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- Fast Scan Speed (20 Channel per Second)
- Priority Channel Monitoring
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A compact and pocket sized handheld offering continuous frequency coverage that's simple to programme and has a triple conversion sensitive receiver.
- 5 - 1300MHz
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- Delay/Hold Function
- Priority Channel Monitoring
Recommended!!!
Special Price . . . . . . . £199.95
(Sold without NiCads/Charger- takes 4AA Batteries)
Special Price . . . . . . . £209.95
(Incl. NiCads/Charger)

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Scanners Are Back!

UBC55XLT
Our new 40 channel model offers outstanding value for money, giving clear reception on Marine, Rescue Services, Amateur, PMR and Public Service Bands. housed in a rugged case it will give years of reliable service.
Freec: 66-12 MHz (with gaps)
Receive mode: NFM
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Featuring a new rotary tuner and tuning scan facility, this 40 channel model incorporates automatic memory store and now you use direct keypad for frequency control and finished with a leatherette carry case.
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Easy to use with 200 memory channels, this model covers 10 bands from VHF to UHF. The new bespoke case has large clear keypad controls and high quality audio output. Already our most popular model.
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Receive mode: NFM & AM
Supplied with NiCad Pack and Charger
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Trade & Export Enquiries
Trade: (01705) 698113  Fax: (01705) 690626
The SCOUT™ Has Taken Tuning Your Receiver To a New Dimension

Featuring Automatic Tuning of your AR8000 and AR2700 with the Optoelectronics Exclusive, Reaction Tune (Pat.Pend). Any frequency captured by the Scout will instantly tune the receiver. Imagine the possibilities! End the frustration of seeing two-way communications without being able to pick up the frequency on your portable scanner. Attach the Scout and AR8000/2700 to your belt and capture up to 400 frequencies and 255 hits per frequency. Or mount the Scout and AR8000/2700 in your car and cruise your way into the future of scanning. A simple interface cable will connect you to a whole new dimension of scanning.

The Scout’s unique Memory Tune (Pat.Pend.) feature allows you to capture frequencies, log into memory and tune your AR8000/2700 at a later time. A distinctive double beep will inform you when the Scout has captured a new frequency, while a single beep indicates a frequency that has already been recorded. For discreet monitoring, a pager style vibrator will inform you of any hits the Scout captures.

The Scout will also Reaction Tune and Memory Tune Icom CI-V receivers: (R7000, R7100, and R9000) and Pro 2005/6 equipped with OS456, Pro 2035 equipped with OS535 (which gives them the needed CI-V port to interface the Scout). Download the Scout frequencies to a PC with the Scout Utility Disk and CX-12AR (optional) for reference and building your frequency database.

Act Now!! Let the Scout Reaction Tune you into The World of Scanning

Features
- Automatically tunes these receivers with Reaction Tune (Pat.Pend.) CI-V receivers (ICOM's R7000, R7100, and R9000), (Pro 2005/2006 equipped with OS456, Pro 2035 equipped with OS535) or AOR models (AR2700 and AR8000)
- Records and saves 400 unique frequencies
- Records 255 hits on each frequency in memory
- Digital Filter and AutoCapture in (Pat.Pend.)
- 10MHz-1.4GHz single frequency range
- View frequencies in RECALL mode
- 10 digit LCD with EL Backlight
- 16 Segment RF signal strength bargraph
- CX-12AR Computer Interface for Scout & AOR (optional)
- PC Utility Disk for downloading memory to PC included
- Rapid charge NiCads with 10 hour discharge time
- 38 12 VHF/UHF mini-antenna shown with Scout (optional)
- Distinctive Beeper/Vibrator indicate frequency hits

At right: Scout shown with CLIPMATE™. A handy windshield mount for Scout, for quick access and visibility.
Features

12  The Rainbow Loop
    Bill Wilson

17  A Low-noise Vertical Antenna
    Tim Wright

20  A Modified Joymatch ATU
    C.M. Lindars

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    Terry Brown G0NSA

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    Go Bump In The Night
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    Andrew Howlett

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    Lowe HF-250
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    G4WNC

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    Alan Gardner

Because of space constraints, the second part of Brian Adkinson's Simple 2-valve SW Radio has had to be held over.

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Club Secretaries: Send all details of your club's up-and-coming events to: Lorna Mower, Short Wave Magazine, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PV. Please tell us your County and keep the details as brief as possible.

**AVON**

British International RC: Tuesdays, 8pm. The Fighting Cock Public House, Henlow. All visitors are welcome. The club has been formed so that all radio enthusiasts, whether they be Licensed Amateurs, s.w.l.s or CBers can get together and have a good natter and do things you just cannot do in Clubs. P.B. Box 28, Bristol BS9 1GL.

**Hampshire**

Hordemann & DARC: 1st & 3rd Tuesdays, 7.30pm. Loveland Village Hall, Loveland Lane, Loveland, Hampshire. September - Natter night, 20th - HM schools event in the Forest by Toby Stone. S. Swain (01750) 540275.

**Warwickshire**

Mid Warwickshire ARS: 2nd & 4th Tuesdays, 8pm. St Johns HQ, Warwick Dr, 61 Eccomock Road, Warwick, CV34 5QR. September - Introduction to the club. September event starts at 6pm and runs until 9pm. During the event, there will be on-air demonstrations, packet radio, home-made antennas and other local attractions. More information can be obtained from Sharward Promotions on (01788) 273636 or FAX: (01788) 273635.

**Wiltshire**


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**rallies**

August 28: A computer/ham/gamers fair is being held at Manchester University, PIEcote Hall, Oak Road, Manchester. Not sure to what extent this will be for adults and for children/boys. Doors open at 10am to 5pm. Free map/CD and posters and two technical how-to. Booking line: 0161-267 2262.

August 27: The Catharine & District Amateur Radio Society are holding a summer rally at the school. Admission is £2, but free for members. Doors open at 10.30am and admission is £1.50, which includes a draw. There will be a large amount of traders, in attendance, refreshments will be available. Brian G3THB (01525) 498664.

August 27: The Gazetteers Club are holding their Open Day at the Focus Centre, Livingstone Place, Galsworthy. Doors open at 11am till 4pm. Admission will be by donation. There will be 25+ traders, a ham radio exhibit, a shop, and refreshments will be available. John Campbell G3MUMM. G3THB (01525) 833286.

August 27: The East Coast Amateur Radio & Computer Rally is to be held at the Eastern Leisure Centre, Vista House, Electrician Show. Doors open at 10.30am to 4pm. There will be many suppliers and manufacturers of radio-equipment, computers and computer software, electronics, antennas and some small items. There will also be a Bring & Buy plus a car and bicycle display from 11am. Free car park and in or S227 051084. Further information can be obtained from Sharward Promotions on (01788) 273636 or FAX: (01788) 273635.

August 27: The Trowbridge Rally is being held at the Cranfield Leisure Centre, Paginton, Devizes - where there’s room to tap and chat! Doors open at 10am. There will be trade stalls, a Bring & Sell, beginner radio stand, space for outdoor enthusiasts to display many of their hobbies, a restaurant and a bar. For the family, only a four minute walk away, there is a beach, leisure centre and a boating lake, steam railway and a flume water park. Further details can be obtained from John G3YCH. GTHB (01380) 822686.

August 27: The Huntingdonshire Amateur Radio Society are holding their rally at St. Peter’s School, St. Peter’s Road, Huntingdon, Cambridgeshire PE19 2EX. Doors open at 10am and admission to £1.50. Refreshments will be available and there will be 200 or so hams and a car boot sale. Tel/FAX: (01835) 822686.

September 4: Amateur Radio Operators are holding their rally at the Sun Inn, 15 High Street, Grindleton, Burnley, Lancashire BB10 9TE. Doors open at 10am and admission to £1.50. There will be many traders, a Bring & Buy, refreshments and free technical advice. 0161-627 2502.

September 6: microwave techniques by Dr. Miles Capstick Clwyd. G3LPT. (01258) 657651.

September 10: The 14th Lincoln Hamfest will be held on the Central Lancaster High School, Craig Road, Lancaster. Doors open at 10.30am, admission is £1 and there will be a large number of traders in attendance and refreshments will be available. Iain B716 BS (0292) 269493.

September 10: The BARTG Rally is being held at Sandown Exhibition Centre, Telford, Shropshire. Doors open at 10am and admission to £1.50 for adults and £0.75 for children/OAPs. Doors open 10am to 3pm. There will be many traders, a Bring & Buy, trade stands, Novice feature, flea market, `Bring & Buy', trade stands, Novice feature, flea market, and refreshments will be available. John Campbell G3MUMM. G3THB (01525) 833286.

September 10: The Ossett Community Centre, Prospect Hall, Wakefield Road, Ossett, West Yorkshire, WF5 7NF. The club has been formed so that all radio enthusiasts, s.w.l.s or CBers can get together and have a good natter and do things you just cannot do in Clubs. 01924 472792.

September 17: Peterborough Radio & Electronics Society East of England Rally is to be held at the Peterborough Sportspace, Easy access from A1, A47. A30. All there will be trade stands, radio/magazines and books and other local attractions. View Middlesex G3VJI. G3VJI (01832) 575970.

September 19: The Mini-Warsopshire Amateur Radio Society are holding their rally at the Miniguards Pub, Miniguards, Lego Lane, Warsop. There will be a number of traders, a ham radio display with displays of passport radio, home-brew, kit construction and lets and more. All welcome to come and see the club is set up, and questions and learn about amateur radio. Don (01621) 602566.

September 24: The Peterborough Radio & Electronics Society are holding their rally at the Miniguards Pub, Lego Lane, Warsop. There will be a number of traders, a ham radio display with displays of passport radio, home-brew, kit construction and lets and more. All welcome to come and see the club is set up, and questions and learn about amateur radio. Don (01621) 602566.


October 4: Amateur Radio Operators are holding their rally at the Sidmouth Town Hall, Town Hall Road, Sidmouth, Devon. Doors open at 10am to 4pm Admission fee forG3 £1.50 and under 16s free. If accompanied by an adult, Peter Nicholl (01271) 600562.

October 11: The 15th Lincoln Hamfest will be held on the Central Lancaster High School, Craig Road, Lancaster. Doors open at 10.30am, admission is £1 and there will be many traders, a Bring & Buy, refreshments and free technical advice. 0161-627 2502.

October 18: Practical Wireless, 28th - Practical Wireless, Cockington. 7.30pm. The Victory Social Club, Kechill Road, Churt. 01258 657651.

October 25: Amateur Radio Operators are holding their rally at the Miniguards Pub, Lego Lane, Warsop. There will be a number of traders, a ham radio display with displays of passport radio, home-brew, kit construction and lets and more. All welcome to come and see the club is set up, and questions and learn about amateur radio. Don (01621) 602566.

October 25: Amateur Radio Operators are holding their rally at the Miniguards Pub, Lego Lane, Warsop. There will be a number of traders, a ham radio display with displays of passport radio, home-brew, kit construction and lets and more. All welcome to come and see the club is set up, and questions and learn about amateur radio. Don (01621) 602566.
Car Boot Sales

Usually when you start off in a hobby you haven’t got that much money to spend - at least not until you are sure you like it! This is especially true if you are a ‘junior’ or ‘senior’ listener. So what do you do?

There are several ways you can save money when buying a radio, but is it really a bargain?

Recently, we’ve been to a couple of car boot sales and we were fortunate enough to see a later model of a Tandy lap-top computer going for a really good price. As it is battery powered we were able to check it worked and so decided to risk parting with the cash. Since getting it home we’ve been pleased with it and it seems to work fine, so that was a bargain. I did see several scanners and short wave radios, in fact I think I saw several CB sets and an amateur radio set as well. But how do you know if you are getting a bargain?

I would say that if you don’t know what you are looking for, don’t risk it. Make sure you can check the scanner or whatever works. If you don’t know how to drive one because you are just starting off then don’t take someone with you who does know. Ask why they are selling it. The answer will probably be that either they’ve bought a newer one or that they tried the hobby and have given up.

Finally, remember that if it goes wrong next week that’s your problem and it could be expensive getting it repaired. So your bargain may not be a bargain after all!

Second-hand Adverts

Another way to save money is to buy second-hand through adverts in your local free paper or in places like Short Wave Magazine. Obviously, prices will be higher than at a car boot sale, but you should get a better chance to try before you buy. Again, if it goes wrong you have to get it fixed at your expense.

Radio Dealers

Of course, you can buy from a recognised dealer and buy a well-known make of radio. For your money you will get an after-sales service, they’ll help you get the hang of the controls and advise you how to get the best from your radio. If anything should go wrong, then you’ll get the technical support needed.

So, ‘you pays your money and takes your chance’. Personally, what do I think? Well, my first radio was bought new from a main dealer as have been the ‘major’ purchases ever since. I have bought second-hand and from car boot sales, although these purchases have been the more minor elements to the station. I’m not a great risk taker and prefer to have the back up in case things go wrong, but I am always on the look out for a bargain.

Radio Rallies

I am reminded of a recent fax from Frank Elliot, the organiser of the longstanding Leicester Amateur Radio Show, that rallies are a very good place to buy. Not only do you get lots of radio dealers in one venue, there are often some good ‘show special’ deals to be had. Most shows also have a bring and buy stall where many a good bargain - and some junk - can be obtained. Don’t forget, though, that my warnings about car boot sales and second-hand adverts apply. The Leicester Amateur Radio Show, will be held as usual at the Granby Halls on the 20 and 21 October. Details from Frank G4PDZ, Tel: 0116-267 1086.

Broadcast Bands Award

Here are a few details for the ISWL Short Wave Broadcast Band DX Award.

This is available to all broadcast band listeners for verified reception of short wave broadcast stations in all six continents. The number of countries that must be verified in each continent when applying for any of the four classes of award are shown in the table.

<table>
<thead>
<tr>
<th>Class</th>
<th>Europe</th>
<th>Africa</th>
<th>Asia</th>
<th>N.Am</th>
<th>S.Am</th>
<th>Oceania</th>
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<tr>
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</table>

The cost of the award to non-members is £2.00 and to obtain a claim form you need to send the return postage to: Herbert Yeldham, Awards & Contests Manager, ISWL, Belle Fleurs, Wade Reach, Walton on the Naze, Essex CO14 8RG.

On the Air

I’ve heard that a new radio station has finally gone on the air with some test broadcasts. WVTG (possibly WGTG) is transmitting on 7.355MHz from McCaysville, GA in the USA. They have a power output of 50kW and their antenna is 275m long suspended 27m above the ground. Their test transmissions are aired between 1300-2200 each day. Their address is Box 1131, Copper Hill TN 37517, USA. They will QSL all reports sent to them.

This station has been listed in the W7RH this year, but they have only just got onto the air. It could be worth trying to hear them and get their nice new QSL card.

Other Shops

Nowadays it seems as though you can buy a scanner or short wave radio in the strangest of places. Camera shops, television shops even discount centres seem to have scanners available, if not short wave radios. Often they have unusual brand names for sale although they are cheap, but it’s difficult to find out how good they are until you have got it home and used it for a while. It’s worth asking what kind of guarantees go with the purchase, just in case. Usually they will just replace it with another one, but you won’t get any other kind of after-sales service.

Pen Pals

I wonder how many newcomers feel that they are the only people in the world struggling to understand this complex hobby of ours. Would you like to correspond with other newcomers? If so drop me a line with your name and address and we’ll put together a list of people wanting to write. Tell us a little about your hobby and let’s see if we can put people together.

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New Realistic Scanner

Link Electronics have sent me a press release on the PRO-62 scanner. This is a new Realistic scanner that covers 68-88, 118-174, 380-512 and 806-980MHz. It has 200 memories and you can select a.m. or f.m. on any of the programmed frequencies. It costs £139.99 and is available from Link Electronics, 216 Lincoln Road, Peterborough PE1 2NE. Tel: (01733) 345731.

Novel Idea

As everyone else seems to be talking about Internet and ‘information super highways’, etc., I thought I would say fashionable and mention something too! This has got to be the strangest way to listen to a radio’ broadcast. The station WRN now broadcasts live onto the Internet! If you want to see/listen to this for yourself you should check the WRN Homepage at http://www.wrn.org

I think this takes first prize and the strangest way to listen - unless you know different.

Short Wave Magazine, September 1995
### Fab Feba

Feba Radio have produced a booklet - Organising a Feba Event. This little booklet is packed with creative ideas, recipes, hints, tips and much more. Just what every hard-pressed, looking-for-inspiration, church meetings secretary always wanted.

The booklet has been brought out during Feba’s 25th anniversary of broadcasting from their Seychelles station to help people organise an anniversary event. Whether it’s making an event at church special or a social event with a missions emphasis, this little booklet has it all.

Although written from the standpoint of Christian radio and offering resources available from Feba, Feba hopes the new booklet will be widely used by those wanting to increase awareness of Christian mission.

Copies of this smashing booklet can be obtained from Mrs Jennie Ring at Feba, Ivy Arch Road, Worthing, West Sussex BN14 8BX.

### Summer Schedules

The International Short Wave League’s Guide to English Language Short Wave Broadcasts to Europe (Summer Schedules) has recently arrived on the SWM Newsdesk. The information is presented in time order (GMT/UTC) with aligning programme time periods, country and station names, frequencies, programme details, news, features, sport and world service transmission, etc.

The guide costs £1.50 (£1, $1 or two IRCs. For the latest in the World of Listening, the booklet will be widely used and in the Epsom and Leatherhead areas. Improved reception is also available from ITC Engineering Information and BBC Engineering Information at the addresses below.

### Challenge Time

The idea of the 1995 October s.w.l. challenge is to log as many countries as possible in the 48 hours from 0000 on October 28 to 2359 on October 30 1995. The challenge takes place at the same time as the SSB Leg of the CO.WorldWide DX Contest.

### Interim Station

The BBC has opened an interim f.m. transmitting station at Crystal Palace to improve reception for some two million people in South London from Crystal Palace in the east to Richmond in the west and in the Epsom and Leatherhead areas. Improved reception is also available for those people travelling into London.

Interim tests of all the BBC national services began on 6 March 1995 and are liable to interruption. The new transmission frequencies are:

- **Radio 1**: 98.5MHz
- **Radio 2**: 88.8MHz
- **Radio 3**: 91.0MHz
- **Radio 4**: 93.2MHz

On some radios, the f.m. band may be marked as v.h.f. Please note that as this transmitter broadcasts only with vertical polarisation, any external or loft-mounted aerials must be mounted so that their rods are vertical.

Listeners with self-tuning RDS (Radio Data System) radios need take no action, except to ensure the RDS function on the radio is selected. Such radios will then automatically tune to the appropriate frequencies.

Further information on f.m. reception including advice on fitting an external f.m. antenna is available from: BBC Engineering Information, Villiers House, The Broadway, Ealing, London W5 2PA. Tel: (0345) 010313 (local call rate).

### National Transmitter News

**Television Relay Stations**

May 15, Catrine, Ayrshire, a new television relay station opened, provided jointly by the BBC and the ITC. The station is located on a mast in the Shawshold area of Catrine, about 18km east of Prestwick. It is designed to bring good television and teletext reception to about 240 people in the Ballochmyle Street, Mill Street, Chapel Brae and St. Cuthbert’s Street areas of Catrine.

Viewers wishing to use the new Catrine relay should consult a local television dealer or aerial contractor, but reception advice is also available from ITC Engineering Information and BBC Engineering Information at the addresses below.

### Station Details

- **Channels:**
  - BBC1 (Scotland): 55
  - BBC2 (Scotland): 62
  - ITV (Scottish TV): 59
  - Channel 4: 65

- **Antenna Group:** C/D
- **Polarisation:** Vertical
- **Effective Radiated Power:** 5W

### Reception advice is available from either:

- **ITC Engineering**
  - Kings worthy Court
  - Winchester
  - Hants SO23 7QA
  - Tel: (01962) 848647

- **BBC Engineering Information**
  - Villiers House
  - The Broadway
  - Ealing
  - London W5 2PA
  - Tel: 0181-231 9191

### Response to VHF/UHF Threat

The RSGB has recently published its response to the CEPT Detailed Spectrum Investigation Phase 2 Report. In an article in the July edition of *RadioCommunication*, summarising the Society’s formal reply to the RadioCommunications Agency (RA), each frequency band is dealt with in turn, detailing the original input by the IARU and the RSGB’s reaction to the CEPT recommendations.

The RSGB Licensing Advisory Committee states: "There are very severe and growing pressures on our allocations at present, it is in all our interests to defend them as vigorously as possible at every opportunity. The Society will be opposing these losses vigorously in its input to the RA."

Non-members of the RSGB are urged to read this article and to join the national society in order to strengthen its hand in tackling threats to the current frequency allocations. Copies of the July *RadCom* are available to non-members who send an A4-sized self-addressed envelope with 43p worth of stamps to: John Davies, *July RadCom*, RSGB, Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JE.

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Short Wave Magazine, September 1995
Refurbishment & Extension

As part of its continuing programme of transmitter refurbishment, the BBC will be fitting new transmitters to the BBC channels at the Moel-y-Parc, Angus and Stockland Hill television transmitter sites. This new equipment will also bring the additional benefit of Nicam stereo sound to the two BBC television channels at each of these sites.

The Moel-y-Parc transmitter serves viewers in north east Wales and also provides coverage to some viewers in Cheshire, Greater Manchester and Merseyside. The Angus transmitter serves viewers around the Tay estuary and parts of Lothian and Perthshire.

The Stockland Hill transmitter covers east Devon, west Dorset and parts of Somerset. In addition, over fifty low power relay stations will receive the Nicam stereo service when their parent station begins transmission.

Both the Moel-y-Parc and Angus transmitters are expected to begin Nicam transmission in the winter of 1995/6, with Stockland Hill following in the Spring on 1996.

BBC Television began its Nicam stereo service back in August 1991. With the addition of these three transmitters, the total number of main stations broadcasting the Nicam service will be twenty seven, corresponding to over 90% of the population.

Tropical Bands Survey & Clandestine Stations List

Now available is the 23rd edition of Tropical Bands Survey, (28 pages) issued by The Danish Short Wave Clubs International (DSWCI) and compiled by Anker Petersen. The survey lists all active broadcasting stations in the 2.00-5.900kHz range, by frequency, power, location and transmission. The survey is based upon monitoring stations in the world. Each station is listed in frequency order, as well as in time order and country by country. You'll also find much background information on the Clandestine stations, which it is claimed can not be found anywhere else!

The Clandestine List is available for 10 IRCs or 50 Danish Crowns airmail delivery or £5.95. Reduced rates for bulk order can be obtained for orders of 100 or more.

Also available is the Clandestine Stations List. This listing contains all the latest available data on all active Clandestine stations broadcasting on short wave, including transmission schedule, political organisation, language, addresses and verification policy. The stations are listed in frequency order, as well as in time order and country by country. You'll also find much background information on the Clandestine stations, which, it is claimed can not be found anywhere else!

The Clandestine List is available for 10 IRCs or 50 Danish Crowns airmail delivery or £5.95. Reduced rates for bulk order can be obtained for orders of 100 or more.

Old Timers Net

Many s.w.l.s all over the country regularly tune into 3.680MHz between 8 and 9am every morning to listen to the sometimes rather heated debates on this popular 'Old Timers' net. Sometimes referred to as the 'Voice Recognition Net', as the dozen or more taking part all seem to recognise each other's voices and seldom bother to use callsigns (only to comply with the regulations of course!).

Recently, members met in the wireless museum at Bletchley Park during the recent rally, several for the first time, and tried to put a 'face to the voice' - very difficult!

Material is held on the database for up to a month before being archived onto disc.

Also back in July, World Service launched the BBC's Anniversary Information Service, a database of over 25 000 anniversaries. General or specialist lists will be made available for use throughout the BBC and searched can be made by name, date, subject or country.

The BBC World Service has a regular global audience of more than 130 million listeners and a world-wide reputation for accurate news. Until now, cross checking for accuracy and consistency has been done manually, but in future will be made easier with the introduction of a new database, which can automatically archive all news and current affairs material. Scripts, talks and correspondents' despatches will all be stored in the database. For instance, a user wanting to call up a previously archived material to check how a story was reported, can now do so by making a simple telephone call. The computer finds the material, which is then electronically delivered to the user requesting it via the newsroom's computer system.

News

Database DAVE

Major new computer developments were launched back in July by the BBC World Service, hence making programme makers around the building have faster, better, access to sound in a variety of languages. Computers are being used for the first time to move sound from a central actuality database to programme departments. News stories are now archived electronically and the BBC's only comprehensive anniversaries database goes live during the month.

The new actually database now means that staff in the 41 language services of BBC World Service, the world's leading international broadcaster, can now access sound material 24 hours a day through a newly developed distribution network. Called DAVE 2000 (Digital Audio Voice Editor), the network consists of computers each connected to its own speaker and tape deck. Users can go to any of the work stations and key in the code of the soundbite they want, preview, edit and dub the material onto tape using the linked tape deck.

Up to 40 hours of material can be held on DAVE ranging from popular sound effects and the current Top Ten chart singles to famous speeches.

New President

Back on July 8, the Council of the RSGB elected Peter R. Sheppard G4EJP as the Society's President for 1996. He is currently Zonal Member for Zone A, the north of England. Any enquiries regarding the RSGB should be sent to: The Radio Society of Great Britain, Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JE or alternatively, ring them on (01707) 659015.

Members of the 3680 Old Timers' Net, (L to R) Garen G3WYWU, Les G2FQP, Chris (s.w.l. son of G8CK), Bill GBCK, Douglas G3KPO, Jim G4PZB, Ron G4UAC, Mavis (XYL of G4MJN), Roy G3REZ and Bob G3BAC.
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Despite the obvious advantages of using a loop antenna for medium wave DXing, see the 'quarterly list of equipment used' that appears in the 'LM&S' column of this magazine for proof! - many listeners must be put off the idea of using a loop in a domestic environment. This is because of the, usually, grotty appearance of a home-constructed loop and its user hostility - rather like living with an overgrown cactus plant or spider's web waiting to ensnare the nomadic domestic gerbil/moggie or any wandering budgie or grannie... 

The Rainbow Loop, like John Tweeker's version in January 1991 SWM, is an attempt to civilise the beast, being clean and uncluttered. It is practically indestructible and is highly reproducible. It is particularly useful when used with any of the modern broadband input receivers, which are hard put to make any sense of medium wave when used near a medium wave transmitter - I can see the rigging on the local medium wave mast (radiating 14kW) from his QTH! 

Of course, all these receivers are excellent when preceded by even a single tuned circuit to clean up the plethora of signals barging into the front-end and zapping the poor old mixer. How strangely different from the old-fashioned track-tuned receivers with ganged tuning capacitors, which admitted only the signal you wanted to listen to! 

There is perhaps one exception among non-professional receivers, the NRD-515, which employs automatic two-stage ganged tuning pre-selection on the medium wave band. Even the Lowe HF-125/225, which has been beautifully designed for excellent r.f. performance under difficult conditions comes to grief when confronted with massive local signals.

The Rainbow Loop is not really suitable for receivers that do not have a low impedance antenna input of around 50Ω or so.

Two versions of the 'active' section of the 'Rainbow' are shown, Fig. 1 is the basic assembly, while Fig. 2 uses an extra tuned stage, which does make a real difference to the overall r.f. selectivity. In this version, unplugging the loop assembly automatically converts the unit into a two-stage pre-selector (with an optional low-Z input) for your end-fed or random wire antenna.

The Circuits

This consists of a simple varicap tuned f.e.t. source-follower to convert the high impedance of the loop to a low impedance suitable for the 50Ω input of the receiver. One could use the f.e.t. as an amplifier, but the last thing that most present-day receivers need is extra gain, they are usually more than adequate in this respect.

A gain control, R4, is included, together with the On/Off switch, which also bypasses the loop and automatically connects the normal antenna straight to the receiver so that instant comparisons may be made. Varicap tuning was chosen for a few reasons, 270° rotation of the tuning control is achieved as opposed to the 180° of a tuning capacitor. The Varicap can be 'trimmed' easily with the tuning voltage to give the required swing and there's simply a lot less physical work to do in the construction stage!

S1 has three functions.

Bill Wilson sadly died after this article had been accepted and scheduled for publication in this issue. His family have kindly agreed to its publication.
When switched 'On', the loop or bandpass filter is enabled (depending on whether or not the loop is plugged in), the wire antenna at SK1 is earthed to avoid spurious pick-up, and power is applied to the circuit. When 'Off', S1a and S1b connected the wire antenna straight through to the receiver and disables the loop/bandpass filter.

A 9V battery supplies both the f.e.t. and the tuning voltage for the varicap, however, I use an optional built-in NiCad battery and charger, the I.e.d. acting as a front panel indicator that the charging process is taking place. This means, varicaps being what they are, that when the battery voltage begins to drop, it will be impossible to tune the loop to the h.f. end of the band. There is the consolation that it's a battery condition indicator for free.

SK4 is the d.c. charging socket, 12V d.c. is needed here to recharge the PP3 NiCad, 15-20V d.c. for a 12V pack. I use a 12V pack of eight AA NiCads to provide a long lasting steady 9V via a zener diode. If you decide to use a PP3 NiCad, the value of Rx is 1kΩ for a 12V pack of 1.5V AA cells, this value becomes 18Ω.

The integral charger saves the trouble of opening the case whenever the battery begins to go flat. I use this method in practically all my battery operated equipment and it does save a great deal of hassle. The one exception is my digital watch (but I'm working on it......).

Construction
First, visit your local d.i.y. store and get a length of pvc 'U' section extrusion 19 x 7mm, the type used for edging 15mm chipboard. You'll require 1.5m of this channel together with some flat, self-adhesive, sponge draught excluder strip. This latter is not essential, but will provide a tidy job on completion.

The small abs box is first prepared by cutting two openings for the extrusion to fit through. Drill two holes to start each opening and then, using a sharp craft knife, these pilot holes are enlarged to 19 x 7mm to accommodate the 'U' channel. Next, a small block of wood is shaped to enable the ends of the channel to be fixed to the inside of the box using 20mm or so screws and nuts or woodscrews.

The jack plug is next fitted to the bottom of the box. The precise method will depend on the type of plug and the size of the box used. A side entry type is preferable, but in any event, any internal p.c.b. slots moulded inside this part of the box will need to be removed, very easily done using a sharp woodworking chisel, especially if the box is first warmed slightly to make it less brittle.

If a straight barrel plug is used, the easiest way to arrange for the thickness of the wall of the box to be held between the plug and its cover when they are screwed together, but remember to fit the two leads first. Fig. 3 shows the method I used.

The sponge strip is now stuck down around the whole length of the channel, this is simply to give some tension to the windings when they are fitted. Finally, a small scrap of stripboard is screwed to the wooden block to enable the connections to the ribbon cable to be made.

The 10-way ribbon cable can now be laid round the channel with the ends going into the box and a wooden wedge inserted into one slot from the inside to firmly secure that end of the ribbon to the case. The cable is now pulled tightly round, compressing the sponge, and the other end secured in the same fashion, this will enable the ribbon to be held firmly in the channel without putting any tension on the soldered connections.

Next, nine pairs of cable ends are trimmed to a suitable length and soldered to the

---

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stripboard so that each conductor is in series with the next, the two free ends being then taken to the plug tags. One complete end conductor of the ribbon is left unconnected, this can just be left floating to provide a coupling loop for experimental purposes.

The 'active' part of the unit is next constructed, a weighty diecast metal box is ideal as it provides both screening and mechanical stability. The main components are mounted on a section of stripboard. Apart from ensuring that the lead to the gate of the f.e.t. is reasonably short, there is nothing critical about the construction.

The output of the device should be coupled to the receiver by means of an appropriate coaxial plug. Don't forget that this low impedance connection will allow the loop to be situated some distance away from the RX - even in another room if this is electrically less noisy. Quite a good place for the 'Rainbow' is screwed to the ceiling of the shack, leaving the operating position clear, if you do inadvertently try to garrott yourself on it, the loop will simply flex itself out of the way. Makes a perch for the budgie as well but make sure he hasn't eaten any of the ferrite beads lying about on your bench, this could seriously upset the inductance of the loop!

**Alignment**

No alignment is required for the basic version, but you can try the effect of disconnecting either one, two or three turns of the loop to give enhanced coverage to marine/160m amateur band frequencies but at the expense of the l.f. end of the medium wave performance. The advanced version (Fig. 2.) is aligned as follows. Attach your random/long wire, plug in the loop and tune the receiver to a weak station, around 550-600kHz. Tune the loop (with the R6) for maximum signal and then adjust the core of T2 for maximum signal. Now remove the loop and with the RX and loop tuned to a weak 550-600kHz signal, peak up the signal with the core of T1. Don't forget that T1 is not in circuit when the loop is unplugged. The value of C1 should be chosen to suit the particular long/random wire in use, the smaller the value, the better, as this will have minimum damping effect on the receiving set-up.

Now it's ready to go, and you can enjoy the many benefits of the Rainbow Loop.

---

**Fig. 2.**

**You Will Need**

### Simple Version

<table>
<thead>
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<th>Resistors</th>
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<tbody>
<tr>
<td>Carbon Film 0.25W, 5%</td>
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<tr>
<td>100Ω</td>
<td>R3</td>
</tr>
<tr>
<td>100kΩ</td>
<td>R2</td>
</tr>
<tr>
<td>1MΩ</td>
<td>R1</td>
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<tr>
<td>Potentiometers 0.25in shaft</td>
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<td>R4</td>
</tr>
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<td>50kΩ lin.</td>
<td>R5</td>
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<tr>
<td>Capacitors</td>
<td></td>
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<tr>
<td>Ceramic film</td>
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<tr>
<td>0.01μF 50V</td>
<td>C1</td>
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<td>C4</td>
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<td>KV1235</td>
<td>D1</td>
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### Advanced Version

<table>
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<td>R1</td>
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<td>R7</td>
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<td>Potentiometers 0.25in shaft</td>
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<tr>
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<td>C2, C5, C6, C7</td>
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<td>Variable</td>
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<td>2N3819</td>
<td>Tr1</td>
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### Miscellaneous

- 4-pole 2-way switch, S1; 0.25in mono jack socket, SK1; 4mm socket, SK2; Coaxial socket, SK3; 0.25in angled mono jack plug, PL1; PP3 Battery, B1; Battery connector - PP3 type; Veroboard; metal box; 10-way Ribbon cable, 1.5m, for L1; p.v.c. edging strip.

---

YMRS80046N (Toko) | 2 | T1, T2
A Low-noise Vertical Antenna

Tim Wright has been working on the design of a low-noise vertical antenna for general receiving purposes. He has been using one of his designs at his noisy QTH at Pagham with very good results. Dick Ganderton has also been trying one.

The antenna is manufactured by Communications Aerials Ltd., Unit 1A, Woodland Industrial Estate, Eden Vale Road, Westbury, Wiltshire BA13 3QS. Tel: (01373) 822835. It is understood that retail sales will be handled by Garex Electronics, Unit 8 Sandpiper Court, Harrington Lane, Exeter EX4 9NS. Tel: (01392) 468899.

Large antennas are often used to produce a narrow beam transmission, or to drag in a minute signal from a distant source. The general purpose receiving antenna tends to be overlooked, even though there is a great deal that can be done to optimise medium and high frequency reception.

The strongest possible signal into the receiver does not always yield the best results. Even when the wanted signal is weak, too large an antenna will bring in strong adjacent channel signals so powerfully that they may cause blocking or intermodulation problems. A good receiver gives its best performance when the unwanted background noise below the signal is slightly greater than the unwanted noise generated in the receiver.

Use of too large an antenna will mean greater levels of signal and unwanted noise with the attendant risk of overloading the receiver.

Use of too small an antenna means very weak signals will be hidden by the receiver's internal noise.

The sky is a source of noise that we cannot eliminate without also losing the desired signal. The new design of antenna is sized so as to receive unavoidable sky noise at a level a little above the receiver's noise.

The size of a resonant antenna varies inversely with frequency, while its capture area varies directly with its size. The amount of noise received depends directly on the capture area. A larger antenna receives more sky noise, so we would like to keep the antenna at its ideal size, but use it to receive all frequencies. At lower frequencies the antenna is too small to be resonant, so we have included broad band matching to maintain a reasonable impedance match at the receiver over the frequency range.

The matching circuitry gives some additional advantages.

1. The feeder between the antenna and receiver will have low losses. This enables the antenna to be sited well away from sources of man-made noise such as computers, fluorescent lights, TV sets, etc. The receiver can be sited for the operator's convenience, even if longer feeds are required.

2. The antenna signal path is isolated from the receiver power source. This eliminates earth loops and noise pick-up, prevents galvanic action in marine environments and improves safety in land-based systems - no problems with earth leakage trip circuitry. Modern wiring practice using PME makes such isolation desirable as a fault current in the building can flow to ground via the antenna and create a fire hazard.

3. No active matching components are used, so there is no need for power to the antenna and cross modulation and overload problems are avoided. The system is unlikely to be damaged by intense r.f. fields and static discharges.

An antenna that works superbly at first, but deteriorates with time is highly undesirable. This one is made to the highest marine specifications and has been extensively tested for over two years in land use and for six months at sea, with no electrical or mechanical problems.

Tim Wright suggested that I might like to try out the new design of low-noise vertical antenna after he had demonstrated how it dramatically reduced the noise level into his measuring receiver at his Pagham QTH.

I returned home with a 3m long marine grade whip antenna fitted with 10m of Twiexx feeder cable and a prototype version of the special balun needed to convert from the Twinax feeder to a conventional 75Ω coaxial feeder. The only other antenna available at short notice at my QTH was a Lowe Electronics Long Wire Magnetic Balun, which has a low-noise performance anyway.

The new whip was mounted at the top of my Tennamast so that it was at a height of around 5m. A suitable earth spike was made from a length of copper tube and knocked into the ground as near to the base of the mast as possible. The earth connection from the balun was connected to this spike and the Twinax coaxial feeder plugged into to the balun.

Unlike Tim, I do not have a measuring receiver, so all I could do was compare the results from the two different antennas by using a changeover switch. I used my trusty Eddystone 940 as well as a Lowe HF-150 Stack and found that the noise level on the new vertical was at least two "S" points lower than the Magnetic Balun Long Wire.

The whip is a phosphor bronze rod 3m long with an epoxy encapsulated matching unit all designed to withstand exposure to a marine environment. The base is made from marine grade cast aluminium and either 10 or 20m of Twinax feeder cable is factory fitted.

Short Wave Magazine, September 1995
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Let the OPI D Scout turn your AR8000 to the captured frequency instantly. The Scout will capture & memorise up to 400 frequencies that can be recalled directly from the AR8000.

**Special Offer**

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- Full Microreader range in stock and ready for immediate dispatch.

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**Sweaves (150KHz - 30MHz), + FM Stereo.**

- All modes
- Full weather protection.

**Price**

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**SSB 100 Airband Base Antenna**

- 50 ohm coaxial cable, helps match end fed long wires to 50 ohm coax.
- Fully moulded with wide frequency coverage and SSB mode.

**Price**

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**Scantenna SP-33**

A low noise preamplifier with even better performance, improved circuit design & selectable band pass filters to optimise the receiving range of your choice. 25-1500, variable gain & attenuation. Powered from batteries or 12V DC.

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**Scanmaster GPW2**

Low noise GPS14 preamp covering 1-1400MHz with variable gain of +3 to +20dB (requires PP3 battery).

**Price**

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**Scanmaster Base Stand**

A fully adjustable desktop stand for use with all handhelds. Fitted BNC & Coaxial flylead.

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- DSP-5P Plus...
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**DLB Longwave Balun**

Matches and fed long wires to 50 ohm coaxial cable, helps on receiver to reduce noise & interference & allows transmission up to 1000Watts. Fully moulded for full weather protection.

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- Faster scanning - Memory channels are scanned at about 40 channels per sec
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OPTO Scan 456
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- R10 - FM
  - Receives FM from 30-2000
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  - Field strength indicator
  - 9V battery operation

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  - Data port for interface to PC
  - with optional CX12AR

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- Receive the very latest news & weather Fax’s
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  - Program names can be displayed on the front panel. The
  - Single key press will select your mode & bandwidth as well
  - as a programmable auto selection of the bandwidth when changing mode.
  - Supports IR and QRA. Runs within Windows...

DC440 Decoder
- A new decoder that displays DTMF, CTSCS, + DCS tone frequencies. Computer port for logging/control... £299.95

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- Computer controlled interface for Aorb & Ion radios & Opto in Scout/M1... £179.95

OPTO Scan 456
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OPTO Scan 533
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- AOR AR3000A Super W/ W Band... £275
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- Bearcat 142 XLT Basic model... £39
- Bearcat 200 XLT as new... £30
- Cometel 290... £165
- Fairmate HP100... £195
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- Realistic Pro 39... £75
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- Yupiteru MVT7100... £285
- Yupiteru VT-142... £195

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- HF 225... £365
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- Sangean ATS 803 Portable RX... £95
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The Partridge VFA (Variable Frequency Antenna) together with the Joymatch antenna tuning unit from the same stable has been a useful system for many years. C.M. Lindars obtained his second-hand about 25 years ago and offers some useful modifications to improve the usefulness of the combination.

My Partridge VFA was the De Luxe model consisting of two copper pipes with a loading coil approximately in the centre. Unfortunately, it had been mistreated at some time, fracturing it. It needed to be dismantled and the wooden portion repaired with a strong wood-working adhesive. During this operation, opportunity was taken to inspect the coil and general construction.

In use, it seems to be preferable to mount the VFA vertically, as high up as possible, although it works in almost any position. For best results, the down lead needs to be at least 2.5m long and an a.t.u. is essential.

Several different models of the Joymatch a.t.u. were available. Mine is a simple 'L' match consisting of a tapped coil and a variable capacitor of 365pF. In use, tuning is sharp on most bands and there is no doubt that it raises signals at least three 'S' points. The coverage of the original a.t.u. was 1.2 to 32MHz.

My particular version of the Joymatch, known as a "Triple Purpose 'L' Match", started life as a kit, including full instructions to enable a neat job to be made. The original owner who had assembled it was, unfortunately, over generous with the solder and had managed to short consecutive turns of the coil together in several places.

To cure this problem, the coil was removed from the case and the tapping points gently lifted with a small hook. This has the effect of tightening the turns of the coil and raising the tapping points clear of the other turns. After re-tinning, the various connections were remade and all was well again.

Recently, whilst using the a.t.u. on a 12m long wire and downlead, there seemed to be a tendency for the variable capacitor to always need to be at minimum capacity. It was then discovered that if the capacitor was transferred to the RX end of the coil a better peak could be obtained.

This gave me the idea of installing a simple toggle switch at the back of the case so that the capacitor could be tried in either position 'at the flick of the switch'. I remembered that some years ago, July 1977 to be precise, a Dr. Squance had described a very comprehensive a.t.u. in Short Wave Magazine.

Realising that there was insufficient space for all the options included in his design, the decision was made to mount a 3-pole, 4-way rotary switch at the back of the case of
the a.t.u. and wire it so that all four options shown in Fig. 1 would be available at the twist of a knob. A suitable switch would be Maplin

1. Capacitor C in parallel with the coil.
2. Capacitor C from coil to Earth at the antenna end.
3. Capacitor C from coil to Earth at the RX end.
4. Capacitor C in series with the coil.

This greatly increases the usefulness of the a.t.u. and allows it to be used with a variety of antennas, other than the Partridge VFA.

**Circuit**

The circuit diagram of the modified a.t.u. is shown in Fig. 2 and the wiring detail in Fig. 3. A 10mm dia. hole needs to be made in the back of the case to mount the switch, care being taken not to damage either the coil or the original 12-way tapping switch and its wiring. Wire the new switch with all connecting leads before mounting it on the back panel. Then ‘dress’ the new wires to give short, neat connections.

In use it is helpful to keep a record of the optimum position of the three controls for the various bands and a simple self-adhesive paper label on the back panel assists here. The modified a.t.u. is very satisfactory in use and the absence of a second capacitor, which would allow a T1 configuration to be set up, is not noticeable. With the simple addition described, a good piece of gear becomes even better.

---

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Short Wave Magazine, September 1995
**SMC, ARE & REG WARD**

**37 years and still Number 1**

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**THIS MONTHS SPECIAL**

**Yaesu FRG-100**

General coverage HF receiver 50kHz – 30MHz. 50 memory channels

**save £130**

**only £469**

+ free PA11C mains power unit worth £39

*Offer only available while stocks last*

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**Scanning Receivers**

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>AR-3000A</td>
<td>£929</td>
<td>100kHz – 2036MHz. SSB, CW, AM, FM, FM wide. 400 memory channels.</td>
</tr>
<tr>
<td>MVT-7100</td>
<td>£349</td>
<td>500kHz – 1650MHz. AM, FM, SSB, WFM. 100 memory channels.</td>
</tr>
<tr>
<td>ICR-7100DC</td>
<td>£1269</td>
<td>25MHz – 2GHz. AM, FM, WFM, SSB. 900 memory channels.</td>
</tr>
<tr>
<td>FRG-9600</td>
<td>£529</td>
<td>60 – 905MHz. AM, FM, WFM, SSB, CW. 100 memory channels.</td>
</tr>
</tbody>
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**HF Receivers**

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>AR-8000</td>
<td>£399</td>
<td>500kHz – 1900MHz. AM, FM, FM wide, SSB, CW. 1000 memory channels.</td>
</tr>
<tr>
<td>ICR-1</td>
<td>£399</td>
<td>100kHz – 1300MHz. AM, FM, WFM. 100 memory channels.</td>
</tr>
<tr>
<td>AR-2700</td>
<td>£269</td>
<td>500kHz – 1300MHz. AM, FM, WFM. 500 memory channels.</td>
</tr>
<tr>
<td>AR-3030</td>
<td>£649</td>
<td>30kHz – 30MHz. AM, SAM, USB, LSB, CW, FAX, FM. 100 memory channels.</td>
</tr>
<tr>
<td>R-100</td>
<td>£589</td>
<td>100kHz – 1856MHz. AM, FM, FM wide. 100 memory channels.</td>
</tr>
<tr>
<td>R-72DC</td>
<td>£795</td>
<td>AM, SSB, CW, FM, RTTY (optional). 99 memory channels.</td>
</tr>
<tr>
<td>R-71E</td>
<td>£899</td>
<td>100kHz – 30MHz. AM, SSB, CW, RTTY. FM (optional), 32 memory channels.</td>
</tr>
<tr>
<td>R-5000</td>
<td>£959</td>
<td>100kHz – 30MHz. SSB, CW, AM, FM. 100 memory channels.</td>
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</tbody>
</table>

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**Save £100**

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CARR A = £2.50  CARR B = £5 (Handi's)  CARR C = £9.50 (Mobiles)  CARR D = £13.50 (Base Stations)  CARR E = £16.50

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*Short Wave Magazine, September 1995*
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ONLY £119.00 INC Carr B
PK12/100K - 100k Mail Drop Memory Upgrade £47.00 Carr A
PK232/MBx - An old favourite that still offers state of the art performance.
BETTER VALUE THAN EVER AT ONLY £299.00 INC Carr C
PK900 - Deluxe multimode data terminal
ONLY £459.00 INC Carr C
PK96 - 9600 Baud packet TNC with 14K of mail drop memory. £189.00 INC Carr B
PAK WIN - Windows based packet software programme
ONLY £99.95 INC VAT
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DC to AC inverter
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- Output Voltage 23V AC
- Output power 125 watts, 200 watts (2 mins)
- Output Freq 50Hz
- Output wave Modified Sine Wave
- Efficiency >80%
- No load current 120mA
- Low battery alarm -10.7V DC
- Low battery shutdown -10V DC
- Dimensions 130 x 132 x 57 mm
- Input Connection Car type cigar plug
- Output connection 13 amp type mains

MANSON EP920 20A PSU
3-15V DC adjustable*18A continuously 20A max.
Built-in Volt and Ammeter thermostatically controlled fan.
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2-way 0.1GHz 2.5W PEP 0.5dB insertion loss.

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COAX SWITCHES
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CX201 S0239 Sockets £18.50
CX201/N 'N' Sockets £19.95
2-way 0.1GHz 2.5W PEP 0.5dB insertion loss.
I was very pleased to see such extensive coverage given to M.W. listening (Medium Wave DXing and Kiwa Loop review) and related topics. This is most timely as we are approaching the autumn and the start of the traditional M.W. DXing season. This year, in particular, is significant since we are virtually at the minimum of the M.W. sunspot cycle and this is usually a time of enhanced M.W. propagation.

There are a couple of points I’d like to raise in Tom Crosbie’s article that need some clarification, lest they raise the expectations of newcomers to 111.w. listening. I refer to Tables 1 & 2 on pages 17 and 20 which clearly give the newcomer/beginner the impression that they will hear the stations listed. I won’t criticise the contents of the lists point by point, but both lists include stations that have been off the air for at least eight months (here, Austria 1476kHz and DXLM 1570kHz). Both lists also include a significant number of stations that have never been heard in the UK and others that are considered by DXers to be top rate catches. Most new listeners attempting to hear these stations will almost certainly be disappointed and may well give up trying. Sadly, Table 2 omissions ALL of the Top Ten North American stations heard in the UK in the last two years, which I have listed below:

<table>
<thead>
<tr>
<th>Country</th>
<th>Best Frequencies (kHz)</th>
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<tr>
<td>Albania</td>
<td>1395</td>
</tr>
<tr>
<td>Algeria</td>
<td>891, 981</td>
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<tr>
<td>Belgium</td>
<td>827, 1512</td>
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<tr>
<td>Canada</td>
<td>930, 596</td>
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<tr>
<td>Croatia</td>
<td>1134, 1125</td>
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<tr>
<td>Czech Rep.</td>
<td>639, 1287</td>
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<tr>
<td>Denmark</td>
<td>1830</td>
</tr>
<tr>
<td>Finland</td>
<td>563, 558</td>
</tr>
<tr>
<td>France 1</td>
<td>390, 1377, 1071</td>
</tr>
<tr>
<td>Germany</td>
<td>584, 1424, 1425</td>
</tr>
<tr>
<td>Greece</td>
<td>1398</td>
</tr>
<tr>
<td>Iceland</td>
<td>567, 612</td>
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</table>

Just for interest I have compiled my own version of ‘Your First 60 Countries’ which I include below. But it is worth stressing that 50 countries is not a beginner’s target from the UK. In fact, hearing over 40 countries from the UK is a good achievement. For this reason I’ve confined the list to 30 countries that most listeners, irrespective of their location in the UK, should be able to hear if they choose their listening time with care. Also note that every frequency is used by more than one country, so you may have to tune in at different times/days to hear a particular country, as described by Tom in his article.

I am only too pleased to be able to let readers know how to contact the Medium Wave Circle - I hope that you get some new members as a result - Ed.

The above list is based on reports by listeners published regularly in Medium Wave News and other UK magazines, but I have omitted stations that recently have become very much harder to hear since Talk Radio UK appeared on air. Many high performance features!

For this reason I’ve confined the list to 30 countries that most listeners, irrespective of their location in the UK, should be able to hear if they choose their listening time with care. Also note that every frequency is used by more than one country, so you may have to tune in at different times/days to hear a particular country, as described by Tom in his article.

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The Circle can be contacted by writing to the Secretary at 131A Hampton Road, Southport Lancs PR8 5SY, England, or you can E-mail the Circle at steve.whitt@zoo.btco.uk for more information.

Keep up the good work
Steve Whitt
Editor Medium Wave News

Thank you for your comments on Tom’s article. With regard to the listings of stations being out of date the stations were checked out when Tom first wrote the article - using all the current reference books. As I have pointed out in my Editorial this month, I would never state that any station could not be heard in the UK. It may be improbable, but impossible - no. Further, a lone listener may have heard a station that no one else has heard, but he just hasn’t told the rest of the world.

I do hope you can find some space in your mailbag to include at least the above two lists and any others you feel are missing.

Steve Whitt
Editor Medium Wave News

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MW & SW Listener

The HOWES CTU8 SWL kit covers 500kHz to 30MHz. Increases wanted signals by providing impendence matching, and at the same time reduces spurious signals and interference with “front end” selectivity for the receiver. Kit contains case with smart printed front panel and all parts. Reviewed in the December issue of SWM. It only weighs about 350gms so it’s great for portable and holiday use as well as the home station. Great performance and value!

Factory Built: £49.90
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The DX20 covers 20, 40 & 80MHz bands with optional extra band modules for 160M, 30M, 15M or 10M amateurs or 5,45MHz HF air. Many high performance features!

DX20 Kit: £39.90, DCS2 “S meter” Kit: £10.90, HA20R hardware pack: £28.90

Please add £4.00 P&P, or £1.50 P&P for electronics only kits.

HOWES KITS contain good quality printed circuit boards with screen printed parts and all board mounted components. Sales, construction and technical advice are available by phone during office hours. Please send an SAE for our free catalogue and specific product data sheets. Delivery is normally within seven days.

37 from Dave 64KOH, Technical Manager.
Essential reading for all mast or tower owners. Some sound advice from Terry Brown G0NSA.

Not so long ago, the only choice for mast guys was wire rope. Not only is this material inflexible and hard to handle, but it requires to be broken up into non-resonant sections to avoid problems on h.f. with the antenna tuning. With the advent of readily available Nylon ropes, the task of providing guys has become much easier.

But to be effective, the guys need to be attached correctly. For instance, Nylon rope is smooth and very few knots will hold for long without slipping.

Knots will also reduce the strength of the rope leading to premature failure of the system. What is needed is to fasten the guys without knots in such a way that your mast will stay in the air.

Master The Art

I have tried to master the art of rope splicing, but always end up with a joint so untidy that I would be ashamed to put it aloft! Now I use whipping twine to form all my joints and find it a much easier way to get the job done.

Where the rope is attached to the mast or anchor points, it is essential that the correct hardware is used to protect the rope from wear. 'D' shackles and thimbles of various sizes are obtainable from hardware stores or ships chandlers to suit the size of rope you are using. At each end of a guy line the rope is passed around the channel in a thimble and the cut end of the rope is laid against the guy rope for several inches, whipping twine is then used to finish off the job. Having formed what is known as a hard eye, the guy can be attached at each end by using a 'D' shackle.

By using the thimble, the rope is protected from wear and strain is avoided by spreading the load through a gentler turn. All ropes will stretch with time and to save having to undo all your hard work to take up the slack, it is a good idea to insert rigging screws when the guys are being assembled.

A rigging screw consists of a solid body with a screw thread in each end arranged so that turning the body causes a threaded rod at each end to tighten or loosen the guy rope, depending on which way the body is turned.

Two Purposes

A point to bear in mind is that with wind vibration, both the 'D' shackle and rigging screw are liable to unscrew themselves. The hole in the bar of the 'D' shackles serves two purposes. One is to allow the undoing. The rigging screw should be secured by means of a figure of eight piece of wire passed through the eye at each end. A coating of grease will help to keep the screw threads from seizing up.

All the hardware needed is available in galvanised or stainless steel at prices that are not too prohibitive. It must be remembered that you only get what you pay for and whilst more expensive the stainless steel will last a lot longer.

The use of the correct hardware will not only mean your guys will last longer but they will look better and more professional - besides which, the system will be easier to check and maintain.

Now that the winter has ended and the warmer weather is upon us, let us not forget those days of ice and wind and the toll it has taken on the metalwork we amateurs put up in the air. From the modest support pole to the largest tower, our aim should be to keep it up in the air at all times. A little time spent now will keep it in a safe condition and avoid costly accidents. The first consideration should always be your safety and the wellbeing of those around you, a few simple rules just to get us in the mood.

A) Wear good strong shoes with non slip soles. B) Gloves are also advisable. C) If your maintenance involves any kind of work above ground, fix the bottom of the ladder to a stout ground post to stop it moving, also tie off the top of the ladder.

D) The use of a harness could save you a nasty fall. E) Never work on a tower in its wound up state. F) If you drop a spanner, it could make you very unpopular if it hits anyone or goes through the conservatory roof. A piece of string from the harness to the spanner will avoid this and save you having to climb down to retrieve it.

Safe & Secure

Having made sure you and any helpers are as safe as possible, its time to stand back and take stock of what needs doing. A simple support pole should be checked to ensure that all fastenings are secure and not corroded, any joints should be tight and free from rust. Pulleys benefit from an application of grease and ropes should be checked for cuts or wear. A more robust type of support is the wind-up mast or tower, and although they vary in heights, the workings are basically similar. As they are wound up and down, an arrangement of cables and pulleys hoists the beast into the air, with the sections sliding inside each other.

Over a period of time the cable (usually steel strands) will stretch and may well suffer broken strands. The cable should be inspected and replaced at once if found to have any breaks. A repair is not possible and the cable has reached the end of its useful life.

The liberal application of grease to the cables and pulleys will inhibit rust and keep things moving smoothly.
Antenna Special

The winch is the key to movement for any tower and deserves to be treated with respect. If greased and used properly it will give years of service.

A brake of some sort will operate to stop the winch slipping and allowing the whole lot to come crashing down and usually consists of a spring loaded cam that engages a toothed wheel. Only a fool will rely on this arrangement alone to hold things aloft. If a locking mechanism is not provided to stop the winch from moving, then make one or change the winch.

On some winches the brake only works on the upward movement of the tower. Coming down, you are on your own. Letting go of the handle when lowering the tower is not a good idea nor is trying to stop the handle as it spins out of control when you have let it go, serious injury will be caused, as will damage to whatever is on top of the tower.

Top Condition

Nearly all supports will require some sort of guying to stop excessive movement at the top of the structure, how many will depend on how high or heavy your set-up is. As you rely on these guys to hold things steady during the worst our climate throws at us, it makes sense to ensure that they are in top condition.

Pay close attention to all cables and fixings and use the best quality you can afford. Check that however the guys are anchored, it is in good condition. Short cuts here will put the whole structure at risk.

If you have a Boy Scout handy all well and good, if not, buy a good book on how to splice and join ropes.

If a rotator is in use then now is the time for a look to see if the rain has got into the works and to replace grease. Nuts and bolts will also be easier to undo if you remembered to grease them before you did them up, if not, do it now.

The final link in the chain is the stub mast between the mast itself and the antenna. Most of the flexing in the system is done by the stub and it must be in good condition and strong enough to do the job. One good idea I saw recently is to push fit a wooden dowel inside the metal stub. I also ran a Nylon rope up the inside of my stub with the dowel, as moisture caused the dowel to swell and fill the pole, the rope was securely trapped. Now, should the pole fail, the rope will stop the antenna falling too far and doing too much damage.

Final Check

When the antenna itself was assembled and prior to its erection it should have been protected from the elements by the application of grease to all fixings and joints. While you are checking that all is well with the antenna, it will only take a moment to wipe off the old and replace with new grease.

A final check that all cables are sound with no leaks and the whole system should be ready to spend another year on the air. On paper it all sounds like hard work but should only take a few hours - a small price to pay when you think of what would be involved should the whole lot come crashing down.

Should the worst happen, and despite your best efforts it all comes down, then at least when the insurance assessor arrives he will see that you took every care of your equipment. It is all insured, of course?

Radio Amateurs Examination Courses

Audley & Halmerend Adult Centre, Audley, Stoke-on-Trent, Staffs.
RAE course, Tuesdays, 6.30 - 9.30pm, starts 19 September.
Enrolment at Audley Adult Centre on September 12 at 7pm or at Sir Thomas Boughey School, Halmerend on September 14 at 7pm. Contact Doug G8BAA (not QTHR) on (01782) 723444.

Blackpool and the Fylde College, Fleetwood Nautical Campus, Broadwater, Fleetwood, Lancashire FY7 8JZ.
RAE course, 30 weeks, starts 12 September.
Tutor - G3VDO. Fees - under 19, £3, over 19, £55.
Contact (01253) 352352 E. 4021.

Glenrothes & District Amateur Radio Club, Balweirrie High School, Kirkcaldy. RAE courses, Mondays, 7 - 9pm, starts late September.
Contact Ken Horne GM3YBO on (01592) 265789 (evenings) or T. McGill at Balweirrie High School on (01592) 640335 (mid September).
Morse class, Tuesdays, 7 - 9pm, starts late September. Contact Ken Horne GM3YBO on (01592) 265789 (evenings) or T. McGill at Balweirrie High School on (01592) 640335 (mid September).

Newbury Technical College. RAE course, Wednesdays, 7 - 9pm, starts September 13. Tutor - G3NDS. Contact Newbury College on (01635) 35353 or Ray Oliver G3NDS on (01672) 870892.
Morse class, Fridays, 6 - 7.30pm, starts September 15. Contact

Newbury College on (01635) 35353 or Ray Oliver G3NDS on (01672) 870892.

North Trafford College, Talbot Road, Stretford, Manchester M32 0XH.
RAE Theory course, Monday evenings or Wednesday mornings.
Electronics Servicing/Construction course, Tuesdays afternoons.
Computing course, Tuesday mornings.
Morse class, beginners, Wednesday afternoons.

Swindon Technical College.
RAE course, Mondays 7 - 9pm, starts September 18. Contact Swindon College on (01793) 498300 or Ray Oliver G3NDS on (01672) 870892.

Wombourne Adult Education Centre, Youth & Community Centre, Church Road, Wombourne, Wolverhampton WV5 9EZ.
RAE course, Mondays 7 - 9pm, starts September 18. Contact Brian Fereday on (01902) 820826.
Morse class, Thursdays, 7 - 9pm, starts September 21. Contact Brian Fereday on (01902) 820826.
Enrolment is on September 11 & 12th at Wombourne Youth & Community Centre, Church Road, Wombourne or by post.
## Receivers

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<th>Brand</th>
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### SPECIAL OFFERS

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## Accessories

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### Special Offers

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<tr>
<td>Drake</td>
<td>SW8</td>
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73's Peter Waters G3OJV/GOPEP
ATUs, Pre-selectors, Bump In

O.K, you have a receiver and you have an antenna; join one to the other and you can hear signals, so why do you need anything else between them? The listeners who may have experience of transmitting equipment will say that matching between a transmitter and an antenna ensures maximum transfer of power, and the same ought to be true in matching an antenna to a receiver, but the two arguments are not complementary in practice since the transmitter case involves matching at a few frequencies only and between relatively constant impedances.

For a receiver which is covering the range from 100kHz to 30MHz, it's unlikely that its input impedance is anything like constant over the range, and for an antenna operating over the same frequency range, its impedance can change dramatically as can its reactive components. It would take a very complex tuning system to match the average short wave receiver to the average antenna over the full 1.5MHz range, and I haven't seen such a system on the market yet - at least, not outside full blown professional installations which cost as much as the family car....

Passive Pre-selector

And yet I hear the cries from afar "I've got an a.t.u. with my receiver and I can peak signals with it". Probably true, O Master of the Universe, but the peak you hear is probably nothing to do with impedance matching and more to do with the additional front-end selectivity given by inserting a tuned circuit between the antenna and the receiver, meaning that the a.t.u. is acting as a passive pre-selector. Although it is true that at some frequencies the wildly swinging impedance of the antenna will approach values which the a.t.u. can accommodate, for most of the time the so-called 'matching' does not and cannot exist.

However, before I get sent the Black Spot by makers of antenna tuning units, let me say that any additional front-end selectivity is a bonus, and an a.t.u. performs a useful function in this respect.

Many a.t.u.s on sale utilise the II network which has an input (antenna) tuning capacitor, an output (receiver) tuning capacitor, and a series coil which usually has coil taps selected by a rotary switch. To give some idea of the range of component values required for a II network, let me quote from published data for a network operating at about 4MHz at an antenna impedance of 1.5\( \Omega \) and a receiver input at a nominal 50\( \Omega \). The antenna capacitor has to be around 360pF, the receiver capacitor around 1.8nF, and the coil around 6.5\( \mu \)H. If the antenna impedance happens to be nearer 8\( \Omega \), the network values change quite dramatically to 120pF, 760pF and 18\( \mu \)H. For lower antenna impedances the capacitor values would be enormous and the coil remarkably small, and none of the II network a.t.u.s with which I am familiar have anything like the range of component values to accommodate the impedance changes in a short wave receiving setup.

Dr. Ulrich Rohde has published figures for the impedance of a horizontal wire antenna at h.f. which show that (in the case of his example) at 5MHz the antenna exhibits an impedance of some 2k\( \Omega \) resistive and 3 to 4k\( \Omega \) inductive reactance, whilst at 6MHz the impedance has swung to 100\( \Omega \) resistive with 3k\( \Omega \) capacitive reactance. It takes a mighty matching network to cope with that!

Low-pass Filter

The final thing to remember is that the II network acts as a low-pass filter; in other words it passes all frequencies lower than the one in use. In transmitting this is an advantage because the network helps reduction of higher harmonic outputs from the transmitter, but in a receiver there is no advantage at all because what you really want is something which passes only the frequency of interest and reduces all others, whether above or below that frequency. This means that if you are using a simple a.t.u. and trying to listen to a weak station on the international distress and safety frequency on 8.291MHz, your receiver will still be suffering from the welter of strong broadcast stations about 1MHz lower which may well be producing unwanted interference to the stations on 8.291MHz.

However, there are certainly some receiver tuners on the market which do not use the II configuration, and these would be more effective (See the review of the Howes CTU8 in December 1994 SWM).

Unfortunately, it is sometimes difficult to find out from dealers' catalogues exactly what configuration their tuners employ, so be sure to ask some questions before buying. Manufacturers MFJ offer a wide range of commercially made receiver tuners, and I feel sure that they must have something suitable.

Herd of Buffalo

I said earlier that any selectivity ahead of a receiver is worth having: let's consider why.

Imagine that a solitary Apache Indian is standing in the middle of a prairie and coming towards him at full tilt is a herd of buffalo. His job is to isolate the only white buffalo from the herd and take it back to the camp. If he simply stands there and tries to catch this sole buffalo, he is going to be trampled to death! If you now consider that poor chap as your receiver, and the herd of
buffalo as the entire h.f. spectrum of signals galloping down the antenna, you may gather what your receiver has to cope with - or get trampled to death.

Now imagine that the tribal medicine man has conjured up a very strong fence all the way across the prairie and in that fence is a gate which is wide enough to pass just one buffalo. The buffalo catcher has also been given magic powers to move the gate to any position along the fence so as to catch the white buffalo. Once through the gate the catcher can deal with the solitary buffalo quite easily whilst the rest of the herd is stopped by the fence. That fence is a selective filter, and the moving gate the tuning control. If you have such a filter between your antenna and receiver, you can select the signal you want to hear and substantially reject the unwanted spectrum. That's front-end selectivity, and is probably the main benefit of an a.t.u., not its ability to match impedances.

Pre-selectors

Unlike an a.t.u., a pre-selector makes no attempt to match impedances because its function is to pre-select; that is to select wanted signals from a spectrum and reject all the others. Some pre-selectors do it well; others not so well, but all selectivity is welcome, particularly with today's generation of receivers which tend to have broad band input circuitry. Between the antenna socket and the first mixer of a typical modern receiver lies a bank of band pass filters, often arranged to cover frequency octaves, i.e. 1 to 2MHz, 2 to 4MHz, 4 to 8MHz, 8 to 16MHz, and 16 to 32MHz. The frequency range below 1MHz is covered by a low pass filter which could have a response right down to 100 or 30kHz depending on the particular receiver.

Let's assume that you are trying to listen to weak US Airforce s.s.b. traffic on 8.050MHz but all you can hear is strong broadcast garbage. After a while you realise that out of the garbage you can hear German so you think "I'll bet it's Deutsche Welle", and after much head scratching you realise that what you are hearing is a 3rd order intermodulation product caused by Deutsche Welle on 7.140MHz and Monaco on 6.230MHz both running powers of 500kW (That's half a million watts, Fred). There's nothing mysterious about 3rd order products; they are calculated as either (2f1 - f2) or (2f2 - f1), and in this case if you use (12 x 7140) - 6230 you find, as if by magic, that the 3rd order product is bang on 8.050MHz.

Because your receiver's bandpass input filter covers 4 to 8MHz, there is no rejection of either 7.140 or 6.230MHz, allowing both those 500kW signals to get into the receiver at the same time as your poor struggling wanted signal on 8.050MHz. Enter the pre-selector, riding over the hill like the 7th Cavalry to rescue you. A half-decent pre-selector peaked on 8.050MHz will reject or at least severely attenuate both of the unwanted signals, allowing you to listen in peace. Note at this point that a 11 network type a.t.u. will certainly not help because it has a low pass characteristic and would therefore pass both unwanted signals without attenuation...get the picture? Remember though that some a.t.u.s do not use the II network and they would almost certainly help in this situation.

Pre-selectors With Built-in Pre-amplifiers

Oh Boy! Having taken all that care to minimise high level interfering signals, the last thing you need is a 20dB amplifier in line to restore them to your original level and hammer the living daylights out of your receiver. The only gain you might need in a very selective pre-selector is about 6dB to make up for the losses within the selective networks. In my experience, most short wave receivers have more than enough gain built in already, and you will turn a silk purse out of your receiver, the most obvious component is a multi-section variable capacitor driven from the main tuning control. One section of this capacitor will tune the receiver local oscillator, but all the other sections will be tracking the tuned circuits at the front end of the receiver to provide a 'magic gateway' of selectivity to select the 'white buffalo' and reject the herd. Receivers of this type did not need pre-selectors; the preselection was inherent in the design.

Even in receivers of the 'Collins' design using fixed down-conversion to a tuneable i.f., the r.f. amplifier and first mixer still had track tuned circuits to provide that all important front end selectivity. In receivers such as the Collins 51J series, the front-end tracking was done mechanically by an elegant gearbox and cam drive system, whilst in other receivers such as the Edystone EA-12 the front end tuning control was brought to the front panel labelled 'RF Tuning' and you simply turned this control to peak the incoming signal; pre-selection built-in as a normal feature.

To summarise then; for the average listener with a length of wire for an antenna, it is unlikely that any 'Antenna Tuner' will be capable of tuning the wire to resonance except on a few frequencies, but the a.t.u. will, nevertheless, give some front-end selectivity, even though it may not help to reduce intermodulation products from interfering signals lower in frequency than the one being received. A properly designed pre-selector will provide real assistance for most receivers built since the late 1970s, and will definitely improve some recent short wave receivers with no built-in r.f. selectivity at all....you will have to discover for yourselves which receptor/s I mean.

John Wilson G3PCY, offers the fruits of decades of short wave listening.
REACTION TUNE ensures that you hear it FIRST!
NEW OPTOELECTRONICS Scout & AOR AR2700 / AR8000 receiver

If portability is of prime concern and "hand carry" is the only possibility then the Scout may help you locate those elusive transmissions when visiting airshows, motorsport events etc.

The Scout is similar to a conventional frequency counter in that it measures the frequency of any transmission from 10MHz to 1.4GHz which is 10dB to 15dB higher than the ambient RF background level. However, the Scout distinguishes itself from a traditional frequency counter by being able to differentiate between random noise and coherent RF transmissions automatically as an embedded microprocessor evaluates each measurement to determine when and which RF frequency is dominant.

Of particular interest to operators of the AR2700 & AR8000 is the ability to connect the Scout directly to the receiver (small modification required) so that active frequencies are automatically fed to the AOR receiver which immediately jumps to the active frequency reported by the Scout, this feature is called REACTION TUNE.

Previously the Scout would only connect with the ICOM R7000, R7100, R9000 and Pro-2005/6 ALL OF WHICH ARE BASE STATION UNITS. OPTOELECTRONICS have acknowledged AOR's innovation of computer control in hand held receivers (CURRENTLY ONLY OFFERED BY AOR) and have added support to the Scout making it possible to take the system portable so the full potential may be exploited. Another strong plus for the AOR is the AUTOMODE BANDPLAN DATA programmed into the AOR receivers, this ensures that when an active frequency is reported by the Scout, the AOR receiver will automatically change to the correct mode - again, not available on other brands.

Specific applications include compact "go anywhere" use where previously unreported frequencies may be in use at airshows, motorsport events etc. As the Scout effectively reviews a tremendous frequency range "in one go", that elusive transmission may be easily located and REACTION TUNE ensures that you hear it FIRST!

Due to the high popularity of the new Scout, the price has reduced to £399 (Modification to AR2700 / AR8000 £25 plus carriage) Special package of AR8000 + Scout £820
* FREE UK carriage on all main items *

Sorry, no space for "tip of the month" this issue. Remember we carry other models in new stock too by AOR, Yupiteru, Icom, Lowe, Drake, Opto Scout etc. Usually there is a selection of good clean used equipment available too. Please call or send a S.A.E. for full details and prices. "packages" are available along with a spectrum display. CONCERTO £49 + £3 P&P

CONTROL SOFTWARE for AOR receivers

AR8000 receiver - hand held all mode receiver with twin frequency display, alphanumeric text comments and optional computer control. £425
AR2700 receiver - hand held receiver with optional voice record module and computer control. £285
AR3000A receiver - base / mobile all mode true base station. £955
AR3000A PLUS receiver - enhanced version of the AR3000A with WEFAK, narrow AM filter, SDR "ready" etc. £1039
AR3030 receiver - all mode short wave receiver. £665

Many accessories available from stock.
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ICOM ICRI £375, IC7100DC £1375, YUPITERU MVT7100 £349, VT225 £239, VT125 £185, LOWE HF150 £399, HF225 £479, HF225E £675, PR150 £229, DRAKE SW8 £625, R8E £1149, OPTOELECTRONICS Scout £399 & more...

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PACKAGE AOR/02 The New Concept AR8000 UK receiver bundled with the SC8000 leatherette soft case, TW500 telescopic whip (in addition to the standard RA8000 helical aerial), WA1500 wire aerial with BNC plug... FREE CARRIAGE £459 (saving over £32)

PACKAGE AOR/03 The New Scoot AR2700 UK receiver bundled with the SC2700 leatherette soft case, RU2700 voice record module (workshop fitted), DA9000 flexible whip (in addition to the standard TW500 telescopic whip aerial)... FREE CARRIAGE £349 (saving over £25)

PACKAGE AOR/04 The New Scoot AR2700 UK receiver bundled with the RU2700 voice record module (workshop fitted)... FREE CARRIAGE £325 (saving over £18)

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Baluns

'Things that go bump in the night' are usually things dangling from your wire antenna hitting the rain gutter or the bedroom window, and the most popular of the 'bumpers' in recent times has been the so-called long wire balun. Firstly, they are not baluns. 'Balun' is a contraction of 'Balance to Unbalance', and since these devices are intended to go between an unbalanced coaxial cable and an equally unbalanced long wire antenna, they should be called 'Ununs'. Secondly, although hailed as new, the design goes back to the days of steam radio in the late 1920s when receivers were insensitive, long wire antennas were used, and electrical interference was a real problem. Today's 'Ununs' are still not as elegantly conceived as those original 1920/30 designs, (nor indeed as elegantly named) but there is no doubt that they transform the performance of a long wire/receiver combination.

Critical

I used the word 'transform' deliberately, because that is what these devices consist of; an r.f. transformer to convert the low impedance of a coaxial feeder to the much higher impedance found at the end of a wire antenna. Before you go dashing off to raid the junk box for a core and some wire, however, the design of these things is not straightforward because you have to get the right turns ratio to cater for most situations and the choice of core material is critical for good performance across the spectrum. You also have to find the right compromise between the number of turns needed for good I.F. characteristics, whilst at the same time ensuring that distributed capacitance is not going to ruin the h.f. end. The long wire 'Unun' is the easiest way I know of making a long wire work, giving genuine electrical interference. Prices currently range from a reasonable £19.95 from Barton Communications, to a startling £45 for imported units, which frankly seems rather high. I note that Waters and Stanton are currently offering a package deal of a Balun and an MJF passive preselector for £87.50, thereby giving the best of all worlds for not much more than the cost of the imported Balun alone.

Some of you may have knowledge of the amateur radio scene, where antenna baluns are often used and widely advertised for sale. Unlike the listener's 'Unun', the amateur radio balun is correctly named because it is normally used at the centre of a balanced dipole antenna to give a correct match to low impedance unbalanced coaxial cable. Such a balun is virtually useless to the general shortwave listener, because it is intended to work between matched impedances and simply do a balanced to unbalanced transformation, usually with an impedance ratio of 1:1, or sometimes 4:1. Used at the centre of a dipole intended for use across the whole h.f. range, where the antenna impedance will be swinging all over the place, this type of balun will just not work, and you are wasting money if you buy one. Don't do it unless you are only interested in listening to a single frequency, i.e. the resonant frequency of the dipole (or three times the resonant frequency of the dipole).

Active Antennas

If because of local circumstances you really cannot erect a length of wire for an antenna, then the active antenna may seem to be the only way of solving the problem. An antenna of this type is 'active' because it incorporates a wide band r.f. amplifier with sufficient gain to make up for the limited length of the actual antenna, which may be no more than a metre long whip or a short, very fat dipole piece of wire.

There are good active antennas; there are bad active antennas, and I can only tell you of my own experiences with some of them. A professional would probably go straight to Rohde & Schwarz and take a look at the HED10. This covers 10kHz to 80MHz so would suit the short wave listener perfectly, if he could take out a small mortgage to buy it - this quality is never cheap. In the realms of the hobby market there are the antennas from Dressler which perform extremely well, or the DX-1 from RF Systems in Holland, but neither of these have been advertised for some time so the current prices are not known. I do recall that they are in the 'hundreds of pounds' category. Best value for money have always been the AD-270 and AD-370 from Datong which offer good performance at modest (£60 to £80) prices. Things to definitely avoid are those active antennas which are no more than a whip antenna with a high gain pre-amplifier at the base. They simply don't work, because the preamplifier generates the most dreadful series of intermodulation products from the entire h.f. and v.h.f. spectrum that it is possible to imagine, and all you get in your h.f. receiver is a meter-pinning noise level overlaid by mixtures of Radio 1 FM and the local Fire Brigade.

Good receiver designers sweat blood developing linear front-ends and bomb-proof mixers for receivers in order to get good intermodulation performance. Having achieved it, the unsuspecting user then puts up a cheap active antenna which has such a poor intermod performance that it totally negates all the designer's good work, and the receiver can do nothing about the shambolic mess of signals being generated at the top of the antenna mast inside the active antenna. For an active antenna to be any good at all it ought to have better intermodulation figures than the receiver which it feeds, and this is what costs the money in a good antenna. The simple whip with an f.e.t. buffer at the bottom will just not cope with the situation and will be worse than useless - and I do mean worse than useless.

Lightning Protection

The best protection against lightning damage is to live in a cave where there are no storms. But next to that you can unplug your antenna feeder from the equipment during a storm and connect it to a good earth well away from the radio.

There are devices on the market which consist of a spark gap inside a coaxial back-to-back connector, but if there is sufficient voltage on the antenna feeder to jump an air gap, it has probably already finished off your receiver. The situation is rather like that of a safety match; the only way to test it is to strike it, after which you throw it away. As a note of caution, an electrical storm many miles away can generate huge static voltages on a long wire antenna, so it pays to always disconnect the antennas when the radio is not in use.

Another device which is claimed to offer high voltage protection is the 'Transi-Trap', which contains a gas filled glass element with precise breakdown characteristics, or the "Receiver Guard 2000" from Design Electronics Ohio, which uses high-speed diode switching. Both these are available from Universal Radio in the United States, who are happy to deal directly with you.

Unexpurgated Views

Those are my unexpurgated views on just a few of the accessory units available to the short wave listener, and I hope that they lead you to raise a quizzical eyebrow when you read some of the more fanciful claims made by various people. Of course you are free to disagree with me, but I began in radio communications at the tender age of 12, was pirating with my home built equipment on Top Band at 14, and have been professionally involved ever since, including 30 years as a founder and director of what became the best known hobby radio company in the UK and Europe. Now retired (sort of), I am pleased to pass on my honest opinions of equipment, techniques, people and personalities in the business, and I hope you enjoy what I say, or at least pause to consider.....

Correspondence c/o Short Wave Magazine is welcomed, and I wish you as many happy years in the hobby as I have enjoyed myself.

Short Wave Magazine, September 1995
If you are looking to improve the DX potential of your portable receiver, Andrew Howlett G1HBE may have the answer with his medium wave booster.

The short wave performance of modern mid-priced portables is surprisingly good, but where some of these sets fall down is on medium wave, making DXing on this band difficult if not impossible. A loop aerial can make a dramatic difference, but because of their size they can be rather awkward to operate. For the last couple of years, I've been using the gadget described here to 'winkle out' those distant stations.

The Circuit

The circuit is shown in Fig. 1, and it could hardly be simpler, m.w. signals are picked up by L1 (on the ferrite rod) in the usual way, and tuned by C1. The use of a dual gate f.e.t. as the active element makes the circuit tolerant of strong local signals, and the second gate provides a convenient method of gain control. The amplified signal appears at the drain of Tr1 and exits via the d.c. blocking capacitor C4 to make its way via a length of screened cable to the coupling coil L3. This couples the amplified signal to your radio's ferrite aerial by transformer action; more on this later. The extra 'boost' is provided by components C3 and L2, which introduce positive feedback around the whole circuit, and as the feedback loop includes the main tuned circuit L1/C1, a 'Q-multiplier' effect takes place, reducing the bandwidth and cutting down the strength of stations on each side of the tuned frequency whilst boosting the wanted signal.

Construction

The bigger the antenna the better, and this is as true of ferrite rods as it is of any other type. I used a 200 x 12mm one from J. Birkett of Lincoln, and it came complete with a medium wave winding of about 40 turns on a sliding former. There was also a secondary winding of about 8 turns on the same former, but as this was not required it was removed, taking care not to damage the 40 turn winding, as I used it for the main tuned circuit. If the rod you have does not have a suitable coil, one can be wound quite easily from enamelled copper wire of about 30s.w.g. Wind the turns neatly with one wire diameter spacing between each turn, onto a former made from plastics tube or rolled paper. Fig. 4 shows the arrangement including the extra feedback winding L2, which can be made using the same method. The electronics can be built-up very easily on a small piece of Veroboard, and the circuit is so simple that no layout is given; the only critical part of the circuit being the correct orientation of the f.e.t., Tr1. The connections for this are shown in Fig. 1. The tuning capacitor can be an air-spaced type taken from an old radio, or the use of an air-coil of about 8 turns. The output to L3, via C4, is shown in Fig. 2.
Experience the World of Listening

The AR3000A has established itself as a high performance base mobile receiver offering an extremely wide frequency coverage of 100 kHz - 2036 MHz and all mode receive. The introduction of the AR3000A PLUS provides even greater performance and capabilities.

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AR3000A-PLUS receiver £1099 UK carriage free
SEARCHLIGHT Windows PC software £99 + £3 P&P
AORSC DOS PC software £75 + £3 P&P
CR400 tape lead (also for AR3030) £16.95 + £1.50 P&P
MM1 mobile mount £16.95 + £2 P&P
WA7000 base aerial HF/VHF/UHF £149 UK carriage free

The SDU5000 is a spectrum display unit designed with the AR3000A in mind. Locating brief transmissions has never been so easy, by using the MAX facility any transmission within ± 5 MHz may be identified and signal strength measured in dBm. A small modification is required to the standard AR3000A to provide compatibility but the AR3000A PLUS is ready to go. The SDU5000 will also operate in conjunction with the ICOM receivers R7000, R7100 & R9000 (optional CT-17 required). SDU5000 £799 UK carriage free

The AR3030 is The New Classic of short wave receivers. Coverage is from 30 kHz - 30 MHz and all mode receive. The legendary 6 kHz mechanical AM filter is fitted as standard along with a 2.4 kHz Murata filter for SSB and an additional filter for NFM. Stability is excellent due to the standard fitting of a TCXO.

AR3030 £699 UK carriage free
Optional VHF converter (air or marine) £109 + £3 P&P
Optional Collins SSB, CW or 4.0kHz AM filters £89.29 each + £2 P&P
Concerto Windows PC software £49 + £3 P&P

The AR8000 UK receiver is without doubt the most full featured wide band hand held receiver on the market today. Frequency coverage is from 500 kHz - 1900 MHz without gaps with all mode reception... twin frequency display, alphanumeric text comments.

AR8000 £449 UK carriage free
SC8000 case £17.95 + £1.50 P&P
CU8232 interface £99 + £3 P&P
PC-MANAGER DOS software £49 + £3 P&P
* Windows software to be released soon...
TW500 telescopic whip £14.95
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+ £1.50 P&P
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+ £1.50 P&P
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The AR2700 UK is the very latest high-tech hand held receiver from AOR. Frequency coverage is 500 kHz - 1300 MHz with receive modes of NFM, WFM & AM. An optional VOICE RECORD chip RU2700 permits an instant 20s digital recording of air which may be replayed over and over again. Computer control is also possible by using the optional IF-ADP and CU8232 adaptor and interface.

AR2700 £299 UK carriage free
SC2700 case £17.95 + £1.50 P&P
RU2700 record module £44.90 + £2 P&P

A WEB site is "currently under construction" and the URL is:
http://www.demon.co.uk/aor

All prices include VAT. Please request the full list of accessories and prices.

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### BASE SCANNER RECEIVERS: 0% APR

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### SHORTWAVE - WORLDWIDE - DX RECEIVERS

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a miniature ‘Polyvaricon’ example (where do they get their names from?) available from Maplin or Cirkit, the only trouble with these is finding a knob to fit them! Keep the wires between L1 and C1 short, trouble with these is finding a line with that of the rod; Fig. 2 shows how. Probably the most practical design of coil is that shown in Fig. 3. The coil consists of about ten turns of enamelled copper wire (30s.w.g. will do again) supported on a 40 x 40mm piece of Veroboard. The screened lead feeding this coil need not be ‘proper’ coaxial cable, microphone lead being perfectly good enough and more flexible. The coil can be glued to the board, or if you have the facilities it could be potted in epoxy resin to form a neat block. The only non-damaging way of attaching the coil assembly to your radio is Blu-tak, not very elegant but effective.

### Setting-Up

Complete the wiring of the electronics, but leave L2 off the ferrite rod for now. If the f.e.t. you used came with a static protection wire around the pins, remove it now. After checking for wiring errors and short circuits, attach L3 to the end of your radio as shown in Fig. 2. Tune into a weak station in the middle of the medium wave-band and connect the battery and switch on. Set the gain control R2 to about two-thirds clockwise rotation and then tune the booster’s tuning capacitor C1 until you hear the station peak up. Rotate the booster’s ferrite rod for best possible reception, and then turn R2 up and down to check that the strength of the signal can be altered. If R2 does not seem to have the right effect, switch off and re-check your wiring; Table 1 lists the voltages for a correctly functioning unit. Assuming all is well, carefully push L2 onto the end of the rod, listening to the signal all the time. If you’re lucky and you’ve got the ‘sense’ of L2 right, there will be a point where the station becomes much stronger, and if you go beyond this point the booster will burst into oscillation. If none of this happens remove L2, turn it around and try again. Position L2 so that oscillation starts at about three-quarters rotation of R2, then tune to the bottom and top ends of the band to make sure the booster has enough gain to work properly at the extremes of its tuning range. If the circuit will not oscillate at one end of the band, a small adjustment of L2 towards the main winding will put matters right. Once you are satisfied that your booster is working, seal L2 in position as it should require no further movement. The size of the ferrite rod will dictate the size of box into which the booster is built. Needless to say the box must be a plastics one, or no signals will penetrate it!

### Table 1

<table>
<thead>
<tr>
<th>Component</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply</td>
<td>9V</td>
</tr>
<tr>
<td>Tr1 drain</td>
<td>6V</td>
</tr>
<tr>
<td>Tr1 source</td>
<td>0.7V</td>
</tr>
<tr>
<td>Tr1 gate 1</td>
<td>0V</td>
</tr>
<tr>
<td>Tr1 gate 2</td>
<td>0-0.8V</td>
</tr>
<tr>
<td>Top R2</td>
<td>0.8V</td>
</tr>
</tbody>
</table>

### In Use

There is a knack to using the booster, but once mastered it can make a dramatic difference to weak signal reception. For best effect, the trick is to operate the booster in its ‘not quite oscillating’ mode. Careful tuning and control of R2 can narrow the bandwidth to such an extent that ‘sideband cutting’ is possible, much reducing interference from adjacent stations. When used like this the tuning becomes extremely sharp, so be patient. Finally, if the booster has little or no effect, although all the voltages are correct and it can be made to oscillate, the fault is almost certain to be poor coupling of L3 to your radio’s antenna. Try different positions for L3. Happy twiddling!
Brand new and hot off the production line is the all new Lowe HF-250. Mike Richards is the first reviewer in the world to get his hands on this latest offering from this British receiver manufacturer.

The Lowe HF-250 is the latest in a fine breed of receivers from this famous manufacturer and is bound to cause quite a stir. Over recent years Lowe’s have established themselves as a champion of British design and achieved wide success through a range of well built high performance products. The HF-250 represents a change in so much that it is now in direct price competition with many of the Japanese mainstream receivers. One of the most significant changes in this model is the styling. As can be seen from the photographs, the new model boasts very sleek curving lines that should increase its appeal considerably. These improved looks have been achieved without losing the individual style for which Lowe Electronics have become famous. In addition to the obvious aesthetic changes, the HF-250 boasts a wide range of enhanced features that make it a formidable contender in this very competitive market.

Layout
One of the striking features of the new design is the sleek black anodised brushed aluminium front panel and the clarity of the panel markings. The simple use of white on black is very effective both in terms of styling and practicality. When using the HF-250 for late night DXing the clear panel markings are a great boon. The main display illumination was also very well balanced for all lighting conditions. Besides the main display, the front panel was dominated by the main tuning knob. This knob had a wonderfully silky feel and was very free moving. The remaining operational functions were set using press buttons. These all had a very positive feel with a click to confirm operation. In addition to the main display, there was a bank of i.e.d.s used to show the mode and memory status. On the HF-250’s top panel was an ingenious cut-away handle that I hope you can see from the photographs. Not only was this a good carrying handle but also provided the vent for the internal speaker. Moving on to the rear panel, there was a good selection of antenna connection options. Antennas catered for are 600Ω wire, 50Ω coaxial feeders and a whip for portable operation. Each option was selected using a three-way slide switch on the rear panel. The WA-250 whip option was particularly useful for portable operation as it includes a built-in antenna pre-amp to provide the correct high impedance match for a whip antenna. In addition to the versatile antenna connections, the HF-250 featured the now standard record and external speaker outputs. These both used 3.5mm jacks and the speaker jack included switching to disable the internal speaker. The output level from the record jack was around 350-400mV from a 5kΩ source.

Remote Control
One of the very new features of the HF-250 is the provision of an optional full function remote control unit. The controller looks just like any other TV/hifi remote control, but gives access to virtually all the HF-250’s features and adds a couple more. The only irritating omission was the lack of a volume adjustment. The handset included the usual up and down buttons for frequency and mode adjustment and this was supplemented by a MHz button. This increased the frequency in 1MHz steps with a loop around at 30MHz. To help with the quick selection of a band, the MHz button included an auto repeat so you could hold the button depressed and just release when the required frequency is reached. The new features added with the remote control were mute and standby and most importantly, direct frequency entry. The mute did just that and suppressed the audio output with a toggle action. The direct frequency entry was a very welcome addition. Pressing the numbers on the keypad caused the display to build-up the required frequency. For frequencies above 3MHz the receiver switched to the entered frequency as soon as the final digit was entered. When entering lower frequencies you have to press the Enter button to let the receiver know you had finished entry. One point to note with this operation is that you could only enter frequencies in kHz despite the display indicating frequency to 100Hz. Power for the remote control unit was via two AAA cells mounted in the rear of the handset.

Smart Tuning
Lowe have put a lot of development effort into making the manual tuning feel right.
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The result is a simple but very effective tuning algorithm that appears to cope very well with all the listening modes. The secret lies in allocating the correct tuning steps for the rotary control combined with well judged rate switching as you move the knob faster. In practice the switching was hardly noticeable, but the end result was the ability to search around the band very quickly but with a minimum 8Hz per step fine tuning to home in on the required signal. The actual frequency steps used also varied with the selected receive mode. The beauty of this implementation was that it felt so right. This great feel was further boosted by the heavy tuning knobs, their action was very smooth and free running and could easily be spun for very rapid frequency changes. Any readers who’ve used the classic Edystone dials will know what I mean. A more conventional feature for fast tuning was the provision of Up and Down MHz buttons. As you would expect, these altered the displayed frequency in 1MHz steps and included a fast auto repeat and automatic loop around at 30MHz. An additional extra was the provision of a FAST button next to the main tuning dial. Holding this depressed whilst tuning caused the tuning rate to increase to 1kHz per step. Once you had found the required frequency you could operate the control lock facility to prevent inadvertent operation of the controls. This lock was particularly comprehensive and completely disabled the remote control and front panel functions.

**Mode Roundabout**

Selection of the required receive mode used a novel carousel technique. Whilst the selected mode was indicated with a group of six I.E.D.s to the left of the main display changing modes was done by first pressing the Mode button and then using the Up and Down buttons to highlight the required mode. This same changing modes was done by first pressing the Mode button and simultaneously pressing the two store buttons. The memories can be reviewed in two ways. You can either select memory mode and have the display just show the stored parameters or you can select channel mode. In this mode the receiver will tune to each stored frequency as soon as the memory is selected. There were no memory move or delete functions so management has to be by re-writing and over-writing the memory channels. As with most modern receivers, the HF-250’s memories retained the mode and attenuator settings as well as the frequency. The storage medium for the memory information was an electrically erasable programmable read only memory or eeprom. The great advantage of these devices is that they don’t require back-up batteries and each memory will be retained for a minimum of ten years. Closely associated with the memory and general tuning options was the provision of a background tuning store. This was similar to having two v.f.o.s and could prove useful particularly when monitoring a duplex signal. Using this system you could pre-set the receiver so that it was tuned to two frequencies and then switch between the two at the touch of a button.

**Versatile Filtering**

One of the hall marks of the Lowe receivers has been the inclusion of a wide range of i.f. filters. The HF-250 includes four i.f. filters, namely 2.2, 4, 7, and 10kHz. These filters are automatically allocated according to the mode selected as follows: a.m. = 7kHz, a.m.s. = 7kHz, a.m.s. (I.E.D.U.S.B.) = 4kHz, s.s.b./c.w. = 2.2kHz. The automatic allocation will suit most occasions but the filter can be changed at any time by pressing the Filter button and cycling through the available choices. This lets you quickly adjust the filtering to give the best results. Those interested in c.w. work will find the HF-250 particularly good as it now has a user selectable 200Hz audio filter. When this mode is selected, pressing the Filter button gives the option of the standard 2.2kHz filter or the additional 200Hz audio filter. When the narrow band f.m. option is fitted the filter buttons are used to switch the squelch on or off. In this case the i.f. filtering is fixed at 12kHz.

**Memory**

The HF-250 features 255 user-programmable memories in which to store all your favourite frequencies. Although there was no formalised grouping, as found in scanning receivers, there were some good memory review features that can be used to help make sure things are kept in order. Storing frequencies in the memories was very simple - you just tune the required frequency, select a free memory using the Up/Down buttons and simultaneously press the two store buttons. The memories can be reviewed in two ways. You can either select memory mode and have the display just show the stored parameters or you can select channel mode. In this mode the receiver will tune to each stored frequency as soon as the memory is selected. There were no memory move or delete functions so management has to be by re-writing and over-writing the memory channels. As with most modern receivers, the HF-250’s memories retained the mode and attenuator settings as well as the frequency. The storage medium for the memory information was an electrically erasable programmable read only memory or eeprom. The great advantage of these devices is that they don’t require back-up batteries and each memory will be retained for a minimum of ten years. Closely associated with the memory and general tuning options was the provision of a background tuning store. This was similar to having two v.f.o.s and could prove useful particularly when monitoring a duplex signal. Using this system you could pre-set the receiver so that it was tuned to two frequencies and then switch between the two at the touch of a button.

**Computer Control**

One of the ways to really make receivers like the HF-250 sing is combine their excellent r.f. performance with the sophisticated facilities offered by computerised control. The HF-250 is well set-up for this with a full set of commands. A significant improvement over the HF-150 is full two-way communication. This means that any PC with a computer being able to set modes and frequencies, it can also interrogate the receiver to check the current status. This effectively closes the control loop and opens up potential for comprehensive control. One of the important extras was the ability to read the S-meter data. This combined with the accurate setting of frequency means that you could fairly easily use computer control to build-up a display of activity within a defined band. At the time of writing the only computer control program available was Lowe’s own Basic package. Whilst this provides very useful on-screen control of the receiver it only scratches the surface of what could be done. I would expect that most of the main stream computer control programs will very quickly be enhanced to cater for the HF-250 command set.

**Timer Control**

Just to complete the main features, the HF-250 includes a clock and a pair of programmable timers. The clock is fairly conventional and provides a read-out in hours, minutes and seconds. The two timers could be set-up with on and off times along with a pre-set memory number. This was a very versatile feature particularly if you want to record stations that transmit at an unsociable hour! My only criticism of this mode was the lack of panel markings showing the timer functions on the buttons. Mind you, if they had...
marked the panel I probably would have complained that the panel was too cluttered!

Operating Manuals

Lowe have addressed the problem of combining help for newcomers with detailed operating instructions by providing two books - an operating manual and a listeners guide. The main operating manual sticks very much to the point and sequentially describes the receiver's functions and how best to operate them. This was supplemented by detailed, but very small circuit diagrams, and a basic circuit description. I was a little disappointed with the overall quality of the manual and would like to have seen better print and binding quality with a few more illustrations to explain some of the operations. The Lowe Listeners Guide is very well known and provides a useful introduction to all aspects of listening.

Using The HF-250

For the review I tried the HF-250 in a number of different locations with a wide variety of signal types. For the base stations tests I used the receiver with a random wire antenna fitted with a MLB and coaxial feeder. For portable operation I used avialable antennas and simple wire systems. The manual tuning ergonomics were really excellent with well chosen and seamless rate changes on all bands and modes. I found that the Fast Tune button next to the tuning knob took some getting used to and was only really suitable for right-handed operators. This was not too serious a problem as the other tuning options covered most requirements. The mode selection system also took a little practice but was soon mastered. Most of these idiosyncrasies were more a feature of the individual design than real operational problems. Perhaps most important of all was the HF-250's on-air performance. This proved to be extremely good. I’ve found with many Lowe receivers that the disappointment from the apparent lack of buttons and gizmos is very soon overshadowed by pure good performance. The HF-250 is no exception and produced top quality results in all modes. The s.s.b. quality was really very good indeed due to the use of a well designed product detector. Equally the a.m. performance provided very low distortion through the use of a full wave detector. Another example of the way in which Lowe have sought to help the listener through good design is the inclusion of an automatic noise blanker. This operates from the a.m. detector and causes a momentary blanking of the audio signal whenever high level a.m. noise peaks are detected. Whereas some of the flashier receivers would have a switch or two for this, Lowe have sought to simplify the operation by making the feature completely automatic. The r.f. performance was also very good and with no gain before the first mixer, was able to produce a 3rd order intercept point of greater than +4dBm at 10kHz signal separation. This increased to +13dBm with a 50kHz signal separation. I was particularly pleased with the ability to select different i.f. filters. Not only could this be used to minimise interference from adjacent signals, but you could also open-up the filters for better quality audio when working on a clear band. I suppose the clumsiest part of the whole operation was the clock and timer settings as you had to refer to the manual to remember all the functions. With a small internal speaker mounted inside the top panel, users would be well advised to use an external speaker for best quality. I tried the HF-250 through a Bose bookshelf speaker and was impressed with the results. You will note that the HF-250 features something of a rarity with a tone control on the front panel. Even this has been very thought-out and gives a flat response when set at its mid point, with low and high pass characteristics respectively at each and of the control travel.

Summary

I certainly liked the HF-250 and found it a refreshing change from many of the receivers in this price range. The HF-250 is eminently suitable for the listener who demands high performance but doesn’t want the distraction of an array of switches and knobs for every function. Lowe have also managed to produce a receiver that looks good whilst still keeping that individual design flair that has become a trademark of this manufacturer. Although there were one or two niggles with the HF-250, these were all fairly minor and didn’t compromise the overall result. The all important r.f. performance was excellent for all types of listening from utilities through to broadcast.

The Lowe HF-250 costs £799 and is available from Lowe Electronics, Chesterfield Road, Matlock, Derbyshire. Tel: (01629) 580800. My thanks to Lowe Electronics for the loan of the review model.
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If you have ever attended an air display or special event with a scanner you will know that it can be very frustrating to see radio communications taking place all around you whilst being unable to find the frequencies in use.

There are several ways of improving this situation including using the automatic search and store function on your scanner - if it has one. However, this does take some time and you need to make a fairly educated guess at the range of frequencies in use to improve your chances of detecting what may be very brief transmissions. A slightly better method is to use more sophisticated equipment such as a spectrum analyser or frequency counter.

A spectrum analyser allows you to see a large portion of the radio spectrum on a screen and each time a transmission is made a vertical line appears on the display indicating the frequency and received signal strength. This does allow you to detect quite weak and very short duration transmissions but the equipment is very expensive, quite large and you have to keep your eyes glued to the screen. Not very practical if you want to walk around.

The second option is to use a frequency counter. This can work quite well providing you understand the limitations of such a device. A normal frequency counter is designed as a piece of test equipment for the purpose of accurately measuring radio frequencies. If you attach an antenna to it and the counter is sensitive enough, you should be able to measure the frequency of any transmitter within a limited distance from the counter. The problem is that a normal counter will continue to give a random display even if no signals are present. You have to be able to see someone using a transmitter before you can look at the display to see if it is showing a steady value.

I modified a hand-held counter a few years ago so that it would only update the display if a signal was present, the last reading being frozen once the signal ceased. In order to tell when a signal was present I also added a small audio beeper to alert me when the display was being updated. This worked very well and I was able to find lots of frequencies very quickly just by keeping the counter in my pocket and walking close to people if they were using a transmitter; as I could then leave reading the display until later. The only problem with this arrangement was that the battery would only last for a few hours and that the counter had an I.e.d. display, which I was unable to read in bright sunlight. The next improvement was a counter -with an I.c.d. display and built-in memory. This was a lot more sensitive but I missed the facility of an audio beep when a signal was present, and although it had a built-in computer interface I still needed to manually programme the displayed frequencies into my scanner.

**Had To Try One**

So when I heard about the Optoelectronics 'Scout' frequency recorder, which had an I.c.d. display, digital filtering and capture, 400 memories, computer port and radio interface, audio beeper and 'Vibrate' mode - I knew I must try one!

When the unit first arrived I was surprised at just how small it was - measuring only 85x30x95mm (without the belt clip) it is about the size of a cigarette packet, making it very easy to carry around. The front panel has a 20x55mm I.c.d. display providing a function, frequency and signal strength indication, a red 'gate' I.e.d., three small slide switches for power, filter and capture functions and a square push-button to select the 'gate' time. The top panel has a d.c. power socket, red I.e.d. charge indicator, BNC antenna connector and a 2.5mm audio jack which is used as the computer port. Also supplied was a small mains charger, antenna, PC software disk and instruction book.

The next question was - how can such a small unit having so many functions be operated with only four controls? On switching the unit on I was greeted with a loud Morse greeting spelling out the word 'SCOUT' and the display showing initially all the segments displayed followed by the software version 3.1 and the computer interface selected, in this case AR8000. By playing with various switch combinations I found I could select different options but, I must admit that I had to refer to the manual before I could make much sense of what I had actually achieved.

**A Good Command of Things**

The commands are easy once you know what you are doing. This depends on the switch positions when the power is initially switched on. In its normal state the unit just acts as a frequency counter. Different gate times can be selected by momentarily pressing the square push-button on the front panel. This toggles the unit through four different gate times of 800μs, 8ms, 80ms and 800ms giving display resolutions of 10kHz, 1kHz, 100Hz and 10Hz respectively.

Operating the filter switch causes a digital filter to be selected which prevents the unit constantly displaying a random count. This is very useful if you wish to use a fast gate time but don't wish to see the last digits of the display constantly flickering.

With the filter selected, operating the capture switch changes the operation from that of a normal frequency counter to what Optoelectronics call a frequency recorder. In this mode the unit will detect and store any signals strong enough to overcome the background level of radio signals. The unit can record up to 400 different frequencies and in addition log up to 256 occurrences of a particular frequency. A clever software filter prevents any signals within 10kHz of previously measured frequencies from being stored. This very effectively overcomes the problem of memories filling with adjacent frequencies when the count is not absolutely stable. Frequency resolution is fixed at 1kHz in the capture mode and it takes under a second to effectively lock onto a signal and perform the necessary digital filtering.

Switching the filter function off with the capture switch still on permits you to toggle through all the frequencies stored in memory by pressing the gate push button. This displays the memory number and measured frequency with the number of 'hits' appearing alternately on the I.c.d. screen.

Clearing all the memory contents is achieved by switching the unit off, unless you press and hold down the gate button for longer than a second. This puts the unit into a 'sleep' mode which dramatically reduces the battery drain and additionally permits you to switch the unit off without erasing the memory contents - although I must admit that I sometimes forgot to do this before flicking the power switch. The internal Nicad batteries gave over six
hours continuous use with the 'sleep' mode automatically operating when the batteries go flat - so you don’t lose the memory contents. In addition the built-in charger circuit permits a full recharge within one hour from a suitable 12V supply.

Powering the unit with the filter selected initiates the auto back-light function. In this mode the back-light illuminates and stays lit for three seconds if a signal is detected. If the capture switch is on when the power is switched on an audio ‘bleep’ is activated when a signal is detected. One ‘bleep’ for a known signal, two ‘bleeps’ for a new one. Flicking the capture switch during powering up selects either AOR AR8000 or Icom CI-V signalling protocols via the computer port - but more of that latter.

A final mode is selected by pressing the push button during power up enabling the 'Vibrate' function. Instead of the 'bleep' the small plastic spoon on the operators face! I found it most amusing to watch the unit move across a table each time a local paging transmitter operated.

By this stage you are probably wondering how well it works in practice and what sort of measurement distances can be obtained. Connecting a small multi-band scanner antenna to the BNC socket immediately produced a reading with the capture mode selected and during the next few minutes several different transmissions were recorded. I was most impressed by this and connected up a signal generator to check the level of signal required to produce a stable reading on the display. This turned out to be very good over the range 50-500MHz with a level of 1mV producing a reading. Maximum sensitivity was at around 200MHz with the response dropping slightly below 20MHz and above 900MHz, although readings could still be easily obtained outside these limits.

The actual distance from which transmissions can be detected is very dependent on the transmitter power, antenna, location and background signal level. It is actually determined by a very clever algorithm, which looks for the strongest signal which is at least 10-20dB above the general noise floor. However, as a guide with a 1/4 wave antenna connected to the Scout, a 1W v.h.f. hand-held transmitter could be detected at 30m, a 1W u.h.f. hand-held transmitter could be detected at 20m and a 25W v.h.f. base station detected at 0.5Km. With a 1/4 wave v.h.f. airband antenna connected several signals from aircraft on the local airport approach were measured. With a v.h.f. low band antenna connected to the Scout very good ranges were achieved. I believe this was partially due to the fact that signals at lower frequencies generate a higher voltage at the output of a resonant antenna by virtue of the element capture area. In fact Packet Data transmissions from AA patrol vehicles operating at around 72MHz were being recorded almost constantly.

**Variety of Conditions**

During the review period I was able to try the unit out under a variety of conditions. One of the most interesting tests was to visit a local p.m.r. radio site. The site has eight masts within a radius of 0.5km and has various services operating from it including a Band II f.m. broadcast transmitter, v.h.f. paging services, v.h.f. and u.h.f. links and other general p.m.r. services. I thought that if the Scout could make sense of that lot it would be a Ulysses - well it almost managed it!

The main problem was the 1KW f.m. broadcast station which operated continuously and produced a much higher signal level than any of the other services on the site. Fortunately I had remembered to take a home-made Band II notch filter with me and inserting this in line with the antenna made a vast difference. I found that I was able to walk around the site with the telescopic antenna collapsed and by watching the I.C.D. signal bargraph display I was able to null out some of the stronger signals (some of which I had already captured and so I was then able to detect some of the less obvious transmissions. Once I returned home the next test was to try out the computer interface. I used this with the supplied software and a home built level converter to download the contents of the Scout to a PC text file. I was then able to import the data into a database and compare the measurements against previous loggings I had made. This made the identification of unknown transmissions very easy and helped to confirm the source of some of the known ones.

Another interesting aspect is the ability to tune a receiver to the frequency being captured by the Scout. I was able to try this with both an Icom IC-R7000 and an AOR AR8000 hand-held and it worked very well, with the radio usually locking to a signal in less than a second. The Icom does not have the automatic mode selection which is available on the AR8000 so some button pressing is necessary at times to switch between a.m. and f.m. With the AR8000 some manual changes were still required because of the mixture of modes in the lower v.h.f. bands, however most of the time the automatic selection made monitoring a pleasure. Enabling the band scope function whilst in using the Scout to tune the AR8000 was most interesting as you are almost immediately able to determine if the receiver is exactly tuned to the incoming signal.

As a final test I decided to try the Scout/AR8000 combination on a car journey to London as I thought this would provide plenty of opportunities to capture different transmissions. I used an external antenna on the car to feed the Scout and just the antenna supplied with the AR8000 attached to the receiver. I assumed that this would give the strongest signal to the Scout and that the AR8000 would be sensitive enough to receive signals with the antenna inside the car.

The first thing I noticed during the journey was the large number of times the Scout captured paging transmissions. This became very annoying as the receiver remained tuned to the paging frequency until the next signal was detected. Turning the squelch control up, switching in the attenuator and placing the receiver in the passenger footwell helped to reduce the reception range so that it was comparable to the detection range of the Scout. This made monitoring much more comfortable and I could safely assume that if I could hear a transmission I was reasonably close to its source. The second problem was that for the majority of the time the signals heard were those from mobile stations, this meant that it was often necessary to look up the frequency offsets in order to determine what frequency the base station was likely to be operating on and hence the user. If the use of Scout/ receiver combinations proves to be popular perhaps AOR will consider incorporating an automatic duplex tuning option in to the next generation of receivers - or even better have a built-in ‘frequency recorder’ mode of operation.

**Time to Smile**

I had a great deal of fun using the Scout - so much so that I have now bought one! Providing you are aware of the limitations of using a frequency counter to try and capture transmissions off-air you should not be disappointed. I can't wait to try mine out at various shows during the summer months. So if you see a spectator suddenly start smiling for no apparent reason - it's probably me with the ‘Vibrate’ mode selected.

Thanks to Waters and Stanton Electronics, 22 Main Road, Hockley, Essex SS5 4QS, Tel: (01702) 204865, Fax: (01702) 204905, for the loan of the Scout and the modified AR8000.

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Alan Gardner, ever interested in anything to make his scanning exploits easier, tests the reaction tuning capabilities of the new Optoelectronics Scout 400.
This month an extremely good offer on the reference guide to utility FAX stations. If you don’t mind being a year out of date then you can save a small fortune on the Klingenfuss GUIDE TO FAX STATIONS Fourteenth Edition.

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WATERFALLS AT BALDOCK

The Radiocommunications Agency operates the UK's monitoring input to the International Monitoring System of the ITU at Baldock Radio Station.

Dick Ganderton and Kevin Nice recently visited the station and were both taken with the 'waterfall' charts.

Baldock Radio Station is located in an electrically quiet location around 60km north of London. Operated 24 hours a day throughout the year, the station specialises in offering assistance to those suffering from interference as well as monitoring segments of the radio spectrum. There is also the International Satellite Monitoring Station located adjacent to the Radio Station.

**Waterfall Plots**

To help seek out interference problems, Baldock can monitor, automatically, any portion of the radio spectrum up to 30MHz. Using the latest computer software, developed at Baldock, it is possible to monitor signals in any part of the h.f. spectrum and to plot these out in a striking format.

Known as 'waterfall' plots the technique involves sweeping the desired segment with a computer controlled spectrum analyser. The resultant plot forms the first line of the 'waterfall'. At pre-determined time intervals the sweep is repeated with the new plot drawn behind the first one, but displaced to the right. This is continued throughout the total period allocated to the survey, producing the striking 'waterfall' charts, samples of which are reproduced here.

The computer program works out how to displace the sweeps and hide the appropriate bits behind the previous sweeps to give the 3-D 'waterfall' effect.

The signals can be displayed in two different ways. The 'max hold' mode shows all signals occurring during the scan and this emphasises short-term events. The other mode is 'video averaged' - used to show long-term signals and is particularly useful in showing the carrier on a.m. signals.

This very striking plot shows a transmitter drifting across the portion of the spectrum being monitored. This information can be used by the Radiocommunications Authority to identify rogue stations and get something done about them. This is a 'video averaged' plot. The drifting signal has been coloured by SWM to make it stand out better. The time scale of the complete plot is six hours, while the frequency span is 2.18 to 2.19MHz.
Another 'video averaged' plot covering 11.6 to 11.7MHz and 1200 to 0000UTC. This plot indicates the occupancy of this segment of the spectrum during the scan. Note that some of the signals are very clean while others have marked sidebands.

This plot covers 5.90 to 5.95MHz and a time span of 0000 to 1200UTC. Occupancy of the segment can be clearly seen as can the purity of the transmissions.
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Prior to the advent of the R1155 communications receiver, bombers of the Royal Air Force were fitted with the R1082. Such sets, now about 53 years old, are not often seen. However, thanks to Robert Willington (Tunbridge Wells), I can show you one and, what’s more, it’s sitting in its own dedicated transit case. Fig. 1.

The R1082 set uses a pair of plug-in tuning coils for each given range. These are coloured green and red and are inserted, as required, by the wireless operator in the appropriate sockets. Green at top centre Fig. 1 and red at the bottom. There are 28 coils, 14 of each colour, and those not in use are kept in a specially designed carrying case, Fig. 2. Incidently, the bright emitter valve of the 1920s seen in the lid is part of Robert’s vintage wireless collection.

The majority of the RAF’s wartime sets and accessories were packed in robust wooden cases. Note the metal reinforcing on the corners, the strong carrying handle and the stencilled contents label on the side, Fig. 1. The centre right of Fig. 1 shows the A ‘crown’ M (Air Ministry) logo inside the lid of the equipment case. This logo, sometimes called ‘Arthur Mitchell’ can also be seen on many valves and components along with a 10A or 10E RAF reference number.

Muirhead Dials

I cannot tell you much about the R1082 because many years have gone by since I have taken one to bits. However, the on/off switch is at the upper left immediately above the 4-pin power input socket, Fig. 1, and the main tuning controls are the two Muirhead slow-motion dials on the right-hand side of the panel. Some versions of these dials have an illuminated cursor fitted above the outer scale that holds a festoon type bulb. The front cover, secured by a central screw, has been removed in Fig. 3 to give you a clearer view of its gearing. Muirhead dial mechanisms were also used by the RAF on their RF26 and RF27 tuning units and the R1224A receiver. The one shown in Fig. 3 is on the front panel of the battery operated R1224A communications receiver built in the mid-1930s.

Observations

As usual my thanks are due to the people mentioned here for placing their observations on record for us all to see.

Solar

During his daily solar observations, Ron Livesey (Edinburgh), using a 2.5in refractor telescope with a 4.0in projection screen, located one active area on the sun’s disc on May 8, 12 and 15 and two on days 13, 14, 18 and 19.

From his observatory in Selsey, Patrick Moore kindly sent a drawing, Fig. 4, of the sunspot group that appeared on his projection screen during his morning solar observation on May 14. Patrick also reported ‘no spots’ from the 25th to 30th inclusive.

Aurora

Ron Livesey, the auroral co-ordinator for the British Astronomical Association, received reports of aurora described as ‘glow or patch’ for the overnight periods on May 4/5 and 5/6, ‘homogeneous arc’ on 15/16 and 23/24 and ‘ray bundles’, ‘active pulsating’ and ‘corona structures’ on 23/24, from observers in Fair Isle, Scotland and The Shetland Isles.

Magnetic

The magnetometers used by Karl Lewis (Salisbury), Ron Livesey, David Pettitt (Carlisle), Tom Rackham (Goostrey) and Tony Rickwood (Gillingham), between them, recorded strong disturbances to the earth’s magnetic field on May 2, 3, 5, 16, 30 and 31 and lesser events on days 4, 6, 7, 8, 17, 23, 24 and 25.

Sporadic-E

On eight days between May 20 and 31 inclusive, David Glenday (Argyll) logged pictures in Band I (48-68MHz) because of disturbances in the E region of the earth’s ionosphere. He received pictures from Norway (NRK) on Chs. E2 (48.25MHz) and E4 (49.75MHz) on the 20th, France on Ch. L2 (49.25MHz) and Spain (TVE1) on Chs. E2, E3 (55.25MHz) and E4 on the 21st, Czechoslovakia on Ch. R1 (49.75MHz) and Spain on the 22nd, Norway, Spain and Sweden (SVT1) on the 23rd, Switzerland (DRS) with a lozenge-shaped on-screen logo on Ch. E2 and possibly Italy (RAI-UNO) on Ch. Is (53.75MHz) on the 27th, France and Spain on the 30th and Spain on the 31st.

In Basingstoke, John Woodcock identified pictures in Band I from Croatia and Italy on the 12th, Portugal on the 18th and Spain on days 11, 13, 16 and 17. On each of these days John also saw many pictures in Band I from undetectable sources. During the event on the 12th he heard a German amateur in Berlin on his recently constructed 56MHz converter.

Band II

At midday on June 2, Howard Smith (Merseyside) was on the Isle of Wight and heard three Arabic stations and a lot of Spanish stations while tuning through Band II (87-107MHz). Later, while returning to Yarmouth and the ferry, he found that “the band was full of Italian stations, such as Radio Milan and many commercials. Then I received a loud signal from Radio Zagreb”.

“Lots of DX this month with a couple of large Sporadic-E disturbances,” wrote Arthur Grainger from Carsars Junction. As expected all the bigger stations that he normally hears were much stronger and, in addition to logging such stations, in Band II, as Horizon Radio (103.3MHz) from Milton...
In June I measured just 0.82in of rain compared to 1.18in for the same three months. Six inches less than the total for the same three months of 1994.

The daily variations in atmospheric pressure from May 26 to June 25, Fig. 5, were taken at noon and midnight from Arthur Grainger's barometer in Scotland (dotted trace) and from my own barograph (solid trace) down here in Sussex.

When George Garden (Edinburgh) noted a high pressure area over Europe on May 30, he drove his pick-up truck, equipped with a multi-standard Grundig TV receiver and a U.H.F. beam antenna, Fig. 6, to Carr O’Mouth for a spot of TVDXing. Around 1903 he received pictures, in colour, from Denmark’s TV2 on Ch.35. He returned to the site early in the evening of the 31st and caught a French film from Denmark (TV2) and a games show from Holland (NED. 2), on Chs.30 and 47 respectively. At 1831 George watched an international news bulletin on TV2 and said that the colour was the strongest of all stations reported. "The view out to the North Sea in this direction is unobstructed and conditions were very hazy", said George.

While in Dorset during the last week of May, Howard Smith logged Europe 1, France Culture, France Info, France Inter, France Musique, Radio France Normandie and RTL2 in Band II, all at a distance of about 130km. To Howard’s surprise he heard a very strong signal from Radio Frequence Nord on 94.7MHz, over 480km away, near the Belgian Border.

SSTV

In June, John Scott found the h.f. bands busy at times around 14.230MHz with the familiar sound of slow-scan television picture pulses. Between May 28 and June 26, John copied a variety of captions from stations in France, Fig. 7, Holland, Hungary, Italy, Russia, Sicily and Spain and exchanged pictures with local GM stations around 144.5MHz. John tells me that GM0MVF, using a Spectrum computer and G1FTU software, had contacts with stations in England and Morocco and that GM0VRP had one of his first slow-scan contacts with KH6AF in Hawaii. For the benefit of those readers unfamiliar with SSTV techniques, the dotted traces across the top of the ‘CG’ line and the HA call-sign in Fig. 8 were caused by some form of electrical interference on top of an otherwise very good signal.
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From the World Satellite Almanac by Morse (c.w.) identifications heard on TV/games selector switches (more selected into the TV via a 50 pence coaxial cable (shudder) and switch free Hispasat (30°W) offerings. Dish The Latest from the Clarke Belt right-hand circular and gives noise 'Squarial' has been modified to using a Global 10 extender module. bullet LNB from a car boot sale and popular UK news carrier Eutelsat I beyond Astra - particularly the satellite signals will not travel received thus confirming that beyond 16°E no signals can be chaparral 0.7dB noise LNB - now using my 1.5m dish and a very weak and sparklie offering months and Eutelsat II F3 at 16°E is SARAJEVO' at 10.964GHz vertical. The coverage via the Iveco SNG uplink (Wirral) and Ian Waller (Lincoln) were carrying in FSS band (10.9-11.7GHz) on both mainland sites and well worth others upside down and the 'clear' signal was split into 4 horizontal sections west seemingly more to a 13 or 14°E dish. Fortunately there are others that and favourably placed. Martin Peters (Reading) is one such enthusiast with a variety of home dishes, for domestic Astra he uses an old BSB 350m dish and FSS bulk LNB from a local source and provides good Astra signals even using a Global 10 extender module. For general sat-zapping he uses an 800m dish and prefers the Clarke Belt manually. A former BSB 'Squarial' has been modified to right-hand circular and gives noise free Hispasat (30W) offerings. Dish down-feeders use normal u.p.1 TV coaxial cable (shudder) and switch selected into the TV via a 50 pence TV/games selector switches (more shudders) - Martin comments 'breaks all the rules but works fine'. Martin's main reason for his letter relates to several queries over Morse (c.w.) identifications heard on Intelsat birds by readers recently. From the World Satellite Almanac by Mark Long, Martin sends details - the FCC require that all uplinks out carry a Morse code identification, this to assist other users by providing an identification in case of interference, queries, etc. The 'Automatic Transmitter Identification System' (ATIS) is usually carried at 25w.p.m. on the 7.10 or 8.30MHz subcarrier and details callsigh (usually starting with a 3-digit identity code, telephone number and other information. There are now several Morse decoders on the market that will provide a readout of c.w. information. Thanks, Martin. Orion 1 Atlantic enthusiast Colin Paton (way up north in Greenock, Scotland) advises that 6 new Scarecrows can totally destroy a TV channel satellite. It was reported that when orbital early 1996 and Telenor may be ordering another new satellite to provide up to 30 analogue TV channels. Satellite 7A, when orbital early 1996 will replace the existing Intelsat 702 at 1°W bird and improve Scandinavian capacity from 18 to 24 TV channels. Back to Colin and Colin logs the 2PN bird with down-links observed at 12.58GHz vertical (Starbird); 12.667 and 12.617GHz vertical; 12.645GHz horizontal all with occasional TV news feeds and other programme offerings. Also on the same bird but FSS can be found VH-I German (clear) 11.469GHz; TV-10 Gold (inverted video) 11.491GHz and 11.685GHz carrying Asiant 1 (clear) out of New York. Orion often provides useful back-ups into the UK from UK mainland sites and well worth checking out for OBs (outside broadcasts) during the day not forgetting the early morning breakfast shows. Recently on consecutive days Intelsat K at 21W were carrying in FSS band (10.9-11.7GHz) live weather forecasts, etc., and GMTV from seaside resorts such as Bournemouth. Again its worth a quick scan before racing off to work.

A month later I aired the query of the off-air broadcast coverage July 2. What was happening at the 'Queda' prison near Brescia in Italy? During the afternoon and into the late evening coverage was of the buildings, close up of windows with folk inside and the to-ing and fro-ing of police and other security types. Intelsat 5/5 at 19W maintains coverage via the Iteco SNG uplink BTV 30' at 11.136GHz vertical. The event was of some importance but perhaps not to the UK as no mention was heard on our news.'
How to use the Propagation Charts.

The charts contain three plots. The lower dashed line represents the lowest usable frequency (LUF), or ALF (Absorption Limiting Frequency). The chances of success below this frequency are very slim.

The middle line indicates the optimum working frequency (OWF) with a 90% probability of success for the particular path and time.

Lastly, the upper dashed line represents the maximum usable frequency (MUF) a 50% probability of success for the path and time.

To make use of the charts you must select the chart most closely located to the region containing the station that you wish to hear. By selecting the time chosen for listening on the horizontal axis, the best frequencies for listening can be determined by the values of the intersections of the plots against frequency.

Good luck and happy listening.
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SAM

Last month, in the 'Traffic Log', I asked if anyone had heard any 'SAM' callsigns, with a particular set of flight numbers; those numbers were 676, 677, 789 and 125. I said that I had a theory about what they were, and now I am 100% certain.

In the early 1970s the US Government decided to buy four Boeing 747 Jumbo Jets, and to fit them out as emergency command posts, so that they could continue to govern the USA in the event of a war or other disaster. The USAF decided to give them the official designation of E-4. One of the aircraft was always on standby close to The President, so that he could be quickly in control of any situation should the need arise. These four aircraft acquired the nick-name of 'Knee-Cap', which was close to their official title of NACAP - National Emergency Airborne Command Post. The four aircraft are officially based at Offutt Air Force Base in Nebraska, but there is usually one at Washington DC, or following close -by when The President is using 'Air Force 1', and are often heard on v.h.f. and u.h.f. for Air Force 1, and are often heard using their normal 'Gordo' callsigns for VIP and WIP flights has been with this merger, the callsigns used were always suffixed with a single digit number. The callsign 'Kitty' and 'Kittyhawk' used to be used by 'The Queen's Flight' based at RAF Benson in Oxfordshire. In the past 15 years there have been reported a fleet of VFR type helicopters and Andover turbo-prop aircraft; however the Andovers have been replaced by three British Aerospace 146 four-engine jets. The callsigns were always suffixed with a single digit number. The callsign 'Kittyhawk' signifies that the VVIP is on board, and 'Kitty' is used for all other flights (i.e., positioning flights). I believe that the number used indicated which pilot was flying the aircraft, but I have seen reports which claimed that it represented which VVIP was on board. even when there was no VIP on board.

In March 1995, 'The Queen's Flight' ceased to exist, and was combined with 32 Squadron based at RAF Northolt in West London, which is used for transporting VIPs. The new unit was renamed as '32 (The Royal Squadron)', and now comprises the fleet of Wessex helicopters and BAe146 jets from Benson, with the Gazelle helicopter and BAe125 executive jets of the former 32 Squadron. In conjunction with this merger, the callsigns used by VIP and VIP flights have been changed. When you hear a 'Kitty' or 'Kittyhawk' flight working Architect you cannot easily tell if it is a BAe146 or a BAe125 jet, unless they say so. The number suffix used to be fairly standard, in that '1' to '5' were BAe146 aircraft and '6' and '7' were the Wessex helicopters. Now, they use a 4-digit number between 1000 and 1999, or the old single-digit system, but you cannot tell by type of aircraft you are hearing! They also use an 'R' suffix when the VIP is on-board (maybe it stands for Royalty?), so you may hear callsigns such as 'Kittyhawk 1261R' or 'Kitty 7'. The Wessex and Gazelle helicopters do not have any h.f. comms equipment, so you will not hear them working Architect. The BAe146s have retained their old Seicalls, and all the BAe125s have Seicalls, so here is a list to help you which aircraft you are hearing:

Traffic Log
(all frequencies in MHz, all times UTC)

4.9735 (24/6, 15.50 onwards; 25/6, 09.00 onwards) Z080 calling 'any station on this net', and was answered by 2G3C, who QSY'ed to frequency 'TUF', and then requested assistance with the NMN service.

6.122 (15/6, 19.30) Z308 calling 'any station on this net', and was answered by 2K7C, who QSY'ed to frequency 'TT', which was not found. They later appeared on 5.343MHz and tried to QSY to 'DT' again (so 5.343 is not DT).

8.764 (5/7, 22.33) ZN96/CanCoast Guard Portsmouth with an electronic voice reading along co-ordinators for the Gulf Stream in the Gulf of Mexico. It was followed by an announcer about a new free-phone number for reporting problems with the NMV service.

10.194 (15/6, 20.13) ZY03 working Trenton Military for a phone patch. There was no answer, so '03 said they would try again in 10 minutes.

10.780 (22/6, 22.03) Ascension working USS John Hancock, which was on stand-by for the Shuttle launch on 23/6 (which was cancelled). John Hancock wanted to know the SAI Monitoring frequency for the launch, and was told 5.716MHz.

11.059 (29/5, 07.19) SAM E77/working Andrews VIP on F356, just establishing contact, with no traffic to pass at the time.

11.175 (28/5, 07.00) SAM E77/ working Croughton on a SAM mission, requesting some discrete frequencies from Andrews VIP. Andrews suggested F356 as primary and F461 as secondary.

11.175 (6/7, 19.40) 'Tafelipe Delta' calling Incirlik on 15.502MHz, but getting no response. They also called for Incirlik on 8.927MHz, and 15.015MHz, but always transmitting on frequency 11.175MHz. Maybe 15.502MHz is a private frequency of some sort, but I don't know who 'Tafelipe Delta' is.

11.232 (15/6, 21.11) Sentry asked us to QSY to 10.154MHz. The callsigns used by the Wessex HCC 32 (The Royal Squadron) are bright red with a blue horizontal band across the middle. Although the picture was taken a few years ago, they still look exactly the same today.

Bosnia

Dave B. from Merseyside writes to say that he has noticed a very active frequency being used by the UN forces in the blockade of the former Yugoslavia. The frequency 7.025MHz is being used extensively for blockade operations in the Adriatic Sea, with station 'MS' being the Net Control Station. There is a lot of communications between units (presumably ships) with 'plot- graph' callsigns, and frequent mentions of 'Ponies' (helicopters). There are also reports of ships being boarded and searched, with details of their journey being passed back to 'MS'. Dave also mentions a few other frequencies which are connected with Bosnia, he says to try the following: 14.4525MHz (daytime, spare frequency), 5.4315MHz (main Naval blockade net).
**Letters**

Now to D. L. McLean in Yeovil. Don has been chasing DX for more years than I can remember, and he notes this time the amount of short-skip stuff heard on the 14-28MHz area. In the day there has been little DX about but the best times have been late afternoons into evenings on 14 and 18MHz and a few South Americans on 21MHz at the same times.

An oddity was the strange conditions sometimes on 18MHz around 2300 and 0300. Velocity factor 66% and attenuation 6.2dB per 100 feet. We’ll stay with Imperial units to make it easier, and assume 16 feet of the feeder. Clearly the s.w.r. at the antenna feed-point is 2000Ω or so, but what do the s.w.r. seen at the bottom of the feeder indicate? The usual practice is to keep away from lossy feeder isn’t perfect, it is lossy. Let’s imagine a practical case, of a shortwave listener. Why? Backalong, most amateurs must be proofed against moisture or rain. Why? Backalong, most amateurs.

**Question**

A first letter from Phil Townsend in London E17, queries whether the period chosen for the Set Listening Period was a good choice. The morning period is probably the best time for DX chasing, simply because so many people in our time zone are not active! Turning to the list on 14.130MHz Phil noted TMS and PG3GR claiming to be United Nations. An oddity was the strange DX conditions sometimes on 18MHz around 2300 and 0300. Velocity factor 66% and attenuation 6.2dB per 100 feet. We’ll stay with Imperial units to make it easier, and assume 16 feet of the feeder. Clearly the s.w.r. at the antenna feed-point is 2000Ω or so, but what do the s.w.r. seen at the bottom of the feeder indicate? The usual practice is to keep away from lossy feeder isn’t perfect, it is lossy. Let’s imagine a practical case, of a shortwave listener. Why? Backalong, most amateurs must be proofed against moisture or rain. Why? Backalong, most amateurs.
Short Wave Magazine, September 1995

I welcome any news and comments. In particular I am interested in any s.w.l. information on Australian stations heard by SWM readers so I can chase up more details and interesting snippets from this end.

Greg Baker, PO Box 208, Braidwood NSW 2622, Australia. Internet: greg@pcug.org.au

Australia

News this time covers a wide range including news of troubles at Australia Television and possible effects on Radio Australia.

Australian commercial radio and communications magazine and digital television. And although pay television has been built and this will be secured until construction can recommence.

Weather Halts Tower Project

Hobart's notorious Mount Wellington has claimed another victim. The National Transmission Agency (NTA) has been building a new 131m transmission tower atop this Tasmanian mountain to replace the 1950 vintage tower that is giving up its struggle with gales, ice, rain and snow. The new tower will be a 67m high concrete shaft supporting a 64m array of broadcasting antennas shielded by a fibreglass radome.

Radio and Communications Magazine

Australia's two commercial communications magazines - Amateur Radio Action (ARA) and CB Action (CBA) - have merged to form the new and larger monthly Radio and Communications (R&C) magazine. According to the Editor, Len Shaw, there is and has been a strong overlap in the interests of CB and amateur radio aficionados and that large numbers of amateurs were introduced to the hobby via CB radio. As examples he cites shared interests in scanners, antennas, DX and communications satellites. He also points out that a 60% increase in printing paper prices would have meant large increases in cover prices for ARA and CBA that would have made their separate production less viable.

Australian Television

The Australian Broadcasting Authority (ABA) has put forward a proposal to lift the minimum Australian programming content from 50% to 55% in the time period 1995 to 1997. This initiative is to prevent the swamping of Australian content with foreign - particularly US - input.

Australia Television

During which time the ABC hopes to attract significant viewership. But to date, about $36m has been used and this will be secured until construction can recommence.

Having failed to attract significant sponsors and run up cumulative losses of $48 million ($3.7 million) Australian Television (ATV) has been bailed out with an interim $A2.5 million (£1.1 million) injection of funds from the Australian Broadcasting Corporation (ABC). This money will allow ATV to continue until June 1996, during which time the ABC hopes to attract significant viewership. But to date, about $36m has been used and this will be secured until construction can recommence.

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Digital Television

The ABA has released an expert report on the next generation of television broadcast technology in Australia. Digital terrestrial television broadcasting (DTTB) is billed as providing Australian audiences with cinema quality picture and sound and providing Australian audiences with cinema quality picture and sound and a range of other services by sharing facilities.

Len also makes a strong plea to allow no code amateur licences. He says that we are excluding hundreds, probably thousands, of potential amateurs by requiring them to pass a test that has no practical application in today's world. That should stir a few people up.

The first issue of R&C runs to 100 pages and includes a number of feature articles - speech processing, v.s.w.r., number stations, the ultra-sensor, DAB2 in the first issue - and construction projects and a range of equipment reviews.

Radio Wave Listening

The ABC is working through overseas news gathering arrangements with the BBC and the Canadian Broadcasting Corporation. The aim according to the ABC managing director is to improve services by sharing facilities. Unions are justifiably concerned that it will lead to staff losses in the long run and are concerned that the move may have some connection with the diversion of large slabs of ABC funds to prop up ATV.

My address is PO Box 208, Braidwood, NSW 2622, Australia. For personal replies please send 2 IRCs. Those with an Internet connection can now get me at the address at the head of the page.

Other News & Information

Australia's Special Broadcasting Services (SBS) - the network specialising in foreign language programming - has its Internet World Wide Web home page at http://acallink.net.au/~towm/sbs.html. At this stage it is fairly basic but does provide a mission statement, a definition of a multicultural society and details of SBS radio and television and answers the question What is SBS? The SBS home page has links to the home page for Michael Lee, the Minister for Communications and the Arts and into other Australian government services. Lee's Internet address is minister@dca.gov.au.

Another Internet home page is Australia's Ionospheric Prediction Service (IPS) with home page at http://www.ips.gov.au/. Through this page web surfers can access the current IPS solar terrestrial report, other reports and summaries and a series of images. Some parts of the site are under construction but the report from the IPS Sydney Regional Warning Centre brings a range of data including the Australian region ionospheric summary and forecast, Australia fo2 ionospheric values, a geomagnetic summary and forecast, Learmonth magnetometer data, Learmonth K-indices, solar summary and forecast and a current Learmonth solar image.

I can't claim to understand all of the numbers but it is certainly comprehensive. The IPS page leads into a myriad of other relevant Australian and overseas services. Interested users can also subscribe to mailing lists to receive up to date solar and geophysical data.

Comments and suggestions to


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Airband

Did any of you take up the SWM reader’s offer of piloting the flight simulator (see last month)? If so, you could write in and share the experience! Geoff of y Swaffield (Wallington) tried it, finding it a bit different to the light aircraft with which he is more familiar. But, it was good fun!

Mayday

When an emergency arises that is serious enough to threaten life, a Mayday call should be transmitted to the air traffic unit that is currently being worked. However, many aircraft are outside regulated airspace and might not be in touch with a suitable unit. In this case, a call on the international distress frequency 121.5MHz is advised (aircraft crossing the North Atlantic also monitor this frequency so it’s still worth a call in this area).

So, asks Brian Taylor (Woking), just how is your position pinpointed on 121.5? Various relay stations around the country pick up the signal and send it by land-line to either the Scottish or London Area Terminal Control Centres. The Distress and Diversion cell (D&D) at each centre receives the message. Whereas it helps to know the nearest centre, in practice it’s acceptable to put out your call and see which one answers.

In the Cockpit

Last month I introduced Secondary Surveillance Radar (SSR). An airborne transmitter sends a signal to the ground-based radar, enabling a strong, clear image to paint on the controller’s screen. Alongside the target symbol (representing the aircraft) there appears a ‘squawk’ code as transmitted by the aircraft. The four-digit code is dialled up by the pilot, in accordance with the controller’s instructions. Last month’s photo showed an SSR transponder control panel with the code 7000 set in.

Now I’ll explain what the codes mean. 7000 is the conspicuity code as set by aircraft that aren’t under radar control. They might be flying within the coverage of a controller’s radar and yet remain outside controlled airspace. Code 7000 says to any controller who sees it: ‘I’m here, I’m not coming into your airspace, and you can see me clearly so as to confirm my movements’. The code is not in any way highlighted on the radar screen despite being called ‘conspicuity’. With the vast number of light aircraft displaying this code, it is often the most frequently seen squawk. Even some balloons carry a transponder.

Another non-radar code is 2000. This is where the aircraft is not expected to be within radar cover, but is under control. In this case, the technique is known as procedural control with the aircraft reporting its position to the controller over the radio. This often happens in Greece, for instance. However, there might be some nearby radars in use (e.g. in adjacent countries, or for military purposes). Pilots squawking 2000 while under Greek procedural control will tell you that their transponders are occasionally interrogated by radar. Each time the transponder replies, a light flashes on the control panel. In last month’s photo you could see the light. Under each number-window is a black knob. The (green) light is between the knobs.

Never forget the emergency

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Never forget the emergency
over the radar screen isn't easy. The block of codes that it will allocate in unit in a given area has its own helicopter.

In the London area, 0020 is the 'open skies' treaty squawk 7007. Observation flights operating under FL100 this is mandatory.

for free -falls commencing above dropping parachutists, 0033 is set; direction means total radio failure. transmitter failure, the opposite clockwise in a triangle is indicating An aircraft seen on radar to fly

communications radio has failed codes! I explained 7700 above (see 'Short Wave Magazine, September 1995)

interference' i.e. hijack. There's and 7500 signifies 'unlawful 'Mayday'; 7600 means that the aircraft's instruments. It will not only appeal to the complete

aircrafts instruments. It will not only appeal to the complete

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Yakovlev YAK-52.
Christine Mlynek.
I'm glad to report that no scanner users were mentioned - showing that the RA also has less service users - but illustrating quite clearly that even qualified users can make mistakes. Mr. Atkinson questions the ease of purchase of equipment such as this - perhaps second hand or even stolen - and wonders if it is not time such equipment carried a warning regarding its capabilities? EPIRBs do not ' sound off ', and you have no indication from the set that it is working - until a rescue helicopter appears overhead. However, many people would not know what it looks like and therefore would not have a clue about the capabilities of the set. It brings to mind the true story of an offshore worker, from one of the rigs - who pinched a beacon, 'for fun' whilst offshore and, on arrival home, threw it on top of his wardrobe.

... to be woken, during the early hours of the next morning, by a Coastguard helicopter hovering above the house! Yes, a prosecution followed - and rightly so. Wont advice, be careful when buying at boot sales if you're unsure of the equipment being offered.

R. Dalton of Ashford, in Kent, writes in asking where he can hear the UNPROFOR Bosnian ops. Not on v.h.f., I'm afraid! This operation is mostly f.h.f, and you'd need a high frequency receiver to be able to monitor any Bosnian ops. There are many frequencies available but I would point you in the direction of Graham Tanner who edits the 'SSB Utility Listening' column in the magazine. This is where any s.s.b. utility workings would be. Scanning ranges are mainly UK based! Again, Interproducts carry a title concerned solely with this sort of listening and I'd advise you to search out their ad on page 75 and get a copy of their list.

John Hepburn writes, again, with some interesting aircraft frequencies gleaned from a sortie at Newcastle airport. Using a PRO-50, John alluded this to his existing PRO-30, and set out to monitor as much as possible. I've reproduced them here, with the additional gen that most are ground services.

John goes on to say that you don't need an a.m. radio to stay busy at airports and I agree with him! Monitoring is not just about flights - and equipment activity only adds to the sense of knowing what's going on. Many thanks for those, John.

A letter from Paul Dexter of Shipston-on-Stour asks if anyone is interested in monitoring Fire Brigade transmissions? Paul wonders if whether anyone would like to correspond with him on this aspect of utility monitoring and, if so, to contact him at: 6 Garrards Road, Shipston-on-Stour, Warwickshire CV36 4HH.

Paul also mentions the letter from a reader experiencing interference by a data signal - possibly from a mobile data unit - to airband comms. He suggests that the signal could well be from this source. His answer? When the interference starts, look for a fire engine! If one leaves the station shortly after the data burst, then this is the problem. If not, then it isn't. So simple as to be obvious, really!

Again, Paul mentions that I'm reluctant to publish Police frequencies, but have no qualms about doing the same for other users. I agree that this is a bit of a grey area but the publication of Police frequencies seems to me to be counter productive. Ambulance frequencies are put in as a 'maybe' - you may find them there or you may not. However, by using the word 'police', I feel I'm opening myself to prosecution simply as I'm suggesting they are there. Does that make sense? I believe that the day I publish one frequency and tie it in with a particular force in the day I have a visit or receive a summons. In my position I have to be very careful about this and while I'm not backing down, I don't believe in courting trouble either! Best left as it is, I think!

Whilst in this area, it's time I very briefly outlined MASC - Marconi Advanced SDescrambler - which is slowly but surely coming in on 'sensitive' frequencies. In its most simplistic form MASC is a circuit board that can be fitted to radio sets to block off reception by unauthorised users. It uses analogue methods - known as spectral rotation - that changes the audio frequency of voice. It mixes, if you like, the frequencies of the human voice with a higher audio frequency and results in the 'Donald Duck' copy you may hear on the air. You may be able to ID the odd word here and there, but otherwise it's unintelligible - and therefore secure.

Key numbers are programmed into the circuit board - there are about 100 000 000 000 different combinations available! This allows keys to be changed should the set fall into the wrong hands, thus making it useless at a stroke to the new owner. MASC transmissions are recognised by small data bursts at the start and end of every transmission. These bursts give the ID to a control room operator of the officer calling in, and are useful in making a 'silent ID' if there is trouble - if attacked, for example, the officer does not need to do anymore than press the p.t.t. switch.

MASC is recognised by the Home Office and ACPO - Association of Chief Police Officers - as being a system that will ensure 100% secure transmissions in the future although many police forces and special units already have MASC capability. Some examples are the Philips PRP74 u.h.f. hand held, the Icom IC-H10S v.h.f. hand-held and the Racal Couger PRM 4515 - known in the military as PRC 394 series. PRC 394 = personal. 395 = base. 396 = vehicle. 397 = maracap. These secure sets mean that interception of frequencies is impossible for the average scanner owner and should a descrambler become available for systems like MASC, then I would envisage severe retaliation by the Home Office, the RA and Police...

---

John Griffiths, c/o 22 Ffordd Beibio, Holyhead, Gwynedd, North Wales
Authorities. The future of interception of such transmissions grows less and less as military trained communications system experts freelance for work outside of the dwindling defence market. Even if some of these experts build a descrambler, the marketing of it would be instantly banned. Rightly so, given the sensitive nature of police work.

Paul Wey, who edits and produces The Scanning Report has sent me a list update and, whilst looking through it, I've noticed many frequencies marked as 'Unid' - radio shorthand for unidentified. Can any readers place positive IDs on the following frequencies? All are in the Birmingham / West Midlands area.

441.925 / 453.925
443.025 / 456.525
453.050 / 453.125
453.700 / 441.150
453.050 / 453.125
441.925 / 453.925
461.3375
461.3375 / 164.975
456.800 / 453.175
453.700 / 441.150
453.050 / 453.125
441.925 / 453.925
461.3375 / 164.975
461.3375.

My own listings show these to be in various areas - but I hesitate to use them as I feel certain they're wrong. I'd be grateful if any readers could possibly ID them. If they are 'sensitive', then I'll communicate with Paul direct. Please send in all lists to the column.

To round off this month, I'm enclosing a list of airband frequencies heard here at my temporary location in Steeple Claydon, Bucks. It should illustrate how lucky I am being 'dahn sarf' - and on top of lots of action! The following were heard on the VT-255 and AOH AH-2000, on whips. I've yet to get my antennas up for h.f. and v.h.f./u.h.f., but I will.

In the meantime, good listening - and keep on writing!

---

**Steeple Monitor VHF/UHF Airband**

<table>
<thead>
<tr>
<th>Frequency</th>
<th>ID</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>119.000</td>
<td>Juliet Romeo</td>
<td>Briar Radar</td>
</tr>
<tr>
<td>123.200</td>
<td>UNID</td>
<td>UNID - ID Req.</td>
</tr>
<tr>
<td>123.300</td>
<td>Benson</td>
<td></td>
</tr>
<tr>
<td>126.550</td>
<td>Wycombe Air Park</td>
<td>ID needed.</td>
</tr>
<tr>
<td>128.600</td>
<td>VOLMET</td>
<td></td>
</tr>
<tr>
<td>129.550</td>
<td>'X-Ray 2'</td>
<td></td>
</tr>
<tr>
<td>315.750</td>
<td>Uniform 71</td>
<td></td>
</tr>
</tbody>
</table>

Morning period (10am - noon.)

---

**1995/96 Guide to Fax Radio Stations**

This manual is the international reference book for the fascinating worldwide meteofax services: 76 radiofax stations on 283 frequencies, 20 telefax services and 41 weather satellites are described in full detail, including the latest transmission schedules of Blackwell Radiofax and Telefax, Royal Navy HQ and METEO-SAT. Additional chapters cover abbreviations, call signs, equipment, regulations, standards, technique, and test charts. Here are special charts for aeronautical and maritimes navigation, the agriculture and the military, barographic soundings, climatological analyses, and long-term forecasts, which are available nowhere else: the most comprehensive international survey of the products of weather satel- lites and meteofax services from all over the world now covers 432 sample charts and pictures received in 1994 and 1995!

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Short Wave Magazine, September 1995
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--- VISA AND ACCESS WELCOME ---

HOKA CODE-3 UK Version
"...the standard against which all future decoders will be compared..."

Monitoring Times - December 1994 (page 103)

If you monitor Short Wave RTTY you will already know about HOKA! A superb decoder and an essential part of your Short Wave receiver. Now it is available in the UK. Here's what you've been waiting for - HOKA CODE-3 - the UK's first complete, all-in-one, multi-system, full-coverage, multi-language, multi-band, 100% error-correcting decoder!

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Call or write for more information - there is just not enough room here to tell you everything about CODE-3

--- VISA AND ACCESS WELCOME ---
Those who received the Kepler elements printout at the beginning of July may have been surprised by my written commentary that METEOR 3-5 was going to be switched off from 6th.

The mailing list for Kepler elements is now split into two groups - those receiving printouts at the beginning of the month and those receiving them around the middle. Where information on future METEOR/NOAA operations becomes available, it can be included.

Fig. 1: OKEAN-4 Image, 1 July 1995.

Meanwhile, amongst a colourful batch of prints from Cedric Roberts of Halesowen, came Fig. 2, a NOAA picture of Britain from June last year. Cedric uses a Barcom system and colour printer.

Roger Ray of Telford now uses a laptop computer running JVFAX version 7, fed by the Martlec interface unit. Roger monitors a number of WXSATs and sent a variety of NOAA and METEOSAT pictures, from which I have selected the NOAA-14 north-bound pass taken on April 2. This shows Spain, Europe, Italy and the UK almost devoid of cloud - a weather situation that has typified spring/summer this year.

Roger comments that his laptop computer generates less r.f. noise than his desktop machine, producing better overall coverage.

Remember That SAE

I occasionally receive letters requesting considerable amounts of information. One asked for circuit diagrams, lists of addresses of people who might do construction kits, advice on receivers, decoders, image processing, and what else was needed as well as a computer! The correspondent failed to even enclose an s.a.e. As many readers know, I do respond to every letter when a stamped, addressed envelope is included. If you write from 'abroad', please enclose an IRC.

Many readers have requested considerable amounts of information. The application of orthographic symbols is a method of improving the legibility of computer-generated documents. Orthographic symbols are used to represent the different types of characters, such as letters, numbers, punctuation marks, and symbols. They are used to ensure that the information is clear and easily readable.

Geostationary wxsat News

The ending of METEOSAT-3 WEFAX telemetry means that westerly counties of the UK can now receive almost uninterrupted, direct 1691.0MHz WEFAX from GOES-8, currently positioned over the eastern coast of America. From Plymouth, this WXSAT is about 3° above the western horizon.

An improvement in the quality of GOES-8 WEFAX pictures can now be seen. Until July 10 at 1500UTC, the WEFAX images, had product, were generated using pixels having 4-bits width, that is 0000 - 1111. This corresponds to 16 grey shades. This format was replaced by an 8-bit format, which is 00000000 - 11111111, resulting in an increase to 256 grey shades, and a marked improvement in contrast.

Another significant change in GOES-8 operations started the same day with the dropping of the tropical east and tropical west sectors. The areas covered by these sectors were already included in the NE, NW, SE and SW sectors, so there is no loss of coverage of the USA. I have asked the operations staff whether we might have some whole-disc GOES images - yes.

GOES-8 provides a superb collection of images, including some obtained by NOAA-14 during its passages over the poles. During future editions of "Info", I hope to slot in the occasional image, by way of illustration.

GOES-9 remains in testing mode for some weeks, and is scheduled to finally replace GOES-7, which then becomes a stand-by WXSAT.

GOMS (ELEKTRO) - Scoop?

I have been making enquiries through a very helpful scientist who has contacts within the Russian Air Force section that deals with the GOMS (ELEKTRO) satellite. He called the Mission Control Center, who replied "No, it is in very bad state". Soon after RSA released information that ELEKTRO was quite good, apparently contradicting his comments. My friend wrote me saying "in fact, it is simple - there are real facts and there are official releases. But, since I have no deal with GOMS, I do not want to explain something that concerns ELEKTRO. Between us, this satellite was ten years in dock and was launched as fast as an A-bomb missile should be launched!"

Australian Amateur Rocketry

A slight deviation from our normal coverage of space matters but I am sure many readers may be interested in hearing about the latest exploits of the Australian amateur rocket group. Australia has its own space programme, funded by the Australian Space Office (ASO), with a budget, so I understand, of A$9M in this financial year.

The amateur rocket group receive some funding from the ASO, as part of its educational programme, as well as support from other industry and government organisations (mainly in equipment and supplies) and from annual membership subscription fees.

Ausroc 12-1 is an amateur rocket built by the Australian Space Research Institute (ASRI). It was launched on 26 May 1995 from the Woomera Instrumented Range and attained an altitude of just over 2km and a range of about 8km.
Beginners - Getting a Good Quality WXSAT Signal

Last month I mentioned that receiving a signal from a WXSAT is not difficult, between two and four operational polar orbiting WXSATs pass over the UK several times each day, so a general purpose scanner, fitted with a length of wire - even indoors - can pick up a signal. The average power transmitted by the WXSATs varies between 3 and 5W; ample for most antennas.

So, if your interest in monitoring WXSATs is limited to getting some sort of signal into your scanner, you need use no more than any conventional antenna; dipoles, v.h.f. antenna, dipole, Yagi, Lindenblad, or random-length wire. Of these antennas, the dipole is likely to be the least sensitive, having an extremely wide frequency band for general reception. Most dipoles users fit a wide-band pre-amp at the dipole end, and can expect to receive signals over an extremely wide range of frequencies. Using such a dipole and pre-amp, feeding my wide-band scanner, I have easily picked up the 400MHz transmissions from navigation and military satellites of the COSMOS series.

Many of the letters that I receive from beginners comment that they can already hear the WXSATs on their general purpose scanners, and want to know what extra equipment is required to ‘decode the signal’. Unfortunately, the answer is far from straightforward, because of two separate problems that are not obvious to the beginner.

Fig. 3: NOAA-14 picture April 2 from Roger Ray.

To tune to the 137MHz carrier coming from the WXSAT, we have to use an antenna that is both tuned and properly designed. Several types are possible; the most common being the dipole. It is not difficult to make your own dipole at little cost.

First estimate the length:

wavelength = speed/ frequency i.e. approx 300 million miles per second/137 500 000Hz

The result: wavelength = 2.18m.

This is the true wavelength - but a rather unwieldy length. It is easier to cut a dipole to a fraction of this dimension: half-wavelength = 1.09m quarter wavelength = 0.55m

We must allow for the change of velocity of the wave within the dipole - it is about 5% slower than in free space:

actual total length across half-wave dipole = 1.145m.

This is a convenient length, corresponding to half a complete wavelength, therefore called a half-wave dipole. There is no mystery about using a ‘half-wave’ instead of a ‘full-wave’ dipole. The generation of ‘resonant’ signals in a length of wire is a complex subject, but for a specific wavelength, multiples and sub-multiples (we call them harmonics) of this wavelength are all generated by the passing WXSAT (or pager!). We can therefore use shorter lengths of wire than seem suitable at first sight, using these calculations.

Signal Polarisation

A properly cut dipole can receive the 137MHz (a.p.t.) signals, but the received strength will only be about one-half of that available, WXSATs of the present generation scan the earth by rotation about their own axis. This rotation affects the nature of the f.m. signal, that contains the picture data in the telemetry transmitted by the satellite. Its spin imparts a circular polarisation to this downlink 137MHz band signal, that means that any antenna to be used for receiving this signal, must be circularly polarised. A number of types of antenna can fulfill this requirement, so the potential user does have a choice, although the frequency band limits this choice somewhat!

Most WXSAT monitors use the conventional crossed-dipole, phased for right-circularly polarised signals. Phasing is normally done by fitting a phasing-harness; this is an accurately cut length of 75Ω cable, connecting each of the dipole pairs together, so that their signals add constructively to produce the final signal. If the cable length is wrong, or if it is fitted wrongly (connections reversed), the resultant signal will vary wildly, producing unsatisfactory results. Testing a new antenna should be done at ground level before final installation!

Next time we shall look at what the receiver has to do to get a good quality signal out of the 137MHz carrier received from the antenna.

Bulletin Boards

If you have a modem fitted to your computer, you can contact a few BBSs that may provide information on WXSAT matters to a varying extent. The following are the main ones - in alphabetical order - that carry relevant information.

Dartcom on (01822) 88249 (protocol as above) 8 bit, 0 parity, 1 stop bit).
This board is mainly for Dartcom customers but can be accessed by anyone, and includes some useful files. Caution should be exercised before downloading large Kepler files that may contain ancient data.

RIO (Remote Imaging Group) on (01945) 440666 (protocol as above) 1691.0MHz for WEFAX.
A very useful board, mainly for members, that provides current Kepler element files and an assortment of useful utility software.

I also send monthly Kepler print-outs to people who want to know what the signal'.

Unfortunately, the answer is far from straightforward, because of two separate problems that are not obvious to the beginner.

Fig. 4: Ausroc II-2 is on the way!
PROsat II is used by most leading Weather Satellite enthusiasts. They have come to rely on the vastly superior features of PROsat II. Features such as 1,000 frame full screen full colour animate, 3D, direct temperature readout, latitude-longitude overlays and country outlines from NOAA, and Windows export make Timestep products preferred by most serious users. All satellites are catered for including the awkward Japanese GMS and the very infrequent Soviet Okean series. All current SVGA cards are supported. NOAA images contain full resolution visible and infrared data in a stunning 2.4Mb file!

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Advanced Weather Satellite users will by now have read about our new TRACK II prediction software. Full screen colour graphics and 6 simultaneous satellites are just some of the amazing features. For the ultimate in detail we offer HRPT digital systems with five 1.1km ground sensors, towns and rivers are clearly visible. For everyday use we also have the PDUS digital Meteosat system that takes 2.5km data every 30 minutes. Timestep PDUS colour animate is used several times a day by Anglia Television because of its very high resolution combined with spectacular colour. Forecasters will appreciate temperature calibrated 30 minute interval images.

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ALSO WANTED USED VALVES AND OLD VALVE AMP EQUIPMENT
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SEND, PHONE, FAX, LIST, INSTANT DECISION
One of the problems experienced by many readers is the difficulty of getting JVFAX to work with slower PCs. Having asked for your experiences in a recent Decode I now have enough information to put a few ideas down on paper. Judging by the replies I received, the most common problem is trying to run JVFAX with a 286 based computer whilst using the simple comparator interface. The basic problem here is that the 286 processor is not fast enough to carry out all the tasks set-up by JVFAX. By far the most demanding is the simple comparator interface. Although this is by far the cheapest and most popular type of interface the penalty comes in increased demands on the processor. With this interface, the audio signal is simply amplified to -232 level and applied directly to the computer. The JVFAX software then examines the signal by noting every time the signal crosses OV and then measuring the time between each crossing. This simple, but effective, technique enables the software to work out the frequency of the incoming signal. This information can then be used to decide whether to print a white, black or grey dot on the screen. Whilst all this is going on the computer also has to look after the screen display, look out for keyboard commands and show the spectrum analyser tuning display. So you can see the processor is kept very busy indeed.

One of the most effective ways to improve FAX reception on a slow PC is to invest in one of the specialist JVFAX interfaces that include on-board processing to take the strain of the computer’s processor. One of the most popular examples of this is the one produced by Martelec. For more information see the review of the Dolan’s 1994 Short Wave Magazine or contact Martelec Communications Systems, The Acorns, Wyck Lane, East Worthingham, Alton, Hants GU34 3AW. Tel: (01420) 82752.

**Decode Special Offers**

Here’s a summary of the special offers currently available to Decode readers:

- IBM PC Software: JVFAX 7: A full featured FAX and SSTV transceiver program with full automatic recognition of weather pictures.

**HAMILCOM 3:** Provides RTTY, CCIR and ANLEX transceiver facilities with a built-in translator for decoding SYNOP and SHIP weather reports.

- DSP Starter Disk: A selection of digital signal processing programs as developed in this month’s Decode.

**Day Watson Beginners List:** A chronological listing of reliable signals - essential reading for those new to decoding.

**Decode List:** Straightward listing of frequencies logged by Decode readers over recent months.

**Complex Modes List:** A comprehensive listing by signal type of the more complex transmission types.

(For more details please see the Decode List.)

If you want to stick with the simple interface there are a few things you can do to improve the performance. The first is to alter the maximum interrupt frequency on the main configuration screen. I’ve shown a sample screen dump to help you find the right field. The standard setting for this field is 5.6kHz but you will probably find a figure of around 3.6kHz will give more consistent results with a 286 based machine. If you’re still having problems you can drop the interrupt frequency further if you wish. The next trick is to alter the bits setting shown against the comparator interface in the configuration screen. The normal setting is 8 but this can be changed to 6 or even 4 to improve results. To help make sure you alter the correct field I’ve highlighted it on the screen. Another very important consideration for users of the comparator interface relates to the use of Microsoft’s EMMS36 memory manager. On some machines this can adversely effect JVFAX timing resulting in garbage on the screen. The answer is to try disabling the memory manager. One of the best ways to do this and also eliminate any other programs that may cause problems is to create a basic boot disk. You can do this by using the DOS Format command with /S suffix. This formats a new disk and copies over the basic system files. To use the boot disk you need to reset your computer with the boot disk in drive A.

Another problem often faced by 286 users is a small hard drive disk. If space is of a premium you can change a couple parameters to minimise JVFAX’s usage of disk space. The first is to limit the number of grey levels of your FAX charts. Whilst the maximum is 256 levels you can reduce this in stages to minimise the disk space usage. The minimum is 2 levels which can in itself be useful for FAX charts as the incoming signal is forced to pure black or white. Another tip is to turn off the quick save option from the miscellaneous settings sub menu, via the configuration screen. Finally it’s well worth getting an up-to-date version of MSDOS as the modern versions come with memory management routines that can be used to free-up memory and so improve the general operation of JVFAX. One of the cheapest ways to do this is to avoid buying the very latest version but go for the previous version. You will usually find that this is available at a much discounted price from the larger dealers or at computer shows and rallies. As the latest DOS is version 6.2 it’s probably worth looking out for version 6.0 (you will find version 6.0 a little less bug filled through - Ed!) That’s about it so far but if you have any other handy tips please drop me a line.

**MCL-1100 Update**

Bob Taylor from Momentum Ltd. has just sent me details of a new enhancement available to all MCL-1100 and the earlier DM-1000 data decoders. The enhancement comes in the form of an expansion board that fits inside the decoder. The intention is to use this board to support a wide range of additional features. However, the initial release contains software for synoptic decoding. With this facility you can tune in to one of the many synoptic RTTY stations such as Bracknell Met on 4.469MHz and automatically decode the five digit groups into plain text weather reports. This opens up a fascinating new world of weather information that can be invaluable to those with a general interest in weather. The Momentum implementation supports all the main synoptic modes including: TEMP, TEMP DROP, TEMP MOBIL, TEMP SHIP, SHIP SYNOP, AIREP PILOT, PILOT MOBIL, and PILOT SHIP. If you’ve previously used a decoder with...
SYNOP facilities you will have discovered that with so many stations using 75 baud RTTY the decoded text can flash up on the screen too quickly. Momentum have handled this problem with a display buffer and a user selectable scroll speed. This means you can adjust the display speed to render the text readable. This was a great advantage though you will occasionally run into problems with busy stations as the buffer will eventually fill-up and you will start to lose data. However, I think the advantages easily outweigh this occasional problem.

I've yet to see an example of the expansion board, but from the manual it looks very easy to use. Like many expansion systems, this one has to be factory fitted and the total cost is £129 inclusive of VAT. However, in addition to providing the usual D -type connector, but from the expansion options offer a selection of annotated screen dumps showing very clearly the parameters that have to be adjusted. There is even a frequency listing showing a selection of easy to find stations. As if all this wasn't enough, CommSlab also provide a telephone helpline so you can discuss problems with someone in the know.

For much of the main section of this guide is the h.f. frequency list and schedules. The schedules are particularly valuable with full details of all the transmitters including time and the range of frequencies used. There was also a similar range of detail available for satellite based systems. The final 300 page section gave examples of the type of charts that can be received. This was useful not only to decide the type of chart you want to receive, but also to let you see the results you can expect from good quality amateur gear.

Klingenfuss Guide to Facsimile Stations

Joerg Klingenfuss has recently sent me the latest, fifteenth edition of his essential guide for the FAX enthusiast. One of the most obvious changes with the new edition is the inclusion of the year on the front cover. In this case the latest issue is shown as 1995/1996. This may seem a minor point, but if you have bought several over the years you have to put them all together to work out which is the latest! This latest version is 48 pages longer than last year’s and contains lots of updated information. The first few sections contain a wealth of reference and equipment information. This is followed by a substantial section covering meteorological satellites. As well as providing basic details of each satellite there were separate sections dealing with APT Predict and FANAS orbital data systems.

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New Complex List

Thanks to some great work by Ray Watson, my complex list has been completely revised. As one of the most experienced listeners Day has got the list off to great start by supplying a complete listing of all his complex loggings. The range of modes spans just about everything that can be decoded using equipment that’s available on the amateur market. The new list should be ready for dispatch by the time this column gets to print.

Cheap Internet!

Those of you who’ve tried the internet will have discovered that the major disadvantages are the costs. For many this has been because you have to dial a long distance call to make the initial connection to your internet supplier. There is help at hand thanks to modern digital switching techniques. Using this technology many Internet suppliers are now able to offer their customers access via virtual Points of Presence or v-PoPs. Using this system, the customer just dials a special local number and the telephone switching system automatically routes the call to a free modem at a distant site. From the customer’s point of view you just have to pay for a local call, while the Internet supplier is able to reduce the number of sites he has to maintain so saving on accommodation and maintenance costs. You will find that many suppliers are now offering this service and from my own experience I recommend the BBC Networking Club that operates through the Pipex network. If you want more information two of the most popular suppliers are: BBC Networking Club, Sulgrave House, Woodgr Road, London W12 8QX or Demon Internet Limited, 42 Hendon Lane, London N3 1TL. Tel: 0181-349 0063.

New Interface

Interfaces for JVFAX and HAMCOMM always attract readers. The latest to come my way is the RSD 116 from CommSlab Ltd. Like many other HAMCOMM/JVFAX interfaces they have managed to fit all the electronics inside the standard 25-way D-type connector. However, in addition to providing the usual receive facilities, the RSD116 includes transmit/receive switching and a filter to tidy up the transmit tones. The RSD116 is supplied with three unintermediated leads for connection to your transmitter or receiver. These were colour coded to facilitate easy identification. For those with an interest in

transmission there was a miniature potentiometer accessed via a small hole in the D-type connector that could be used to adjust the modulation level. With all the necessary connections made, the RSD116 performed very well giving good definition on received FAX charts. A look inside the D-type connector showed that the traditional 741 op-amp had been replaced by a more modern LF071 amplifier. One of the features that separates this interface from all the others is the level of help provided. The review model was supplied with a draft copy of a manual designed to guide the new user through all the common difficulties with HAMCOMM, JVFAX and PXTM. This manual included a selection of annotated screen dumps showing very clearly the parameters that have to be adjusted. There is even a frequency listing showing a selection of easy to find stations. As if all this wasn't enough, CommSlab also provide a telephone helpline so you can discuss problems with someone in the know.

For more information contact CommSlab at PO Box 19, Ethil, Kent DA6 1LH. Tel: (01322) 330600. My thanks to CommSlab for the loan of the review model.

DSP Update

My DSP coverage to date has generated lots of feedback from readers that is very gratifying. Many have asked if the programs on my DSP disk are available direct from the Internet. You’ll be glad to hear that there is help at hand thanks to the SWM Book Store price £20.00 to anyone seriously interested in FAX reception. The guide is available from the SWM Book Store price £20.00 plus P&P. My thanks to Joerg Klingenfuss for supplying the review copy.

Fax from Northwood received using JVFAX on an IBM PS/2 286 PC.

The next hot DSP news comes from Mike Kerry GB8MKM from Grovendon Software. Mike has written explaining that he can supply code to adapt the Texas DSK for use with the Grovendon software transceive programs. As this range of programs are very popular with the JVFAX users, the DSP software should prove very useful. Mike also reports that support software supplied with the DSK is rather crude and can be improved. In an attempt to overcome some of the problems Mike has written his own assembler for use with the TXMSSDCS65 DSK. The really good news is that Mike has space the cross assembler available as shareware. Mike has also very kindly let me include his software in my DSP starter disk. As a result all future orders for this disk will automatically include this new range of software.

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From £255.00

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Mike Richards, SMW, May 1994.

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**SYNOPTIC DECODER**
SYNOP-TEMP-PILOT-AIREP

******MESSAGE NUMBER 790******
SYNOPTIC REPORT AT MAIN HOURS FROM FINLAND COMPILED BY HELSINKI (MET INSTITUTE) SYNOPTIC REPORT FROM LAND STATION DAY 16 WIND MEASUREMENTS: TAKEN BY ANEMOMETER FROM STATION AT: SODANKYLÁ (02836) IN FINLAND STATION TYPE: MANNED - WITH WEATHER REPORT.

******MESSAGE NUMBER 878******
DEUTSCHE LUFTREISE FLIGHT NO: 4707 POSITION: 39N 05W TIME: 16:00 UTC AIR TEMPERATURE: 24°C WIND 100 KNOTS AMERICAN AIRWAYS FLIGHT NO: 1097 POSITION: 05N 03W TIME: 16:04 UTC AIR TEMPERATURE: 48°C WIND 74 KNOTS

******MESSAGE NUMBER 794******
BUOY REPORT FROM SHIP (MOBILE), COMPILED BY TOULOUSE (MET CENTRE) IN FRANCE DATA FOR REGIONAL EXCHANGE FOLLOWING MINIMUM TEMPERATURE: 17.9°C CLOUD INFORMATION - LOWEST CUMULUS AND STRATOCUMULUS LEVELS ALTOCUMULUS MAINLY SENSAIR CIRRIUS IN THE FORM OF F DATA FOR REGIONAL C MINIMUM TEMPERATURE: ACTUAL REPORTS

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The "CALLSIGN" section lists alphabetically, almost 3000 callsigns in current use with airlines, handling agents, governments and other operators, from over 100 countries. The information includes, CALLSIGN - LETTER AT PREFIX - AIRLINE or OPERATOR and COUNTRY OF ORIGIN

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Short Wave Magazine, September 1995
A number of new commercial stations are now operating on the medium and short waves and several more are in the pipeline. They hope to attract a regular listening audience but most people prefer to listen to the stations they know and like, so they may well run into difficulty.

To enable them to judge if their efforts are really worthwhile these stations will need feedback from listeners, so be sure to tell them what you think about their programmes when sending a reception report to them.

Long Wave Reports

Note: I.W. & M.W. frequencies in (kHz); S.W. in MHz; Time in UTC (=GMT). Unless otherwise stated, all logs were compiled during the four week period ending June 30.

Over in Canada Alan Roberts (Quebec) has been Sheikh Hughes in Morden. Commenting on their programmes, John Wells (E.Grinstead) says they "make a change from the usual rubbish".

Reports from other areas indicate that their broadcasts are being received over a much wider area than planned! All three channels were logged during the late evening by Martin Price in Shrewsbury. Over in Wootton, IoW the ground waves from their output on 1413 reached SIO333 at 1413. During the last evening their transmission on 1413 has been received by Roy Patrick in Derby. Reporting from Lanarkshire, Arthur Grainger (Carstairs Junction) says "Premier Radio is a real surprise. At night it can boom in on 1413 at SIO444 and what service this is. I wonder if any other Northern DXers have found the same. I did surprise one programmer by entering into a "phone-in competition one evening."

Also attracting attention is another new station, namely Viva 963, which is aimed at female listeners. Although their programmes cover such topics as women's news on the daily news, the environment, men, sex and shopping, it is hoped they will attract a number of males too! Their transmission for London and the South East on 963 was rated 44444 at 0647 by Rhoderick Illman in Oxford. Reports on reception in other areas would be very welcome here.

Short Wave Reports

The propagation conditions in the 25MHz (11m) band are so unpredictable that international broadcasters have ceased using it. Variations in propagation occur daily in the 21MHz (13m) band but it is still in use. Sometimes R.Australia's broadcast to Asia via Darwin on 21.175 (Eng 0530-1100) has reached the UK. During favourable conditions it was rated 45544 at 1015 by Ross Day in Broxbourne and 43444 at 1030 by Norman Thompson in Odaby. It was also received in Gibraltar byat between the I.W. and S.W. bands but it is still in use.

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**Medium Wave Chart**

<table>
<thead>
<tr>
<th>Freq (kHz)</th>
<th>Station</th>
<th>Country</th>
<th>Power (kW)</th>
<th>Listener</th>
</tr>
</thead>
<tbody>
<tr>
<td>72-102</td>
<td>Berlin</td>
<td>Germany</td>
<td>100</td>
<td>A, B, D, E, F</td>
</tr>
<tr>
<td>102-132</td>
<td>RNE1</td>
<td>Spain</td>
<td>100</td>
<td>A, B, D, E, F</td>
</tr>
<tr>
<td>132-162</td>
<td>WWV</td>
<td>USA</td>
<td>100</td>
<td>D, E</td>
</tr>
<tr>
<td>162-192</td>
<td>Yerkes</td>
<td>USA</td>
<td>100</td>
<td>D, E</td>
</tr>
<tr>
<td>192-222</td>
<td>WWV</td>
<td>USA</td>
<td>100</td>
<td>D, E</td>
</tr>
<tr>
<td>222-252</td>
<td>WWV</td>
<td>USA</td>
<td>100</td>
<td>D, E</td>
</tr>
<tr>
<td>252-282</td>
<td>WWV</td>
<td>USA</td>
<td>100</td>
<td>D, E</td>
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<tr>
<td>282-312</td>
<td>WWV</td>
<td>USA</td>
<td>100</td>
<td>D, E</td>
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<td>312-342</td>
<td>WWV</td>
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<td>100</td>
<td>D, E</td>
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<td>USA</td>
<td>100</td>
<td>D, E</td>
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<td>372-402</td>
<td>WWV</td>
<td>USA</td>
<td>100</td>
<td>D, E</td>
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<td>USA</td>
<td>100</td>
<td>D, E</td>
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<td>100</td>
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<td>USA</td>
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</tr>
<tr>
<td>762-792</td>
<td>WWV</td>
<td>USA</td>
<td>100</td>
<td>D, E</td>
</tr>
<tr>
<td>792-822</td>
<td>WWV</td>
<td>USA</td>
<td>100</td>
<td>D, E</td>
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<td>WWV</td>
<td>USA</td>
<td>100</td>
<td>D, E</td>
</tr>
<tr>
<td>942-972</td>
<td>WWV</td>
<td>USA</td>
<td>100</td>
<td>D, E</td>
</tr>
<tr>
<td>972-1002</td>
<td>WWV</td>
<td>USA</td>
<td>100</td>
<td>D, E</td>
</tr>
</tbody>
</table>

Note: Entries marked * were logged during darkness. All other entries were logged during daylight or at dawn/dusk.

**Listeners:**
- AP: Paul Rowney, Burnham-on-Crouch (Clare Prindle, wife in Appley)
- DM: Martin Dale, Stonopark (LJ, Martin Price, Sheerness)
- CH: Chris Hatherley, Barton-on-Humber (H, Brian Hughes, Madeley)
- SW: Sheila Hughes, Morton (M) Andrew Stiles, Leicester
- JO: John Jones, Ormskirk (L, Nicholas Thompson, Dafydd)
- ET: Eddie McDowell, Newry (L, Phil Townsend, E. London)
- TJ: John Thorne, Woodstock (TJ, Thomas Williams, Tunbridge Wells)

Okechobee, USA 17.750 (Eng to Europe, Africa 2200-2300) 32222 at 2200 by Clare Prindle in Appley.

Despite varying conditions in the 15MHz (19m) band there is always plenty to interest the listener! Amongst the many entries in the reports were VOA via Kavala 15.205 (Eng to Europe, M.East 0500-0700) rated S10444 at 0515 by Francis Hearme in N.Bristol; AWR via Slovakia 15.620 (Eng to Africa 0800-1000) 44444 at 0900 in Newry, UV via Meyerton: 15.410 (Eng to W.Africa 1100-1150) SIO222 at 1100 Co Ferihan; ISBS Reykjavik, Iceland 15.775 (CJ [s.s. b. c. p.] to Europe; T125-1400) SIO444 1500 at 1500 in Oadby; Voice of Vietnam, Hanoi 15.009 (Eng to Africa 1600-1630) SIO222 at 1600 in London; UABER, Dubai 15.385 (Eng to Europe 1600-1640) SIO533 at 1615 in Doncaster; WVHA via Scotts Corner, USA 15.665 (Eng to Europe, USA 1500-1600) 1615 in Kentucky; Radio Africa No.1, Gabon 15.475 (Fr to W.Africa 1600-1630) SIO444 at 1720 in Burnham-on-Crouch, HBC Quito 15.490 (Eng to Europe 1700-2000) SIO222 at 1800 in London; Later, the Voice of Vietnam, Hanoi 15.009 (Eng, Fr to Europe 1800-2130) 35543 at 1801 in Walnsend, RBN Brazil 15.265 (Eng to Europe 1800-2000) SIO444 33442 at 1910 in Working; Monitor R.int via WSBH 15.665 (Eng to Europe 1800-2200) SIO455 at 1930 in

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**Short Wave Magazine, September 1995**
Local Radio Chart

<table>
<thead>
<tr>
<th>Freq (MHz)</th>
<th>Station</th>
<th>LC</th>
<th>MW</th>
<th>AM</th>
<th>Pk</th>
<th>Listener</th>
</tr>
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<tbody>
<tr>
<td>1017</td>
<td>999</td>
<td>999</td>
<td>990</td>
<td>828</td>
<td>792</td>
<td>666</td>
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<tr>
<td>1617</td>
<td>1608</td>
<td>1599</td>
<td>1590</td>
<td>1581</td>
<td>1572</td>
<td>1563</td>
</tr>
</tbody>
</table>

Note: Entries marked "were logged during darkness. All other entries were logged during daylight.

Many broadcasters are taking advantage of the conditions in the 9MHz (311m) band. Among those noted were R.Australia via Shepparton 11.705 (Eng to Pacific, Asia 0630-?) 33343 at 0648 in Woking; R.Netherlands via Bonaire, N.Antilles 9.750 (Eng to Pacific areas (including C.P.R.) 0730-0825) S1022 at 0730 in N.Bristol; SRI via Lenk? 9.535 (Eng to Europe 1000-1030) 44444 at 1015 in Prague; Czech Rep. 9.505 (Eng to Europe 1030-1050) 44444 at 1030 in Most; R.Netherlands via Nauen 9.650 (Eng to Europe) 0825-1435 at 1318 in Penmaennawr; VOAA via Thineng, Philippines 9.760 (Eng to S.Africa 1400-1700) 33343 at 1745 in Edinburgh.

Malta 11.925 (Eng, Ar to N.Africa 1400-1600) S1044 at 1400 in E.London; WYFR via VOFC Taipei, Taiwan 11.550 Eng to India 1300-1500) 33343 at 1500 in Woking; BBC via Kranji, Singapore 11.750 (Eng to Far East 1100-1800) 33333 at 1700 in B.C-America 1600-1700 S10334 at 1607 in Doncaster; R.Australia via Shepparton 11.695 (Eng to Pacific areas) 1430-1700) 43434 at 1545 in Penmaennawr; R.Australia via Carnarvon 11.660 (Eng to S.Africa) 0600-0700) S1044 at 1645 in Edinburgh.

Later, R.Bulgaria, Sofia 11.720 (Eng to W.Europe 1900-2000) with 53333 at 1900 in Broxbourne; AIR via Bangkok 11.620 (Eng to Europe 1745-2230) 33333 at 1930 in Port Said; R.Moscow int via Gabon, Romania 11.580 (Eng to Europe 1900-2000) S10334 at 1955 in Kiscollay; SRI via 7.116 (Eng, Fr, It, Ger to Africa 2000-2200) 54444 at 2012 in Bridgewater; R.Kuwait via Kabd 11.990 (Eng to Europe, N.America 1800-2100) 33343 at 2030 in Stockport; R.Romania Int, Bucharest 11.940 (Eng to Europe 2110-2155) 44444 at 2100 in Appleby; R.Havana Cuba 11.705 (Eng to Europe 2100-2230) 33323 at 2215 in Newry; R.Japan via Moyabi, Gabon 11.860 (Eng to Europe 2100-2200) 33333 at 2230 in Tendring (Mellow) in Cairo; R.Cambodia 11.830 (Eng to Europe 0800-0930) 33333 at 0900 in Truro; R.Norway Int, Oslo 13.800 (Norw [Eng Sun] to Asia 1200-1300) 45433 at 1200 in Bridgewater; R.Vlaanderen Int, Belgium 13.670 (Eng to N.America 1300-1325) 33323 at 1300 in Appleby; SRI via Sottens? 13.635 (Eng, Fr, It, Ger to S.E.Asia 1300-1500) S10322 at 1300 in Woodhall Spa; R.Romania Int, Bucharest 11.940 (Eng to Europe 2110-2155) 44444 at 2100 in Appleby; R.Havana Cuba 11.705 (Eng to Europe 2100-2230) 33323 at 2215 in Newry; R.Japan via Moyabi, Gabon 11.860 (Eng to Europe 2100-2200) 33333 at 2230 in Tendring (Mellow) in Cairo; R.Cambodia 11.830 (Eng to Europe 0800-0930) 33333 at 0900 in Truro; R.Norway Int, Oslo 13.800 (Norw [Eng Sun] to Asia 1200-1300) 45433 at 1200 in Bridgewater; R.Vlaanderen Int, Belgium

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As the ground waves travel away from the transmitting antenna (often a Marconi ‘T’) they follow closely the surface of the earth, which causes them to lose energy, or become attenuated. Such losses are minimal over sea paths but they can be quite high through the density of soil or rock, notably granite and old sandstone. Nevertheless, as the chart clearly shows, the ground waves from some beacons were received in considerable distances!

The listeners who were prepared to explore the band after dark found that it was quite easy to pick up the sky waves from certain parts of the world by merely increasing the selectivity of his equipment. The listeners who were prepared to explore the band after dark found that it was quite easy to pick up the sky waves from certain parts of the world by merely increasing the selectivity of his equipment.

A most impressive visual display has been made by Peter Workman (Shoreham-by-Sea) starting beacon Diving in May. He uses a Lowf H-225 receiver with a BCC computer plus the Technical Software ‘W’ program, which causes the signals to be displayed on a CRT. John Hobson (Ely) first searched the band in early June during daylight and it soon became apparent that the selectivity of his receiver was inadequate. He says ‘Things got better when I fitted a 500Hz filter and better still when I received Robert Connolly’s indispensable booklet.’

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