a vehicle that may or may not have a plastics material bumper. The base mount is constructed from two pieces of angle aluminium bolted together.

The aluminium material was obtained from a local scrap-yard as one length. Lengths of about 80mm were then sawn off as required.

The plastics bumper should be removed if necessary. Then holes may be drilled in the car body and the mount fixed in place. The bumper can then be replaced.

Base Plate

For vehicles without bumpers, a steel base plate must be used. It should be fixed to the outside of the boot compartment with two or three bolts and nuts, as shown in **Fig. 2**.

For added safety and security, when fixing antenna mounts, lock-nuts or lock-washers should be used on all bolts. All the metalwork used to construct the mounting bracket, should also be cleaned and given a thin coat of grease, to minimise corrosion before assembly.

Please take care that, when drilling and fixing items to a car, avoid wiring, hydraulic brake pipes, fuel pipes, or anything else that may affect the safety of the vehicle. If in doubt, a local garage may be able to fit the antenna mount for you.

Once a metal mounting base is fixed in position, it's relatively easy to devise a base insulator. One ARRL publication (**see ref. ‡2**) suggests a spring base to support the bottom insulated section.

The same article also suggests steadying the structure with nylon cord. This seems self-defeating, I think that it's better to make the structure fairly rigid in the first place.

I use exhaust system U-clamps to fix the antenna to the base. Suitable insulating material, such as strips of polythene or polythene tube will insulate the antenna from ground. The method of construction is shown in **Fig. 3**, the mounting-plate as seen from behind.

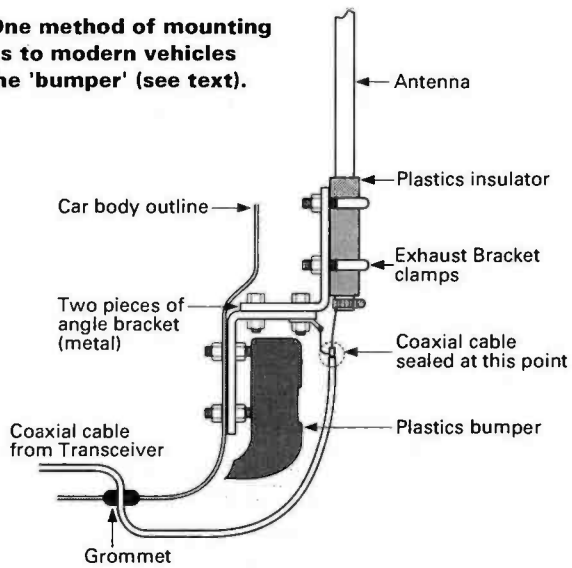
If you're unable to find polythene tubing of the right diameter to fit the bottom element, it may be split so that it does fit. Splitting the tube will not impair the insulating qualities of the structure; the voltage is fairly low at the bottom end of the antenna element.

Coil Construction

Now it's time to look at coil construction. And at this point, I'll mention that in the past, loading coils have presented me with constructional problems.

Where coil construction information was available, it was usually far too specific. So, learning from my own difficulties with other people's projects, I've made the following construction method

Fig. 1: One method of mounting antennas to modern vehicles above the 'bumper' (see text).



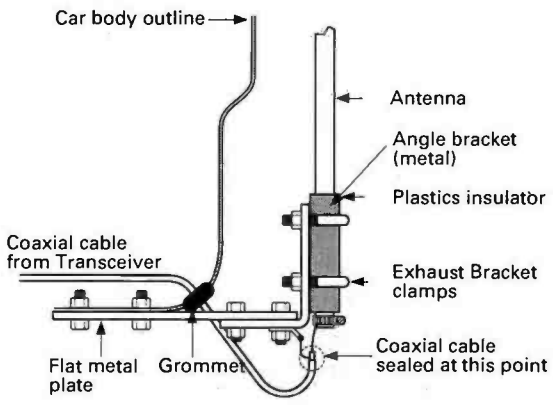


Fig. 2: Alternative method of mounting antenna bracket (see text).

simpler, and it's less critical of sizes and materials.

The loading coil is made up from 1.63mm (16s.w.g.) tinned copper wire. A coil wound for 14 to 28MHz is approximately 75mm in diameter and 45 mm long.

To make the coil, wind the wire around a suitable former, such as a small jamjar. When the coil is removed from the former, you have a low loss air-spaced loading coil. Two or three sections of plastics insulating material, can be used to make the coil structure more rigid as shown in **Fig. 4**.

Insulating Material

The insulating material can be fixed to the coil, before the coil is attached to the antenna. To do this, drill 1.8mm holes in the insulating material. They should be 4mm apart, one hole for each of the turns of the coil.

To start, place the insulating material together, and then wind the coil through the holes in the material. This process should be continued until all the coil windings are supported.

Move the insulating supports around the coil, so that it's supported in two or three places, depending on how many insulating strips you have used. The pieces can be held in place using a few spots of adhesive, such as an epoxy resin adhesive. The adhesive should be applied where the insulating material touches the coil.

Tapping Points

The advantage of the open construction method I've adopted, is that tapping points can be made on the coil. The tapping can be achieved with a flexible wire link.

The flexible link is connected to the lower element, by a jubilee clip just below the coil. The other end of the link is fitted with a small crocodile clip, which is clipped to one of the turns of the coil.

This tapping technique results in turns being shorted out, so that one coil can be used for several bands. I'll describe a method of setting the tappings, later on.

The insulator section is constructed from an 80-90mm length of plastics tubing. This has an internal diameter of 20mm.

The antenna bottom element is made from a 20mm aluminium tube. Don't forget, that if a different diameter tubing is chosen for the bottom section, then plastics tubing of a suitable diameter is also required.

Slots, around 15mm long, are cut longitudinally at each end of the piece of plastics tubing. This is to allow it to be fixed tightly to the antenna element when the jubilee clips are tightened up.

Telescopic Whip

The top section is tuneable, using a telescopic whip antenna of about a metre in length.

Additional top capacity, to increase antenna efficiency, is achieved by an added horizontal capacity element.

This capacity element can be seen in **Fig. 4.** It's made from one length of 2mm steel rod, with legs some 320mm long. There's a spacing of approximately 30° between the legs.

The telescopic whip antenna used in my prototype, has a base diameter of 12mm. I made a reducer from two short lengths of aluminium tube, 20mm and 14mm diameter.

The 20mm section is tapered by cutting two or three 'V' slots at one end. The 14mm tube is placed inside the 20mm section. A jubilee clip is placed over the 'V' cuts, and when it's tightened, the outer tube clamps on to the inner one.

Small slots are cut in the 14mm section of tube. This is so that the top telescoping whip antenna section can be fixed, using a jubilee clip. This is fixed on to the antenna with jubilee clips in a similar way to that shown in **Fig. 4**.

Connecting & Matching

Connecting and matching-up is very straightforward. The coaxial cable is split, in the boot of the car, near to the antenna base.

The centre conductor is fed through a hole in the body work. The braiding is connected to the bodywork.

This connection must have a low resistance. So, all paint and corrosion around this connection **must be removed** and the clean metal work then smeared with grease.

Several Bands

To use the antenna on several bands with a link-tapped coil, the antenna must be resonated on the lowest frequency band first. To do this, remove the link so that the coil has maximum inductance.

If you have a dip oscillator (dip meter), you can use this to measure the antenna resonance. It's a very useful accessory.

To adjust the antenna, start by removing the coaxial cable connection from the antenna base. Then connect a one-turn link between the antenna and the nearest earthing point, as shown in **Fig. 5**.

Couple the dip-meter into this link, and then adjust the top telescopic section until the antenna is resonant within the band. Finally, mark the position of the telescopic antenna extension.

If you wish to use the antenna on other bands, connect the coil shorting link to a point on the coil, and then measure the resonant frequency. Adjust the position of the tapping point for the correct resonant frequency. **Do NOT** adjust the top telescopic section.

When the correct tapping point for the band is found, mark the point on the conductor

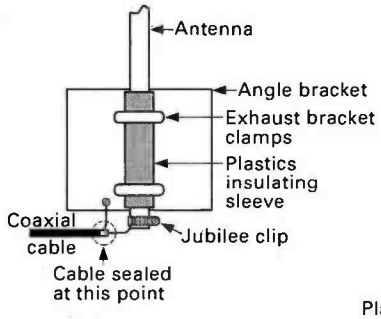


Fig. 3: Details of angle bracket, showing use of exhaust bracket clamps. The end of the coaxial cable must be sealed and made fully waterproof.

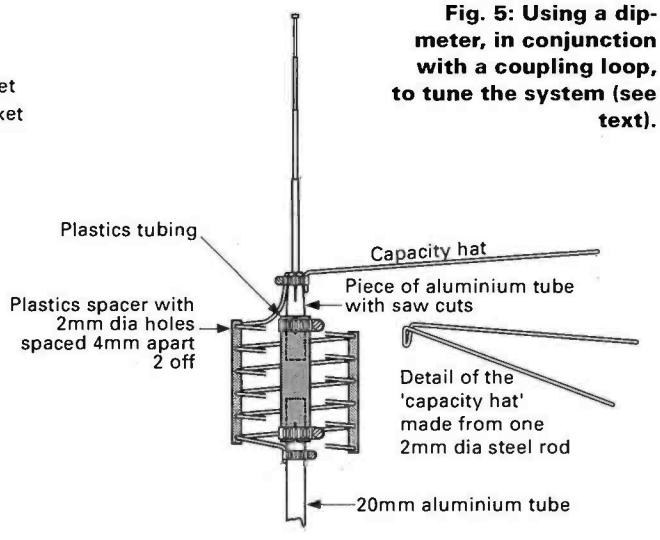
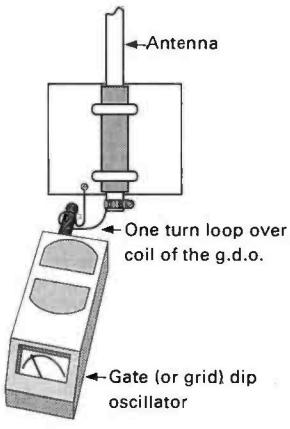


Fig. 4: Detailed view of loading coil with telescopic tuning section, showing method of winding coil through insulating material and capacity hat.

Fig. 5: Using a dip-meter, in conjunction with a coupling loop, to tune the system (see text).



with a marker pen. You can then move to the next frequency band, and repeat the tapping point adjustment.

Load Impedance

Most mobile equipment requires a 50Ω output load. Since the feed-point impedance of a mobile whip is quite low, a matching network may be necessary.

When installing the antenna system, I recommend that a matching network **is used**. A suitable network is shown in **Fig. 6**.

The most convenient way of achieving a suitable match for the loading, is to increase the electrical length of the antenna, so that its resonant frequency is lower than the operating frequency. Although this increases the feed impedance, it also introduces inductive reactance, which can be compensated for with a base loading capacitor.

The matching capacitors may be connected as shown in **Fig. 7**, and the capacitor value must be changed for each band. This is best achieved by having several capacitors in a box, and selecting them using a switch.

The value of the base loading capacitor will depend on the band in use, and the feed impedance of the antenna. These values will, in turn, depend on the actual installation.

I think capacitor values of between 150 and 450pF would be about right. But the final values should determined by experiment, as I'm about to explain.

Experimental Process

You can start the experimental process by disconnecting the one-turn link at the base of the antenna, and reconnecting the coaxial cable to the antenna. You should then disconnect the shorting link at the coil if you have fitted one.

Next, set the transmitter to the 14MHz band. Then select one of the larger values of loading capacitor.

Now connect the transmitter into the antenna system, through an s.w.r. meter. Adjust the length of the telescopic top section and the capacitor value for the lowest s.w.r. reading. This may be a bit fiddly and could require some experimentation (see *). Finally, make a note of the overall length of the telescopic section.

Repeat the adjustments for the other bands by connecting the links to the marks obtained using the g.d.o. **Do not adjust the telescopic top section once it has been set for the lower frequency band**! You should adjust the higher frequency matching, by moving the coil tap point.

Tapping Points Soldered

Once the coil tapping points have been found, thick wire tapping connections can be soldered to the coil in these positions. The link can then be made using the brass inserts from a plastics connecting block (choc-block). This will provide a better connection than a crocodile clip.

That's it! Your new home-brew h.f. mobile antenna is ready for use. Good mobile-DX, and I look forward to working you on the bands.

(*) An easier way of matching the system, would be to measure the antenna feed impedance. This method of matching will be the subject of a later article.

Further Reading

(‡1) Optimum Design of Short Coil Loaded HF Mobile Antennas, ARRL Antenna Book, 15th edition, pages 16-5 to 16-11.
(‡2) ARRL Antenna Book, 15th edition, page 16-1.
The *ARRL Antenna Book* is available from the *PW* Book Service, which is now to be found in the 'Arcade' section.

How Difficult? ***Intermediate***
How Much? ***Approximately £6 (depending on materials to hand)***

Shopping List

Telescopic whip section, 2mm steel rod (see drawing), hose-clips, aluminium tubing (see text), plastics tubing. Exhaust U-clamp type brackets, epoxy resin adhesive, nuts, bolts and metal bracket material to suit (see text). Coaxial cable, capacitors for matching network (see text), sealing compound and grease for waterproofing entry holes and protecting vehicle bodywork.

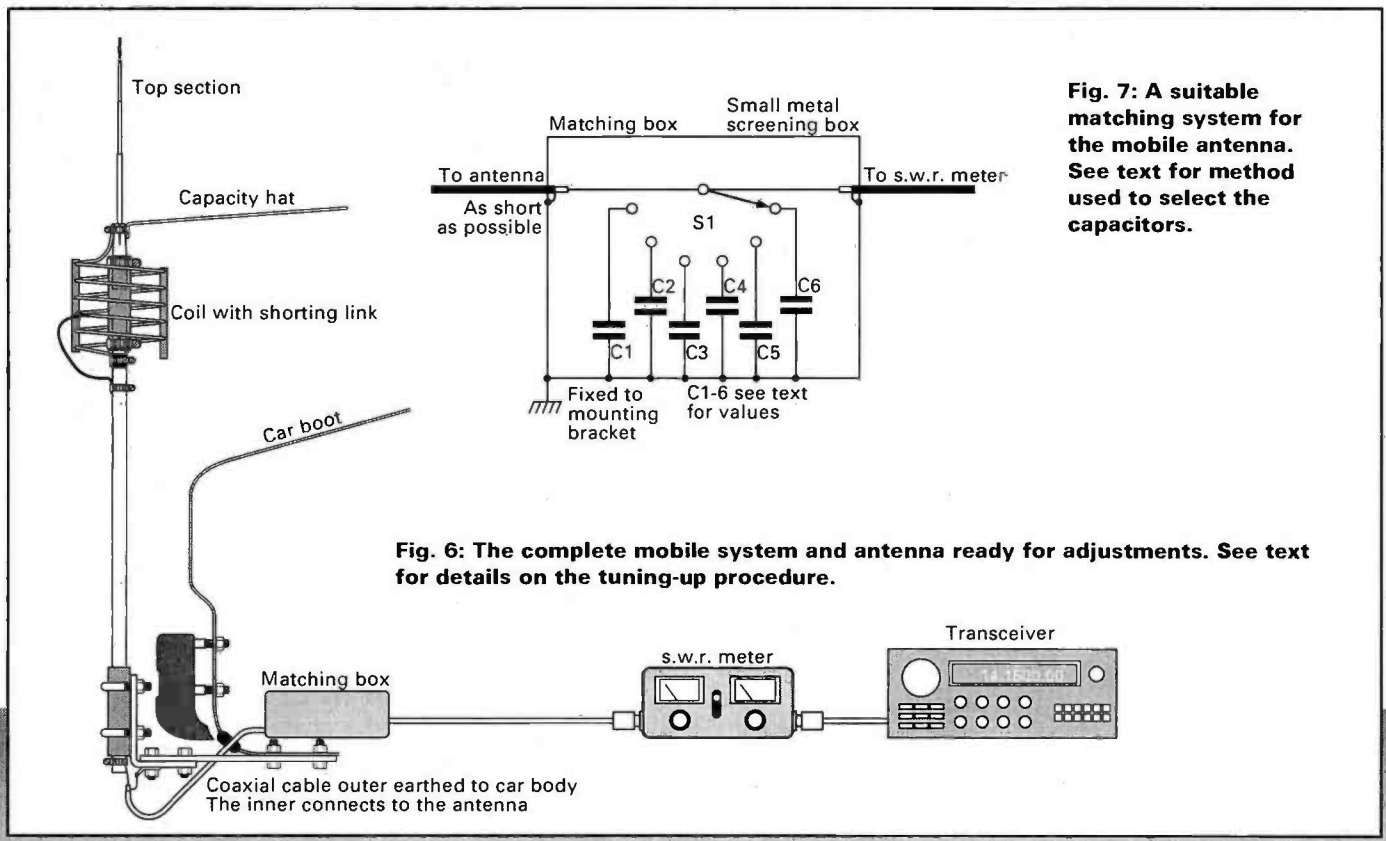


Fig. 7: A suitable matching system for the mobile antenna. See text for method used to select the capacitors.

Fig. 6: The complete mobile system and antenna ready for adjustments. See text for details on the tuning-up procedure.

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Drake TR7 Transceiver with SPS7 power supply: s.s.b. and c.w. filters fitted, receive DC-30MHz, £565. Geoff G4ECF. Tel: (0483) 570033.

Eddystone 898 dial assembly boxed, unused (see page 24 February issue). Best offer secures. Heathkit Laboratory oscilloscope model 0-12U, £50. Tel: 081-450 4844 daytime, 081-954 1750 evenings.

ERA MkII Microreader used twice, £75. Kenwood HS5 headphones new, £20. BNOS 144MHz 100W Linear with Pre-amp, £30.

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Yaesu FT-290 MkII 144MHz multi-mode. All accessories, £350. Clip on 25W amp, £50. Portable black and white TV (small) v.h.f/u.h.f. multi standard ideal beginners DXTV or travel, £50. Nick or Lindsey, Uxbridge. Tel: (0895) 236397.

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Drake RR3 MSR2 DSR2 R4245 receiver, any condition working or not. Racal 1792 bits. MA1103A. Watkins Johnson v.l.f. receiver. Modern solid state receivers by Siemens, Dansk, Sait or Collins or w.h.y.? G3YFK. Tel: (0743) 884858.

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Tyrone Amateur Electronics, 44 High Street, Omagh, Co Tyrone, Northern Ireland. Tel: 0662 242043

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Lowe Electronics, Cumbernauld Airport Cumbernauld. Tel: 0236 721004

DONCASTER
Alan Hooker, 42 Nether Hall Road, Doncaster, South Yorkshire.
Tel: 0302 325690

EALING
Martin Lynch, 286 Northfield Avenue Ealing, London. Tel: 081 566 1120

EASTCOTE
Lowe Electronics, 223 Field End Road, Eastcote, Middx. Tel: 081 429 3256

EDGWARE
Haydon Communications, 132 High Street, Edgware, Middx.
Tel: 081 951 5782

FIFE
Jaycee Electronics, 20 Woodside Way, Glenrothes, Fife. Tel: 0592 756962

HANGER LANE
A R E, 6 Royal Parade, Hanger Lane, London. Tel: 081 997 4476

HAYWARDS HEATH
Bredhurst Electronics, High Street, Handcross, Haywards Heath, West Sussex. Tel: 0444 400786

HOCKLEY
Waters & Stanton Electronics, Spa House, 22 Main Road, Hockley, Essex
Tel: 0702 206835

LEEDS
South Midlands Communications, Nowell Lane Ind Est, Nowell Lane, Leeds. Tel: 0532 350606

LEEDS
Lowe Electronics, 34 New Briggate, Leeds. Tel: 0532 452657

MAIDSTONE
Lowe Electronics, Chatham Road, Sandling, Maidstone. Tel: 0622 692773

MATLOCK
Lowe Electronics, Chesterfield Road, Matlock, Derbyshire. Tel: 0629 580800

NEWCASTLE
Lowe Electronics, Newcastle Airport, Woolsington, Newcastle.
Tel: 0661 860418

NEWPORT PAGNELL
Photo Acoustics Ltd, 58 High Street, Newport Pagnell, Bucks.
Tel: 0908 610625

NEWTON LE WILLOWS
Amateur Radio Comms Ltd, 38 Bridge Street, Earlestown, Newton Le Willows Merseyside. Tel: 0925 229881

NORFOLK
Eastern Communications, Cavendish House, Happisburgh, Norfolk.
Tel: 0692 650077

NORTH HUMBERSIDE
Peter Rodmell Communications, Field Head House, Leconfield, North Humberside. Tel: 0964 550921

NOTTINGHAM
R A S Nottingham, 3 Farndon Green, Wollaton Park, Nottingham.
Tel: 0602 280267

PORTSMOUTH
Nevada, 189 London Road, Portsmouth Hants. Tel: 0705 662145

SLOUGH
Lowe Electronics, London Heathrow, 6 Cherwell Close, Langley, Slough, Berks. Tel: 0753 545255

STOURBRIDGE
Dewsbury Electronics, 176 Lower High Street, Stourbridge, West Midlands.
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Converting A 27MHz

Many 27MHz a.m./f.m./s.s.b. CB transceivers, such as the 'Ham International Multimode II', were imported in to the UK. Although illegal on the UK 27MHz CB band, many amateurs obtained the necessary permission to convert them to 28MHz operation. P. E. Francis explains how you set about modifying the rig.

A large number of continental transceivers manufactured by Ham International, found their way into Britain. They originally appeared mainly as a result of the upsurge in unlawful CB radio operations.

One of these sets, the Multimode II, lends itself nicely for conversion onto the 28MHz band. Fortunately, many radio amateurs obtained these transceivers, and the necessary permits to convert them, before the Radiocommunications Agency stopped issuing new permits several years ago.

The rigs (once converted) can, of course, be used legitimately either as a straight transceiver or (with the p.a. section removed) to drive a transverter. Once on 28MHz, they can prove extremely effective.

I've aimed the following article at the radio amateur who has one of these sets and wants to use it on the 28MHz band. Alternatively, I've no doubt that there are amateurs who have the partly broken-down chassis of such rigs in their shacks. Licensed amateurs in this position, can quite legitimately use these units as transverter drivers (as per the relevant Radiocommunications Agency directive on the subject).

The Conversion

The equipment needed for the conversion needs to be little more than a power meter with a 50Ω dummy load and a frequency counter. You'll also need a selection of trimming tools, some patience and a 6.5536MHz crystal.

First of all, install the dummy load and power meter onto the set. Then switch the set to Lo band channel 1, select f.m. mode and note that the output frequency is 26.965MHz.

On the underside of the transceiver, to the right side of the rig, **Fig. 1**, look at the pins of IC1, a PLL02A. Note here that pin 9, is soldered to the copper track which is a permanent 5V rail. The diagram, **Fig. 2**, shows the main board lay-out to help you locate the various components.

The pin 9 on IC1 needs to be removed from its present 5V rail and reconnected to earth. This modification is best carried out by cutting away the copper foil connection, using a sharp knife.

Cutting the track isolates pin 9. You then solder a jumper lead from pin 9 onto the earth copper foil, which is just to the right of the 5V rail.

Take care on soldering the jump lead to pin 9. This is in case you bridge the gap that has been put across the print, or you may short the 5V rail out.

This modification alters the logic signals to IC1, which is the phase lock loop. This procedure is vital to the re-programming of its output frequency.

Note that after this stage of the operation, the output frequency on channel 1 is now 27.487MHz. We're getting nearer!

New Crystal Frequency

The next job to do, is to remove the crystal, X1, which is on 10.240MHz. You then replace it with the new crystal on 6.5536MHz.

Operating the microphone p.t.t. switch after this, will almost certainly result in no r.f. output. You'll now have to adjust the voltage controlled oscillator (v.c.o.) block to get an output.

To obtain an output again, unscrew the ferrite core of the largest plastic v.c.o. block (alongside IC1) with the microphone p.t.t. depressed until r.f. output suddenly appears. Unscrew the core a further half turn and then leave it alone.

The reason for the loss of the r.f. output is due to the operation of special circuitry. This protection disables the transmit portion of the set, and is brought into operation if the phase lock loop is in a 'non-locked' condition.

Observe now, that the channel 1 frequency is now 28.294MHz. At last, we're on 10 metres!

Output Acceptable

The rig's measured r.f. output will be acceptable over some 40 channels or more, but output will drop off after that. So, some slight tweaking of the cores of: T1, T2 and T3 will now be required in order to achieve reasonable 'bandspreading' of power over the full 120 channels.

If at any time, power output drops to zero or 'chattering' of the r.f. output level occurs, it may be necessary to unscrew the v.c.o. block a little further.

That deals with all the frequency determining adjustments, so now put the set onto 'Mid band', channel 60, and adjust the cores of T4, T5 and T6 for maximum r.f. output. Next, adjust the cores in L7, L11 and L13, the r.f. driver and output stage

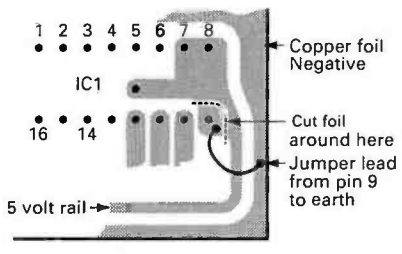


Fig. 1: Details of the p.c.b. modifications needed on the Ham International 27MHz transceiver, to prepare it for use on the 28MHz amateur band. The same modifications may apply to other similar transceivers held by licensed amateurs with the necessary Radiocommunications Agency permit to convert.

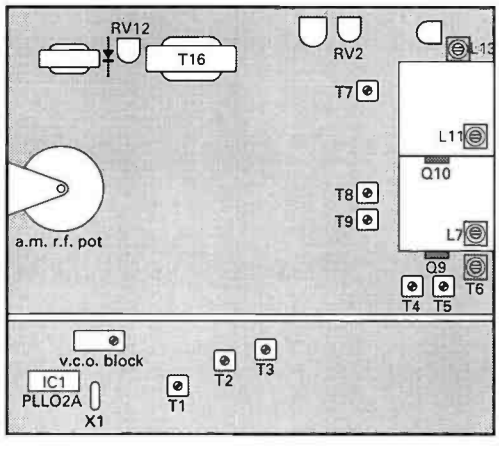


Fig. 2: Diagram showing main board lay-out on the transceiver, with main components and those involved in the conversion indicated.

Multimode Transceiver

tuning coils, for maximum output.

The cores may need to be stagger-tuned in order to achieve a good, even spread of power over all channels. It may be worth noting at this stage, that by adjusting RV2 (the a.l.c. control) can give a slight boost to the s.s.b. output.

The control RV12, is the modulation percentage control for the a.m. section of the transmitter. The transmitter is capable of up to 20W p.e.p. on s.s.b., depending on the p.a. transistor type and how well the output stages have tweaked up.

Receive Adjustments

Next, switch the rig to receive and select a good steady carrier or strong station around channel 60, and start the adjustments of the cores in T7, T8 and T9. Aim for maximum signal strength reading, or maximum noise in the event of there being little band activity.

Again, some stagger tuning of T7, T8 and T9 receiver front-end tuning coils may be needed. This might be required to avoid any sharp drop in receiver performance, over the full coverage from 28.294 to 29.476MHz.

It will be necessary to make a log of the output channels in terms of frequency, and the frequency variation available with the 'clarifier' control for obvious reasons. However, there is provision on the rear of the set to install a frequency counter, which could be useful.

On this rig, the transmitter only, is usable on a.m., f.m. and s.s.b. modes but the receiver is only operable on s.s.b. The reason for this, is that in the original design, the frequency of crystal X1,10.240MHz was tapped off through C13, a 5pF capacitor and mixed with another frequency of 10.695MHz, giving a difference of 455kHz.

The 455kHz was of course the i.f frequency used on a.m. and f.m. However, the now obsolete crystal of 10.240MHz could well be built up on an external circuit board. The signal could be injected into C13, after first removing the C13 connection to one leg of X1.

My suggested (extra) modification would serve nicely for a.m. and f.m. modes. It could be particularly useful if the set was contemplated for use as a prime mover for a transverter to 144MHz, for example.

Since this article was aimed mainly at the h.f. bands operator, it was not considered too important to dispense with the a.m. and f.m. facility. The crystal specified came from RS Components, and was used for a clock project.

There's no reason why some other crystal frequency couldn't be employed with the above modifications. But don't forget, output channels will of course vary from those quoted if an alternative frequency is used.

The 28MHz band is very noise free, and many pleasurable hours can be spent having world-wide contacts. Even using relatively low power, providing a good antenna is used and band conditions are good, you can work some excellent DX.

PW

Feature

Helical Earthing Systems

Richard Q. Marris G2BZQ takes a look at a rather unusual earthing system.

Many amateurs have problems with installing earthing systems (r.f.). The mains earth is essential, as a safety measure, with mains operated equipment, but does not make a good r.f. earth, and should not be relied on for that purpose.

The helical wound antenna is quite well known, but what is not quite so well known is that a helical wound r.f. earth will often, but not always, work excellently. A typical helical r.f. earth is shown in **Fig. 1**.

It consists of turns, of wire, wound around a suitable insulated round rod or tube. The formula established, at the QTH, for calculation of the length of wire needed for the winding is:

$$\text{Length (in feet)} = \frac{492}{\text{F (MHz)}} + 10\%$$

So, if we were interested in a frequency of 14.1MHz, the length of the helical earth would be:

$$\text{Length (in feet)} = \frac{492}{14.100} + 10\%$$

After working out the maths, we arrive at a figure of 38.4 feet (11.70m)

This could be wound on a length of 1in diameter dowel (long broom handle) using 16/0.2mm pvc insulated flex which has a nominal o/d of 5.4mm; and is also $^1/_2$ of mains lighting lead. The turns should be slightly spaced. Such a helical can be used throughout the 14MHz band. For a lower frequency band, such as 3.5MHz, then a larger diameter plastics drain pipe section is suggested with the length of wire worked out from the same formula. The idea can be tried for mono-band function and should be connected at the a.t.u.

Trial And Error

The positioning of such an earth is best established by trial and error. It should not be laid on the floor, or ground, but uplifted to two or more feet, and a horizontal support consisting of the backs, of two wooden chairs, is useful to establish the best position. The earth can be tried at various angles to the antenna, or even hung out of an upper window, or propped at an angle against the wall.

There is a 'best' position where the antenna loading is best, but experience in various apartments in the UK and USA, on 14MHz, has produced different angles, at different QTHs, with various antenna types. A simple plug/socket arrangement, at the a.t.u., would enable individual helicals to be used on different bands.

For the s.w.l. interested in general short wave listening, it is suggested that a helical could be wound, for say 3MHz, on a length of plastics drainpipe, with a few taps to be tried at the various higher frequencies. The drawing **Fig. 2** shows an experimental layout that could be used over several bands.

Experimentation

A certain amount of experimentation is suggested.

Whether a helical r.f. earth is tried for transmission and/or reception, it may well solve a difficult earthing problem, especially for apartment dwellers and others who cannot run a short earth lead to ground.

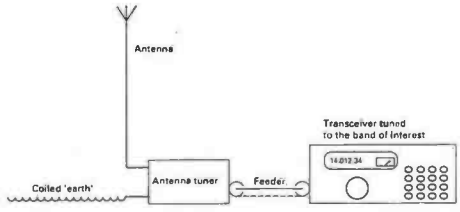


Fig. 1: A typical helically-wound r.f. earth.

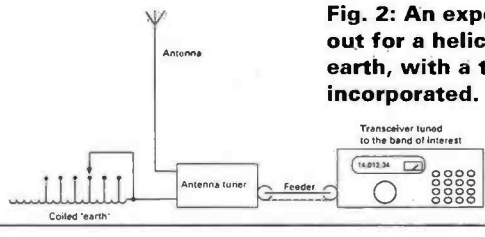
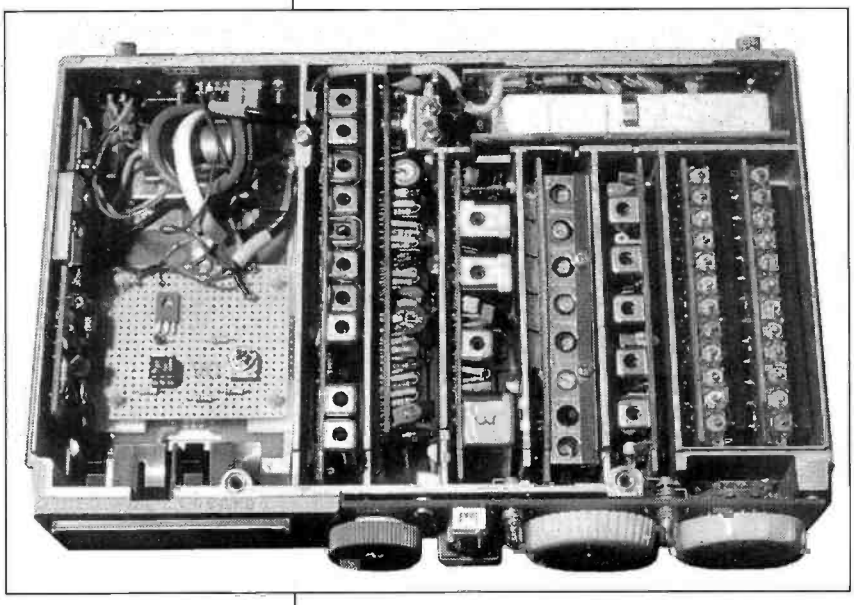


Fig. 2: An experimental lay-out for a helically-wound earth, with a trapping facility incorporated.

Modifying The Pye Olympic P Band Transceiver



The converted Pye Olympic transceiver ready for action on 70MHz.

There's usually only one major problem when it comes to modifying surplus p.m.r. equipment for amateur use, and that's when the source of supply dries up! But, Ken Ginn G8NDL has found plenty of the Pye Olympic transceivers, and now he's going to explain how to set about the job.

In recent years, ex-p.m.r. equipment has come on the market which is capable of being used on the 70MHz band. The Pye Olympic is one such rig.

The Pye Olympic transceiver actually comes in a number of forms. For example, there's the motorcycle unit and the boot-mounting rig.

Both types come with a remote cable to a control head, which can be mounted at the rider or driver's position. The dash-board mounting unit is the more familiar of the three types, and it's seen quite frequently at rallies.

Specific Bands

The Olympic transceivers are designed to operate in specific bands. These bands are: E (68 to 88MHz), D band (88 to 108MHz), C band, and so on through to A, for simplex operation.

There is however, another band, designated as P. This operates over two such bands (for example) D and E, using a half duplex system.

These rigs can be found with the transmitter working in the E band, and the receiver in the D. What has to be done to the rig is to convert both receiver, and perhaps the transmitter side also, to allow the rig to operate on 70MHz.

What I'm about to describe, is the modification needed to the rig to get a working P band rig running on 70MHz. The modification is aimed at keeping the same performance as the original.

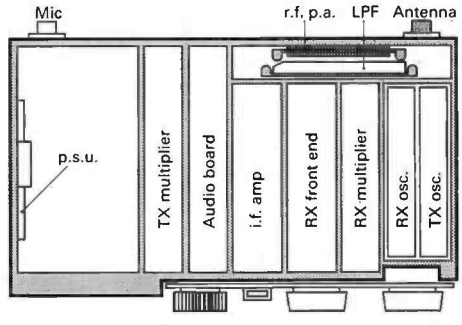


Fig. 1: Diagram showing main chassis of the Pye Olympic transceiver, with main sections indicated.

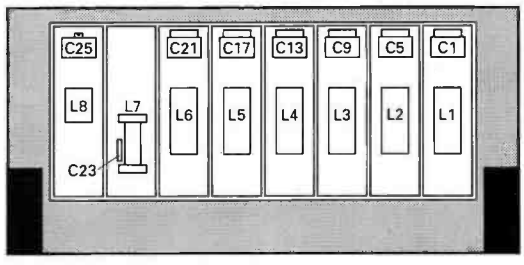


Fig. 2: The front-end inductor section (see text).

Identifying The Parts

It's best to start the conversion by identifying the various parts that need modifying. These are the receiver front-end (marked AT27879/4), the receiver multiplier (marked AT27877/4) and the transmit multiplier (marked AT27881/5).

The rest of the boards and modules need no modification. See **Fig. 1**, for reference.

Front End

The front-end module needs the most work carried out, and this job will take an hour or so to complete. To begin, remove the module from the rig and open up the lid.

Now, you should lay the module down on the bench with the connectors nearest, and the Tetfer trimmers away from you. Look at the coils in the unit, and from right to left we have L1 through to L7 (**refer to Fig. 2.**).

The coils L1 to L6 are air wound, L7 is wound on a 3mm former and L8 is a toroid. The coils L7 and L8 are not touched.

Next, carefully remove coils L1 through to L6. Take care not to damage any components which are

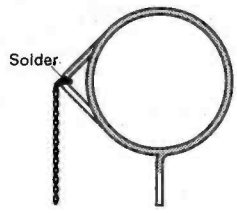


Fig. 3: Diagram showing the method used to make the tapping points on inductors (see text for details).

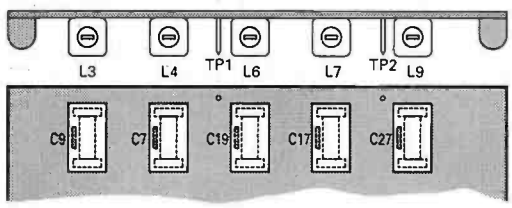


Fig. 4: The receiver multiplier board. To carry out the modifications the screening cans have to be removed (see text).

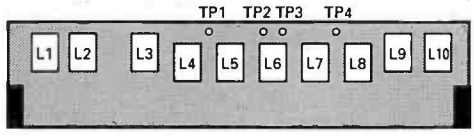


Fig. 5: Diagram showing the transmitter multiplier board (see text for alignment details).

in the same screened compartment as the coils being removed. Once removed, the coils can be discarded.

When the old coils have been removed, ensure that the plated-through p.c.b. holes are clear of any solder. The job now is to rewind these coils to the following instructions.

Coil Details

Take care when winding the coils. By following these instructions you should get the job completed with few problems!

All the coils mentioned, are made up with 0.8mm diameter enamelled copper wire. They should be closely wound on a 6mm former (a 6mm drill will do).

L1 10 turns, tapped at $1^3/_4$ turns near the earthy end

L2 10 turns, tapped at 3 turns near the earthy end

L3 8 turns, no taps.

L4 10 turns, tapped at 2 turns near the earthy end.

L5 8 turns, no taps.

L6 10 turns, tapped at $2^3/_4$ turns near the earthy end.

The taps are made with some 30s.w.g. tinned copper wire. A length of 'wrapping' wire with the insulation stripped is ideal for this purpose (refer to **Fig. 3**).

To make the construction of the coils more rigid, some epoxy-resin adhesive was used for fixing. I applied this to the internal surface of the coils, and the technique makes handling the coils much easier, before the adhesive sets.

Once you've completed this job, the coils can now be located into the board. Take care not to short any of the taps against the side of the metal screening.

The final modification on this board. is to put a 3.3pF sub-miniature ceramic capacitor in parallel with C23. This capacitor can be accommodated on the track side of the board. The position of C23 is shown in **Fig. 2**. The front-end module can now be replaced with the screening lid back into the rig.

Receiver Multiplier

The receiver multiplier board also needs modification, to bring it to the required frequency band. The screening cans of all the coils have to be removed for this operation (see **Fig. 4**).

In this modification the following components have to be changed:

C9 This is changed to a 100pF sub-miniature ceramic capacitor, inside the screening can of L3.

C7 This capacitor is changed to 100pF sub-miniature ceramic, inside the screening can of L4.

C19 This capacitor is changed to 82pF sub-miniature ceramic, inside the screening can of L6.

C17 Changed to 82pF sub-miniature ceramic type, inside the screening can of L7.

C27 Change this capacitor to a 39pF sub-miniature ceramic type, inside the screening can of L9.

The above capacitors should be components with a lead spacing of 0.1in (2.54mm) to fit the p.c.b. correctly. This completes the mods to the receiver, and now the alignment can be carried out in the normal way.

Aligning The Receiver

The next job, is to align the receiver. The alignment is accomplished in the usual way, with the typical set-up using a signal generator and a method of reading SINAD if possible.

Listening by ear can work just as well with a speaker. Start by setting up the rig with a crystal in the appropriate channel, and select that channel.

Measure the voltage on TP1 (on the receiver multiplier board) with the aid of a multimeter. Connect the negative lead on the multimeter to the negative supply to the rig, and the positive on the meter to the various test points. You then should adjust L3 and L4 for a maximum reading of around 1.0V d.c.

Transfer the multimeter probe to TP2, and then adjust L6 and L7 for a peak reading. Now re-tune L3 and L4 for a maximum reading on the meter, around 0.5V with the probe still connected to TP2.

Now, prepare an r.f. signal generator to provide approximately 10mV output. Connect it to the antenna socket on the rig at the test frequency, and modulate it with a 1kHz tone 65% system deviation (3kHz for a 5kHz system). Next, you should tune L9 on the receiver multiplier for best quieting.

The next job is to adjust C1, C5, C9, C13, C17, C21, C26 and L7 on the front-end module for best quieting. The presets on this module can be adjusted with a screwdriver, but the coil L7 needs a non-metallic tool for trimming.

A small knitting needle filed to the appropriate shape for the slug's slot, is the best alternative for the job if a plastics tool is not available. Be careful with this coil as it is very fragile. You'll also find that the trimmer C26, has quite an effect on the overall performance of the receiver.

Should any coil cores be stiff, then the

application of a little localised heat will help to free them. But take care, and don't overdo the heating or you could melt the formers!

Incidentally, on all the Olympic transceivers converted to 70MHz so far, I've found that by using this method the sensitivity is around 0.4μV for 12dB SINAD. A couple of the receivers have even managed down as far as the 0.2μV level.

Transmitter Modifications

The transmitter modification is by far the simplest of the three board modifications to make. It only requires six 27pF capacitor to be added to the track side of the transmitter multiplier.

There is an extra capacitors, across each of the following components: C14, C16, C20, C23, C30 and C36. The extra capacitors are mounted on the track side of the board.

Transmitter Alignment

The transmitter section alignment can be carried out in much the same way as the receiver. In other words, it's done by adjusting slugs in the coils, while watching the resulting points of resonance on the test points on that board.

Make sure that there is a crystal in the correct socket, and a dummy load on the antenna socket. You'll also need a power supply able to provide 5A at 13.8V.

Set the rig to transmit, but be careful as some microphones have a 40 second timer mounted in the casing. The 'shaver' shaped type of microphone has this facility. The timer can make the tuning up a little difficult, as it will release, and key up again throughout the tune-up procedure!

Keep the transmitter keyed during the alignment process. Looking at the transmitter multiplier (refer to **Fig. 5**), you should then connect the multimeter positive lead to TP1. Then adjust adjust L1 and L2 for a minimum reading, before adjusting L3 for a maximum of around 8.0V.

Transfer the multimeter probe to TP2, adjust L4 for a minimum. Now re-tune for minimum. Lastly adjust L5 for a maximum of about 0.9V.

Transfer the probe to TP3, and adjust L6 for a minimum. Re-tune L5 for a minimum. Adjust L7 for a maximum of about 8.0V.

Transfer the probe to TP4, and adjust L8 and L7 for a minimum. Adjust L9 for a maximum of about 12V.

Connect an ammeter in series with the power supply (10A range). Re-tune L9 for maximum supply current. Adjust L10 for a maximum supply current, approximately 3.5A.

Output Power

You should check the output power if possible, and this should be over 15W. The rig should draw around 3.5A from the power supply at 13.8V.

I have discovered some rigs that have given output powers in excess of 20W. This is quite normal, as some of the r.f. p.a. bricks used in the Olympic are capable of giving this order of output power.

In practice, the higher output p.a. stages are indistinguishable from the 15W type commonly found. Unfortunately, there are no external markings which give a clue to the type used.

You could be forgiven for thinking that the Band E model would tune down to 70MHz easily. Unfortunately, although the operating frequency of the original transmit frequency is near 70MHz, it proved difficult. In the rigs I've converted, I managed to squeeze 72MHz out of them, but was unable to get down that extra 2MHz.

I discovered that the problem was because the multiplier stages would not operate as designed, and they multiplied at a higher integer than intended. This is why the padding capacitors were used on the transmitter strip.

Crystal Specification

For the 70MHz band, the crystals need to conform to the Pye T54JO specification. Don't forget to quote this specification with the crystal frequency at the time of ordering. This information will give them all the information that they require.

Additionally, by informing the crystal supplier of the type of rig, and the fact that it is an f.m. transceiver, you'll also assist them to supply the correct crystal for the job.

TX crystal frequency. = TX frequency/12(MHz)

RX crystal frequency. = (RX frequency + 10.7)/12(MHz)

For example: transmit crystal for 70.450MHz is 5.870833MHz, and the receive crystal is 6.7625MHz.

PW

Conclusion

In conclusion, I should mention that I've have lost count of how many rigs modified over the last 18 months, of both the boot and dash-mounting versions. The boot-mounting version lends itself to modification to packet operation very well, and I have modified two.

With the modifications for packet, I've had to take out the control circuitry and substitute my own design, in the form of a PIN-diode switch. This modification can also be accommodated in the same enclosure, making a more reliable antenna change-over system.

I hope you have as much pleasure from your converted Pye rig as I've done. It's a very economical way of getting on to 70MHz.

There's an event with something of interest for all Radio Amateurs, SWLs and Computer enthusiasts.

LONDON
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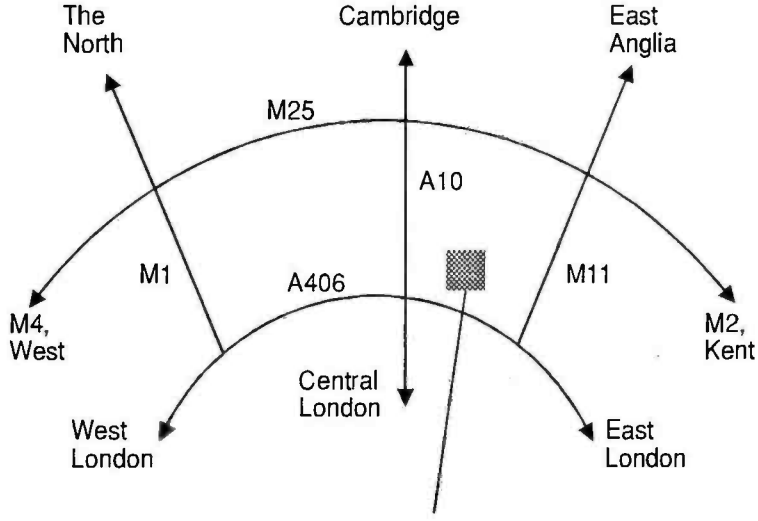

Picketts Lock Centre

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Saturday March 13th
10.00am - 6.00pm

Sunday March 14th
10.00am - 5.00pm

Lee Valley Leisure Park

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ARE Communications	K
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Bonex	C
Bricomm	B
Brightman J.E.	L
Cheshunt & District ARC	J
Compelec	P
G4ZPY Paddle Keys Int.	P
Garex Electronics	D
Gemini	F
Hesing Technology	W
Icom (UK) Ltd	S
ICS Electronics Ltd	V
Keyes, Robert	Q
Lake Electronics	U
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MacDonald, Bill	L
Martin Lynch	R
Munro, Mr. J.	A
Nevada	H
New Cross Radio	L
Oasis Computers	E
PW Publishing Ltd.	**T**
R.J.H. Communications	J
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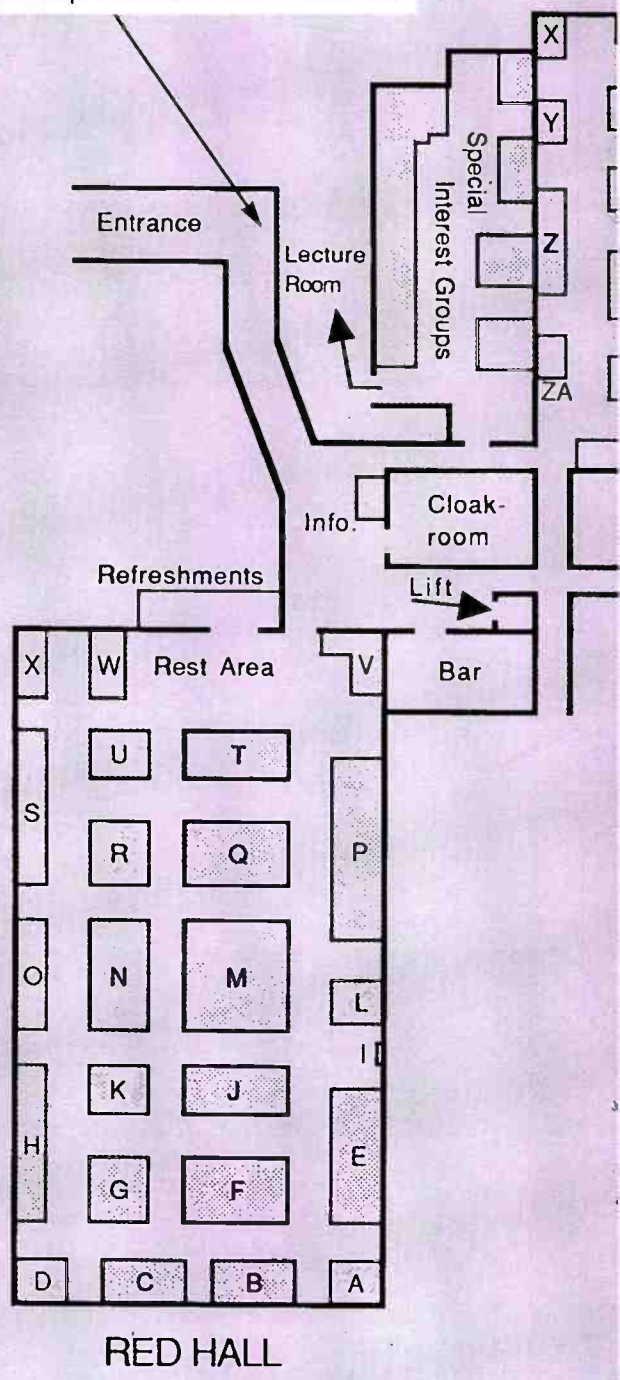

RED HALL

Your Guide to

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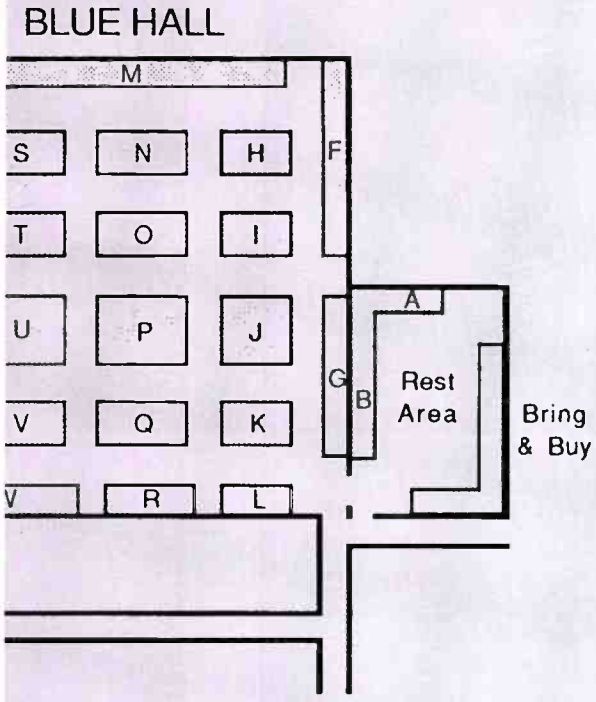

Show Lectures

Saturday March 13th

12.00 - 2.00pm
'DXpeditioning: Pacific and Africa' by Roger Western G3SXW

2.00 - 4.00pm
'Computer Logging' by John Linford G3WGV

Sunday March 14th

12.00 - 2.00pm
'The Colour TV Repeater for London' by Adrian Hurt G0OJY

2.00 - 4.00pm
'Morse Clinic' by Ron Ray G3NCL & Jim Lycett G0MSZ

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Ham Radio Today	I
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Feature

A User Guide to 934MHz

We asked keen operator John Levesley G0HJL/GC126 to tell us about the 934MHz band. Here's John's plain man's guide to this enigmatic band.

The use of 900+MHz for CB goes back to the beginnings of legal CB in the United Kingdom. The original proposals have been modified in both frequency and antenna specification since then, but in spite of these changes, and an embargo on the import or manufacture of new equipment, the band is still with us.

As with CB radio in general, only messages in plain speech can be transmitted. This is carried out using frequency or phase modulated transmissions.

British Company

A British company, REFTEC, soon produced the first practical 934MHz transceiver and matching antennas. There were three models in all, starting with the MkI, now a little long in the tooth. The MkII was a very nice radio and is still giving pleasure to many, and the REFTEC base station, which is pretty rare and resembles the flight deck of Concorde.

Other early rigs were the Grandstand transverter (27 to 934MHz), and the very rare Westminster dual-band 27/934 base station. The final successful British set produced was the Uniace 400, but by then came the imports from the land of the rising sun.

It didn't take the Japanese long to identify the UK as a market for 934MHz CB radio. They were already exporting a similar system to Switzerland. The NPR Kestrel or Commtel was the first of the Japanese imports, followed by two similar hand-held models and the Cybernet Delta One rig.

If REFTEC deserve all the credit for getting 934MHz CB started, and SELECTRONICS of Canvey Island the credit for setting up the first specialist dealership, it was undoubtedly Nevada Communications in Portsmouth who accelerated the band's growth with the Delta One rig.

The Cybernet Delta One established itself as the 'Mini Cooper' of 934MHz. Small, neat, full of features, good ergonomics and reliable and it took the band by storm.

The only better looking sets I saw, were two Clarion transceivers, demonstrated by Jim Finch, a great enthusiast for 934MHz, of Solid State Electronics.

Fig. 1: The Cybernet Delta-1 934MHz CB radio, on the right of the operating bench, shared with a wide-band receiver, and an h.f. amateur band transceiver.

These were state of the art personal radio system transceivers for Switzerland, with all kinds of selective calling and control features. The Clarion showed what might have been.

Because of the cost of the equipment, the service grew slowly at first. Comparative maps I made several years ago show eight stations in South East Dorset in spring 1984 when I first operated, doubling the next year, and doubling again in 1986.

Patchy Activity

The use of the 934MHz band was patchy throughout the UK, activity was confined to many geographical pockets. The intensity of operation increased southwards from Scotland, through the North of England and into Eastern and Southern England.

In Wales, activity was mainly restricted to the North and South coasts of the principality. In Northern Ireland and the Channel Islands, activity was limited to a few dedicated operators.

The years 1986-88 were probably the vintage years of 934MHz, with superb lift conditions. There was a peak in operator numbers and a steady supply of good quality equipment.

Around this time, there was a serious blow. The government reallocated the 934MHz frequency to a commercial digital voice communication service (a sort of super CB service for small firms or large commercial sites).

Although this service has still not materialised, the authorisation to manufacture or import 934MHz transceivers was withdrawn. The existing 934MHz users can continue to operate as long as their stations are capable, although new equipment is very scarce, and second-hand items are in short supply.

Despite continuing assurances that the band could continue to decline gracefully by natural attrition over many years, a significant number of operators left the band in resignation, despair or disgust.

There is every indication however, that the band is now undergoing a regeneration, as equipment is bought and used by new operators. If a really good period of lift on the band returns, then a total resurgence of activity could happen quite suddenly.

The Specifications

Dismissed as a gimmick when it first appeared, 'experts' said that stations would be lucky to operate across the road with the specification allowed. Indeed on paper it didn't look promising, low power with low gain antennas and high feeder losses.

The specifications were coupled with operators who were seen as lacking the technical background to cope with the black art of working with these frequencies.

Remember that 12-years ago when these discussions where evolving, it took a lot of skill for radio amateurs to get good performance from a 1.2GHz system.

The proposed 934MHz band was popularily derided as a 'toytown' radio service for the masses by some older amateurs. The experiences of the pioneers in 934MHz showed that the facts did not match their predictions.

Line-Of-Sight

Like any u.h.f. frequency, day-to-day propagation at 934MHz is more or less line-of-sight. However, as the frequency is suitable for radar applications, it's subject to reflected and scattered signals. This scattering effect can lead to some irregular signal enhancement. This scattering can

also send signals round corners, and produce some unexpected signal paths between stations. Rather like auroral propagation, but very much more localised.

Propagation both by ducting and refraction is also quite common on 934MHz. Local morning or evening temperature inversions will often enhance conditions. Also propagation over low-lying land or sea paths may be reliable over ranges well in excess of 150km. Stations in low-lying locations, but with a good take-off for their signals, will often experience knife-edge bending of their signals. Atmospheric conditions over distant highland ridges, may also bend signals over the ridge and down the other side.

Full blown tropospheric refraction propagation is spectacular on 934MHz, with sustained directional propagation over hundreds of kilometres on low power and with simple antennas. One confirmed contact from was Jersey to County Antrim, some 700+km.

After talking with amateurs in the USA about their 900MHz allocation, I found that they regard this band as similar to 430MHz, rather than 1.2GHz.

Antenna Location

Successful operating at 934MHz depends mainly on your antenna location. In general, the higher and less obstructions, the better. Remember a 75-80mm wet leaf is a $\lambda/4$ reflector at 934MHz!

Mature trees in full (wet) leaf can attenuate signals like a black-hole. I hate to be negative, but if you live in a deep hole surrounded by trees, be prepared to go mobile if you want to get anything from the band.

On 934MHz, it is generally unsuitable for car to car contacts, even over quite short distances. It is also of limited suitability for car-base operations over distances exceeding 7-10km. When used for marine mobile operations or from hilltops it's rather better, sometimes with spectacular results during lift conditions.

The band is pleasantly informal, and is well known for the high standard of operating. Operators stick to a code of practice that is polite, friendly and sensible. We've not experienced some of the worst excesses, seen on 27MHz, or for that matter, some amateur bands.

The (illegal) use of linear amplifiers is frowned upon, though the limited availability of them has prevented serious abuse.

Power microphones are acceptable, but other operators soon let you know if your signal is over-the-top. Odd aberrations have been the results of excessive temporary enthusiasm, rather than serious misdemeanour.

Individual operators have tried out repeaters, phone patches, and various data communication modes, all of which are of course prohibited. Many operators and their representatives still maintain a generally good reputation with the Radio Communication Agency who, on the whole, have not been upset by these little individual deviations.

Packet Radio

There is a desire amongst some 934MHz operators, myself included, that nationally one channel should be officially designated for use with packet radio. I would hope that at least one to one communication, digipeating and the use of personal mail boxes could be considered.

Interference from cellular telephone services can be a problem. The band is bracketed by mobile phone allocations, and some interference does occur. Interference may be reduced, but not eliminated, by switching off any receive pre-amplifier or by fitting a cavity filter. One easy way to avoid interference, would be to have the option of operating using horizontal polarisation.

Normally, vertical polarisation benefits mobile operation from hilltops (few horizontally polarised mobile antennas were produced commercially). Even now, the most useful antenna is probably a vertically polarised collinear.

There is though, some subjective evidence that horizontal beams are marginally more effective on 934MHz.

A station with no interference problems could operate with a right hand circular polarised helical beam. This is a very effective antenna and can work stations of either polarisation.

Barrier Features

The band is populated with clusters of stations, separated by 'no go' areas, usually high ground or other barrier features. Many operators seem to be in their mid 30s, but the number of operators is difficult to calculate.

There may be as many as 1000 active stations still on air, with half as many again temporarily silent. Strangely enough many 934MHz users have gained, or hold, amateur licences. There are only a few junior operators, but a high proportion of ladies on the band.

The calling channel is usually channel 10 or 20. Except under lift conditions, it is quite normal to hear only one or two channels in use.

A popular aspect of band usage is mobile operation from high ground, which has a large following in some areas. The conversation may be brief if there's lots of activity, though rarely as concise as some amateur contacts.

During openings or large scale ducting, stations you normally cannot hear, appear as 9+40dB signals. Confusion may reign as half the stations in Britain attempt to use the 18 chat channels to work DX!

Vertically Polarised

Mobile antennas for 934MHz are mainly vertically polarised collinears of various designs. There are some small collinears around, including the original REFTEC models that look like cellphone antennas.

Other antennas can be over a metre long. The most easily identified, are the Nevada mobile collinears with their distinctive orange base, and air-spaced phasing coils.

Collinears make good base-station antennas as well, and many are shrouded for weather protection. Directional antennas have mimicked amateur design antennas. Commercial models having been derivatives of either loop or Yagis, quads, helical beams, skeleton slots and even dishes.

Many operators own a receive pre-amplifier, capable of boosting incoming signals by as much as

Fig. 2: The Cybernet rig nestling behind the gearstick, ready for a mobile session.

Fig. 3: The antenna for mobile use, is a Nevada collinear type on a gutter mounting bracket.

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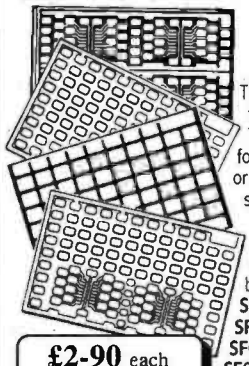

The new **HOWES** "SperiBoards" are general purpose PCBs for education, training, prototyping and one-off projects. They are quick and easy to use, and much more suitable for RF than "strip board" types. Components (conventional or surface mount) solder directly to the pads in a more sophisticated version of the old "drawing pins in a breadboard" trick. Two styles have their solder pads surrounded with a ground plane, so a short earth connection is always to hand! All are "Eurocard" size: 160 by 100mm.

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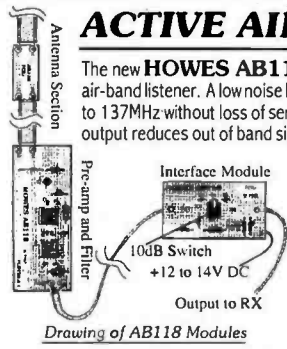
DFD4 Kit: £39-90 **DFD4 Assembled PCBs: £59-90**
PMB4 Kit: £9-90 **CA4M Hardware: £19-90**

ACTIVE AIR-BAND ANTENNA



Drawing of AB118 Modules

The new **HOWES AB118** Active Antenna has been optimised for the VHF air-band listener. A low noise IC preamplifier gives excellent performance from 118 to 137MHz without loss of sensitivity at the band edges. A band-pass filter on the output reduces out of band signals to help your receiver's performance. The half-wave, end-fed antenna element is formed with ribbon cable, so it can be easily rolled up and packed for holiday use. It also fits in standard 1.5inch plastic water pipe for permanent weather resistant installation at home. The total antenna length is 1.65M. The **HOWES AB118** gives excellent air-band performance that will help pull in those more distant signals from both home and portable locations.

Kit: £17-70 **Assembled PCBs: £24-70**

Some kits from the range:-

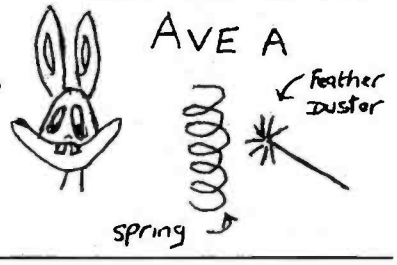
		Kit	Assembled PCB
AA2	150kHz to 30MHz Active Antenna	**£8.50**	**£12.90**
AA4	25 to 1300MHz Active Antenna for scanners	**£19.80**	**£26.80**
ASL5	External sharp SSB/ narrow CW Audio Filter	**£15.90**	**£24.60**
CTU30	Antenna Tuning Unit for all shortwave bands	**£31.50**	**£38.40**
CV100	Converter, adds Shortwave to VHF scanners	**£26.50**	**£37.90**
DXR10	10, 12 & 15M SSB/CW Receiver	**£26.60**	**£39.90**
SPA4	4 to 1300MHz Broadband receiver pre-amp.	**£14.90**	**£20.90**
TRF3	TRF Shortwave Broadcast receiver (for junior op?)	**£15.50**	**£21.70**

PLEASE ADD £1.50 P&P for kits & boards, or £4.00 if ordering hardware.

HOWES KITS are produced by a professional RF design and manufacturing company. They contain good quality printed circuit boards with screen printed parts locations, full clear instructions and all board mounted components. Sales and technical advice are available by phone during office hours. Please send an SAE for our free catalogue and specific product data sheets. Normally all items are in stock and delivery is within seven days.

72 & 73 from Dave G4KQH, Technical Manager.

Essex Amateur Radio Services



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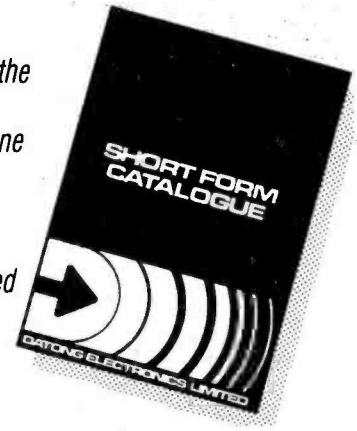

— VISA AND ACCESS WELCOME —

20dB. Firms such as Crestbyte, Nevada, Corona, RN Electronics and several other specialist manufacturers have made internal, in-line and masthead units.

Some masthead units incorporated an antenna switcher unit. One even had an output amplifier stage at the masthead which lifted the power at the antenna back to the permitted 8W output.

Shock Price

An enormous shock to many, is the price of coaxial cables and plugs. On 934MHz you **cannot** compromise on the quality of feeder and plugs.

From the start you should buy silver-plated N-type or BNC plugs and sockets at about £3-4 each. Cable, such as H100 or similar at £1+ a metre is recommended.

The older UR67 is fine at lower frequencies. But it's just not good enough for efficient operations at 934MHz.

The 934MHz Club UK is, I think, the only specialist organisation representing 934MHz users. I don't think the Personal Radio Club of Great Britain is active any longer. If I'm wrong, sorry, please contact the Editor a.s.a.p. to correct the mistake.

Until a couple of years ago the 934MHz Club UK used to run a couple of contests. In the late 80s, the contest was discontinued by the club committee due to lack of support. The Club does run some award schemes and also activity days.

Members congregate at some of the regional radio rallys, like the Wimborne Hamfest in Dorset, where local operators have put on a stand for several years. For details of the club, contact: **The 934MHz Club UK, Hon Sec Doris Spencer, PO Box 934, Featherstone, Pontefract, West Yorkshire WF7 6YZ.**

Second-hand Equipment

For those of you looking to start on 934MHz, you'll have to use second-hand equipment (but not second-hand cables or plugs). A number of advertisers in *PW* once imported 934MHz equipment, and they are mentioned in the text. Brian Hollins used to run a 934MHz Exchange agency, although he's not very active anymore.

Second-hand equipment is advertised occasionally, but you'll have to be quick. Before I finish I have one plea to those of you with a set, or sets, mouldering away and not being used. There are a lot of people out there keen to get on the band. Please put the rigs on the market, for the sake of 934MHz. You'll get a good price, and help keep the band alive. **PW**

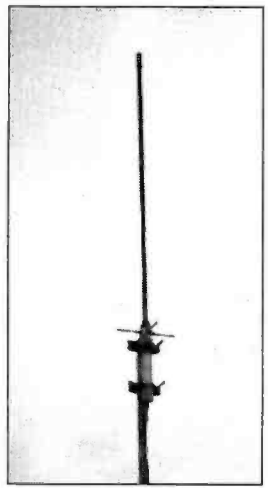

Fig. 4: Available from Nevada, the base station collinear antenna. Mounted high up it provides good all-round coverage.

Coming Soon...

The SG-2000 HF Mobile Transceiver

In an effort to encourage more h.f. mobile working in the UK, Rob Mannion G3XFD brings news of an interesting transceiver from the USA, the SG-2000 which is featured on this month's front cover and which he hopes to review in PW *very soon.*

I've been a very keen h.f. band mobile operator for many years. For almost two decades I used my trusty old Yaesu FT-75, and it's still capable of world-wide QSOs on 14MHz, even when only running 30W p.e.p.

Unfortunately, here in Europe we just don't seem to go in for h.f. mobile operating as they seem to do in the USA. You've only got to see the car parks at Dayton every year to realise how keen the Americans are on mobile working, particularly on 7 and 14MHz.

Dayton And Friedrichshafen

Last year, during my visits to the Dayton HamVention and Friedrichshafen Hamfest, I came across the SG-2000 h.f. mobile transceiver, featured on this month's front cover. Although not primarily designed for the amateur radio market, I found it to be an interesting concept.

At both the American and German shows the rig was installed in a sports car. The interest being shown (even by middle-aged radio amateurs like myself) was surprising.

As a result, we're hoping to have one of the transceivers to review very soon. I hope to give the transceiver a thorough 'road test'.

The SG-2000 transmitter covers from 1.8 to 30MHz continuously in 0.1kHz steps, with ±10Hz frequency stability. The receiver covers the frequency range of 500kHz to 30MHz.

The transmitter has 150W output, and its rugged construction would seem to lend itself particularly well to mobile and maritime mobile working.

Although not originally specifically designed for the amateur radio service, the SG-2000 has been proved to be a very rugged transceiver, and it should prove to be useful for the mobile and maritime mobile operator. *Practical Wireless* hopes to review one of these rigs in the near future.

Your Mobile Equipment

While the SG-2000 transceiver equipment review is under way, I would be very interested to hear about your mobile equipment. Do you operate h.f. mobile? If you do, *PW* would like to hear from you on this very neglected aspect of amateur radio in the UK.

In the meantime, I'm pleased to say that there are rumours of new products for h.f. mobile on the way from various manufacturers. You can be assured that we'll keep you informed of developments as they surface.

So, having brought you a sneak preview of the SG-2000, I've really got to try hard and get one to review. Watch this space, and if you're keen on h.f. mobile working, please let us know about your activities.

... From The USA

Bits & Bytes

The Computer In Your Shack

Your response to the first 'Bits & Bytes' was overwhelming - from both readers and professionals there are many interesting items to review. However, due to space limitations, some items will have to be left until next time.

Johnny Brown G3LPB is a 'Dragon' collector (the computer that is!). He's an avid 'fixer' of all the older type machines.

Johnny is a 'hoarder' and has spare parts and software for many computers. If you think he can help you in any way, why not drop him a line.

Please make sure that you include **return postage** and packing. Johnny's address is: 45 Marlborough Avenue, Falmouth, Cornwall TR11 4HS.

John Bellis GD7KQX has a PK232 and a VIC 20. He had the packet system running when using a borrowed C64, but no joy with the VIC 20.

John has Pacterm for the VIC but when the first command comes onto the screen it all locks up. If you have the answer would you please let me know, or contact John direct, he is QTHR.

Richard Gulliver G4EDQ wrote to me from Germany, and asked me to bear in mind the none-PC users. No problem Richard, this is an 'all computers' column. I made a couple of phone calls and managed to get some useful information for Commodore users, see the 'Club Spot' elsewhere in 'Bits & Bytes'.

Vic Flowers G8QM needs some amateur radio software, plus 3in discs, for his Amstrad PCW 8512. The only source of CP/M software I know is the PDSL (full details elsewhere in this article).

If any of you have any amateur radio software for the Amstrad PCW, or know of a source of such, plus also the source of 3in discs for these machines, please let me know. I'll pass the info on to Vic, and also include it in the next 'Bits & Bytes'.

BASIC Listings

It has been suggested that I print program listings in BASIC in this column. But due to the fact that all computers use their own dialect of BASIC (plus, not all readers would find this of interest). I don't feel this is a good idea. However, what do **YOU** think?.

Fig. 1.

Shareware

The other thing that's been bothering a lot of you, is the meaning of 'Shareware'. As I'll be reviewing a lot of 'shareware' programs over the coming months, I'll give a short description now.

Shareware programs are commercial programs that are distributed via the public domain. They're available on a 'try before you buy' basis, for an **evaluation** period (normally around 30 days), before parting with your cash.

You are allowed to give copies to your friends, etc. If, at the end of this period, the software is what you want, you are then expected to **buy** it by sending your money to the author or his agent. This will get you the latest copy of the program, plus news of updates, etc.

There are libraries where you can buy discs containing these programs. I have listed those who have contacted me so far. Any others will be listed as and when I hear from them. (I would especially like to know of any shareware libraries for non PC computers).

The Public Domain and Shareware Library (PDSL). Tel: (0892) 663298, speak to Rod Smith G4DQY. Ask him about the 'Libris Britannica' CD. WOW!

Shareware Marketing, 3a Queen Street, Seaton, Devon EX12 2NY. Tel: (0297) 24088. Also, Paul Sergent G4ONF. Paul doesn't run a library, but does handle the registration for several shareware programs. Tel: (0603) 747782.

Second User IBM

I bought a 'second user' IBM XT a few weeks ago. It was a model 5150, no books but in very good working order. It has 640K RAM, two 360K 5.25in floppies, and came with PC-DOS 3.3.

The machine was made in 1982. The system unit and monitor are in pristine condition, the keyboard is a bit dirty but will soon get cleaned. I gave £50 for this and am very happy with it. I shall be putting a hard disc in this machine soon, so I will feature that as a future project for these pages.

I also got hold of a none-working (then, but not now) Spectrum. This is built into a DKTronics case and includes an Interface 1 plus power supply. It also includes a Microdrive unit, but no cartridges. I would be pleased to hear of a source for these, especially with 'HAM' software on them. This machine will come in handy for reviews in 'Bits & Bytes'.

The other thing I need is an Atari STFM power supply. I have a friend's one here, he cannot afford a new p.s.u. and this one is beyond repair.

Okay, so that's an idea of what 'Bits & Bytes' is all about. Any help I get with these items will be published here.

This Month's Review

The first item for review is a book, *Basic Packet Radio*, written by Joe Kasser W3/G3ZCZ. Joe is well-known as the man behind 'Lan-Link'. It comes with a disk containing a copy of Lan-Link.

Basic Packet Radio has over 360 pages. It's extremely well-written, very informative, and is ideal for the absolute raw beginner, as well as the veteran. The many chapters explain "everything you always wanted to know about packet, but have been afraid to ask"! This book also contains the entire Lan-Link manual.

If you own a PC and a TNC and you want to do things correctly from the start, and use the best software available, then this may be just what you are looking for. The price is £19.95 (plus £2.50 p&p).

For a copy of *Basic Packet Radio*, plus information of all the other programs written by **Joe Kasser**, contact **Terry Dansey G0BIX at Readycrest Ltd., PO Box 75, Chatham, Kent ME5 9DL. Tel: (0634) 687168**. Many thanks to Joe for the review copy.

Shareware Marketing sent me a couple of discs to look at. The first one is called "PC TRACE" (disc No.EN15) and is a PCB Design program. The other disc contained a Logbook program called: "LOG-EQF" (disc No.HR6) and is an electronic logbook. I will be reviewing these in future issues.

Siskin Electronics sent me a PACTOR Controller for review. No room in this issue, but watch this space. If you need **anything** for Data comms, contact the lads at Siskin. **Tel: (0703) 207155.**

If Slow-Scan TV or FAX is where your interests lay, then this may be of interest to you. Comar Electronics sent me their PC Slow-Scan TV and PC HF FAX v 6.0 for review. As both of these use the same items of hardware, and both operate in much the same way, the main review will be of the SSTV system.

Photograph **Fig. 1**, shows what you get for your money. The handbook is very informative, as well as extremely easy to follow. The disc contains all the software, including an INSTALL program. The hardware consists of the Demodulator (for receive) and (optional on the HF Fax) the Modulator (for transmit). The Demodulator is built into the casing of a standard DB25 pin plug, which plugs directly into the serial port of your computer.

The lead from the Demodulator plugs into your receiver (or receive side of your transceiver). If you are using the Modulator as well, then this plugs between the computer and the Demodulator. The lead from the Modulator goes to the Mic socket of your transmitter.

The cassette tape helps you to get everything set-up correctly, and gives you practice at receiving 'live' signals.

To run PC Slow-Scan TV you will need any PC that has at least one Floppy disc drive and 640K of system memory (RAM). Almost any monitor is okay for the FAX program, but you need **at least** a VGA monitor for this newest version of Slow-Scan TV. If you want to print your pictures, then both programs will accept all 'popular' printers. Your computer will also need a Serial (RS232) port (plus printer port if using a printer) and MS (or PC)-DOS 2.1 or higher.

The PC Slow-Scan TV is completely menu driven, and leaves you in no doubt as to what to do or how to do it. Once you have tuned in the signal, you just press the (R)eceive key to start 'Digitising'. When the whole picture has been received, it will then be 'read' onto your screen. To send a picture you just press the (S)end key. This displays a new menu, which allows you to send a 'currently loaded' picture or one from your .GIF or .PCX collection. In RX and TX mode all 'standard!' modes are recognised and used. This includes 'Martin', 'Scottie', 'Robot', 'AVT', etc., in Colour as well as B&W.

A built-in Tuning Oscilloscope helps you get the best possible results, and **full** editing facilities allow you to edit pictures.

I used a couple of pictures from my '.GIF' collection, loaded them into the SSTV program and edited them with my callsign, etc. Whilst I have received lots of very good pictures from stations on h.f. (see **Fig. 2** as an example), I have only, so far, transmitted pictures on v.h.f.

This complete package, whilst being very sophisticated and complex, is so very simple to use. Obviously I have a few 'gripes' about the way it does things. Like having to load a picture onto the screen before you can transmit it (rather than sending it straight from the file list). As I've never tried any other SSTV packages it's impossible to make comparisons. However, considering all the features, and ease of use of PC Slow-Scan TV, for the price, I feel it must be worth further investigation.

Fig. 2: A slow scan TV picture 'grabbed' from the screen.

At the time of writing this, I haven't been able to find any h.f. FAX stations, so I can't report on the transmit side of that program. However, I have received lots of very good weather maps and charts. As the two programs appear to look and work the same, and both use the same hardware units, I have no doubt that PC h.f. FAX will give the same results (and drawbacks!). The frequency I found most activity on was 14.230MHz u.s.b.

PC Slow-Scan TV costs £135.48 (plus £3.25 p&p). PC HF FAX v 6.0 costs £116.33 (plus £3.25 p&p). For this system the optional Modulator (for TX) is £59.80.

For either of these products, plus information about the other items in this range, contact Peter Cotton at Comar Electronics, Unit 10, Samuel Whites Estate, Medina Road, Cowes, Isle of White PO31 7LP. Tel: (0983) 200308.

My thanks to Peter Cotton for the review items. Also to Alan G0KRU for the hours of fun and enjoyment he gave me whilst in two-way SSTV QSO.

Well, that's it for this month. Keep the letters and goods coming. Everything of interest will get a mention/review eventually. Usual contact routes, via packet G0GSZ @ GB7LDI.#35.GBR.EU. Telephone or FAX (0603) 748338. Post to: 2 Mayes Close, Bowthorpe, Norwich NR5 9AR. **Till next time, 73 de Peter G0GSZ.**

CLUB SPOT

THIS SPACE IS FOR YOUR CLUB!

Amiga Amateur Radio User Group
No fee.
Send an A5 s.s.a.e. (24p) to:
Bob Wellbeloved G3LMH
8 Orchard Close
South Wanston
Winchester
Hampshire
SO21 3EY.

Commodore Club (C64/128)
No fee.
Paul M. Timmins G0NDV (@ GB7SYP)
60 Bramwell Street
Netherthorpe
Shefield
S3 7PA

Come on club secretaries, let's hear from you with news and views on the radio computing scene!

Computing In Radio Special Issue

Look-out for the May Issue of *Practical Wireless,* it is a **Computing In Radio Special.**

I look forward to seeing you then! *Peter G0GSZ.*

Feature

Back To The Future
To The First Repeater in 1901!

We've got a mobile 'theme' this month. As many of us use repeaters when we're working mobile, Stan Crabtree G3OXC thought he'd surprise us by revealing that repeaters are almost as old as radio communication itself!

You might be forgiven for thinking that radio repeater stations were a relatively modern idea. The system nowadays, is confined to frequencies in the v.h.f. range and above, and serves to extend the range of radio communication for fixed and mobile stations.

Today, the modern repeater aids communications where difficult or unsuitable terrain exists between two stations. The use of such equipment also allows portable equipment to employ much lower power.

Many people will be surprised to know, that the first repeater was reported to have been used in Belgium as far back as 1901! It was used to provide a wireless telegraphy service between Brussels and Antwerp.

Effective Range Limited

In the early 1900s, the effective range of wireless telegraphy using long waves was limited. A range of 160km was possible over the sea, but propagation over land was reduced to less than a quarter of this distance.

Although tuning had been introduced after a fashion, the significance of resonant circuits was not thoroughly appreciated. After all, it was the very early days of radio!

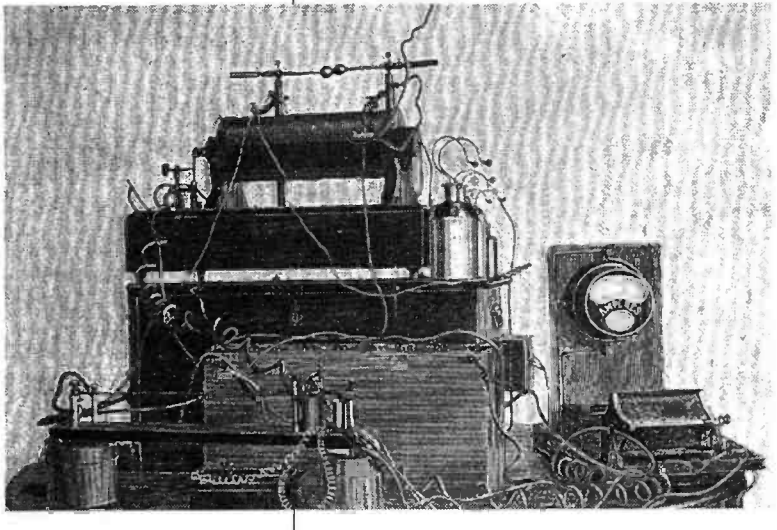

Fig. 1: The first recorded wireless telegraphy repeater, built for service in Belgium by Emilio Guarini.

One of the problems that faced the Belgian authorities, when they decided to set up the new system of communication, was the distance of 40km between the two principal cities of Brussels and Antwerp. A further difficulty was the hilly ground between the two locations.

Countryman Of Marconi

Coming up with the answer was Emilio Guarini, a countryman of Guglielmo Marconi, born and brought up in Puglia, Italy. By coincidence, an improptu change of direction made by him, was similar to that made by his fellow Italian.

At the age of 18, Emilio was attending college at Trani, but became disillusioned and frustrated at his rate of progress. On impulse, he quit his studies and decided to go abroad to widen his experience. But where Marconi chose England because of family ties, Guarini for some reason opted for Belgium.

Continuing his studies in electrical engineering, Emilio's progress was rapid. In 1900 at the age of 20, he submitted a paper to the Academie des Sciences in Paris on the role of the antenna and earth in electrical wave propagation.

Hertzian Waves

Intrigued with the current development of Hertzian waves, Guarini also put forward the idea of wireless repeater stations every 800km or so. Using this technique, he suggested any area of the earth's surface could be covered - and it would be especially useful for polar expeditions which were being considered at that time.

Emilio Guarini got his chance to put his theory into practice in late 1901. This is when the Belgian government approached him with the idea of the Brussels-Antwerp link.

Guarini chose as his repeater station the town of Malines, mid-way between the two cities. It was also important that it was on elevated ground.

Substantial Task

There was a substantial task ahead. Apart from the complexity of the repeater section, the basic apparatus in 1901 was very rudimentary.

On the transmitter side, there was the induction coil, spark gap, Morse key and capacitor. The capacitor, in those days, was usually in the form of Leyden jars.

For reception, the coherer was being used as a detector. When conduction occurred, a circuit was made to a relay coil. The relay in turn operated a recording pen which endorsed the Morse characters on a paper tape, driven by a clockwork mechanism.

Land Repeater

In the land telegraph system, the introduction of a repeater presented no great problem. By means of a polarised armature, a local battery was switched in and out of circuit to follow the Morse characters keyed at the source station.

However, for wireless telegraphy the requirement became more complicated. Despite this, the basic system appeared plausible enough.

Wireless waves reaching the antenna would activate the coherer. This would switch in a relay circuit, adjusted so that it would close the induction coil circuit creating the spark and radiating the energy.

On test, this newly transmitted wave was found to interfere with the weaker incoming signal and the coherer was 'choked'. Even with the relatively slow signalling speeds in use (rarely above eight words per minute at this time) - the system proved to be inoperable.

Improving The Design

Guarini set about improving the design until it worked correctly. Unfortunately, it only worked successfully after the time and work had increased the cost to nearly $10 000, a considerable sum in those days.

His first job was to enclose the coherer and the sensitive relay in a metal box. This provided shielding to the receiving circuits to a great extent.

Secondly, Guarini dispensed with the conventional idea of including the coherer in series with the antenna and the ground. Instead, the receiver circuit was fed via a small coil arrangement (virtually a step-down transformer) which served to isolate the coherer.

Possibly, by coincidence, this idea was rather similar to the 'jigger' arrangement that Marconi had developed during trials with the Royal Navy vessels.

Using the isolating arrangement, ranges were considerably increased, but the Marconi Company had not made their existence generally known. As a report published at the time stated, the inclusion of this device 'prevented atmospheric electricity which gathered on the aerial wire from influencing the coherer'.

A Blondel type of coherer was employed, using large nickel filings with traces of silver. The mixture was then enclosed in a glass tube, which was then evacuated.

Further Experiments

After further experiments, the young inventor inserted a relay operated antenna switch, activated by received signals. Unusually, this also served as a Morse key and controlled the power supplied to the induction coil.

An illustration of the repeater apparatus is shown in **Fig. 1**. The Ruhmkorff induction coil, mounted at the top of the assembly, provided a 10in spark when supplied from strorage batteries with a capacity of between 6 and 9A. In operational use, the spark gap was reduced to 6in.

The condenser was formed by the bank of five Leyden jars, seen on the right of the coil. The antenna switch is shown in the left foreground, mounted on an Ebonite strip supported on two round boxes.

Between the latter mentioned equipment, is the metallic box containing the coherer and internal instruments. On the right of the table, an ammeter shows the flow of the current to the Ruhmkorff coil, this being regulated by the setting on a sliding type wire resistance positioned below it.

Guarini Speciality

Antennas were Guarini's speciality, and he spent some time before coming up with the design shown in **Fig. 2**. The antenna consisted of cable made up from seven strands of wire, each being 9mm in diameter.

The antenna was 33ft long, and was made up of 50 parallel wires arranged in a cylindrical form. The antennas were erected 90ft high. In Brussels, the antenna was attached to bamboo poles to the Column of Congress. At Malines, the antenna was attached to the tower of Saint Romhaut, and at Antwerp to the steeple of Notre Dam.

Emilio Guarini never achieved the acclaim or financial success of his countryman Marconi. Despite this he contributed much to the progress of wireless communications in the early days.

PW

Fig. 2: Antennas were Guarini's speciality and this is the design used in conjunction with the 'first repeater' (see text).

Radio Diary

* Practical Wireless & Short Wave Magazine in attendance.

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

February 14: 2nd Northern Cross Rally will be held at Rodillian School, A61 between Leeds & Wakefield. Usual dealers, ample parking, bar & refreshments, Morse test. Talk-in S22. **Dave Gray on (0532) 827883.**

February 21: The East Coast Amateur Radio & Computer Rally will be held at Clacton Leisure Centre, Vista Road, Clacton-on-Sea, Essex. Doors open 10.30am. **Richard (0255) 474292.**

February 21: The Barry ARS Rally will be held at the Barry Leisure Centre. **Colin Lake GW0LBJ on (0222) 530070.**

February 27: Tyneside ARS 5th Annual Rally will be held at the Temple Park Leisure Centre in South Shields. All usual trade stands, free parking. Talk-in S22. All the amenities of the Leisure Centre, including heated pool & gymnasium. **Jack Pickersgill G0DZG on 081-265 1718.**

February 27: The Bredhurst RATS Annual Rainham Radio Rally will be held at the Parkwood Community Associations Hall, Parkwood Green, Rainham, Kent. Near junction 4 of M2 motorway. Talk-in S22. **Kelvin Fay G0AMZ on (0634) 376991.**

***March 13/14**: The London Amateur Radio & Computer Show will be held at Picketts Lock Centre, Picketts Lock Lane, Edmonton, London N9. Large trade presence, free parking, lectures, disabled facilities, Bring & Buy, special interest group section. Talk-in on 144 & 430MHz. **(0923) 678770.**

March 13: Lagan Valley ARS will be holding their Annual Hamfest in the Nurse's Recreation Hall, Lagan Valley Hospital, Lisburn. Trade stalls, Bring & Buy, refreshments, QSL bureau, club stand. **GI0GDF, QTHR.**

March 21: Tiverton South West Radio Club Mid-Devon Rally will be held at the Pannier Market, Tiverton. Easy access, only minutes from junction 27 on the M5. Two halls of trade stands, free parking, Bring & Buy, snack bar. Club room bar open throughout day. Doors open 10am, talk-in S22. **G4TSW, PO Box 3, Tiverton, Devon.**

March 28: Bournemouth Radio Society's 6th Annual Sale will be held at Kinson Community Centre, Pelhams Park, Millhams Road, Kinson, Bournemouth. Doors open 11am to 5pm. Talk-in from G1BRS on 144MHz S22. Amateur radio & computer traders, clubs & specialised groups. Refreshments. Admission £1, including free raffle ticket. **Ian G2BDV on (0202) 886887.**

March 28: Pontefract & DARS will be holding their 13th Annual Components Fair & Springtime Rally at the Carleton Community Centre, Carleton, nr. Pontefract. Admission by prize programme, three prizes plus free prize draw for lady visitors. Traders, Bring & Buy, bookstall, licensed bar, hot & cold snacks. Free car parking. Talk-in S22. Car boot spaces will be available. **Colin Wilkinson G0NQE on (0977) 677006.**

April 18: Marske-by-the-Sea Radio Rally will be held in the Marske Leisure Centre, High Street, Marske-by-the-Sea, near Saltburn. Doors open 11am. Usual traders, Bring & Buy & refreshments. Talk-in S22. **Mic G7ION on (0287) 610030.**

April 18: Cambridgeshire Repeater Group have their Amateur Radio Rally at Philips Telecom PMR - Catering Centre, St. Andrews Road, Chesterton, Cambridge. Trade stands, Bring & Buy, Auction, hot food & drinks. Doors open 10.30am. **Mike G6COQ on (0223) 358985 Ext. 3310.**

April 26: The Bury (Lanchashire) RS will be holding another Hamfeast/Rally at the Leisure Centre, Bolton Street, Bury. **Laurence G4KLT on 061-762 9308.**

May 3: Dartmoor Radio Club Rally will be held at Yelverton War Memorial Village Hall, Meavy Lane, Yelverton, Devon. Doors open 10.30am. Talk-in S22. **Ron G7LLG on (0822) 852586.**

May 9: The 9th Yeovil QRP Convention will be held at the Preston Centre, Monks Dale, Yeovil, Somerset. Featuring lectures, displays of home-made QRP equipment & vintage radio, on-air QRP stations & trade stands. Refreshments, doors open 9am, admission £1.50, talk-in S22. This convention is not a rally, but a convention for amateurs not only to attend interesting lectures about the technology & practice of low power communication, but also to meet other QRPers. There will also be the usual friendly QRP Contest on 3.5 & 7MHz, during the evenings of the previous week. This event is known as the QRP 'Funrun'. **Peter Burridge G3CQR, 9 Quarr Drive, Sherbourne, Dorset DT9 4HZ. Tel: (0935) 813054.**

May 16: The 2nd National Vintage Communications Fair will be held at the NEC, Birmingham. Doors open 10.30am to 5pm. Hundreds of items for sale, including vintage radios, telephones, gramophones, jukeboxes, radiograms, etc. Admission will be £3. **Jonathan Hill on (0398) 331532.**

May 16: The Parkanaur Rally will be held at the Silverwood Hotel, Lurgan, Co. Armagh. Doors open 12 noon. Admission £1. Plenty of parking. Usual traders. Refreshments available. Talk-in S22. All proceeds of this rally will go to the Stanley Eakins Memorial Fund, a very worthy charity. **W. A. Hutchman, 35 Carlingford Park, Newry, Co. Down, N. Ireland BT34 2NY.**

SATELLITE Scene

PAT GOWEN G3IOR

In his first new-look column, Pat Gowen G3IOR has news on the American Space Shuttle, coming satellites and schedules.

The Shuttle Amateur Radio EXperiment, SAREX for short, will be very active this year. If no changes come about, the following will be the dates of NASA's Shuttle flights that you may be able to QSO.

The STS-55 launch will fly on February 25 for a nine to 11-day mission carrying 145.550MHz voice and packet using the window mounted antenna. Commander Steve Nagel N5RAW, and Pilot Commander Jerry Ross N5SCW will be the operators.

Also running will be 433MHz voice f.m. from the German SAFEX radio amateurs aboard the carried D-2 SPACELAB module. They will use a dual-band whip antenna mounted on the exterior of Spacelab.

They also hope to transport the 145MHz SAREX tranceiver across for some two band tests. Sadly this flight will have only a 28.5° inclination, and so will be below the north European horizon at all parts of the orbit.

Nine Days

The following STS-56 mission planned on March 23 for nine days duration will also have a SPACELAB. The inclination of 57° will be superb for all of Europe, giving daily passes right over the top of the UK.

The mission will carry f.m. voice, packet, SSTV and an ATV uplink. The operators will be Commander Ken Cameron N5AWP, Ken Cockrell KB5UAH, Mike Foale KB5UAC, and Ellen Ochoa KB5TZZ.

The third 1993 SAREX mission will be aboard STS-57, also carrying Spacelab, is currently scheduled for April 29. It should be aloft between seven and nine days, but again a 28.5° inclination will mean that no-one north of the latitude of the extreme south of the Channel Isles will be able to QSO it. Pilot Brian Duffy N5WQW will operate 145.550MHz f.m. voice and packet radio.

Coming Satellites

Eleven new OSCAR satellites are either soon to be launched or are now under construction with launches planned between now and 1996. These are:

1. RS-15 from AMSAT-UA, due for launch on a non-fixed date between late February and early April 1993 into a 2300km 67° inclination orbit. It will have an orbital period of two hours 14 minutes and an increment of 33.5° west per orbit.

Dave Rowan G4CUO has calculated that we shall see seven or eight passes per day, each lasting up to 32 minutes. A real DXCC getter this!

Dave ascertains that we in the UK will be able to make QSOs out to KL7, all US states W1-W0 (sadly not KH6), all VE1 to VE8, XE, TG, YS, YN, TI, TI9, HP, all the Caribbean, HK0, HK, HC, OA, CP, ZP, PY to Sao Paulo, PY0, ZD7, ZD8, all ZS, S8, 7P, 3D6, 5R, FR, 3D7, 3B6, S7, VQ9, 8Q, VU, 4S, YB, 9V, 9M2, 9M4, 9M8, V85, DU, CR9, XX9, VS6, BY, BV, JR6, JA, HL, BY9, JA9 and UA0, and, of course, all points between!

2. ARSENE from France, going aloft with ASTRA-1-C on the ARIANE V-58 mission due for launch on 20 April 1993.

3. UNAMSAT-1 from AMSAT-XE of Mexico, which has had its launch postponed, but should be up and active soon.

4. CT-UoSAT by the Portuguese AMSAT Group, in combination launch with KITSAT-B and ITAMSAT-1, due in September.

5. ITAMSAT from AMSAT-Italy. This launch into a microsat-type orbit will fly with the big SPDT-III and the amateur radio KITSAT-B plus the above Portuguese University AMSAT created CT-UoSAT pair, in late September 1993.

The ITAMSAT is structurally and digitally identical to the existing MicroSats, and will be compatible with existing digital communications software, supporting 1200 and 9600bps modulation. The four uplinks will be on 145.875, .900, .925 and .950MHz and the pair of downlinks on 435.760 and 435.810MHz.

6. Phase-3D from AMSAT-DL, NA and international support, with launch plans and details as supplied in past columns. More information will be coming soon!

7. TECHSAT from Israel.

8. SUNSAT from AMSAT-South Africa.

9. SEDSAT-1 from the University of Alabama.

10. KITSAT-B, very similar to KITSAT-OSCAR-24, with the ARIANE SPOT-3 September 1993 launch given above.

11. HUTSAT from the Finnish AMSAT-OH Group.

Whilst last month I gave some of the details of TECHSAT, HUTSAT, RS-15 and UNAMSAT, I shall very soon be covering ARSENE. As the time of placing the other spacecraft into orbit approaches and as the full technical specifications, needs and operational requirements become known, I shall be giving readers full details in this column. For sure, the next two to three years will be a very exciting time for OSCAR satellite users.

Attitude Changes

The Sun makes a complete orbit of the Earth and the satellite path over the course of a year, so the OSCAR-13 attitude schedule gives a familiar bi-annual rhythm. In previous years the orientation of the Sun's orbit with respect to the satellite's orbit has been relatively benign, with poor presentations being short-lived. Through 1993 however, the orbits are the least favourably inclined possible, so some unfamiliar strategies are needed to compensate, as lots of eclipses by both earth and Sun can be predicted. These are reflected in the schedules below.

James Miller G3RUH provides the following provisional plans he has calculated for OSCAR-13 operations in 1993. He points out that the mode schedules are dictated by the satellite attitude, and this is established according to the Sun position as seen by the satellite.

Mode Schedules

Until February 8, OSCAR-13 was in Mode B only throughout the entire orbit, with it's attitude to the sun changing from 130/0 in mid-December 1992 to 150/0 on 18 January 1993. The omni-directional antenna was then used from MA 170 to MA 15. Due to eclipses, the transponder will continue to be commanded off between Mean Anomaly 170 to 256 from January 28 to March 4.

From February 8 to March 8 the schedule planned is:

Mode B: MA 0 to MA 40

Mode S: MA 40 to MA 50 S transponder off, B on.

Mode LS: MA 50 to MA 55 S beacon and L transponder on.

Mode JL: MA 55 to MA 70 Alon/Alat 150/0

Mode B: MA 70 to MA 256

Omnis: MA 170 to MA 15

On March 8 the attitude will move to 180/0. It is requested that users don't uplink to the B transponder between Mean Anomaly 40 and 50, otherwise interference is given to the short-lived Mode S period.

From March 8 to May 10 the plan is for:

Mode B: MA 0 to MA 120

Mode S: MA 120 to MA 130 S transponder on, B off

Mode LS: MA 130 to MA 135 S beacon + L transponder

Mode JL: MA 135 to MA 150 Alon/Alat 180/0

Mode B: MA 150 to MA 256.

More news of what's happening in orbit next time.

END

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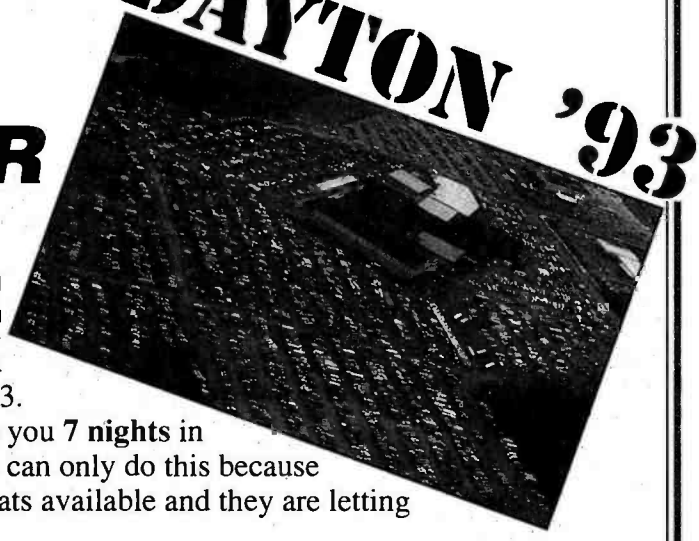

PRACTICAL WIRELESS is pleased to announce a very special offer for its trip to Dayton in April 1993. For anyone who is willing to pay now, we will give you **7 nights** in Dayton for *less* than we charged last year for 5! We can only do this because the airline has a limited number of reduced price seats available and they are letting them go at a silly price to anyone who pays now.

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Roger Hall G4TNT

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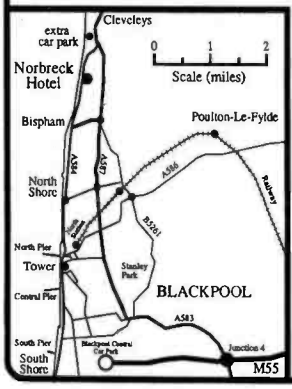

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Maritime Mobile

Amateur Radio All At Sea

The oceans and radio have been together for almost a century. Mike Harris G0HOC, explains a few of the practicalities of taking radio equipment to sea. The information should also prove useful to short wave listeners.

Fig.1: Hoisting a temporary antenna. At sea, good long distance contacts are possible on low power and without a great deal of expensive equipment. Antenna arrangements are often the critical factor, though in the spirit of amateur radio, a little trial and error experimental work, is the key to success.

Many of Marconi's experiments were carried out at sea. Today, by international agreement, various frequencies (eg 2.182MHz, 156.8MHz) have been reserved specifically for distress or urgent messages.

Other frequencies are for use by ships and coastal stations calls. However, there are no allocated frequencies for everyday informal use.

Hand-held At Sea

A hand-held radio is the easiest kind of transceiver to take to sea, needing no additional antenna or power supply. Precautions to keep the system dry need to be made, and probably the easiest way of doing this is to enclose it in a heavy polythene bag.

These bags, Aquasacs, are available specifically for hand-held radios, cameras or just documents. The material is transparent and flexible, so most controls can be operated without uncovering the radio. Fully sealed and containing air, should the bag fall into the water, there's a good chance it will float.

If you have ever been put off using 27MHz CB radio for various reasons, at sea it comes as a pleasant surprise. Away from large population centres, it becomes much quieter and more pleasant to use.

Maritime Mobile

Since the amateur maritime mobile licence has been incorporated into the amateur licence, many amatuers now use '/MM' after their callsigns. The CEPT agreement with most European countries, has removed many of the obstacles to using amateur radio on holidays afloat.

On long distance world cruisers, the benefits of amateur radio are well known. Most of us though, have to make do with more modest horizons.

There are the amateur maritime nets, operating mainly on sections of the 7, 14 and 21MHz bands. These provide a marine radio meeting place. For those using it, there is a chance to give their positions, or to discuss weather reports, or find out how friends are doing.

Often these nets start when a small group of '/MMs' meet regularly via radio, as a way of passing time on long ocean trips. As more join the list, a net has been formed.

The arrangement can of course collapse equally quickly. This makes it difficult to give a comprehensive listing of all nets operating at any particular time.

A few nets have withstood the test of time, having been in existence for 20 years or more. Some nets are keen to receive calls from anyone with an interest in marine activities, regardless of whether they are sea or land based.

However, some nets have particular times when they listen out for emergency traffic to or from stations at sea. So please listen out first and get to know the form before calling in.

Continued on page 55

Fig. 1a.

Fig. 1b.

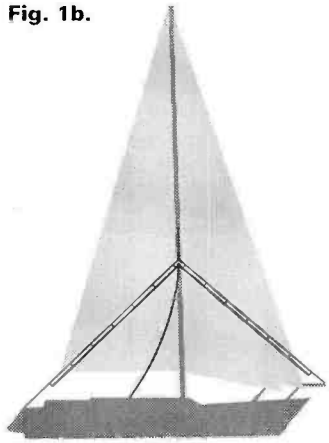
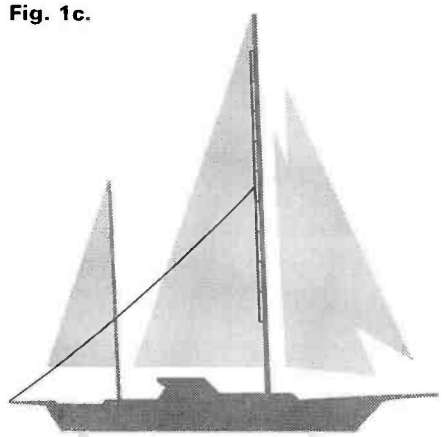


Fig. 1c.



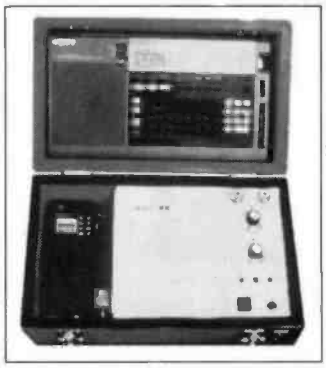


Fig. 2: My portable QRP rig. I use a Sony 2001D receiver with a Howes kit transmitter. The box also contains a 12V dry-fit battery and has room for a collapsible whip antenna and Yaesu FT23R hand-held.

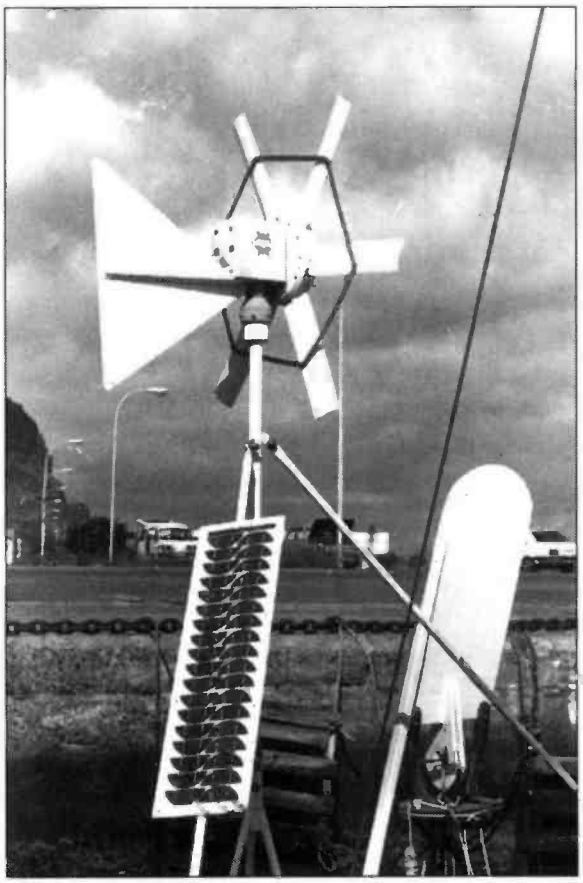


Fig. 3: Using a combination of wind and sun power to charge up the batteries. The wind-driven charge is a specially strengthened version of the Rutland 'Windcharger'.

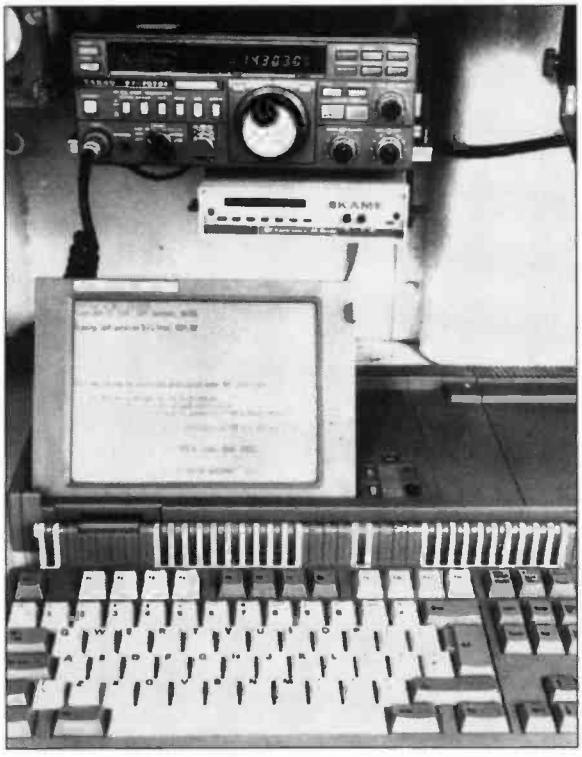


Fig. 4: Portable computing. In addition to packet radio, the KAM gives access to utility stations broadcasting RTTY, c.w., FAX (not too clear with the computer shown here) and AMTOR/SITOR codes. It is worth remembering that NAVTEX (navigational and weather information), broadcast by stations throughout the world on 518kHz, can be decoded in FEC AMTOR or LAMTOR (Listening mode AMTOR).

QSL Cards

I've heard that '/MM' stations never send QSL cards, though I know of many that do. This view has some truth in it, so I'd better explain why. I know some amateurs value QSL cards highly, and if possible, I try to send them direct to those requesting them. But as I've precious little space to spare, I don't collect them myself.

Moving home frequently, makes receiving normal mail difficult, let alone QSL cards via the bureau. So, sending cards may not always be as straightforward as it seems.

Imagine a QSO made whilst at sea. Do I seal it in a bottle, before tossing it overboard? Or do I wait until reaching terra firma? In some landfalls, a trip to the post office might involve a long hike inland, if there is a post office at all.

Computers Aboard

When computers came in big boxes, with separate monitors needing mains power, the idea of installing one aboard a small boat was regarded as just plain silly. Now we have laptop, notebook or pocket computers with very low power requirements.

From navigation and inventory control to providing amusements for the crew, it's becoming increasingly obvious that computers have a very important part to play in small boats. Of course, they can also be useful in radio communications.

With access to stations broadcasting FAX, weather and navigational information, a computer (with radio and decoder) can be extraordinarily useful at sea. The ability to receive detailed weather information is obviously important. A multimode decoder like a Kantronics KAM, an AEA PK-232 or an MFJ, gives packet radio capability as well.

Packet Stations

Land-based packet stations often keep their equipment running continuously, enabling others to leave messages or relaying calls to more distant stations. At sea, radios and computers often have other pressing tasks to perform, and power is limited. So this type of operation is seldom possible. None the less, packet radio is an extremely versatile mode and one that '/MMs' should consider using more often.

I like getting to know people in locations I am visiting. Fortunately, most islands have thriving amateur communities. Last year, when visiting the Canaries, a short message, left on the club BBS, brought an introduction to a group of friends I would otherwise have missed.

Very few islanders spoke English, and my ability with Spanish is still at the survival stage! Real time QSOs would have been hard going for both sides. Packet, on the other hand, isn't nearly so immediate. Messages on a BBS give both sides time to look up phrases, or to ask their friends.

I haven't seen packet radio used this way, but imagine a bulletin board which '/MM' stations could access, reporting their position, weather conditions, skeds for contacting friends and any other generally useful information. Surely there must be bulletin boards set up for handling marine traffic somewhere? If readers know of such facilities, I would be very pleased to hear from them.

Antennas On Boats

Whip antennas for v.h.f and u.h.f. are quite small, and relatively easy to mount on boats. However, it's worth bearing in mind that items sold for land-mobile use may be made from materials unsuited for

use at sea.

Extra care must be taken to exclude moisture from connections and cables. Electrolytic corrosion is a serious problem.

Copper, brass and stainless steel items often survive quite well in company with each other. But if possible, avoid bolting them directly to anything made from aluminium.

Use plastics material sleeving and washers on all bolts. An insulating gasket between dissimilar metal parts will also help. It might also be worth using nylon nuts and bolts and all-plastics components if they're available

Operation at h.f. generally demands a larger antenna. Because space on boats is always limited, beams and quads are usually out of the question. Fortunately, there are plenty of other types of antenna to experiment with.

On boats where there isn't a mast to suspend a long wire, whip antennas are often used. Even a simple G-whip can be quite effective, though a good r.f. ground is necessary for best results.

The sea itself provides an excellent r.f. ground. On metal skinned boats, a sound connection to the hull should work. Wooden or fibreglass hulls need a little more thought.

A large copper plate or one of the smaller, purpose made earthing plates (e.g. Dyna plate), bolted to the outside of the hull can be the answer. It may be sufficient to lay a large sheet of copper against the inside surface of the hull. This provides a capacitive connection to the sea.

In general, the simplest types of antennas are often the most successful. This is probably the reason why a good many '/MM' operators use nothing more exotic than a wire dipole. When stored, dipoles take up little room in the luggage and they can be hoisted from the mast as a quick temporary antenna. They can be used on quite small boats, though activities may be restricted to times at anchor or using a motor rather than sailing.

On sailing boats its not always easy to find an antenna site away from metal rigging and masts. The sailing rig has to be take priority.

But when sails are not in the way, a half-wave dipole hoisted from the mast head **(Fig. 1a)** can be most effective. Try to feed the centre point as close to a right angle as possible. Even the arrangement in **Fig. 1b**, where the dipole is hoisted from a flag halyard, has often been found to work well.

The arrangement of **Fig. 1c**, would work effectively only if the mast is made of wood or composite material.

Mobile Dinghy

I'm usually not very successful at fishing, so it's not often I spend Sunday mornings mobile in a dinghy. The location was the bay of Gibraltar with a slightly lumpy sea. I was just drifting between 'the rock' and the Spanish border. A bright clear day and except, for a small Spanish fishing boat a mile or so away, I was alone.

It was an ideal time, so I thought, to try out the new whip antenna I had to put together for a low power, 14MHz c.w. transmitter I take on holidays or the occasional trip abroad. I normally manage to hoist a temporary half wave dipole from somewhere, but a whip antenna would give me the chance to operate from awkward locations like my 2.5m (8ft) dinghy.

Fig. 5: A typical commercial marine band s.s.b transceiver aboard a large modern yacht.

The station consists of a Howes MTX20* transmitter, a Sony 2001D receiver and a rechargeable battery pack.

To provide protection from the elements, I built a waterproof wooden case to enclose the various parts. In addition, I use the receiver inside an Aquasac.

Ground Plane

Given the good ground plane that the sea can provide, low power h.f. operation can often produce surprisingly good results. So, after taping the antenna securely to the mast and tossing the metal grounding plate overboard, I was ready.

After calling unsuccessfully for a time, and finding 14MHz noisier than usual, I began to settle to the idea that I had chosen the wrong day. Just as I began to think that fishing wasn't such a bad idea after all, a station in London replied to my call. Then another in the Canaries and a few more, and things began to look a little brighter.

I have to admit that the signal reports were nothing to write home about, but I was pleased see that the system worked under marginal conditions. One station described the signal as sounding a little watery!

Could it be that the odd wave had got into the set? I think that it's more likely the cause was feedback. I was having problems matching the antenna to the transmitter output impedance. I would deal with later.

A more pressing problem appeared, I'd drifted into a collection of fishing net marker buoys. The people in the Spanish fishing boat I'd noticed earlier, were now taking a suspicious interest in my activities.

Unwilling, not to mention unable, to explain, that I wasn't after their catch, I set off home to make the modifications on the whip antenna.

PW

For a list of a few known maritime nets, send an s.s.a.e. to the editorial address. Please mark the envelope 'maritime nets'.

*** C. M. Howes Communications, Eydon, Daventry, Northants NN11 6PT. Tel: (0327) 60178.**

Further reading:
A Guide to Small Boat Radio **Mike Harris - Published by Adlard Coles 1991.**

The February issue of Short Wave Magazine has articles on Maritime Distress Messages and Long Range Maritime Services. Another article shows you how to interpret Facsimile Weather Maps.

PETER SHORE

BROADCAST Round-up

Introducing his new-look column, Peter looks back at his early days in the hobby, and provides some good advice.

I was 11-years old when I first became interested in short wave radio listening. The spur proved to be a magazine which my parents had picked up at an exhibition they had visited: it was a copy of *Moscow News* which listed the times that Radio Moscow's English programmes for Great Britain and Ireland could be received, and on which metre bands.

The radio in the kitchen - a Roberts set - had short wave and so, at the appointed hour, I tuned across the bands and, sure enough, there was Moscow in English. It was quite a thrill to know that I was listening to a broadcast from several thousand miles away, from what, to an 11 year old, was a very distant and unknown land.

It was not long before I discovered that other stations were audible. I quickly found Radio Canada International and the Voice of America and I started to write to many of the programmes I heard. The thrill of receiving letters from all over the world, as well as copious amounts of propaganda from the East, was equally as good as catching a station for the first time! My sister was quite pleased, too, with the stamps from hither and thither.

The Roberts set was not ideally suited to DXing and my parents invested in a Russian built Vega *Selena* with umpteen different bands and a noisy inbuilt mains transformer. It soon started to earn its keep and I discovered more and more about the workings of short wave. But even the Vega did not keep me satisfied and so I started to save my pennies and scan advertisements for second-hand equipment here in *Practical Wireless*.

I was soon the proud owner of a nearly new communications receiver complete with digital readout, continuous short wave coverage, variable bandwidth, b.f.o. and so on. After that I did not look back.

The point which I am trying to make - and I hope that I am doing it without boring you with a potted biography - is that if you are just starting out listening to the international broadcast bands you do not necessarily have to buy the latest, most sophisticated and therefore perhaps most expensive piece of kit on the market. It is quite possible to start short wave listening with basic equipment with which you will have just as much fun whilst gaining experience, and from then on move up to better receivers as your interest develops.

If you are going to hunt for a second-hand piece of equipment, do bear in mind some golden rules. If you are buying from a shop, see if they will offer some sort of guarantee. After all, you do not want to make a capital investment, only to see the radio pack up after a matter of weeks.

If you are buying privately, ask for the reason for the sale. Is it genuine - someone moving up to new equipment, giving up altogether, or trying to off-load a piece of junk. And do not be afraid to haggle with a private seller, or even in this day and age a shop selling second-hand gear.

Good luck, and if you manage to acquire a good piece of nearly new short wave radio equipment at a reasonable price, please drop me a line here at *PW*. I'd be delighted to hear from you and to pass on any tips you may have to the rest of our readers.

Meanwhile, you will want something to listen to, so here's some frequency information from around the world.

Europe

Radio Vilnius now has English daily at 2000 on two short wave frequencies of 9.71 and 9.675MHz and on medium wave on 666kHz. There is also a transmission at 0000 on 17.69, 17.605 and 7.15MHz.

Sony ICF 2001D.

Radio Norway International's English service was cut in half at the end of January. The station had carried English programmes on both Saturday and Sunday, but now only the Sunday transmissions remain. This follows a withdrawal of funding by the Norwegian Foreign Ministry for the English service.

Radio Sweden in Stockholm has lost half an hour of its one-hour transmission at 2130GMT. The portion from 2200 until 2230 was carried exclusively on satellite, but budgetary cut-backs mean that funding could no longer be guaranteed for this extra European-only service. The 2130 transmission remains on the air for 30 minutes on 6.065 and 1.179MHz and on the Astra satellite.

Radio Ukraine International broadcasts in English at 2200 for an hour on 15.385, 9.71, 7.24, 7.195, 6.02, 6.01 and 4.825MHz and then again at 0100 on 10.344 (in upper sideband), 9.86, 9.75, 9.71, 7.24, 7.195, 7.18, 6.145, 6.08, 6.07, 6.02, 6.01 and 4.825MHz.

Africa And The Middle East

Radio Iraq International has English services at 2200 until 2400, directed to Europe on 15.21MHz and to East Asia at 1400 to 1700 on 13.68MHz.

From the Sudanese city of Omdurman come international services of the Sudan Broadcasting Service's Radio Omdurman. The station transmits to Europe, Africa and the Middle East in English at 1800 on either 9.17, 9.18 or 9.18MHz. The transmission lasts 60 minutes. It is preceded at 1700 by French on the same channels.

The TRT's Voice of Turkey in Ankara is on the air in English to Europe at 2000 for an hour on 9.445MHz and at 2200, also for an hour, on 11.895. The North American Service opens at 2200 on 9.445 with a repeat at 0300 on the same channel.

Asia And The Pacific

There is a brand new English language service to try for from one of the former Soviet republics. Azerbaijani Radio in Baku is now reported to be operating in English every day at 1700 for 60 minutes in the 49m band on 6.175MHz - unfortunately the same channel as Radio France International's European service. However, do try and see whether this new station is audible in your part of the world.

The Americas

Radio Havana Cuba broadcasts from the Caribbean island to Europe at 2100 on 17.705MHz. Spanish, also heard at 2100, beamed to Europe and Africa, is carried on 17.77, 15.22 and on 13.66MHz, the last one in upper sideband mode.

Cheerio for this time. Keep listening!

E N D

Dorset Morse Festival Weekend 1993

Are you keen on Morse? Do you want to take the test, or make a final practice before taking the plunge? If so, why don't you come and join us at the first Clayesmore Morse Festival Weekend on Saturday and Sunday March 27-28.

There will be trade stands, RSGB Morse tests, and lectures. You'll also have a chance to meet other CW enthusiasts!

The Morse Festival hosted by the school Radio Society G0RSC, is to be held at Clayesmore School between Shaftesbury and Blandford in Dorset. The Festival runs from 10am Saturday to mid-day on the Sunday. Come for the day, or stay for the weekend. Overnight accommodation and food at an inclusive reasonable price is available at the school.

Full details are included in the Morse Festival information pack, which is available by sending an A4 stamped addressed envelope to 'Clayesmore Morse Festival Weekend', Clayesmore School, Iwerne Minster, Blandford, Dorset DT11 8PH.

ROGER COOKE G3LDI

PACKET Panorama

This month, Roger Cooke G3LDI, brings you news of a new piece of software, and some more general information with changes of the country and continent designators.

Dave Roberts G8KBB, has sent me details of the latest release of his computer program, TheNet. Dave is a very active member of EADG, East Anglian Data Group, and is involved in networking as a profession. He is also very keen on TCP/IP and is at present involved in setting up a 64kbaud s.h.f. link.

Latest Release

The latest release incorporates: an IP router, the ability to remotely set the node alias and the ability to listen for three additional aliases and automatically invoke the BBS, Host or DXCluster commands on uplink.

Additional node broadcast controls exist in the form of selective port control over 'hash' node broadcasting. The word **'quit'** is introduced as an alias for 'bye', and a UI command allows arbitrary UI frames to be sent for use in, for example, MAIL notifications. In the routes list, callsigns may optionally be shown as alias and callsign.

A menu driven windowing patch utility, with context sensitive help is also included. The previous releases introduced the following:

Access control list capabilities.

Multi-user conferencing (TALK command).

CWID keyer.

Better Sysop authentication.

MHeard list showing callsigns, packets heard and time since last heard.

Closedown command to remotely shut down the node.

DXCluster command that operates like the BBS / Host commands.

BText command to set the Nodes' beacon message.

Ability to enable or disable any command.

Improved command prompting with only valid commands shown.

KISS as an alternative to the crosslink protocol.

Hardware handshake controlled host mode operation.

MODE command for configuring additional parameters.

BBS command to auto connect to a remote BBS.

HOST command to auto connect to another BBS or HOST.

BYE command to disconnect.

STATS command to display internal statistics.

MANAGER command for system manager access.

AUDIT command to set system audit levels.

Bug fixes (e.g. info messages too long).

Changes to the Nodes command.

An improved nodes broadcast algorithm for the crosslink port.

Split port nodes broadcast intervals.

Ability to enable/disable nodes broadcasts on each port.

CQ apologises nicely if disabled.

Most escape commands have been replaced with MODE parameters.

Beacon messages can be digipeated.

CALIBRATE command for remote checking of TX deviation.

LINKS command to show current level two links.

Configuration of the beacon period.

Auto routing of 'connect' to either BBS, DXCluster or HOST.

Remote dump of entire neighbour lists for all nodes.

Hardware requirements are fairly simple, the software runs in a Z80 based TNC or similar clone such as the BSX2.

Installation instructions are included in a file on the disk. But essentially, all that is needed is a single piece of wire from pin eight of the modem disconnect header, to pin one of the Eprom. The Eprom needed is a 27512, rather than the normal 27256 of a normal TNC2. Pin one of the Eprom is bent out from the socket, and connected as described above.

The IP Router

The IP Router co-exists in the node with the other software. It is connected to the Level 2 and Level 3 (netrom) protocol machines, and is managed from the Level 7 switch. It will accept data from Level 2 Datagrams, Virtual Circuits or NOS protocol extended netrom frames. It will output to these three depending on the setting of the IP route and ARP tables.

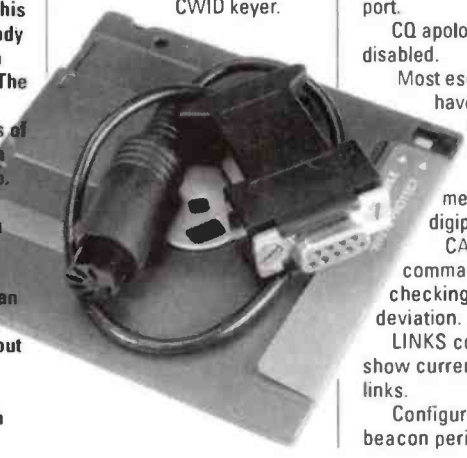
The router supports the IP options of NOS and also does IP fragmentation. Level 2 segmentation is not supported.

Single Disk

The software is supplied on a single 720K 3.5 inch disk and comes complete with a user manual, detailing the installation, command structure and an overview of the operation. If you are interested, you can obtain a copy by sending the usual request, together with a disk, mailer, plus enough return postage to:

Dave Roberts G8KBB, 7 Rownhayes Close, Ipswich IP2 9SX.

Dave also welcomes any suggestions for change and these can be sent to the same address, or to G8KBB @ GB7MXM.



From the German group that brought you the Baycomm package, this is Mini-Pac. This handy little 'plug' is really a complete v.h.f. t.n.c. The miniature surface mounted components of a standard r.f. modem are on the small p.c.b. All that is needed for packet operation is a software communications package running on an IBM PC or clone. For more information about this cheap entry to paket radio, contact Siskin Electronics on (0703) 207587.

Operation in Hungary

I've had a bulletin sent to me by HA5DI, but space has prevented me from using it, but an A5-sized s.s.a.e. to the editorial offices will get you the information. Please mark the envelope 'Hungarian Packet Stations'

Continent Designators

Just enough room to squeeze in information of proposed continental designations. The following were suggested by Tom W3IWI, in a paper presented by him.

Hopefully they will become adopted world-wide eventually, and I would suggest that you use them when addressing mail. Hopefully sysops in this country will adjust their forward files accordingly.

The code NOAM replaces NA for **NO**rth **AM**erica and Canada, while CEAM is added for **CE**ntral **AM**erica, including Mexico and Panama. For the **CARiB**ean Islands including 9Y, the code CARB is added.

Further south, SOAM replaces SA for **SO**uth **AM**erica, over the Atlantic, AFRI replaces AF for **AFRI**ca. For Europe EURO replaces the older EU, MDLE is added for the **MIDdLE** East including 5B4, 4X, HZ, JY etc.

For Asia, ASIA replaces AS, to include the callsigns YB and 9M. North of the equator in the Pacific, NPAC replaces OC for the PACific islands, while south of the equator, SPAC replaces OC for the **S**outh **PAC**ific.

Finally added codes are, INDI for the INDIan Ocean islands, and ANTR for ANTaRctica.

That's about it for this month. Don't forget that 'Packet Panorama' will be in *PW* every month as from now.

73 and happy packeting de Roger, G3LDI @ GB7LDI.

E N D

D A V I D B U T L E R G 4 A S R

David Butler G4ASR introduces his new look column, and looks into tropo, aurora and everything else of interest to the v.h.f. operator.

VHF Report

Hi and welcome to the new style v.h.f. column! I have news of excellent tropo openings, a number of auroras, some amazing meteor scatter contacts and a report about the recent Quadrantids meteor shower. There's also information about the 50MHz band, new DXCC countries, details of up-and-coming v.h.f. meetings and the usual solar data, propagation forecast and contest calendar.

Tropo

Conditions via the tropo propagation mode during December were generally poor, although there were enhanced periods notably on December 14 and between December 26-28 when tropospheric contacts could be made with stations up to 1000km distant.

The best direction from the UK on December 14 was in a south-easterly direction with stations such as HB9HLI (JN37), HB9SAX (JN36), HB9SNR (JN36), OE2HFD (JN67), OE5MKN (JN78), DE5VHL (JN68) and OE5XJM (JN68) being worked on the 144, 430MHz and 1296MHz bands.

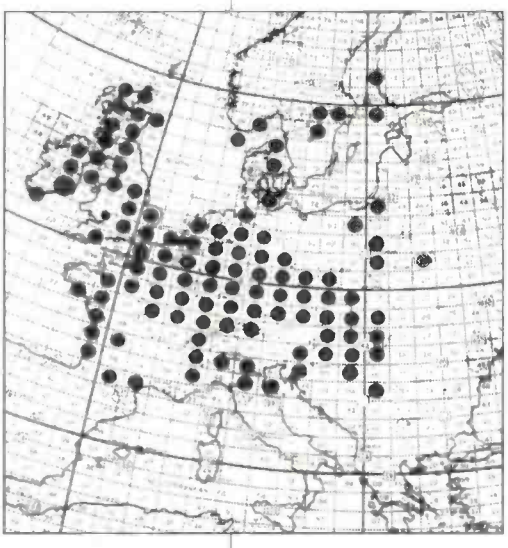


Fig. 1: David Butler's c.w. contacts made by the auroral mode (see text).

Conditions to the east were also good with **Richard Gardner G4WKN** (ID92) reporting many s.s.b. and c.w. contacts including SP3DRT (JO91) on the 144MHz band. Various beacons were also reported such as HB9HB (144.865MHz), HB9F (432.984MHz) and OK0EAJ (432.938MHz).

The period between December 26-28 produced much traffic on all bands, especially during the afternoons when it coincided with the RSGB Christmas v.h.f. contest. All bands above 144MHz had propagation to a wide area of continental Europe including F, ON, PA, DL. Stations in HB9 and Germans close to the SP border were also worked.

Conditions were also good within the UK and many stations in southern England reported working GM3POI (ID88) on the Orkney Islands. Towards the end of the period the moving tropo had swung around towards Scandinavia, enabling many contacts to be made with stations in OZ, LA and SM.

It was interesting that, at times, stations could be worked on tropo or aurora (see later) depending on which way you pointed the beam! Another point of interest was that the EA1VHF beacon (144.867MHz) located on the north coast of Spain (IN53) was audible over much of England and Wales for nearly a week, sometimes peaking 599, but with very little amateur activity noted.

Paul Bradbeer GM7GUC, kept a close eye on the weather maps over the Christmas period. Having decided that conditions looked good for DX, he went out on December 27 to operate portable from East Lomond Hill (ID86).

Using an Icom IC275H and a Cushcraft 13-element Yagi on the 144MHz band he made 128 QSOs, only 10 of which were with G-stations. Most of the contacts were located in DL, ON and PA, the best DX being DB0BIT (JN39) at 1012km and F1CYB (JN17) at 1058km.

On December 28, Paul found that the best propagation was towards Scandinavia and nearly 40 s.s.b. contacts were made with stations in LA, OZ, SM, DL and PA with SM7MBG, in JO75, being rated the best contact.

Jim Smith G0OFE (IO90) reports working F1ER (JN03) on November 22 when it was pouring with rain, normally an unlikely time to work long distances. Jim mentions that he has often noticed that if we are in a warm sector of a depression during winter time with a strong ridge of high pressure to the south, enhanced tropo conditions to the south of France can result. It's always worth watching the weather map, even when the weather is unsettled.

Auroral Calendar

In last month's issue of *PW*, I described an auroral calendar and by using the example shown I wondered if an event would occur on December 20. Unfortunately it didn't, but there was one which occurred three days earlier on December 17!

If you've made a copy of the calendar you might care to add in the following dates on which openings occurred; November 30, December 17, 28 and 29th. That's 58 auroral events recorded in central England during 1992.

If you live further north then you should have noticed more. However, if you live in southern England then you probably heard no more than 20 openings.

Conditions during 1992 were not as good as in previous years. But nevertheless, a fair amount of DX could still be worked as indicated on the locator map, **Fig. 1**. It shows all auroral c.w. contacts made from my QTH (IO81) during 1992 on the 144MHz band, with stations in 110 squares and 23 countries.

The openings on November 30 and December 17 were relatively weak with little DX being reported. Apart that is, from a few stations such as LA1WFA (JO49), OZ5IQ, OZ7AMG (JO65), SL0CB (JO89), SM5BSZ, SM5DIC (JO89) and SK6KQ.

The event on December 28 however was quite interesting, because it occurred during the RSGB Christmas v.h.f. contest (as did the opening on the 29th). The aurora was favourably located enabling UK stations to work into the Baltic states.

Some of the DX that could be found on c.w. included LA1EKO (JO16) on an oil platform in the North Sea, SMs in call areas 4, 5, 6 and 7, ES2XM (KO28) and UZ2FWA (KO04). The latter station was particularly strong (8 x 13-element Yagis and 1.5kW) peaking 57A.

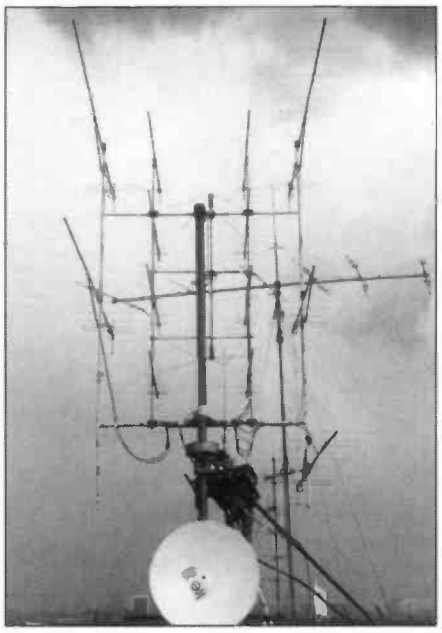
Meteor Contacts

What is probably one of the rarest meteor contacts to be made on the 144MHz band for some time must surely be that between the stations of **David Law G0LBK** (IO93) and JX7DFA (IQ50), located on Jan Mayen Island.

The contact, during the Geminids meteor shower on December 13, was completed in 20 minutes, with G0LBK receiving five bursts and five pings with signals at times peaking S8. The distance between the two stations was 1977km and contacts were also made from JX7FDA with G4APA (in fact, the first G-contact), GM0HUO and GM4YXI.

The station of JX7DFA, operated by Per-Einar LA7DFA, consisted of 4 x 15-element Yagis and a 70W amplifier. Plans were well under way to become very active on e.m.e. (with 1kW), but unfortunately the entire 144MHz antenna system and a 50MHz Yagi were destroyed in severe gales on December 14.

The Earth has been encountering the



Good antennas - always the best pre-amp! The 144 and 430MHz system at the QTH of DK0DW. Photo by GW8VHI.

Quadrantids meteor shower (January 3-4) every year since the year dot. But in 1993 they seemed to have decided to go walk-about and not appear!

Although the number of background meteors rose, it was fairly insignificant and conditions were generally regarded as poor. A fair bit of activity was noticed on the 50MHz band, but I can't understand why all the activity was centred on 50.110MHz (the inter-continental DX-calling frequency) and not on 50.300MHz (s.s.b.) and 50.350MHz (c.w.), the meteor scatter calling frequencies.

Yes, I know you may have heard me on .110 but I didn't really want to be there. Still, I did get S59AM (ex-YT3ET) and S59UN (ex-YU3ZV) for new ones!

In the November 1992 issue of *PW*, I described tests carried out in 1979/80 with VE1ASJ via m.s. on the 144MHz band, and wondered if anyone would like to challenge the record this year.

If you're thinking about a QSO partner, news has reached me that Mike VE1MQ is looking for well-equipped stations in western Europe to participate in trans-atlantic tests. He uses a 17-element Yagi and 170W (in my opinion far too QRP!) and can be contacted on 0101 506 357 3035.

The 50MHz Band

Conditions during December on the 50MHz band were very grim, with DX only being reported on four days and three of those (December 17, 28, 29) were due to auroras! A Sp-E opening to Sweden and Finland occurred between 1600-1700UTC on December 21, but was missed by many operators.

Following the aurora on December 28, a number of stations waiting for the midnight phase were rewarded with an Auroral-E opening. This propagation mode is subtly different from aurora and is more akin to Sp-E. Signals are T9, even though the ionisation originates from auroral particles, rather than solar uv radiation.

Signals were first heard by **Neil Carr G0JHC** (IO84) at 2230UTC who heard OH1X peaking 52. At midnight, G3OIL (IO91) reported the GB3LER beacon (Lerwick) putting in a very strong T9 signal, and later between 0100-0200UTC Peter G7ETZ found LA6VBA and LA9ZV.

Two Republics

On 1 January 1993, two autonomous republics were created from the former Czechoslovakia. Czech radio amateurs located in the states of Bohemia and Moravia will continue to use the old prefixes of OK1 and OK2, but those situated in Slovakia who previously used the prefix OK3, will now use OM3.

A new Society, the Slovak Amateur Radio Association (SARA), has been formed and will provide similar facilities to that extended by the existing Czech Central Radio Club (CRCC). The DXCC status of these republics has not yet been announced, but I suspect this will be a mere formality when the ARRL DX Advisory Committee next meet.

Tom Ciepielowski SP5CCC passes on the news that all licence class holders in Poland were granted access to the 50MHz band from 15 January 1993. They are allowed to operate between 50-52MHz with 10W of s.s.b. or c.w., and there are no geographical restrictions. Tom expects around 100 stations to be active by the summer Sp-E season.

VHF Convention

The RSGB's National VHF Convention is being held at its usual venue, Sandown Park Racecourse, Surrey on Saturday 6 March, the doors opening at 1030. In addition to the trade exhibition, specialist groups and equipment test facility, a full lecture programme has been arranged. Further details can be obtained from myself on (0873) 87679.

The Martlesham Radio Society are holding a v.h.f. round-table at the BT research laboratories Martlesham Heath, Suffolk on Sunday 28 March. The meeting will include a technical workshop, lectures, noise figure and other measurements and a bring and buy stand. A p.c. will be running both the DL6WU antenna program and TCALC receiver front-end analysis program. Also on display will be all the transverters featured in the *VHF/UHF DX Handbook* (ISBN 0-9520468-0-6). Please note that the meeting is strictly by invitation only. Tickets **must** be obtained in advance from **Malcolm Bell G4CXT**. His telephone number is (0473) 645533 (day) or (0473) 610073 (evening). The Nordic v.h.f. meeting is being held between June 11-14 at a QTH near Haslev, Denmark. The event will include a lecture programme and of course will provide an ideal opportunity to meet many Scandinavian v.h.f. operators.

Indoor accommodation and food is being provided at a local Scout camp and will be inexpensive but basic. I'm planning to be at this meeting and will have further details if you care to contact me.

Looking ahead to September and a reminder that the largest v.h.f. meeting in Europe is being held in Weinheim, Germany (JN49), on September 17-19. Again, I can give you more details if required.

There was a increase in geomagnetic activity during the last week of November, with three small M-type flares occurring on November 22, an M4.4 flare on the 23rd and four M-type flares, the biggest being an M2.6 on November 30. A number of brief short wave fade-outs (s.w.f.) occurred during this period and auroral activity was observed on November 23 and 30th.

During the first two weeks of December, the quiet side of the sun was in view and very little solar activity and no flares were recorded. However, as the active side of the sun rotated into view, the geomagnetic field became more unsettled and a sudden storm commencement (s.s.c.) was issued on December 17.

A disintegrating filament caused a magnetic storm to start on December 27. It continued until the 29th, creating auroral activity on December 28 and 29th.

Contests

In case you've forgotten, the last three 70MHz cumulative contests will take place on February 21, 28 and March 14. Each session runs between 1000-1200UTC. In addition to exchanging callsigns, report and serial number, stations must also give locator and QTH information.

If you fancy a bit of key-bashing and conditions are right, you might like to enter the German AGCW-DL 430MHz contest, being held on Saturday March 20, between 1900-2300UTC. Contestants can enter one of three sections relating to the transmitter power; A = less than 3.5W, B = less than 25W, C = more than 25W output.

Participating stations, who must only use the band 432.010- 432.150MHz, should call "CQ AGCW TEST" and exchange RST, serial number, power class and locator, for example; 599001/C/IO81MX.

The RSGB Microwave Committee have arranged Winter cumulatives contests for bands above 2.3GHz to take place on Sunday February 28 and March 28.

The Nordic activity contests will be held between 1800-2200UTC on the following Tuesday's: February 16 (Microwaves), February 23 (50MHz), March 2 (144MHz) and March 9 (430MHz).

Deadlines

As usual, I'll remind you about deadlines. Please send your letters to reach me by the end of the month at the very latest. I normally write up the column around this time.

Don't forget that I can also receive messages via packet radio at my mailbox GB7TCM or at my DX cluster GB7DXC.

Photographs of your shack, antennas or any v.h.f. activity are especially welcome. Other pictorial items such as QSL cards, awards, certificates, etc., are also required. They will all be returned to you.

E N D

P A U L E S S E R Y G W 3 K F E

HF BANDS Report

Paul Essery starts off his new-look column with some good advice, by advising you to listen!

Chasing DX

Become a listener! In any QSO, you must have a receiver tuned to his transmitter and vice versa. Otherwise no contact is possible. First find where your man is transmitting; then find where he is listening.

By extensive listening to other people in pile-ups you get to know the right way and - FAR more important - the wrong way! Example: some 25 years ago a licensed amateur showing his rig to a couple of others, called an imaginary VK on 7MHz around 2100Z and completed half of a c.w. contact.

The frequency at the start was quiet but QRM grew. Chuckling, to the pub for a couple of hours. When they got back, a great mob were still calling the imaginary VK! Not one could have heard the VK, 'cos he just wasn't there! However, no real DXer had been fooled.

In a big pile-up, you can be sure he won't be listening where he is transmitting. So you must listen on two frequencies; meaning a two-v.f.o. transceiver, or an outboard v.f.o., or a second receiver, or even an old-time 'separates' rig using two receivers. Know where he is transmitting and where he is listening and you've as good as nailed him. Incidentally, for long odds, you've got his details before your first call!

Low Power

I think that G-QRP Club members come in two types, operating-wise. First comes the guy with the low power but a first-class antenna system. Secondly there are the real masochists who like to use low power and couple it to a poor antenna!

The first type - G4BUE in flea-power mode for example - can compete on near level terms with the 'Full Gallon' ops. He can put a signal anywhere in the world when the band permits; the limit is set by how well the other chap can copy.

The QRP shack of Lieghton GW0LBI.

Our second type is like Eric G0KRT (Worcester Park, Surrey). Eric runs a Lake DTR7 at 1W into a 1990s version of the W3EDP antenna; the 1930s original ran an 84ft top (26m), coupled to the 'wrong' end of the tank coil, against a counterpoise of given dimensions. He uses a single quarter-wave counterpoise and feeds it conventionally. To nail K8PO in the CQ WW CW contest was an achievement, but, as Eric says, a major contest is a good time for him to find new countries. As the DTR7 is a 7MHz only rig, G0KRT knows his band. Eric's set-up also covered all Europe, with a couple of LZs to add another new one on the band.

Another low-power way lover is Leighton Smart GW0LBI in Trelewis. The rig is a Yaesu FT747GX modified for a maximum of 20W. Outside, 175ft (53m) of wire - just over the quarter-wave length - covers 1.8MHz from 9m high; a W3DZZ trap dipole at 8m does for 80 and 40; sloping dipoles for 14/18/21/28MHz and these manage to reach about 4m.

Leighton GW0LBI nailed three Ws on sideband with just 50mW. Outside that, KB1FK was raised on 1W c.w. and KF4RP on sideband with 4.5W - he was running 1kW and the QSO lasted 26 minutes. On the awards side, DXCC QRP is now on the wall, with 40 countries worked on milliwatts.

Ted G2HKU in Sheppey tries 5W when the mood takes him; on 28MHz c.w. 5W made out with 6W6/K3IPK and VP5P.

Contests Prefixes And Expeditions

The EA RTTY Contest covers 3.5-30MHz, as per bandplans, 1600 Saturday to 1600 Sunday, February 13-14. EAs send RST and 'Prefijo Provincial' of two letters. Others send RST and CQ Zone number. Score, on 14/21/28MHz, one point for own continent, two for other continents, on 3.5 and 7MHz three and six; multipliers DXCC countries and Spanish Provinces on each band. Final score total QSO points on all bands times total multipliers points on all bands. Logs mailed by April 10 to EA RTTY CONTEST MANAGER, EA1MV, PO Box 240, 09400 Aranda de Duero, Spain.

The CQ WW WPX Phone dates are March 27-28, and c.w. May 29-30. Single-ops use only 36 of the 48 hours. Off periods at least 60 minutes in length and clearly marked in the log. Categories, single-op single band, single-op all-band; no form of 'DX alerting' allowed, multi-single, multi-multi. Low-power, as for single op but less than 100W output (!). 'QRP/p' output power not to exceed 5W; this category to indicate 'QRP/P' on results sheet and indicate actual power out for all claimed contacts. QRP/p stations only compete with each other. Exchange RS(T) plus serial number. Score: stations on different continents count three on 14/21/28MHz, six on 1.8/3.5/7MHz; same continents one for 14/21/28MHz, two for 1.8/3.5/7MHz. Own country no QSO points but OK for multiplier. The multiplier is the number of different prefixes worked. Final score, total QSO points times multiplier. Postmark date no later than May 10 or July 10 respectively, to WPX Contest, Steve Bolia N8BJQ, 4121 Gardenview Drive, Beavercreek OH 45431, USA.

The ARRL International DX Contest has February 20-21 for c.w., March 6-7 for Phone. 1.8-30MHz, categories single-op single or all-band. multi-op one transmitter, multi-op two transmitter, multi-multi. USA/VE send RS(T) plus state/province. Others send RS(T) plus power input (three digits). Outside USA, multiplier is sum of states/provinces worked per band. W/VE, multiplier is DXCC countries each band. Mail deadline April 7 to ARRL DX Contest, 225 Main Street, Newington, CT 06111. Both ARRL and CQ contests have firm disqualification rules.

The RSGB 7MHz c.w. Contest is from 1500z February 27 to 0900z February 28. UK stations send RST plus county code, others RST plus serial numbers. Logs by April 1 to SV Knowles G3UFY, 77 Bensham Manor Road, Thornton Heath, Surrey CR7 7AF.

Note the OK1 and OK2, Czech Republic are now OK and OL. OK3 is now Slovakia and OM. No detail yet on DXCC status. The old Y2-Y9 calls are replaced by DL1-9 ones.

About March 5, Kingman Reef KH5K operation is likely for eight to nine days, with Palmyra in parallel.

San Andres, HK0 is promised between February

27-March 7. KB6GL and AA5AU will sign HK0/own call.

The C6AGN Bahamas activity from Green Turtle Cay is set for March.

Reports

Rich G0RKJ (and N7CXB) in Liskeard, has an R5 antenna, an IC-725, fed through two low-pass filters with a watt meter between. He has high-pass filters at the video input and on the TV. Rich likes 28MHz f.m., where the calling frequency is 29.6MHz, QSYing to - usually - 29.350 for the contact.

European f.m. simplex contacts are best around 0900-1100, with the US contacts between 1300-1630GMT. Most interesting one in the crop possibly, was EI7CV worked through the Boston repeater at 29.620MHz; neither the EI nor Rich could hear each other direct.

A new reporter is Clive GM3POI in Deerness, Orkney, who uses 7MHz c.w. Clive found XX9TRF, BV2TA, A71AL/SP5EXA, HZ1AB, KP2A, VS6WO and others around the six continents.

Ted G2HKU tried 1.8MHz for GW4RPU and ON7BW on sideband, GM3POI on the key. On 3.5 a string of Ws, EA9LZ and OH0W; 7MHz again Ws, EA9EA, UL7, UI8; ZC4ST and UF6CFZ on 10MHz, Ws and 9H4R on 14MHz; Z21HQ, 6W6/K3IPK, VE7ZZ and Ws on 21MHz; and a stack of assorted DX on 28MHz

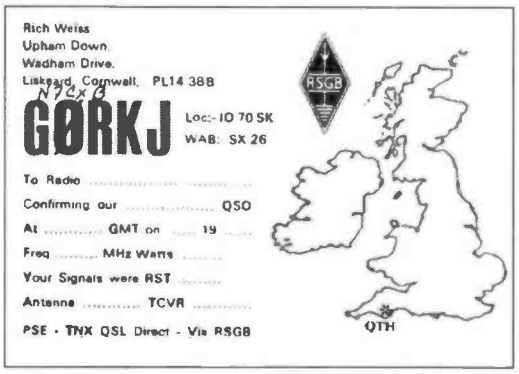
Don GM3JDR (Aukengill) works, c.w., the world on any band; around 0800/0900 on 3.5MHz JAs and LUs. 7MHz saw all the continents with a good showing of W6/7. 10MHz, ZA and VK6HO; 18MHz VP2V/KG6WI, 21MHZ 9Y4VU, P40J and O44BC plus 28MHz with such as 8R1K, P40s, 6V6U US1U and 5N0HKJ plus of course the smaller fry.

The WARC band specialist Vince 9H1IP (M'Scala) on 24MHz had TL8CK in November and in December came C9RJJ 7Q7ZZ and XX9TNB. 18MHz in November was notable for PY0TSN (Trindade Is), D2EL and others, with December for C31YA and 7Q7TA. Lesser lights also of course.

On 10MHz, Mike G0KDZ found VQ9AC, XW7F91E, KL7CYL and A71AL/SP5EXA - what a contrast the latter two make!

Favoured by John G3BDQ is 1.8MHz, with W0DRL (Kansas, 0713z) as the best among lots of DX. We'll tell you how he hears such stuff next time.

Finally, Don G3NOF (Yeovil) who notes that with winter conditions the higher bands are dead by 1900. 14MHz yielded a string of JY40 stations VP8CGK in South Georgia and VQ9AC as pick of the crop for this time.



QSL card of Rich G0RKJ.

Listeners

Listeners are also welcome to report; tell us what you have to listen with and the best of the DX each month.

Deadlines

Send your our reports to my address please, to arrive by the beginning of each month. **287 Heol-y-Coleg, Vaynor, Newtown, Powys SY16 1RA.**

'Bye now!

E N D

Ron Ham starts his column off this time by taking a close look at a reader's 1928 receiver.

Valves &

I'm keying this month's vintage wireless chat while looking at the picture, **Fig. 1**, of the inside of a 1928 *'Selecta'* wireless receiver. This was kindly sent by **Peter Jones** of Fownhope in Hereford.

Peter's photograph gives us a chance to take a detailed look inside this typical battery set of the late 1920s era, and to mention in passing a few of the closely allied subjects as they come to mind. Peter has other interesting items in his collection that we can talk about next time.

Dry Batteries

It appears from the internal structure that this *Selecta* was powered by two dry batteries. There's a high-tension (h.t.) battery which fitted along the bottom of the cabinet in the dedicated space below the speaker, and a grid-bias type which sat in that special large clip, centre right. There's also a 2V wet cell (low-tension), better known as a rechargeable accumulator. The latter stood on the left, below what looks like, a screened-grid valve.

Coloured wander plugs, often with polarity tags on the leads, would have been used to connect the set to the required tappings on the 9V grid-bias and the 90 or 120V high-tension batteries. A pair of spade-connectors (red and black) were used to hook around the two large terminals on the top of the accumulator, **Fig. 2**. Depending on use, the expected battery life was about 12 months for the grid-bias, four to six months for the h.t. and around four days before the accumulator needs recharging.

Most set owners had two accumulators, one in use while the other was at the local cycle or wireless shop, or garage, being charged. The average price for charging was 6d (2.5p) and remained so through to the early 1950s.

In those days, many people put another 6d by each week, toward the cost of a new h.t., and their annual 10 shillings (50p), wireless licence. In fact, a special container was made to collect enough sixpenny coins to meet the licence fee, which at one time was seven shillings and six pence (37.5p).

Fig. 1: Peter Jones 1928 'Selecta' Receiver.

Replacement

Although, like many similar sets, the rear cover of the *Selecta* is hinged for easy accumulator replacement, this procedure was always a risky and messy business. I say risky, because an accumulator, **Fig. 2**, (and there are still some about), contains a large amount of sulphuric acid and periodically need topping-up with distilled water. The acid level, illustrated by the dotted line in **Fig. 2**, is usually scribed on the thick glass container.

WARNING, this acid is dangerous. If acid is spilt it will burn you and very quickly make holes in your clothes or anything else that it touches.

I've heard of many table cloths, nearby carpets and curtains, if the set was near a window, that went rotten through being dripped on, or accidentally rubbed, by the accumulator when it was changed. I also emphasised messy, because from the shop's point of view, each time one was put on charge, the vent plug or 'stopper' (between the terminals at top of **Fig. 2**) had to be removed to let the charging gas escape.

A full charge took about three days and, as a result of the accumulator 'gassing', a fine coating of liquid often covered the terminal area. At the end of the charging period, this had to be wiped off and the terminal threads greased to prevent green corrosion setting rapidly in.

Despite being a large diameter, such corrosion could solidly lock the terminal threads. Most accumulators were fitted with a wooden 'roller' type carrying handle by the makers (top **Fig. 2**). Some folk had a special carrying box made which fitted in their bicycle basket. The user had to walk or cycle to the charging plant, because it was illegal to take one on a bus. The reason being that even one tiny drop of spilt acid could ruin the whole seat.

Current Consumed

The amount of the current consumed in a set depends upon the type of valves employed. I estimate the total current taken by the four valves in **Fig. 1**, would be 600m/a low-tension and 10m/a high-tension.

Obviously, the set designer's choice of valves in the late 1920s was limited, however, let's take a look at the basic power requirements of a 'simple' wireless valve. This is a thermionic device referred to as a tube in the United States, and a lamp in some European countries.

The component parts within its glass envelope are called electrodes. The part that 'lights up' is known as the filament, in directly heated valves, **Fig. 3**, or the heater in indirectly heated valves, **Fig. 4**. With few exceptions, the former are found in battery-operated receivers and the latter in sets run from the mains.

Basically, for a valve to work, its 'heating' arrangement emits electrons which are attracted toward a relatively highly positive anode. It is the heating element, like a torch bulb and the anode that consume the power in a three electrode valve, known as a triode.

The filament in the directly heated valve emits the electrons which pass through a wire-mesh, called the grid, on their way toward the anode, **Fig. 3, I (left)**. Some early text books refer to the anode as the plate, which is logical, because if you take a look at a triode valve you will see the filament in the centre, surrounded first by the wire-mesh grid and then a solid metal plate (anode) as illustrated in **Fig. 3 (left)**.

The electrodes are insulated from each other inside the glass envelope and connected by thin wires to specific pins on the valve-base. The theoretical drawing of a triode, as it would appear in a circuit diagram, can be seen on the right in **Fig. 3**.

The difference between directly and indirectly heated valves is the additional electrode known as a cathode (K), **Fig. 4**. This is placed in the centre of the valve between the heating element and the grid. In this case, it is the coating on the cathode that emits the electrons and not the heating element.

All the heater does, is to keep the cathode at its efficient working temperature. Although more complex valves have several grids, it is always the one nearest the cathode or the filament that is called the control-grid. The signal input point in most circuits.

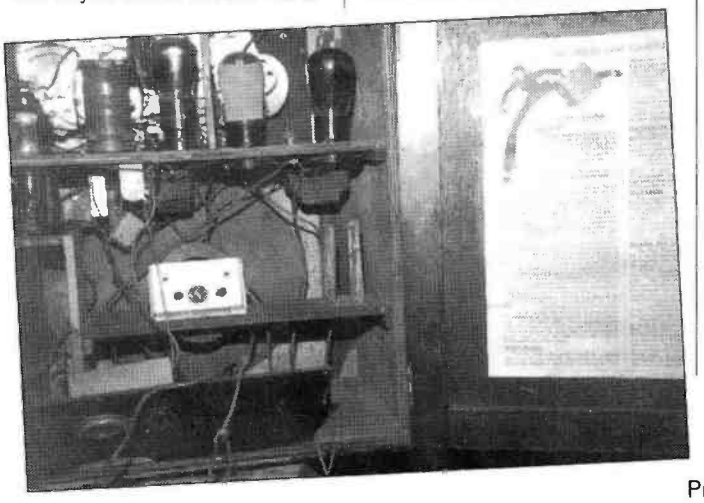
Valves & Components

Three triodes, like those in **Fig. 3**, can be seen to the right of the tuning coil inside the *Selecta*, **Fig. 1**. One thing I spotted, was the metallic coating coming off the first valve in the top right-hand compartment.

The coating acts as a screen to stop the valve detecting unwanted signals. Note also the balanced armature loudspeaker with a mechanical 'tone' adjuster in the centre of the magnet assembly. The adjuster should be moved about half a turn either way when the set is running to produce the best quality sound. A distinct 'pop' should be heard when the setting is correct.

A torch bulb, seen between the two right-hand valves in **Fig. 1**, was commonly used in those days as a fuse in the h.t. circuit. There are metal cans below the first and third triodes, which look to me like intervalve transformers. If so, they would have primary and secondary windings connected to four terminals and possibly marked 'IP' and 'OP' (input and output primary) on one side and 'IS' and 'OS' (input and output secondary) on the other.

The transformer windings should also be checked for continuity, because if any one was open-circuit on either transformer, the set would fail to function. It's worth remembering that transformer



Vintage

By Ron Ham

windings are vulnerable to going open-circuit when a set is out of action or stored in damp surroundings for long periods.

Valve Faults

It is important to stress at this point that a battery valve runs cool, but BEWARE of a mains valve. This is because its glass envelope gets very hot and will burn your hand if you try to remove it without caution.

On one occasion, I found two valves in a television receiver with their glass envelopes cracked. However, after a few enquiries I learnt that the customer had watered the plants on a shelf above the set and some of this cold liquid had leaked through the back panel on to the hot valves!

In general, a directly heated (battery) valve requires 1.5 or 2V to light its filament. There was around 100V on its plate, whereas the heating element within an indirectly heated (mains) valve requires 6.3 or 12V to raise its cathode to the normal working temperature. This should explain why a battery set comes to life almost immediately, and a mains set takes a time to 'warm-up' after switch-on before it can be used.

Communications Receiver

When operating a valved communications receiver, it's best to switch it on at least 30 minutes before use. This is so that the valves, especially the local oscillator, can settle down.

This action will help to prevent frequency drifting on the short wave bands at the start of operations.

Sometimes, following the replacement of a faulty local oscillator valve in such a receiver, the dial calibration 'wanders' or is a bit out. This usually corrects itself after the new valve has (aged) been working for several hours.

Octal Valves

Some of you may have noticed that the octal valves used in the crystal calibration oscillator fitted to the Canadian Army WS-52, have the base of their locating spigot painted blue. This indicates that these particular valves have been deliberately 'aged' by the makers and are suitable for immediate use in an oscillator. Ageing simply means that, although brand new, the valve has been run for an agreed period, by the makers, before packing.

I think that the most common valve fault is an open circuit filament or heater. This is proved by removing the suspect valve from its holder and connecting an ohm meter across the pins marked 'F' in **Fig. 3** or 'H' in **Fig. 4** to check for continuity. (These are NOT the correct pin numbers). NEVER switch a set on and off rapidly, as surge currents associated with this action, can easily damage this part of a valve.

Other reasons for replacing a valve are low emission, intermittent operation and microphony. Poor receiver performance, due to low emission, means that the filament or cathode in the offending valve is not producing enough electrons. A set will stop and start if the connection to an electrode inside a valve has come loose. This is more likely to occur in mains valves because of their high working temperatures, than in battery valves.

A strange musical 'booming', more like a 'boi-oi-oing', coming from the loudspeaker, when the cabinet is touched or when a piece of music produces a hefty bass note, is probably caused by a valve that has decided to work more like a microphone. In the early battery sets you often find a 'wobbly' valve holder which prevented this noise being a nuisance

Valve Data Lists

I suggest that all collectors of vintage sets should keep an eye open in the second-hand book shops for valve data and equivalents lists. These were published by such manufacturers as Brimar, Cossor, Dario, Ediswan, Ever Ready, Ferranti, Marconi, Mazda, Mullard, Osram, Philips and Tungsram, or by technical book publishers like Bernards or Wireless World.

For instance, I looked for a possible screen-grid valve for the Selecta, **Fig. 1,** in my third edition (1958) copy of the *International Radio Tube Encyclopaedia* by Bernard B. Babani. One possible valve I found was a 2V tetrode (SG220) which has an extra grid between the control-grid and the anode.

The valve manual told me that, unlike the triode, the anode connection for this particular valve is its top-cap. Briefly, the introduction of this extra grid helped to break the inter-electrode capacity between the control-grid and the anode. By operating this second grid at a lower voltage than the anode, it gave the set designer more control over this type of valve in front-end circuits.

A comprehensive valve manual is a valuable asset. This is because for about 60 years, a multitude of valves were made covering a wide variety of types with differing base connections, pin configurations and working voltages.

In addition, the valve world has direct equivalents and similar types for special purposes. For example, the Marconi KTW63 is equivalent to an American 6K7, and a Mullard EF39 is equivalent to a Cossor OM6 and a Marconi W147.

NEVER replace a valve by guess work. Always check your valve data book before making the change, because there may be a slight difference which will effect your particular circuit.

The popular 6K7 has a top-cap control-grid which is ideal for short screened-leads to i.f. transformers or tuning capacitors. However, in a number of sets it was more convenient for this grid to come out to a pin in the base. That need was met by the valve makers with a 6SK7, which put the control-grid down below but also changed some of the other electrode/pin connections.

Don't forget to write to me at **'Faraday', Greyfriars, Storrington, West Sussex RH20 4HE.** See you next month.

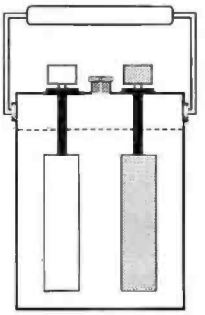


Fig. 2: A typical 'wet' 2V accumulator.

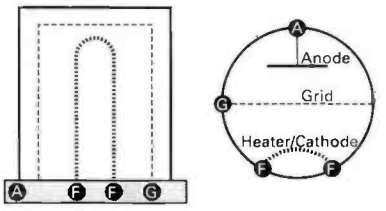


Fig. 3: The basic lay-out (simplified) of a directly-heated triode.

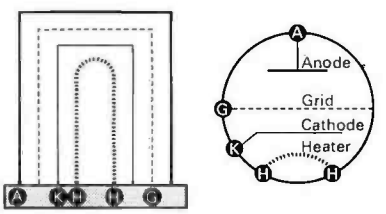


Fig. 4: Simplified lay-out of an indirectly-heated filament valve for a.c. use.

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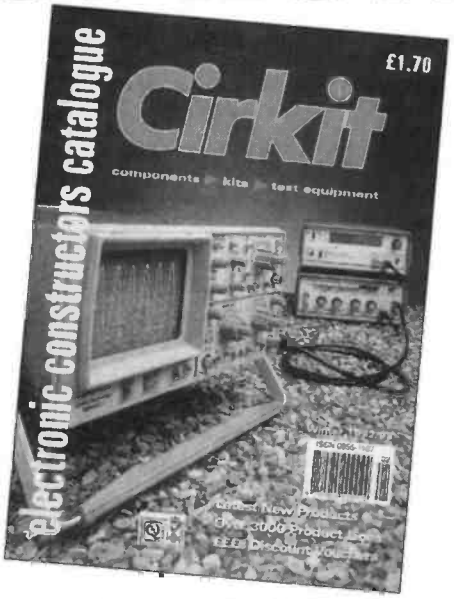

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Edited by Erwin David G4LQI
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Mike Wooding G6IQM
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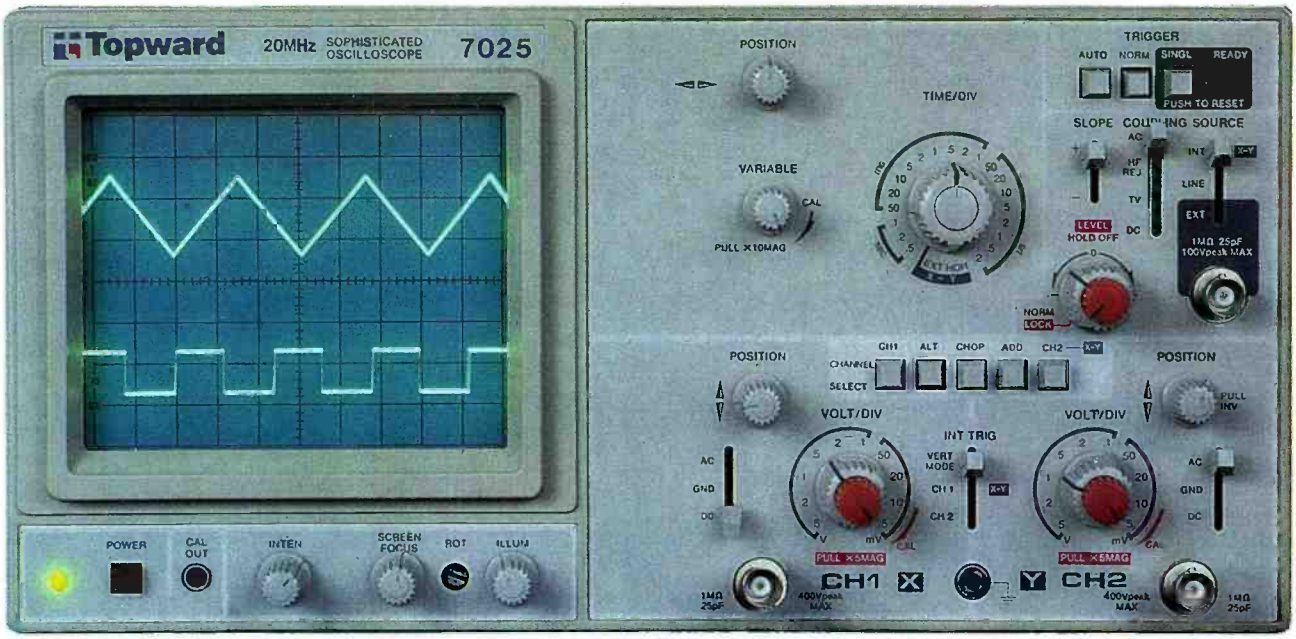

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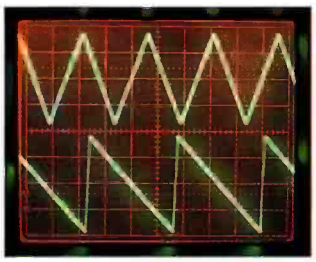

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