

Diamond Jubilee year 1932-1992...Diamond Jubilee year 1932-1992

DECEMBER 1992 £1.75

practical Wireless

Free Inside

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**MARCO
Trading**

Winter Supplement

ISSN 0141-0857



**CONSTRUCTION
AT HOME**

*Special issue with ideas and information for
the home construction enthusiast*



Same Again Sir?

In the battle of the stations, the FT-990 all-mode HF transceiver is the clear winner. Based on the same remarkable performance, ease of operation and the features of the FT-1000. The FT-990 is an extraordinary achievement, compare the advantages yourself. Feel the silky smooth tuning, hear the dual digital SCF (Switch Capacitance Filter) provide unsurpassed reception quality never before obtained. Be heard with the CPU controlled RF FSP (RF Frequency-Shifted Speech Processor) for the extra pile-up "PUNCH." See the lightweight and compact FT-990 with built-in AC switching power supply. The FT-990 is a true champion HF rig without compromise. Leave it only to Yaesu to offer powerhouse performance that leaves the rest far behind.



FT-990
HF All-Mode Transceiver

- ✓ **Dual VFOs With Direct Digital Synthesis (DDS):**
Two ten-bit DDS plus three eight-bit DDS.
- ✓ **High Dynamic Range:**
108dB. RF circuit design with quad FET first mixer similar to the FT-1000 as only Yaesu's unsurpassed tradition can provide.
- ✓ **CW 500Hz Crystal Filter (Included).**
- ✓ **Dual Digital SCF Filter and IF Shift, IF Notch:**
Superior interference reduction.
- ✓ **Automatic Mode-Dependant AGC Selection.**
- ✓ **Full and Semi-Break In CW Operation:**
With built-in iambic memory keyer with BFO offset and CW spot. Key jacks on both front and rear panels.
- ✓ **6 Function Multimeter.**
- ✓ **Adjustable RF Power Output:**
With internal heatsink and whisper-quiet temperature switched squirrel cage blower.
- ✓ **Adjustable Level Noise Blanker:**
For a wide variety of noises and woodpecker.
- ✓ **CPU Controlled RF FSP (RF Frequency Shifted Speech Processor):**
For better intelligibility and pile-up "PUNCH" for competitive situations.
- ✓ **High Speed Automatic Antenna Tuner:**
With 39 memories.
- ✓ **50 Memories:**
Independent ATU and mode/IF filter memory.
- ✓ **Multimode Selection on Packet/RTTY:**
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- ✓ **Front Panel RX Antenna Selection:**
Allows quick switching.
- ✓ **Digital Voice Storage (DVS-2):**
Option provides instant playback of 16-second receive memory, plus two 8-second or 4-second "CQ contest" messages on transmit.
- ✓ **Built In Switching AC Power Supply:**
Reliable performance with significantly reduced size and weight.
- ✓ **Band Stacking VFO System:**
Each VFO register memorises your most recent operating frequency, mode, bandwidth and clarifier information for instant return to your favourite frequency and mode.
- ✓ **Accessories/Options:**
TCXO-2 (Temperature Compensated Crystal Oscillator), XF-10.9M-202-01 (2nd IF SSB Narrow 2.0kHz), XF-445C-251-01 (3rd IF CW Narrow 250Hz), SP-6 (External Speaker), MD-1C8 (Desk Microphone), YH-77ST (Headphones).

Performance without compromise

practical Wireless

DECEMBER 1992
(ON SALE NOVEMBER 12)
VOL. 68
NO. 12
ISSUE 1029

NEXT ISSUE (JANUARY)
ON SALE DECEMBER 9

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worth £169, in our prize
competition this month.

Front cover acknowledgements:



Our thanks go to
Maunder's Homes
(South) Ltd., for the
photographic location at
their site at Broadstone,
Dorset.



We also thank Draper
Tools Ltd., Hursley Road,
Chandler's Ford,
Eastleigh, Hampshire
SO5 5YF, for the
photograph showing a
selection of tools from
their extensive range.

Due to pressure on space 'Satellite
Scene', 'Packet Panorama', and
'Reflections' have been held over.

Before ordering equipment, readers are
advised to check current prices of
imported equipment with our
advertisers, due to the recent
fluctuations in the value of the £.

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Published on the second Thursday of each month by PW Publishing Ltd., Enefco House, The Quay, Poole, Dorset BH15 1PP. Tel: (0202) 678558. Printed in England by Southernprint (Web Offset) Ltd. Distributed by Seymour, Windsor House, 1270 London Road, Norbury, London SW16 4DH, Tel: 081-679 1899, Fax: 081-679 8907, Telex: 8812945. Sole Agents for Australia and New Zealand - Gordon and Gotch (Asia) Ltd.; South Africa - Central News Agency. Subscriptions INLAND £21, EUROPE £23, OVERSEAS (by ASP) £25, payable to PRACTICAL WIRELESS, Subscription Department. PW Publishing Ltd., Enefco House, The Quay, Poole, Dorset BH15 1PP. PRACTICAL WIRELESS is sold subject to the following conditions, namely that it shall not, without written consent of the publishers first having been given, be lent, re-sold, hired out or otherwise disposed of by way of trade at more than the recommended selling price shown on the cover, and that it shall not be lent, re-sold, hired out or otherwise disposed of in a mutilated condition or in any unauthorised cover by way of Trade, or affixed to or as part of any publication or advertising, literary or pictorial matter whatsoever. *Practical Wireless* is Published monthly for \$45 per year by P.W. Publishing Ltd. Enefco House, The Quay, Poole, Dorset BH15 1PP U.K. Second Class postage paid at Middlesex, N.J. Postmaster: send address changes to *Practical Wireless*, c/o C & C Mailers International Inc., 900 Lincoln Boulevard, PO Box 177, Middlesex, N.J. 08846 USA. (The USPS (United States Postal Service) number for *Practical Wireless* is: 007075).

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The latest dual bandy handy that offers as standard features most other manufacturers only offer as options. Too many to list.

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ALINCO DJ580E

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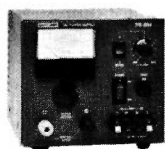


KENWOOD TS950SDX

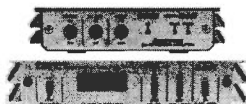


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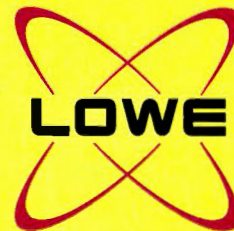
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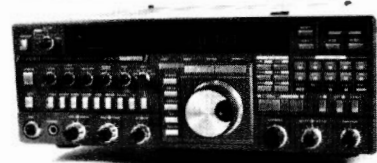
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MARTIN LYNCH
NEWSLETTER

FT990 - Highly popular entry level budget priced 100w HF multimode. Latest advances mean spectacular performance 160m-10m!
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FT890 - The minute multiband, multimode HF 'superig'. 100w ideal for mobile/base.
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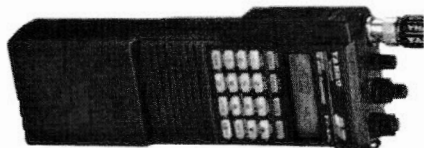
Because of my continuing policy of holding huge stock levels for all brands, I am delighted to inform readers that we will continue to offer equipment at the usual low prices, while current stocks last. **THIS WILL BE ON A FIRST COME FIRST SERVED BASIS HOWEVER**, since some current stock was purchased at the **LOWER JAPANESE YEN PRICE!** I know there's nothing more frustrating than buying from a company with little or no stocks and such companies do exist. At **MARTIN LYNCH** we can ship virtually every item ordered immediately, except in rare circumstances! Remember the **MARTIN LYNCH PRICE PROMISE**, if you are offered a better deal, in writing, from another authorised dealer, anywhere in the UK... **WE'LL BETTER IT!**



YAESU FT736R

I sold nine, last month alone. Another nine customers now have the only VHF/UHF base station to offer 25W on 2 & 70, together with 6 meters and 23CM operation as an option. Built in PSU, full duplex operation, the list goes on and on.

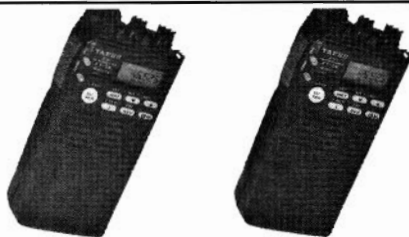
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YAESU FT530R ★ NEW★

The latest dual band handle from Yaesu. It's been delayed in coming but it has been worth waiting for. All internal options fitted, lots of mind boggling features and built to the same robustness as the FT26/76 series. With NICADS and charger included.

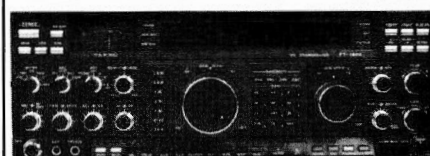
CALL FOR SPECIAL PRICE



YAESU FT26/FT76

My personal favourite handles, easy to use and very well built. Very special prices on these award winning 2M and 70CM handles. Both with NICAD/charger.

CALL FOR SPECIAL PRICE



YAESU FT1000

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It's small, it's simple to use. It comes complete with AM/CW filters fitted, covers all H.F. bands and has a general coverage receiver. Microphone included? Not usually but I'll throw one in!

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YAESU FT290R MKII

Not just a "New B licence" 2M multimode, but consider the remarkable FT290R with the clip on 25 watt linear and you have a totally unique concept in 2 metre operation. Without the linear you have a true portable, capable of all modes - no other manufacturer can offer you this. With matching FL2025 25W linear amp.

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A Selection from the ICOM range.

IC728 & IC729

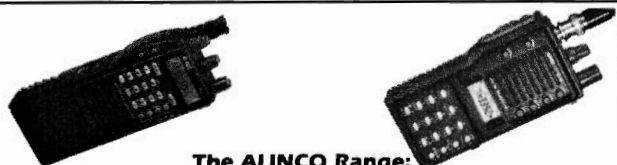
Easy to use H.F. base or mobile, the new twins from Icom really fit the bill. My mate Dennis Branson at ICOM said they were good and he's right - they are! With PBT and speech processor fitted, they offer outstanding value and reliability. 100W out on all the H.F. bands and 10W on 6M with the IC729, you should have one!

CALL FOR SPECIAL PRICE

IC275H

The only company to offer you a competition grade 100 watt 2 metre multimode in one neat package. If you are keen on 2M operation, [as keen as I was years ago - remember GBJNW? - do you really want to?] Wave goodbye to the Liner 2 and become a man over night.

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The ALINCO Range:

DJ580E: In a nut shell? W/S can retire on this one alone! The best dual band handle available. Full stop.

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DJF1E: The other manufacturers are getting worried - this neat little 2M handle comes complete.

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DJF4E: *NEW* identical to DJF1E with all the same features but on 70cms. Ideal for novice. Comes complete.

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DJ51E: As with the DJF1, but minus keyboard, [who wants to imitate Russ Conway anyway?] NICADS & charger, but less Wonga. Ideal 2M starter rig.

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Martin Lynch £25 gift vouchers - still the best way to handle the headache of buying gifts! Remember there's no time limit on spending them... so why not use them to save for your new rig, and top up with anything else legal. [Credit cards, HP, cash or Part Exchange].



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Practical Wireless, December 1992



2m & 70cms Dual Bander DJ-580E

£389

inc VAT

The DJ-580E hand-held is the most advanced design ever offered to the radio amateur. Building on the winning formula of the DJ-560E, ALINCO have now reduced the size dramatically and introduced a combination of innovative features that will make your operating even more fun and certainly more versatile.

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.

For example you now have ALINCO's patented circuit that retains full operation with dry cells even when battery voltage falls by 50%. Great for emergency applications. You get a programmable auto power off feature, battery saver, digital telephone dialler and three output power levels. And we've only just started! Key in a special code on the keypad and your rig will turn into a fully operational automatic crossband repeater. Key in another code and you will open up the receiver for a.m. airband reception and frequency segments up to 995MHz! You can even use the DTMF feature to send and receive two digit code messages.

To learn more about the transceiver that has already taken the Japanese and American markets by storm, phone or write for a full colour brochure.



"The Most Comprehensive Specification Ever Offered!"

Available direct or from your local dealer

Auto repeater mode
AM Airband Reception
Expanded Receive to 995MHz

UK "Gold Seal" Warranty
Now with every unit
Look for the sign on the box!

Specification

Tx	144-146MHz 430-440MHz
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	Ni-Cad pack, AC charger, belt clip, carry strap, dual band antenna.

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- Barometric trend alarm for change greater than .02, .04, or .06 inches of mercury per hour
- All highs and lows recorded with time and date.
- Time & date
- Backlit LCD display.

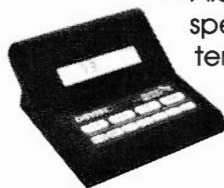


WEATHER WIZARD II

Monitor indoor and outdoor weather conditions at the touch of a button. The Weather Wizard II offers the most requested features of a sophisticated, professional-quality weather station, all at an affordable price. With the optional Rain Collector you can measure daily and accumulated rainfall. Adding Weatherlink expands your capabilities, allowing you to process and store weather data through any IBM compatible PC. **£229.95.**

WEATHER WIZARD II includes:

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- Wind direction in 1° or 10° increments
- Wind speed to 126 mph
- Wind chill to -134°F
- All highs and lows recorded with time and date
- Alarms for wind speed, wind chill, temperature and time
- Time & date.



WEATHER MONITOR II

The Weather Monitor II is our top of the range personal weather station, combining all weather monitoring functions into one incredible package. Add the optional Rain Collector, external temperature/humidity sensor and Weatherlink, and you'll have the world's most powerful computer weather station at a price that's equally incredible. **£339.95.**

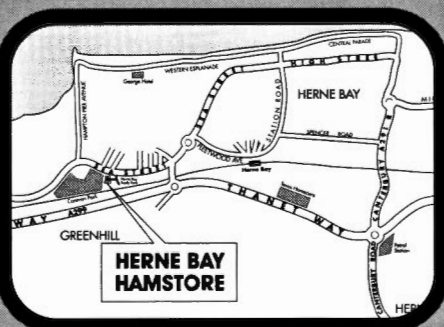
WEATHER MONITOR II includes:

- Inside temp. from 32° to 140°F
- Outside temp. from -50° to 140°F
- Wind direction in 1° or 10° increments
- Wind speed to 126 mph
- Wind chill to -134°F
- Barometric pressure (with memory recall)
- Inside humidity
- All highs and lows recorded with time and date
- Alarms for temp, wind speed, wind chill, humidity, & time
- Barometric trend alarm
- Time & date
- Backlit LCD.



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THE WEATHER THIS WINTER

KEEP TABS ON THE ELEMENTS

ICOM SYNOP PLOTTING SYSTEMS

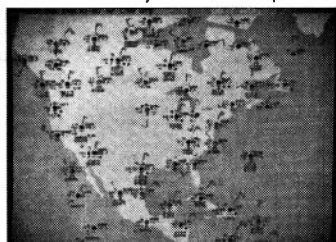
Advanced Synoptic Code Weather Plotting

Using RTTY based transmissions of raw weather data readings from across the world, the ICOM Synoptic Plotting Program will graphically show current and historic weather conditions.

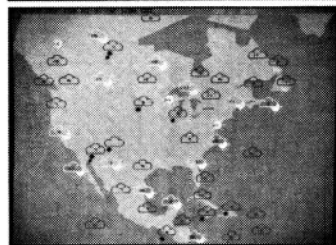
Taking the form of conventional WMO synoptic code symbols, you can view the complete plot, selectively view individual features such as temperature or cloud cover; or even view the trends in a television-style pictorial chart.

All plotting is superimposed onto user selectable maps. Common areas such as the UK and Northern Europe are available at the touch of a key, whilst you are also able to specify map co-ordinates to display any area in maximum resolution.

The system will plot data captured with the



ICOM RTTY System and provide a direct link into the optional ICOM Synop Decoder to provide a unique live plotting facility.



Once plotted on screen, the charts may be sent to a wide variety of dot matrix, laser and colour printers; Roland or Hewlett Packard plotters, or exported to a graphics program for user annotation.

ICOM FACSIMILE SYSTEMS

Weather Facsimile Charts

Weather facsimile broadcasts are made around the clock by over 90 stations worldwide, giving current weather maps and forecasts for up to five days ahead.

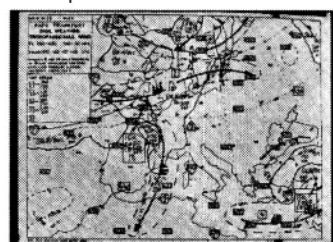
The ICOM Weather Facsimile system allows connection of an HF single side-band receiver to an IBM PC via the receiver's loudspeaker socket and the serial port of the PC.

The software scheduler allows you to set a list of images to receive and automatically captures those images without intervention. With suitable receivers, it will automatically tune the receiver.

During capture a wide array of tuning aids, including a unique pop-up miniscope, greatly assist the user. Automatic detection of broadcast IOC and LPM remove the need for specialist users.

Once captured, the images may be viewed on screen, zoomed to reveal more details, or sent to a printer permanent copy.

The Icom Facsimile system works with most HF single side-band receivers. When used with ICOM receivers in conjunction with an ICOM controller, the computer will have full control of the receiver.



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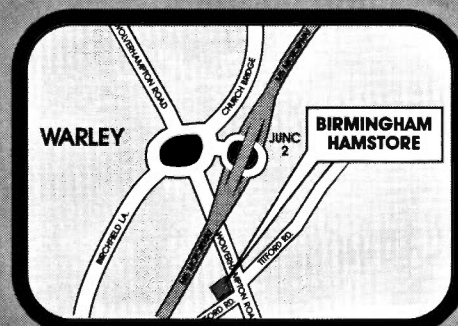
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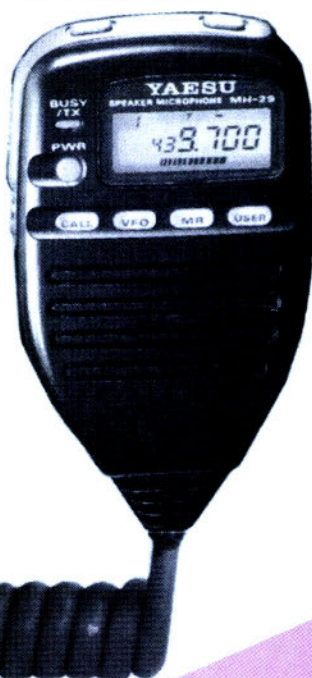


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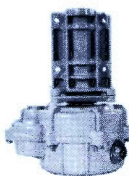
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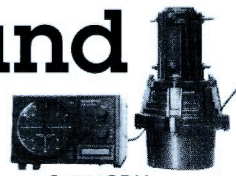


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CK46	Rotary bearing 1.5-2.5 mast	£35.75	B
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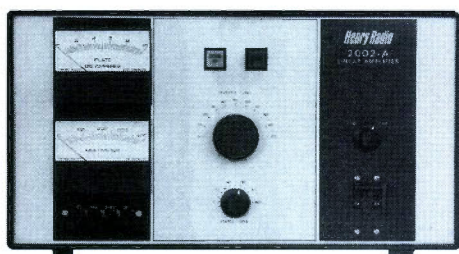
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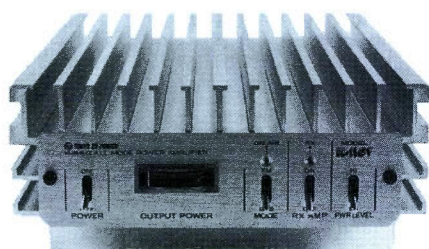
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2002A



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HL110V

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HL36U	70cm 5/10W in 25-30W out pre amp	£138.00	B
HL63U	70cm 10/25W in 50W out pre amp	£220.00	C
HL130U	70cm 3/10/25W in 120W out pre amp	£397.00	C
HL1240U	23cm 2/10W in 40W out MGF 1202 pre amp	£529.00	C

Daiwa

LA2080H	2m 1.5-5W in 30-80W out pre amp	£159.95	B
DLA80H	2m/70cm 0.5W-25W in 80W out		
	2m 60W out 70cms in MGF 1302 pre amp	£339.00	C

DLA80H - "Ideal for dual band handie or mobiles"

A = £2; B = £5; C = £7.50; D = £12.50; E = £16.50



Here at SMC we do stock a wide range of power supplies to suit all applications. There are two major ranges to choose from, the Daiwa range and the Yaesu range. Both ranges are high quality products which will provide many hours of continuous fault free use.

All the Daiwa range, except the PS140MKII, feature variable voltage with switchable voltage/current metering. Both the PS304 and RS40X feature a cigar lighter socket, convenient for powering your handheld transceiver.

PS120MKII	3-15v variable	9A cont/12A max	£69.95
PS140MKII	13.8v fixed	12A cont/14A max	£65.00
PS304	1-15v variable	24A cont/32A max	£129.95
RS40X	1-15v variable	32A cont/40A max	£189.00

The models range from 4A to 32A continuous with convenient models at 9, 12, 20 and 24A. Many models have comprehensive current/voltage metering with prices to suit all pockets.

FP700	13.8v fixed	10A cont/20A peak	£223.76
FP757HD	13.8v fixed	20A cont.	£264.38
FP800	13.8v fixed	20A cont	£249.00
FP400C	13.8v fixed	10A cont/20A peak	£163.33
FP8	13.8v fixed	8A cont	£158.62
SMC 120406	13.8v fixed	4A cont/6A peak	£20.39



FP700

POWER SUPPLIES

SEE PREVIOUS PAGES
FOR ADDRESSES
ETC.

Where have all the old receivers gone? To the attic every one! You may think I'm parodying a well-known (and sad) song, but where **have** all the old receivers got to?

For many of us, getting our first communications receiver proved to be a great delight. My first 'proper' receiver was an ex-RAF 1155. I'd seen it in a second-hand shop and paid for it in weekly instalments earned from my Saturday morning job, which boosted my school-boy pocket money.

My 1155 provided years of good service, and I eventually passed it on to another s.w.l. I've no doubt, that providing the infamous 0.1µF decoupling capacitors haven't gone leaky again, that it's still working!

I've always been an advocate of home-brewing. In my opinion, there's nothing more satisfying than building your own receiver and hearing those first signals.

Despite my support for home-brewing, there comes a stage where many listeners need a professionally-made receiver. This is where the internal market within amateur radio comes into play.

Once the keen listener has their first communications receiver, it often provides an extra burst of enthusiasm. The enthusiasm then helps in gaining the coveted RAE pass slip.

I'm always on the look-out for older receivers, because there are many newcomers to the hobby who can make use of them. Recently, I even managed to buy a (rather dishevelled looking) Heathkit general coverage communications receiver for £5 at a car boot sale.

That bargain-priced receiver is now proudly owned by a school radio club member, and he's studying hard for his RAE. Needless to say, the Heathkit receiver now shines like a new pin, although it's still waiting for a thorough check and realignment session.

So, where have all the old receivers gone? There must be many thousands of older receivers stored in attics and lofts. If these could be passed on via 'Bargain Basement' and clubs, many newcomers to the hobby would benefit.

To add weight to my suggestion, I must mention one young man, James who lives in North Wales. He wrote to me last year, asking how he could start off in the hobby.

I then suggested that if at all possible he should persuade his

Keylines



father to bring him to the 1991 Leicester show, where I could meet them. James was rather fortunate, as his father took the trouble to bring him to Leicester and we managed to find an ideal starter receiver.

The 'Bring & Buy' stall at the Granby Halls event provided James with an old but serviceable Codar valved receiver for £25. He was delighted with the purchase, studied hard through the winter, and is now a licensed amateur - GW7NJJ.

Perhaps you could help someone in the same way, by rooting out that old receiver and passing it on. Maybe you've got an old Heathkit RA1, a CR100 or other old stager that could help a listener.

Don't forget, that by passing on your old receiver, you'll be keeping a vital 'circle' of older equipment going, and helping newcomers to the hobby. I've no doubt that the money, even if it's only £30 or so, will help you too!

In the November issue of *PW*, we published a letter from an amateur who'd been wrongly issued with a reserved callsign. Mr Burton G0SFV, had written to tell us of his problems with his original callsign.

His difficulties had apparently been caused by computer teething problems at Subscription Services Ltd. in Bristol. This organisation is now handling amateur radio licensing.

Readers of 'Receiving You' will recall that I contacted SSL for their comments. In their response, the company described themselves as being "a wholly owned enterprise company of the Post Office", and their reply was duly published.

Since then, I have learned from other amateurs that they're experiencing difficulties with the SSL computer. So, if you're having problems, let me know and I'll pass your correspondence straight on to SSL.

This month, the editorial team are pleased and proud to welcome Peter Dodd G3LDO, as our new *PW* antenna specialist author. Peter is already well-known for his writing, and the book he's published on practical antenna work.

Along with the arrival of Peter, we've got other exciting things happening in *PW*, especially for those interested in radio-computing. So, if you've got a computer in the shack, watch this space, as you're in for a nice surprise with the first *PW* of 1993.

Rob Mannion G3XFD

Services

Queries

We will always try to help readers having difficulties with a *Practical Wireless* project, but please note the following simple rules:

- 1: We cannot give advice on modifications to our designs, nor on commercial radio, TV or electronic equipment.
- 2: We cannot deal with technical queries over the telephone.
- 3: All letters asking for advice must be accompanied by a stamped, self-addressed envelope (or envelope plus IRCs for overseas readers).
- 4: Make sure you describe the query adequately.
- 5: Only one query per letter please.

Back Numbers & Binders

Limited stocks of many issues of *PW* for past years are available at £1.80 each including post and packing.

Binders, each holding one volume of *PW* are available price £5.50 each (£1 P&P for one, £2 for two or more).

Send all orders to the Post Sales Department.

Subscriptions

Subscriptions are available both for the UK and overseas. Please see current issues for the latest prices.

Constructional Projects

Each constructional project is given a rating to guide readers as to its complexity.

Beginner: A project that can be tackled by a beginner who is able to identify components and handle a soldering iron fairly competently.

Intermediate: A fair degree of experience in building electronic or radio projects is assumed, but only basic test equipment is needed to complete any tests and adjustments.

Advanced: A project likely to appeal to an experienced constructor and often requiring access to workshop facilities and test equipment for construction, testing and alignment. Definitely not recommended for a beginner to tackle on their own.

Components for our projects are usually available from advertisers. For more difficult items a source will be suggested in the article.

The printed circuit boards are available, mail order, from the Post Sales Department.

Mail Order

All *PW* services are available Mail Order, either by post or using the 24hr Mail Order Hotline (0202) 665524. Payment should be by cheque (overseas orders must be drawn on a London Clearing Bank). Access, Mastercard or Visa please.

Receiving You

Dear Sir

I have been very happy to read your article 'Using those Versatile Vacuums' in the October issue of *PW*. I think that it is a nice idea to evoke valves. I hope *PW* will present a project every month.

I am a radio ham since 1983, 37 years old and I think it is a great pleasure to use these older components. My job is not electronics and I consider that it is easier to realise valve transmitters without any sophisticated measurement tools (Multimeter, Hertz loop, etc.).

The projects are 'living'. I have built a small transmitter with EF80 plus EL81 p.a., and tune the anode l.c. circuit by looking at the colour of the gas! I am impatient to read you again.

Christophe Pierre
Juvisy, France

Editor's reply: Thank you Christophe, we'll be featuring the occasional valved equipment article. Readers might like to let us know what valved projects they'd like to see in *PW*.

Dear Sir

I thought your name was Mr F. C. Camm or Mr Scott-Taggart!

Whilst I was wandering round my local W. H. Smiths, I noticed a *Practical Wireless* Diamond Jubilee issue. A quick look revealed a letter from Douglas Byrne, whom I was pleased to have met at a barbecue in Shanklin last August.

However, your other letters seemed to have ignored the fundamental research and discoveries made by myself in 1936 when I was 11. My laboratory was a 6ft shed in my parents' garden.

Amongst other discoveries, I list two items of note: Crystals are not necessary for detection of signals. My first crystal fell from my hands. It slipped through a gap in the floorboards and into a rat's nest. In wrapping the earphone lead to the rusty nail which terminated the tuning coil, I had perfect reception. So, it was rusty nails for the future for me!

I also found that enormous explosive energy is available from the gases from accumulators. I

applied a lighted match, resulting in a dreadful bang and a spray of clear liquid onto my trousers. I thought that I had discovered a new explosive! Strangely, my trousers developed a number of small holes. I blamed them on moths.

Now retired, I have time to ponder on future research. I wonder if there can be a substitute for such things as: PM1LF, PX4, PX25 or even 807s?

Peter Boden
Kettering
Northants

Editor's reply: Thank you for your amusing letter Peter. The most amusing 'point contact' rectifier (your rusty nail) story I know, concerns a crane working near the Brookman's Park BBC transmitter near London. Everytime the hook touched a nearby metal pipe, voices could be heard. The crane, cable, hook and pipe were acting as a crude receiving station! And hands up those of us who haven't discovered the corrosive effect of battery acid!

★★★★★★★ STAR LETTER ★★★★★★★

Dear Sir

The letter from Mike Hahn G4JRB, in 'Receiving You' mentioning used computer bargains at junk sales, was mouth-watering. I wish we had such well stocked sales in this area! Having bought a used (very) BBC model B micro earlier this year (the excuse being my 11-year old son) I find it fascinating, if baffling at times.

Purchase of the appropriate monthly computer magazine has helped. A search of the children's explanations and programs in BASIC also helped. It has been said that amateur radio loses too many people to the computing world. Could this be because no radio amateur magazine at present caters for those radio amateurs interested in computers with regular technical info, descriptions of suitable micros, radio related program listings (**LARGE PRINT PLEASE!**) and applications? Software suppliers please note that I can't order from you if you do not advertise your existence and products in *PW* from time-to-time.

Would you consider including in *PW*, a monthly page for those of us who dabble with computers, and would love to find amateur radio applications for them? Those lucky enough to be able to afford PCs might also need more information.

Dick Goodall GMOOGZ
Culloden
Inverness

Editor's Reply: Thank you for your letter Dick. We've got something arriving right up your street in the January issue of *PW*. In the meantime, I know there are several auction rooms in Inverness, and there's the excellent regular auction sales in Dingwall. Try them for bargains, I've been lucky several times!

Dear Sir

Having recently retired and thinking of taking up short wave listening again I bought a copy of *Practical Wireless* for the first time for 50 or so years.

Congratulations on your Diamond Jubilee year. Upon reading this, the thought struck me that I have just the little memento for you to mark the anniversary! Two superb little BA spanners marked with your magazines name. These were given to me as a young lad who was a keen builder of one, two and three valved t.r.f. sets by kind Mr Camm, who was Editor of *PW* at that time.

In the days of plywood, baseboards, valves almost as large as Coca-Cola cans, condensers the size of cigarette packets, and resistors almost as large as cigarettes, all connections could be made by BA size nuts and bolts. These spanners were put to good use in my radio building days. I think it's appropriate therefore that they return home in your jubilee year.

I apologise that they are not in pristine condition, but they are nearly as old as *PW*, and have survived much use, wartime bombs, V2s and many years in my tool box.

I intend to return to my old hobby again, once I have sorted through the jungle of sets available nowadays. Good luck to you, and who knows what you will reporting on and advertising when you celebrate your centenary.

K. N. Harris
Witney
Oxon

Editor's reply: Thank you for your delightful gift Mr Harris. We only have one other set of the *PW* tools in the archives, I wonder how many others have survived? As regards the magazine's centenary, I've no doubt I'll be either using a shovel, firing the boilers in the basement, or using a genuine 'halo' antenna by then!



Send your letters to the editorial offices in Poole. 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

In 1979 I bought my first radio equipment. It was a CB transceiver. I suddenly became very interested on DX. It's wonderful to contact other radio operators all over the world and this activity is still one of my favourites.

After a couple of years I purchased a short wave receiver, and I began my listening activities on the amateur bands and broadcasting stations. But something was missing. There was a lack of information in my country for radio enthusiasts. I was completely lost. No magazines neither books were available at the book store and all I had to do, was search for new frequencies. And what about those strange noises I heard?

One day I saw *PW* magazine in a store 50km away from my town. I ran to buy the magazine, because it was a unique item in the store and someone could take it first! After that day I am a happy DXer. I know what those strange signals are about, and I can decode them. Wonderful, all thanks to you!

Today I buy *PW* every month at the exact same place I first saw it. I want to thank you for the excellent service you're doing to the world of radio enthusiasts.

Paulo Santos Pinto
Guimarães, Portugal

Editor's reply: Thank you Paulo, *PW* seems to get everywhere doesn't it? I've just started to learn Portuguese, hopefully if we meet I'll be able to greet you in your own language...despite the fact you obviously speak English very well!

Dear Sir

Mike Hahn's letter (Receiving You Sept 1992) requesting radio related software for older computers such as ZX81, Atari, etc. reminded me of a subject about which I had intended to write to you.

Some years ago *PW* mentioned a replacement ROM for the ZX81, known as the FORTH ROM which contained a Forth language operating system by David Husband. There was a promise of forthcoming (pun intended) projects and listings to make use of this ROM. I still have my FORTH/ZX81 and have been reading *PW* ever since, patiently waiting for the projects to appear.

Seriously though, whatever became of the projects? There surely must still be many FORTH ROMS in existence which could be put to good use so here's a challenge: Produce five projects, able to make use of the multi-tasking capability of the FORTH ROM, all of which must be able to run concurrently!

1. All mode data decoder
2. RS232 port & software for RX/TX control or modem link
3. Database
4. Satellite predictor
5. AZ-EL beam motor control directed by project no. 4

An impossible task in 16k, but I'm sure you'll accept the challenge with your usual enthusiasm!

M. Bradbury
Stoke-on-Trent

Editor's reply: Thanks for the challenge Mr Bradbury, and I'm passing your letter on for further attention. You should also look out for the January 1993 issue!

Practical Wireless, December 1992

COMPETITION CORNER

Wordsearch

Win an Alinco DJ-180 Hand-held VHF Transceiver

Kindly donated by Waters & Stanton Ltd.

First Prize

The Alinco DJ-180. Worth £169.

Second Prize

Expo Mini-Drill & Stand plus accessory kit, kindly donated by Cirkut Distribution Ltd. Worth over £45. (See review on page 31 of this issue).

Third Prize

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

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

Bench

Expo

Solar

Contest

Panel

Speriboard

Drill

Practical

Table

Results

Workshop

Rutland

Name.....

Address

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Send your entry (photocopies acceptable with coupon) to: Competition Corner, Wordsearch Competition, December '92, PW Publishing Ltd., Enefco House, The Quay, Poole, Dorset BH15 1PP. Editor's decision on the winner is final and no correspondence will be entered into. Entries to reach us by Monday 4 January 1993.

Competition Corner
Dec '92

John GOSKR - Against All Odds

John Goodall, now on the air as GOSKR, is determined to pay tribute to everyone who helped him to get active in amateur radio. Against all odds, or so it seemed at the time, John has now attained his goal of a full A licence.

Former policeman John, is now partially paralysed following an accident when his police-dog chased a suspect across a building site at night. The dog made it over a trench, but John didn't. He suffered serious spinal injuries which eventually led to the paralysis.

John now walks with great difficulty, helped by crutches. However, he's very mobile, and when not driving his car, GOSKR can be seen piloting a fascinating 'moon buggy' lookalike electric vehicle.

Now living in the Bournemouth area, John, encouraged by his wife Shirley, was determined to pass the RAE. He'd been interested in the hobby since 1955, and he'd had many false starts in pass-

ing the examination.

Following a great deal of support and help from the Flight Refuelling Amateur Radio Society, and many other friends, John was ready to take the RAE in May 1992. Unfortunately, disaster struck when he suffered a heart attack, three days before the RAE was to be taken.

Fortunately, everyone rallied round, and with the agreement and support of the City & Guilds and Bournemouth hospital authorities, John took the RAE from his bed. Although he stayed in hospital for a while, recovery was speeded up when he eventually heard he'd passed!

Briefly licensed as G7MMD, John soon passed his Morse test, thanks to much practice and encouragement from other friends. And now, thanks to the Radio Amateur Invalid & Blind Club, particularly their local representative Bob G6DUN, John's now on the air.

John Goodall thanks everybody, especially his wife Shirley who supported him over the long, stony road to GOSKR. "Without help from all my friends" John says "I would never have made it. Thank you one and all".

Rob Mannion G3XFD

New Magazine For BBC World Service

Thursday October 1 saw the launch of the new magazine *BBC Worldwide*, at a special presentation held at Bush House, London.

The world-famous headquarters of the BBC World Service, played host to hundreds of journalists and radio specialists from many countries. They were greeted by the Managing Director of the BBC World Service, John Tusa, before a promotional video told the story of the unique reputation the BBC's global service has gained over 60 years.

Since the beginning of the BBC's Empire Service in 1932, listeners around the globe have used the *London Calling* guide to check on frequencies, and to see what programmes are coming up. But, in its 60th anniversary year, the World Service is to replace the 28-page programme guide with the 100-page full colour magazine *BBC Worldwide*.

Published monthly, the new magazine is packed with features written by BBC correspondents and programme makers. It also provides the usual frequency guide and day-to-day programme listings for the World Service in a revamped centre *London Calling* section. It also includes comprehensive listings for the current World Television Service available in Europe, Africa and Asia.

However, the BBC are aware that not everyone can afford or obtain the new magazine. Because of this, *London Calling* will still be available in developing countries free of charge.

The first edition of *BBC Worldwide*, the November issue, was available from October 1. Full details on subscriptions are available from BBC Worldwide Magazine, PO Box 76, Bush House, Strand, London WC2B 4PH, tel: 071-240 3456, FAX 071-240 4899.

Silent Key - Seamus Hannaway G14OZT

It's with deep regret that we have heard of the passing of Seamus Hannaway G14OZT. Seamus made many friends during the 1992 PW trip to Dayton in April, and thoroughly enjoyed himself despite being terminally ill with cancer.

A courageous and kindly Irishman, Seamus promoted friendship and gentle humour to everyone he met. Although he knew he was terminally ill, Seamus was determined to visit the Dayton HamVention and have fun. He made it, and we enjoyed his company and that of his friend and companion Ray McAteer G14MFM.

It was a great privilege to have known Seamus. Everyone on the 1992 PW HamVention holiday will remember him as a radio amateur in the very best tradition of the hobby.

Rob Mannion G3XFD

Martin Saunders G7JCJ - Young Amateur Of The Year

Martin Saunders G7JCJ, who comes from Broadstone in Dorset, has been chosen as the Young Amateur of the Year for 1992. Martin, a member of the Flight Refuelling Amateur Radio Society, is a keen packet radio enthusiast.

The first prize of £250, was presented to Martin by Stephen Spivey, the Radiocommunication Agency's Head of Mobile Radio, at the Radio Society of Great Britain's HF Convention in Windsor on Sunday September 27. Martin also received an invitation to visit the RA's monitoring station at Baldock, Hertfordshire.

During the ceremony, Stephen Spivey announced that the Radiocommunications Agency's continuing support for the Young Amateur Of The Year Award. The RA has pledged its support for another two years.

Martin Saunders received a number of prizes, including gifts from Icom UK and Siskin Electronics Ltd. Martin is mainly interested in packet radio and has assembled his own equipment, and operates his own mailbox. He's also written articles explaining packet radio, has been appointed secretary of his local packet group, and serves on the forward planning committee of the FRARS.

The close runner-up in the 1992 Young Amateur Of The Year award, was Neil Mothew G7NGM. Neil, from Loughton Essex is another amateur who is keen on home-construction. Neil has also been invited to visit the RA's monitoring station at Baldock.



Martin Saunders G7JCJ, Young Amateur Of The Year 1992.

Ken Smith G3JIX - Practical Wireless 'Elmer' 1992

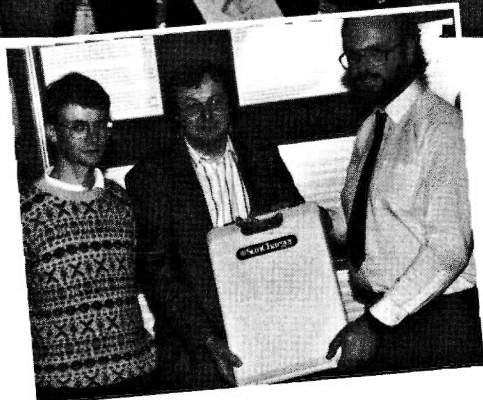
The 21st anniversary Leicester show provided the ideal opportunity to present the first *PW* 'Elmer' award, and Ken is pictured receiving a framed watercoloured cartoon from Rob Mannion G3XFD, the Editor on Saturday October 24. The cartoon, especially commissioned from John Worthington GW3COI, depicts Ken working in his shack surrounded by young people, so it seemed very appropriate for the members of the Thanet Electronics Club to be invited to the presentation!



The 1992 Practical Wireless 144MHz QRP Contest

Overall winners of the 1992 QRP Contest, the operators of the Mansfield Contest Group station G0MCG/P, are pictured being presented with the winner's cup, by contest adjudicator Dr. Neill Taylor G4HLX, at the 1992 Leicester Show. The Mansfield Group also received a 'Rutland Windcharger' wind-driven 12V d.c. generator, donated by Marlec Engineering of Corby, Northamptonshire, and presented by Marlec's representative Teresa Auciello.

The runners-up, 'The Pack of Three' signing G8NTD/P, operated very successfully from a high spot in Staffordshire. Their efforts won them a set of 12V portable solar panels, donated by Bob Keyes GW4IED as shown in the lower photograph.



Military Wireless ARS

The Military Wireless ARS has been formed with the club callsign G0PTZ by licensed radio amateurs and short wave listeners who are interested in Navy, Army and RAF radios. With a view to circulating information between members, visiting radio meets/fairs,

and holding special event radio stations (by licensed members using modern amateur radios). Members will be able to send lists of 'sales and wants' to the Secretary, who will collate these into a master list and send a copy to each member. The yearly subscription will be £5. Membership forms are available from (0705) 250463.

Stolen Equipment

Stolen from Stockton & Billingham Radio Group, Community Centre, The Causeway, Billingham, were an Icom 740E s/n 18004066 and a Yaesu FT290R s/n S130519. Information to Malcolm Hotson G0NRP on (0642) 249067 or Stockton Police on (0642) 615600.

Penpal

I read about your address in the *PW* magazine. I am a young Nigerian of 16 years old and I am interested in communication, but the development of telecommunications is far more advanced in your country than Nigeria. And I had loved to have a friend overseas who can be enlightening me more on communications.

I had tried many pen-

pal clubs but all proved abortive, therefore I would like you to kindly connect me to a boy or girl of about 13-16 years old who can be writing with me as I promise to furnish the person with any information about communication and other fields in Nigeria.

Stephen Anokwuru.

All letters to Stephen to be sent c/o Practical Wireless, and we will kindly pass them on to him in Nigeria.

Transatlantic Link

On Thanksgiving weekend, the Whitman (Massachusetts) ARC will commemorate the 500th anniversary of Christopher Columbus' epic discovery of North America by operating special event stations from Plimoth Plantation. This is a re-created village set in the year 1627 and located close to the site of the landing of the Pilgrim Fathers from England in the ship *Mayflower*.

Operation will be from 1200 to 2400UTC/GMT on both Saturday 28th and Sunday 29th November, using the callsigns WA1NPO, N11X and N1FRE. The club will be looking for s.s.b. contacts with UK stations on these frequencies, dependent upon propagation: 28.370, 24.970, 18.140, 14.270 and 7.270MHz.



All contacts and s.w.l. reports will be confirmed. QSL via Bureau or direct to **PO Box 48, Whitman Mass. 02382, USA.**

Newsdesk -92

Kenwood And Lowe Electronics

Further to a recent announcement that Trio-Kenwood UK Ltd., are to take over distribution of Kenwood Amateur Radio products in the UK and Ireland, Lowe Electronics and Kenwood now issue a joint statement as to the future relationship between the companies.

John Wilson, Director of Lowe, says "For many years, the name Lowe has been closely linked with Kenwood Amateur Radio products and this will remain to into the future. We have always been the largest Kenwood retailer and intend to keep that position".

Mike Atkins, Sales and Marketing Manager of Kenwood Communications Division, says "The new distribution arrangement will allow both the Kenwood brand and Lowe's retail organisation to go from strength to strength; with a new shop opened in Leeds and another planned for the Oxford area in the near future, Lowe and Kenwood are aiming to ensure that customers and potential customers are served even better than before.

Club News

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

Avon

Bristol ARC meet at 159th Scout HQ, Firtree Lane, St. George, Bristol. November 12/December 10 are QRP/home-brew play & display nights with Dave G4ZBT, the 19th is 'Test Gear Calibration' by John G4WOD, the 26th is a Computer evening with Barry G0CFM & December 3 is The (Infernal) Combustion Engine Explained' by Lance G0CCU. More details from **Lence Whitelegg G0CCU** on (0272) 721744.

Bedfordshire

Sheffield & District ARS meet Thursdays, 8pm at the Church Hall, Amphil Road, Bedford, Bedfordshire. On November 12 they have a table-top sale. For further information, contact **Brian Elliott G4MEO** on (0767) 680043.

Berkshire

Maidenhead & District ARC meet at The Red Cross Hall, The Crescent, Maidenhead, 7.30pm. November 17 is 'Technical Computing For Radio Amateurs' by Gerald G3MCK & December 3 is their Christmas Social, Prize giving & construction contest. Details from **Neil G8XYN** on (0628) 25952.

Reading & District ARC meet 2nd & 4th Thursdays, 8pm at The Woodley Pavilion, Woodford Park, Haddon Drive, Woodley, Reading. November 26 is a Construction Contest, Jim Carter G0LHZ & December 10 is their AGM with Wine & Cheese, Chris Nunn G0MZN. More details from **Nick Challacombe G0LGG** on (0734) 722489.

Buckinghamshire

Aylesbury Vale RS meet 1st & 3rd Wednesdays, 8pm in the Village Hall at Hardwick. November 18 is 'The Oscilloscope & Its Uses' by Nigel Pritchard G8AYM & December 2 is G6NB Construction Contest. Further details about the club from **Martyn G4XZJ** on (0296) 81097.

Cheshire

Stockport RS meet 2nd & 4th Wednesdays, 7.45pm in Room 14 of the Dialstone Centre, Lisburne Lane, Offerton, Stockport, Cheshire. November 18 is a Hot Pot Supper, the 25th is 'G3FYE Memorial Lecture' by G3MUO & December 9 is their AGM. Further details from **Jim France G3KAF** on 061-439 4952.

Clwyd

Delyn RC meet every other Tuesday, 8pm at the Gwernymyndd Community Centre in Gwernymyndd, near Mold, Clwyd, North Wales. November 17 is St. Johns & December 1 is Jandex Kits - talk & demo. For more details, contact **Steve Studdart GW7AAV** on (0244) 819618.

Wrexham ARS meet at the Maesgwyn Community Centre, Maesgwyn Road, Wrexham. November 17 is Outdoor Radio Usage/Requirements (Raynet/Events). More details from **Ian Wright GW1MVL**, 'Derwydd', 2 Duke Street, Rhos, Wrexham, Clwyd LL14 1SY. Tel: (0978) 845858.

Cornwall & Isles of Scilly

Cornish RAC meet at the Memorial Hall, Perranwell Station, Perranwell, nr. Truro, 7.30pm. December 3 is their Christmas Party with RSGB Videos & others & the 8th is an Activities night. For further information, please contact **Geoff Bate, 9 Tresithney Road, Carharrack, Redruth, Cornwall TR16 5QZ**. Tel: (0209) 820836.

Co. Antrim

Carrickfergus AG meet Tuesdays, 7pm in Downshire Community School, Downshire Road, Carrickfergus. Further details from **Gavin** on (0232) 835650.

Co. Armagh

Mid-Ulster ARC meet 2nd Sundays (September to June) at 3pm in 'The Silverwood Hotel', Lurgan, Co. Armagh. Everyone interested in radio is welcome. Further details from **Bill G17BQH, 35 Carlingford Park, Newry, Co. Down BT34 2NY**. Tel: (0693) 61298 evenings only.

Derbyshire

Buxton Radio Amateurs meet at the Lee Wood Hotel, Buxton at 8pm. November 24 is EMC Discussion & December 8 is a Quiz night. For further details, contact **Derek Carson G4IHO** on (0298) 25506.

Derby & District ARS meet Wednesdays, 7.30pm at 119 Green Lane, Oerby. November 18 is 'Mobile HF Aerial Construction' by Barry Walker G0LCU, the 25th is 'Home Weather Forecasting' by Roy Williamson G4NPT, December 2 is a Junk Sale & the 9th is a Constructor's Contest. More details from **Richard Bucky G3VGW, 20 Eden Bank, Ambergate, Derby DE5 2GG**. Tel: (0773) 852475.

South Normanton & Alfreton District ARC meet at the New Street Community Centre, New Street, South Normanton, Derbyshire, 7.30pm. November 16 is a talk on 'AMTOR' by 2EOAAL, the 23rd is a talk on Derbyshire's most used 70cm repeater GB3DY by Ian G3ZYC, the 30th is a Visit to Nottingham's BBC radio & TV studios & December 7 is a natter night. More details from **Phil G6YAL, 6 Victoria Street, Alfreton, Derbyshire DE5 7GS**.

Dorset

South Dorset RS meet 1st Tuesdays, 7.30pm in the Wessex Lounge of Weymouth Football Club. December 1 is a club meeting. **Mike Lenzi G7HNY, 12 Putton Lane, Chickerell, Weymouth DT3 4AG**. Tel: (0305) 773860.

East Sussex

Southdown ARS meet 1st Mondays, 8pm in the main hall of the Chaseley Home for the Disabled, South Cliff, Eastbourne. December 7 is their Christmas Social. Details from **John Vaughan G3DQY** on (0323) 485704.

East Yorkshire

North Ferriby United ARS meet Fridays, 8pm at the North Ferriby Utd. FC Social Club, Church Road, North Ferriby, East Yorkshire. November 13 is a night on the air, the 20th is 'Emergency Planning Communications' by Mike Norrie, the 27th is a night on the air & December 4 is a Surplus Equipment Sale. Further details from **Frank Lee G3YCC** on (0482) 650410.

Essex

Braintree & District ARS meet 1st & 3rd Mondays, 8pm at the Community Centre, Victoria Street, Braintree. November 16 is Members' Buys - & why they are a good or bad buy & December 7 is a Junk Sale. **Eddy Scherer, 21 Maysent Avenue, Braintree, Essex CM7 5TZ**.

Clacton RC meet alternate Wednesdays in The Imperial Public House, Rosemary Road, Clacton-on-Sea. November 25 is a talk by Andy Cook G4PIQ on 'Five Play Radio'. For their membership details, phone (0255) 672606, 436565 or 615207.

Greater London

Acton, Brentford & Chiswick ARC meet 3rd Tuesdays, 7.30pm at Chiswick Town Hall, Heathfield Terrace, London W4. November 17 is 'Members Reminiscences Of Hamming'. Further details from **Colm Mulvany G0JRY, 11 Erconwald Street, London W12 0BP**. Tel: 081-749 9972.

Clifton ARS meets at the 'Earl of Derby' Public House, Dennetts Road, New Cross, London SE14. November 20 is a Test Gear evening, the 27th is a Bring & Buy & December 4 is Contest discussion. More details from **Keith Lewis** on 081-859 7630.

Crystal Palace & District RC meet 3rd Saturdays, 8pm at All Saints Parish Rooms, Beulah Hill, London SE19 (opposite junc. Grange Road). November 21 is a Junk Sale. More details from **Marino Fiorentini G7HUC** on 081-653 1090.

Edgware & District RS meet at the Watling Community Centre, 145 Orange Hill Road, Burnt Oak, 8pm. November 12 is 'Gas Turbines Revealed' by Ian Cope G4IUI, the 26th is Morse Training & December 10 is a Junk Sale. More details from **Howard Drury G4HMD, 11 Batchworth Lane, Northwood**. Tel: (0923) 822776.

Havering & District ARC meets Wednesdays, 8pm at Fairkytes Arts Centre, Billet Lane, Hornchurch. More details from **W. P. Drea G0CBU** on (0708) 445135.

Loughton & District ARS meet in Room 14 of Loughton Hall, 7.45pm. November 20 is an Inter-Club Quiz with the Silverthorne Club, the 21st is 30th Anniversary Meal/Christmas Dinner & December 4 is Packet Clinic - Your Packet questions hopefully answered by John G8DZH. For more details contact **Mike Pilsbury G4KCK** on 081-504 4581.

Southgate ARC meet at Winchmore Hill Cricket Club Pavilion, Firs Lane, Winchmore Hill, London N21. November 12 is construction contest judging for the G6QM trophy. **Brian Shelton G0MEE, 22 Berkeley Gardens, Winchmore Hill, London N21 2BA**. Tel: 081-360 2453.

Gwynedd

Dragon ARC meet 1st & 3rd Mondays, 7.30pm at the Four Crosses Hotel, Menai Bridge. November 16 is a Sale of Surplus Equipment & December 7 is Ron Watson Jones - with more amazing pictures. **Tony Rees GW0FMQ** on (0248) 600963.

Hampshire

Basingstoke ARC meet 1st Mondays, 7.30pm at the Forest Ring Community Centre, Sycamore Way, Winklebury, Basingstoke. November 29 is a 144MHz Foxhunt - OS174 - Fox: Eddie G4SQZ & December 7 is their Christmas Social & Quiz night. For further details, phone (0256) 25517.

Horndean & District ARC meet 1st Thursdays, 7.30pm at Horndean Community School, Barton Cross (off Catherington Lane), Horndean, Hants. December 3 is a Video evening. For more information, contact **Stuart Swain, 35 Mavis Crescent, Havant, Hampshire PO9 2AE**. Tel: (0705) 472846.

Itchen Valley RC meet 2nd & 4th Fridays, 7.30pm at the Scout Hut, Brickfield Lane, Chandlers Ford. November 13 is 'Liquid Crystal Displays' from David Coates of Merck Ltd. & the 27th is 'Building & Operating Low Power (QRP) Equipment For The HF Bands' by Keith G3XUO. Further details from **Maurice Cheeseman G1IPQ** on (0703) 736784.

The Three Counties ARC meet every other Wednesday, 8pm at the Railway Hotel, Liphook Hampshire. November 18 is a talk about a trip to the Dayton Hamvention in the USA by Rob Mannion G3XFD, Editor of *Practical Wireless* & December 2 is 'Amateur Television Transmission' by Mike Sanders G8LES. **Kevin Roche G8GOS** on (0420) 83091.

Hereford & Worcester

Bromsgrove ARS meet 2nd & 4th Tuesdays, 8pm at Lickey End Social Club, Alcester Road, Burcot, Bromsgrove. November 24 is a night on the air & December 8 is their Christmas Dinner. **Mr D. Edwards G4ZWR, 2 Mason Close, Headless Cross, Redditch, Worcs B97 5DF**. Tel: (0527) 546075.

Hertfordshire

Dacorum AR & TS meet 1st (informal) & 3rd (formal) Tuesdays, 8pm at The Heath Park, Cotterells, Hemel Hempstead. On November 17 Mike Goodwin G0NJI will give a talk on aerial design. Further details from **Dennis Boast G1AKX** on (0442) 259620.

Hoddesdon RC meet alternate Thursdays, 8pm at the Conservative Club, Rye Road, Hoddesdon, Herts. November 12 is their AGM, the 26th is a talk on 'Radio Controlled Flying' by Ray G0MEO & December 10 is their Christmas Social. Details from **Roy G4UNL** on 081-804 5643.

Verulam ARC meet 2nd & 4th Tuesdays, 7.30pm at the RAF Association Headquarters, New Kent Road (off

Malborough Road), St. Albans, Hertfordshire. 2nd Tuesdays are their activity evenings & 4th Tuesdays are their main monthly meetings. November 24 is a talk by John Tellack on 'Remote Imaging'. More details from **Walter Craine G3PMF**. 5 The Crescent, Abbots Langley, Watford, Hertfordshire WD5 0DR.

Humberside

Goole R & ES meet most Fridays, 7.30pm at the West Park Pavilion, West Park, Goole, last Fridays at the 'Black Swann Inn', Asselby. November 13 is a 'Contests' talk by Richard G0GLZ, the 20th is a Quiz & the 27th is a Social evening. Further details from **Steve Price G8VHL** on (0405) 769130.

Kent

Maidstone YMCA ARS meet Fridays, 8pm at the YMCA Sports Centre, Melrose Close, Maidstone, Kent. November 13 is a Construction Competition, the 20th is RAE & December 4 is RAE. More details from **Colin Roberts** on (0622) 670936.

Sevenoaks & District ARS. October 19 is 'More Medical Electronics' by Peter Donaldson. November 16 is 'Fact, Fallacy & Foible' by Jack Brown. Details from **The Secretary, c/o Sevenoaks District Council, Council Offices, Argyle Road, Sevenoaks, Kent TN13 1HG**.

Lancashire

Bury RS meet Tuesdays, 8pm in The Mosses Community Centre, Cecil Street, Bury, Lancashire. 2nd Tuesdays are Lecture/Talk nights & other Tuesdays are general natter nights with the club's 'new' rigs on the air. December 8 is their AGM. More details from **Colin Fox G3HIL, The Lair, 5 Pinewood Crescent, Holcombe Brook, Ramsbottom, Bury BL0 9XE**. Tel: (0204) 883212.

Fylde ARS meet 2nd & 4th Thursdays, 7.45pm at South Shore Lawn Tennis Club, Midgeland Road, Blackpool. November 12 is a Construction competition, the 26th is an Informal & December 10 is a Supper & Social evening. **Eric Fielding G4IHF** on (0253) 726685.

Hesketh ARC meet every other Tuesday in Birkdale, Southport. November 10 is 'The Humble Diode' by Albert G3ZHE, the 24th is 'QRP Delights' by Rev. George Dobbs G3RJV & December 8 is a Live Packet/TCPIP demo. More details from **Bernie G7DEM** on (0704) 63344.

Preston ARS. November 12 is 'QRP Radio Construction' a talk by Rev. Dobbs G3RJV. November 26 is 'Look At Lancashire' an illustrated talk by Mr Green & December 10 is their Christmas Buffet. Details of their meeting place & time from **Eric Eastwood G1WCQ, 56 The Made, Freckleton, Preston, Lancashire PR4 1JB**. Tel: (0772) 686708.

Lincolnshire

Spalding & District ARS meet Fridays, 8pm at The Riverside Centre, The Old Fire Station, Double Street, Spalding, Lincolnshire. November 13 is a Construction contest. Further details from **David Johnson, 65 West Street, Bourne, Lincolnshire PE10 9PA**. Tel: (0778) 425367 (6-7pm).

Merseyside

Wirral & District ARC meet at the Irby Cricket Club, Mill Hill Road, Irby, Wirral, 8pm. November 18 is D&W, The Harp, Ness, the 25th is a talk & demo. on

'Amateur TV In 1992' by Denis G3UVR, December 2 is D&W, Hotel Victoria, Lower Heswall & the 9th is the Chairman's night. Further details from **Paul Robinson G0JZP, 15 Cornelius Drive, Pensby, Wirral, Merseyside L61 9PY**. Tel: 051-648 5892.

Norfolk

Dereham ARC meet 2nd Thursdays, 8pm at the St. Johns Ambulance Hall, Yaxham Road, Dereham. November 12 is Propagation G3YLA & December 10 is a Social evening. More details from **Mark Taylor G0LGJ** on (0362) 691099.

Northants

Kettering ARS meet Tuesdays, 7.30pm at the Electricity Sports & Social Club, Ekedale Street, Kettering. December 8 is the provisional date for their Christmas Get-together. Further details from **Len GORDV (but QTHR as G7EHM)** on (0536) 514544.

Nottinghamshire

Mansfield ARS meet at the Polish Catholic Club, off Windmill Lane, Woodhouse Road, Mansfield. December 3 is their Christmas Social evening, families & friends welcome. Further information from **Mary G0NZA** on (0623) 755288.

Nottingham ARC meet Thursdays, 7.30pm at the Sherwood Community Centre, Mansfield Road, Nottingham. November 12 is a talk 'Very Early Radio' by Ron G4NZU, the 19th is an activity/construction/WAB, the 26th is a talk on Std Freq./Time Signals by Martin G6ABU, December 3 is Forum & the 10th is a talk 'Tuning Club HF Equipment' by Trevor G0IXR. Further details from **Ian Miller G4JAE** on (0602) 232604.

South Notts ARC meet at Highbank Community Centre, Farnborough Road, Clifton Estate, Nottingham, or Fairham Community College, Farnborough Road, Clifton Estate. November 13 is a talk-in S22 & RIS, the 20th is a Construction, the 27th is on air & December 4 is a talk-in S22 & Open forum. For further details contact **Ray G7ENK** on (0602) 841940.

Oxfordshire

Oxford & District ARS meet 2nd & 4th Thursdays, 7.45pm at the British Legion Club, Haddow Road, Crotch Crescent, Marston Road, Oxford. December 10 is Christmas Mince Pie Party. More details from **Terry Hastings G0CFN** on (0865) 863526.

Scotland

Dundee ARC meet Tuesdays, 7pm in the College of Further Education, Graham Street, Dundee. November 17 is a lecture by Ian Stuart GM4AUP on 'Activities Within The RSGB & Amateur Radio', the 24th is a Construction night, December 1 is a lecture by Paul Bradbeer GM7GUC on 'RF Radiation' & the 8th is a Construction night. Further details from **George Millar GM4FSB, 30 Albert Crescent, Newport-on-Tay, Fife DD6 8DT**.

Somerset

Yeovil ARC meet Thursdays at Red Cross HQ, Grove Avenue, Yeovil, Somerset. November 12 is a Club Junk Sale, the 19th is Construction of 80/20m

Rig - the club project, the 26th is Completion & Testing RX Project/Committee meeting, December 3 is 'Getting The Best Out Of Your Rig' by G3GC & the 10th is 'This Is Packet Radio' by G7KBE. Further details from **Brian McIntyre G7KBE** on (0300) 20975.

Surrey

Sutton & Cheam RS meet 3rd Thursdays, 7.30pm at Sutton United Football Club, The Borough Sports Ground, Gander Green Lane, Sutton, Surrey, with natter nights on 1st Thursdays. November 19 is 'Secret Listeners' by Brian Cannon G8DIU, the 24th is a committee meeting, December 3 is a natter night & the 6th is a 144MHz Fixed & AFS Contest. More details from **John Puttock G0BWV, 53 Alexandra Avenue, Sutton SM1 2PA**.

The Kingston & District ARS meet 3rd Wednesdays, 8pm at 'Alfriston', 3 Berrylands Road, Surrey KT5 8RB. November 18 is their AGM & Construction Competition G6BI Cup. More details from **Ray Fuller** on 081-398 1128.

Wimbledon & District ARS meet 2nd & last Fridays in St. Andrews Church Hall, Herbert Road, Wimbledon SW19. November 13 is Meet the Committee & the 27th is a Surplus Equipment Sale. **Chris Frost G0KEB, 61 Selbourne Avenue, Tolworth, Surrey KT6 7NR**. Tel: 081-397 0427.

Warwickshire

Stratford-Upon-Avon & District RS meet 2nd & 4th Mondays, 7.30pm at the Home Guard Club, Main Road, Tiddington, Stratford-Upon-Avon, Warwickshire. November 23 is 'Intelligent DXing, Knowing What, When & How' by Bob Whelan G3PJT. Further details from **Alan Beasley G0CXJ, 2 Ilmington Road, Blackwell, Shipston-on-Stour, Warwickshire CV36 4PE**. Tel: (0608) 82495.

West Midlands

Coventry ARS meet Fridays, 8pm at Baden Powell House, 121 St. Nicholas Street, Radford, Coventry. November 13/27th & December 11 are NOTA & Morse Tuition/Novice Licence Classes, November 20 is a talk & demo. by Castle Electronics & December 4 is a Visual Entertainments evening. For further details contact **David G1ORG** on (0203) 311468.

Midland ARS meet in Unit 22, 60 Regent Place, off Caroline Street, Birmingham B1 3NJ. Wednesdays are RAE classes & Thursdays are natter nights. November 27 is an Atari night, the 30th is a Computer night & December 8 is their Christmas Party. For further details, contact **John Crane G0LAI** on 021-628 7632 evenings.

Solihull ARS meet 3rd Thursdays in The Shirley Centre, 274 Stratford Road, Shirley, Solihull, West Midlands. November 19 is a Surplus Equipment Sale. For more details, contact **Colin Taylor G3USA, 231 Robin Hood Lane, Hall Green, Birmingham B28 0DH**. Tel: 021-777 9965 evenings or (0827) 53344 daytime.

West Sussex

Mid-Sussex ARS meet Thursdays, 7.45pm at Marle Place Further Education Centre, Leylands Road, Burgess Hill, West Sussex. November 19 is G3JGR Silent Key Sale. More details from **Chris Coward G3YTU** on (0444) 458992.

Wiltshire

Trowbridge & District ARC meet 1st & 3rd Wednesdays, 8pm at the Southwick Village Hall, 8pm. December 2 is their Christmas Party. More details from **G0GRI** on (0225) 864698.

Yorkshire

Barnsley & District ARC meet Mondays in the radio club room & shack, at the rear of the Darton Hotel, Station Road, Darton, Barnsley. November 16 is a talk by the Rev. George Dobbs on 'QRP', the 23rd is a Construction Competition, the 30th is an on the air night & December 7 is their Christmas Buffet. For further information, ring **Ernie, G4LUE** on (0226) 716339.

Bridlington & District ARS meet alternate Thursdays, 7.30pm in the Combined Cadet Building at Bridlington Upper School, Bridlington. November 12 is 'Cadet Radio' by John G3XYF/Jack G5VO, the 26th is 'QRP' by Dave G0DEB & December 10 is their Christmas Dinner. More details from **Norman Bedford G4NJP** on (0262) 673635.

Halifax & District ARS meet 1st & 3rd Tuesdays, 7.30pm at the 'Running Man' Public House, Pellon Lane, Halifax. November 17 is a Video - The Lancaster Story. For further details, contact **David Moss G0DLM, Beechwood Lodge, Leeds Road, Lightcliffe, Halifax, West Yorkshire HX3 8NU**. Tel: (0422) 202306.

Hambleton ARS meet in West House, Allertonshire School, Northallerton at 7.30pm. November 12 is RAE, the 19th is a talk on Mobile Robotics by Paul G1FGI & the 26th is RAE. For more details, contact **Nigel Robertshaw G0NHM** on (0609) 776608.

Keighley ARS meet at The Ingrow Cricket Club, Ingrow, Keighley, 8pm. November 12 is a natter night, the 19th is Packet on the air, the 26th is 'A Dog Who Has Two Tales' by G4ZVD, December 3 is a natter night & the 10th is a natter night. Further details from **Kathy Conlon G0RLO** on (0274) 496222.

Wakefield & District RS meet Tuesdays, 8pm in First Floor Rooms, Ossett Community Centre, Prospect Road, Ossett. November 17 is 'Satellites For The Total Beginner' by G0JUL & the 24th is a Construction night. More details from **Dave Ackrill G0DJA, 104 Durkar Lane, Craggstone, Wakefield WF4 3HY**. Tel: (0924) 240577.

News
club

Practical Wireless 144MHz QRP Contest 1992 Results

Neill Taylor G4HLX, presents the results of what turned out to be a very good entry for the 10th anniversary PW QRP contest. Neill also has some good news for listeners to this 'fun' event, as they'll be able to join in the 1993 contest with their own special category and prizes.

The tenth annual *Practical Wireless* 144MHz QRP contest attracted a high level of activity. Because of the extra activity, I'm pleased to report that 162 entries were received, and this resulted in the highest number of entrants since 1985.

The increased activity on the day, was accompanied by generally good weather. The propagation was also reasonable, providing a combination which made it a very enjoyable event.

The team who made the most of these conditions were the Mansfield Contest Group, G0MCG/P. As a result, this group has won the contest for the third year in succession, operating from their Derbyshire site.

The exceptional station at G0MCG/P, with an antenna array comprising a total of 90 elements, has proved hard to beat. They fully deserve the first prize of the Rutland Windcharger wind-driven generator, donated by Marlec Engineering of Corby in Northamptonshire.

A new group, the 'Pack of Three' operating with the callsign G8NTD/P, operated very successfully from a high spot in Staffordshire. They gained second place, winning the runners-up prize of a set of 12V solar panels, presented by Bob Keyes GW4IED.

Tennamast Trophy

The Tennamast Trophy for the leading Scottish station this year, goes to the Aberdeen VHF Contest Group GM4ZUK/P. They did well from locator square IO86.

Lists of stations leading in the other categories will be found in the tables. Congratulations to them all.

As a special celebration of the tenth year of the QRP contest, as well as the 60th anniversary of *PW*, all entrants who submitted an s.a.e. will be awarded a certificate to mark their achievement. The promise of this proved very popular!

Many groups and individuals (there were 79 single-operator entries) put a lot of effort into their stations. A large number expressed similar sentiments to those of G0RKG/P: "Wherever we come, our certificate will be proudly displayed!"

Certificates will be sent out along with full detailed results tables. But please be patient, as 162 will take a little time to prepare.

Anyone else requiring a full detailed results table should send an s.a.e. to the *PW* Poole office. Alternatively, you could look out on your local packet BBS for bulletins addressed to CONTEST from G4HLX. The packet bulletin will be sent soon after this magazine is published. So, now it's time to turn to look at what went on during the event itself.

Nothing Spectacular

Nothing spectacular happened to conditions on the 144MHz band during the contest. Despite this, the general impression was fairly summed up by G2HRP who said that "Propagation seemed fairly good on the whole".

The comment from G6ARC/P was: "slight lift conditions enabling more squares to be worked", compared with recent years' events. Some operators noticed that early morning conditions seemed even more promising: "an early hint of a lift", says G0ODX/P.

At G10RYE/P, "conditions about one hour before the contest began seemed pretty good. Several beacons could be heard at reasonable strengths, but just as the activity started they vanished totally, as if someone had switched them off".

The days before and after the contest, saw some sporadic-E openings at 144MHz. But nothing of this sort transpired during the contest, unless the incomplete contact by GM6FPX/P with an EA5 was via this mode!

However, they "suspect this should have been GM0/EA5 from the Glasgow docks"! It's many years since we've enjoyed an Es opening during the *PW* contest, despite its scheduling in the height of the season.

I'm pleased to hear that G00VA/P was

**Table 1
Practical Wireless 144MHz QRP Contest 1992**

Pos	Callsign	Points	Pos	Callsign	Points	Pos	Callsign	Points
1	G0MCG/P	16605	55	G8ETD	2023	109	GW0HWK	737
2	G8NTD/P	10850	56	GW4SND/P	1920	110	G0AVU/P	726
3	GW1VDF/P	9660	57	GM6FPX/P	1818	111	G1BEK	720
4	G1NUS/P	8866	58	GX3BRK	1805	112	G4LDR	715
5	G4APD/p	6831	59	EI6ARB/P	1804	113	PE1EWR	700
6	G3WOR/P	6300	60	G6OUT/P	1776	114	G0MIH	696
7	G6ARC/P	6076	61	G4WIK/P	1751	115	G3VGG/P	672
8	G1DSP	5907	62	G1JKX/P	1738	116	G8JWF	663
9	G0STH/P	5450	63	G4FMG/P	1720	117	GW4WVO	624
10	G6FQZ/P	5180	64	G2HR/P	1710	118	GW1CXX/P	602
11	GW0NWR/P	5134	65	EI4E/P	1617	119	G7ICV	585
12	G4SRS/P	4900	66	GM4ITR/P	1554	120	GM4YEQ/P	546
13	G0ODX/P	4738	67	G0NZI/P	1535	121	G4FVK	546
14	G4ZTR/P	4347	68	G4TSW/P	1507	122	GW1WQM/P	540
15	G0MFC/P	4116	69	GM0BWR/P	1462	123	G1THG	510
16	G1DPL/P	4100	70	G0NYL	1458	124	G1MZD	495
17	G4SME/P	4076	71	G0EGX	1444	125	G0RKG/P	480
18	G8DDY/P	4048	72	G4EDR/P	1406	126	GU7LSX/P	468
19	EI3GF/P	4020	73	G1AYM/P	1404	127	G7EPP	445
20	G1POS/P	4008	74	G0LJD/P	1394	128	G11XLK	407
21	G00GS	3960	75	GD7JQI/P	1380	129	G0PZR/P	397
22	G4RSE/P	3772	76	G0RNY/P	1360	130	PE1NHS	392
23	G2BQV/P	3768	77	GW3LNR/P	1343	131	G3PGC/P	374
24	G1SAS/P	3726	78	G3NPB	1320	132	G7IYG	351
25	G0GRI/P	3542	79	G10RYE/P	1280	133	G7KWN	340
26	G4SEU/P	3536	80	G4RES/P	1274	134	G7BPH	340
27	G10RC/P	3504	81	GM00CG/P	1195	135	G0JEE	315
28	G00CE/P	3360	82	G0RRC	1184	136	G0JLF/P	275
29	G00VA/P	3358	83	G4SSD	1140	137	G0MWV	252
30	G7FOX/P	3339	84	G0ADH/P	1131	138	GW7BOY	243
31	G30LX	3322	85	G8LVQ	1083	139	GM8TT/P	228
32	G30AP/P	3276	86	GM7GUC/P	1037	140	G2FKO	224
33	G4BZP/P	3168	87	GM7CQJ/P	1035	141	GW0NCN	224
34	GW0PDX/P	2898	88	G7HXW/P	1026	142	G8BBI/P	216
35	G0FKN/P	2882	89	G0RQR	1020	143	G7HIY/P	192
36	GW1IKN/P	2839	90	G00SH	998	144	G1XSV	168
37	GW0HCN/P	2806	91	G14OWA/P	975	145	G1UCT	152
38	G1MTC/P	2800	92	G1JGE/P	962	146	G7EKC	144
39	G0AFH	2706	93	G10LSB/P	950	147	G1JZU	112
40	G1ZJL/P	2667	94	G7DKX/P	935	148	GW7KES/P	92
41	G3WHK	2625	95	EI4GRC/P	935	149	G0MTN	85
42	GW4KVI/P	2622	96	G7HIA	930	150	G10EI/P	85
43	G40AM/P	2620	97	G8GVS	928	151	G7CLY	84
44	G0PCX	2546	98	G7LQD/P	900	152	GM7IFS	45
45	GD7KQX	2451	99	G6YZR/P	884	153	GW7GCD	32
46	G7KBQ/P	2320	100	G4CRC/P	865	154	G4CIB/P	30
47	G8CUP	2300	101	G0JQA/P	864	155	G8PAD/P	27
48	G0FUW/P	2300	102	GW0FXC/P	836	156	GW0NVN/P	27
49	GW7GXV/P	2247	103	G4AVN/P	836	157	G0RKJ	14
50	G0LAR/P	2185	104	G4YPT/P	810	158	G7LJN	10
51	EI2SDR/P	2184	105	G6ZJW/P	798	159	GW8AWT	6
52	G0BNC/P	2176	106	G8SEQ	793	160	G8VEL	6
53	G1JDP/P	2162	107	G3BPK/P	765	161	G7BXG	1
54	GM4ZUK/P	2147	108	G4ZVN/P	742	162	EA6/G8ZRE	1

Table 2
Leading Multi-operator stations

Pos	Name	Call	Score	QSO	Squ	Loc	Ant	a.s.l.,m	TX/RX
1	Mansfield Contest Group	G0MCG/P	16605	405	41	I093EC	4x14P+ 2x17Y	380	IC251
2	Pack of Three	G8NTD/P	10850	310	35	I093AD	4x9Y +15Y	490	FT225RD
3	Hereford VHF Contest Group	GW1VDF/P	9660	322	30	I081KW	2x19Y	720	TR751E
4	R. Thornley & S. Mayer	G1NUS/P	8866	286	31	I093AB	2x9Y	405	FT290R
5	Rugby Amateur Transmitting Soc.	G4APD/P	6831	207	33	I092LJ	17Y	210	FT225
6	Worthing & District ARC	G3WOR/P	6300	210	30	I090TV	2x16Y	220	FT221R
7	Atherstone ARC	G6ARC/P	6076	196	31	I092FM	19Y	165	TS780
8	Spalding & District ARS	G1DSP	5907	179	33	I092WS	2x9Y	0	FT221R
9	St. Helens & District ARC	G0STH/P	5450	218	25	I083PM	17Y	155	IC251E
11	North Wales Wafflers	GW0NWR/P	5134	193	28	I082KU	14Y	350	FT726

Table 3
Leading Single Operator Stations

Pos	Name	Call	Score	QSO	Squ	Loc	Ant	a.s.l., m	TX/RX
10	Colin Potter	G6FQZ/P	5180	185	28	I091GI	17Y	295	IC271E
14	John Lemay	G4ZTR/P	4347	161	27	J001HW	2x9Y	75	LT2S tv
16	Martyn Beer	G1DPL/P	4100	164	25	I081ED	14Y	500	FT290R
18	Peter Thompson	G8DDY/P	4048	176	23	I090JO	19Y	225	FT221R
20	Jon Page	G1POS/P	4008	167	24	I092AC	14Y	300	FT480R
25	Ian Carter	G0GRI/P	3542	161	22	I081DE	13Y	435	TR751E
29	P.A. Crake	G00VA/P	3358	146	23	I091GI	13Y	285	TR751E
33	Frederick Partington	G4BZP/P	3168	132	24	I084IG	8Y	600	TR7010
41	Derek Poulter	G3WHK	2625	125	21	I091VJ	16Y	40	IC970E
42	Chris Dunn	GW4KVI/P	2622	138	19	I081LS	9Y	520	FT480R

Table 4
Leading Stations

Overall Winners	Mansfield Contest Group	G0MCG/P
Runners-up	Pack of Three	G8NTD/P
Leading Single Operator	Colin Potter	G6FQZ/P
Runner-up Single Operator	John Lemay	G4ZTR/P
Leading station using a single antenna	Rugby Amateur Transmitting Soc.	G4APD/P
Leading English Station	Mansfield Contest Group	G0MCG/P
Leading Welsh Station	Hereford VHF Contest Group	GW1VDF/P
Leading Scottish Station	Aberdeen VHF Group	GM4ZUK/P
Leading Irish Station	Wicklow DX'ers	E13GF/P
Leading Northern Irish Station	Derek McCorkell & Stanley Robinson	G10RYE/P
Leading Fixed Station	Spalding & District ARS	G1DSP

See
'Newsdesk '92' for
pictures of the
QRP Contest
presentation at the
1992 Leicester
Amateur Radio
Show.

amongst those groups who found "lots of stations to work", thanks to the high level of activity. Even from Scotland itself, GM4ZUK/P commented that there were: "more GMs about, and that's common during a contest".

The lack of activity from France puzzled a few operators. Even the winners G0MCG/P remarked "for some reason we only worked two French stations. Don't the French read *PW*?"

You'd think that GU7LSX/P on Guernsey was perhaps best placed to catch any F stations on the air. However, he reported that "I didn't even hear a French station"!

Weather Talking Point

The weather during the contest is always a talking point. "It was a scorcher", says G0MCG/P, "the cans in the cooler box were in demand"!

In the first few years of the *PW* QRP contest, the event gained a reputation for bringing sunny weather. However, the last few years have brought wet and windy conditions to groups in some areas trying to erect a portable station.

At last, this year saw a return to our traditional "brilliant sunshine" as G3WOR/P describes it. From their location GW0FXC/P reported that "We can't remember the last time we had good weather on the day of a contest".

Sunburn Reports

Hot and sunny weather is not all good news, however. Apart from several

sunburn reports, G7KBQ/P found an unusual difficulty.

"Our major problem proved to be the sun. It was totally impossible to see the read-out on the rig"!

Not everyone had unbroken sunshine, but on the other hand GW7GXV/P found one advantage of being on a mountain. At 830m a.s.l. in Snowdonia he reported that: "I was above the cloud for some of the time"!

High Standards

Generally speaking, high standards of operating seem to have been the order of the day. "We found that everyone was extremely friendly and polite" said G0RQR, amongst others.

On the other hand G6OUT/P, notes that: "a few stations didn't always give the /P". Indeed, the omission of this suffix, (whether by the sending operator or the logger at the receiving end), has been the cause of a loss of points for a number of stations during the cross-checking of logs.

Newcomers Plea

From G0RKG/P, who were newcomers to contest operating, comes this plaintive plea: "It would be helpful if stations calling 'CQ Contest' also gave their location to allow those answering them to point their beams in the right direction".

Crowded Band

During the contest, the high density of stations gave rise to a crowded band. For

example, G00VA/P heard "many stations calling CQ on top of each other".

For their part GW1VDF/P sensed some sort of conspiracy. "For some inexplicable reason whenever we are doing well a lot of stations work us, and then settle down on a frequency less than 5kHz from us".

For his part, G0GRI/P learnt a lesson when he stuck to his frequency, calling CQ only 5kHz from a neighbouring station. He felt that it was up to them to move away.

After two hours of this, working stations at a slow rate amid the QRM, he gave up. He moved up the band, whereupon: "things began to pick up. I only wished I had moved earlier and not been so stubborn"!

Quality Good

The quality of signals seems to have been generally good. There were very few remarks of a derogatory nature.

"No nasty signals" were heard at G00VA/P, while G0BNC/P remarked that "signals were cleaner than in all previous seven years I have worked".

Several groups had young people, including novice licensees, involved in their stations. For example, G0QSH report that the contest "gave our younger members, who popped in during the day a chance to see what it is all about".

At other stations, novices were an important part of the operating team. This was the case at G0RKG/P, where 2E0ABA and 2E1AAL, aged 11 and 12, did much of the operating.

Advice Ignored

The advice given with the contest rules to portable stations, about having an alternative site in reserve, was ignored by some groups to their cost. "On arrival at the site, we built the mast and antenna with haste" report GW1KN/P, "moments later other stations came to use our site which shows that it is worthwhile having an alternative site".

One of these unfortunate stations was GW0FXC/P, who had to "get out the map to find somewhere else". Having chosen a likely spot, they dashed off there, only to find that "again it was occupied".

Well Organised

I expect a number of groups are wondering (like G8NTD/P), "how do G0MCG/P do it?" The answer is simple!

The Mansfield group won with an extravagant and very well organised station. It was located at a good site in the centre of England.

The team comprises of five operators plus three s.w.l.s logging. All the s.w.l.s now intend to enrol on a novice course, having been well and truly "bitten" by the contest bug!

The main rig at G0MCG/P was an Icom IC251E, with a muTek front-end. This feeds the full antenna array of four 14-element Parabeams and two 17-element Tonna yagis.

Both sets of antennas have separate GaAs f.e.t. pre-amps at the mast head. On receive only, the Parabeams are connected to the main IC251E.

Receiver Only

The Tonna antennas are routed to an IC275, which is used as a receiver only. This technique enables other parts of the band to be monitored, in the constant search for DX and new squares.

Both antenna stacks are fed with Andrews Heliax LDF4-50 cable, and are erected at heights of 20m above ground! This system makes for a state-of-the-art receiving system, as well as guaranteeing all 3W of transmit power are very efficiently transmitted.

But the Mansfield group don't stop there! Another sophisticated scheme is used for handling the audio leaving the receivers.

Paul GOCYB, explains the system: "We designed a new audio system, to enable the operator to select the audio from either of the two receivers, and to also feed that audio to the people rotating the antennas.

The system was very successful. Enabling us to beam up on stations quicker, and cutting down on the abuse that's generally hurled at the antenna man by the frustrated operator".

So, now we've all heard how it's done, we know what to aspire to for next year. Well done Mansfield!

Gremlins

A few stations experienced equipment problems and gremlins. Of these, the mishaps befalling G8VEL should surely attract some sympathy.

He returned early from a trip to Spain, thinking that the contest was on June 14. On discovering his error (the contest was held a week later), he had to cancel his daughter's birthday party in order to take part.

After just one contact in the contest, he reports that his rotator "froze solid with the antenna pointing south-east, the worst possible direction". If this wasn't bad enough, the receiver front-end then "went very quiet" and "contact number two was practically next door, and the last was actually made using a Slim Jim! At least the gremlins must have had a good day!"

The unfortunate G8VEL expected that this disaster, allowing only three contacts, would leave him at the bottom of the table. However, this was not to be the case because G8ZRE, a regular PWQRP contest entrant, decided to not let his badly-timed holiday in Ibiza spoil his fun!

He took his rig with him, complete with our recommended power-measuring circuit: "try explaining this contraption to Airport Security" he wrote (presumably after he'd been released!). Unfortunately, the problems didn't end there, as he called CQ as EA6/G8ZRE for four hours before making his first and only contact!

Problem Lighthouse

On the other hand, G7DKX/P experienced a problem of an altogether different kind. This station had arranged to operate from the top of a lighthouse on the Humberside coast.

After obtaining permission from the local representative of Trinity House, they duly set up their station. Just before the contest started, they found themselves in the middle of a row about who actually

owned and controlled the lighthouse building!

An irate gentleman from a local bird-watching organisation, insisted that the permission was not valid. So, rather than get involved in the argument, they retreated to an alternative site nearby, with their antennas some 30m lower!

Another entrant attracting suspicion was G0GRI/P. This station had "a visit from the local constabulary. Evidently a passing motorist had reported 'a man with a large aerial on the hill'".

Fortunately, the policeman was satisfied when shown the copy of PW containing the contest rules. But perhaps this episode suggests that it would be wise to also carry your licence validation document at such times.

Contest Organisation

There was only one complaint about the contest organisation. It came from G6ARC/P who asked "is there any chance of extending the two-week log submission date to three?". They cite holiday arrangements as causing difficulties in meeting the deadline.

I'm afraid that as adjudicator, I have to answer no to this one, as my family also want a summer holiday. The checking of the logs is a considerable burden. The job has to be squeezed into a short period, in order to get the results published as soon as possible.

Now it's time for adjudicator grumbles! Although the vast majority of entrants submit neat, well-presented logs and covering information, there are exceptions.

A few logs always give me a headache. Some are very hard to read.

The difficult-to-read records are usually because they submit poor photocopies of the original 'rough' log, written during the event, complete with illegible corrections. Others have not read the rules properly, and have the log columns in the wrong order, or omit some of the covering information.

A few logs fail to highlight, or otherwise indicate, their first contact in each locator square. This, of course, gives extra work for the adjudicator.

I had 162 logs to deal with, and each entrant only has one. So, it doesn't seem unreasonable to ask the entrant to do his share of the administration and ease things for me.

My policy is to penalise such entries by deducting 5% from the score. This is lenient, in many contests omitting such vital information would result in disqualification.

This year, 10 stations lost 5% in this way. But let me reiterate that most of the contestants submit an entry which is well laid out, and easy for me to check.

Brighter Note

On a brighter note, many entrants offered kind words on our 10th anniversary contest. "Heartiest congratulations" came from GW8AWT.

"Many thanks for your efforts in setting up your QRP contest for the last 10 years" was the comment from G0STH/P. "We have much enjoyed this very friendly contest".

From GW0NWR/P came the

Table 5
Leading Stations Using A Single Antenna

Pos.	Name	Callsign	Antenna
5	Rugby Amateur Transmitting Soc.	G4APD/P	Tonna 17el yagi
7	Atherstone ARC	G6ARC/P	Cushcraft 19el yagi
9	St. Helens & District ARC	G0STH/P	Tonna 17el yagi
10	Colin Potter	G6FQZ/P	Tonna 17el yagi
11	North Wales Wafflers	GW0NWR/P	Cushcraft 14el yagi
12	Stroud District ARS	G4SRS/P	Tonna 16el yagi
16	Martyn Beer	G1DPL/P	14el yagi
17	Skelmersdale & District RC	G4SME/P	Cushcraft 15el yagi
18	Peter Thompson	G8DDY/P	MET 19el yagi
20	Jon Page	G1POS/P	14el yagi
21	Steve Malpass	G0OGS	Jaybeam 14el Parabeam

Table 6
Leading Stations In Each Locator Square

Square	Name	Call	Entrants in Square
IN79	B.M. Woodcock	G4CIB/P	1
IN89	Phil Cooper	GU7LSX/P	1
IO53	Galway Radio Experimenters Club	EI4E/P	2
IO62	Wicklow DXers	EI3GF/P	1
IO63	South Dublin Radio Club	EI2SDR/P	2
IO64	Derek McCorkell & Stanley Robinson	GI0RYE/P	2
IO66	Riki McHarg	GM8TT/P	1
IO70	David Blackford	G3NPB	5
IO71	Peter Brock	GW1CXK/P	4
IO74	John Bells & Roger Evans	GD7KQX	4
IO76	Glasgow VHF Contest Group	GM6FPX/P	1
IO80	BBC Ariel Group Rampisham	G3OAP/P	6
IO81	Hereford VHF Contest Group	GW1VDF/P	20
IO82	North Wales Wafflers	GW0NWR/P	4
IO83	St. Helens & District ARC	G0STH/P	13
IO84	Frederick Partington	G4BZP/P	3
IO85	Keith Fisher	GM4ITR/P	5
IO86	Aberdeen VHF Group	GM4ZUK/P	5
IO90	Worthing & District ARC	G3WOR/P	2
IO91	Colin Potter	G6FQZ/P	17
IO92	Rugby Amateur Transmitting Soc.	G4APD/P	18
IO93	Mansfield Contest Group	G0MCG/P	16
IO94	Tynemouth ARC 'D' Team	G7KBQ/P	6
IO95	The Shed Inn	G1JXX/P	5
JM08	Dave Hewitt	EA6/G8ZRE	1
JO00	Eastbourne Electronics ARC	G0FKN/P	1
JO01	John Lemay	G4ZTR/P	11
JO02	High Wych Contest Group	G1SAS/P	4
JO03	South Holderness Contest Group	G7DKX/P	1
JO11	Frank Laanen	PE1EWR	1
JO32	R.J. de Groot	PE1NHS	1

recollection that "most of all, on each contest we've had a lot of fun and laughs". Then came the accolade from G0LAR/P: "the PW144MHz QRP contest is a delight to work in. Long may it continue to be so".

From G3NPB came the comment: "a hugely enjoyable contest". And as always, the benefit of QRP operation was expressed: "here was a contest we could try without feeling inadequate" expressed by G0RKG/P.

Meanwhile, those contestants having their first go, continue to be amazed by what they can achieve with only 3W. For example, G7KWN found it "very surprising what can be done with 3W". From Wales, GW7BOY commented that "for me to work into Eire, Scotland and the south coast of England all in one morning with only 2.5W, is special".

Enthusiasm

With all this enthusiasm for QRP operation at v.h.f., and the pleasure that a day's contest activity has brought each year, I'd like to thank all those who have entered the 1992 event. I must also thank G4XPE and G4IQM for their useful check-logs, and indeed all those who have supported the contest during its first 10 years.

In a forthcoming article I shall be reviewing all 10 contests. I also intend answering the question "which groups have achieved the leading positions, taking the results of all ten events together"? Who will be the overall leading station of the decade?

The 1993 Contest

Meanwhile, many groups seem anxious to start planning for the 1993 contest. The provisional date for this is Sunday June 20 1993.

Due to the interest shown by listeners, I'm pleased to report that next year's contest will cater for the s.w.l. too. Both the Editor and I are conscious that the s.w.l. has been neglected in previous years.

Although we know that listeners did take part, no formal logs were received. However, to encourage s.w.l.s to participate, a new section of the QRP Contest will be introduced. A special prize will be awarded to the leading s.w.l. for the 1993 event. Full details of how s.w.l.s can enter, will be published in time for the contest.

Finally, I again thank you all for entering. And, like many other Practical Wireless QRP Contest entrants, I'm looking forward to our 11th contest.

Neill Taylor G4HLX

BOXING IT UP

PART 1

Not happy with your home-brew project's finished appearance? To help you get that 'professional look' Stephen Harding G4JGS, has written a DIY guide to boxing your home-brew gear.

Although you can buy all sorts of boxes and enclosures, they rarely seem to exactly fit your needs. They also tend to be rather expensive.

The alternative to buying ready made boxes, is to build your own. Many people fight shy of this because they say they don't know how to do it, and I'm aiming to give you a starting point for exploring the possibilities.

TOOLS NEEDED

Another stumbling point with box and enclosure construction, concerns the number of tools needed. My approach to the hobby, is that you should not have to go out and buy anything specifically in order to make things for amateur radio.

If you do have to go out and buy, make sure you spend your money wisely. There's no point in buying professional quality tools if you are not going to earn your living with them.

At the same time, there's no point in buying very cheap tools. They rarely last and give inferior results.

Nor is there any point in going out and buying tools for the sake of it, unless you are taking up tool collecting as a hobby!

If you can use a particular tool, think at least twice before committing your money. Look for alternatives that you already have, and if you can, spend the money you save on materials and components.

Whatever tools you do buy (or already have) it's important that you take care of them. Tools represent a considerable investment.

Cutting tools in particular should be stored safely, and kept sharp. They perform much better, and are less of a danger to the user this way.

THE MATERIALS

The materials I'm suggesting you use for construction don't require

specialised or expensive tools. They'll only require the sort of tools you're likely to have around the house and shack.

Before you consider using a particular material, it's worthwhile considering what you want the box or enclosure to do.

You can also make your units user-friendly (to you!). How many times have you complained that the controls of a piece of commercial equipment are too close together, inaccessible, or badly labelled?

FINISHED ITEM

To start the design process, just consider where the finished item is going to be. Then decide how it will fit in with the rest of the shack equipment.

Will the proposed item be used fixed or moveable? What will it be next to and connected to? Is there a vital display that you must be able to read from 10 paces? And so on.

Before you start, it's worthwhile doing a few simple drawings. You don't need anything elaborate as you're the only person who has to understand them anyway!

IDEAS CRYSTALLISING

Once the ideas are crystallising, a mock-up casing made in card is very useful to confirm sizes and shapes. Switches and other controls that you need to operate, can be put on your model. You can then test whether you can get your hand to them comfortably.

Don't be afraid of giving yourself a little more space than you think you need. This is especially important if the equipment inside generates heat.

You'll also need to think about airflow paths through the case, and where the air gets in and out. Generally it's wise to vent at the highest point of the box.

Before you start the final

design, it will help if you make some fairly decent drawings of each face of the enclosure, including the vital measurements. Keep it simple!

Don't attempt three dimensional drawings, leave that to the professionals and artists. You'll need a view of the front, the back, the two sides, the top and bottom. Six drawings in all.

When you do the drawings, make sure you mark in everything. Don't forget to leave spaces for labels and other markings, and don't be in too much of a hurry to finalise things.

TRADITIONAL CASES

It's traditional that cases for amateur equipment have been made out of metal, either sheet steel or aluminium. They have the advantages of strength, easy mass production and good radio frequency screening. But metals are quite hard to work, and getting a good finish can be difficult.

Nowadays, one of the many forms of plastics could be used. A quick look in any electrical shop, will show how much they have taken over as the material for enclosures.

Modern plastics are light, cheap, self-coloured, easy to shape and very versatile materials. Their only two disadvantages are their response to heat, and poor r.f. shielding.

I'll mention the r.f. shielding later. And, providing airflow has been carefully considered, heat should not be a problem.

MODERN PLASTICS

With modern plastics, the only real problem is which one to use! The most widely available in high street DIY shops is acrylic sheet, better known by its trade name Perspex.

Unfortunately, Perspex is a very abrasive material to work with, and quickly blunts tools. It's also rather hard and brittle, requiring little force to shatter

it like a piece of glass.

The only tools suitable for use with Perspex are those made from metal, and even good quality twist drills will need sharpening frequently. Despite the difficulties, very nice looking enclosures can be made with Perspex.

POLYSTYRENE FAMILY

The polystyrene family, in particular, high impact polystyrene, often known as HIPS or vacuum forming plastics, are very useful. This material comes in quite a wide range of colours and several thicknesses from 1mm up to 6mm.

This form of plastics can be bought from model-making shops, or the suppliers I've listed. It's easy to cut, shape, drill and form, and will take a variety of finishes.

The most useful thickness is 3mm, which is easy to cut and gives a very light but strong box. Larger boxes may need some strengthening sections, but avoid making them too heavy. A box 300mm x 200mm x 100mm will cost around £5 for materials.

There are two methods you can use to build a case from polystyrene. The easiest method is to make all the flat surfaces of the box individually, then assemble it.

Don't worry about great accuracy in cutting out. There are many ways of disguising your mistakes!

However, it pays to take care in marking-out. Right angles will need the use of a try-square. Accurate marking-out needs a thin line, and this can be done by using a fine tip spirit-based felt-tip pen.

MARK ON INSIDE

I always mark out on the inside, as the pen colours can penetrate through several layers of paint. Cutting is best done by scoring the surface, and then breaking it. This provides a clean and square

WORKSHOP SPECIAL ARTICLE

edge, for joint making.

Scoring on thin sheet, can be done with a Stanley knife held against a steel straight edge. Take care with your fingers!

acrylic sheet, as the edges produced are very sharp.

For a box having all the sides the same height, one long strip provides the individual pieces. A sloping

suppliers.

The solvent comes in a small bottle, and you don't need very much. A fine paint brush is all you need to apply the solvent. Make sure it has

and hold it in position with the try-square, as shown in **Fig. 2**. Dip your brush into the solvent, and run it along the join line.

You should see the liquid being drawn into the joint by capillary action. Do this several times, and leave it for about 10 minutes.

The solvent dissolves the plastics, and as it evaporates it leaves a 'welded' joint. When the joint is strong enough, you can put on the next side, making a corner.

A little sticky tape, Sellotape



Fig. 1a: An old screw-driver makes a useful marking tool (see text).

Fig. 1b: Another version of marking tool (see text).

On thicker sheet, a scoring tool can be made from a small piece of circular steel bent at right angles and then filed as shown in the diagram, **Fig. 1a**. You can use an old screwdriver for this tool.

Another type of cutting tool can be made from a broken section of hack-saw blade. The tool is shown in **Fig. 1b**.

The best way to use the tool, is to draw it towards yourself while pressing down firmly (as shown in **Fig. 1a**). If it's done correctly, a thin spiral of swarf will rise in front of the cutting edge. To break the sheet, simply place it with the scored line over the edge of a

topped box needs a piece that's the width of the base, and as tall as the long and short sides added together.

Mark out the sloping line across the sheet, and you should have both pieces marked with the same angle of slope. If you make a mistake, don't throw away the pieces of polystyrene as you may be able to use them later.

BOX ASSEMBLED

Once you've cut the pieces, the box can be assembled. Don't worry about how to get the gear into it, that comes later!

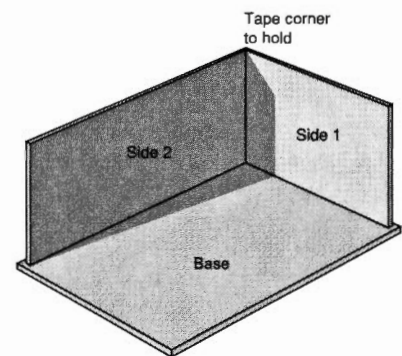


Fig. 3: Assembling the box, using tape to hold the corners together before the adhesive is applied.

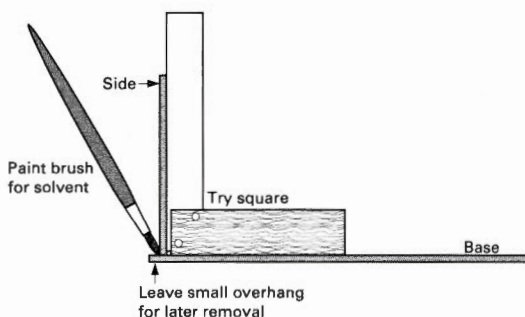


Fig. 2: Applying the solvent adhesive, using a try-square to maintain the correct angle.

table and press down sharply.

Thicker plastics and acrylic sheet, will need much more force. Place the material in a vice where it can be really firmly held. Take care with

The preferred method of joining polystyrene and acrylic is to use a solvent adhesive. The best is a chemical called dichloromethane, easily purchased from model making

natural bristles, because if they're not natural they'll be dissolved!

Some very good results can be obtained with plumber's plastics piping solvent adhesive. Most DIY stores sell this, but experiment on some scrap material first, to see how well and how quickly it works.

ADHESIVE APPLIED

The adhesive can now be applied, starting with the base and one of the sides. Put the base on a flat surface, a section of plate-glass would be ideal (those from old TV sets are useful).

Set the side up on the base,

or insulating tape, as in **Fig. 3**, will hold the job together while the solvent is evaporating. The strength of the joint depends on how tight the individual pieces are held together during the setting stage.

MATCHING UP

The next job is matching up the height of the box sides. The easiest way is to stick a sheet of abrasive paper to a flat surface, **Fig. 4**.

By using 'wet and dry' paper, illustrated with a grit of about 120, you can achieve some rapid results without much effort. Another advantage is that it can be used wet (surprise surprise!), producing a better finish.

Place the part-formed box upside down on the abrasive surface, as shown in **Fig. 5**. Then move it around in a

circular motion to smooth the high spots down, as in **Fig. 4**.

If the difference in height is greater than about a millimetre, it takes a bit of time, but the result is well worth it. The same process is used when making a box with a sloping top, so that the top will flush-fit.

JOINT FACES

Once the six faces of the box are assembled, make sure that all the joint faces meet correctly, forming decent corners. The box can now be trimmed.

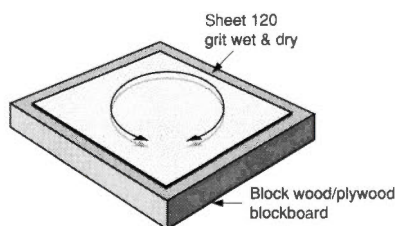


Fig. 4: Using a sanding board with 'wet and dry' (see text).

If there's a lot of material to be removed, a file is very efficient, **Fig. 6**. Once you've used a file in this way, it's best to keep it for this purpose.

A half-round file, can be used for shaping flat corners on the flat side, and curves with the rounded side. A rat-tailed file is useful for opening out holes for instruments and controls.

Always use the files so that you are putting the pressure into the joint, not away from it, as I've shown in **Fig. 6**. By doing this, the chances of you breaking the welded joint are minimised.

There'll probably be one or two joints that need filling. Body fillers, such as Plastic Padding, used to repair accident and rust damage on cars, is suitable.

Before using it, you must make sure that the surface is clean and dust free by wiping it over with tissue paper soaked in methylated spirits (**no smoking please!**).

Once the area has been cleaned, keep your fingers off, as the natural grease on your skin may be enough to affect the way the filler sticks. Mix the paste according to the manufacturer's instructions.

Editorial note: Heavy petroleum vapours are given off by Plastic Padding, follow the manufacturer's advice and mix the paste where there's good ventilation and no naked lights (including cigarettes!).

FILLER APPLIED

As soon as you have

prepared the filler material, it can be applied to the case using an old knife as a spatula. Force the filler material into any gaps,

leaving it slightly proud.

In practice, I've found that most fillers shrink slightly on curing. Because of the shrinking, it's almost impossible to get a good finish straight from the knife.

Once the filler has cured, it can be sanded down smooth. If you don't have a sanding machine, a block of wood with some 80 grit production paper wrapped round it will aid sanding down.

When sanding, rub over the

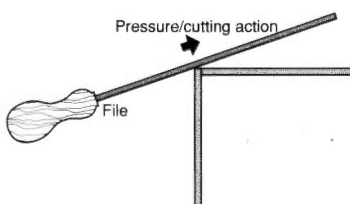


Fig. 6: Using a file to finish the edges of a box.

whole surface so that any imperfections are spotted. You can then deal with them just before you get to the painting stage.

FILLED AND SMOOTHED

Once the box has been filled and smoothed, the positions of all the holes, etc., can be marked and drilled. If

you're using acrylic then a metal-working saw is needed. Once separated, the two halves will need rubbing down to make them match perfectly.

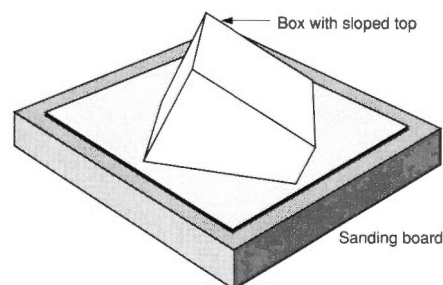


Fig. 5: Sanding box edges, using the fixed board method.

there's a large area to take out, as for fitting a meter for example, a hole-saw is a great help.

If you haven't got a hole-saw, use a drill to form a chain of holes around inside the area you want to remove. You can then open them out by sawing between the holes with a file or small hack-saw blade.

Cut out the holes roughly and then file to size carefully. It's very easy to take too much material off!

The next stage is the separation of the top and the bottom of the box. Decide where you want the case to divide, and draw a line all the way round it.

A marking gauge is the best tool for drawing the line, because it's accurate and leaves a shallow groove. Then

FINAL STAGE

The final stage is to make the two parts of the box join together. This is done by fitting a skirt around the inside one of the two parts.

The various finishing stages are shown in **Figs 7, 8, 9, 10, 11, 12 and 13** (next page).

Don't worry if when you go to fit the two halves together they won't go, or are very stiff. Use your file carefully on the corners until there's a smooth fit.

Radio frequency screening can be added at this stage. The simplest way is to use heavy duty aluminium foil, by sticking it on the inside.

Make each aluminium foil panel slightly too large, it can then overlap its neighbour. Then it can be stuck down using double-sided sticky tape, which seems to be the best adhesive.

Be careful with some of the solvent-based adhesives, because they attack plastics. Test a sample on a piece of scrap material first, and leave it for several days before committing yourself.

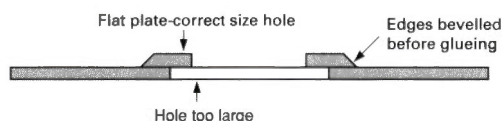
So, that's how to make basic boxes. Now, I'll describe one or two refinements.

Continued over...

LOOKING SOFTER

Your home-brew boxes don't have to look square and hard. You could get them looking softer, because they

If you really overdo the heating, there's a real fire risk. Burning plastics give off poisonous fumes, **so please be careful!**



Figs. 7 to 13: Various stages in finishing and assembling boxes and enclosures in plastics (see text).

don't have to have that harsh, sharp-edged look.

The softer-look can be done relatively easily. All you have to do, is to exploit the thermal properties of plastics.

Put simply, when you warm plastics up, they become pliable and can be formed into any shape required. Provided the material is held in shape whilst the material cools, the plastics will retain that shape.

If the process goes wrong, you can have another go! However, before you do, I have a few words of warning.

Plastics need to be heated to around 120°C. This is hot enough to cause serious burns. So, some heat resistant gloves are needed and oven gloves should be quite adequate.

If you overheat the plastics, it will start to boil off some of the base chemicals. This permanently spoils the surface.

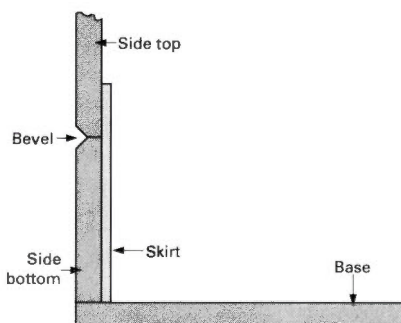


Fig. 8 (see text).

HEATING PLASTICS

So how do you go about heating plastics? The answer is that there are basically two

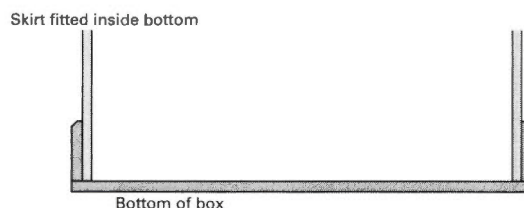


Fig. 9 (see text).

methods open to you.

One method of heating plastics, is to use the ordinary domestic oven and heat the whole lot. It's very effective, but handling a large section of hot floppy plastics is quite entertaining!

The other method of heating plastics, involves a localised thermal source. Here, you just heat the area you want to shape. This technique uses hot-air guns, sold for paint stripping and similar jobs.

Providing you keep the air blast moving, so that a localised hot spot doesn't develop, the hot-air guns are very

effective. The other method is to use an infra-red strip heater, of the type frequently found in bathrooms.

You can heat the material, by holding the plastics sheet about 75mm away from the heater, turning it frequently. This is so that heat is applied from both sides.

You'll find that the material quickly gets hot enough to bend. Make sure the heat has penetrated right through the plastics, before you start bending, or it can break.

You're less likely to have problems on thin sheet where heat penetration is quick. Problems are more likely on thicker sheet, as heat penetration takes longer and it's quickly dissipated.

SUITABLE FORMER

Obtaining the shape you require, is best achieved by forming the plastics material around a suitable former or pattern. A block of wood is convenient because it's easy to work, and can stand up to hot plastics.

Ensure that all the corners are rounded, as the plastics will tear as you form sharp corners. The wood's surface finish has to be fairly good. This is because thin plastics sheeting will pick up grain definition quite easily.

You don't

have to go out buying good wood. Look for the nearest building site, home improvement scheme, joinery works, etc. Go scrounging!

Once you're satisfied with your former or pattern, you can think about the plastics. Mark out and cut the pieces, making the section for the box sides about 20mm longer.

The longer length is so that when you fold the sides round your pattern, they'll overlap a little. They can then be clamped together by using a little solvent on the edges, with a cut made through the middle of both layers.

The two sides should then match up perfectly. A little filler after you have stuck a reinforcing plate on the inside to hold the join together, will disguise the line.

Now heat the plastics, and when it's ready fold it round your former, holding until it has 'set' in position. Take care, as it will still be hot!

BASIC SHAPE

Once you have the basic shape, the assembly of the plastics material into a box follows the procedure already outlined. Finishing is carried out with the sanding block.

You don't have to make

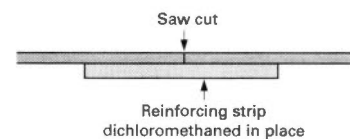


Fig. 10 (see text).

your shapes from scratch, as existing materials in ready-formed shapes can be modified. The beauty of it is that you can tailor things to suit yourself, and the way you

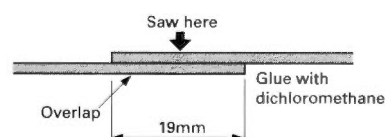


Fig. 11 (see text).

WORKSHOP SPECIAL ARTICLE

use them, rather than having to put up with the commercial compromises.

The limit is your imagination, and what you can scrounge or buy from your local hardware store. Plastics, like radio amateurs, are versatile!

RESULTS WORTHWHILE

Some of you might feel intimidated by the idea of working in plastics. My advice is don't worry, because the results can be very worthwhile. Despite the advantages, I

realise many radio enthusiasts prefer working in metal. So, next time I'll be taking a look at the techniques and workshop methods used with metals.

In the meantime, keep busy. You too can get your radio and other equipment neatly boxed up!

PW

Suppliers for most of the materials mentioned in this article are:

Design Craft & Graphics Ltd.
12 Hanborough Business Park,
Long Hanborough,
Oxford OX7 2AB.
Tel: (0993) 882588.

K & M Ltd.,
1 Wharf Lane,
24a New Wharf Road,
Lowgates, Barlborough,
Stavely, Chesterfield,
Derbyshire S43 4HZ.
Tel: (0246) 477471 or
812872.

More information on
Finigans paints from:
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Tel: (0532) 441100.

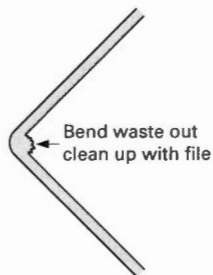


Fig. 12 (see text).

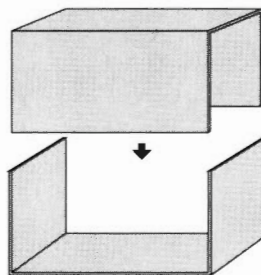


Fig. 13 (see text).

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A K Electronics is a small electronics firm branching out into the supply of workshop equipment. Their major item, at present, is a temperature controlled de-soldering station for less than £300. More information is available from **A K Electronics, 54 Sheldrake Road, Christchurch, Dorset BH23 4BP.**

Cirkit has a 192-page catalogue available through most high street newsagents, which costs £1.70. Somewhat hidden towards the back, is a comprehensive section of test equipment. In this section, oscilloscopes (both mains and battery powered) and signal generators, both audio and r.f. are featured.

There are also two spectrum analyser adapters that work using your 'scope as a display. Just the sort of thing to check out that home-brew rig you're building. **Cirkit Distribution Ltd., Park Lane, Broxbourne, Herts EN10 7NQ. Tel: (0992) 440779 (24h) or FAX (0992) 464457.**

Electromail is the non-trade outlet for RS Components, who are one of the main suppliers to trade and industry. The quality of their catalogue, and of the items they supply reflects this position. The catalogue, in full

colour and three parts, comes out every four months, and costs £6.50.

A charge of £2.95 p&p is a made to every order and VAT also has to be added to the prices shown. All part numbers are the same as those for RS Components, making them easy to get hold of. **Electromail, PO Box 33, Corby, Northants NN17 9EL. Tel: (0536) 204555 or FAX (0536) 405555.**

Greenweld have a 160-page catalogue, costing £2. They can supply security components to make up a system to ensure you keep your workshop and equipment. Included in the comprehensive catalogue are sections on audio, video, graphics, stationery supplies, tools, measuring and test equipment.

Greenweld have no minimum charge, but make a flat charge of £2.75 p&p on all orders sent out by normal post.

The catalogue is free to schools, colleges and trade. Apply to **Greenweld Electronics Ltd., 27 Park Road, Southampton SO1 3TB. Tel: (0703) 236363 or FAX (0703) 236307.**

Henry's Audio Electronics have a colour catalogue with almost 300 pages filled with many items to suit the electronics workshop. Their range of measurement equipment is very comprehensive with eight pages covering meters, including one that can be interfaced to

an IBM PC (or clone). Also included are light-meters, signal generators (at r.f. and audio), oscilloscopes and frequency counters.

The catalogue costs £2.65 plus an A4 s.a.e. (or £4 cash or cheque to cover costs). Free to schools, colleges and industry. **Henry's Audio Electronics, 404 Edgware Road, London W2 1ED. Tel: 071-724 0322 or FAX 071-258 1831.**

Kenwood, the manufacturers of the Kenwood/Trio radio equipment, also make



AK Electronics de-solder station, Model R2100.



Kenwood 40MHz readout oscilloscope, CS-5130.

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For more information contact **Tony Starling, Trio-Kenwood UK Ltd., Kenwood House, Dwight Road, Watford, Herts WD1 8EB. Tel: (0923) 816444 or FAX (0923) 819131.**

Mainline Electronics supply ultrasonic cleaners, as well as the wealth of specialist r.f. electronic components.

Their catalogue is available in the November 1992 issue of *Practical Wireless*, or from **Mainline Electronics, PO Box 235, Leicester LE2 9SH. Tel: (0533) 777648/780891 or FAX (0533) 477551.**

Marco Trading may be seen at many rallies, where their stall is covered in tools of all descriptions. Their catalogue reflects the many lines of stock they carry, and it's full of all sorts of

tools and test equipment. In their Winter Supplement they have a particularly nice 50MHz oscilloscope (Tektronix D755) for just under £300 + carriage.

Other sections cover almost anything that you could want for the workshop. Tools and components, boxes and kits, and semiconductors of all types may be found in the catalogue priced at £2.

Marco Trading, The Maltings, High Street, Wem, Shrewsbury SY4 5EN. Tel: (0939) 32763 or FAX (0939) 32689.

Maplin Electronics has a catalogue to be found in almost every high street newsagents. Several hundred pages are laid out in alphabetical order making it very easy to find items. The sections on test equipment and tools are particularly comprehensive, covering most requirements for the workshop.

The catalogue costs £2.95 at newsagents, or £3.45, including postage, from **Maplin Electronics, PO Box 3, Rayleigh, Essex SS6 8LR. Tel: (0702) 554161 or FAX (0702) 553395.**



Ungar 2110 ESD safe solder station.

The **SAJE Electronics** company have just released a piece of test equipment for the smaller shack or workshop, the MAXCOM MX-9000. Contained in one case are: a triple-output p.s.u., an eight digit 100MHz counter, a function generator covering 0.2Hz to 2MHz, and completing the quartet of equipment, a digital multimeter. This multimeter will read volts and currents on both a.c. and d.c. (max. reading 1999).

We hope to be able to review one of these 'Four-in-ones' in the near future.

More information is available from **SAJE Electronics, 117 Lovell Road, Cambridge CB4 2QW. Tel: (0223) 425440 or FAX (0223) 424711.**

Ungar have designed a new high-tech soldering station, the entry level Ungar 2110. The low-leakage military specification soldering station, has a 60W 24V iron, temperature controllable over the range 300-450°C (±6°).

For more information about the ESD-safe iron, contact **Ungar, Eldon Industries UK Ltd., Clifton Road, Shefford, Beds SG17 5AB. Tel: (0462) 814914 or FAX (0462) 815543.**



SAJE Electronics all-in-one MAXCOM MX-9000.

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10-0090	Stemmed test plug with plastic barrel	0.40 0.30
10-0091	Stemmed test plug with chrome barrel (screwed) barrel	0.30 0.20
11-0416	Plastic insert in test plug	0.30 0.20
11-0417	Plastic insert in test socket	0.30 0.20
11-0418	Miniature shaver test socket	0.40 0.37
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11-0420	Shaver shaver test socket	0.40 0.37

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11-0080	2.5 mm Panel socket with plastic body	0.10 0.12
11-0081	2.5 mm Panel socket with plastic body	0.24 0.19
11-0082	2.5 mm Panel socket with plastic barrel	0.20 0.22

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A TABLE-TOP P

Fig. 1: The bench laid out flat for clarity, viewed from overhead.

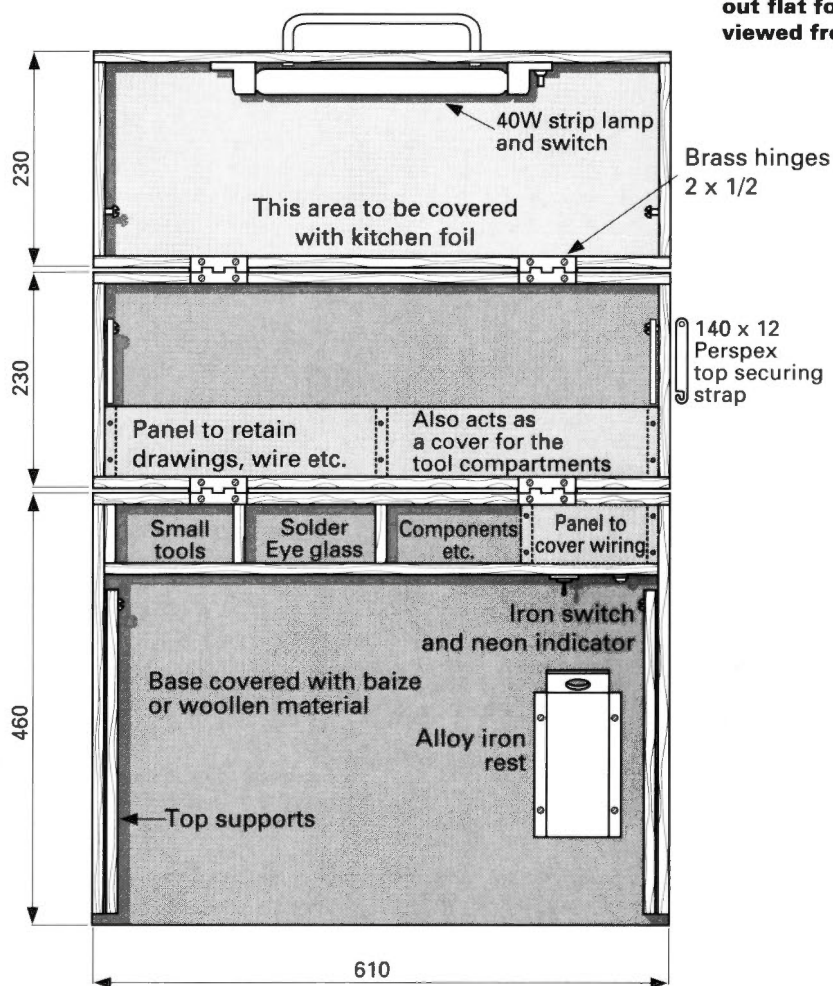
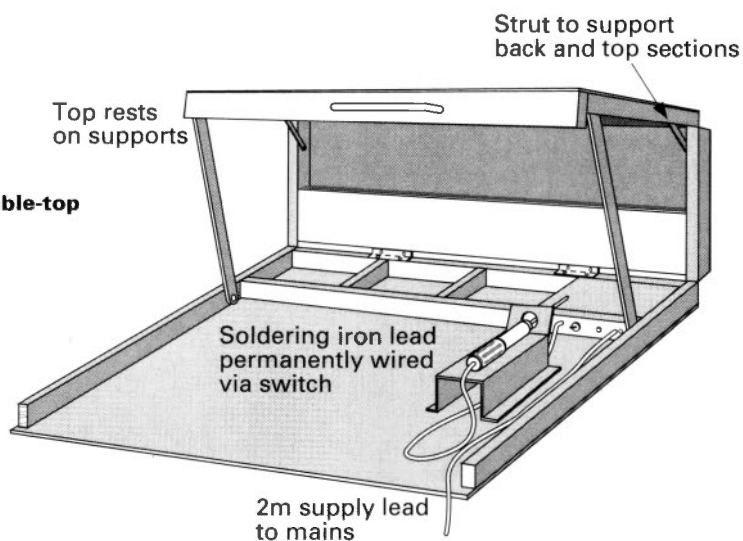


Fig. 2: The completed table-top project bench.



Are you stuck for a place to work? Does your family complain about the damage you're causing to the kitchen table? If you're in this position, Vic Flowers G8QM has a really practical table-top project bench that could help solve the problem.

How Much?
£12 (depending on material to hand)

How Difficult?
Beginner

SHOPPING LIST

Hardwood (for framing) 8m length of 25 x 13mm, suitable plywood or hardboard for small panel measuring 575 x 90mm. Brass hinges (these are still sold in imperial measurements) to suit (price depends very much on quality) 4 x 2 x 1/2 in. Suitable 240V strip lamp and sockets, push-on/off switch, toggle switch, mains neon indicator, Chrome-plated carrying handle.

PROJECT BENCH

If you're one of the many radio enthusiasts who have minimal workshop facilities, you may find my table-top project bench useful. It's a very simple idea, and the complete unit is made up from three sections, each lightly pinned and glued.

Many of my QRP projects have been assembled using this project bench on the living room table. I designed and made it up before attempting the major task of building the Heathkit SW7800 Communicator receiver (which worked first time!).

OPENED OUT

Under good lighting conditions, the unit may be used fully opened out. When the project bench is closed down, the mains lead and the soldering iron (see diagram) are retained inside.

The only other modification I've carried out, is to provide a mains socket. This was done so that I could use a p.s.u. to power 12V d.c. equipment.

REFLECTING SURFACE

It's a good idea to cover the top inside surface of the bench with aluminium kitchen foil.

The foil provides an effective reflective surface, and it can be glued in position and carefully smoothed down.

The hinges used in the bench are mounted so as to be set flush in the wood surface. Although they're more expensive, it's best to use good-quality brass hinges, rather than the cheaper steel types.

The actual wiring-up, and the cable layout of the table-top project bench is up to the individual. Having said that, you may find my approach helpful.

I took the supply to a connecting strip ('choc block' type) in the allocated

compartment. From there, I took the supply to the strip lamp and associated switch using flexible cable which can be secured by sleeving and glueing to the wood surface.

As the project bench folds away after use, I had to make allowances for cable protection. So, to prevent damage to the wiring, I left loops at the points where the sections open or close.

IRON SUPPLY

In my version of the bench, the soldering iron is permanently connected. The iron supply is taken from the connecting strip via a toggle

switch, with a neon lamp connected across the wires to provide indications of whether it's on or off.

Whatever method you're using, you must observe all electrical safety precautions. Don't forget that this means all live connections should be made safely, by using the plastics junction boxes, etc., available at DIY stores.

This useful little bench isn't difficult or expensive to build. Having your own portable work-surface could save you a lot of domestic trouble and strife!

PW

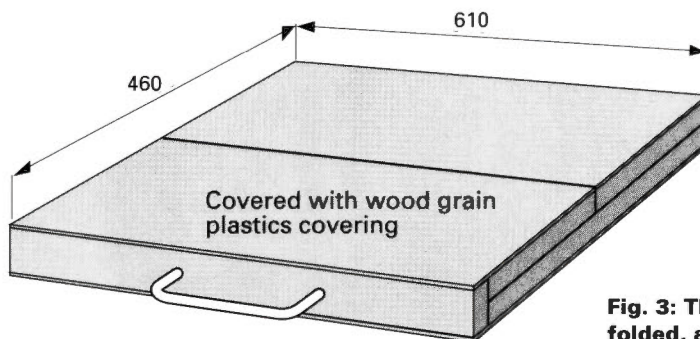


Fig. 3: The project bench folded, and ready for storage.

PW PCB Service

Board	Article (Project) Title	Issue	Price	Board	Article (Project) Title	Issue	Price
WR314	UHF Pre-Amplifier	Dec 92	£Call	WR286	Meon-4 (RF PA)	Jun 91	£5.54
WR313	10MHz Transmitter	Nov 92	£4.65	WR287	Morse (Speedbrush)	May 91	£4.85
WR312	Receive/Mixer (Getting Started)	Nov 92	£4.15	WR255	Meon-4	May 91	£6.76
WR311	Oscillator BFO (Getting Started)	Sept 92	£2.60	WR285	Scope Probe PSU	Apr 91	£4.87
WR310	1.2GHz Pre-scaler	Aug 92	£3.75	WR284	Scope Probe	Apr 91	£5.75
WR309	Volt Reg/Divide by 100	Aug 92	£3.15	WR283	Sudden Receiver	Mar 91	£4.54
WR308	TTL 1MHz Oscillator (Getting Started)	July 92	£2.20	WR282	Repeater Toneburst	Feb 91	£5.10
WR307	Crystal Checker (Getting Started)	June 92	£4.25	WR281	High Voltage PSU	Jan 91	£4.70
SET	WR303/304/305/306	Apr 92	£19.30	SET	WR263/264 +WR276-80	Jul 90	£21.96
WR302	Inductance Bridge				Marland Transmitter	Sep 90	
WR301	GDO (Getting Started)	Apr 92	£4.75	WR272	NiCad Recycler	Jun 90	£7.06
WR300a	Challenger Receiver	Feb 92	£4.75	WR275	Low Voltage Alarm	Jun 90	£6.49
WR300	OSCAMPS Oscillator	Mar 92	£4.75	WR273	Valve PSU	May 90	£7.00
WR300	OSCAMPS Amplifier	Feb 92	£5.20	WR274	RX Attenuator	May 90	£5.84
WR299	Multivibrator (Getting Started)	Jan 92	O/S	WR271	Product Detector	Apr 90	£5.05
WR297/298	Additional Beaver boards		O/S	WR270	Badger Cub	Apr 90	£5.04
SET	WR295/296 PW Beaver	Oct 91	£12.00	WR269	Glynne	Feb 90	£6.83
SET	WR292/293/294 Chatterbox	Aug 91	£14.00	WR268	Inwell (RF PA)	Feb 90	£6.12
SET	WR290/291 Robin Freq. Counter	Aug 91	O/S	WR264	Inwell (Relay)	Feb 90	£5.10
SET	WR292/293/294 Chatterbox	Aug 91	£14.00	WR263	Inwell (VFO)	Jan 90	£6.12
WR289	Meon-4 (Control)	Jul 91	£4.67	WR267	PW 49'er	Jan 90	£6.12
WR288	Morse Master	Jun 91	£4.89	WR266	Tuned Active Antenna	Jan 90	£5.71

The p.c.b.s. for all the latest projects are now available. We have a stock of boards for many other projects produced in the past, but these stocks are subject to variation. Please check price and availability before ordering. Add £1 p&p to orders for one board (or one set of boards) and £2 p&p to orders of two or more p.c.b.s.

You can telephone your order using Access or Mastercard by calling (0202) 665524 at any time. Please allow 28 days for delivery.

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Radio and electronics club members, save money on p.c.b.s when you order through your club. Tell your club secretary to send for details, marking the envelope 'PCB discount information' to our editorial offices.

Please note that this list is only of our more recent p.c.b.s, call the office for more details of boards available back to 1980.

SPERIBOARDS

A recent addition to the kits available from Howes Communications, is the SperiBoard. We asked 'Tex' GITEX, our technical sub-editor, to tell us what he thought of them.

It's been said that there's nothing new in electronics. This may, in many cases, be true, however, there are many cases when innovation is not really required. What is more necessary is that an idea is improved significantly, to make it better than the original.

REGULAR MATRIX

The SperiBoard system from Howes Communications is one of those improved upon ideas. The SperiBoard system is a regular matrix of four-sided lands on a high-quality glass fibre board.

I wonder how many of you have been interested in the 'drawing-pin' system of construction, that Steve Ortmayer G4RAW uses? This idea is the 'Rolls-Royce' version of that system.

No longer do you have to find an unused piece of floorboard. Neither do you need to bend your thumb back at right-angles, pressing the drawing-pin into a wood knot, located in the only place where all the components will reach.

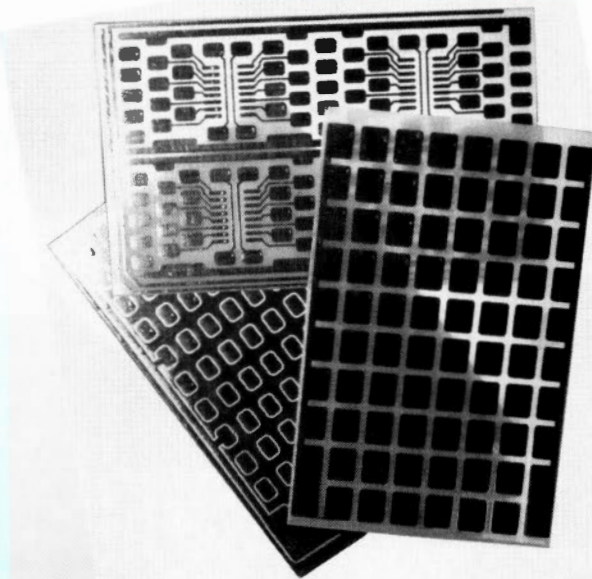
Using an easy-to-see layout method, circuits can be built up quickly and cheaply. The traditional 'bird-nest' method of making up a prototype is a valid one.

Your initial idea can, rapidly, be turned into a working model on the kitchen table. By following the circuit diagram layout, this eases finding those inevitable mis-connections. More to the point, it minimises the chance of actually creating them.

FOUR TYPES

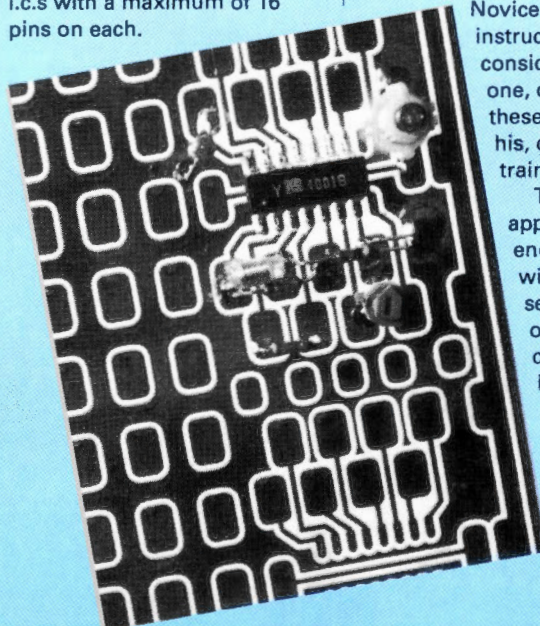
There are four types of SperiBoard available at present. A least one of them will be suitable for the circuit you're building.

All four are based on the Eurocard size of 160x100mm. Two of the boards are etched



clean of copper, other than the lands themselves. The other two have only a narrow channel around each 'island', leaving what could be used as a groundplane available beside each 'island'.

The SperiBoard wins hands down over the drawing-pin method, by having pad shapes available for dual-in-line integrated circuits. One board is dedicated to take up to four i.c.s with a maximum of 16 pins on each.



Another board will take two i.c.s. Again each i.c. may have up to 16 pins. The other half of this board has an area with isolated 'lands'.

EASE OF CONSTRUCTION

Take a look at the photographs on this page, and I'm sure you will immediately see the ease of construction. This idea is such a good one

that I think every Novice Licence instructor should consider using one, or more, of these boards in his, or her, course training.

The boards appear robust enough to withstand several rounds of construction. Even with the inevitable heavy-handed

soldering that goes along with the initial attempts at soldering.

Each board is big enough to build several circuits. Each trainee could build several small related circuits on the board, and could interconnect to become a receiver, Morse oscillator and audio amplifier. This could really fire the enthusiasm of those much needed hobbyists.

My thanks go to C. M. Howes Communications, Eydon, Daventry, Northants NN11 6PT, tel: (0327) 60178 for the opportunity to try out the SperiBoard series.

SperiBoards are available in the following sizes, those marked with a * are shown in the heading shot.

SF01S *

160x100mm, 60 lands (10x6) each 10x12.5mm, with nine-land supply rails along each long side.

SF02S *

160x100mm, 98 lands (7x12 + 14) each 8x5mm, with one supply rail around the board and a common earthplane.

SF03S

160x100mm, one half similar to SF02S, the other half with areas for two i.c.s, with up to 16 pins each, plus associated component pads. This SperiBoard is an amalgam of SF02S and SF04S.

SF04S *

160x100mm, four symmetrical areas, each for one i.c. with up to 16 pins and associated component pads

Each board costs £2.90, inclusive of VAT, or a 'Four Pack' at £9.90, a saving of £1.70. A post and packing charge of £1.20 is made regardless of quantity ordered.

PW

Fig 1: The beginnings of a circuit idea laid out on part of SperiBoard type SF03S (the type not shown in the heading shot).

THE EXPO MINI-DRILL

As PW has a workshop theme this month, Rob Mannion G3XFD has tried out a useful bench accessory in the form of a miniature 12V d.c. drill and stand.

When it comes to p.c.b. working, my favoured method is to use the surface-mount technique. In other words, I don't bother to drill mounting holes, instead I mount the components on the copper foil side of the board.

The main reason why I've adopted the surface-mount method, is that drilling a multitude of component mounting holes is tedious. Mounting the components onto the copper track side means that I don't have to drill those holes.

However, there are times when I can't mount the components onto the same side as the tracks. This is the time when a small drill is a handy tool to have.

A standard-size workshop mains electric drill is helpful, but quite frankly they're too large for p.c.b. work. An old-fashioned hand-drill is okay, providing you've got the energy!

In my case, using a hand-drill with my artificial arm is difficult and tiring. Years ago, I was able to hold the handle in my teeth, while turning the hand-wheel. But with increased dental charges, that's not such a good idea nowadays!

About 20 years ago, I bought an extremely useful 12V d.c. electric drill, made by Low Voltage Motors Ltd. This company, a subsidiary of Lucas, specialised in these little drills, well-made, and complete with a long lasting epicyclic gearbox.

I'm still using my original 'Low Voltage Motors' drill. The small size (about the length of a soft drinks can) makes it ideal for work in the car and other small spaces. I originally bought it for work on a boat and motor-caravan, although I've also used it where other people would use a hand-drill.

TOO LARGE

Despite the fact that it's only about the size of a soft drinks

can, my original 12V drill is too large for p.c.b. work. So, as I'm now doing much more work on p.c.b.s, I decided to look out for a suitable drill and stand for board work in my shack.

Looking through the various catalogues, I spotted the Expo drill and associated stand supplied by Cirkit. After I had explained my needs to Cirkit, the drill and stand soon arrived in my office.

I was in for a surprise, because I'd expected the Expo drill itself to be imported. However, it turned out to be made here in the UK.

As I planned to try the drill out specifically for p.c.b. drilling, I also ordered the associated stand. I'm pleased I did, because the stand proved to be extremely useful.

STAND IDEAL

I've used drill stands before, but never one as small as the version that's available for the Expo drill. It's an ideal size for p.c.b. work.

The pull-down lever action on the drill stand, made the drilling of the p.c.b. mounting holes much easier. Drilling p.c.b. holes is inevitably tedious, but with the stand it

was so easy that I wondered why I hadn't tried one before.

The lever, and the whole mechanism is just right for those small jobs. Although not up to professional precision standards, it's perfectly satisfactory for radio workshop use.

In fact, I think the Expo drill would be ideal for any workshop. I can imagine model-makers and model railway enthusiasts making full use of the drill, and the associated tool kit.

RUNS SMOOTHLY

The drill itself is well-made, and runs smoothly. The miniature chuck that's supplied seems to be of good quality and is also well-finished.

However, after several evenings of use in the shack, I

came to the conclusion that some form of speed control was needed. The drill runs at a very high shaft speed, and I found it was easier to use, when operated by a variable voltage power supply.

In operation, the drill works quite happily between 6 and 12V. When drilling p.c.b.s I found that 9V was about the best setting on the p.s.u.

CONCLUSIONS

My conclusions regarding the drill and stand are that they would be a valuable addition to the workshop of any keen home-brew enthusiast. Personally, I would buy the drill and stand together. This is because I found most of the advantages to be in this useful combination.

If you're aiming to do any constructional work, I think that this little drill would prove to be a great time saver. It also provides a professional-looking finish to p.c.b.s and panels.

My thanks go to Cirkit Distribution Ltd, of Park Lane, Broxbourne, Hertfordshire EN10 7NQ, tel: (0992) 441306 for the opportunity to use the Expo mini-drill and optional stand. They can supply the drill (ref: 54-10150) for £11.58 plus £1.40 p&p. The associated stand (ref: 54-10210) for £24.13 plus £1.40 p&p. The drill and tool-kit are available (ref: 54-10250) for £21.99 plus £1.40 p&p (all prices include VAT).

PW



SPECIFICATIONS

Working voltage	6 to 12V d.c.
Dimensions	75 x 34mm
Chuck	3-jaw pin type
(accepts drills up to 2.3mm)	
Drill stand dimensions	230 x 190 x 79mm
Maximum drill stand clearance	250mm (without bit)
Leverage depth control	30mm maximum

Radio Diary

***November 22:** Bridgend & District ARC will be holding their rally at the Bridgend Recreation Centre, two miles from junction 36 on the M4. Doors open 11am (10.30am for the disabled). Cafeteria open all day, bar opens at 12, entrance fee £1 for adults. Full recreation facilities available for all the family. Further details from **Charles Sedgebeer GW3RVG** on (0656) 860434.

November 19/22: Blenheim PEL's Christmas Computer Shopper Show takes place at Olympia's Grand Hall. The show offers the complete buying solution for home and business. For further details on The Christmas Computer Shopper Show '92, contact **Mav Mann** at Blenheim PEL on 081-742 2828.

November 22: The West Manchester Radio Club's 'Winter Rally' will be held at the Bolton Sports & Exhibition Centre, Silverwell Street, Bolton (town centre). All the usual trade stands, societies, Bring & Buy, etc. All at pavement level. Refreshments available all day & bar. Doors open at 10.30am for disabled & 11am for general public. Admission £1, children free. Further details from **Dave G1100** on (0204) 24104 evenings only.

November 22: The Bishop Auckland Radio & Computer Rally will be held at a new venue, The Spennymoor Leisure Centre, Spennymoor, Co. Durham. There will be catering & bar facilities on site, as well as all the other amenities of a top-class leisure facility, for those members of the family not wishing to partake in the rally. The venue is very easy to find from major routes through the area A1(M). Further details from **Mike G0PRQ** on (0388) 766264.

November 28: The Greater London Amateur Radio & Computer Show will be held at Harrow Leisure Centre, Christchurch Avenue, Harrow, Middlesex. Major suppliers & manufacturers of radio equipment, computers, accessories, antennas, computer software & second-hand gear. Close to Harrow-Wealdstone BR & tube station. Easy access from motorways M1, M4, M25 & the A406 north circular road. Fully signposted by the AA. Ample car parking available. Two bars & cafe serving hot meals & drinks all day. Large Bring & Buy. Easy access for the disabled. Rally information centre on site. Talk-in on S22 & SU22. Doors open from 10.30am until 4.30pm. **CLPK, 18 Litchfield Close, Clacton-on-Sea, Essex CO15 3SZ.**

December 13: Centre of England Christmas Radio, Computer Electronics & Communications Rally will be held at the National Motorcycle Museum, near the NEC, Birmingham, junction 6 M42. Opens 11.30am (11am for disabled visitors). Admission is £1, with a reduction for RAIBC members. Over 60 traders in three large halls, ample parking, bar & restaurant facilities. Concessionary rates for those wishing to visit the museum. Talk-in on S22. Christmas Special - 'spot the cracker', which will be on many of the trade stands to win a free prize. Details from **Frank Martin G4UMF** on (0952) 598173.

1993

January 24: The Lancastrian Rally will be held at the University of Lancaster. Doors open 10.30am for the disabled. Further details from **Sue G10HH** on (0524) 64239.

February 7: South Essex ARS Radio Rally will be held at The Paddocks, Long Road (A130), Canvey Island, Essex. Doors open 10am. Trade stands, Bring & Buy, home-made refreshments, free parking. Parking outside main door for disabled visitors. Talk-in on S22. **Ken Hendry G0BBN** on (0268) 755350.

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. More details from **Jack Pickersgill G0DZG** on 081-265 1718.

***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 2m/70cm. Further details on (0923) 678770.

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. Details from **Mic G7ION** on (0287) 610030.

*** Practical Wireless & Short Wave Magazine in attendance.**



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turns on automatically at preset time and frequency. ★ Large digital frequency display. ★ Fourteen memories - nine memory channels for your favourite station frequencies. Last setting of mode and waveband stored in five memories. ★ Direct press-button access to all 12 shortwave broadcast bands. ★ Two power sources - battery or AC mains adaptor. ★ General coverage of all AM bands in LW/MW/SW

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DIMENSIONS: 29.2cmx16.0cm (11.5inx6.3inx2.36in).

OUTPUT: 1200mW (10%THD) WEIGHT: 1.7kg (3.75lbs) without batteries. Wide/narrow filter switch.

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FROM PERF BOARD TO PROJECT

Angus Ellefsen G3FJO, thought that making his own p.c.b.s was messy, difficult and time consuming. Read how his novel use of pre-drilled boards changed his ideas.

I like making my own p.c.b.s, whether for my own projects, or for those in *PW*. But it was not always so. I used to have many boards with disappointing layouts. That was before I began using matrix board to help in marking up the p.c.b.

With projects from *PW*, or any other published p.c.b.s, all the layout has been done. For my own projects, I prepare layouts on a computer. The computerised process is quite straight-forward and has the advantage that the circuit is drawn from the component side of the board. I can then use the 'mirror' function to show the pattern as seen from the track side. The actual layout can be printed using either a 'normal' dot-matrix printer or a laser printer for better quality.

TRANSFERRING LAYOUTS

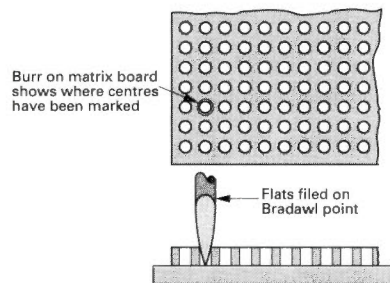
The tedium came when transferring these layouts to the copper clad board. One of the various methods I tried, consisted of scribing a fine 0.1in grid directly onto the copper. This method was far too time consuming, and the results were less than satisfactory.

The idea that I came up with, is so simple that it must have been thought of before. But just in case it hasn't, here it is!

PRE-DRILLED MATRIX

What is it that makes my p.c.b. work so much easier now? The answer is, a piece of 0.1in matrix board (or Veroboard) taped along two

Fig. 2: A sharp pointed bradawl is used to mark through the holes in the matrix board. A burr on the matrix board, around each marked hole signified that it has been marked.



adjoining sides to the p.c.b. I want to mark out. See **Fig. 1** for more details. Matrix board is probably better known as 'perfboard'.

With the matrix board on top, it's very easy to mark off the various pad centres through the holes of the matrix board onto the copper clad board underneath.

To mark the centres, I use a bradawl with its point kept sharp with a file. Don't press too hard with the bradawl, as this can raise a small copper blister, which does not provide a very flat surface for the subsequent application of the dry transfer.

It's also a good plan to file the bradawl point to a square section, as shown in **Fig. 2**. This is done so when you twist it, making your centre marks, a slight burr forms on the top edge of the matrix board. This enables you to see where you have marked before, and prevents you losing your bearings.

When all the centres are marked, take off the binding tape, remove the

matrix board and rub on etch resistant pad transfers. It's quite easy to see the bradawl markings through the clear holes in the centres of the pad stencils. After placing all the pads, draw in the tracks connecting the pads with an etch resist felt-tip pen.

SIMPLE TIP

Another simple tip, picked up during a conversation with a friend, is to use glass fibre boards for etching. The extent to which the etch is proceeding can be easily detected through the dark brown chloride solution. The colour of the copper contrasts well with the light colour of the glass fibre board.

ETCHING DISHES

Cheapness and cleanliness, is brought about by using old polythene ice-cream or margarine containers as etching dishes. Another container, half filled with water, is used to drop my board into when it is etched, so I can examine it carefully.

So don't just sit there saying you don't have the facilities to make your own p.c.b.s. Get on with the job, it really is fun, and much easier and cheaper than you think.

PW

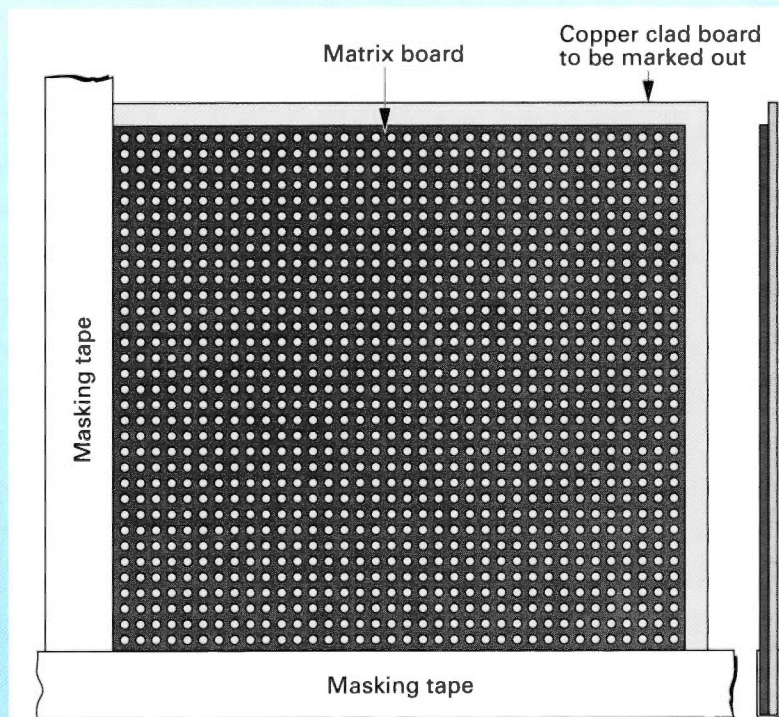


Fig. 1: The matrix board is taped to the copper-clad board as shown here.

A SIMPLE 430MHZ PRE-AMPLIFIER

Mike Rowe G8JVE shows you how to make a simple pre-amplifier to liven up the receive side of your u.h.f. transceiver.

I bought an ex-p.m.r. Pye M296 for conversion to the 430MHz band. While it worked very well on transmit, the receive side was less than brilliant.

This small pre-amplifier is the result of my experiments to bring the receive side of the transceiver up to the same standard.

IMPORTANT FACTORS

One of the most important factors was that the pre-amplifier had to be as small as possible. Although this unit isn't micro-miniature in size, at about 38x25x10mm in size, it fits the space inside the ex-p.m.r. rig quite well.

SIMPLE

You can see how simple the unit is, by looking at the circuit in Fig. 1. The circuit consists of a bipolar transistor operating in common emitter mode.

Both input and output circuits, consist of tapped tuned circuits. This allows the correct impedance matching for the input, output and the transistor.

CONSTRUCTION

To start the construction, the inductance, L2, should be wound first. This item is formed by winding eight turns of 0.25mm enamelled copper wire tightly round the body of R3, a 270Ω resistor. Then comes the fiddley bit. Keeping the winding tight, solder the ends onto the wires of the resistor.

Now you have to make the coils L1 and L3. These two coils are made from two lengths of 0.71mm tinned copper wire. Silver-plated wire would provide a slightly better performance if available.

REMOVE KINKS

Stretch each piece of wire, to remove kinks. Then bend each length, so that it looks like the drawing of L3 in Fig. 3. The 'flat' top is 18mm long, the distance from the groundplane is 4-4.5mm.

On L1, the input tapping is made on the link point. On L3, the output line, the tapping point for the coaxial line is made at the bend point at the 'earthy' end of the loop as

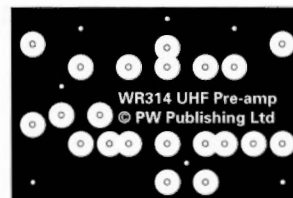
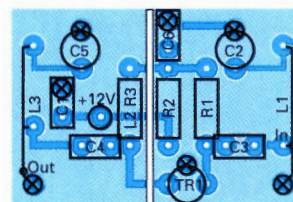
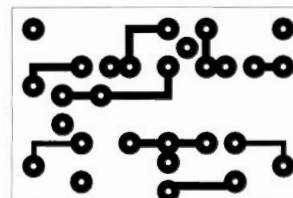


Fig. 2: The track pattern and overlay of the pre-amplifier p.c.b. See Fig. 3 for more details of L1 and L3.



Components shown with a crossed circle at one end are soldered to the earth plane side of the p.c.b. as well as underneath.



shown in Fig. 3.

With the transistor type number on top, bend the legs to fit the p.c.b. and fit the transistor on the board. Carefully solder the emitter (middle) lead to the earth

plane. The transistor should be tight against the p.c.b. Solder and fit the two trimmer capacitors, C2 and C5.

ANTENNA CHANGE-OVER

Now you have to find where to put it! Trace the lead or track that goes from the antenna change-over relay to the receive input stage. The pre-amplifier goes into this line. Break the original circuit, and wire the pre-amplifier input to the change-over relay. The pre-amplifier output goes to the original receive input stage.

Find a source of +12V d.c., preferably available only on receive, and connect the pre-amplifier '+12V' pad to this +12V supply point. The amplifier unit is then ready to be adjusted.

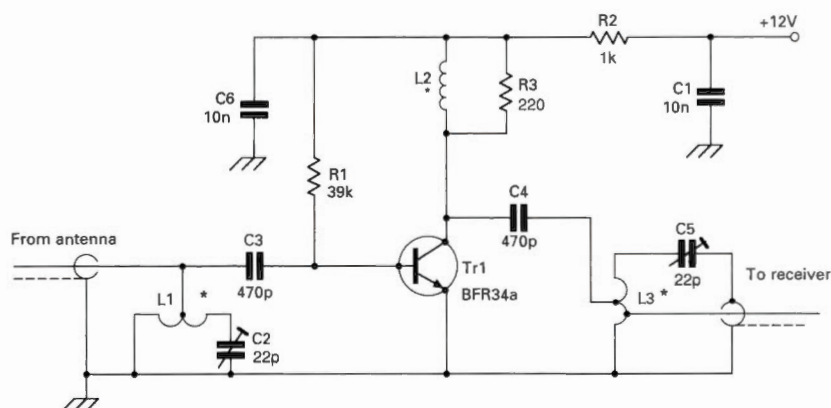
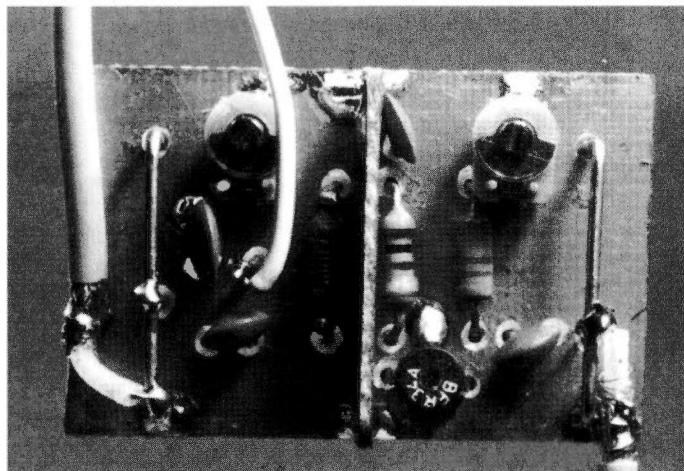


Fig. 1: This simple pre-amplifier could improve the receive side of your ex-p.m.r. u.h.f. transceiver.

WORKSHOP SPECIAL ARTICLE



The author's prototype. Compare this, almost twice size, photograph with the drawing of Fig. 2.

FINAL ADJUSTMENTS

All that now remains to be done is to do the final adjustments on the amplifier for maximum signal gain, and best signal-to-noise ratio. To do this, find a signal that is very noisy. If you find a test point that shows the signal strength, then adjust C2 and C5 to give maximum signal with the best signal-to-noise ratio.

To help achieve best signal-

to-noise ratio, the tapping points on the input and output tuned lines can also be slightly adjusted. Be warned, don't move very far from the points shown in the drawing, impedance changes are very sudden on tuned lines.

PW

SHOPPING LIST

Resistors

Carbon film 5% 0.25W

220Ω	1	R3 (used to form L2)
1kΩ	1	R2
47kΩ	1	R1

Capacitors

Miniature ceramic

470pF	2	C3, 4
10nF	2	C1, C6

Variable foil trimmers

10pF	2	C2, 5
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Semiconductors

BFR34a	1	Tr1 (or BFR90)
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Miscellaneous

Enamelled copper wire, (0.25mm), silvered copper wire (0.71mm), miniature coaxial wire (UR176 or similar), a length of single strand insulated 'hook-up' wire. A board is available from PW PCB Service.

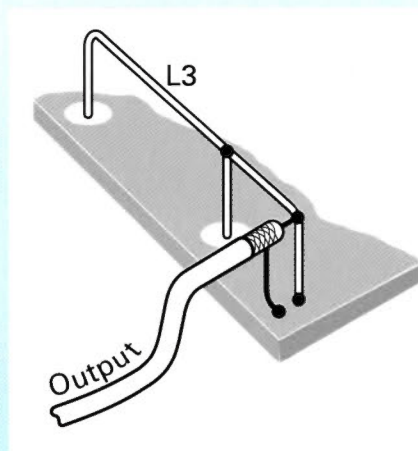


Fig. 3: Detail for bending L1 and L3 (L3 shown here). The tapping point for L1 is above the middle connection. The tapping point on L1 is not the same as the tapping point for L3 shown here.

Special Offer

Learn French With The Linguaphone Visa Cassette Course

The course comprises of a series of audio cassette lessons with accompanying booklets, produced in a delightful, friendly and chatty style. The Linguaphone Visa course is ideal for the whole family, and Rob Mannion G3XFD has tried one out himself. "I found that the Linguaphone Visa French course is ideal to listen to in the car, and it's friendly and informative style using every day situations makes you want to join in. The Visa approach certainly makes learning another language an enjoyable process".

We have a limited number of the Linguaphone Visa French courses for £19.95 including p&p. So, hurry, don't miss the language course bargain of the year. It could be your passport to learning another language!

To: Practical Wireless Special Offer (December)
FREEPOST, Enefco House, The Quay, Poole, Dorset BH15 1PP
Please send me a Linguaphone Visa French Course @ £19.95.

Name

Address

.....Postcode

I enclose cheque/PO (Payable to PW Publishing Ltd) £.....

Charge to my Access/Visa Card the amount of £.....

Card No.

Valid from.....to.....

SignatureTel:.....

I have a friend/wife/children in the shack with me.
 He is a visitor/a short wave listener.
 She is a visitor/a short wave listener.
 He/she intends to sit his radio exam.
 I am at home/at work at a friend's house.
 This is a demonstration/special station/club station.
 I have visited your country.
 I hope to visit your country.
 We had a nice time.
 Excuse my German.
 I wish I could speak your language as well as you speak mine.
 Can we continue in English?
 May I say it in English?
 May I explain it in English?

QSL

Could you please send me your QSL card?
 I would be very pleased to get a QSL card from you.
 I shall send you my QSL card via the bureau/direct.
 My name is in the American/British callbook.
 Is your name and address in the callbook?
 Can you give me your address and telephone number over the air?
 What is your postal code/telephone code?
 This is my address and my telephone number.

Concluding Remarks

May I thank you once more for this call/contact and wish you a very good day/evening/weekend.
 Merry Christmas and a Happy New Year.
 I send you my best regards.
 All the best to you and yours.
 I look forward to working you again.
 May I wish you 73, 55, 88 and make this my final.
 Back from... to... for a final final remarks from you.
 So best wishes and good DX.
 Goodbye until next time/until our next contact

Stating Future Intentions

This is... signing off and clear with... and I am now standing by for a call on this frequency.
 ... now monitoring this frequency and waiting for any call.
 ... now changing frequency to...
 ... now returning to the calling channel.
 ... now going QRT.

Ich habe einen Freund/(female: eine Freundin)/meine Frau/Kinder bei mir im Shack.
 Er ist ein Besucher/ein Kurzwellenhörer
 Sie ist eine Besucherin/eine Kurzwellenhörerin
 Er/sie will Lizenzprüfung machen.
 Ich bin zu Hause/am Arbeitsplatz/bei einem Freund (female: bei einer Freundin).
 Dies ist eine Vorführstation/Sonderstation/Klubstation.
 Ich habe Ihr Land besucht.
 Ich hoffe Ihr Land zu besuchen.
 Wir haben viel Spaß gehabt.
 Entschuldigen Sie mein Deutsch!
 Ich wollte, ich könnte Ihre Sprache so gut sprechen wie Sie meine.
 Können wir englisch weitersprechen?
 Darf ich es auf englisch sagen?
 Darf ich es auf englisch erklären?

Könnten Sie mir bitte eine QSL-Karte schicken?
 Es würde mich freuen, eine QSL-Karte von Ihnen zu bekommen.
 Ich werde meine QSL-Karte über das Büro/direkt schicken.
 Mein Name ist im amerikanischen/englischen Callbook
 (in der amerikanischen/englischen Rufzeichenliste).
 Stehen Ihr Name und Ihre Anschrift in der Rufzeichenliste?
 Könnten Sie mir Ihre Anschrift und Telefonnummer über Funk sagen?
 Wie ist ihre Postleitzahl/Vorwahlnummer?
 Hier sind meine Anschrift und meine Telefonnummer.

Noch einmal besten Dank für diesen Anruf/diese Verbindung (dieses QSD). Ich wünsche Ihnen noch einen schönen Tag/Abend/ein schönes Wochenende.
 Frohe Weihnachten und ein glückliches neues Jahr.
 Herzliche Grüsse.
 Alles Gute an Sie und Ihre Familie.
 Ich hoffe, Sie bald wiederzuhören.
 Ich wünsche Ihnen dreihundsechzig, fünfundfünfzig, achthundachtzig und beschliesse jetzt dieses QSD.
 Zurück von... an... für ein letztes Finale bemerkung en von ihnen variet
 Also alles Gute und gut DX.
 Auf Wiederhören bis zum nächsten Mal/bis zu unserem nächsten Gespräch/ bis zu unserer nächsten Verbindung

(Callsign) verabschiedet sich hiermit von... und geht jetzt auf allgemeinen Empfang auf dieser Frequenz.
 ... wartet auf einen Anruf auf dieser Frequenz.
 ... schaltet jetzt um auf...
 ... geht zu den Anrufkanal zurück.
 ... macht jetzt QRT.

Ich haabe ine-nen froynt (line-ne froyndin)/mine-ne frow/kinder by meer in shak.
 Er ist ine bezoocher/ine koortsvellenher-er.
 Zee ist ine-ne bezoocher/in-ne koortsvellenher-rerin
 Er/zee vill leeetsentsprifoonng mucnen
 Ich bin tsou howse/um arbies-pluts/by ine-nem froynt (by ine-ner froyndin).
 Deeze ist ine-ne forfurstatseon/zonderstatseon/Kloobstatseon.
 Ich haabe eer lunt bezoocht.
 Ich hoffe eer lunt tsou bezoochen.
 Veer haaben feel shpaas gehaabt.
 Enshoolidigen zee mine doysth.
 Ich volve ich kermte eere shpraache zo goot shprechen vee zee mine-ne.
 Kernen veer ainglish vite-ter-shprechen?
 Darf ich es owf ainglish zaagen?
 Darf ich es awf ainglish erklären?

Kernen zee meer bitte ine-ne koo-ess-el-karte shikken?
 Es vürde mich froyen ine-ne koo-ess-el-karte fon eenen tsou bekomen.
 Ich vaide mine-ne koo-ess-el-karte über dus büro/deerecht shikken.
 Mine naame ist im aamerikaanisher/ainglishen callbook
 (in der aamerikaanischen/ainglishen roof-tsiche-en-liste).
 Shaten eer naame oont eere unshrift in der roof-tsiche-en-liste?
 Kernen zee meer eere unshrift oont telephone-noommer über foonk zaagen?
 Vee ist eere post-lite-tsaal/forvaalnoommer?
 Heer zint mine-ne unshrift oont mine-ne telephone-noommer.

Noch ine-maal besten dank für deezen unroof/deeze ferbindoong (deezees koo-ess-ol). Ich wünschne eenen noch ine-nen shermen taak/aabend/ine shermes vochenende.
 Fro-he vine-nachten oont ine glückliches noyes yaar.
 Haartsliche grüsse
 Ulles goote un zee oont eere fameele-e.
 Ich hoffe zee balt veedertsoo-her-en.
 Ich wünschne eenen dry-oont-zeebtsig, fünfundfünftsig, achtoontachtsgig, oont beschleese jett deezees koo-es-o..
 Tsooruk fon... un... für ine leetstes feenaale bemerkungen fon eenen variet.
 Alzo ulles goote oont gwoo day ix.
 Owf veederher-en bis tsoum naichsten maal/bis tsou onzerem naichsten gespraich/ bis tsou onzerer naichsten terbindoong.

(Callsign) fairupshpeedet zich heermi fon... oont gait yetst owf ulgemeine-nen emprung owf deezer frekvents.
 ... variet owf ine-nen unroof owf deezer frekvents.
 ... shaltet yetst oom owf...
 ... gait yetst owf den anroofkanal tsoorük.
 ... macht yetst koo air tay.

Basic QSOs In German

We continue the 'Basic QSOs' as Gareth Roberts GW4JXN presents part two, which deals with further topics in the German language, to help you get more out of that contact!

Weather and Radio Conditions

The temperature is ... degrees centigrade.
Today the weather is fine/sunny/(very) cold/hot misty/windy.
It is raining. It is snowing. The snow is 300mm thick.
Today/yesterday/during the weekend it has been raining/snowing
Winter/spring/summer/autumn has come.
It is/was very windy. There is/was thunder and lightning.
Working conditions are poor/bad/good/very good/excellent.
All the bands are open. The 10, 15, 20, 40, 80 metre band is closed/open to North/Central/South America,
Eastern/Northern/Southern/Western Europe, Asia,
Australasia, Africa, the Far East, Japan.
I have just heard a ...
I can hear but cannot work a ...
There is an opening on 2 metres/70cm.
This lift is getting better/getting worse. Hope it lasts.
Nice to speak to you.
It is ... o'clock approximately here local time.
What time is it in ...

Die Temperatur ist ... Grad Celsius.
Heute ist das Wetter schön/sonnig/(sehr) kalt/heiss/neblig/windig/bewölkt.
Es regnet. Es schneit. Der Schnee ist dreissig Zentimeter tief.
Heute/gestern/am Wochenende hat es geregnet/geschneit.
Der Winter/Frühling/Sommer/Herbst ist gekommen.
Es ist/war sehr windig. Es gibt/gab Gewitter.
Die Bedingungen sind schlecht/gut/sehr gut/ausgezeichnet.
Alle Bänder sind offen. Das zehn/fünfzehn/zwanzig/vierzig/achtzig Meterband ist zu/oben in Richtung
Nord/Mittel/Südamerika. Ost/Nord/Süd/West Europa,
Asien, Australien, Afrika, Fernost, Japan.
Ich habe eben einen ... gehört.
Ich höre einen... aber ich bekomme keinen Kontakt ...
Auf zwei Meter/siebzig Zentimeter sind überreichweiten.
Die Bedingungen werden immer besser/schlechter.
Hoffentlich bleibt es so.
Es freut mich, mit Ihnen zu sprechen.
Es ist hier ungefähr ... Uhr Lokalzeit
Wie spät ist es in ...

Dee temperatuur ist ... graad tselsius.
Hoye ist dus vetter shern/zonnig/(zair) kulf/hise/neblig/windig/beverlkt. Es raignet.
Es shniete. Der shnai ist drise-sig tsentimeter teef.
Hoyte/gestern/um voochenende hat es geraignet/geshniete.
Der vinter/frühling/zomer/harbst ist gekommen.
Es ist/vaar zair vindig. Es geebt/gaab gewitter.
Dee bedingoonen zind slecht/goot/zair goot/owsge-tsiche-net.
Ulle bender zind offen. Das tsain, fünftsain, tswaansig, feertsig, achtsig meterbunt ist too/offen in richtoong
nord/mittel/sudamerika. Ost/nord/süd/vest
oyropa, aazee-en, owstralee-en, aafrikaa, faimost, yaapan.
Ich habe aiben ine-nen ... gehert.
Ich her-re ine-nen... aaba ich bekomme kine-nen kontakt ...
Owf tsay mäter/zeebisig tsentimeter zind über-riche-vite-ten.
Dee bedingoonen vaarden ima bessa/slechtsa.
Hofentlich blibe-t es zo.
Es froyt mich mit eenen tooo shprechen.
Es ist heer oongefair ... oor lokaatste
Vee shpait ist es in ...

Arranging a Sked

May I speak to you again?
Are you free tomorrow/this time next week at ... hrs GMT?
How about this frequency or alternatively let's try the 10, 15, 20, 40, 80 metre band.
No I'm sorry, I am not free at that time.
I am usually on 20 metres at ... UTC on (days of week) except ...
I have to go to bed/to work now.

Darf ich Sie noch mal rufen?
Sind Sie morgen/heute in einer Woche um ... Uhr UTC frei?
Wie wäre es mit dieser Frequenz oder Versuchen wir mal das Zehn, Zwanzig, Vierzig, Achtzig-Meter-Band.
Nein es tut mir leid, ich bin zu der Zeit nicht frei.
Ich bin normalerweise am (days of week) um ... Uhr UTC auf zwanzig Metern ... ausser ...
Ich muss jetzt ins Bett/zur Arbeit gehen.

Darf ich zee noch maal roofen?
Zint see moargen/hoyte in ine-ner voche oom ... oor oo-tay-tsay fry?
Vee vaire es mit deezer frekvents oder faissoochen veer maal das tsain, tsvuntsig, feertsig, achtsig mäterbunt
Nine es toot meer life, ich bin tooo dair tsile nicht fry..
Ich bin normaalerv-se um (days of week) oom oor oo-tay-tsay owf tsvuntsig mätern .. owsser..
Ich moos yetst ins be/tsoor arbite gay-hen.

Technical

I have a new rig/linear/antenna which I am testing.
Is my modulation OK? Your modulation is good/bad.
What is my exact frequency?
I'm using a speech compressor.
Does this make any difference?
Thank you for the test.

Ich probiere ein neues Gerät/einen neuen linear/eine neue Antenne aus
Ist meine Modulation in Ordnung? Ihre Modulation ist gut/schlecht.
Wie ist meine genaue Frequenz?
Ich benutze einen Sprachcompressor.
Hören Sie einen Unterschied?
Danke für den Test.

Ich probeere ine noy-es gerat/ine-nen noyen linear/ine-ne noy-e unterne ows
Ist mine-ne modoolatseeon in ordnoong? Eere modoolatseeon ist goot/slecht.
Vee ist mine-ne genow-e frekvents?
Ich benootse ine-nen spraach-compress-or
Her-ren zee ine-nen oontersheer?
Dunke für dain test.

Social

From the shack I can see mountains/sea/moors.

Vom Shack (von der Funkbude) aus sehe ich das Gebirge/
die See/die Heide.

Fom shak (fon der foonkboode) ows zay-e ich dus gebeerge/
dee zay/dee hide-de.

Getting Started - The Practical Way

This month, the Rev. George Dobbs G3RJV describes the construction of a suitable mixer for the 'Getting Started' direct conversion receiver.

Last month, I provided you with a block diagram of a simple direct conversion receiver. The diagram showed how it was possible to mix two radio frequency (r.f.) signals, to produce an audio frequency (a.f.) signal.

The process I described, known as a mixer, is shown simply in Fig. 1, on page 48 of *PW* November 1992. The mixer is a 'three port' circuit. This is because two signals go in and one comes out.

In fact, more than one signal comes out! But we only require the one that contains the signal information from the station we want to receive.

Mixing Complications

The mixing process may sound like a simple function, but there are a number of complications. For a start, the r.f. input from the antenna contains **all the radio signals** that the antenna picks up. And that means a lot of signals!

Secondly, the v.f.o. signal itself complicates the process. It contains not only the frequency controlled by the tuned circuit, but also harmonics of this frequency.

The v.f.o. can contain a whole host of signals. These may not only be the required products $f_i \pm f_o$, but also f_i and f_o , and other products of the input signals we don't need. Mixing can be a messy business!

Thankfully in this project, we're aiming to keep it simple. Although we're not building one of the best mixer circuits, it will work well enough for the 'Getting Started' receiver.

The mixer circuit of the project shown in Fig. 3 on page 48 in *PW* November 1992, actually contains more than the mixer. It also has the input tuned circuits, and an a.f. pre-amplifier. So, let's consider them in turn.

Input Tuning

The d.c. receiver project uses two stages of input tuning, comprising T1, C1 and T2, C3. The antenna input is linked to T1, using the small coupling

winding on T1 which provides a low impedance input.

It's usual for the antenna signal, in amateur radio equipment, to be at an impedance of approximately 50Ω. The link winding matches the input to roughly this impedance.

The common name for an input circuit of the type we're using at the front-end of this receiver, is a **band-pass filter**. This is because the circuit should allow signals from the required band to pass through to the receiver, and attenuate (or reject) out-of-band signals.

Sometimes, a variable tuned circuit is placed on the input of a receiver. This can provide sharp input tuning, but the user then has to constantly use the tuning control to peak signals as the receiver is moved in frequency.

The circuit used in the 'Getting Started' receiver is one of the simpler band-pass filters. It's made up of the two tuned circuits coupled by a small value capacitor, C2.

The two tuned circuits are said to be 'loosely coupled'. The value of C2 is critical to the function of the filter over the required range.

Dual Gate Device

The mixer is again a very simple option, and it uses a dual gate m.o.s.f.e.t. device. In practice, this transistor, Tr1 is best seen as an f.e.t. type transistor which can accept two inputs.

The device has a source and drain, like a normal f.e.t., but has two gates for inputs. Its operation in this circuit is straightforward.

In our receiver, the radio frequency input from the antenna, after passing through the band-pass filter, appears across R1, which supplies gate 1 (G_1) of the m.o.s.f.e.t.

The v.f.o. input signal is fed to gate 2 (G_2). The mixed output then appears on R4 at the drain of the m.o.s.f.e.t. The other resistors and capacitors associated with Tr1 provide the appropriate levels of biasing and signal decoupling.

Direct Conversion

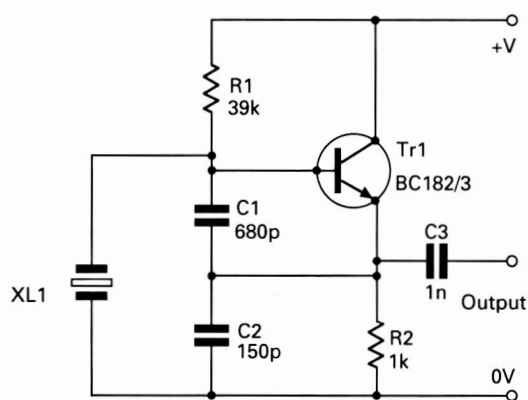
Now, it's time to remember what I was saying about the complications of mixer circuits! It's important to bear in mind, that in direct conversion receivers, all we require from the output of the mixer are the audio frequencies.

Unfortunately, as I've mentioned already, there are a lot of unwanted products generated by the mixing process. To get the best results, only the signals needed should be selected by the appropriate filters.

Fortunately, there are several methods of filtering the output to reduce the level of unwanted r.f. signals which come through the mixer. And, like the other circuit elements in this receiver, the filtering is also very simple.

The filter is made up from C8, R5 and C9, and together they form a rudimentary low-pass filter. In other words, this circuit allows the audio frequencies to pass and the higher frequencies to be attenuated.

Fig. 1: Using a crystal of 3.5795MHz for XL1 gives a very simple signal source, in the 3.5MHz band, suitable for setting up the receiver.



Audio Preamplifier

The a.f. signal produced by the mixing process is coupled via C10, to an audio pre-amplifier stage Tr2. Once again, this is about as simple as a circuit can be in practice.

In the circuit, R7 sets the bias to obtain a high gain, and the amplified audio signal appears on the collector at R8. The capacitor, C11, then couples the amplified signal to the output of the board.

The signal level at this point is still at a low level. It would be unable to drive a loudspeaker or a pair of headphones. Despite the low output, it might be possible to hear the louder signals using a pair of high impedance headphones placed between the output and the circuit 'ground'.

However, it's not a problem because the board is designed to drive an a.f. amplifier which then provides a useful level of output. This amplifier, by the way, is the audio section of the 'Oscamp' published in 'Getting Started' in February 1992.

Building The Board

Last month's Fig. 5, showed the p.c.b. and associated component overlay. This layout could also be used in perf-board construction, although beginners are recommended to use the p.c.b. design.

If the perforated board method is used, extra wiring must be provided. You must add wires under the board to 'ground' the band-pass filter coil screening cans.

With either approach, the construction stage should be straightforward. You'll avoid problems, if you compare your layout with the circuit diagram as work proceeds. This is a good way to keep a 'running check' on the work.

The only slightly difficult part of the mixer board assembly, is aligning the tuned circuits in the band-pass filter. This operation can only really be done when the audio amplifier is added, in the next part of the series.

However, if you have been following 'Getting Started' and want to 'jump the gun' you already have an advantage. The advantage comes about because it's possible to feed the output of the mixer board to the amplifier in the 'Oscamp'.

The 'Oscamp' project as I've already mentioned was described some time ago, in the February issue of *PW*. If you've built this project, you'll only require a short guide to tuning up the receiver band-pass filter.

Connected To Mixer

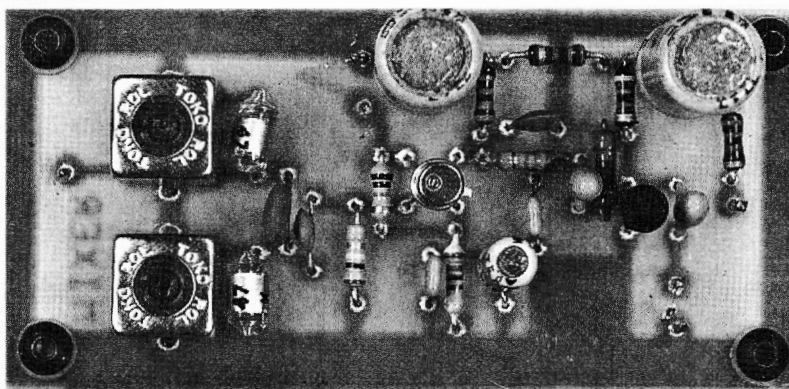
To start the setting-up procedure, the v.f.o. board must be connected to the mixer p.c.b. You'll also need to connect the antenna to the input of the receiver. The best option is an antenna tuned for the 3.5-3.8MHz (80m) band.

In practice, few of us have space for a dipole, or other tuned antenna for this band. Because of this, you'll probably be using a multi-band antenna, or just a length of wire.

You can use a length of wire, matching it to the receiver using a suitable antenna tuner unit. You may recall I described one some time ago (May issue of *PW*) and if you built it, you're another step ahead again.

Signal Source

Perhaps the ideal way to tune the band-pass filter, is to provide a signal source on 3.5MHz. This could be from a dip-meter or perhaps from a signal generator.



The completed mixer p.c.b. for the 'Getting Started' direct conversion receiver.

As a beginner you may not have a dedicated signal generator. Don't despair, because the dip-meter described in the April and May issue of *PW* will provide a useful alternative.

Another alternative is the simple oscillator, used as the basis of the crystal activity checker, published in the June issue of *PW*. The oscillator circuit, Fig. 1, on page 33 of this issue, is very simple and can be built very quickly.

You only need a cheap crystal, and fortunately there are several suitable crystals available cheaply at rallies and shows. However, if necessary you can buy a new 3.5795MHz crystal for around £1 from Cirkit (reference 45-35795) which will provide a suitable reference source.

Finally on this point, you could even tune-up, by using signals on the band (during the evening is best). This simple method is quite practical, and it's one I use if I have tuned up a band-pass filter using a signal generator. I always give it a final 'tweak' with signals on the band I want to use.

The Testing

To start the testing, you should provide the receiver with an signal input. This can be either from the signal source (or the dip-meter) or the antenna.

I usually begin with a frequency somewhere near the middle of the required band. The secret is then to peak the required signal or signals, using the cores.

The process of peaking the signals should then be repeated at the high and low ends of the band. I usually repeat the whole sequence a couple of times, until I'm satisfied with the results.

Well, that's the lot for this month, but you've got more than enough to keep you busy! Next time I'll describe the audio amplifier, show you how to join the boards and put the project in a suitable case.

PW

Errors & Up-dates:

There were several errors in November's 'Getting Started'. The first involved Tr2, (the BC183) in Fig. 3, on page 48, which was inadvertently given the wrong number. Please note that the BC183 (on the right in the diagram) is Tr2, and **not** as shown.

The second error involves the resistor, R7, in the same diagram. The top end of R7 should be connected to the collector of Tr2, and **not** to the 9V supply as shown in the diagram. Please accept my apologies for these errors.

Editor

Mathematics For The RAE

As usual, as I left you some 'homework', I'll start with the answers to last month's questions. There were four questions last time about inductive reactance, and the answers were:

- i) c ii) a
ii) d iv) b

They weren't that bad, were they? I'm sure you had them all right!

Varies With Frequency

Now for this month's topic. We turn our thoughts to the way the reactance (or impedance), in Ohms (Ω), of a capacitor varies with frequency. From last month, you'll remember that the reactance of an inductor goes up when the frequency goes up, but capacitors do just the opposite.

For any capacitor the reactance falls as the frequency rises. In other words, it follows a reciprocal law.

So let me put that mathematically, and give you another little formula to learn (and remember!)

$$X_C = 1/(2\pi fC)$$

This is where X_C is the required capacitive reactance, again in ohms Ω , and π (Pi) is the good old school favourite, I've taken π to be 3.141, and f is the frequency in Hertz (Hz), and C is the capacitance in Farads (F).

General Curve

The general curve for the reactance of a capacitor is shown in Fig. 1. As you will see, it's very different from the inductive reactance curve which was a straight line. For capacitive reactance the curve really is a curve as in Fig. 1. The curve never quite reaches 0Ω (a dead short) at high frequencies.

Look at the point marked 'b' on the drawing of Fig. 1, the line heading off to the right, reaches 0Ω at an infinite frequency.

The other end of the curve marked 'a', disappearing upwards in the drawing, only reaches infinite impedance (open circuit) when the frequency is 0Hz , or d.c.

An Example

I'll put some figures into the formula and give you an example. What is the reactance of a $1\mu\text{F}$ capacitor at a frequency of 1000Hz ?

Let's put in the formula again:

$$X_C = 1/(2\pi fC)$$

and then put the figures into it

$$\begin{aligned} X_C &= 1/(2 \times \pi \times 1000 \times 1\mu\text{F}) \\ &= 1/(2 \times \pi \times 1 \times 10^3 \times 1 \times 10^{-6}) \\ &= 1/(6.282 \times 1 \times 10^{-3}) \\ &= 10^3/6.282 = 159\Omega \end{aligned}$$

Second Example

As a second example, let's work out at which frequency will a 100pF capacitor have a reactance of 50Ω ? So let's start from the formula:

$$X_C = 1/(2\pi fC)$$

We know the reactance along with the capacitance, so how do we work out the frequency? Start by taking ' 2π ' to the other side and the formula becomes:

$$2\pi X_C = 1/(fC)$$

Then we can take over the ' C ' to become:

$$2\pi CX_C = 1/f$$

Now we only need to invert both sides to become:

$$1/(2\pi CX_C) = f$$

When we put the figures into this new formula, it

becomes $1/(2 \times \pi \times 100 \times 10^{-12} \times 50) = f$. We can turn that round at the same time to become:

$$\begin{aligned} f &= 1/(6.282 \times 1 \times 10^{-10} \times 5 \times 10) \\ &= 1/(31.41 \times 10^{-9}) = 10^9/31.41\text{Hz (or } 10^3/31.41\text{MHz).} \end{aligned}$$

This gives an answer of 31.837MHz .

Reactive Direction

If inductive and capacitive reactances are both given in ohms, how do we know which is which? Fortunately there is a convention:

Inductive reactance is considered to be **positive(+)**

Capacitive reactance is considered to be **negative(-)**

This is only a convention, and is to enable combinations of inductance and capacitance to be evaluated. The '+' and '-' signs are used to indicate that inductive reactance has an opposite effect to capacitive reactance. This will become more obvious in the next bit where we look at resonant circuits.

Homework Again

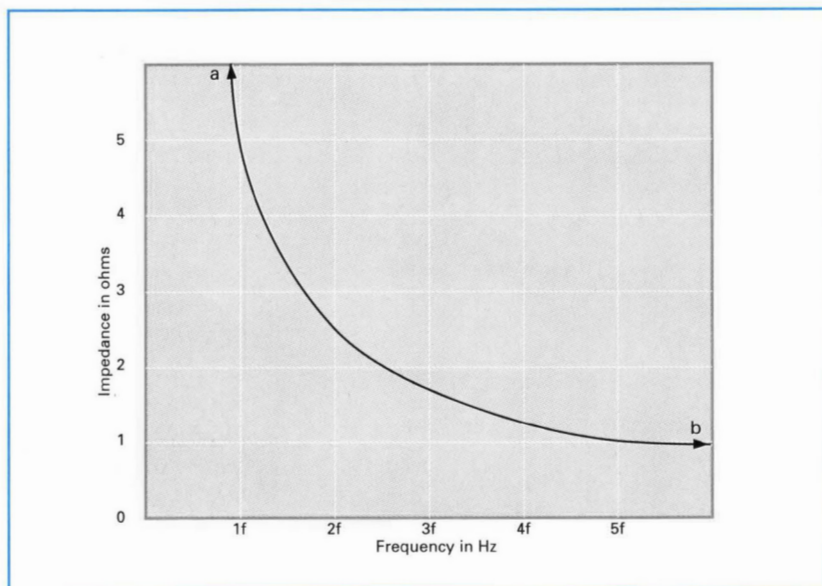
Before I leave you for this month, I'll leave you with a little homework again. Here are four questions to be answered before next time. See you then.

Take π to be 3.141 in all these questions.

- What is the reactance of a 100nF capacitor at 1kHz ?
a) 1.5916Ω b) 159.16Ω
c) $3.184\text{k}\Omega$ d) $1.5916\text{M}\Omega$
- A capacitor of $10\,000\mu\text{F}$ is to be used for smoothing in a p.s.u. What is its reactance at 100Hz ?
a) $159\text{m}\Omega$ b) 62.89Ω
c) 159Ω d) $1.591\text{k}\Omega$
- In an r.f. filter circuit, a capacitor must have a reactance of 150Ω at 28MHz . What capacitance value should it be?
a) 853pF b) 475pF
c) 8.53nF d) 15.6pF
- In a circuit, a capacitor is known to be 330pF , and is found to have a reactance of 55Ω . What frequency is this measurement taken at?
a) 769MHz b) 87.69MHz
c) 876.9kHz d) 8.769kHz

This time, after first giving the answers to last month's inductive reactance questions, Ray Fautley G3ASG, turns to discussing the reactance of capacitors.

Fig 1: This is the generalised impedance curve of a capacitor, when measured with respect to frequency



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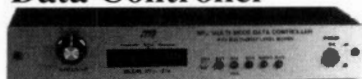


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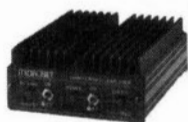
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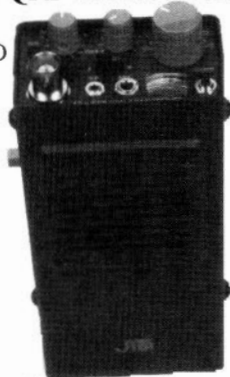
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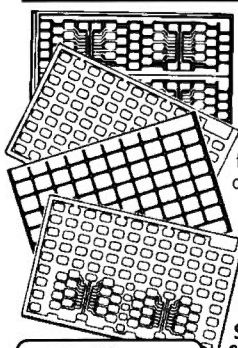
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72 & 73 from Dave G4KQH, Technical Manager.

Back-Scatter

HF Bands

Reports to

Paul Essery GW3KFE

287 Heol-y-Coleg, Vaynor, Newtown, Powys SY16 1RA

It never rains but it pours! To add to the rapid decline in sunspot numbers, this time there have been various flares and similar disruptive manifestations.

The effect in September on the bands has been to remind me of similar disruptive times in earlier cycles, and how things did in due course come back to normal. Hope, they say, springs eternal!

Good And Bad News

Good first. The following have been accepted for DXCC and cards can be submitted at any time: XU0NU and XU1NU operations, 14/21/28MHz ONLY, operation between 6 July 1992 and 6 January 1993; F6BLQ/D2 operation between June 23 and 23 July 1992, again 14/21/28MHz only; C9RJJ from 20 July 20 1992; 7Q7CE from June 4, 1992; ZA/K6ZYF and ZA/G3MHV between June 13 and 13 July 1992.

A second note adds that previously rejected 5R8JD cards for operation from 6 July 1988 may be resubmitted, and that S92IJ (from 10 March 1992) and S21ZA from August 1992.

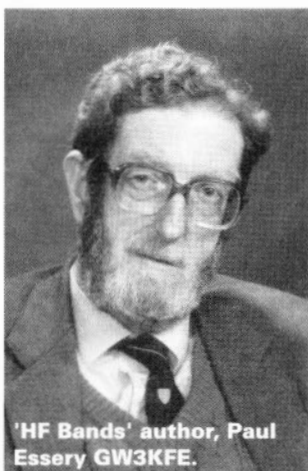
The daughter of Tom VR6TC and Betty Christian has, we hear, now been licensed as VR6RC.

A FAX from G3VLH/C53GV to *DX News Sheet's* G4DY0 and to *The DX Bulletin* says John has been in Accra on business and spoke to the Director of the Ghana Frequency Registration and Control Board. He was told that Ghanaian activity will definitely resume on 15 January 1993.

I may now safely say that the '9G0R' was Ghana Slim! Oh, yes, talking of old Slim, another of his manifestations was the '701ZZ' - neither VE1ZZ or VE7ZZ given as his QSL Managers know nothing about him, so don't waste your money on a card.

Also on the downside, the Secretary of the Pakistan Amateur Radio Society has written to the ARRL, RSGB, DARC and JARL saying that AP/WA2WYR was a pirate. This despite John's document which comprises his own letter endorsed by a member of the Pakistan PTT. John was preparing to leave Pakistan on October 1 with some 15 000 contacts in the log.

At the time of writing I understand the main sponsor for the HA5BUS team has become insolvent, putting the team and the activity in serious difficulties. At the time of writing they are still in Australia but we have no more news.



'HF Bands' author, Paul Essery GW3KFE.

Jim Smith, writing to DXNS, indicated that the proposed Heard Island DX-pedition was coming forward, albeit there is a mountain of work to be done. More news on this one as it comes in. (Late flash - cancelled in favour of an operation from Willis which will be over by the time this reaches you. The reason, essentially, was lack of support.)

The WARC Bands

Let's make a start on the WARC bands, with **Mike GOKDZ** in Thirsk, who mentions S21ZC, 9D0RR, FP/G3TKN, ZL2ACY, ZL3KR, VK2BKH and VK3XU on 10MHz, in between the summer bouts of grass cutting.

The letter from **John 2E0ACN** in Northfield came alas, just one day after the outgoing copy last month had been shipped, but was nonetheless welcome. For the record, if a letter misses the deadline but arrives while I'm putting things together, then, thanks to the modern marvels of the word-processor I can usually take it in.

However, once the piece is complete it is immediately taken to the post; once it gets to Poole it is 'in the mincing machine' and no late news can then be taken in. Anyway, John 2E0ACN built himself an OXO transmitter for the 10MHz band, with a crystal on 10.133, a BC108 and a 2N3866, which he then put in the same box as his 21MHz rig. Just 300mW sufficed on this band, plus a spot of c.w., to raise DL8SBZ, G4YFT - a local - DL3IAF, HB9NE, DK8WF, QZ5AGN, FD1GKT; ALL of these stations were using high power, and all were thinking John had a beam rather than his end-fed wire.

Next we go overseas to Malta, where **Vince 9H1IP** lives at M'Scala. He stuck to sideband and on 24MHz managed FY5FJ, while on 18MHz he

found F6BLQ/D2, 9J2CP, CN8NY and WA2UDT/KP2.

The 'anniversary' issue of *PW* recently brought back many memories for us old-timers, noted **Ted G2HKU** from Minster, Sheppey. Ted tried 10MHz for 4L0FWW, 4K4NN, UA9KCN and UL7VU, while a quick trip to 18MHz with the five watter raised YL2PQ, DL2MDU/CT3, AM8AF, K1VMI, 9D0RR, 5N0ZKJ and AM6ZS. As for 24MHz, Ted doesn't even mention it!

For **Don G3NOF** too, that October offering brought back so many memories; he visited G3BDQ at the seafront QTH and saw the station of the picture, and the pair of them then made G3NOF's first visit to G6QB, who wrote the DX Commentary of those days in the old *Short Wave Magazine*.

Conditions on 18MHz were patchy, but Don made sideband contacts with CN8MC, CN8LG, CN8NS, C01RG, F6BLQ/D2, FM5GD, FR5DX, GD4WBY, HC2RG, J28YC, JAs, KE7IK, KL7XD, OA4BCZ, OD5/SP1MHV, OH0MEP, OH0NLP, UL2I/UA9AT, UM8MCW, UO50ED, R19A, R29A, RN9A, RI8BU, RO4OA, T77C, TI2MEN, TZ6VV, VE7IM, VE7SR, VE7ZT, VP9BBQ, W7LXR, W7ZQ, WA2UDT/KP2, WP4WS, XE3AAF, XX9AW, ZS1ACY, ZS6IR, ZS6YA, 4L1FL, 4L2IA, 9H4CM and 9K2JR. The crop of 24MHz included HC2RG, HP2CWB, J37AJ, KP4CKY, KP4UA, O44CJO, VE1XDX, ZP6CW and 9Y4TP.

The 1.8MHz Band

On the 1.8MHz band, Ted G2HKU mentioned his regular sideband contacts with ON7BW and ON7SF - but Ted seems to have spent more time picking apples in what he describes as the best year ever for this fruit.

Our only other reporter is listener **Gerald Bramwell**, in Manchester, who listens to c.w. from UA4NDF, SM5AHK/6, SM6CPY, DK2PH, Y53UO, LA5SAS, ON7TK, F6CNI, DK2UQ, DL2QL, plus sideband from G3YRO and PA0IJM.

The 28MHz Band

A first report on the 28MHz band comes from **Reg G000F** in Stroud. Reg is somewhat of a 28MHz addict and has a TS830S at a normal output of around 60W into a monoband 3-element beam plus a half-sized G5RV for the other bands.

I was greatly amused by Reg's comment on why he reads the column - 'for savage amusement to

find out what I have missed!' What Reg found included CE6EZ, CP2EN, CX6AT, LU1EMB, PY2EYE, ZP5CF, FY5EM, 3X0HNU, D2FGC, D44BS, FH8CB, J6/F2WT, J5UAI, EL2PP, DL3JFN, G4SNA, IK2OBP, OE5BGN, SP9VOT and 9A3ER; all sideband signals.

The only other reporter on 28MHz this time was Don G3NOF in Yeovil, who mentions Z21AV, 5H3JD and 9J2FR.

The 7MHz Band

Our first port of call on the 7MHz band is with **Eric Masters G0KRT** in Worcester Park, Surrey, who uses a Lake DTR7 low-power rig at around 1W output into an antenna comprising about 26 metres top as originally proposed by W3EDP, but with a quarter-wave counterpoise.

In the two-way QRP line, Eric keyed with GM3MXN, G14PCY, DJ0PJ, DL6PL, FD1PQE and SM6SLC. With stations running higher power, Eric scored with GW0RTP, a couple of other Gs, DL1HQE and a dozen other assorted DLs, EA6ZY, F1JNE and a dozen other F stations, HA6OY, HB9IQP, I1QII, I2IAL, I2QIE, IK2AHB, LY2BN for a band new one, OE6MRD, OH6MMC, ON4GU, ON5RV, OH6MMC, OZ2AGR/P, OZ3EDR/P, OZ9EDR/P, SM4GL, PA0TJJ, UB3JWW, UB5FDM, RB5HAW, SP6DAY and UA4FLB. Just goes to show what a simple antenna, 1W and a direct-conversion receiver can do given skilled handling.

Ted G2HKU mentions keying with ZA1W, UD6DCP, S04CW and 3A/G3XJS/M.

The 3.5MHz Band

Not a lot of news on the 3.5MHz band! I haven't been able to get on the band at all for several weeks, other than for the occasional Sunday-morning natter and no one else has reported. Nonetheless, we do know that the long-distance contacts are being worked, both on sideband and c.w. - its just that no-one tells us!

Our reporter John 2E0ACN however, does give it a whirl but he only managed 2E0AAU and DH7UAA.

The 14MHz Band

As always, the 14MHz band is where the majority of the real DX is worked. Ted G2HKU, despite the problems he has, managed to get on and key with 4L0FWW, 4K4NN, UA9KCN and UL7VU.

The sideband list from Don

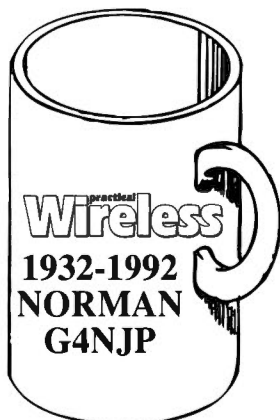
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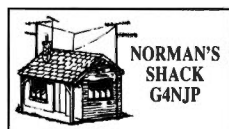
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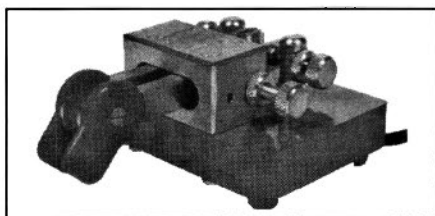
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G3NOF starts with A4XID about whom he has some niggling doubts, OLOHRO/P (IOTA EU-129), HS1HSJ, IBOPi, JWOF, JX9EHA, JY5GO, NU2L/VE8 from IOTA NA 047-174-177), OX3NP, TI4CF, UJ8RA, VQ9WVM, VU2KKO, VU2RMJ, WT20/VE8 (from NA175 and NA176), 4L6HMC, 5H3DC, 9M2ER and 9M8YL.

Silent Key

Christian Loit FY5AN, passed away on September 18, at the age of 60. The accident which killed him occurred directly after his operation in the French DX INFO net.

Christian finished with the net and went out to clear tree branches away from his antennas. Unfortunately he fell some 5m and died immediately. He will be missed.

The 21MHz Band

It is a basic tenet that one should use the highest frequency band which will sustain traffic, and 21MHz has been the one for much of the time.

I'll start with Don G3NOF, who mentions his sideband contacts with A25/W7LN, AP2ZA, D44BS, J28YC, JAs, R3A, TZ6NU, VP8CGK (S. Georgia), VP8CKB (S. Georgia), VP8CLO (Falklands), XX9AW, ZD7DP,

7Q7JL and 9M2ZA.

Dver to Ted G2HKU, who mentions OE1NBW/5B4, YN/SM00IG, 4L1FA, on the big rig, while with low power we find T77C, Y09FHU/VE1, EF8VBV and OD5/SP1MHV.

The only activity from John G3BDQ this time, seems to have been on 21MHz. In between such 'unimportant' matters as holidays...the results on sideband were contacts with 9V1YU, 9V1YJ, DU9GKK, DU1YP, DU1EIB, UJ8JMM,

9M2ZA, 9M2YY, D2EL as pick of the crop, TU2JL, VU2JJQ, 005SK, and an assortment of West Coast Ws.

The place of honour at the end of the piece goes to John 2E0ACN. John took a little time out from music making to find LZ3QE, YU3DEW, HB9KAJ, RB5IID, DA8MCA and IK4PNV with his few milliwatts.

Deadlines

As always, addressed to GW3KFE at the address at the head of the column. To arrive with me mid-month, each month.

Solar Data For July-September 1992

Because of my coverage of v.h.f. history in the last two issues of *PW*, I have much solar data to catch up on. So I start where I left off, at the end of June, with news of M type flares and proton events.

On June 29 and 30th, there were magnetic storms and consequent auroras but these were fairly small events. During the first two weeks of July there was a considerable increase in flare activity and by July 13 the solar flux had reached a level of 176 units. The quiet side of the sun then came into view with the flux dropping to 99 units by July 23.

The geomagnetic activity was very quiet up to July 21, but on the 22nd the A index rose to 33 units and auroral propagation was observed on the v.h.f. bands. The more active side of the sun rotated into view from July 27, with an M1.6/SF flare being reported on August 2 and two flares, an M4.8/1N and a M2.3/1N occurring on August 3.

On August 12 there was an M1/1N flare, a magnetic storm commencement on the 13th and an aurora on the 14th, albeit a small event. Solar activity was then low until August 20, when a number of M flares caused a severe magnetic storm and a number of auroras were

recorded on August 20, 21, 22 and 23. After this period, solar activity dropped to very low levels with the solar flux only averaging 96 units.

Towards the end of August the more active side of the sun again rotated into view, with the geomagnetic activity increasing to sub-storm levels. By September 3, a full storm was in progress. There were numerous sudden ionospheric disturbances (s.i.d.) and short wave fade-outs (s.w.f.) and a number of auroras were recorded on September 2, 3 and 4.

An outbreak of flare activity in which 13 M type flares were recorded started on September 5 and caused auroras on September 9 and 10, the latter being quite intense. Geomagnetic activity then declined, but reached major storm level on September 17 and another aurora effected the v.h.f. bands. The solar flux was quite low during this period sinking to 106 flux units by September 20, only rising to 116 units by September 26.

Forecast

Now I'll take a look at the forecast. Although it is unlikely that F2 propagation on the 50MHz band will be anything like as good as in previous years, it would still be unwise not to check the band for

the occasional opening.

During November and early December, check the 50MHz band, between 1200-1400UTC, for Caribbean and North American DX. If conditions are really good, then this path might stay open through to January.

There is every likelihood that a number of good auroral openings should be observed in the next few months. Don't forget to beam north initially to ascertain there is an event, and then to move the antennas towards more easterly beam-headings to work the real DX!

Auroral Events

A number of openings via auroral mode have been observed since my last report in the September issue of *PW*. Auroral events were recorded in central England on July 22, August 14, 20, 21, 22, 23, September 2, 3, 4, 9, 10 and 17th. There may well have been other minor events, but I am not aware of them.

The opening on September 10 was quite significant with stations in DL, EI, F, G, GI, GM, LA, OH, ON, OZ, PA, SM and YL being worked from the UK on the 144MHz band. Weak signals were first heard by Simon Freeman G3LQR (JO02) around 1430UTC. With the intensity of the event increasing a number of good DX contacts were made, including OH5LK (KP30) at 1530UTC. The event continued for a few more hours with Richard Gardner G4WKN (IO92) finding SM1MUT (JO97), SM5BSZ (JO89) and SM5MIX (JO78) between 1605-1650UTC. Andy Cook G4PIQ

(JO01) caught YL2MB (KO27) at 1656UTC and DK1KO (JO53) at 1953UTC. One interesting station that appeared during this event (and on September 3) was LA0GH/P, operating from a lighthouse in JO37.

Finally, Peter Bates GM4BYF (IO85) reports that he has just received a QSL card from RB5CCO (KN59), confirming an auroral contact made on 1 December 1989 at 2032UTC. The distance? Only 2455km!

Sporadic-E

A few letters have arrived since my last Sp-E report, and the first out of the bag is from Colin Robertson GMOHBK (IO77), who mentions working nine stations on the 144MHz band during an opening on June 20, including EA7, CT1WW (IN61) and ZB0T (IM76). In the 'big one', on June 22, he worked 222 stations between 1738-2056UTC, including 130 x DL, 41 x I, 13 x HB9, 12 x YU, 11 x OE, 8 x F, 4 x HG, 2 x OK and 1 x PA.

Mervyn Rodgers GMOGDL (IO86) was also active during these Sp-E openings, working CT1WW, EA2LU/4 and EB4CXZ on June 20 and 77 stations in DL, F, HB9 and YU on the 22nd.

Andy Napier GM1TBW (IO97) runs 25W into a 19-element Yagi and found this sufficient to work IK1MTZ (JN35), IK2NCJ (JN45), FC1FIH (JN23) and F1HLL (JN26) during an opening on June 7 and 32 x I, 5 x HB9, 2 x F and 1 x DL on June 22.

Alan Mills G0EGX (JO01) didn't think the Sp-E opening on June 22 favoured his location, but he still managed to work 6 x I and 6 x YU. He also heard LZ, IT9 and SV but not for long enough!

Strangely, I didn't receive any reports of openings during July, although at my QTH I did participate in one event on July 5, between 1516-1537UTC, in which I worked IOJX, IOJLK/D, IOUZF, IK0EBA, IK0SMG, IK0USA, IW0CZC, IZFWH, I8KBJ and IT9IPQ/P. According to the DX Cluster, G0ORC worked



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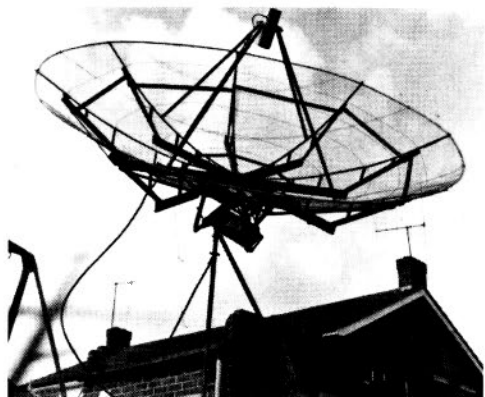
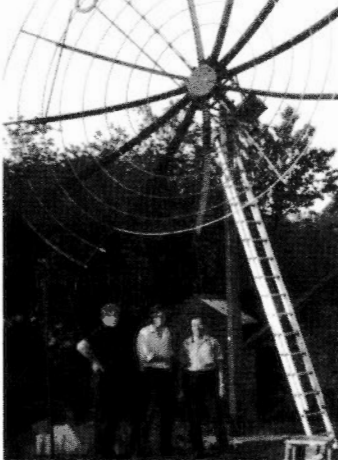


Fig. 1. The 5m dish at the QTH of G3LTF - circa 1963.

Fig. 2. Left to right: G3LQR, G8BGQ and G3WSN helping to construct a polar-mounted dish antenna.



EA6EA at 0835UTC on July 14, but no one else seems to have spotted this opening.

To round off the 1992 Sp-E season, **Silvio Rua IW1AZJ** (JN35) mentions working SP4MPB (K003) on September 13 at 1105UTC, in what was probably the last event of the year. Apparently there were also three openings during the same morning in parts of Germany. Oh well, there's always next year!

Tropo Openings

There were some excellent tropo openings which effected the v.h.f. and u.h.f. bands during the months of August and September. Some even managing to coincide with contests!

One such occurrence was on August 1-2, when stations in GW and western G were able to work many EA and F stations participating in their local 144MHz contest. During the weekend, propagation slowly spread across the UK, enabling stations on the east coast to participate in the opening.

Among the DX stations recorded were EA1BLA, EA1DAV, EA1FCX, EA1FBF/P, EA1FES, EA1RCI/P, EA1TA/P, EA1WZ/P, EA1YV, EB1EFC and EA2AZW. All stations being located in the area IN52, IN53, IN62, IN63, IN73 and IN82.

Conditions were excellent during the period August 14-16, with many operators in central and eastern G working into EA, HB9, I and OK. At the station of G4PIQ, s.s.b. contacts were made with HB9/DB8KJ/P (JN36), HB9JAW (JN47), HB9SAX (JN36), I2FAK (JN45) and I2FHW (JN44). Andy later received a QSL card from I3LLH (JN65) which said he copied G4PIQ for over two hours on the 14th.

The IARU Region 1 contest on September 5-6 was not favoured with good conditions, but nevertheless **Allan Duncan GM4ZUK/P** (I086) managed to work EA1BI (JN12), a very considerable distance on tropo.

An extended tropo opening

fortunately coincided with the second leg of the RSGB 144MHz c.w. cumulatives, being held between 1930-2200UTC on September 16. At my QTH (I081) I made 76 c.w. QSOs (only six with the UK) with much DX, including HB9QQ (JN47), OE2UKL (JN67), OE3JPC (JN77), OK1FPR (J080), OK1KLT (J060), OK1PGS (JN69), OK1UNK (JN69), OK3CQF (JN88), SP6CIK (J081), SP6GVV (J081), SP9EWU (J090) and many German stations in JN48, JN49, JN58 and JN59.

Activity on s.s.b. was also high and UK stations were heard working DX such as OZ1GEH (J065) in the north-east round to HB9STY/P in the south-east. For some, the opening also extended through southern France into the north coast of Spain.

Meteor Showers

The following data, concerning meteor showers during November-December, will help you determine which is the best direction to beam at specific times and when the shower is below the horizon.

The Leonids meteor shower will be encountered between November 13-19, peaking on Tuesday 17th. Between 0100 to 0300UTC beam north or south, 0300 to 0400UTC beam north-east or south-west, 0400 to 0800UTC beam east or west, 0800 to 1100UTC beam south-east or north-west.

The usefulness of the Leonids shower for radio communication purposes is not very good from 1100UTC onwards, and between 1700 to 2300UTC the radiant of the shower is below the horizon, and it therefore cannot be seen from the UK.

The Geminids shower lasts from December 6-15, with the predicted maximum activity occurring on Sunday 13th. Between 2000 to 2200UTC beam north or south, 2200 to 0100UTC beam north-east or south-west, 0100 to 0300UTC beam east or west, 0300 to 0500UTC beam south-east or north-west. The shower radiant is low between 0900 to 1900UTC.

The Ursids shower will occur between December 16-24, peaking on Tuesday 22nd. It's not particularly good in the north-south direction, but to compensate for this all paths from north-east through east to south-east are quite good and are available at all times of the day.

The east-west path is especially good. And the Ursid shower will enable contacts to be made with countries like Poland, Czechoslovakia and Hungary at any time during the 24-hour period.

Moonbounce

In last months column, I described some of the pioneering

moonbounce work carried out on the 430MHz, 1.3GHz and 2.3GHz bands by **Peter Blair G3LTF**. The photograph in **Fig. 1**, taken in 1963, shows the original 5m dish (0.3 f/D) located on a polar mount being used with a linearly polarised feed for the 1296MHz band.

The dish was replaced in 1970 with another of 5m diameter, but of 0.5 f/D ratio and an increase from 8 to 12 ribs. Incidentally, the f/D ratio is the fundamental factor governing the design of a feed for a dish, and it's based upon the diameter of the dish (D) and its focal length (f). The f/D ratio determines the beamwidth of the feed necessary to illuminate the dish efficiently, and for most amateur applications the range 0.5 to 0.75 is generally optimum.

In 1974, G3LTF moved to Harlow, Essex, and the dish was rebuilt as the photograph, **Fig. 2** shows. It was to remain there until 1987, when another move of QTH was made, this time to West Sussex. In West Sussex the dish survived two hurricanes, but had to be dismantled because the local authorities would not grant it planning permission despite being located on a one acre plot surrounded by trees and hedges. According to Peter, the 1989 law specifically forbids all dishes, even below a height of 3m, which is the height you don't need permission for any structure.

ARRL Contest

For those of you with a good single-Yagi tropo system, the ARRL e.m.e. contest provides a unique opportunity to hear, and maybe work, some of the mega-stations active via this mode of communication. Although you may have missed the first leg of the event in October, there is another one being run during the weekend of November 14-15.

The data in **Fig. 3**, gives details of moon rise and moon set times, to enable those of you with fixed Yagis to perhaps hear signals off the moon. I have based the calculations

SATURDAY NOVEMBER 14

UTC	Az	El
0800	268	27
0830	274	23
0900	279	19
0930	285	14
1000	290	10
1030	296	06
1100	301	02

2000	58	00
2030	63	04
2100	69	08
2130	74	12
2200	80	16
2230	86	21
2300	91	25

on central England. With a good antenna system, something like a 16-element Yagi fed with low loss feeder, you should hear a number of stations if you listen very carefully around the bottom 20KHz of the 144 or 430MHz bands. You may not hear stations immediately, because the polarisation of the incoming signal will, in all probability, not be matched up with the polarisation of your antenna.

However, after several minutes, or sometimes hours, it should have rotated, and you may begin to copy weak c.w. signals.

The technical term for the polarisation shift is Faraday rotation, and sometimes you may hear operators saying that "Faraday had locked up". This means that signals were weakened for some time, because of mis-aligned polarisation.

Propagation Experiments

Last month, I described ionospheric time-delay experiments carried out on the 28, 50 and 144MHz bands between **Ray Cracknell ZE2JV** (now G2AHU), SV1DH, ZS6PW and 5B4WR. However, I had not realised that these tests are still continuing today, with **Fred Anderson ZS6PW** in Pretoria transmitting on 28.806MHz and measurements being made at the QTH's of G2AHU, G6JY and SV1DH.

The transmission from ZS6PW carries a pulse train mimicking the Loran C transmission and one second markers. At the QTH of G2AHU, the signals from ZS6PW are picked up on a home-made receiver, and the 10.7MHz i.f. output is fed directly to an oscilloscope.

The 60kHz MSF transmission from Rugby is simultaneously received on a straight receiver with no detector. The resultant 60kHz carrier is fed to a 4528 monostable i.c. which extracts the one second pulses to trigger the oscilloscope. The extracted one second pulses can also be used to generate timing pulses for transmission back to South Africa if necessary.

Allowances have to be made for transmission delays (1ms for every 300km) and for delays through equipment at each end. But, as Ray mentions, it's fascinating to watch

SUNDAY NOVEMBER 15

UTC	Az	El
0830	261	29
0900	267	25
0930	273	20
1000	278	16
1030	284	11
1100	289	07
1130	295	03

2130	66	02
2200	72	06
2230	78	10
2300	83	14
2330	89	19
0000	95	23
0030	101	27

Fig. 3. Moon rise/set times for e.m.e. contest, November 14-15.

variations in time delay (equating to path length and number of hops) as it actually happens.

The great circle distance from ZS6PW to G2AHU is 9187km, which would equate to a time delay of 30.62ms if ground wave were possible. However, as the actual delay is dependent upon the virtual (not the actual) height of reflection and the number of hops taken, this value increases. It increases (for example), to 32.49ms for 3-hops at a virtual height of 400km. I find this area of amateur propagation research really fascinating.

Perhaps other readers might like to try some experiments on the v.h.f. bands. It might be worth noting that the GB3BUX beacons on 50.000MHz and 70.000MHz are both transmitting one second timing pulses (referenced to MSF) specifically for time-delay measurements.

The 70MHz Band

Neil Underwood G4LDR (IO91) is active on the 70MHz band. He uses an Icom IC275E at 144MHz to drive an RN Electronics transverter, giving 25W output into a 5-element Yagi at 17m above ground.

So far this year he has worked five countries, including ZBOT (IM76) at 1840UTC on June 3. The band was obviously in good shape at this time, as the Cyprus beacon 5B4CY (KM64PR) on 70.114MHz was copied 10 minutes earlier peaking 539.

Graham Atkinson G07HEJ (IO74) thinks he might have done quite well in the 70MHz Trophy contest held on September 20. He worked many stations on s.s.b., including G4ADV/P (IO70), G8DDY (IO90), G8PNN (IO95), G07JQI (IO74), GJ7A0G/P (IN89), G44PA/P (IO75), G44DSP/P (IO74), GW3TCU/P (IO82), GW4DGM/P (IO82) and GW6ZMN (IO81).

During the period July-September very little DX was worked on the band from my QTH. The field day contest on July 4-5 produced tropo contacts with GD4UJS/P (IO74), G14TVV/P (IO74), G3W0J/P (IO85), G06EFH/P (IO75) and G06FRT/P (IO86) and on July 7, via Sp-E, with UA2F/DK2ZF (K004) who was working 50MHz/70MHz crossband.

The Perseids shower on August 11 enabled me to work G44IPK (IO99) located on the Shetland Islands. The random (unscheduled) QSO was made on s.s.b. with 37 reports both ways.

A number of other stations were active on the 70MHz band during the Perseids meteor shower. They included E460 in IO43 (QSL via E12CA), E14MTR in IO42 (QSL via E19FK) and GB5YS in IO88 (QSL via G44ZUK).

From Holland **PA2TAB** (JO32GF) passes on the news that he regularly listens to the band and is especially looking for crossband contacts. He is using a PW Meon converter and HB9CV antenna and prefers to operate on 50.185MHz, but can also use 144.185MHz or 28.885MHz if requested. You can contact PA2TAB via packet radio @ P18DAZ.

Russian Operations

A few years ago, nobody could have believed that it would be possible to obtain a permit allowing operation from Russia. But as we now know, dramatic changes took place recently, allowing such opportunities.

Early in 1992, **Rolf Niefind DK2ZF** and **Ulrich Mueller DK4VW**, began making enquiries as to the possibility of operating on the 50MHz band from Kaliningrad (UA2). After several telephone calls to Moscow, they were informed that special permission had been granted to the club station UZ2FWA to carry out tests on that band for a limited period, ending June 1992.

A few weeks later, after the 50MHz permit for UZ2FWA had expired, both DK2ZF and DK4VW obtained permission to operate as UA2F/DK2ZF and UA2F/DK4VW.

Thus was created a unique situation, whereby the only legal 50MHz operation from Kaliningrad was actually being performed by foreign operators!

Their operation, from the UZ2FWA club station, began just after midnight on July 4. Contacts were immediately made with I1KTC, SM7CMV, OZ60L and DK5UG. At 0600UTC they awoke to see, for the first time, the impressive installation at UZ2FWA.

There were five towers with heights up to 40m, with mono-band Yagis and quad antennas for the h.f. bands. There was also a monster 144MHz e.m.e. array consisting of eight DJ9BV 16-element Yagis, each with a boom length of 10m.

The 50MHz rig was switched on again at 0630UTC, and for the whole day the band was full of stations from G, ON, PA, I and 9H. Rolf reports on the very good operation style of the calling UK stations, with not a single British station breaking into a QSO, and remarked that other countries could learn a lot from us!

Many contacts were made that day, but Rolf was particularly pleased to make contact with Emma 2E0AAX up in the novice sub-band. Another good day for Sp-E propagation was on July 7, when contacts were made into DL, G, I, LZ, OE, SV, YO and YU3. At 1000UTC signals from the UK were extremely strong and a number of successful 70MHz-50MHz crossband contacts were made.

During the week-long expedition, the total number of contacts made on the 50MHz band was 665 in 30 countries by UA2F/DK2ZF, and 34 QSOs in six countries by UA2F/DK4VW. In addition, some several hundred QSOs were also made via A013 satellite, Mode B.

Whilst at the club station UZ2FWA, an opportunity was taken to get details of UK stations who

were the first to make contact with Kaliningrad on the 50MHz band. According to the log books these were G2ADR, GD7JQI, G100TC, GJ4ICD, G06FKP, GU1HTY and GW6NLP. If you didn't manage to work UZ2FWA, UA2F/DK2ZF or UA2F/DK4VW this year then don't worry as Rolf and Ulrich are planning to repeat the expedition during the summer of 1993.

Weinheim Convention

During September, I visited one of the largest v.h.f. conventions in Europe, in Weinheim, Germany, organised annually by members of the DLOWH radio club. The really great attraction for me was not the trade show or flea market (which according to some German operators that I spoke to covered a bigger area than that at Friedrichshafen), but the opportunity to meet and socialise with fellow v.h.f., u.h.f. and microwave DXers from all over Europe.

It would be impossible to mention everyone I met (and drank with!) but the list includes DK2ZF, DL5MAE, DJ9BV, EA1BI, EA3ADW, EA3BTZ, EA3UM, F1FLN, G4KUX, G4PIQ, G4VXE, GW4LXO, G8ROU, GW8VHI, GM4IPK, GM4ZUK, HB9MIN, LA8AK, LA80J, LA0BY, OK1MAC, OK2PZW, OK2ZZ, ON4ANT, ON4GG, ON5FF, ON6UG, OZ1DOQ, OZ1GEH, SM6AFH, SM6CMU, SM6FSK, UA2FAW, ZBOT and ZBOW. A truly international group of DXers!

Next year's meeting, the 38th incidentally, will be held between 18-19 September 1993 and if you want further information about the venue and other details I can provide this if you send me an A4 size s.a.e.

Auroral Indicator

Since the World Communications Year in 1983 the beacon **DK0WCY** (JO44VQ) on 10.144MHz has been serving as an auroral indicator. When this type of propagation is observed in northern Germany, the beacon can be remotely controlled by a number of amateurs to send a corresponding message.

As an addition to the service, solar data and a propagation forecast has recently been added. This is obtained from the Deutsche Bundespost Research Institute in Darmstadt and transferred automatically by telephone into the computer at DK0WCY, and subsequently transmitted via c.w. every 10 minutes. I can provide further details of this beacon and the transmission format on request.

During the next aurora keep a look out for SK4MPI (JP70NJ) on 144.960MHz. The direction of the antennas were altered on September 6, one beaming at 050° and the other at 310°, each system running 800W e.r.p. It has already

been heard at good strength in south-east England during auroral events on September 10 and 17th.

Jussi Liukkonen OH5LK passes on the news that the following Finnish beacons became operational during August from Pirttikoski (KP360I), OH9TEN on 28.267MHz, OH9SIX on 50.067MHz, OH9VHF on 144.945MHz, OH9UHF on 432.945MHz and OH9SHF on 1296.945MHz. Any reception reports should be sent to RATS, P.O. Box 88, SF-02151 Espoo, Finland.

At the Weinheim v.h.f. meeting, the French v.h.f. manager **Michell Rousselet FE1FLN**, informed me that the beacon FE6BPB (JO10), currently testing on 144.858MHz, will soon change its call sign to FX2VHF. Incidentally, many operators have been reporting the location of this beacon as Balise. This is not the case, balise actually means beacon!

QRZ Contest!

A 144MHz fixed station contest, organised by the RSGB v.h.f. contests committee, will be held on Sunday December 6, between 0900-1700UTC. This popular contest always generates a great deal of activity and may be the last chance during 1992 to pick up those rare counties for the tables. Although aimed at the single operator, fixed station, the contest also features a section for radio societies affiliated to the RSGB. Teams, of up to five members can participate. Stations exchange RST, serial number and locator.

The RSGB 430MHz cumulative contests have been arranged to run on November 13, 30th and December 15, between 2030-2300UTC. Microwave cumulatives, for the 1.3 and 2.3GHz bands, will be held on November 19 and December 7, also between 2030-2300UTC.

Finally, don't forget the Scandinavian activity contests which are held between 1800-2200UTC on the following dates, 50MHz on November 24 and December 22, 144MHz on December 1, 430MHz on December 8, Microwaves on November 17 and December 15. A full set of rules can be obtained from myself on receipt of an s.a.e.

Deadlines

Don't forget the deadlines! As usual please send your letters to reach me by the end of the month at the very latest as I normally write up the column around this time. 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.

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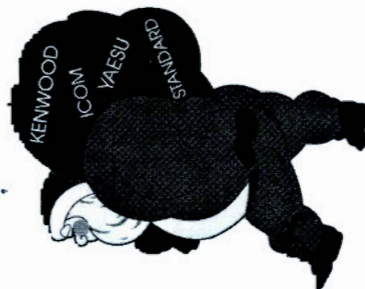
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Back-Scatter

Broadcast Round-up

Reports to Peter Shore via the PW Editorial Office

The biggest story of the month concerns a small European country with two official languages: Belgium. The country is made up of a French speaking community and a Flemish speaking community, and the two lead quite separate lives in many respects.

Broadcasting is also divided into two, with Radio-Television Belge de la Communauté Française serving the French speaking population and Belgische Radio en Televisie (BRTN) serving the larger Flemish speaking populous.

Earlier this year, RTBF stopped, rather abruptly, its overseas broadcasting operation because of financial difficulties. But international broadcasting continued from Belgium through BRT International with programmes in six languages including English.

But BRT International felt that it needed a new direction, and so at 1000GMT on Saturday September 26, relaunched itself as Radio Vlaanderen International. An enormous party was held at the Wavre transmitting station about 20km outside Brussels.

More than 500 listeners, BRTN staff and guests from around Europe watched the first transmission of the renamed station from a special studio in the antenna field. The station has a new call sign, jingles and interval signal and an attractive new logo. But it is now concentrating its main broadcasting effort in two areas: serving the expatriate Flemish speaking community overseas, and offering a high quality signal to Europe, in particular to Belgium itself, to serve the large international community in the country.

Programmes remain much the same: a complete list of the English service appears in European news later in this column. But the station hopes to inaugurate a low-powered v.h.f.-f.m. transmitter in Brussels later this year to complement the medium wave transmitter on 1.512MHz.

It struggles on with antiquated equipment at its Wavre transmitting station, around 20km outside Brussels. One of the short wave transmitters dates back to 1952 and the antennas include elderly curtain antennas and desperately inefficient rhombic antennas. But the 250kW transmitter at Wavre, running at just 100kW for the first nine months of this year, is now operating at full power again.

Albania is in discussion with a number of international broadcasters to earn hard currency by hiring out its transmission facilities. The first station to successfully sign an agreement is religious broadcaster Trans World Radio.

A two year contract will allow broadcasts on the powerful medium wave transmitter on 1.395MHz for up to three hours a day. The transmissions are heard daily at 2130, and started at the beginning of October.

The BBC World Service, celebrating its 60th anniversary this December, has broken new ground. It will be using transmitters in the former Soviet Union to broadcast programmes in to the Indian sub continent and to China.

Transmitters in Russia at Vladivostok, Irkutsk or Khabarovsk in the Far East and Tschita will be used. A site at Tashkent in Uzbekistan will also beam BBC programmes.

Radio Netherlands has also reported that it is negotiating with the Russian authorities to hire time to transmit its programmes to South and South East Asia.

Radio Norway International may lose its English service next year. The half-hour programmes heard at weekends only are presently funded by the Norwegian foreign ministry, but it has indicated its intention to withdraw support in 1993.

The Norwegian Broadcasting Corporation, NRK, says it will not pay for the service, as its mandate is to provide Norwegian language programmes to Norwegians at home and abroad. It is unclear whether there will be a stay of execution.

Broadcasts from the Democratic Voice of Burma continue over the Norwegian transmitters at Kvitsoey. The station's transmissions now last for 55 minutes and are noted on 17.84MHz. The station is reported to be jammed in Burma.

The South African Broadcasting Corporation is launching a pan-African television service due to be on the air from October, called Channel Africa. It will be in English and French with half-hour broadcasts and will not be encrypted. At the same time, Radio RSA changes its name to Channel Africa.

Will there be a new US international radio service? A Congressional Committee has recommended establishing Radio Free Asia, along the lines of Radios Liberty and Free Europe. It cites the success of those stations in helping to hasten the end of communism in the former Soviet empire.

Radio Free Asia programmes would act as surrogate broadcasting to the closed societies of Asia (China and Burma, for example), with news, music and entertainment. The committee's decision was not unanimous: some members suggested that US foreign policy

would be better served by concentrating resources in the Voice of America instead.

The problems surrounding the proposed VoA/RFE/RL relay station in Israel's Arava Desert continue. Environmentalists still protest that the r.f. signals will interfere with birds whose migratory routes overfly the site, whilst the government seems keen to go on with the scheme. But now the VOA has reportedly signed an agreement with the Kuwaiti government for the construction of a new relay station in the Emirate. The agreement, which will last 20 years, allows up to 11 medium wave and short wave transmitters to be constructed.

European Stations

All times GMT (=UTC)

Radio Vlaanderen International's English language schedule for the winter period:

0730-0800 on 11.695, 9.905, 5.91 & 1.512MHz
1000-1030 on 9.905, 5.91 & 1.512MHz (not Sundays)
1230-1300 on 21.81 (Sundays only)
1400-1430 on 17.55 & 1.512MHz
1900-1930 on 15.54, 5.91 & 1.512MHz
2200-2230 on 9.905, 5.91, & 1.512MHz
0030-0100 on 13.655 & 9.93MHz

Radio World presented by Frans Vossen is heard on Saturday each week.

A sudden visitor to the short wave bands during September was Radio Bosnia-Herzegovina Studio Sarajevo, noted at around 1300 on 7.240MHz u.s.b. There was considerable drift on the transmitter, with the signal ending up on around 7.238 by fade out noted at about 1800.

Radio Netherlands daytime transmission in English to Europe expanded with the start of the winter schedule at the end of September. It is now on daily at 1130 to 1325 on 5.955MHz. The communications

programme *Media Network* on Thursdays is now heard at 1151.

Radio Ukraine International has English:

0000-0100 on 15.57, 15.355, 12.06, 12.04, 12.0, 11.79, 11.52, 10.344(u.s.b.), 9.64, 7.25 & 7.195MHz
2100-2200 on 15.57, 15.135, 12.0, 9.865, 9.60, 7.25 & 5.96MHz

African And Middle Eastern Stations

Channel Africa from Johannesburg has English to Africa:

0200-0300 on 9.73MHz
0300-0400 on 9.73 & 3.995MHz
0400-0500 on 15.22 & 3.995MHz
0500-0600 on 15.22MHz
0600-0700 on 15.22MHz
1000-1200 on 11.90MHz
1600-1800 on 11.885 & 9.565MHz

The Voice of Turkey in English operates:

0300-0400 on 9.445MHz
1230-1300 on 9.675MHz
2000-2100 on 9.445MHz
2200-2300 on 11.895, 9.445 & 7.185MHz

Asian Pacific And American Stations

Radio Australia's transmissions are often audible in Europe. At peak listening times, the schedule is:

0730-0830 on 21.59, 21.525, 17.75, 17.63, 15.24, 11.88 & 11.72MHz
0830-1000 on 25.75, 21.59, 17.75, 17.63, 9.58 & 9.56MHz
1800-1900 on 11.91, 11.88, 9.58, 7.26 & 7.24MHz
1900-2100 on 11.91, 11.88, 11.855, 11.72, 9.58, 7.26 & 7.24MHz
2100-2300 on 13.705, 11.88, 11.855, 11.72, 9.58, 9.54 & 9.51MHz

The WJCR station is a religious broadcaster based in Kentucky, USA. It operates 24 hours-a-day on 7.49 and 7.465MHz.



Transmitter hall at BRTS Wavre site. Two short wave transmitters shown.

Publications News

Just as this column was about to leave the computer and head for Poole, the 1993 edition of *Passport to World Band Radio* arrived on my desk. It describes itself as the "world's No. 1 selling short wave guide" but is nonetheless priced at a not inconsiderable US\$16.95 (£14.50 from the PW/SWM book service). With 416 pages, the book does offer value for money.

An editorial section runs for a little under two thirds of the book, with a comprehensive section of 51 pages listing almost every single 'world band' receiver, from the cheapest to the most expensive semi-professional, with star ratings awarded according to ease of operation, performance, price and

Back-Scatter

features. The results seem to concur with those which appear in test reviews in PW's sister publication, *Short Wave Magazine*.

There is also a large section which looks at world time clocks and an hour-by-hour guide to what's on the short wave bands. Profiles of the world's leading broadcasters are included and there is a guide on how to receive news wire services and FAX services from around the world. Frequency information is similarly comprehensive, with every frequency used by a broadcast station between 2.30 and 25.94MHz

included. Contact addresses, telephone numbers and FAX numbers for just about every station heard on short wave is included, with key personnel listed in some instances. This is an absolute boon for anyone wanting to write to, or to do business with, stations.

Overall, *Passport to World Band Radio* is an excellent and reliable publication, albeit written from a rather too American angle in some cases. A good buy, and perhaps it's worth alternating between *Passport* and the *World Radio TV Handbook* annually.



Radio Vlaanderen International sticker.

With *Practical Wireless* recently celebrating its Diamond Jubilee, I thought it would be good if we could find some ATV activity back in those far-off days of the early 1930s.

Of course it is very difficult to say categorically who the first ATVer was. Indeed if you take Marconi to be the first radio amateur, then perhaps Baird deserves the title of first amateur television experimenter. However, although the work of Baird (and his assistants) was experimental, it was certainly not connected with the amateur radio hobby, so that rules out Baird.

All the same, during the era of mechanical TV and televisors, several amateurs did get involved. Indeed there is one fast-scan ATVer in the USA, who claims continuous involvement in amateur television of one kind or another since those early days.

His name is Mel Dunbrack W1BHD, and he says he has been "fooling around with television reception and transmission since 1923". Mel is still active on ATV, FAX and the h.f. bands, as well as being a member of AMSAT, having watched the Russian *Sputnik* fly over the USA. So unless there are any claims to the contrary, we'll name him as the world's first ATVer.

First ATV Activity

The first ATV activity we can date was in 1927, when vision signals were transmitted across the Atlantic by the British amateur Ben Clapp 2KZ. No pictures were seen in New York, as no TV receiver was available - shame!

Success came the following February with the world's first transatlantic television transmission of live pictures. They were sent from amateur radio station G2KZ at Warwick Road, Coulsdon, and received by Robert Hart W2CVJ and Ben Clapp G2KZ in New York.

In March of the same year, live TV pictures sent by the Baird

FOCAL POINT The World of ATV

How old is amateur television? Probably older than most readers would think, though Andy Emmerson G8PTH had to do some investigation himself to be certain.

laboratories in London were received on *SS Berengaria* in mid-ocean. Video recordings of them were made on a gramophone record by W2EB and W2BUO in the United States.

Move Forward

We now move forward to the year 1932 and to Australia. Amateur station VK2KI transmitted 30-line pictures on 136m; this was a project of the Waverley Radio Club.

In January 1934, G2AO of Eastbourne was transmitting 30-line TV on 160m. Ray G2KU himself received amateur TV signals on 40m on July 15 and 22 at 2200hrs, but could not get a picture.

December of the same year saw 30 and 60-line transmissions being made by Harold Bailey G2UF of Denton, Manchester, on 10m. He was in fact the first person to transmit TV on 10m, and did a lot to publicise television: he published a sixpenny booklet popularising the subject and held public demonstrations in Blackpool and elsewhere.

It is G2UF too, who was the person behind a note in *Wireless World* (3 April 1936) entitled 'Amateur Television in Yorkshire'. The text is one tantalising sentence and reads "The Yorkshire Television Association is applying for a licence to erect an ultra-short wave station at Gilderstone, near Leeds, for television experiments." What became of this I have no idea,

although I suspect not a lot, otherwise it would have been mentioned in the magazines of the time. We do know that Bailey was president of the Yorkshire Television Association (and that Logie Baird was vice-president).

A short paragraph entitled 'Amateur Television' appears in the January 1939 edition of *Television and Short Wave World*, and reads as follows:

"Some American amateurs have recently installed a fairly high definition television transmitter which they are operating on a frequency of 57 megacycles. Members of their society have built their own receivers with miniature tubes, and considering the difficulties, results, it is stated, are quite satisfactory. British amateurs are limited as to the amount of work they can undertake, for television licences are difficult to obtain with transmissions restricted to a frequency of approximately 29 megacycles, while only one picture per day can be transmitted".

In fact, amateur television had been specifically permitted since January 1935 by the Postmaster-General (and on bands up to 56MHz), but I have never seen any evidence of ATV transmissions being made in the later 1930s.

There were some non-broadcast television transmissions by the Baird company with experiments from Crystal Palace and some airborne surveillance trials. These have been described by Ray Herbert G2KU, who was present on those flights.

Back To The USA

The story now moves back to the USA and to the New York World's Fair of 1939. Dave Ingram writes in his book *Video Electronics Technology* that ATV was demonstrated in the amateur station there. "The managing director of W2USA, Art Lynch W2DKJ (now W4DKJ), after seeing a successful demonstration of amateur television equipment at a radio show in Chicago in June, was convinced that television communications should be added to the station at W2USA, "the most visited amateur radio station in the world".

Since the World's Fair was scheduled to close at the end of October, time was short. But Art lined up the necessary talent, and with some help from industry, the group built two complete television systems in an effort to establish the first two-way television contact.

"Their goal was accomplished on September 27, 1940 when amateurs at W2USA and W2DKJ/2 at the *New York Daily News* building in Manhattan began exchanging fair quality television pictures on the amateur 112MHz band. Accompanying sound was transmitted on 56MHz. Distance between the two stations was about eight miles.

"The television equipment at each end of the circuit consisted of a camera-modulator unit, a receiver and a transmitter which were duplicates of equipment described earlier in *QST*. The system used 30Hz vertical scanning, 3600Hz horizontal scanning and a 120-line raster.

Considering that the pictures were viewed on a CRT with a P1 phosphor, the results were quite gratifying. Each station boasted the very latest in electronic equipment, including electro-magnetically deflected cathode ray tubes, free-running sweep tubes synchronised by external pulses, and iconoscope camera tubes.

The equipment was donated by

RCA, National, Hallicrafters, Hammarlund, Thordarson and Kenyon. The station at W2USA used a single 1kW lamp for subject illumination, while W2DKJ/2 had a battery of smaller lights with reflectors.

"A number of amateurs in the vicinity of New York were working on their own television receivers. On October 15 W2ADE put on a demonstration of members of the Northern Nassau Radio Association by receiving TV signals from the 20W station at W2DKJ/2, 17 miles away. The range was increased to 29 miles on October 19 when good quality TV signals were received at W3FRE in Denville, New Jersey."

Pre-War Amateur Operation

Another description of pre-war amateur operation in the USA is to be found in the December 1942 issue of *Electronics* magazine. Here Robert Mautner and Frank Somers (calls not given) describe their extremely professional camera, monitor, sync pulse generator and transmitter. This equipment, they say, was constructed just before the war and was used successfully in the 114MHz band for several months.

The comprehensive list of references also mentions a couple of articles on ATV in the May and July 1940 issues of *QST*. All these

FOCAL The World of ATV POINT



'Focal Point' author, Andy Emmerson G8PTH.

transmissions were on the RMA standard of 441 lines, with 60Hz vertical frequency.

The war put paid to further ATV

development and the next mention of this subject occurs in 1948, in the British magazine *Mechanics*. The October 15 issue devoted its centre

spread to an Australian amateur, VK3LN, who had built his own television camera and receiver. The system's line standard is not mentioned, but the illustrated article stated that he proposed to transmit speech on 144 megacycles and that clear vision reception was expected within line-of-sight.

Onto The Year 1950

We move on to the year 1950, when W2LNP in the USA published a three-part article in *Radio and Television News* describing his home TV station. This conformed to the very same standards used by American ATVers, namely 525 lines, 60 fields, audio subcarrier and transmitted on the 420-450MHz band. The article is extremely progressive for its time and set the scene for all subsequent development.

From now on amateur television activity generally conformed to broadcast standards, allowing the use of domestic TV sets for reception. The British Amateur Television Club was formed in 1949, and a whole new era of ATV began. Its story will be recounted on a later occasion.

Inevitably this article has been only a brief summary, and I hope to give the subject a fuller treatment in future. I would like to acknowledge the assistance of Ray Herbert G2KU with the research for this article.

DEWSBURY



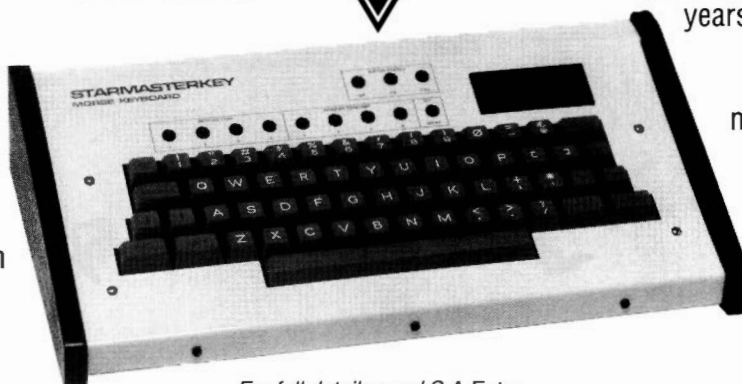
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The receiver is supplied with a comprehensive selection of accessories: DA900 wide band flexible aerial, NiCad pack, Dry battery case (for use with 4 x AAA alkaline cells), Charger, DC lead fitted with cigar lighter plug, Earphone, Soft case, Belt hook, 5 metres (approx) of aerial wire terminated in a BNC connector for shortwave reception and Operating manual.

Versatility is excellent. The AR1500 may be powered from its internal NiCad pack, spare dry batteries may be carried for extended operation and used with the dry battery case, the set may also be plugged directly into the cigar lighter socket of a motor vehicle (external input range 11 - 18V DC).

Although offering a long list of facilities and operating modes, the receiver remains easy to operate. Many facilities have been carried across for the well proven AR2000 receiver. The AR1500 has a new "automatic memory" feature which automatically stores busy channels from search bank 9 into the 100 memory channels of scan bank 9.

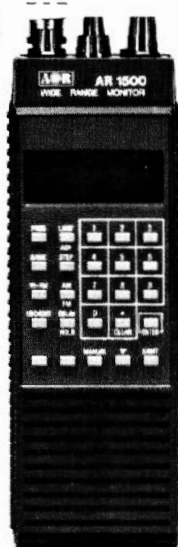
There are 1000 memories in total arranged in 100 memories x 10 banks. There are also 10 additional programmable search banks. Each memory will store frequency and mode (NFM, WFM or AM - not SSB) the search banks will also store the step increment. There is a massive EEPROM memory store for all memories and search banks so that no backup battery is required. The memories may be over-written time and time again. The display often provides 'prompts' for selected operations such as a flashing "CH" to invite the user to key in a new memory channel number. All information such as frequency, mode (except SSB), channel etcetera is presented via an easy to see Liquid Crystal Display (LCD). The display is fitted with a switchable light to increase visibility in areas of low level lighting.

The AR1500 can meet a number of requirements to satisfy Airband or Marine enthusiasts. Professional off air monitoring and of course casual listening too. The World's shortwave and Amateur bands can be monitored, even the longer range Oceanic Airband and ship to shore. Of course the performance of this compact hand-held receiver can not be directly compared to that of the AR3000A or dedicated General Coverage Receiver.

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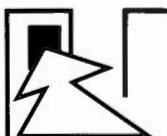
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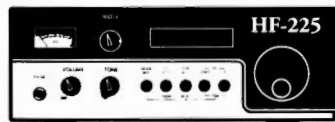
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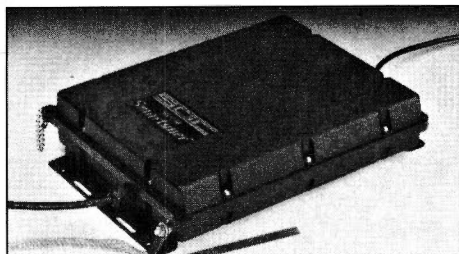
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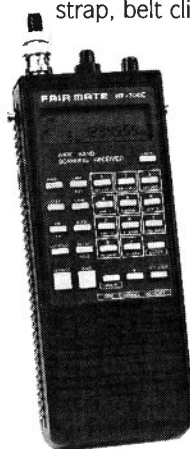
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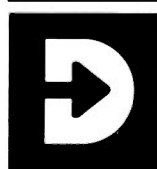
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