SPACE SPECIAL
IMIR, the Shuttle and the ISS
GOES-8 - the Ultimate WXSAT!
Readers’ WXSAT Pictures
Optoelectronics Xplorer Reviewed
60 Years of BBC Television

THE JOHN WILSON REVIEW - AKD Target 3
Entry Level Communications Receiver

AIRBAND SATELLITES BROADCAST DXTV SCANNERS
<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>AOR AR8000</td>
<td>500kHz-1900MHz, Computer control, Data clone, 100 Memories, NiCads &amp; charger</td>
<td>£349</td>
</tr>
<tr>
<td>AOR AR2700</td>
<td>500kHz-1300MHz, SPECIAL PRICE £189</td>
<td></td>
</tr>
<tr>
<td>YUPITERU MVT7100E</td>
<td>NEW DMC version of this popular radio. 530kHz-1650MHz</td>
<td>£299</td>
</tr>
<tr>
<td>TRIDENT 2400</td>
<td>One of the most comprehensive scanners on the market with a superb fbx from end. 100kHz-2000MHz</td>
<td>£299</td>
</tr>
<tr>
<td>BEARCAT UBC 3000XLT</td>
<td>New top of the range handheld from Uniden with TURBO SCAN. 25-1300MHz, 400 Memories</td>
<td>£225</td>
</tr>
<tr>
<td>BEARCAT UBC 220XLT</td>
<td>Easy to use with a good receiver. 66-956MHz (with gaps), 200 Memories, AM/FM, Supplied c/w NiCads &amp; charger</td>
<td>£189.95</td>
</tr>
<tr>
<td>BEARCAT UBC 120XLT</td>
<td>Airband handheld that is easy to use with TURBO SCAN. 66-1000MHz (with gaps), 100 Memories, AM/FM, Supplied c/w NiCads &amp; charger</td>
<td>£139</td>
</tr>
<tr>
<td>BEARCAT UBC 65XLT</td>
<td>Best value for money scanner on the market. Covers Marine, Police etc. 66-512MHz (with gaps), 10 Memories, AM/FM, Required: 5 x AA Batteries</td>
<td>£149</td>
</tr>
<tr>
<td>BEARCAT UBC 860XLT</td>
<td>Wideband base scanner with TURBO SCAN COVERS CIVIL AIRBAND. 66-956MHz (with gaps), 100 Memories, AM/FM, 12V DC, Mains adaptor supplied.</td>
<td>£149.00</td>
</tr>
<tr>
<td>REALISTIC PRO 50</td>
<td>Low cost scanner covers Marine, Police, etc. 66-512MHz, AM/FM, 20 Memories, Requires 6 X AA Batteries</td>
<td>£99</td>
</tr>
<tr>
<td>REALISTIC PRO 25</td>
<td>20 Memories, Hyperscan, 66-88, 137-174, 406-512, 806-956MHz</td>
<td>£169.95</td>
</tr>
<tr>
<td>REALISTIC PRO 2037</td>
<td>A NEW Base scanner with triple conversion receiver. 66-960MHz (with gaps), 200 Memories, AM/FM, Hyperscan, 240VAC or 12V DC operation SPECIAL!!</td>
<td>£179.99</td>
</tr>
<tr>
<td>TRIDENT 980</td>
<td>Triple conversion sensitive receiver. 5-1300MHz, 125 Memory storage, AM/FM/WFM, Direct keyboard, rotary control, NiCads &amp; charger, DC cigar lead, earpiece, carry strap</td>
<td>£249</td>
</tr>
<tr>
<td>REALISTIC PR025</td>
<td>20 Memories, Hyperscan, 66-88, 137-174, 406-512, 806-956MHz</td>
<td>£99</td>
</tr>
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</tr>
<tr>
<td>WELZ WS1000E</td>
<td>Pocket sized scanner covering 500kHz-1300MHz</td>
<td>£349</td>
</tr>
</tbody>
</table>
**SCANMASTER Base Stand**
A fully adjustable desk top stand for use with all handhelds. Fitted coaxial fly lead with BNC and SO239 connectors.
£19.95

**SCANMASTER Mobile Mount**
Mount on the air vent grills on a car dashboard to allow easy and safe operation of most handhelds.
£9.95

**SCANMASTER Drill-Thru Mount Mobile Antenna**
A low profile discreet scanner antenna optimised for the UHF bands c/w 10' cable. Receives 25 - 1000 MHz.
£19.95

**SCANMASTER TSC 2601**
Handheld scanner high gain antenna, 29cm long, covers 100 - 1000 MHz with 3.4 dB gain @ 900 MHz.
£19.95

**SCANMASTER SP55 Pre-Amp**
Using latest surface mount technology, with variable gain - 6dB to + 20 dB and three selectable bandpass filters this top range Pre-Amps will boost your scanners performance from 24 - 1500 MHz.
£69.95

**SCANMASTER Mobile Desktop**
A complete desktop antenna covering 25 - 1300 MHz just 36' high with 4 mtrs of cable and BNC plug.
£49.95

**SCANMASTER SP55 Pre-Amp**
Wideband variable gain low noise G and A's FET pre-amp to boost reception on your scanner.
£59.95

**SCANMASTER GW2 Pre-Amp**
Wideband variable gain low noise G and A's FET pre-amp to boost reception on your scanner.
£59.95

**SCANMASTER Desktop**
A complete desktop antenna covering 25 - 1300 MHz just 36' high with 4 mtrs of cable and BNC plug.
£49.95

**SCANMASTER Active Discone**
A quality wideband stainless steel discone with frequency range of 25-1300MHz. Fitted Low loss 'N' type connector. Able to transmit on 2m and 70cms.
£49.95

**SCANMASTER Double Discone**
A high performance wideband antenna, offering gain over a conventional discone. Stainless steel construction with standard PL259 connector, mounting pole plus brackets.
Superior performance on Air, Marine and PMR bands.
* 25-1300MHz
* Ultra wideband TX Capability
£59.95

**SCANMASTER Active Base Antenna**
As above with 20 dB Pre-Amp available august
£59.95

---

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**NEVADA**

BEWARE LOW COST IMITATIONS!
Connect the **SCOUT** with your AOR AR2700*

The Scout, with its revolutionary Reaction Tune feature, can tune the AOR Model AR2700 to the frequency it captures in less than one second. No more scanning through an entire band of frequencies, hoping to find that one elusive unknown signal. The Scout will lock onto and capture into memory all nearfield frequencies, up to 400, while simultaneously tuning the AR2700 to the recorded frequency. Take it along to a sporting event, amusement park, shopping mall, or downtown, and start building your own frequency database. See below for list of other compatible Scout Reaction Tune receivers.

- Automatically tunes the AR2700 to the frequency captured
- Takes guess work out of scanning for active frequencies
- Records and saves up to 400 frequencies in memory
- Records up to 255 hits on each frequency in memory
- Interface to a PC for frequency download using the optional Optolinx PC Interface
- Distinctive beeps indicate frequency hits, pager style vibrator for discreet recording
- Automatic EL backlight for night operation
- 16 segment RF signal strength bargraph
- Frequencies are automatically saved when unit is turned off
- 10MHz - 1.4GHz Frequency Range
- Also Reaction Tunes: AOR AR8000
- and Radio Shack Pro 2035/2042 (OS535 installed)

*Modification to AR2700 required for Reaction tune. Instructions included in Scout manual.

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**Recommended Accessories**

- **DB32 Antenna**
- **CC30 Carry Case**

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**Optoelectronics**

5821 NE 14th Avenue • Ft. Lauderdale, FL • 33334

Haydon Communications
132 High Street • Edgware • Middlesex • HA8 7EL
TEL: 0181*951*5781 FAX: 0181*951*5782

Nevada Communications
189 London Street • Portsmouth • Hampshire • PO2 9AE
TEL: (01705) 662145 FAX: (01705) 690626

Waters & Stanton Electronics
22 Main Road • Hockley • Essex • SS5 4QS
TEL: (01702) 206835 FAX: (01702) 205843

Internet: www.optoelectronics.com

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*AOR AR2700 scanner not sold by Optoelectronics.*
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WRN appoints Director of Corporate Affairs

World Radio Network’s Director of Corporate Affairs, a new position with responsibility for marketing, public relations and sponsorship development, is Simon Spanswick, formerly with BBC World Service.

Simon Spanswick had worked in the BBC for ten years, and before that was a freelance broadcaster. During his career in the Corporation, he has worked both in the domestic services and in World Service. He joined BBC Monitoring in 1986, and since then has gained experience in a wide range of areas, including domestic Corporate Affairs and World Service Strategic Planning where he was part of the small team that developed the BBC World Service’s funding case submitted to government.

“Simon’s combinations of skills and experience, both as a broadcaster and in corporate affairs, will be of immense value to World Service Press, Publicity and Marketing. Since 1992, Simon Spanswick has presented Waveguide, the weekly communications programme on BBC World Service.

Simon Spanswick is also coordinator of Digital Radio Worldwide, the consortium of international broadcasters (including the eleven most prominent international radio stations) which is working on the implementation of satellite-delivered digital radio as the ultimate replacement for short wave broadcasting. He has also been involved in the development of Digital Audio Broadcasting (DAB) in the UK where BBC domestic radio launched its introductory public service - the first in the world - in September 1995.

“Working for the BBC has been enormously satisfying, particularly since I have been able to combine a role behind-the-scenes with one at the sharp edge of broadcasting in front of the microphone,” Simon Spanswick said. “But now at a time of great change and opportunity brought about by new delivery methods and the increasing pace of digital development, it seems the right point to help develop one of the most successful independent organisations in the international broadcasting industry,” he added.
the decoder and programme subscribers pay 2950 Rupees for expanding into Lahore and channels of satellite delivered programming. The service is expanding into Lahore and subscribers pay 2950 Rupees for the decoder and programme viewing currently is free.

FRANCE

Problems in France for the ARTE/La Cinquieme networks and viewing currently is free.

UNITED KINGDOM

Edinburgh may soon have its own text and sound channel - 'Channel 6' - on ch.E34 once permission is obtained from the DTI for the terrestrial service - which may be on air by late December '96. The text service may offer up to 800 pages of public information and news, sourced from various Scottish newspapers and local radio. The UK's Channel 5 is seeking DTI clearance to expand into ch.35 for network expansion and the Police, rescue services and others, NiTech have just used by the Police, rescue services particularly in the Southern UK region which has sparse terrestrial service - which may be on air by late December '96. The text service may offer up to 800 pages of public information and news, sourced from various Scottish newspapers and local radio.

BELGIUM

There is a new Belgium BRTN TV1 transmitter operating on ch.E10, 100kW e.r.p. at Saint-Pieters-Leeuw. Wavre now operates in Band 3 only from ch.E8 for RTBF-1 @ 100kW. Check out also from the Wavre mast Tele-21 ch.E28 @ 100kW. Check out also from the Wavre mast Tele-21 ch.E28 @ 240kW on ch.E34 once permission is obtained from the DTI for the terrestrial service - which may be on air by late December '96. The text service may offer up to 800 pages of public information and news, sourced from various Scottish newspapers and local radio.

FINALLY

New Band 1 Sporadic E potential for '97 - TMT-1 Turkenistan operates at ch. R3 horizontal from Carayev at 36kW and also in Moscow the NTV channel is now 24-hours on ch.R4.

NiTech 900mA NICADs

Perhaps better known for their high power waterproof torches as used by the Police, rescue services and others, NiTech have just obtained from the DTI for the terrestrial service - which may be on air by late December '96. The text service may offer up to 800 pages of public information and news, sourced from various Scottish newspapers and local radio.

yachts talking part in the race are:

<table>
<thead>
<tr>
<th>Name</th>
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<tr>
<td>Toshiba</td>
<td>MPUX3</td>
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<tr>
<td>Motorola</td>
<td>MWSE2</td>
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<tr>
<td>Ocean Rover</td>
<td>MPNW4</td>
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<tr>
<td>Concert</td>
<td>MPNX4</td>
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<tr>
<td>Save The Children</td>
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<tr>
<td>Group 4</td>
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<tr>
<td>Time &amp; Tide</td>
<td>MWSF2</td>
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<td>Nuclear Electric</td>
<td>MYPQ3</td>
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<tr>
<td>Heath Insured II</td>
<td>unknown</td>
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<td>Global Teamwork</td>
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<td>Pause To Remember</td>
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<td>Commercial Union Assurance</td>
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<td>Courtaulds International</td>
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MONITOR THE CHALLENGE

On 29 September 1996 14 yachts competing in the BT Global Challenge around the world yacht race set sail from Southampton, embarking upon a mammoth voyage the 'wrong way' around the globe.

There is much radio traffic from the competitors, which includes phone patches, interviews, etc. Traffic is via national coastal stations, taking into account propagation. Here is a list of Portishead (GKA) frequencies that are being used.

The bands that are most likely to be used are as follows:

Leg 1 UK - Rio - competitors should be able to get good communications with the UK. Probably 12 or 16MHz until crossing the equator - then they should come in well on 16MHz late afternoon/early evening. First few nights ch.410 has been very busy from 1900UTC, as they go further south try Ch.816

Leg 2 Rio - Wellington - this is the most difficult leg - GKA early evening and early morning, Cape Town the rest of the way from Rio to the Cape Horn.

Cape Horn - 165°W A very good 'Grey line' path exist between this area and GKA on 12/16MHz between 0700 and 1000UTC.

165°W to Wellington - hopefully they will be able to raise VIS - but VIS have problems due to relocation which may give problems. The 0700 - 0900UTC path should still be viable on most days.

Leg 3 Wellington - Sydney - Should be Sydney Radios.

Leg 4 Sydney to Cape Town - should be Cape Town (ZSC) and GKA - 16MHz 1400 - 1600UTC.

Leg 5 Cape Town - Boston - First couple of days Cape town, then GKA midday onwards.

Leg 6 Boston - UK - GKA all the way 16MHz 1100UTC onwards.

The best channel to monitor after the first few days will probably be ch. 1602, that should be interesting during November/December around 0800UTC for a hour or so.

Frequencies in use are announced after the traffic lists sent every H+00 on 4.384, 8.764, 13.146, 17.245, 19.755, 22.711MHz (whichever is currently operational).

Those of you with WWW capability can also take a look at the Web site at http://www.bthchallenge.com though listening to the yachts is much more interesting!
with AA cells of lower capacity.

launched a new AA size cell. The 900mA cell has been designed by the newly launched Battery Division, which has been set up to provide a much wider range of potential customers, who will benefit from the NiTech's experience in designing and sourcing all types of battery.

The new cell is ideally suited to hand-held and portable receivers and accessories. It offers superb performance and has a fast charge capability and extended cycle range. The capacity is significantly higher many of the cells currently in use in these applications - a simple upgrade to these high capacity cell will greatly enhance your listening pleasure and operating time between charges.

NiTech are an IS09000 approved company, their customers include MoD, British Rail, BT and virtually every emergency service in the UK.

For more information contact: NiTech Limited, 4-6 Channel Africa
Churchfield Trading Estate, St. Leonards-on-Sea, East Sussex TN38 9UB. Tel: (01424) 852788, FAX: (01424) 851008.

The uncertain future of Channel Africa was mentioned in our Broadcast Special (October) issue. However, Tom Davies (South Africa) has informed us by email that sufficient funds have now been found to enable the station to continue on the air until March 1997, by which time its future will have been finalised.

As always, reports Tom, money is a major consideration and the South African Government has asked for detailed budget proposals for the station's current and future operating expenses as part of a full investigation.

Tom reckons that an external service, intended for the rest of Africa will continue in one form or another.

Ultimate Customer Service

Companies always like to tell you about their fantastic customer service and Martin Lynch & Son are no exception. This is, however, customer service and Customer Service...

In August, Mr. Halley of Londonderry, Northern Ireland, sent his sick receiver to Martin Lynch & Son's workshops to be repaired. Just over a week later Customer Services Supervisor Andy Wyspianski, telephoned the Halley's residence to let him know that the radio was ready.

Mr Halley was out so Andy explained the details to Mrs Halley. Whilst doing this, Andy heard a thud, followed by what he thought was the handset being dropped. After several "Are you all right?" requests from Andy had solicited no reply from Mrs Halley, he feared the worst. Dialling 999 he explained the situation to the emergency services, who responded by sending a police car and ambulance to the Halley's home.

The police had to force entry and found Mrs Halley slumped in the hallway. She had suffered a burst ulcer while talking to Andy, fell down and knocked herself out on the hallway radiator. The ambulance rushed her to hospital where she was operated on and is now doing fine. Howzat for customer service in the extreme! Martin Lynch said: "In addition to the workshop staff who actually repair the equipment, I employ two customer service engineers. Their job is to liaise with customers before, during and after repair and what Andy did was commendable, especially the speed with which he reported the incident. He could well have saved Mrs Halley's life."

High Power Regulated Mains Adaptors

Reltec Electronics Ltd., distributors for Mascot, the Scandinavian power supply manufacturer, has announced a range of regulated low-voltage mains adaptors.

Designed to provide an alternative power source to batteries in domestic and industrial equipment, the new range is particularly suited to applications requiring a relatively high power, stabilised output.

All three models in the range can be supplied with integral or corded, UK or Euro style mains plugs and there is a wide choice of single or multi-headed appliance plug-leads. Double insulated construction meets EN60950 electrical safety standards and they are CE marked as well.

Top of the range is the Mascot 8717, a switch mode supply in a case 100 x 51 x 63mm. Maximum output is 10W at a regulated voltage that can be set to any level between 5 and 24V. Load regulation is better than 2% over the range 0 - 800mA at 12V.

The other two units are linear supplies - the Mascot 8713 is the same size as the 8717 and has a maximum output of 7.5W at its 15V setting. Output voltage can set between 5 and 42V. The low-cost 8613 comes in a smaller 95 x 51 x 57mm case and is available in 6, 7.5, 9 or 12V at either 600 or 400mA depending on which version is chosen.

Reltec Electronics Ltd., 124-126 Stockbridge Road, Winchester, Hants. SO22 6RW. Tel: (01962) 863141. FAX: (01962) 855987.

Lowe SRX-100 Communications Receiver

Lowe Electronics have just announced the latest addition to their receiver range. The Lowe SRX-100 is an entry-level communications receiver with a very respectable performance. Continuous tuning is from 30kHz to 30MHz by a flywheel tuning knob with fourspeed stepping, c.w., a.m., u.s.b. and s.s.b. modes are push-button selected from the front panel. A clarifier control and on-off/volume complete the controls, making the SRX-100 easy to drive.

Frequency and mode are displayed on the liquid crystal display. Power is provided by a 12V d.c. mains adaptor via a standard coaxial power socket on the rear panel. A 3.5mm jack socket for headphones completes the back panel fittings.

Lowe Electronics have told SWM that they are targeting the SRX-100 at the Far Eastern and North American markets with the remarkably low price of $239.

Further details of the SRX-100, as well as their other receivers, can be had by accessing their Web site at http://www.lowe.co.uk/
HIGH ADVENTURE MINISTRIES BRINGS GOSPEL RADIO TO THE MIDDLE EAST

"Terrorists need to be born again!" declared George Otis, founder of the High Adventure Ministries global gospel broadcasting network, as outside the studio a battle raged between Israeli soldiers and Hezbollah fighters.

The Voice of Hope stations broadcast in English, Arabic and other foreign languages, from the Israel-Lebanon border - in spite of the ongoing fighting, which has been a familiar pattern ever since the first Voice of Hope radio station started transmitting in 1979.

Otis knows from first-hand experience that the messages transmitted from his stations are a powerful influence in the area. In 1983 terrorists stormed the studio in southern Lebanon and three of the attackers and two station staff were killed. Otis visited the surviving terrorist in hospital to forgive him and convert him there and then.

Reception of the Voice of Hope signals from northern Israel has always been difficult in Jerusalem because of the mountainous terrain. Now Otis has opened Love FM which can be heard in Jerusalem, Bethlehem and numerous Arab villages to the north of the city.

High Adventure Ministries has expanded to become what is claimed to be the world's largest full-Gospel radio network. Its powerful s.w. transmitters in California and on Palau in the Pacific, as well as the Voice of Hope ones in Lebanon offer global coverage to reach more than 200 nations in over a dozen languages.

For further information and a schedule contact: High Adventure Ministries, PO Box 109, Hereford HR4 9XR. Tel: (01432) 359099, Fax: (01432) 263408.

closed loop feedback system. The d.c. motor is preferred as it can develop 300% or more overload torque to cater for high wind conditions.

The flexibility of the 3600XRi permits motor voltage, power and r.p.m. to be optimised for the size of antenna to be driven. However, it is essential that movement of the antenna from start to finish be as smooth as possible, irrespective of the maximum speed employed.

This is done by selecting a ramp up and down profile within the common electronic area and the ramps in each 3600XRi controller matched to this profile. If the ramps are incorrectly set, the antenna will overshoot.

Each motor may have different load conditions at any given time and be subject to constant reversal during the manual satellite acquisition stage. Using individual controllers permits the armature current to be set for each motor to achieve stable axis speeds ranging from 0.075° to 4° per second.

The option exists to include tachometer control to meet specific client requirements. Should the motor stall, due to an obstruction or fault, the individual 3600XRi will signal an overload and if the stall persists, the drive is inhibited after 30 seconds to prevent motor damage.

Operational procedures have thus been simplified to using a joystick control to locate the selected satellite. The axis co-ordinates are displayed on three l.c.d. indicators and can also be retained in a labelled store. The stored data can be recalled via a single push button to drive the antenna to those co-ordinates to an accuracy of 0.1°.

When transmitting signals to the satellite, the controllers are limited to movements within a sector scan area to prevent the operator accidentally going off satellite during final line-up. The same sector scan limits are used for tracking of non-synchronous satellites in elliptical orbits.

For more details, contact Mike Hudson, Sales Director of Sprint Electric Ltd. on (01903) 730000.

CHILDREN IN NEED APPEAL

Twenty amateur radio clubs throughout Britain have agreed to join with the Mid Sussex Amateur Radio Society in this year's BBC Children In Need Appeal. All will be operating special event stations and many will be sponsored by contacts.

At the time of going to press, the GB callsigns are not known, but these will promulgate by packet and hopefully by GB2RS. All are being asked to use the word 'Narcina' as a means of identification and all stations are asked to call in and swell the number of contacts.

One h.f. and v.h.f. will be GB0KIN, the MSARS station, on Friday and Saturday 15/16 and again on Friday and Saturday 22/23 November together with other times in between. The clubs taking part are N. Bristol, Warrington, N. Wales, Hastings, Braintree, Wigan, Preston, Leicester, Grantham, Lowestoft, Thames Valley, Dundee, Horsham, Keighley, North Wakefield, Olney, Blackwood, S. Notts, Caravan & Camping and Worthing.

Any others wishing to join in will be most welcome. For further information, contact G3LGF on (01903) 521152 or on packet GOGMC @ GB7ZZZ.

Part of the Voice of Hope transmitter site on the Lebanese - Israeli border. The station is home to a 50kW m.w. station as well as two short wave ones - a 10kW on 6.280MHz and a 25kW one on 9.965MHz.

No MORE SQUABBLES!

A solution is at hand for couples who squabble over whether to watch TV or listen to the radio. Truedox Technology from Taiwan have come up with a device that allows couples with disparate tastes in music or television to pursue their preferred sounds at the same time without disturbing each other.

The IWA-900 uses wireless signals to transmit sound through walls and floors up to 1.50 feet. The transmitter unit is plugged into your TV or stereo's external speaker socket and stereo earphones are connected to a palm-sized receiver. This means that you are then free to roam around the house without disturbing anybody else or missing a minute's dialogue of your favourite film or radio programme.

This type of wireless receivers have been around for a decade or more, but until now they have not worked successfully. Early models picked-up garage door opener signals or CB radio signals or buzzed when exposed to certain kinds of lighting. Signals also tended to drift in and out, thus requiring retuning.

Truedox have solved these drift difficulties with patented phase lock loop technology that locks in and holds correct signals automatically. They have also added a unique auto-level control that stops sudden sound spikes from blasting in listeners' ears. Innovative circuitry automatically avoids frequencies being used by, say, a 900MHz wireless telephone or mutes the receiver altogether when range limits are exceeded.

The IWA-900 is expected to be available early next year in this country, priced around £80. More information about this device is available from Marcus Smith or Emma Simpson on 0171-329 0096.

SEND YOUR NEWS TO: Short Wave Magazine ARROWSMITH COURT, STATION APPROACH, BROADSTONE, DORSET BH18 8PW.
November 1:
The Bangor & DARS Annual Radio Rally will be held at Hamilton House, Hamilton Road, Bangor, North Ireland. The Rally starts at 7pm sharp. Great prizes on offer, so don't miss it! G12MY/EA7G/CE0FV 406557

November 2:
Donegal (Tir Conall) ARS are holding their Annual Radio Computer and CB Rally in Jackson's Hotel, Ballyshannon, Co. Donegal, Ireland. Admission is £1 only. More details from Gerard Dykes EI8HO, Secretary, 30 St Benildus Avenue, Ballyshannon, Co. Donegal.

November 3:
The 6th Great Northern Hamfest (formerly the Ballyshannon Amateur Radio Rally) will take place at the Metradome leisure complex in Ballyshannon town Centre. Doors open at 10am. Talks and Exhibits. Divided car parking in leisure complex, all parking in surrounding car parks. Admission is £1.50. More details from Ernie Bailey on (01226) 716339 or mobile on (0836) 748958.

November 4:
There is another rally this weekend. Thames Valley Electronics Rally is to be held at Kempton Park Racecourse, Staines, Middlesex. Doors open 10.30am to 4.30pm. There will be demonstrations and a bar available. Admission is £1.50 for adults, OAP's £1 and children up to 14 years old free. The entire event is on one level. There will be retailers, accessory suppliers, antenna stands, a Bring & Buy stall, etc. More information can be obtained from HD Promotions on (01494) 450304.

November 5:
AMS '96 will take place at Bingley Hall, Staffordshire. Showground Weston Road, Stafford. This event has NOT been cancelled and must not be confused with other similar events at this venue. AMS '96 is a computer and electronics event. Amateur Radio content. The event usually attracts over 90 trade stands. For more information, log onto the website at promotions@sharward.keme.co.uk or contact the organisers for further information at Sharward Promotions, Knightsbridge Business Centre, 30 Knightsdale Road, Ipswich, Suffolk IP1 4JJ. Tel: (01473) 741533; FAX: (01473) 741361.

November 9:
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November 10:
Midland Amateur Radio Society - Birmingham's Eighth Annual Radio & Computer Rally will be held at Stackallan Green Leisure Centre, Slade Road, Erdington, Birmingham. Doors open 11am to 4pm. Admission £1. Large free car park, free Christmas draw, trade stands, local clubs and special interest exhibitions. Further information from Peter G6DRN on 0121-443 1189. Trade details from Norman G8HHE on 0121-422 9787.

November 11:
The US Government's Asia-Pacific Network (originally named Radio Free Asia) was supposed to broadcast via Voice of America relay facilities in Thailand and the Philippines. But an unforeseen problem developed when the two countries decided they didn't want to chance offending the non-democratic regimes in the area, which are the primary targets of the Asia Pacific Network broadcasts. Washington has discussed hiring time on one of the religious short wave stations on Guam and Saipan, but the outcome of those negotiations is uncertain. Meantime, a new transmitting station for APN broadcasts is being built on the island of Tinian, in the Northern Marianas. It's said that the transmitters will be those from the now closed RFI/RL base at Maxavoquela, Portugal. The Tinian station is expected to be on the air by 1998. Tinian, of course, was the base from which the atomic bomb raids on Japan were conducted. Meantime, it's unknown at this point when the Asia Pacific Network broadcasts will begin, and from where.

Voice of America

The Voice of America relay station in Sao Tome is now on the air. The tropical band frequency of 4950 is in use from 0300 to 0330 in English Sunday to Thursday; 0500-0600 or later. The programming is a mix of block music segments and programmes produced by outside sources. Further information from Peter G6DRN on 0121-443 1189. Trade details from Norman G8HHE on 0121-422 9787.

Argentina

Antarctica - Last time we mentioned the return of Radio Nacional Arconigel San Gabriel in Argentine Antarctica, operating on 15.476. The station is now active but it does not operate as late as it did before. It runs only to around 1950 instead of 2330 as it used to do, and seems to be a lot more difficult to hear than it formerly was. The channel is blocked by Africa Number One until 1900.

Some interesting Latin American clandestine stations have either returned to the air or been confirmed as continuing to be active. La Voz Popular, operated by the guerrillas in Guatemala, broadcasts only on Tuesdays and Fridays or around 7.000 from 2015. Some stations are being picked up and confirmed. On -Thames, Middlesex. Doors open 10am to 4pm. Admission £1. Large free car park, free Christmas draw, trade stands, local clubs and special interest exhibitions. Further information from Peter G6DRN on 0121-443 1189. Trade details from Norman G8HHE on 0121-422 9787.

Radio Station News

Venezuela - Stations from this country recently logged include Radio Amazonas on 4.939.5, Ecos del Tarbes on 4.980 and 9.640, Radio Occidente, 9750. Guyana - s.w.l.s have welcomed the return of the Voice of Guyana, which is being heard quite well in North America on 3.290 around 0100. Honduras - La Voz de Mosquitia, Puerto Lempira on 4.910, has been off the air for a time and probably still is, due to transmitter problems. This little station relies on a couple of old, converted Viking brand amateur radio transmitters, both of which are now in need of repair. They have been shipped back to the US to be fixed and it is not known how long it will be before repairs can be completed and the transmitters returned. Radio Capan International has returned to the air, and returned to its original frequency of 15.675, after conducting experimental transmissions in the 41m band. It's been heard with fairly good signals around 1600. Broadcasts run until 0000 or later. The programming is a mix of block music segments and programmes produced by outside groups.

La Voz Evangelica - HRVC on 4.830 is believed to have a new transmitter and is reportedly now operating 24 hours a day. It's also said to be identifying as 'The Voice of Honduras.' La Voz Radio El Buen Pastor is now operating on 4.815, a move from their former 4830 where they suffered a lot of interference from Radio Tachira in Venezuela, as well as Costa Rica's Radio Reloj on 4.832. The station signs off shortly after 0100. Incidentally, Radio Reloj's 6.006 frequency has been reactivated. Also reactivated is Radio Progresso, 5060v, sometimes using the slogan 'Progreso Internacional.'

Argentina - Radio Ravidia is being noted again, in lower sideband on 8.100 around 0000 to as late as 0530, although this appears not to be a daily occurrence. This is an s.s.b. 'utility' feeder which may be being used to provide local radio to Argentines in Antarctica.

When in use the channel may not carry Ravidia exclusively. Other Argentine medium wave stations have been relayed in this fashion in the past, though Ravidia seems to be the one most often carried.

Mexico - Radio Mexico International continues to provide very good reception on 9.705. Not surprisingly, they feature a lot of Mexican ranchera music. This frequency is scheduled for operation from 2000 to 0500 (0400 on Saturdays and Sundays). Other hours: 1200-1600 and 1800-2300 on 5.985. The station is reported to be having problems with the transmitters, neither of which is operating at its maximum 10kW. Most of the other Mexican stations you see in various listings have either been inactive for quite some time or are off the air permanently. Those still active and recently
That covers all the news from the Americas for this time. Good listening!
***Letters***

**Hallo Dick**

Sorry if I didn’t start with ‘Dear Sir’, but I always find it strange in a radio hobby magazine such as SWM to see such formality on the Letters page. Though you do have my permission to change the ‘Hallo Dick’ to a ‘Dear Sir’ if you decide to print this letter. Having got that off my chest, I think I should get on with my reason for writing.

I read your Editorial concerning ‘Rallies’, although as I’ve lived in Germany for the last 22 years, you might not consider me particularly qualified to comment on this subject. However, I do travel back to the UK two or three times a year and by coincidence, all my visits always coincide with a rally date. I generally visit the Dunstable Downs Boot Sale and Woburn, plus maybe one local rally each year.

I think it could be argued that there are too many local rallies, but I see them more as a chance to meet old friends than to do a lot of serious shopping and I don’t expect such a large selection of stands at a local rally, when compared to the national events. In fact, I’m often amazed that so many companies are prepared to give up their Sunday to set up on these rallies.

Looking back over the last 20+ years I have also seen an increase in the number of computer stands at all rallies, but don’t think they have ‘taken over’, more that they reflect the effect computers have had on most, I say, that I know they sell lots of games, etc., but I think they’re unrealistic to think that amateurs only use their computers for ‘shack work’ and there are, as with the radio segment of any rally, lots of hardware and software bargains to be had if you search around.

For me, not a lot has changed rally-wise over the 22 years. I arrive early and leave after a couple of hours, when the crowd level becomes intolerable. I certainly haven’t noticed (subjectively) that the crush is a lot less these days, or maybe as I’m getting older my tolerance to crowds has diminished! I always come away with my bargains (luck according to the other half), even though I’ve walked Dunstable Downs in the pouring rain and stood in a Woburn tent ankle deep in sweat and cow droppings (I always thought that it was from sheep or dear - Ed), I’ve enjoyed every minute of it and plan to continue ‘rallying’ for many years to come.

Do we have rallies in Germany other than Friedrichshafen? Well, yes we do but I’ll see you next year at Woburn.

Dick Ganderton G8VFH

**Dear Sir**

I write in response to the letter from M. Torsley, Bradford, on page 9 of the September ’96 edition. Mr Torsley has acquired a radio microphone receiver set to the middle frequency of the band covered by DIT specification MPT 1345. These receivers are not normally tuneable, the frequency being set by a crystal.

For interest, the other frequencies are 173.8, 174.1, 174.8 and 175.0MHz. In addition, radio microphone systems often make use of compander circuits, which would need to be disabled before the unit could be used as a radio, even if this were practicable. I believe that Soundblop products are distributed by Able Ltd. I hope this information is of help.

David Kay Newcastle-under-Lyme Staffordshire

**Dear Sir**

Your reviewer of short wave receivers, John Wilson G3PCG, really does a brilliant job on the technical background and other qualities of the AR7030 h.f. receiver in the March 1996 issue of SWM. In the review of the AR7030 RX he mentioned that he had worked on the NRD505/S15. I had an NRD575 myself but I have never seen a S05, so would John have any photographs of the S05 and R1155 receivers? If so, could he send me some photographs? I would be much obliged.

I have had no luck so far from my request in the May 1994 edition of SWM asking for photographs of the R1155 and Reciion R50.

James Reilly Co. Down N. Ireland

**Dear Sir**

With reference to Mike Richards’ article ‘When I Win The Lottery’ in Short Wave Magazine September 1996, I, too, aspire to winning the lottery and would also like to splash out on some short wave goodies. However, I am still waiting for those lucky balls, so like Mike, I would like to try out the T2FD aerial.

Unfortunately, he tells of finding it in a book and its excellent features - but what book and how do you construct it? I have looked in various books and when I mention T2FD to anyone, there is a blank expression and silence.

Can you please either send me constructional details or, alternatively, publish details so that others may be equally enlightened? The constructional details should also include details of the 10:1 balun. With any luck, this aerial will take the place of my long wire into a magnetic balun.

I. G. Bennett Whitley Bay Tyne & Wear

PS: I own a RA17L and find it a very easy receiver to operate, even though it takes up a lot of space and has valves.

Mike explains how to build a T2FD antenna in this month’s ‘Decode’, see page 76- KN

**Dear Sir**

I am a retired printer over in the USA who enjoyed the article in Short Wave Magazine, September issue, page 26, ‘When I Win The Lottery’. I also wanted to tell you that it takes a lot of guts to name your equipment selections out in public.

While I just happen to think that you are right on target, I am aware of that ‘hatchet wielding’ group of fellow hobbyists out there in s.w.land who take every opportunity given to assail anyone who goes public with any equipment that’s different from their own!

I’ll bet you’ll get your share of ‘Hey, you’re nuts Richards, you’ve gotten it all wrong’ type of mail from our s.w. friends out there. Well, I’m not one of those, you’ve done a fine job.

I am new to decoding, having only on old Universal M1000 decoder and for my PC an MA400 for my ‘on top of my NRD-535 receiver’ use. These two are okay for just a starter set, but I am like you - the Hoka Code30 is the way to go.

I am going to buy mine from our local USA franchises, Computer Aided Technologies in my state of Louisiana. The owner, Jim Springer, has sold me a few other CAT computer programs (ScanCat Gold) and when Jim says “Hoka Code30”, I sure believe him. You put the icing on the cake.

As to a receiver, you have also helped me to go for the new AR7030, one third the price of my former choice, the WJ HF-1000. I have a friend who has a HF-1000 and he loves it. But as you aptly said, ‘why the larger size?’ I think that Watkins Johnson only stays with the case about one DX one. The only active antenna that I have is the RF Systems T2FD. I am a big fan of RF Systems and I have two of their Mids (6dt on 12m balun dipper antenna) one DX one. The only active antenna that I even found to work well - yet, as you say, not as good as plain old outdoor wire - but close!

I also have the RF Systems T2FD and the DX I listen to is 101.0. The RF Systems DX I listen to is a passive two-
position T2FD with an internal control box that also has a m.w. attenuator and several attenuation settings. The downsides of the RF Systems antennas is price. I think that lower is a UK dealer, you may want to at least get a copy of the spec sheet for all RF Systems antennas, including the T2FD and DX listeners.

Again, as you accurately spelled out, the T2FD is a very quiet design, basically it is a take-off of a loop antenna. For what it's worth, my RT 2FD is a very well constructed and it does not take up a lot of space in the garden.

Well, that is all. Sorry to be so windy, I only really wanted to commend you for a fine articles and to make you aware of the already made RF Systems T2FD, but not to discourage you from homebrew.

Have a good day and keep up the good work.

John T. Wagner
Pickerington
Ohio
PS: Short Wave Magazine is a great magazine!

Dearest Sir

After reading Mr. Semmens letter (October edition) with regards to him not being able to listen to utility stations and etc., allow me to voice my opinion. I am quite new to short wave listening and purchased a Sangean AT803A radio secondhand from Multicom 2000 (thank you for an excellent service) and a Howes CR8 a.t.: running a loft aerial of some 80cm.

I spend most of my time listening to utility stations ranging from ATCs to marine with strange ones in between plus the odd station, which would be classed as a DX. Not having to work within a limited field, I would expect to be able to catch anything using his setup. Inchester, Inchester, is not the best place for radios, but its amazing what you can find with a little patience.

By the way, I caught Rocket Radio on Saturday from California (7125, 1200-1330 UTC) and they also mentioned Miami Radio, which I listened to the same day, albeit for just 20 minutes SIO44 - but it was enough. It's not just 'you get what you pay for', it's also 'learning to get the most out of what you've got'.

I did enjoy reading about the Numbers Stations and the work that Enigma does. They now have a new subscriber, thanks to your magazine. Now I would like to say a big thank you to SWM for sending me the book, ordered. I arrived within 48 hours of ordering. I will not hesitate in using your book service again.

Which brings me to a question: listening on 4.742, UK RAF, Architect at ordering. I will not hesitate in using your ordered. It arrived within 48 hours of September 1996 issue of Short Wave Magazine, regarding the generation of interference with shortwave radio reception by a FAX machine. I would submit comments in two areas, first a clarification of what the BABEL and FCC approvals actually represent and secondly some suggestions of remedial action which could be taken which might improve the situation.

BABEL (The British Approvals Board for Telecommunication) has responsibility to ensure the maintenance of the quality of service available over the telephone systems provided by BT and the other Operators in the UK. They do concern themselves with Radio Interference (or EMC to use the more fashionable term), but only in as much as it may affect the telephone service. It has been several years since I was current with the BABEL requirements, but at that stage they only laid down limitations of the level of r.f. energy sent by equipment connected to the telephone network back into that network. BABEL approval provides no indication of the potential of equipment to interfere with radio receivers.

FCC registration is about radio interference. At least registration against FCC Part 15 is. There is also FCC Part 68 which deals with the same issues as BABEL but in the USA. Any electronic processing equipment employing frequencies above 50kHz is required to be assessed for potential interference with radio receivers before being sold in the USA. With regard to the short wave frequencies the assessment is made by measuring the r.f. voltages introduced onto cables connected to the equipment on the (reasonable) basis that the cables are the only things long enough to act as effective radiators.

There are two classes of compliance. The less severe is Class A'. This requires no r.f. signals of more than 1mW in any 9kHz bandwidth. Class B requires a tighter requirement of about 1mV. The derivation of these limits goes back to 'Protection Distances' - The hypothetical minimum likely distance between equipment causing interference and equipment being operated by a person other than the owner of the interfering source. The distance is 30m in the case of industrial and commercial equipment and 10m in the case of domestic equipment. FAX equipment is likely to have been treated as commercial equipment and quite possibly only complies with Class A'.

Until quite recently there were no similar generally applied regulations in the UK. This has changed since the implementation of the EEC EMC Directive. From the 1st January 1996 any electronic equipment being newly sold is required to display the CE mark. In most cases this represents (amongst a lot of other things) a manufacturer's declaration that the level of interference produced by the equipment conforms to regulations very similar the FCC ones.

An attempt to reduce the problem of interference should concentrate on the cables connected to the FAX machine, i.e. the power cable, the incoming phone line and the cable to an extension phone if one is present.

Can you run your fax R71E off a battery? This is first. If the problem goes away you can conclude that the r.f. energy from the FAX machine is travelling through the a.c. power wiring and you can concentrate on this for a cure. In this case the device offered further down for treating the FAX machines power cable can be usefully applied to the a.c. power cabling to the radio as well.

Unplug both phone lines. If the interference only occurs when the FAX transmission is in progress then it will probably be necessary to pull out the main phone line in the middle of a test transmission set up the required test condition. If the problem does not go away, don't discount the phone lines, but do start suspecting the power line.

Obtain some ferrite loops to wind the power cable and telephone cables around. You should be able to get these from one of the 'High Street' electronic components shops, if you are lucky enough to live near one, otherwise try the mail order electronic suppliers. You may well be able to get the type that have been cut in half allowing you to pass the cable over and around one half then put the other half back to complete the ring. Do make sure the two halves of the ring meet together firmly. These type are made specifically for this job and are a 'lossy' ferrite. If you can only produce the problem by having both the power line and the phone line plugged in at the same time add ferrites to both at the same time first of all. If the situation improves then remove them one at a time to see if both are actually needed.

If the problem proves to be with the a.c. power line but the ferrites are not sufficient try using a mains EMC filter usually obtainable from electronic suppliers. NB: For safety as well as operational reasons these filters must be connected to an earthed power outlet. Fit one as close as possible to the point where the power goes into the FAX machine.

If the phone line is giving the problem try wrapping it in earthed aluminum foil. Unfortunately it is difficult to do much more than this without violating the BABEL regulations yourself. In the USA, r.f. filters to reduce the pick up of radio transmissions by telephones are available and these would help with the reverse problem that we have here. As far as I am aware there is no similar BABEL approved devices.

Philip Williams C. Eng., MIEE, G4KIL
(Formerly EMC Engineer with BNR Europe Ltd., now Electronic Technologist with Ghana Institute of Linguistics, Literacy and Bible Translation)

is there something you want to get off your chest? do you have a problem fellow readers can solve? so then drop a line to the editor.

if your letter is published you will receive a £5 voucher to spend on any SWM service

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Components for SWM Projects

In general all components used in constructing SWM projects are available from a variety of component suppliers. Where special, or difficult to obtain, component certification, a specified, will be quoted in the article.

The printed circuit boards for SWM projects are available from the SWM PCB Service, Badger Bt., Clarense Road, Birmingham B23 8AL. Tel: (0965) 374918.

Photocopies and Back Issues

We have a selection of back issues, covering the past three years of SWM. If you are looking for an article or review, or whatever that you missed first time around, we can help. If we don't have the whole issue we can always supply a photocopy of the article. Back issues are £2.60 each, photocopies are also £2.60 per article, plus £1.00 for subsequent parts of serial articles.

Binders, each taking one volume are available for £9.50 plus £1 P&P for one binder, £2 P&P for two or more, UK or overseas. Please state the year and volume number for which the binder is required. Prices include VAT where appropriate.

Orders for back numbers, binders and items from our Book Service should be sent to: PW Publishing Ltd., FREEPOST, Pest Sales Department, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW, with details of your credit card or a cheque or postal order payable to PW Publishing Ltd. Cheques with overseas orders must be drawn on a London Clearing Bank and in Sterling. Credit card orders (Access, Mastercard, Eurocard or Visa) are also welcome by telephone to Broadstone (01020) 659930. An answering machine will accept your order out of office hours and during busy periods in the office. You can also fax an order, giving full details to Poole (01020) 659950.

Technical Help

We regret that due to Editorial time scales, replies to technical queries cannot be given over the telephone. If you require help with problems relating to topics covered by SWM, please write to the Editorial Offices, we will do our best to help and reply by mail.
RCON - AVAILABLE NOW!

RCON is our new receiver control program designed to control many short wave receivers and scanners, offering enhanced control options and a wide range of memory management options.

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There’s obviously a whole lot more which you can find out by asking for our datasheet or by downloading the manual from our Website!

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Saturday 14th December, 1996

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117 Beaumont Road, St Judes, Plymouth PL4 9EF
Before we cover the history of BBC Television it is worth discussing the development of BBC Radio, which began seventy-four years ago. In 1922, the BBC was one of the first organisations to start regular public service broadcasting. Ten years later, short-wave broadcasting to listeners throughout the British Empire began.

**BBC Radio**

At the beginning of World War II, large numbers of trained BBC staff were absorbed by the Armed Forces. The broadcasting service at home was restricted in coverage, by peace-time standards, because of the limitations imposed in the interests of national security. Much of the BBC’s efforts were devoted to improving the coverage during enemy air attacks. Sixty low-power transmitting stations were constructed in the largest cities throughout the country; some 150 wartime studios were built and equipped, and to meet the very great expansion of the BBC Overseas and European Services, three major short-wave stations were constructed to supplement the coverage of the pre-war Daventry station which was itself greatly expanded. In 1939, the BBC had twenty-four transmitters in operation with a total power of 1.2MW. At the end of the War, the number had been increased to 121 transmitters with a total power of some 6.24MW.

By August 1961, plans were already in progress to create a considerable number of local sound broadcasting stations, a second television programme and the introduction of colour television. At that time, the BBC were looking forward to inter-continental ‘live’ television exchanges, perhaps in colour, using radio links made possible by satellites or special cables laid under the Atlantic and Pacific Oceans. In 1961, the BBC requested permission from the government to make a modest start with colour but were refused because “major innovations in television and sound broadcasting should not be permitted until the Pilkington Committee had reported”. Despite this, BBC engineers decided to give the public the opportunity to see for themselves what colour television looked like by arranging a demonstration to be included in the BBC exhibit at the 1961 National Radio Show at Earls Court.

**Crowded Radio Spectrum**

After the War, one of the biggest problems which the BBC had to face was the overcrowding of the long-wave and medium-wave bands caused by the great increase in the number and power of broadcasting stations all over Europe, which had taken place during the preceding five years. A series of international wavelength plans had been produced from time to time to regulate the use of available channels in these bands. None of the plans were entirely successful because there were far too many stations for the wavelength space available. BBC stations were operated in these wave-bands in accordance with the Copenhagen Plan of 1948, which was put into effect in 1950. This Plan was itself only a compromise, and the number of broadcasting stations in Europe had almost doubled by 1961. As a consequence, in the Sixties there were large areas in the United Kingdom where foreign stations caused serious interference with reception of BBC programmes, particularly during the winter evenings. Careful planning was, therefore, necessary to provide the best possible service in these circumstances. Between 1951 and 1954, twelve additional low-power transmitting stations were constructed for the BBC Home Service. This involved determining the areas in which they were most needed, finding, testing and selecting the actual sites, obtaining all the necessary approvals and installing buildings, plant, masts and antennas.

**VHF Radio**

Because of the serious interference caused to BBC programmes by foreign stations, and the fact that it was impractical to build any more medium-wave stations (because there were no suitable wavelengths available on which to operate them), consideration was given to the introduction of a new system of broadcasting which used very short wavelengths (that is to say, very high frequencies, or v.h.f.) which were not normally subject to interference from distant stations. Before such a radical step was taken, it was necessary to carry out a very extensive series of experimental transmissions, first with low-power equipment and later on a larger scale using a purpose-built high-power transmitting station located at Wrotham in Kent. A report on the proposed new service was produced by the Television Advisory Committee in 1954. The Committee was set up by the Postmaster-General to advise him on the development of television and sound broadcasting on frequencies above 30Mc/s (or 30MHz in today’s terminology).

The BBC was subsequently given permission by the government to proceed with its development. The BBC’s faith in this system and the bold step taken to build the high-power station at Wrotham were fully justified. By 1961 there were twenty v.h.f. transmitters in operation and the service was available to some 97% of the population. Further approval from the government was sought in order to install a further twenty-one low-power relay stations for which a special design of equipment had been evolved by BBC engineers for unattended operation.

**BBC External Services**

In addition to the broadcasting services for listeners in this country, the BBC also operates the External Services for listeners in Europe and in more distant areas.
parts of the world. In the early 'Sixties, there was a battery of short wave transmitters, thirty-seven of which were installed at four sites in the United Kingdom (Daventry, Rampisham, Skelton and Woofferton) and two at Tebrau, near Singapore. The Tebrau installation and the studios in Singapore associated with it were built under the guidance of the BBC engineers in 1951 for the British Far Eastern Broadcasting Service, which was taken over by the BBC in 1948. The BBC has always done a great deal of work on the design of directional short wave transmitting antennas with the object of providing listeners with the strongest signals and the minimum fading. Short wave propagation conditions are constantly changing from day-time to night-time and from season to season as well as over the eleven-year sunspot cycle. In the short wave bands there is overcrowding too and, until recently, the extra problem of deliberate jamming of certain transmissions by the now defunct 'Iron Curtain' countries.

**Audio Recording Techniques**

Sound recording equipment has always played an important part in the system. By the early Sixties, some 50% of all BBC programmes were recorded. The technical standard of the recordings had to approach, as closely as possible, that of 'live' programmes.

About 80% of recorded programmes were on magnetic tape and, although the recording machines were commercial products, the design of the recording rooms and ancillary items of equipment was done by the BBC.

The disc recording machines were of BBC design and the same applied to the reproducing desks.

The use of disc recording by the BBC decreased rapidly by about 1961 but there were, of course, many programmes in which commercial gramophone records were played.

**Television - The Early Days**

Experimental television transmissions by the BBC began in 1929 when facilities were granted to Baird Television Limited to transmit programmes originating in their studios in Long Acre through the London Station transmitter in Oxford Street. These transmissions, which were subsequently referred to as 'low-definition', employed 30 scanning lines, and 12.5 frames were transmitted per second. Vision only was transmitted, but in 1930 the transmissions were continued from the then new London Regional Station at Brookmans Park with the addition of sound. These 30-line transmissions were considered to be of sufficient technical interest for the BBC to equip a studio in Broadcasting House with Baird apparatus, and this was put into use in 1932.

At this time the development of improved standards of definition was proceeding rapidly. Baird Television Limited and A.C. Cossor Limited were experimenting with systems using 120 and 180 lines, the latter firm concentrating on a method known as 'velocity modulation'. Electric and Musical Industries Limited (EMI) and Scophony Limited also had systems which were well advanced.

The question arose as to whether a public service of 'high-definition' television was possible using very high frequencies (v.h.f.) in order to accommodate the large bandwidth necessary for the transmission of such systems. In May 1934, the Postmaster-General appointed a committee under the chairmanship of Lord Selsdon to report on the relative merits of the various systems and on the conditions under which a public service might be provided.

The main recommendations of the Committee, whose report was issued in January 1935, were:

1. That a high-definition public service should be established at an early date and that v.h.f. transmission should be used.  
2. That the BBC should be responsible for television as they were already for sound broadcasting.  
3. That a standing Advisory Committee approved by the Postmaster-General should be formed.  
4. That the first station should be in London and that the makers of the two selected systems, Baird and Marconi-EMI, should each supply their own apparatus for alternative operation.  
5. That the cost should be borne by the revenue obtained from the existing ten-shilling licence fee.

The Advisory Committee recommended that the studios and transmitters should be at Alexandra Palace and that Baird Television Limited, and the Marconi-EMI Television Company Limited, should be invited to tender for the supply of apparatus for their respective systems. Transmissions on wavelengths of approximately 6.7m for vision and 7.2m for sound (or 45.0 and 41.5MHz) were to be used, and the standards of picture transmission proposed by the two companies were accepted, namely:

a) Baird System: 240 lines, 25 pictures per second, sequential scanning.  
b) Marconi-EMI System: 405 lines, 25 pictures per second with interlaced scanning.
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Short Wave Magazine, November 1996
'Intermediate Film' alternate weeks. The two transmission systems were used during the Postmaster General and on November 2nd 1936 by Alexandra Palace Station was formally opened when a series of trial programmes was radiated in August 1936, after which the transmissions were discontinued until October when a series of trial programmes was radiated for two hours daily. The Alexandra Palace Station was formally opened on November 2nd 1936 by the Postmaster General and a public service for two hours daily came into being. The two transmission systems were used during alternate weeks.

The Baird Systems

It is worth mentioning here how Baird's studios operated. In fact, two were provided at Alexandra Palace whereas Marconi-EMI were allocated only one. In Baird's main studio (measuring 70ft long, 30ft wide and 23ft high) separate methods of producing television programmes were available - the 'Intermediate Film Process' and the Baird 'Electron' camera system. The Intermediate Film Process used a 17.5mm film taken in the studio which was continuously passed, in turn, through a developing tank, a washing tank, a fixing tank, and a second washing tank. The complete process took 65 seconds. The negative film was immediately scanned while still wet by a disc which rotated at 6000r.p.m. Illumination was obtained from a 30A arc lamp. The light from the scanning disc passed on to a photo-cell which incorporated an electron multiplier. The vision current from this device was passed to a valve amplification chain from which it was sent to the Baird control room. The recorded sound was taken off the film via a pick-up head and was passed to the control room. The Intermediate Film Process equipment was housed in a room adjacent to the main studio and had a glass window through which the camera filmed all the action.

'Electron' Camera

The second system at Baird's disposal was the 'Electron' camera located in a special sub-control room. The system could be used for programmes such as lectures or the broadcasting of cartoon films. The set-up was designed to use the spot-light system in which the studio was kept mainly in darkness except for a scanning beam of light projected onto the artist. The reflected light was detected by photo-cells. In the adjoining projection room, a large disc rotating at 6000r.p.m. and illuminated by a 150A arc, generated the scanning beam which was admitted into the small studio via a window. The studio was equipped with four photo-cells which used multipliers from which the generated signals passed through a chain of amplifiers en route to the control room. The sound was picked up by a single microphone. Engineers in the control room could fade between signals produced by both the Intermediate Film Process and the Electron camera system. Apparently, all the artists hated the prospect of appearing in front of Baird's scanning system and found all sorts of excuses to put off turning up at the studio until the following week when the Marconi-E.M.I. 405-line system was in use!

Single Set Of Standards

On February 5th 1937, the Postmaster General announced that, as a result of the experience gained with the transmissions from Alexandra Palace, the Television Advisory Committee recommended that a single set of standards should be adopted for transmissions from the Alexandra Palace Station. The standards were as follows:

- Number of lines per picture: 405 interlaced.
- Number of fields per second: 50.
- Ratio of peak white picture to synchronising pulse amplitude: 70:30.

Accordingly, from February 6th 1937, the Marconi-EMI system alone was used at Alexandra Palace with positive modulation of the vision signal. Both sound and vision transmissions were amplitude modulated and vertically polarised. It is interesting to note that the basis of this system was suggested as long ago as 1908 by A.A. Campbell-Swinton who put forward in a letter to Nature an idea for the use of cathode-ray tubes at both transmitter and receiver. He greatly amplified this idea in a presidential address to the Röntgen Society in 1911, envisaging a special type of c.r.t. at the transmitter, which was the forerunner of the cameras used later.

Credit for the development of this system should also be given to a team of EMI research workers led by Mr. Isaac Shoenberg for translating Campbell-Swinton's theory into a workable television system. That team included such men as A.D. Blumlein and C.O. Browne, who both lost their lives in an accident during the War, and Dr. McGee who later became a professor at the Imperial College of Science and Technology in London.

Alexandra Palace

When the Service started there was a single transmitting station at Alexandra Palace in North London. The transmitter developed a peak white output of approximately 17kW and was of the high-power modulated type. Separate antennas were used for the vision and sound transmitters, each having a gain of 3dB. The power of the sound transmitter was 3kW.

Two studios only were available, situated at Alexandra Palace in the same building as the transmitters. Each studio measured 70ft long by 30ft wide by 23ft high (21 x 9 x 7m) and was equipped with three cameras of the Emitron (Iconoscope) type. About 100kW of lighting was available in each studio, part a.c. and part d.c.

Equipment was provided at Alexandra Palace for televising standard cinema films, such as newsreels, cartoons, and other features, and 'outside shots' for incorporation into studio programmes. The equipment consisted of continuous motion Mechauf film projectors throwing an image directly onto the photo-sensitive mosaic of an Emitron camera.

Outside Broadcasts

It was realised from the outset that outside broadcasts would contribute a great deal to the television programmes. At first, such broadcasts were limited to the precincts of Alexandra Palace because the greatest length of camera cable that could be used was approximately 1000 ft. (305m). However, early in 1937 the Post Office installed a balanced-pair cable vision circuit between Alexandra Palace and central London. It was by this means that the first outside broadcast to be undertaken at a distance.
from Alexandra Palace was
carried. This was the
Coronation Procession of
HM King George VI in May
1937.
To enable outside
broadcast programmes to be
televisioned from places further
afield, the BBC purchased
two mobile transmitters
(operating in Band I with a
vision transmitter output of
1kW), which had a range of
some twenty miles and could
be used to convey the vision
signals to Alexandra Palace
for transmission in the
normal way. Two mobile
control rooms containing
equipment for the control of
three cameras were also
obtained. Regular
programmes were
transmitted for about two
hours each evening and one
and a half hours each
afternoon up to the outbreak
of War in September 1939
when the Television Service
was abruptly closed down
for reasons of national
defence.

Transmission
Standards
To say that television is a
much more complex
business than sound
broadcasting is an
understatement with which
no-one will disagree. One
complication unique to
television is that both the
vision and sound signals
must be transmitted in
accordance with a pre-
determined set of standards.
These standards specify,
among other things, the
number of lines into which
the picture is divided, the
number of pictures
transmitted each second,
and the method of
transmitting the sound. A
television receiver made for
one set of standards only will
not work on another and
unfortunately there are
different sets of standards in
use in different parts of the
world.

Even with the advent of
satellite television, different
standards have been
adopted such as PAL, B-
MAC, D-MAC, D2-MAC and
PALplus. With respect to
normal terrestrial broadcasts
in the Fifties and the early
Sixties, the standards were
often referred to merely by
the number of lines in the
picture (405 lines in the UK,
625 lines in most of Europe,
819 lines in France and
Monaco, and 525 lines in
North America and Japan).

In Britain, the world
pioneer of high-definition
television, a 405-line
standard was adopted in
1936. In September 1943, the
government appointed a
Committee, under the
Chairmanship of Lord
Hankey, to prepare plans for
the reinstatement of the
television service following
the War. The Committee
recommended that the
service should be resumed
on the same 405-line
standard that was in
operation before the War,
and that television should be
extended as soon as possible
to the most populous
provincial centres on the
same basis. At that time, no
alternative system capable of
giving appreciably higher
definition had been
developed in any European
country and it was
recognised that a long period
of research and development
would be needed before any
such system became
available for a public service.

Recommendations
In 1945, the government
accepted the
recommendations of Lord
Hankey's Television
Committee that the
television service should
reopen with the same
standards. It should be
remembered that at that time
the 625-line standard, since
widely adopted in Europe,
had not been put forward. In
1948 the government
announced that the 405-line
standard would also be used
for further stations.

Once this fundamental
question had been
decided it was possible to
begin the long process of
getting the studios and
transmitters at
Alexandra Palace into
working order again. Most of
the apparatus had been
stored during the War and
some had been used for
other purposes so that
nothing less than a
detailed overhaul and the
testing of almost every component in the
system was required. The task was completed
by the appointed time on
June 7th 1946, when the
BBC Television Service
was re-opened. The next
day, an outside
broadcast of the Victory
Parade from The Mall was
successfully accomplished
and the foundations of the
post-war Service were laid.

Test Card 'A' was radiated
by the BBC in the late
'Forties. It was the world's
first television test card to
be transmitted.

The famous BBC Test Card
'C' was introduced in
January 1948 and continued
to give faithful service until
the early 'Seventies. Test
Card 'C' was also used by
many television services
throughout the world.

Fig. 7: The BBC-1 Test Card
'D' was introduced on April
20th, 1964 to mark the
start of BBC-2 on u.h.f. 625-
lines.

The 'Pie Chart' Tuning
Signal, used thousands of
times during the early
Sixties to introduce every
BBC Schools programme.
The two-minute sequence
was accompanied by some
specialty composed music
played on the flute and
cello.

Fig. 8: The familiar BBC-1
on-screen Globe Symbol
with special identification
to celebrate 60 years of
BBC broadcasting, which
began in 1922.

In part 2 Keith
and Gary will
continue the
story.
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**UK Scanning Directory**

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Have AKD hit the TARGET?

A little bit of skullduggery by the Editor enabled John Wilson to take a good look at a new, low-cost, British made, communications receiver selling for just £159 all in.

Ears were set twitching earlier this year when AKD, a British manufacturer of amateur radio transceivers and accessories, announced that they would be introducing an h.f. receiver towards the end of 1996. This was welcome news for me because I was the first person to propose that it was possible for British companies to operate in this market and produced the HF-125 and HF-225 to prove it. Here then was a second British manufacturer about to enter the fray - and with a really low target price hinted at. What a pleasure it was to get my hands on a pre-production sample of the AKD 'Target HF 3' h.f. receiver, and what a surprise it turned out to be.

Unpacking the Target revealed a neat little receiver having similar size to the AKD transceivers - in other words about the size and shape of a car radio. The case and front panel are moulded in a nice grained finish and the colour is a discreet shade of grey. The first thing that struck me was the relative absence of controls, these consisting of an obvious tuning knob, a volume control, a clarifier control and a row of four buttons controlling mode up/down, memory store and memory recall. The rear panel was equally clear of 'things', bearing only the 12V power input jack, an attenuator switch and the antenna connector.

**Flywheel**

First thing to reach for after connecting a power supply was the tuning knob - good gracious it feels like an Eddystone, and there is no doubt that there is a substantial flywheel built in somewhere behind the panel. Take a quick look behind the panel and sure enough, there sits a lead flywheel with enough inertia to satisfy anyone. One minor snag is that the hole for the grub screw is wide and deep enough to slightly unbalance the free running shaft, so on some frequencies the knob will not stay put. My suggestion to cure this would be to use a grub screw as long as the radius of the flywheel so that the weight of the screw would re-balance the whole assembly - however, the tuning is a delight to feel.

One advantage of the flywheel effect is that spinning the knob to get from the bottom to top of the impressive frequency coverage of 30kHz to 30MHz, in conjunction with the four stage 'speedup' of the tuning rate, gets you to a new frequency in fractions of a second. There is no 'roll-over' at band edges, so when you hit 30MHz or 30kHz the receiver stops dead and you have to go into reverse to tune the other way.

Now - the tuning steps; on the face of it a 1kHz tuning step for an h.f. receiver spells difficulty, but because the i.f. filters are 3.8kHz wide for s.s.b. and 6kHz for a.m., it's actually possible to tune across even an amateur band and hear the signals stepping through quite easily.

Once within the pass band, a quick twiddle on the clarifier control brings them in loud and clear, and because there is proper sideband switching with crystal controlled carrier injection there is absolutely no doubt which sideband you are on. Do not confuse this system with receivers such as Taiwanese portables or the WinRadio, which try to provide sideband selection by using a tunable b.f.o. They are infinitely more difficult to use because you never quite know where you are, and the positioning of the carrier injection relative to the i.f. pass band is sheer guesswork. On the Target HF 3, when the display says u.s.b., you can be certain that it is receiving upper sideband signals, and equally that i.s.b. means correctly receiving lower sideband.

**Clarifier**

The clarifier control is designed to neatly tune across the gap between the 1kHz main dial tuning steps, and has a quoted range of ±800Hz. On the review receiver the range was actually ±980Hz, but that's unimportant since the tuning range is clearly more than adequate to cover the desired span with a decent overlap.

Although the handbook contains no technical information either in a block diagram, circuit description or circuit diagram, I had to use my eyes and experience to scan the receiver inside and work out some of the design details. The clarifier works by using a d.c. controlled Varicap diode to tune the second conversion oscillator, which is a crystal running at a nominal 14.84833MHz tripled to 44.545MHz to convert the 45MHz first i.f. down to 45kHz. By pulling the crystal at its fundamental frequency the amount of shift is also tripled, which means that it only has to move ±300Hz to achieve the full clarifier range.

Mode selection is by two buttons, one 'UP' and one 'DOWN', logical and easy to use because there are only three modes to select, u.s.b., i.s.b. and a.m. The other two buttons are memory store and memory recall - there is only one memory, how refreshing and actually how simple to use. Before you switch off, just prod the store button and that is where the receiver will be when you switch it on again.

The main display is a clear black-on-grey liquid crystal unit, reading frequency in kilohertz, with a segmented 'S' meter display along the bottom. It's not illuminated, but that didn't seem to matter in all the conditions I used the receiver, and I don't know many people who would
attempt to use the Target 3 in the pitch darkness - unless your name is Dracula. And that's about it as far as controls go.

Performance

So, how did the Target HF 3 behave in use? Amazingly well, because here is a receiver designed as a receiver with no pretensions to a plethora of unnecessary facilities. Tuning around the spectrum with a decent antenna connected quickly revealed that, despite the simple appearance, the Target 3 behaved extremely well indeed. Recovered audio was excellent; tuning rates were well chosen; the r.f. performance was clearly very good, and this was confirmed by bench measurements as shown in Table 1.

The 'S' meter calibration was approximately 3dB per division, starting with S1 at -104dBm (1.41µV) and S9 at -80dBm (22.5pV). The a.g.c. knee was at about -100dBm (2.25pV), with the audio output kept within 10dB from there on.

Technical types will immediately recognise that this is a pretty good performance from a simple receiver; far better than any comparable receiver at the price, and better than many receivers at a higher price. The reciprocal mixing and 3rd order intercept figures bear comparison with the WinRadio to show how a proper receiver should perform. Taking a closer look inside the radio reveals that the front end has been designed by someone who has studied and understood modern thinking. The input transformer to the mixer is a sight to see; in fact I haven't seen one as chunky in any recent radio, and everything about the first mixer says 'r.f. performance'. The conversion architecture is similar to many designs, using a synthesised first oscillator converting to a first i.f. of 45MHz followed by direct conversion down to 455kHz. A 45MHz crystal filter removes first i.f. images, and second i.f. filtering is by ceramic filters giving the nominal bandwidths of 3.8 and 6kHz. The a.m. detector is said to be quasi-synchronous, and again because of the lack of any circuit information I can only assume that this is similar to the JRC NRD series receivers in which an incoming a.m. signal is passed through a high gain limiting amplifier which strips off the modulation and provides the original, now clean carrier, to demodulate the double sideband signal in an s.s.b. product detector. The advantage of this type of detector is that it combats selective fading on a.m. signals without the 'howl' which you get from phase locked detectors. The ultimate performance on deep fades is not quite up to the phase locked systems but it's very good in practice and the average user of the receiver will never know it's there.

Synthesiser 'Wobble'

So, I'm clearly in love with this little receiver; was there anything less than perfect?

Table 1. Tests conducted at 14.2MHz.

<table>
<thead>
<tr>
<th>Sensitivity (12dB Sinad):</th>
<th>Normal</th>
<th>Attenuated</th>
</tr>
</thead>
<tbody>
<tr>
<td>u.s.b.</td>
<td>-110dBm (0.7µV pd)</td>
<td>-100dBm (2.25µV pd)</td>
</tr>
<tr>
<td>a.m. 60% mod.</td>
<td>-104dBm (1.4µV)</td>
<td>-94dBm (4.5µV)</td>
</tr>
<tr>
<td>Noise floor:</td>
<td>-121dBm (u.s.b. with nominal 3.8kHz i.f. filter)</td>
<td></td>
</tr>
<tr>
<td>3rd order intercept point:</td>
<td>-4dBm (normal gain setting)</td>
<td></td>
</tr>
<tr>
<td>Dynamic range:</td>
<td>78dB</td>
<td></td>
</tr>
<tr>
<td>Reciprocal mixing:</td>
<td>45dB (inside filter pass band)</td>
<td></td>
</tr>
<tr>
<td>+5kHz</td>
<td>90dB</td>
<td></td>
</tr>
<tr>
<td>+10kHz</td>
<td>101dB</td>
<td></td>
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<tr>
<td>+20kHz</td>
<td>105dB</td>
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<td>+50kHz</td>
<td>109dB</td>
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<tr>
<td>+100kHz</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Have AKD hit the target?

The synthesiser has a little 'wobble' on it which is apparent when listening to a steady carrier, but this is undoubtedly due to the trade off which occurs when you want a less 'wobbly' synthesiser which has a slow response time to change, against the need to have a fast enough synthesiser to follow the tuning knob data changes when you need to move frequency quickly. In the case of the Target 3, I personally would have preferred a slower and less wobbly response, but I don't know how that would have affected the tuning rate, so let's leave it to the designer who, let's face it, has done an excellent job.

Another thing which people will notice is that the frequency readout is correct for the centre of the a.m. filter pass band, but since the s.s.b. filter is 3.8 (4kHz wide, the s.s.b. demodulator crystal oscillators are offset by ±2kHz to place the carrier on each side of the filter. This results in an incorrect frequency readout on u.s.b. and I.s.b., but it's exactly the same in this respect as the much admired Trio R-1000, and you must remember that the Target sells for £159 - half what you would pay for a ten year old, second hand R-1000.

The 10TH Brigade

Let me now philosophise about receiver design and how it applies to the Target HF 3.

Every design is a compromise, and never more so than in a short wave receiver. When John Thorpe and I discussed design of receivers, we always began with a target price in mind, for this is a commercial business, and although everyone wants to produce the 'ultimate' receiver, it's highly likely that the 'ultimate' would only satisfy a handful of customers.

No - the first step is finding a place in the market which is set by the end user price and then design a receiver which offers the best combination of features and performance for that all important target price. Having done that and completed the design, along will come the 10TH brigade (If Only They Had). If Only They Had frequency correction so that the display didn't have the ±2kHz offset (but look at the price of £159). If Only They Had used an SO-239 antenna connector instead of a phono socket (but the phono is standard on Collins and Drake gear - and look at the price of £159). If Only They Had fitted high spec. i.f. filters (but look at the price of £159). If Only They Had fitted a headphone socket (actually I agree with that comment, even taking into account the price).

A Bold Move

Let's put the Target 3 into context; this receiver competes directly in the market place with Taiwanese portables, but it knocks spots off them when it comes to r.f. performance. This is a 'real' receiver despite the apparent simplicity, and I admire the straightforward way in which the designer has balanced all the compromises. Had I still been in the receiver manufacturing business, this is the one I would like to have built, and I do congratulate AKD for taking a bold move into the low cost receiver field. Don't let the 10TH brigade destroy your confidence, and I hope that the readers of this review will understand just how good the Target HF 3 really is - and for only £159; it's a bargain.

The Target HF 3 is, I understand, the first in a range of h.f. receivers to be introduced by

AKD, Unit 5,
Parsons Green Estate,
Boulton Road,
Stevenage,
Herts SG1 40G.
Tel: (01438) 361710. FAX: (01438) 367591.

They also have a Web site at http://www.kbnet.co.uk/akd

STOP PRESS

AKD have just told us that, following the comments made in our preview last month and by others, they have relented and are taking the bold step of halting production of the Target HF 3 to allow them to make the necessary modifications to fit a 3.5mm headphone socket on the rear panel.
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Intermodulation-
General Considerations for Active Antennas

After his look at three commercial active antennas, last month, Andy Ikin discusses the importance of good intermod performance.

Many years ago, I purchased a Trio R-1000 receiver for use in the home as my wife was never happy with my home-brew valved sets. At first, the Trio appeared to be a dream come true with its stable local oscillator and direct digital frequency readout. However, as soon as a reasonable antenna was coupled to the receiver, weak signal reception became impossible. Listening to the receiver on the 15m amateur band and the 13m broadcast band was impossible due to the receiver being swamped by phantom broadcasts and Soviet jammers. The only way of curing this problem was to use the antenna attenuator. However, this caused the receiver sensitivity to drop to the point where some stations were lost in the noise. At first I dismissed these phantom broadcasts or interference as simple cross modulation that normally used to occur with valved radios with too much r.f. gain. The problem was much worse than with the valved radios.

I decided to ‘pull the R-1000 apart’ and find out where the problem lay. By using a signal generator loosely coupled to antenna socket with the R-1000 tuned to 21.4MHz I could hear these phantom stations if the sum or difference of the signal generator and the Broadcast bands was 21.4MHz. At this time I was not familiar with this problem of intermodulation distortion, because the old valved receivers used several tuned circuits between the antenna and the mixer to reduce image signals. Also these same tuned circuits prevented interaction of the sum and difference frequencies of the powerful broadcast transmitters. The main problem was the sum of the signals in the 6, 9, 12 and 15MHz bands. My difficulties with the R-1000 was eventually pin-pointed to several deficiencies: the single ended f.e.t. in the r.f. stage was mixing the sum and difference signals because the r.f. filters had insufficient selectivity, the diodes used to switch the r.f. filters were also mixing these signals. I was reluctant to modify the R-1000 because the resale price may have been affected. To resolve the intermodulation of the R-1000, I built a very simple tuned loop antenna using 800mm square frame and a balanced f.e.t. amplifier with an impedance match to 50Ω. This solved the intermodulation problems and provided a reduction in local noise.

Old for New

A few years later the R-1000 was ‘traded-in’ for a Japanese Radio Company NRD-525. The new receiver didn’t suffer from any of the intermodulation problems of the Trio R-1000. The NRD-525 is one of the few receivers that uses a front-end band-pass filter that is tuned by the synthesizer.

At the same time I started to experiment with broad-band directional receiving antennas, using ‘home-brew’ broad-band active loop and dipole antennas. However, I soon encountered the similar intermodulation problems as with the R-1000. The work on the directional antenna was successful, however the performance was compromised by intermodulation. I had considered in 1986 using the Datong AD370 Active Dipole. However I was put off by the Intermodulation Tests reported in the 1988 VRTH. However, in 1991 I purchased two AD370 Head Units and built my own power supply interface unit. I was absolutely amazed by the absence of the intermodulation on short wave. The only slight problem was too much gain on long wave causing the receiver to overload.

My eventual goal was to build a broad-band active loop antenna because of the inherent advantages loops have in their lower sensitivity to local interference. The use of tuned loops was out of the question because the phase characteristics are unpredictable. I still continued to work on producing a broad-band active loop antenna, it was necessary to construct a simple way of measuring the intermodulation performance. My set up used two crystal oscillators, a transformer combiner, a simple pre-selector and the NRD-525 with its ‘S meter’ calibrated against a professional signal generator. After about two years, I had built several broadband loop antennas using a 1m aluminium tube and a balanced transistor amplifier. The loops provided comparable performance to either a 20m long wire with matching transformer or a 10m vertical dipole and balun over a range of 2-30MHz. The intermodulation performance was +80dBm for the second order products and +40dBm for the third order. Reception down to 150kHz was possible with lower sensitivity. During this period considerable experience was gained using active antennas and the problems of quantifying the required performance. Below are a few suggestions on choosing active antennas.

Currently there are several active antennas available providing similar performance. These active antennas generally fall into two types:

1) Whip and dipoles, responding mainly to the electro-static field.
2) Loops, responding mainly to the electro-magnetic field.

The whip/dipole antennas are more numerous because they are easier to design for wide band performance. The loop antennas are either manually tuned or wideband. The manually tuned antennas can provide excellent results because their selectivity reduces intermodulation products.

However, having to manually tune the antenna in step with the receiver is a considerable disadvantage. Also the cost and complexity of the tuned loop is high, if an antenna has to be remotely tuned so the antenna can be sited away from local interference. Thus the wideband loop antenna can offer considerable operational advantages, this is why they are used mainly by civil and military authorities. However, these tend to be expensive and are virtually unobtainable in the s.w.l. and amatuer radio market. Also there are tuned loop antennas that can cost several hundred pounds and only provide mediocre performance because they have to be used indoors where local interference is high.

Where active antennas are used in the presence of local interference. The balanced dipole and balanced loop designs provide the best interference rejection. Whip antennas that use the feeder as an r.f. return path are prone to mains borne interference.

Generally the loop antenna is less sensitive to local interference especially on the lower frequencies. Also the wideband loop antenna is less affected by the presence of nearby objects, this can be a useful feature with directional antenna arrays.
### Formula 1:

\[ IP_2 = \left(\frac{\text{max signal output dBm}}{10} - \text{required intermodulation level dBm}\right)^2 \]

\[ IP_2 = \left(\frac{2^{1+7} \text{dBm}}{10} - 107 \text{dBm}\right)^2 \]

\[ IP_2 = \left(\frac{3+4 \text{dBm}}{10} - 107 \text{dBm}\right)^2 \]

\[ IP_2 = \left(\frac{27^3 \text{dBm}}{10} - 107 \text{dBm}\right)^2 \]

### Formula 2:

\[ IP_3 = \left(\frac{\text{max signal output dBm}}{10} - \text{required intermodulation level dBm}\right)^2 \]

\[ IP_3 = \left(\frac{3 \times 17 \text{dBm}}{10} - 107 \text{dBm}\right)^2 \]

\[ IP_3 = \left(\frac{-1 \text{dBm}}{10} - 107 \text{dBm}\right)^2 \]

\[ IP_3 = \left(\frac{-60 \text{dBm}}{10} - 107 \text{dBm}\right)^2 \]

There is a certain amount of misunderstanding as to whether the 2nd or 3rd order intermodulation performance is the most important. Unfortunately, it is some times stated that because the 3rd order performance is usually critical for receivers then the same is true for active antennas. Most receivers have front end filters to reduce 2nd order intermodulation, so then the 3rd order is dominant. However, wideband active antennas do not have any filtering to reduce the 2nd order and as the 2nd order intermodulation usually appears before the 3rd order is noticeable, then the 2nd order intermodulation performance is critical.

Unfortunately, some active antennas have mediocre 2nd order intermodulation performance. In some cases active antennas are advertised without specifying the 2nd order performance. So what intermodulation performance is required?

This depends mainly on the signal output level of the antenna in respect to the field strength of the strongest signals. The usual measure of the intermodulation performance is the output intercept point of which the 2nd and 3rd order are referred to IP2 and IP3 respectively. The following example is used to convert the intercept point into meaningful figures.

In Europe the expected maximum output of an active antenna could be 32mV or -17dBm. Then ideally the intermodulation products or spurious signals should not exceed the atmospheric and manmade noise level. However, as this varies for different locations, then a good starting point should be 1µV or -107dBm. Therefore to calculate the required second order intercept point IP2 Formula 1 should be used.

To calculate the required third order intercept point IP3 Formula 2 should be used.

This example illustrates the importance of a high 2nd order intercept requirement and dispels the myth that a high 3rd order intercept point is really necessary.

Note: The 2nd order intermodulation varies by a 2:1 ratio of the signal output i.e. a 10dB decrease in the signal output will reduce the intermodulation by 20dB. Conversely a 10dB increase would increase the intermodulation by 20dB.

The 3rd order intermodulation varies in a similar way except that the ratio 3:1 i.e. a 10dB change in the signal produces a difference of 30dB in the intermodulation.

### Table 1

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Mydel Whip</th>
<th>Dipole</th>
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<th>Dipole</th>
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</tr>
</tbody>
</table>

0dBm = 1mW into a 50Ω load.

### Antenna Positioning

Active antennas, like their passive counterparts, need to be sited away from sources of interference such as TVIs, fluorescent lights, computers and electrical wiring. Normally to achieve lower local interference the antenna should be installed outside as far away from buildings as possible. Loop antennas and other vertically polarised antennas should be mounted near to the ground where the incident signal and the ground reflected signal will add in phase. Horizontally polarised antennas should be mounted as high as possible, otherwise their response to lower angle signals will be reduced, especially on the lower frequencies.

### Intermodulation

Intermodulation products generated by some active antennas can degrade reception of weaker signals and swamp the receiver with a mush of noise and spurious signals.

These intermodulation products fall into two categories, 2nd order and 3rd order. The 2nd order is defined as the sum and difference two signals and the even harmonics thereof.

i.e. F1 + F2, F1 - F2, 2x F1, 2x F2

The 3rd order is defined as twice each signal and the sum and difference thereof.

i.e. 2F1 ± F2, 2F2 ± F1

There is a certain amount of misunderstanding as to whether the 2nd or 3rd order intermodulation performance is the most important. Unfortunately, it is some times stated that because the 3rd order performance is usually critical for receivers then the same is true for active antennas. Most receivers have front end filters to reduce 2nd order intermodulation, so then the 3rd order is dominant. However, wideband active antennas do not have any filtering to reduce the 2nd order and as the 2nd order intermodulation usually appears before the 3rd order is noticeable, then the 2nd order intermodulation performance is critical.

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### Treat With Caution

To summarise, if a medium output antenna is to be used (<32mV) then chose an antenna with an IP2 >+60dBm and an IP3 of >+50dBm. However, ensure that the antenna does not overload the receiver by using an attenuator if necessary. At this stage it should be pointed out that the IP3 is dependant on the active amplifier components but IP2 is more dependant on the amplifier balance, so generally for an IP2 specified at say +68dBm most antenna samples would have an IP2 of up to +80dBm. The examples of Datong AD370 that I have tested, fall into this category.

For best rejection of local interference, chose a balanced dipole, balanced loop antenna or a whip antenna with a ground plane isolated from the feeder screen (if you can find one)

Finally it should be noted that receivers should also have a similar high second order intermodulation performance. Some manufactures do not even specify a value for IP2.

Also some receivers and preselectors that use low cost signal diodes (1N4148) for switching their front-end filters are also prone to producing 2nd order intermodulation products with signal inputs >30mV.

Active antenna specifications that refer only the IP3 should be treated with some caution. Where IP2 is not specified, then the prospective user should always enquire. A few months ago I enquired about the IP2 figures for a German active antenna to their UK agent, I have yet to receive a reply. If the IP2 performance is less than +60dBm, then the maximum signal level must not exceed 10mV or 32dBm. However such an antenna may have low sensitivity. Also where an IP3 of >+50dBm is specified then the IP2 should be >+100dBm to ensure a similar low intermodulation performance, otherwise the IP3 is being used more as a selling point than a real measure of overall intermodulation performance.

Last month we inadvertently left out Table 1, which contained the comparative results for the antennas that Andy reviewed. So here it is this month.
**THE ULTIMATE SUPER WIDEBAND RECEIVER**

<table>
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<tr>
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**THE UK's LARGEST SPECIALIST SHOWROOM & FULL RANGE OF...**

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**USED EQUIPMENT PURCHASED FOR CASH. TOP PRICES PAID.**

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**WE NEED YOUR USED EQUIPMENT**

**MULTICOM 2000 USED EQUIPMENT**

<table>
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<td>AOR AR3000 SHORTWAVE RECEIVER BOXED AS NEW</td>
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**12 MONTHS WARRANTY ON OUR USED EQUIPMENT**

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Collection arranged

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</tbody>
</table>

**30 Short Wave Magazine, November 1996**
Hoka Code 3 Gold

The monitoring tool used by professionals

Anyone used to using our professional package, Code30, will be amazed at how we managed to achieve such high performance from so little hardware.

Over a year of hard development work at our Netherlands HQ has resulted in this latest decoder product. Code3 Gold uses the very best of software DSP filtering and detection technology (borrowed from our professional Code30) and the very latest surface mount miniaturised electronics for the hardware interface.

“The performance is stunning, the compactness remarkable and the price is simply unbelievable!”

We are unique in the decoder market because we put all the DSP software onto the PC. This makes it much easier to fully combine the DSP filters with the software signal detectors and the system decoders. This makes on-the-fly adjustments to the shift or baudspeed completely seamless to the decoding process. All decoding is optimised for every possible combination of keying speed and bandwidth. All of this DSP filtering means your receiver does not need to have expensive narrow filters for RTTY. Simply use your wideband SSB setting for SW monitoring and AM or FM for VHF.

Systems supplied as standard: ACARS, POCsAG, DTMF, PACKET, BAUDOT, ASCII, SITOR, NAVTEX, PACTOR, FAX, SSTV

Short Wave Option

This adds nearly every decodeable system there is on shortwave. Diplomatic stations, Customs, Police, Military & Weather Stations sending 5 figure groups, Decode “Annex 10” Aircraft selcals, Morse, Hellscreiber, ARQ-S, ARQ-E, ARQ-N, ARQ-690/98, ARQ-E3, ARQ-SWE, ARTRAC, POL-ARQ, T7BBN Baudot, Twimplex, CCIR242 TDM, CCIR342-2 TDM, FEC-A, FEC-S, Autospec, Spread, HC-ARQ, TORG10/11, ROU-EC, HNG-EC, COQ8, COQ13, Piccolo Mk6, SYNOP (AAXX, BBXX with 10,000 stations).

Upgrading from a previous version of Code3?

If you have a previous version of Code3, then contact us for a very competitive upgrade path to Code3 Gold.

Prices are:-

Code3 Gold £295.00, SW Option £125.00 (if ordered together deduct £20) Post and Packing £10.00 All prices include VAT at 17.5%.

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Shortwave Antennas

- Miller HF1 Compact £65.00
- Sony AN-1 Active £59.00
- Sony SFW-30 €POA
- G5RV Dipole Half £25.00
- Watson Balun £19.95

VHF/UHF Antennas

- BSS-1300 Nest of Dipoles £65.00
- DSS-1300 Desk Nest £41.00
- MSS-1300 Mobile Nest £41.00
- SkyScan Mobile £25.00
- Scanmaster Disciple £45.00
- Scanmaster DDisc £45.00
- Scanmaster SBA-100 Air £65.00
- Diamond D-707 Active £139.00

Whips

- Watson Regular £12.95
- Watson Telegainer £14.95
- Watson Super £19.95
- Diamond Mini £28.00
- Diamond Micro £29.95

EP-300 £9.75
SP-140 £9.95
WSC-1 £19.95
QS-200 £9.95
DESK STD £19.95
PSU/STD £32.00

CTU-9 ATU £35.00
AA2 SW Act Ant £8.90
AA3 VHF Act Ant £19.90
ASL5 Audio Filter £29.90
SPA-4 Pre Amp £8.90
AB-118 Airband Ant £18.80
AOR Soft Case £17.00

Scanmaster SP-55 £69.00
Vectronics AT-100 £76.00
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Opto Scout £135.00
Opto Cub £179.00
AOR CU-8232 Interface £99.00

Garmin GPS-38 £199.00
Garmin GPS-45 £289.00
ICOM SP-3 Speaker £69.00
ICOM SP-7 Speaker £35.00
ICOM SP-12 Speaker £POA
Opto Keypad £45.00
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Unit 3, 86 Cambridge Street, St. Neots, Cambs PE19 1PJ
Tel: 01480 406770 E-Mail 100302,2651@Compuserve.com

Short Wave Magazine, November 1996
Kilocycle Ken, the senior radio inspector lectured Young Golly the trainee as they stopped outside the complainant’s house.

"Believe little of what the complainant says, not that they deliberately mislead you, but they give false clues, false ideas are sprouted - they say it’s a man across the street welding, then you find it’s a faulty lamp socket in their own house. Happens all the time."

"So, you are going to talk this one out of her complaint," Young Golly said. "What do you mean by that?"

"You often get complainants to apologise to you for having complained."

"There’s an art in that," Kilocycle Ken said. "But of course, you must do your best to find the source, and eliminate it, sometimes easier said than done with vague complaints about QRM that one never hears or sees and we eventually end up closing it as a ceased untraced or trivial category. If we can see it and hear it, we can solve it - or if we get enough clues and it is a genuine complaint."

The house was a standard three-bedroom California-style bungalow, built in the 1920s.

Kilocycle Ken said, "You get to be an expert on architecture, know the various periods and what electrical services were put into them. This one would have had electrical wiring in conduit, might still be in place because it’s unusual to see a bell mouth electrical entry still in use. See it there, up on the gable. Most bell mouths have been replaced with a fixed insulator and a fuse.

"Bell mouths are from a time when houses were wired with rubber covered cable in metal conduit, the phase and neutral on two separate wires were fed from overhead street wiring and looped through a bell mouth, which was, and is, a curved pipe, the entry flared like a bell so it didn’t rub the wires.

Sometimes with movement the neutral or the phase would be rubbed through and the wires would contact the bell mouth, which was a part of the conduit and would be earthed. If the phase was touching, then there was serious trouble, but if it was only the neutral, you get a static discharge effect which might be her problem."

The radio was an early 1950s 6-valve dual-wave radiogram with an automatic record changer. The only speed was 78 r.p.m.

How Long Have You Had A Problem?

Mrs Lee, the complainant said, "It’s not on today, but it’s a thumping noise and the loudness of the station varies. It’s worse in windy weather."

"Ahhh," Kilocycle Ken said. "How long have you been experiencing the problem?"

"A long time," she said vaguely.

"And you’ve never done anything about it?"

"My husband died recently and since then the wireless has become such a comfort to me."

"These old valved radios are warm to the touch," Kilocycle Ken said. "I lie in bed at night and the thumping drives me mad."

"We’ll see if we can reproduce it," Kilocycle Ken said briskly. "We’ll try that bell mouth first, Young Golly. We need a clothes-prop."

"What’s that?" Young Golly asked.

"A pole to prop up the line of washing."

"My mother had a rotary clothes-line," Young Golly said. "A long clothes-line would have been standard for this house, rotaries didn’t come into use until after World War II. Have you got a rake or shovel, a broom, Mrs Lee?"

She had a rotary Hill’s Hoist replacement for an old laundry drying line and she produced a worn bristle yard broom.

"You listen on the radio, Young Golly," Kilocycle Ken ordered. He prodded the wire drops from the street.

"Nothing," Young Golly said.

Mrs Lee observed, perplexed.

"It isn’t the bell mouth so it’s probably the vent pipe," Kilocycle Ken said. "Can we have a look at your hot water cylinder?"

Now Mrs Lee was very puzzled.

"It’s your vent pipe," Kilocycle Ken said cheerfully. "I beg your pardon?" she said coldly.

"The vent pipe for your hot water system, almost guarantee it."

The hot water cylinder, somewhat larger than a 44 gallon oil drum, was in the hall cupboard. She removed stacked sheets and towels from the warmth.

Some Way of Venting

Kilocycle Ken said to Young Golly, "The vent pipe is a source of trouble from way back. This pipe comes out of a standard hot water cylinder to let out steam and water if it boils.
The vent pipe was very long, six feet and high up close to the ridge. "Give it a rattle," Kilocycle Ken ordered. "I'll listen." A thumping sound. "That's it!" she said. "The exact noise."

Kilocycle Ken smiled. "Sometimes they make the TV screen flash."

Young Golly reported, "The vent pipe was flashed to the roof with lead, but it's broken away."

"So how do I fix it?" Mrs Lee asked.

"A plumber could repair the flashing, or it could be bonded to the roof with a flexible wire strap so that the vent pipe is earthed, but the easiest and cheapest way is to wedge it with a piece of wood so that it doesn't move."

Mrs Lee said, "I've got plenty of wood. I love my open fire, even though the council has a smoke-free policy."

There was a tomahawk and a wood pile. "Okay, Young Golly, chop some suitable slivers of wood."

"What am I?" Young Golly grumbled.

"You're a radio inspector, or you will be one day when you've acquired the necessary skills."

"Chopping wood is one of them?"

"A radio inspector is versatile."

"Why did it break?" Mrs Lee asked.

"Maybe something to do with the expansion and contraction of the copper pipe, sometimes occurs if the hot water cylinder thermostat is set too high, then the water will flow up the pipe and fall on the roof, most thermostats are set too high. Or it was just the wind."

Young Golly did the job. Back in the car, Kilocycle Ken said, "In that case, she gave us the clue. Once has to listen carefully."

Young Golly said, "It's a wonder she had a hot water cylinder.

"It would have been a retro fit, probably 1940s. Originally, probably, had a wet-back on the open fire or the kitchen stove. Did you see she had a solid fuel Shacklog in the kitchen."

"A wet-back?"

"Hot water pipes behind the grate."

Young Golly sighed. "It took the Radio Inspection Branch a long time to wake up to vent pipe QRM, a long time ago. It probably only occurs in New Zealand, with our corrugated iron house roofs and with every house having an electric water heater, unless in recent times they've got a gas heater, but they aren't common, never caught on."

Vent Pipe QRM

Young Golly asked suspiciously.

"In bed," she said sadly. Young Golly climbed, cautiously.

Young Golly asked suspiciously.

"In bed," she said sadly. Young Golly climbed, cautiously.

Traps for Young Players

"There are other sources of static discharges, traps for young players. I went to a house which, under the cladding, turned out to be a big aluminium box. It was a new place and it had been insulated with aluminium foil, which might not have caused any problems, but its electrical wiring was run in copper-covered cable. When the house vibrated with wind, or even the occasional earthquake, the copper cabling vibrated against the aluminium foil. The aluminium was as usual acting as an antenna and the copper cabling was earthed back at the mains, so that the copper earthed the antenna and caused a thumping noise."

"What was the solution?"

"One would have been to rewire the house with insulated cable, another to find the places where the copper was touching, which was probably impossible. It was a nightmare and is probably still occurring, or they've given up listening to the radio."

"Then there was P50, the P&T stock list number of lead-covered one pair telephone cable, used for internal house wiring. It used to cause electrostatic effects if it was loosely laid across ceiling joints and contracted conduit. Never see P50 now, its plastics wire, lead costs a fortune, and electrical wiring is all plastics covered."

"Why was copper sheathed cable used in that house?"

"The owner was a builder. He probably stole it from a commercial job."

"And you call me cynical!" Young Golly said.

"There are other sources of static discharges, traps for young players. I went to a
AOR AR7030 - High dynamic range short wave receiver £799

Short Wave Magazine - John Wilson
"If I thought the synchronous a.m. detector was clever, I was simply amazed when I came to explore the i.f. filtering arrangements in the AR7030."
"...but the surprise came when I realised that this kind of performance (in the RDI classification of 'superb') puts it up there with the Watkins-Johnson HF-1000 and it is significantly better than any of its peer group."

DX ONTARIO / North American NRC - Guy Atkins
"In a comparison with a Japan Radio NRD-525 receiver, the difference is dramatic. The low noise level is a revelation; and when used in a quiet setting with a good antenna you get the impression there is nothing between the signal, the atmospheric noise level, and your ears. The AR7030 seems nearly 'transparent' as it goes about its business."
"In this age of mega-corporations and design by committee, it is refreshing to see what can be done by a single talented engineer with a vision. John Thorpe and AOR's UK facility are producing a remarkably useful receiver for the hobbyist and beyond."

RSGB RadCom - Peter Hart
"The audio quality on both SSB and AM is really excellent, the filters are well matched to the required bandwidths."
"I must admit to being a little apprehensive at first about the ergonomics. However, after a few hours use, and having mastered the logic behind the menu driven operating system, I found it really was friendly to use. The weighted tuning knob was most smooth in operation and the tuning steps were completely inaudible."

Medium Wave News - Steve Whitt
"...my overall verdict is that the 7030 is an excellent receiver. It is easy to use, sounds excellent and is a versatile DX machine. Moreover, John Thorpe's innovation (e.g. auto tuning synchronous detector, IF filter calibration) has truly added new capability at an affordable price level."

"The AR7030 is one of those receivers that causes a major stir when it appears which is not surprising in view of its price/performance ratio and its innovative features."
"...if you've never used a menu-driven machine such as this receiver, don't be put off and give it a try. I'm hooked."

DSWCI - Don Phillips
"When I compare the AR7030 with the Drake R8E, I find similar sensitivity and flexibility, but on the R8E propagation disturbances have a much more destructive effect on the resulting audio. The AR7030 seems to shrug it off and thrust the music at you. Similarly when listening to a few Peruvian and Bolivian stations the other evening, I found the ID's on the AR7030 easier to hear."

A photo copy of these reviews and others are available, just forward a SAE and enclose 4 x 1st class stamps for each review - thanks!

AR7030 options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Price (P&amp;P)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MF500</td>
<td>500 Hz Collins mechanical CW filter</td>
<td>£39.99</td>
</tr>
<tr>
<td>CFJ455K8</td>
<td>1.0 kHz Murata ceramic data filter</td>
<td>£99.99</td>
</tr>
<tr>
<td>XTAL2.4</td>
<td>2.4 kHz high quality 8 pole crystal filter</td>
<td>£129.99</td>
</tr>
<tr>
<td>FL124</td>
<td>Daughter board for fitting crystal filters</td>
<td>£24.99</td>
</tr>
<tr>
<td>MF2.5</td>
<td>2.5 kHz Collins mechanical SSB filter</td>
<td>£89.29</td>
</tr>
<tr>
<td>CFK455J</td>
<td>3.0 kHz Murata ceramic very narrow AM / SSB filter</td>
<td>£99.99</td>
</tr>
<tr>
<td>MF4</td>
<td>4.0 kHz Collins mechanical AM filter</td>
<td>£99.99</td>
</tr>
<tr>
<td>CFK455I</td>
<td>4.0 kHz Murata ceramic AM filter</td>
<td>£99.99</td>
</tr>
<tr>
<td>MF6</td>
<td>6.0 kHz Collins mechanical AM filter</td>
<td>£99.99</td>
</tr>
<tr>
<td>BP123</td>
<td>(BA7030) Internally mounted battery</td>
<td>£99.99</td>
</tr>
<tr>
<td>DATA MASTER</td>
<td>PC control software for the AR7030 &amp; AR3030 running under Windows95. Built-in data base, logbook, MUF, maps and more...</td>
<td>£129.00 (C3)</td>
</tr>
<tr>
<td>COMP7030</td>
<td>10 page explanation of RS232 control</td>
<td>£3.00 (free)</td>
</tr>
</tbody>
</table>

Planned options to follow:

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Price (P&amp;P)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NB7030</td>
<td>Enhanced multi function audio notch filter plus RF noise blanker. &quot;Features CPU&quot; also supplied as part of the package providing additional memories, alpha-tagged memory, enhanced timer etc... late 1996</td>
<td>£99.99</td>
</tr>
<tr>
<td>Features CPU</td>
<td>Enhanced microprocessor, additional features as supplied with the NB7030 or FM7030</td>
<td>£99.99</td>
</tr>
<tr>
<td>TW7030</td>
<td>Optional telescopic whip for the AR7030</td>
<td>£99.99</td>
</tr>
<tr>
<td>SC7030</td>
<td>Soft carry case for the AR7030</td>
<td>£99.99</td>
</tr>
<tr>
<td>FM7030</td>
<td>Stereo internal converter with RDS display - still under consideration and dependent upon demand</td>
<td>£99.99</td>
</tr>
<tr>
<td>SM7030</td>
<td>Service kit. Circuit diagrams, PC controlled alignment / test disk supplied, RS232 lead etc...</td>
<td>£35.00 (C3)</td>
</tr>
</tbody>
</table>

Planned options to follow:
AR8000 - Still the KING of hand-held receivers...

The AR8000 UK receiver is still 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. PC-MANAGER (versions for DOS and Windows) is an optional utility for memory & search bank management. The software (which works in conjunction with the optional CU8232 interface) permits upload, download, editing, renumbering, saving of data, editing of auto-mode bandplan data (plus a built-in terminal driver for DOS and extra features for Windows including spectrum display and sound recording to disk).

AR8000 UK £410.00
CU8232 interface £99 (£3)
PC-MANAGER £49 (£3)
State DOS or WINDOWS
SC8000 soft case £17.95 (£1.50)
CR8000 tape control interface £44.90 (£2)

AR5000 high performance in a single wide band receiver...

The AR5000 advances the frontiers of performance providing excellent strong signal handling, high sensitivity and wide frequency coverage with microprocessor facilities to match. A great advancement in wide band front end design has been made, partly due to the introduction of automatic electronic preselection between 500kHz - 999.999999MHz with low pass, band pass and high pass filters for other bands. The preselection may be "manually tracked" when monitoring spot frequencies to help reduce any potential effects of interference caused by nearby monster transmitters. "True receive" throughout its range, not an up-converter above 1GHz. There simply is not enough room here to list all the available microprocessor facilities, in fact the whole story of this feature-rich miracle is not revealed until you are able to study the operating manual,... alternately give us a call and "chat through" all the features!

Very wide frequency coverage 10kHz - 2600MHz
All mode reception: AM, FM, USB, LSB & CW
Automatic electronic preselection of the front end
Excellent strong signal handling
NCO (Numeric Controlled Oscillator) with tuning steps down to 1Hz
TCXO fitted as standard
Multiple I.F. bandwidths 3, 6, 15, 30, 110 & 220kHz (500Hz optional)
Auto mode bandplan selection
Multi-function LCD with 8 character alpha-text comments
Extensive search & scan facilities
"Cyber Scan" fast search & scan speeds up to 45 channels / increments per second
Analogue S-meter
1000 memory channels and 20 search banks with EEPROM storage
Auto memory store
Extensive RS232 command list
Sleep timer / alarm
Standard DTMF decode / display
Optional CTCSS search & decode
Two aerial inputs with programmable switching from the front panel
Flexible BANK LINK menu with enhanced features such as DELAY PAUSE, VOICE etc.
Built-in squelch tone eliminator
Audio and discriminator output plus tape recorder control
SDU ready
More, more, more...!

Descriptive leaflet available, please call
RRP £1749

Short Wave Column - After The News, a Look at The Weather

Don't worry. We know all about the METEOSAT downlink on VHF. AOR first came to the market with a range of VHF/UHF receivers and soon became the brand leader. One of our sets and suitable aerial and you're away. Too easy. No, the real stuff comes after the satellite image has been received, weather and location information overlaid and the image forwarded in FAX mode on LF, or long-wave if the radio the AOR 7030 replaced had valves in it. We hear Prague, signing as OLT21 on 111.8KHz - that's kilohertz, remember - and the two most audible in the UK, the Mainflingen senders on 117.4 and 134.2KHz. Winter season listening can only improve reception but at this point in sunspot Cycle 23 (debate, please!) will be subject to deep fades.

You need an efficient antenna at these frequencies. The longest long-wire possible with some attempt at matching. AOR owners already have a WIRE input matching the generally high impedances found with wire antennas and the generally low impedances used in JT's relay-switched input circuits. Electrical noise is the enemy down here, so with AOR's policy of 2-Wire mains connection, you can use the best earth you can without looping into the hash from your house supply. Go for an earth spike, banging it into frosty ground is the best post-Christmas aerobics session you could wish for. Loop or ferrite rod antennas are worth a try as they only react to the magnetic part of the radio wave, leaving noise, mostly in the electrical part, behind. Contribute to this debate or send your Xmas Greeting to:

bob@aor.co.uk

And the same to you.

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Solid State Electronics (UK) Park Lane, Broxbourne, Hertfordshire, EN10 7NQ
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Alan Gardener sets out on his exploration of the outer limits, with the latest near-field offering from Optoelectronics. It's a problem most scanning enthusiasts are familiar with - you know that radio communications are being used in your vicinity - you don't know exact frequencies or who is using them - but you would like to be able to monitor them!

Well the answer to problems like this may well be the new Optoelectronics 'Xplorer'. This is a hand-held device which can very rapidly capture local f.m. transmissions, provide an audio output, indicate the frequency, signal strength, deviation, CTCSS tone, DCS code, DTMF tone, time, date and with a GPS receiver connected, your location.

The concept behind the 'Xplorer' is a logical extension of existing products already manufactured by Optoelectronics. Many enthusiasts will by now be aware of the capabilities of the 'Scout' frequency recorder which I reviewed in SWM September '95.

Optoelectronics also produce a wide-band f.m. communications monitor - the R-10 - which can demodulate local transmissions and give an indication of signal strength and deviation - but that's it - it won't tell you the frequency of the signal you are receiving. With the 'Xplorer', Optoelectronics have combined many of the features of these two products and produced an entirely new device.

So What's It All About?

The unit consists of a small black box measuring 75(w) x 40(d) x 145mm(h) including the knob, which makes it slightly larger than an average pocket size. The front panel has a membrane type keypad which occupies the lower half of the facia and has five control pushbuttons and a power switch. The upper half of the panel has a 50 x 15mm dot-matrix I.c.d. display and a small loudspeaker grill.

The top of the unit has a rather oddly shaped rotary 'push / turn' control knob, BNC antenna socket, data, tape recorder, headphone and power sockets and two I.e.d.s to indicate the battery charge and 'lock' status - and that's it!

As you have probably guessed by now - if there are only five buttons and one knob to control the device, you have got to use several permutations of key presses to achieve the desired result. In practice this isn't as bad as it may seem. The buttons are marked 'F1', 'F2', 'Hold', 'Skip' and 'Shift', and for most operations it is relatively easy to control the functions.

When the unit is first switched on it performs various self tests before reverting to its last state of operation. So if you left it displaying the contents of a memory when you switched it off - that's where it will be when it's powered up again.

Once the unit is running you enter the main menu by pressing the 'F1' key. Further presses of the 'F1' key scroll through seven sub-menus, which are described in more detail below. Once a sub menu has been selected with the 'F1' key it is possible to scroll through further options by rotating the control knob. Once an option has been selected in this way it can be modified by simultaneously pressing the 'F2' key and rotating the control knob. A single press of the control knob activates the volume menu and two presses activate the squelch menu, both of which can be altered by turning the control knob. Although this sounds complicated it is actually very easy to remember and I found that I could use the main functions within a few minutes of first powering the unit.

The Main Menus

CONFIG

This is used to set up the main operating parameters of the 'Xplorer' and includes sub-menus to clear memories, set capture and auto store parameters, initiate fast battery charging, enable the backlight, set up the computer interface port, enable the audio, permit DTMF decoding, enable frequency lockouts and set-up the manual and fast tuning rates.

LOCKOUTS

This provides a means of displaying locked out frequencies. These can be scrolled through by turning the control knob.
EXPLORING THE XPLORER

MEMORY
This provides a means of examining the contents of individual memory locations by rotating the control knob. If the 'F2' key is also pressed the contents of individual memories can be reviewed. These include Frequency, Number of Hits, Time, Date, Audio enabled, DTMF enabled, Latitude and Longitude (With external GPS receiver), Signal Strength, Deviation, CTCSS Tone, DCS Code and DTMF Tones.

TIME/DATE
Displays the current time and date of the internal real time clock.

COORDINATES
Displays the current Latitude and Longitude presented to the unit by an external GPS receiver.

SWEEP
Starts the automatic search and store function. Once a transmission has been detected a press of the front panel 'Skip' button will force the sweep to resume whilst pressing the 'Hold' button will halt the sweep. Pressing the 'Shift' and 'Hold' button manually stores the received signal's parameters into memory and pressing the 'Shift' and 'Skip' button locks the frequency out of any further sweeps and stores the details in the lockout memory.

VFO
Provides a means of manually tuning the receiver. Turning the top mounted control knob varies the frequency. The rate can be set up via the 'CONFIG' menu to tune in steps of 5, 10, 12.5, 25, 30, 50 and 100kHz. In addition a fast tuning rate of 1, 12.5, 25, 30, 50 and 100kHz. In 5 or 10MHz can be selected. This is enabled in the v.f.o. mode by pressing the "F2" key whilst rotating the control knob.

How It Works
Optoelectronics do not provide a block diagram of the unit in the users handbook so I have had to guess at how the unit works. Fig. 1 shows the signal input on the left, where the antenna is connected to the r.f. stage. This amplifies the signal and feeds it to a mixer stage where it is combined with a harmonic rich local oscillator signal derived from a Voltage Controlled Oscillator and multiplier. The resultant signal is passed on to the 10.7MHz i.f. stage before it is applied to the f.m. Demodulator. Audio output from the demodulator is fed to the audio amplifier and loudspeaker and also to the Microprocessor Controller. The Controller determines the incoming r.f. and Audio frequencies, updates the liquid crystal display, stores information in memory and controls the v.c.o. tuning, audio and squelch level.

The v.c.o. only tunes from 40-160MHz, the reception of signals outside this frequency range is achieved by using harmonics of the v.c.o. signal. No front end bandpass filtering is provided so several different frequencies are actually being received at once. By now the more technically minded amongst you may be asking "How does it know which of the signals produced by the harmonic generator and mixer is the genuine one?" For example if the unit is receiving a signal on 30MHz the v.c.o. will be operating 10.7MHz above this frequency at 40.7MHz. This will also produce an image 10.7MHz higher in frequency than the v.c.o. at 51.4MHz. The harmonic generator will also produce Local Oscillator signals at multiples of the v.c.o. frequency and each of these will have two image frequencies.

Indeed if you manually tune the 'Xplorer' using the v.f.o. mode you can hear signals on the image frequencies as clearly as if they were on the wanted frequency. However when the unit is operating in the 'Sweep' mode it only seems to stop on genuine signals. I can only assume that it achieves this by a clever bit of programming which checks for signals on image frequencies when the 'Sweep' stops and then makes a decision as to which is the most likely to be genuine one. This wouldn't work too well if there were lots of signals present at any one time, but in its intended application where it is only likely to be subjected to a few strong locally generated signals it shouldn't be a problem.

Performance
A good example of this is at my home where the signal level from a BBC national f.m. Band II broadcast site is very strong. As I manually tuned the 'Xplorer' I could hear broadcast stations on several different frequencies other than the correct ones. However, when used in the 'Sweep' mode the unit only recorded the genuine frequencies and still managed to capture a few other weak ones. However, fitting a Band II notch filter in line with the antenna improved the performance with other signals dramatically. This highlights the main problem with broadband devices like the 'Scout' or 'Xplorer' you need to exclude as many unwanted signals as possible in order to improve your chances of capturing wanted ones.

The sensitivity was significantly better than that quoted by Optoelectronics (better than 100µV at 100MHz).

I found that the 'Sweep and Autostore would function correctly at the following levels:-
The orbit of MIR is such that it passes over Britain on five or six consecutive orbits every 24 hours, with approximately 92 minutes between passes. Later orbits do not bring it within reception distance. The nature of its orbit is such that each sequence of passes gradually moves earlier during the day, so MIR periodically moves into our early morning (before sunrise) skies, when it can be seen by early risers. A few weeks later, passes move to late, then early evening. This is the most popular time because we can see the satellite illuminated after local sunset. When I go outside during the appropriate evenings to search the skies, neighbours have a habit of suddenly appearing. Curiously, they often spot MIR before I do!

Whenever MIR becomes visible in the evening skies, space enthusiasts all over the world, both casual and serious, make the effort to identify the satellite and watch it cross the stars. The availability of satellite tracking programs, and the access to current Kepler elements for MIR means that one can know exactly when and where to look. Lawrence Harris explains.

The extensive research on MIR focuses on two main areas: human life in space (Microgravity Sciences, Life Space Sciences, and Space Technology Development) and observational sciences (Earth Observation and Sciences, and Space Sciences). The cosmonauts use themselves (and plants and animals) as guinea pigs while they study the influence of gravity on biological processes. These life space science experiments provide insights into the impact of weightlessness on space operations. Advantage is taken of MIR's microgravity environment in order to conduct scientific investigations into biological and material studies.

International Space Station - Alpha

The International Space Station programme began in 1994 and entered the first of its three development stages in 1995. Phase I is the joint MIR/Shuttle rendezvous programme, and its main objective is to provide operations experience. Significant development milestones reached during 1995 included visits to MIR by US Space Shuttles, two satellite link-ups, the transfer of cosmonauts and supplies, and the first participation by a US astronaut, Dr. Norman Thagard, as a member of a Russian station crew.

MIR offers a unique opportunity for long-duration space-data gathering, so ISS designers are using MIR as a test site for hardware, materials, and new construction methods. It forms the "homebase" for the construction of the ISS. Assembly begins in 1997, and in 1998, US and Russian hardware will be assembled in orbit to create a research facility. Research will be conducted while the Shuttle is docked at the station or through remote operations from the ground when the Shuttle and crew are not present. Construction will continue when pressurised modules and attached payload platforms from Japan and Europe are added. The Space Station is expected to be completed by 2001, and will then support a permanent human presence in space. In the 35-year history of human space flight, no previous programme has required so many transport vehicles, so much interdependent operation between organisations, and so much careful timing.

Enter the Shuttle

The decision to build an International Space Station for peaceful scientific research, gave a new impetus to both MIR and the Shuttle programme. The recent presence of US astronaut Dr. Shannon Lucid on MIR formed the MIR-21 flight. The crew consisted of Commander Yuri Ivanovich Onufrienko, Flight Engineer Yuri Vladimirovich Usachyov and Dr. Shannon Lucid, who lived and worked together on MIR. The daily routine incorporated scientific experiments, the occasional EVA (extra-vehicular activity), the routine enlargement of MIR's power capability, and the observation of Earth.
The combined crews work to answer vital questions about the future of human life in space. While in the safety of a known environment, they experience real-life problems that might otherwise arise with more serious consequences aboard the International Space Station. MIR is a test site for many areas of experience and investigation.

Shuttle Launch
The most active phase of any Shuttle flight is the launch. The Shuttle's main engines and solid rocket boosters employ millions of pounds of thrust to reach low-Earth orbit. Before liftoff, the astronauts carefully monitor cockpit displays, and work with controllers in the Launch Control Complex at Kennedy Space Center in Florida, to ensure all systems are go for launch. Once the Shuttle clears the launch tower, they work with controllers monitoring the Shuttle's systems in the Mission Control Center at Houston, Texas.

The Space Shuttle's launch takes it from a vertical position on the launch pad to an average orbit altitude of 185 statute miles in about eight minutes. To achieve this they use three powerful, reusable main engines, and two reusable solid rocket boosters (SRB), the largest solid-propellant motors ever flown. During the early flight, the solid rockets and the external tank that carries fuel for the main engines are jettisoned. The SRB casings are refurbished and reused; the external tank burns up during re-entry.

Monitoring the Shuttle
There are various ways to monitor Shuttle radio traffic - depending on the circumstances of the flight. Those of us living in the UK can expect to receive direct transmissions from the Shuttle only if its orbit actually comes over Britain - so those flights having an orbital inclination of 51° can be heard directly. A number of 'Info' readers have reported success during these flights. Colin Knight of Eastleigh reported the following: "I was lucky enough to hear the direct ‘u.h.f.’ Shuttle downlink on 259.70MHz on launch day. Launch on the 16th September occurred at 0854UTC and they started coming through on my scanner at 0912UTC, and were in range until 0917UTC - only about five minutes".

As well as watching MIR during favourable opportunities, we can tune general purpose scanners into the various published frequencies used by MIR and its associated support vehicles:

**MIR Listening Frequencies**
- 143.625MHz n.f.m. voice
- 145.550MHz n.f.m. voice (amateur radio contacts)

**Soyuz Monitoring**
The Soyuz-TM module is used to transport crews and cargo to and from the MIR Space Station. It uses the following frequencies:
- 166.000MHz n.f.m. data telemetry
- 121.750MHz n.f.m. voice

**Progress**
This is a cargo and resupply vehicle used to send science equipment and data to and from MIR, as well as food supplies and mail for the crew.
- 165.000MHz w.f.m.
- 166.000MHz w.f.m.
- 922.750MHz L-Band
The New Xplorer Test Receiver. Ideal for any two-way communications testing or monitoring. The Xplorer is a value packed performer integrating the functions of a CTCSS, DCS, and DTMF Decoder, Frequency Recorder, Nearfield Receiver and more into one hand-held unit. No more guessing when programming a frequency for monitoring-the Xplorer captures nearfield frequencies off the air from 30MHz - 2GHz in less than 1 second. The New Xplorer, providing the power of handheld portability with state of the art functionality and performance.

Features & Specifications

- Frequency Lock Out, Manual Skip, and Auto or Manual Hold
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- Relative ten segment Signal Strength Bargraph
- Optimum Maximized Sensitivity for increased nearfield distance reception
- Tape Control Output with Tape Recorder Pause control relay and DTMF Encoder for audio data recording
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TEL: (01702) 206835 FAX: (01702) 205843

Mapping Software is currently available for United States only

Check Out Our Web Site:
www.optoelectronics.com
Table 2: Amateur radio stations re-transmitting Shuttle audio.

<table>
<thead>
<tr>
<th>Station</th>
<th>Centre</th>
<th>v.h.f.</th>
<th>10m</th>
<th>15m</th>
<th>20m</th>
<th>40m</th>
<th>80m</th>
</tr>
</thead>
<tbody>
<tr>
<td>W6V10</td>
<td>JPL</td>
<td>224.040</td>
<td></td>
<td></td>
<td>14.282</td>
<td>7.165</td>
<td>3.840</td>
</tr>
<tr>
<td>K6MF</td>
<td>ARC</td>
<td>145.585</td>
<td></td>
<td></td>
<td>14.295</td>
<td>7.165</td>
<td>3.840</td>
</tr>
<tr>
<td>AK8Y</td>
<td>LERC</td>
<td>145.670</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>KA9SZX</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>K4GCC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WA4VME</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

All frequencies are in MHz. Use f.m. on v.h.f., u.s.b. on 10 to 20m, l.s.b. on 40 to 80m.

Table 1: Space Shuttle downlink frequency list.

<table>
<thead>
<tr>
<th>Band</th>
<th>Frequency</th>
<th>Mode</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>v.h.f.</td>
<td>145.840</td>
<td>n.f.m.</td>
<td>Amateur Radio</td>
</tr>
<tr>
<td>u.h.f.</td>
<td>243.000</td>
<td>a.m.</td>
<td>Emergency Voice Channel</td>
</tr>
<tr>
<td>u.h.f.</td>
<td>259.700</td>
<td>a.m.</td>
<td>Primary Voice Channel</td>
</tr>
<tr>
<td>u.h.f.</td>
<td>279.000</td>
<td>a.m.</td>
<td>EVA Voice Channel</td>
</tr>
<tr>
<td>u.h.f.</td>
<td>296.800</td>
<td>a.m.</td>
<td>Back-up Voice Channel</td>
</tr>
<tr>
<td>(GHz)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S</td>
<td>2.2175</td>
<td></td>
<td>Data</td>
</tr>
<tr>
<td>S</td>
<td>2.2500</td>
<td></td>
<td>Data</td>
</tr>
<tr>
<td>S</td>
<td>2.2875</td>
<td></td>
<td>Data</td>
</tr>
<tr>
<td>C</td>
<td>5.4000</td>
<td></td>
<td>Data</td>
</tr>
<tr>
<td></td>
<td>to 5.9000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Summary

These ongoing developments in the space field should provide radio and satellite monitoring enthusiasts with an increasing number of opportunities to tune into the action. As information becomes available on frequencies and schedules, 'Info' will carry the details. I produced a 'Shuttle Pack' which includes the complete Shuttle manifest, and is updated from NASA's press releases. It includes information on Shuttle monitoring - see 'Info' for details. Meanwhile, if you would like copies of the images appearing in this feature, please send me a stamped, return addressed envelope with a formatted disk and list of images required. Please enclose a secure 20p coin towards the costs.
Dick Ganderton told me that there was an opportunity to have a few colour pictures in the next 'Special', it took me ten seconds to reach for the folder of readers' pictures which I retain 'just in case'! A number of readers of 'Info' have submitted colour pictures, sometimes on disk, and sometimes as hard copy. The pictures usually have to be scanned and reproduced in black-and-white, and on a number of occasions I have wished that the original could be seen in all its glory. Well now you can!

Amongst the colour pictures that had not yet been returned to their rightful owners, were prints from Roger Ray and George Newport. Black-and-white prints which have been waiting for publication space also came from Brian Dudman, Peter Schoen and Dr Martin van Duinen, each illustrating features that I planned to include in future editions.

The 'Info'

Roger Ray of Telford upgraded his computer earlier this year, and then upgraded his WXSAT software to the Window's version of PROsati! issued by Timestep. He produced a spectacular METEOSAT-5, colour, whole-disc, visible-light image of the CTOT format, using his Epson stylus colour II inkjet printer. The image is noise-free, and the absence of 'colour blend' - the feature which sometimes happens when artificial colour is added to an original black-and-white image - suggests that a land-outlines mask has been incorporated. Looking at the leaflet on Timestep's software, it is evident that the new program is a generation ahead of the earlier PROsatI.

For readers who have recently discovered WXSAT monitoring and are not sure about METEOSAT and colour, I should explain that most earlier systems have produced images directly from METEOSAT telemetry without incorporating automatic image enhancement techniques. The satellite's image scanners produce a data stream which is transmitted on two channels - 1691.0MHz (called A1) and 1694.5MHz (called A2). Channel A2 also transmits Primary Data (high resolution) images, as well as WEFAX (low resolution) images.

We can receive the 'lower resolution' images transmitted on these two bands, using standard geostationary WXSAT decoding hardware and software. The satellite 'sees' only in black-and-white; there is no colour information in the data stream. After the image data has been decoded (extracted) from the telemetry, it can be displayed on the computer. It can also be 'enhanced' by artificially stretching its contrast, or even changed fundamentally by replacing certain 'grey scales' by the appropriate colour levels. For a 'visible-light' image, the black background can be replaced with dark blue - simulating the colour that the eye expects to see. Similarly, land masses, which usually have intermediate grey shades, can be replaced by shades of green. The lightest greys of an image are normally clouds, so these can be replaced by shades of white/grey (or left untouched). When done with extreme care - often using mask techniques to avoid green clouds and blue land - the result can be as shown in Roger's picture, a result worthy of an exhibition.

George Newport of Canterbury sent me a set of high quality prints which have also been waiting for the possibility of colour reproduction. His NOAA-14 images were obtained on 16 and 19 July. I don't have information on George's receiving equipment, but I know he has access to a good colour printer!

Peter Schoen of Germany operates both a high resolution picture transmission (h.r.p.t.) system built by Timestep, and an a.p.t. system. Being surrounded by houses, Peter's reception starts when the satellites reach about 10° elevation. From a selection of several pictures I have picked the infra-red image received from NOAA-9's channel 4 imager. The picture shows the region of the Baltic Sea, with the islands of Gotland and Oland seen more clearly in this print than in my atlas of the area.

Brian Dudman is another regular contributor to 'Info' and, like several keen monitors of the WXSAT field, he often watches live transmissions during the night. One example of his early morning results is shown in the accompanying pictures.
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- Menu driven features
- Colour View finder
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**UNIDEN BC 9000XLT**
Recently supplied to a government department, the new base scanner from Uniden is a professional tool offering serious performance at an affordable price.

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Matching the HF-150, a preselector can greatly enhance reception of weaker signals, that would otherwise be lost in the noise caused by stronger signals. They really do work. Suitable for most other receivers. Ask for details.

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**Datong Active Antennas**
AD-370/270 The pair of Active Aerials were originally designed for the RNavy several years ago and to date, no other manufacturer has been able to offer such performance from a compact design.

If you are stuck for space and need a good high performance SHORTWAVE ANTENNA then order yours today!

Datong AD-270 (internal) £89.95
AD-370 (external) £94.95 p&p £10.
The METEOR-3-5 image which Brian received at 0630UTC on 6 June. The picture shows the characteristic format of METEOR pictures - image content, aperture indicating bars, grey scale and 'end of line' bars. A few minutes before 0630UTC, METEOR 3-5 had been travelling north-bound in darkness - not transmitting. At the bottom of the picture, we see that METEOR 3-5 had just switched on (137.85MHz) - the left-side of the image is dark and shows the night side to the west of Britain. The aperture covering the image sensor was fully open - indicated by the vertical black column - which can be interpreted as comprising several vertical bars, each representing a binary counter. Within a few seconds the illumination level improves and the first bar (near the bottom) turns to white. During the following few minutes, more bars change as the binary counter increments. The second portion of this calibration section comprises an easily identifiable grey scale - more vertical bars, ranging from black to white. A final set of white/black bars marks the edge of the image line.

Comparison of this METEOR image and the accompanying NOAA-12 image received 80 minutes later, shows similar weather patterns, but the differences in the imagers' sensitivity to the different spectral regions can be seen. NOAA WXSATs show land features very well, whereas METEOR sensors reveal considerable detail in the snow and clouds - the 'white' levels. Both images show what appears to be fog in the Bay of Biscay. The METEOR image also shows streaks, which may be caused by the aperture not opening smoothly.

Dr. Martin Th. A. van Duinen sent me some pictures, one or two of which have been included in columns earlier this year. The first was transmitted by SICH-1 as it passed over the Baltic Sea, transmitting multi-spectral imagery on 137.40MHz. The left section of the image originates from an onboard microwave sounder; the other part is from the radar. Clouds are transparent to this imager. Various calibration sequences are also seen in this image, including vertical grey scales and a (presumed) telemetry sequence which appears as 'piano-key' telemetry.

My thanks to those many readers who have provided such good quality prints. Those who wish to provide colour images on disk can do so, though please remember that opportunities for colour reproduction may be infrequent!
Our Info In Orbit, columnist, Lawrence Harris, provides us with some interesting details and pictures about the latest GOES weather satellites.

The USA has two primary geostationary WXSATs, currently GOES-8 and GOES-9. Though it should be noted that some of the earlier GOES satellites are still operating to a certain extent, providing valuable data and communication facilities. These primary satellites are located at longitudes 75°W and 135°W (the 'east' and the 'west' positions respectively). From here, they allow the provision of detailed, near continuous coverage of hurricanes and other extreme weather systems on both sides of the USA. The legacy of the Challenger accident, together with hardware problems, meant that the launch date for GOES-I, the first of NOAA's next generation of geostationary WXSATs, slipped badly. On 13 April 1994, GOES-I was finally launched. After attaining geostationary orbit on 27 April 1994, then drifted to the 'east' position, the satellite was renamed GOES-8. Subsequently, GOES-9 was launched and positioned at the 'west' location.

Command And Data

The Command and Data Acquisition (CDA) ground station, located at Wallops, Virginia, supports the interface to both satellites. The NOAA Satellite Operations Control Center (SOCC), in Suitland, Maryland, provides spacecraft scheduling, health and safety monitoring, and engineering analyses. Raw satellite scan data is transmitted to the ground station and then processed. This data is transmitted back to GOES, which then rebroadcasts it to the user community.

Diversity

Those who live within the footprint of GOES-8 (see Pic. 2), and that includes the western side of Britain, may be able to receive WEFAX transmissions on 1691MHz direct from this WXSAT. If you are currently monitoring such transmissions from METEOSAT-5, then you already have the required hardware, and your software should cope with the slight differences.

GOES-8 is an amazing WXSAT, providing near continuous images which have been obtained from several sources around the world, including other WXSATs, geostationary and polar, as well as those originating from its own sensors.

To illustrate the diversity of these transmissions, I spent many hours collecting live samples of this imagery. Most of the images shown here were obtained using a 1691MHz TH2SAT Yagi antenna, feeding a Timestep Pre-amp and receiver/decoder, processed and displayed on a Pentium computer.

GOES-7: the previous generation provided imaging at four wavelengths. GOES-8 has a dedicated, high resolution, 5-channel multispectral imager - the Visible and Infrared Spin Scan Radiometer (VISSR) Atmospheric Sounder (VAS). Among the VAS channels normally included in that multispectral data stream...
Ground station system for GOES.

Satellite imaging system.

Satellite deployment configuration.

GOMS image (recent) from SMIS.

SARSAT (Search and Rescue)

GOES provides the instantaneous relay functions for the SARSAT system - "Search and Rescue Satellite Aided Tracking". A dedicated search and rescue transponder on board GOES is designed to detect emergency distress signals originating from Earth-based sources. These unique identification signals are normally combined with signals received by a low-Earth-orbiting satellite system and relayed to a search and rescue ground terminal. The combined data are used to perform effective search and rescue operations.

Image improvement

As an illustration of the consistently improved specifications of GOES-8's on-board systems, compared with the previous generation, the visible imaging channel (0.52 - 0.72mm) generates 10-bit images (GOES-7 provided 6-bit). The detectors now comprise stable silicon diodes instead of photo-multipliers. The overall result of using a significantly improved system, and the acknowledgement of changing user requirements, resulted in the development of a new operating schedule. As with METEOSAT, the schedule can be changed when external circumstances dictate. The schedule issued on 21 May this year includes transmissions originating also from GOES-9, METEOSAT-3, and NOAA-14, with many additional meteorological charts. With so many varied images transmitted from GOES-8, I selected the following samples; please note that the images are not completely noise-free. A satellite barely 3° above the horizon requires precision antenna pointing - my antenna points between the wall of a neighbour’s house, and some greenery. Even so, I am very pleased with the results.

Sample images from GOES-8:

These are the infrared, whole disc images as seen by GOES-8 and -9 on 1 October at 0845 and 1500 UTC respectively, and transmitted in WEFAX format several times each day. Some of...
the GOES-9 slots were not being used because the satellite was still in its eclipse season - suffering power reductions while it passed through the earth's shadow - an effect seen during each solstice (while the sun also passes through the celestial equator).

From the vantage point of GOES-8, most of America can be monitored, together with much of the eastern Atlantic Ocean. The difference in the view seen from GOES-9's longitude is obvious from Pic. 11, received the same day. Neither GOES image is enhanced. There do not appear to be any whole-disc, visible-light images transmitted as WEFAX from either GOES-8 or 9.

**Composite images**

Several sets of composite NOAA-14 images are transmitted during each 24 hour period. At 1122UTC, a set of visible-light and i.r. composite polar images are transmitted. The first in the sequence is W001 (Pic. 10) covering part of the north polar area around longitude 130° (Japan), as seen during consecutive passes by NOAA-14, between 0100 and 0700UTC.

The W002 format (Pic. 5), is a visible-light image of part of the southern hemisphere which includes Australia, and south to the pole. This sequence includes composites of both poles, and other images in this sequence complete the coverage.

At 0914 and 0926UTC each day, infra-red image composites of the whole of the north and south poles respectively are transmitted - see Pics. 12 & 13. These were obtained (by the ground station) from NOAA-14 during the pass times shown on the image header. For clarity, I have enhanced both images using only a contrast stretch. These images could be further enhanced by the addition of artificial colour, and I have found one pleasing effect is obtained using a blue scale (blue being associated with cold). Once such a palette has been set up, it can be saved and re-applied to other ‘ice’ images. Similarly, hot areas can be enhanced using a red palette. Further sequences of polar composites are transmitted at 0514 and 1706UTC.

Routine images of the four quadrants taken in the three wavebands (visible, infra-red and water vapour) are produced and transmitted by GOES-8 throughout the day. The enhanced visible-light image from 1 October, showing the eastern side of America, and the north-western part of the Atlantic Ocean is shown in Fig. 13. Many METEOSAT-5 images of various formats are regularly transmitted during the day, but there seemed little point in reproducing any of these!

TBUS information (equipment status and future operational plans for each NOAA WXSAT) is transmitted in four slots from 1410UTC. Interestingly, these transmissions, and several WXSAT images are also transmitted at various times, and on various frequencies in the h.f. bands. A sequence of ice charts are transmitted at 0240UTC, but I was reluctant to leave my antenna and pre-
amp on public view in my absence, to receive those images!

And Finally

I have left out a few image sets which GOES provides, but they might be featured in a future "Info In Orbit" column. To round-off this feature, I have obtained some specially processed images from the original organisations.

Credits

This article was written using extensive access to information provided by the Cooperative Institute for Research in the Atmosphere - CIRA - in Ft. Collins, Colorado. CIRA is sponsored jointly by Colorado State University, and the National Oceanic and Atmospheric Administration - NOAA. I am indebted to them for their help. Images are published by permission of NASA - Goddard Space Flight Centre, the Japanese Weather Association and the Space Monitoring and Information Service of the Commonwealth of Independent States.

Special Offer to 'Info' readers

Mr Roger Phillips, a Computer Specialist of the NOAA/NESDIS/RAAM branch at CIRA, Colorado State University has kindly provided me with a set of three floppy disks (3.5in, 1.4Mb) containing a computer-based introduction to the GOES-8 satellite. If any reader would like a copy of this set, please send either (a) three disks as described, plus one self-addressed, stamped envelope and a secured 20p coin, or (b) £1 and an s.a.e. (I will provide the disks).
EXPLORING THE XPLORER

Frequency | Sensitivity | Operation tend to be neglected by UK railway modellers. How to run your model like the real thing. 176 pages, hardback.
---|---|---
100MHz | 22uV | The Xplorer is capable of being connected to a PC or any other equipment sporting an RS-232 port. Software and a special RS-232 lead were supplied with the unit and these permitted the memory contents to be downloaded as an ASCII text file to a PC. This would have greater potential if the signal strength, CTCSS and DTMF details could be autostored.
400MHz | 22uV | My main criticism of the Xplorer is the software driven volume and squelch levels - I found that pressing the rotary knob didn’t always activate the control menu, especially if the unit was in the ‘Sweep’ mode. In addition I thought that it would have benefited from some form of automatic volume control or a.g.c. function in the audio amplifier.
1.0GHz | 300uV | The problem is that unlike most scanning receivers, the f.m. demodulator uses the same i.f. bandwidth and demodulator for the entire range of f.m. deviation. So a broadcast signal with 75kHz deviation sounds considerably louder than a p.m.r. signal using only 2.5kHz deviation. As a consequence of this you have to constantly fiddle with the volume control to prevent your eardrums from suffering permanent damage.
1.2GHz | 900uV | Although the handbook states that the Xplorer is not capable of demodulating a.m. signals it is capable of capturing them. It would have been nice to be able to select a.m. demodulation in some instances in order to identify various non f.m. signal sources.
1.5GHz | 7mV | Summary
2.0GHz | 20mV | The Xplorer is a very specialised item of equipment ideally suited to certain professional applications such as Communications Engineering or Counter Surveillance. It has a unique combination of facilities which it would be difficult to provide by any other means, particularly in such a small package.

However, I have been told that current versions function correctly.

Note that this was in the absence of other signals, and that in a practical situation other signals would be present which would significantly alter the operating range.

The i.f. bandwidth appeared to be in the region of 50kHz as deviation readings beyond this level of modulation produced an increasing error in readings.

The signal strength reading varied from a minimum of 7mV to a maximum of 15mV@100MHz which gives a dynamic range of approx 67dB.

Checking out the DTMF and CTCSS functions I found that the review model was capable of accurately decoding DTMF tones, but it did not seem to be able to respond to any CTCSS tones below 100Hz.

As a consequence of this you would have greater potential if the signal strength, CTCSS and DTMF details could be autostored.

It should be noted that Xplorer is not intended to replace a conventional scanning receiver, which is optimised for long range reception at the expense of tuning rate. The Xplorer is designed to locate strong, local, f.m. transmissions in a fraction of a second - but just think how many strong signals are present in an average urban area. As an example I had to lockout about 30 frequencies before I started to get meaningful results using just a short telescopic antenna.

For hobbyist applications other alternatives such as an AOR AR8000 hand-held scanner receiver tuned by an Optoelectronics ‘Scout’ is capable of providing some of the functionality of the ‘Xplorer’ and should be considered as an option.

My thanks to Waters and Stanton Electronics, 22 Main Road, Hockley, Essex SS5 4QS. Tel: (01702) 205835, FAX: (01702) 205843, for supplying the review model.
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Prompted by a visit from his grandchildren, Mr Muir dusted off his old Spectrum+, but damaged the keyboard while using a mini vacuum cleaner to remove dust from it. He now wonders whether a replacement is available. I hesitate to say no, because there is almost certainly a source of spares somewhere in the UK. My advice is to have a flick through one of the magazines devoted to trading in old computers such as Micro Mart (about 70p from newsagents). Be aware though, that it might actually be cheaper and simpler to find a replacement machine at a boot sale! If any reader can help with a spare or pass on the good news.

Finally, D C Tasker writes from Leicester with details of a recent gift: an Atari 800 complete with disk and tape drives. A listener since the 1930s, Mr Tasker tunes the bands with a Lowe HF-150 and would like to try his hand at decoding the data modes with his new computer. He asks for sources of software and literature, but wonders if he’s “...expecting too much from such ancient equipment?”. Not at all Mr Tasker, hopefully you’ve put the literature and disk of software I sent to you to good use already! Other potential Atari users should read on as I have a quarterly computer came....

Masked Ball
Do you ever hanker after an 8-bit computer you once owned and discarded following an upgrade to a 16-bit machine? Or maybe you’ve come upon some interesting bit of radio-related software which you can’t wait to try but no longer own the necessary hardware on which to run it?

Well take heart, because those with PCs, Macs, Amigas and STs can tap into a huge number of emulator packages designed to turn your cutting edge computer into a cut-down version of yesterday’s silicon.

And the point of all this for s.w.i.z? Vast treasure troves of bygone radio software available more or less for free suddenly become accessible when you turn your Mac or PC into an old-timer bit! It might not be as powerful as some of the commercial packages available today, but it costs all of nothing and it’s a lot of fun to experiment with.

Two of my favourites are the Xtender ZX91, and XL-It Atari 8-bit emulators. Both offer high speed crash-resistant emulation and come with sample software. Interested s.w.i.z with Internet accounts should check out the Emulator FAQ available at www.cvedby.net/home/bdi/emcom which lists all known emulators and hardware requirements. Those not on the Internet can scour PD libraries which often advertise CDs crammed with emulators, or have individual packages on disk.

Failing that, write to me with an SAE, floppy disk and list of requirements and if I’ve got it (or can find it somewhere!) I’ll bung it on a disk and return it to you. Now, anyone know of a FAX decode package that will work in 1K on a ZX81?...

Potted Pre-history
Anyone familiar with the rise of home computing knows that Atari played a leading part in the action. Way back in 1979, Atari was marketing a 32K 8-bit computer with a ‘grown-up’ operating system on the inside and a proper keyboard on the outside, and featuring a host of peripherals such as printers, disk drives, modems, light pens and more. While the price was prohibitive in the UK, the Atari 800 (and its cut down sister the 400 – the machines were known during development as Colleen and Candy) showed what was possible from ‘real’ home computers.

Atari continued to develop its 8-bits yet ensured that each new incarnation was compatible with previous machines. The range expanded via the 600XL and 800XL, to the 130XE, a 128K machine featuring 64K of bank-switched memory and the ability to tap into the huge range of existing software and peripherals. A number of dedicated magazines were published in support, notably the American Antic (featuring NECB as a contributing editor) and Analog mags, and the UK-based Page6/New Atari User (still published today!).

The Atari Classic’s American heritage translated to a wealth of Ham-oriented software, much of which is still around if you dig deep to find it. As well as the usual stuff such as contact QSL databases, antenna calculators, Morse tutors and so on, there are programs to decode fax and SSTV, RTTY and cw. Antic magazine published simple plans, constructional details and controlling software for interfaces to decode Morse and fax and while neither qualify as rivals to established favourites such as Hamcomm or JV-FAX, both will give you a shoestring introduction to decoding the data modes.

(Potential owners can write to me for photostats of the articles).

So which model to buy and from where? Any will do, though the exceptionally well shielded 800 was highly respected among the America amateur community. Boot sales are the best source and for price, my last Atari Classic, an 800XL, cost just £50, and the last Atari 800 I bought cost £2 from the All Micro Show (see next item). All peripherals are available too at reasonable prices. A 1030 disk drive should be well under £5 at boot sales (I’ve had one for £1) and everything else costs pennies to a pound or two. LACE is a thriving club for enthusiasts and offers a BBS and comprehensive PD library. Contact secretary Roger Lacey, 41 Henryson Rd, Crofton Park, London SE4 1HL.

Show Time!
While there are probably more press releases than show in the radio calendar, the All Micro Show is one which will interest all ‘ShackWare’ readers – that is, short wave listeners who like to use computers in their pursuit of interesting listening. The AMS is oriented towards fans of older computers, has a healthy radio-oriented turnout and features such obscure clubs as the UK Einstein User Group!

AMS ’96 takes place on Saturday 9 November between 10am and 4pm at Bingley Hall, Staffordshire Showground, Stafford (signposted from J14 on the M6 or shuttle bus from Stafford BR). Tickets are available on the door priced £2.50 for adults and 50p for children under 14. Contact Sharward Promotions (01473) 741533.

Finally... Yes, the end of another column is nigh but keep those letters coming. Do remember to enclose an s.e.e. for a personal reply and bear in mind that, with one page per quarter, I have an awful lot of mail fighting for a small amount of page space (hmm..) so don’t be disappointed if your letter doesn’t make it.

Until next time, good listening.

Jerry Glenwright, 23 Downland Avenue, Southwick, West Sussex BN42 4RF
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This month sees the start of a column, within 'Airband', designed to keep all the military air buffs happy. If you have any info for this, then send your info there, don't send it to me here! I'm going to have to accept being 'grounded' from now on!

This new angle means that I am free up my ear to scanning, a hobby in its own right, which is good, as lately many letters are arriving from people who are more, but are confused by the jargon and technicalities about scanning as a hobby. I've given this a great deal of thought and decided that, with Christmas looming up over the horizon, we'll start from the very beginning and cover both seasoned users and the newcomers. Where's that I hear you ask? Where else - back to basics!

**Book Selection**

There is a good selection of books available on the market, and you can buy these from the magazine, designed to appeal to both the beginner and the more experienced user. Books, like most things, tend to go out-of-date very quickly however, and the column should sit in the gaps between this.

I'll review books that are sent to me and give them a good hearing. So, if you have any that you want reviewed, please send them care of the office! This means that while you could start from book lists of frequencies, regular attention to this column will enhance your listening greatly.

There is, however, only one book that I'd recommend you have with you at all times if you're into the hobby, new and old alike, and it's the one I use as my 'bible'. Written by the late Peter Rouse, the book *Scanners 3 - Putting Scanners into Practice* is about the only one of its kind on the market dedicated to enthusiasts and written in an easy and informative style. It includes such things as circuits for the home-brew enthusiast as well as giving a very helpful run down on the hobby in general. Definitely one for the Christmas stocking!

There are, of course, many more available from the SWM Book Store aimed at what might seem a bewildering array of scanning areas. Such titles that exists cover aircraft, ships and much more, often in great detail, but, as a starting off point, Peter Rouse's book is a definite 'must have' for the shack. If you haven't got a copy you really don't know what you're missing.

**Antenna Types**

One of the commonest questions I'm asked in the mail is, 'What type of antenna should I use?' This is an area that seems to baffle many new entrants into scanning, and also one that is hyped up above the heads of many people with its talk of baluns, a.t.u.s and the like. This month, I'll take a look at two situations, indoor and outdoor, and how you can choose what's the best for you, as an individual. I'll also keep it as simple as I can!

Firstly, *outside antennas*. The easiest way to do this is to tell you that 'the higher it is, the better it is'. Simpler than that, even, is the proviso that any outside antenna is better than an inside, or set-top one and the higher you get it and the more it 'sees', the better the results.

Put it this way. You live on a hill overlooking a major port and you have an antenna on the chimney and your mate lives in the town below, surrounded by blocks of flats, a factory and a multi-storey car park. His antenna and yours are exactly the same, and are both mounted on the roof. You both have the same scanner.

However, you'll hear more and have better quality signals than he does. It doesn't matter why in technical terms. What it does mean is that any antenna mounted with a good 'view' and in 'the clear' ie. no obstructions to mask signal paths, will outperform the same antenna if that antenna is cluttered - no matter what you do to it!

So, if you live on a hill you're in a better position than being in a town or on an estate. Unless, of course, your house overlooks the port as well...

So, what's the best type of antenna for scanning? Again, there is great argument on this point, but I prefer the verticals. Why? Mainly because most frequencies used by v.h.f. and u.h.f. services use vertically polarised antennas, which means you should too. Also, as signals can come from more than one direction, you need to look for a type which has an 'all round' capability. A discine type is also useful here.

However, the 'nest of dipoles' you see advertised are multiband antenna and, while they have their fans, I'm not one of them! If you really wanted to get signals in then go for a log periodic type with a rotator, but that's strictly serious stuff and way beyond the purse strings of us mere mortals!

The moral here is to go for what suits you best, providing that you understand the simplest of radio theory. Which is....if they use it (they being the transmitters) then so should you! Airfields, ships, Port Offices, mobiles, all use long, straight types....I rest my case!

However, for all around general scanning reception, a discine is probably your best bet. I've got nothing against them apart from the fact that one of them on your chimney gives a huge signal to the world that you have valuable radio equipment, particularly a scanner, indoors. So does the vertical but it's not as conspicuous!

With regard to indoor antennas, there is only one rule to remember. It's a compromise! There are a few on the market which would be better than the rubber duck / telescopic whip, but if you can mount an outside type, do so. If you can't, you'll probably be best advised to go for one of these. Again, a bewildering array of products available, but if you have to use one then go for the sort which can be hooked up to a pre-amplifier....which is the next quick bit!

**Boosting Signals**

Pre-amp's are brilliant, boosting signals which were previously weak to better levels. However, they also bring in the rubbish as well, rubbish is all sorts of interference like mains hum, for example, so you'll need a filter! The filter, the booster and the indoor antenna will all cost you as much as an outside vertical or discine, so before you go along that route, think on.

Having said that, a lot of people cannot have outside antenna so it's as broad as it's long. Amplifiers come in two distinct types. Mast head, which you mount 'up the pole' and cable end types. Remember though that connecting an amp may cause more of a problem than it solves unless you also have to happen to have a filter.

Filters, again, come in a variety of shapes and sizes. For scanners, it's best to be looking at an adjustable notch filter. This will 'block out' interference from such thing as Band 2 f.m. broadcast breakthrough, taxi cabs and so on. Worth having.

**Cables & Connections**

Next comes cable. Again, I'll keep it simple. You should not use TV type coaxial cable like UR67 or anything above the 502 impedance of the set. It should be the 50Ω type only. This comes in two main types, low loss and normal. Again, broad rule of thumb states that if you have around two or three metres between you and the antenna then normal cable is okay to use.

**Examples of this type are**

---

John Griffiths, c/o 22 Ffordd Beibio, Holyhead, Gwynedd, North Wales LL65 2EH.
RG58 for h.f. and v.h.f. However, for the higher end of the spectrum, such as, for example, military bands and above, you should be looking at low-loss. There is such a wide choice that your dealer will know what is the best or the most economic to use.

Connections! Most, if not all nowadays, of the scanners on the market use a BNC connector on the set or the antenna. These are also what you need to have the cable connections. If an antenna is advertised as having, for example, a PL-259 or 'N' connector, then you can get a converter to ensure that it fits.

Cable connectors come in many types, by the way - BNC, PL-259, Motorola, miniature jack-plugs, 'N' to name a few. However, converters are also available no problem. If you see an unfamiliar plug on the end of the new kit you've just bought, I'll leave it there on the subject of what you may need. Over the next few months we'll continue with simple explanations as to what's what and then move into other areas involved with scanning in general.

I hope to look at all sorts of stuff like the job that nice little button on your front-end does! I also hope to look at books and at those which you are suited to the scanner owner. In the meantime, it's time for the mail....

Letters

A letter from Stephen Hill asks about the frequency 160715. Stephen lives in Warwick and any ideas as to the frequency can be addressed to me here and I'll do the rest. He also mentions Gaydon, site of the Heritage Motor Centre. They can be heard on 169.1250 CallSign 'Heritage Control' and the test track used by Rover uses 456.0250 base and 461.5250 mobiles. Gaydon is the home of some of the Minis I admire, so those frequencies are going to be valuable for me, and I suspect, for others who have a passion about cars!

Earlier on I suggested that breakthrough from other services would interfere with your reception and that a filter may be needed. A letter from Mr. E. Griffiths of Rhosgadfan asks about how he can reduce this. He says he has a discone connected to 30m of UR43 cable to an AOR AR8000. A change to a less lossier cable, low loss, and the fitting of a suitable filter which will help here. Nevada stock the SNF-170 Adjustable RF Notch Filter which assists in 'clearing up' the marine, air and 2m amateur bands, which Mr. Griffiths is suffering in, and is also adjustable, so that you can 'tune out' the unwanted signal. I hope this answers your question, Mr. Griffiths.

Regular readers will have heard me mention Paul Wey in these pages before now. Just a note and a word of caution. Paul was picked up by the Police (Intelligence Unit) during the Notting Hill Carnival together with his friend. On him he had scanning items such as an Opto Scout Frequency Counter....in the event both were released with no charges and no equipment seized. His friend writes to say that all scanner users should be wary and careful about what they are doing, the next time they may not be so lucky. Neither you could. It does happen - beware.

Lastly, from an 'anonymous source' comes the following rather unusual frequencies that I have never heard of! In the first two, train spotters around the Severn Valley may like to try 160.946 and 166.967. London Bus addicts on the Buses Central London Tours on 180.1625 and 188.1625! Proves scanning isn't all important people or fast jets! A request from a reader for the frequencies for 'Legoland at Windsor. Anyone any ideas?

Keep Writing!

That leaves me now to say 'bye. Don't forget - the unusual aspect of my UFO interests are still on to keep the mail coming in if you heard, saw or may have heard anything unusual over the air in the air. It doesn't matter whether you think you might be going nuts, just get it in and I'll keep it and examine it for tie-ups. All confidences kept. In fact, anything unusual heard, anxious on the radio do drop me a line.

Remember, from now on all military airband issues to Peter Bond unless you wish to keep it strictly as a private interest between us!

Until next time then, catch you down the log and best wishes. Stay careful.
**Shortwave Receivers**

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<th>Model</th>
<th>RRP</th>
<th>Momentum Price</th>
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<td>AR-7030</td>
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Here is the second Frequency Exchange. So far the response has been very encouraging indeed. We have had lots of logs from our readers - thank you. You will help us if you can provide your logs on disk or via E-mail if possible; if not, then you can save lots of editorial time by keeping exactly the format on this page. We look forward to this feature growing - it's all down to you.

If you provide logs on disk, please note that we can read PC and Mac format high density 3.5in disks. Preferred, is MS Word for the Mac. We can, however accept most mainstream wordprocessing formats. If you have an obscure package, then please submit a plain ASCII file.

### Key

- **o.m.** Amplitude Modulation
- **c.w.** Carrier Wave
- **EE** English language
- **FAX** Facsimile
- **HRPT** High Resolution Picture Telemetry
- **i.s.b.** Independent Sideband
- **NATO** North Atlantic Treaty Organisation
- **OB** Outside Broadcast
- **p/p** Phone Patch
- **Picx** Pseudo
- **sby** Standby
- **u.s.b.** Upper Sideband
- **VFT** Voice Frequency Telegraphy
- **wkg** Working
- **hfc** Traffic
- **wx** Weather
- **dpx** Duplex
- **xmsn** Transmission
- **YL** Female Op.
Propagation Extra

I believe that it is still essential that those readers who have an ongoing interest in propagation still have access to the various pieces of information collated by Ron Ham. I have asked Ron to continue to provide his monthly barometric pressure charts in the same format as before. In the meantime I am trying to arrange for a regular supply of sunspot charts and other similar information. If there are any readers who would be prepared to provide such information on a regular basis, please get in touch with me at the Editorial Offices, Broadstone.

Ron has provided two barometric pressure charts for this issue, Fig. 1 covers the month of August 1996, Fig. 2 covers September 1996.

Fig. 2: Barometric pressure chart for September 1996 taken by Ron Ham at Storrington, E. Sussex.

---

And finally Graham Tanner reports 122.95 GHM is the medical helicopter which operates in and around London during the week. It flies from the London Hospital in Whitechapel, but is kept overnight at Denham Airfield in west London. When it has a casualty on-board, it uses the c/s 'Medline', otherwise it uses 'GHM'.

---

Short Wave Magazine, November 1996
World
Propagation Forecasts

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.

Circuits to London

Short Wave Magazine, November 1996
Echostar-2 was launched night of September 10th to local spectators at Kourou, French Guiana and to satellite aware folk across Europe and America by satellite TV distribution feeds. Here in Europe the Space Night programme on Astra's BR transponder featured the whole launch and commentary - it seems that any important night-time launch is always carried on Space Night, it makes a change from the endless repeats of MIR dockings.

There has been a degree of confusion across the Clarke Belt as a result of Intelsat fleet shuffling, allocation changes and slotting in the birds from the more recent launches. John Locker (Wirral) checked out the Intelsat web site and sent in a printout of the Clarke Belt according to the latest Intelsat news.

Indian Ocean: Intelsat 703 @ 57°E; 604 @ 60°E; 602 @ 63°E; 706 @ 66°E.

Atlantic Ocean: Intelsat 707 @ 1°W; 705 @ 18°W; VIII @ 21.5°W; 605 @ 24.5°W; 601 @ 27.5°W; 803 @ 34.5°W; VIII-a @ 52.5°W; 705 @ 50°W; 706 @ 53°W; VIII @ 55°W; VII @ 58°W.

A warning note from John Womersley who advises that the AFRTS TV service that have traditionally distributed their programmes to US bases around the world using B-MAC will be going MPEG compressed over the Christmas '96 period. This channel has always attracted interest and in the recent months B-MAC decoders has always attracted interest and in the Christmas '96 period. This channel will be carried via Intelsat K (11.532GHz horizontal, 3.992GHz vertical), ringside advertisement placards such as 'Pragobanka' suggested a Czech Republic soccer fan upping perhaps their only SNG truck, Marcus Tate on the 29th also logged and confirmed Czech Republic ice hockey this time versus Sweden using a Swedish 'TV3 SWE' SNG vehicle. Intelsat K again with audio at 6.080MHz clean effects and commentary 7.20MHz.

Norwegian receives advises that six Norwegian Telecom SNG units are in current use, TOS-1 a flyaway package; TOS-2, 3, 4 are conventional mobile truck units which live at the Nittedal Earth Station. NRK until recently used their own SNG unit but this has now been absorbed into the Norwegian Telecom fleet. The TOS-6 identification is Eutelsat international registration code for the TOS-6 truck and normally accessible Intelsat 707 @ 1°W.

Viewing satellite downlink programmes helped Edmund Spicer (Littlehampton) gain excellent results in two languages - he was in charge of his college satellite tracking system which covered between Hispasat 30°W and DFS Kopernikus-3 @ 23.5°E. Further help came from his parents who installed a fixed system at home for Telecom 28 @ 5°W to maintain their French language skills both from TV and radio programming. The 28 output carries TF1; France 2; ARTE, La Cinquieme and M6 TV programmes normally scrambled. RTL-9 also appears and encrypts in Smartcrypt other than clear-time 1800-2000.

Orbital News

An interesting development with satellite rocket launchers has been announced by Hughes Space and Communications with the signing of a contract to build a launch site downlink satellite platform. The submersible platform will be used in the Pacific and offer a more cost effective launch facility, exactly on the Equator. Hughes have ten launches planned from mid 1998 including the new HS-702 series that carry up to 90 transponders with 15kW of onboard power.

The Japanese JskyB News Corporation project for a +100 channel digital TV service plans a December '97 opening via the JSAT-3 satellite (132°E) and increasing payload to 150 channels within 1998. With programming transmitted outside of the Indian borders there is no control over the very strict guidelines of India's terrestrial broadcasters. Hong Kong's Star TV is planning an Indian digital TV service by early '97 offering Sky News, Sky Sport and two Indian language channels, by satellite via PAS-4 capacity in Ku band.

More election fever this time via II F4 @ 7°E.
If you can’t see the wood for the trees get an FL3 Audio Filter from Datong Electronics.

With the bands as busy as they are it can be very frustrating when you are unable to hear the station you want to work because other people are operating close to the frequency you are on. One of the easiest and most cost effective solutions is to use an audio filter between the radio and your amplifier. Datong's FL2 and FL3 Audio Filters enable you to do just that.

The FL2 and FL3 allow you to remove annoying signals such as “monkey chatter” and signal “splatter” by stations operating close to your frequency. In addition, the built in notch filter allows whistles and tuning signals to be removed, even if they are on top of the signal you are trying to hear. In the case of the FL3 the notch filter is automatic so you don’t even have to touch any controls. This allows you to get on with working the DX.

Using a high and low pass filter that are continuously variable from 200 to 3500kHz you can set the FL2 and FL3 for optimum listening for different modes of operation such as SSB, AM, CW, RTTY, Packet and AMTOR. With a bandwidth of 25kHz you can set the FL2 and FL3 for optimum listening for different modes of operation such as SSB, AM, CW, RTTY, Packet and AMTOR. In addition, the built in notch filter allows whistles and tuning signals to be removed, even if they are on top of the signal you are trying to hear. In the case of the FL3 the notch filter is automatic so you don’t even have to touch any controls. This allows you to get on with working the DX.

At a cost of £117.44 for the FL2 and £159.69 for the FL3 they offer excellent value for money. The price includes VAT and postage.

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August was an impressive month for long-distance TV reception via Sporadic-E propagation, thanks mainly to the unusual and exotic signals which were received. Unfortunately, the last week in the month saw a rapid decline in Sporadic-E activity, indicating that the main season was drawing to a close. Tropospheric reception occurred towards the end of the month, the most notable reception taking place in the south-east on the 19th when u.h.f. signals were received from as far away as Sweden.

Arabic Reception

The new Syrian second network transmitter on channel E2 was received again in Derby on the 5th. Strong signals were already established by 0900UTC and reception lasted until 0950UTC; the Arabic sound channel was heard at times. On the 11th at 0827UTC, an Arabic signal was present on channel E2, floating with the NRK PM5534 test card from Melhus in central Norway.

A mystery signal on channel E2 from the south-east was received on the 6th between 1600 and 1640UTC. Although the pictures were weak to medium strength, no obvious logo or on-screen identification could be seen. A similar signal was monitored the following day between 1600 and 1700UTC with occasional sound being present. This was similar to an Eastern-European or Russian language, thus ruling out countries in the same direction such as Germany and Switzerland. Slovenia (SLO-1 on channel E3) and Croatia (HRT on channel E4) were received during the opening. For some years, several low-power Slovenian and Albanian repeaters have been listed on this channel but so far there have been no claims of reception.

Portuguese RTP-2 Relay

An opening to Spain and Portugal on the 10th between 1000 and 1100UTC produced Spanish signals throughout Band I. At around 1050UTC on channel E2, a FuBK test card was noticed faintly superimposed in the background of the TVE-1 programme on channel E2. Careful adjustment of the aerials separated the two signals and revealed that the FuBK was indeed from RT3's second network complete with the 'RT3 Lisboa' identification! The RT3-2 35W transmitter is located in the north of Portugal at Valenca do Duro with RT1 broadcasts on channel E4.

Reception Reports

Some of the CIS logos are still causing confusion and as soon as we identify them they seem to change! Ian Milton (Ryton, Tyne and Wear) spotted a 'GT' logo inside a box in the bottom right-hand corner of the screen on the 10th on channel R2 at 1700UTC. This sounds very much like 'bT' as used by Belarus TV which originates in Minsk.

Peter Barber (Coventry) noted an excellent Sporadic-E opening on August 5th with the Italian private station ‘Video’ logged on 47.862MHz at 0800UTC. On the 7th, a full-screen ornamental plaque with Arabic script was seen on channel E4 at 1233UTC; Serbia on channel E3 and RAI UNO on IA were also present at the time. TVA, another Italian private station, was resolved just above channel IA at 1313UTC.

An intense all-day opening occurred on the 10th with signals received between 0630 and 2020 by Peter. During the morning, strong signals from TVE-1 (Spain) and RTP-1 (Portugal) were identified, along with NRK-1 (Norway) radiating the PM5534 test card from Bagn on channel E3. SVT-1 (Sweden) were also noted on channel E3 transmitting the PM5534 test card. From midday onwards, ARD-1 (Germany) was identified on channel E2 with a programme for young people. Also noted were TV NOVA (Czech Republic) on channel R1 with a Yogi Bear cartoon, ETV (Estonia) on R2 and PTJ (Russia) on R2. Evening signals included RAI UNO (Italy) on channel IA at 1929UTC with the 'TG' news and Spanish signals on E2 and E4 including a news item on the severe flooding.

Shawn Taylor (Howden, East Yorkshire) noticed a definite fall-off in Sporadic-E activity during August. Spain, Italy, Portugal and Slovenia were the main countries identified during the month.

Riccardo Mariotti (Italy) comments that the Sporadic-E season has been fairly routine with reception from services such as Russia (OPT), Romania (TVR-1 and TVR-2), Estonia (EESTI TV), Ukraine (YT-1 and YT-2), Slovenia (SLO-1), Spain (TVE-1) and Norway (NRK). The more exotic reception has come from Tunisia (RTT) on channel E4 and also from an unidentified country in the Middle East on channel E3. Despite the infrequent showing of test cards this year, Riccardo managed to video record the Portuguese 'RTP-1' FuBK.

Pertti Salonen (Finland) has written to say that reception from the Iberian Peninsula and the Middle East has been absent this year. Many of the signals have originated in Central Europe with broadcasts being noted from YT-1 and YT-2 (Ukraine) on channels R1 and R2, ARD-1 (Germany) on E2 and ORT (Russia) on channel R1. TVR programmes from Moldova have also been identified on channel R1.

Tropospheric Reception

A spectacular opening at u.h.f. occurred on the 19th. This was witnessed by David Harding in Deal. Between 0515 and 0830UTC, 'Omrop Fryslan' was monitored in snow-free colour on channel E4. This was evidently a regional Dutch station in the north of the Netherlands airing news pages called 'Ethiskrant Friesland' ('Friesland Newspaper of the Air) plus adverts and programme promotions. Teletext pages were headed 'Fryslantext'. Incidentally, a former regional station '2HTV' on channel E49 is to remain off the air.

Danish TV signals were also present on various channels and at one point the local BBC-2 picture on channel E56 was almost obliterated by the PM5534 test card from the Bornholm transmitter. Noise-free signals from Svenborg on channel E32 was eventually swamped by the Dutch FuBK test card when the Goes transmitter came on-air at 0830. Signals from the Nibe transmitter on channel E36 were also identified.

The best was yet to come. At
0610, Swedish TV -4 signals from GSteborg on channel E46 suddenly emerged with perfect colour on channel E46 with a weather forecast. The signal lasted a full twenty minutes before deteriorating.

FM Report
Mike Gaskin (Cornwall) witnessed an incredible f.m. Band opening on the 16th with a number of low-power Spanish 'Canal Sur Radio' outlets being received. Mike also noted AFRTS broadcasts on 102.50MHz from the US Naval base at Rota. Later, several Greek-speaking f.m. stations were logged but none would provide any comprehensible RDS information for identifying their sources.

At 2000UTC on 101.90MHz an Arabic announcement was heard which was very similar to the Saudi Arabian World-Service identification which ends in 'Arabiyah-al-Saudiyah' but in this case ending in 'Riyadh', which is a main studio. There followed a news programme which then gave a local weather forecast. Mike cannot find the station listed and wonders whether it was direct reception (which must be a record in terms of distance for f.m. signals), or whether it was accidentally broadcast by a relay closer to Europe with the initial part of its journey via tropospheric ducting. During the same opening Mike heard a relay of the 'BBC World Service' on 107.60MHz and 'BBC Radio 2' on 106.90MHz with a pronounced echo!

HTV-1 Mystery Solved
In the August column we mentioned a mystery HTV-1 sound channel received on a scanner by Tim Bucknall of Congleton in Cheshire. Apparently there is a self-help relay at Llandegla using this channel (66/67). The hill-top location (approximately 310m a.s.l.) lies to the west of Wrexham and both antennas radiate at 45° and 75° in the general direction of Congleton with an e.r.p. of 1W. Tim can receive the sound from this station on a daily basis although the vision carrier is inaudible. Tim advises that the Wrexham 200W TV relay broadcasts only two channels: BBC-1 Wales on channel E39 and S4C on channel 67.

Keep On Writing!
Please send DX-TV reception reports, equipment news, off-screen photographs and general information to arrive by the 3rd of the month to:- Garry Smith, 17 Collingham Gardens, Derby DE22 4FS.

Fig. 5: The Finnish FuBK test card on channel E3 from the Tervola transmitter, received by Bob Brooks (South Wirral).

Fig. 4: Russian TV advert for a well-known brand of chocolate, photographed by Bob Brooks (South Wirral).

Fig. 6: One from the archives! Test Card 'C', originally introduced in 1948, seen here with BBC-2 identification.
H ow can an aircraft's route be related to the frequency on which it is being controlled? Not simple! There are two problems: more than one frequency might be allocated to the same route and the frequencies keep changing.

It's impossible to list all frequencies for even the UK alone in a small column like this one. If you want to see what I mean, try the Aerad En Route Supplement Europe and Middle East. Towards the end of the COM section in this book is a list of frequencies, classified by each airway in turn.

How do you get this book? It's available to the public by post. First, though, send a stamped, self-addressed envelope (to hold one A4 sheet) to the Broadstone Editorial Office (NOT to me), requesting the Airband Factsheet. On this, you'll find useful addresses of information suppliers. That will enable you to apply direct, asking for the latest prices.

Practical Hints About Airways

Of all the hints I can give you for following the progress of a flight from one frequency to the next, the simplest is the procedure adopted by the pilots themselves. When changing frequency, they might know from experience and published information what's coming next.

In larger aircraft, the radios allow the next frequency to be pre-set in an auxiliary display and then selected at the flick of a switch. Nonetheless, what really matters is that the controller tells the pilot the next frequency and the pilot reads this back to avoid error. That's the only way to be certain as to what frequency will be worked next.

M. Dendle (Leicester) correctly points out that some frequencies are designated 'As directed' and would be worked if the controller so instructs, e.g. if the more usual frequency is busy or unserviceable. Often, though, the published frequencies tell you all you need to know.

You will need an airport chart so as to know where to look in the first place. Aerad will again supply these and I recommend EUR 1/2 (plus EUR 3/4 for the north of Scotland) and H201/202 for UK coverage. If you see an aircraft, or know its route, find it on the chart. Guess which airway it's on by its location and, possibly, heading.

Slight errors don't usually matter as adjacent airways are worked by the same sector controller. Here are two examples that I verified from the published sources. A flight routes Lambourne to Compton via UB29. Aerad lists the UB29 sector from Compton to a beam Brookman's Park as 127.425MHz and this ties in nicely with the actual traffic.

Here's another example: a flight routing from Boulogne via UA2 to Brookman's Park via the UIR boundary. Now, airspace is divided into Flight Information Regions (FIRs). In the UK, we have two: London and Scottish. At high altitude (above FL245) the FIR is called an Upper Information Region (UIR) and so this flight is leaving French airspace and enters London airspace at the UIR boundary. Again, Aerad lists a UA2 sector as a beam Brookman's Park to the UIR boundary on 132.45MHz and that's where you'll find this sort of flight.

Abeam means that the navigation point is currently lying perpendicular to the aircraft's line of travel (track), i.e. in line with the pilot's shoulders. Remember that Aerad lists lower and upper airspace (eg. B1 and UR1) separately but in convenient alphabetical order.

But Airways: Frequencies Keep Changing?

Which makes it hard to keep up when writing a column with a six week lead time. That's why it's so important for pilots to change frequency as instructed and for the readback to be taken notice of! M. Dendle found an example: 118.775MHz is a new one for London Airways, not listed in Aerad 6/86. In fact it first appears officially in an AIP Amendment of 18/7/86. I'm grateful to Martin Sutton (CAA) for supplying the AIP Amendments quoted in this column.

Whereas the frequency now officially exists, we still don't know what it's used for! M. Dendle suspects it covers part of UB1 and UB39.

Are You Insured?

As I said in September, many readers probably visit aerodromes by car, unaware that they might not be insured, with potentially serious consequences! Ted Crease (Bradford) reminds me that, previously, insurance might not apply at all unless on the public highway but my insurer confirms that this is a thing of the past. Worth checking, though.

Ted has a more recent story that warns us all to be careful. When two cars collided after skidding on ice, the insurers refused to pay up. Why? Although this took place on a roadway, someone had parked a light aircraft adjacent to the accident site so as to make the aircraft more prominent as it was for sale. The insurers said that, as aircraft had access to the accident site, the insurance was void. Note: no aircraft was involved in the accident! See what I mean? Damaged cars are one thing. Injuring someone (likely at LOW speed due to the nature of soft tissue damage) could prove exceedingly expensive.

Ted says to watch out for the companies that offer cheap insurance quotes by phone. Don't accept the quote until you've read the ACTUAL policy document and decided that it really meets your needs.

Clive Ellis G4NVX (Hereford) didn't realise that his AA insurance didn't cover him when visiting the St. Mawgan Air Day.

Not quite as restrictive is the Saga policy (insured by Axa) held by Arthur Budd (Southport). I suspect this is only available to older drivers, could you confirm, Arthur? 'Airside' is excluded but there is a definition in the small print.

John Barker (Sheffield) checked with Prudential who reckon that he would be covered (unless on, say, the runway). So, shop around and, above all else, CHECK the small print!

Follow-Ups

Concorde was studied in September by Bill Hillier (Gwent), Len Woolley (Bude) notes that Air France AF002 flies Paris-New York departing 1000Z Sunday and Monday, AF004 some routetime Friday or Saturday. Len lists flights on a computer disc: it is available to readers, and if so, what arrangements would you like, Len? More on Air France from George Nichols (Bristol) who worked on the Olympus engine design: AF001 operates New York to Paris.

Also, says Len, BA185/188 are (or were) Heathrow-Washington (departing 1745 local Monday, Thursday and Saturday) and Washington-Heathrow (departing 0945 Tuesday, Friday and Sunday) services respectively. The flight numbers are possibly re-allocated to a B.757 operation Birmingham-New York JFK-Toronto according to Frank Walshe (Ontario). Frank also notes that BA and AF Concordes often fly the same route in quick succession, working Nat-C on 8.675 or 13.305MHz (eg, 0711 local Canadian time). Anne Reed G-20126/RS-8751 (Cheltenham) suggests that the Washington service is now operated by a B.747 as BA222 outbound, BA216 returning to Heathrow.

About photos: Chris and I have the same trouble as you do, Anne. We can't get near enough to large aircraft for security reasons. We need a frame-filling subject before it will print successfully in this magazine. So, if anyone can provide ariel access (on foot - my car isn't insured, remember!) for snapping transport aircraft, please offer now!

Frequency and Operational News

Relying on AIP information from Martin. Now, this information is too extensive to fit in here so I'll concentrate on frequency changes and refer to navigational details. If you need further information then write in to me.

Aerodromes: Birmingham Zone now 118.05 Iwals 131.325MHz, Glasgow a.t.i.s. now 132.175 (was 115.4MHz), London City Tower now 118.075 or 127.95 (118.4MHz withdrawn). London Gatwick a.t.i.s. now 121.025 (was 123.475MHz). Remember, only settled at 123.2 (was 125.95MHz), clearing up months of confusion!

Airways: New London FIR frequencies: 133.075MHz (no further information available); 133.075MHz south of Abeam.

Tipsy Belfair. Photograph: Christine Mynek.
Regular readers of the Scanning and Airband sections of SWM, will be aware that the Military airband information has been appearing, almost exclusively, under the scanning column. It has now been agreed to collate this information into a new Military Airband column, and I have been given the pleasant task of compiling this section. I hope to include details of all aspects of military airband listening, whatever you hear, especially the unusual, may well be of interest to others. I look forward to hearing from SWM correspondents on a wide variety of military airband related subjects.

Subject to changes to the situation in Northern Iraq, there should have been several units deployed to the Gulf via the UK during September and October. Any reports of discrete frequencies or callsigns in use by the visiting units would be most welcome. Also any information on recent exercises such as “Brilliant Invader”, would be appreciated. All letters to me please via the Editorial Offices - all information will be included anonymously, unless you request otherwise.

R

318.3kHz withdrawn. Turnberry n.d.b. TRN (was 133.75kHz). Unaccompanied pilots were flying at very high levels in the Gulf. It was thought to be a test flight, but it proved to be a training flight for airmen who would be deployed to the Gulf via the UK during September and October. Any reports of discrete frequencies or callsigns in use by the visiting units would be most welcome. Also any information on recent exercises such as “Brilliant Invader”, would be appreciated. All letters to me please via the Editorial Offices - all information will be included anonymously, unless you request otherwise.

SPirit In The Sky

September 2nd, saw the first ‘brief’ visit to the UK of the B-2A Spirit, the stealth bomber operated by the 509th Bomb Wing of the United States Air Force. The inbound flight was running approximately 30 minutes late due to a wide berth given to Hurricane Edward in the Atlantic. The Spirit entered UK airspace across Ireland and then through Wales using the London Control Brecon sector frequency 118.165MHz. Oldham n.d.b. OL (342.7kHz) withdrawn, Ottringham d.m.e. now paired with MAC v.o.r. TACAN MAZ withdrawn, so no (429kHz) withdrawn. Machrihanish (was 433kHz). Clacton n.d.b. CLN BHD (318kHz) withdrawn. UN614, UN863, UP6.

routings: A34, H51, N863, UA20, R41.

130.925MHz below FL195 on Al, introduction, replaced by NEVIS. Possible new frequency A47, B71, 8321, R41). UN601 now Area (covers parts of Al, A34, Birmingham to London Terminal Area (covers parts of A1, A34, A47, B71, B321, R41). UN601 now controlled on 129.225MHz or 125.675MHz between Talal and NEVIS. Possible new frequency 124.9525MHz but, soon after introduction, replaced by 130.9525MHz below FL195 on A1, A2, A34, A47, B71, B317, B321, R41.

New airways: HS2, HS3, HS4, HU52, UNH3, UNH54, UM16, UN865, UW901, UW502, UW552, UW534, UW536, UW538. Altered routings: A34, H51, N863, UA20, UL813, UM14, UN802, UN890, UN614, UN863, UPS.

Beacons: Berry Head n.d.b. BHD (318kHz) withdrawn. Birmingham n.d.b. BIR now 406 (was 453kHz). Clacton n.d.b. CLN (492kHz) withdrawn, Machrihanish TACAN MAZ withdrawn, so no d.m.e. now paired with MAC v.o.r. 118.165MHz. Oldham n.d.b. OL (342.7kHz) withdrawn, Ottringham n.d.b. OTR (398.5kHz) withdrawn. Perth i.l.s. IPRF, GILDA, GULDA, HALIF, HANKY, LESTA, LUCCO, MADLI, MYNDA, NEVIS, NOKIN, OLGUD, OMIMI (supersonic route), PHLI, PILO, POMPI, RATKA (supersonic route), SUPAP, TARAN, TOVRI, TUTON, UNROK, WESUL. Withdrawn: BAKAT, NOTRO, ROBIN. Runways. Kirkwall now 06/24 (was 07/25). Now, if you've waded through the above - spare a thought for me, I typed it all in! The original text is to many pages - the above is a summary. If anything sounds familiar and you want specific information (e.g. the latitude/longitude of a reporting point) then please write in with your request.

Some helicopter callsigns in AIC 83/1996 from the CAA: Pipeline or Powerline (followed by a number) indicate inspection flights (the callsign is self-explanatory) with two electricity operators retaining the callsigns Grid and Electricity respectively. Squawk code will be 0036. If you write in with the number in the callign, I'll tell you which of the numerous operators it belongs to.

The next three deadlines (for topical information) are November 15, December 13 and January 17. Replies always appear in this column and it is regretted that no direct correspondence is possible.

Genuinely urgent information/enquiries: 0181-958 5113 (before 21:30 local please).

Abbreviations

AIC Aeronautical Information Circular
AIP Aeronautical Information Publication
B.t.s. automatic terminal information service
B. Boeing
CAA Civil Aviation Authority
d.m.e. distance measuring equipment
F Fl flight level
FIL Instrument landing system
H z kilohertz
MHz megahertz
n.d.b. non-directional beacon
TACAN TACtical Air Navigation
v.o.r. very high frequency omni-directional radio range
z Zone time (same as Universal Time, Co-ordinated)

Peter Bond c/o SWM Editorial Offices

Mike from Yeovil, heard two weak frequencies in use recently on his AOR AR3000. 249.5 and 248.2 both were thought to be RAF voices, but were too faint to get a positive identification, (possibly Squadron Air to Air?). Both of these frequencies seem to be previously recorded - can anyone help them identify them?

Lastly, some information concerning London Control, with a new frequency being noted in use on the Pole Hill Sector. The frequency 118.775 was in use for about ten days at the end of August in place of 131.05. This was apparently an evaluation, and 131.05 is now back in service. The new frequency is currently scheduled to be brought into service on Pole Hill towards the end of the year - See you next month.
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January 1997 into an 51.6° orbit. STS-81 Atlantic is scheduled for 16 October.

April 1997. GOES-K launch date is advanced.

NOAA WXSATs, has the terminators.

period, both METEORs were near satellites - to vary. During the 'off' period, both METEORs were near the terminators.

Future Launches

NOAA-K, the next in the series of advanced NOAA WXSATs, has been rescheduled for launch in April 1997. GOES-K launch date is now 10 April 1997.

STS-80, Shuttle Columbia is scheduled for launch on 31 October.

STS-81 Atlantic is scheduled for 16 January 1997 into an 51.6° 'orbit' (over UK), and involves another METI-linkup.

Shuttle Monitoring

Shuttle flights are sometimes rescheduled a few days before launch but postponements are rarely reported in the popular press. Consequently, prior to delayed launches I often receive a number of requests for Keplers, even though the flight will not happen. Rather than waste postage, I keep the requests and the first active Keplers when the flight occurs. "Dummy" Keplers are issued about 10 days before the flight so if you want a set of these - do ask! I always send Kepler elements without delay, and request only that a 20p coin be included towards costs.

Andrew Higginothbottom of Bodmin was one of several people asking about Shuttle monitoring frequencies. Launches forming part of the MIR-Shuttle programme have orbital inclinations of about 56° to link-up with the MIR complex. They pass over Britain for about five consecutive orbits, followed by several hours absence. Before the STS-79 link-up I heard Shannon Lucid talking in English on MIR's 143.625MHz, but I believe that she was actually using a different frequency to talk to the ground, while the MIR voice frequency remained open. During the STS-79 linkup, both Russian and American voices were heard on 143.625MHz.

The official Shuttle voice frequencies in the u.h.f. band are 259.7MHz and 296.8MHz. The windows for such direct monitoring are very short, so for more continuous monitoring, try using a general coverage receiver to tune to WA3NAN on one of the many frequencies used for retransmission of the Shuttle voice transmissions. The following may be available:

3,8601 - I.s.b., 7,1845 - I.s.b., 14,294 - u.s.b., 21,380 - u.s.b. and 28,645MHz - u.s.b.

A comprehensive listing of all planned Shuttle flight and payload, together with comprehensive information on reception is available from me as the 'Shuttle Pack'. Please include a secured £1 and stamped s.a.e. for the A4 booklet. This pack is continuously updated using information provided by NASA.

Letters

J. Pretorius wrote from Brakpan, South Africa to send a picture that he had received from METEOSAT-4. I was puzzled until I noticed the date stamp on the image was 8 November 1992! Although printed by an HP deskjet using JFAX v7.1, unfortunately the image was too dark to reproduce properly. He also monitors the v.h.f. transmissions from polar orbiting WXSATs, and a number of h.f. stations, of which he tells me that Pretoria Met ZRO on 7,009 and 12,749MHz and Boston stations are heard at high signal strength locally.

Fig. 4: Australia - SICH-1 on 20 July from Les Hamilton.

Future Launches

Fig. 1: NOAA-14 h.r.p.t. image from Dr. Martin van Duinen.

Fig. 2: Screen shot of satellite tracking map.

Dr. Martin van Duinen wrote from Holland to send several images from his Hansen h.r.p.t. system. One image, from NOAA-14 h.r.p.t. on 12 October, shows France. The resolution is so good with this imagery that city areas can easily be identified as can the shadows from clouds. With the sun in the south, 1339UTC, the shadows of the cloud bank which crosses west to east can be clearly seen.

PC-GOES/WEFAX V4

Jim and Hilda Richardson of Stratkniness sent several images, and news about the new update - PC-GOES/WEFAX version 4 - released by John Hoot of the American company Software Systems Consulting. Earlier versions of this WXSAT utility decoding software were previously available from a UK company, which no longer retails WXSAT products.

I was able to obtain a copy of the program for a quick review. Version 4 is a considerable upgrade from the last version. From the main menu, the choices are 'File', 'Receive', 'Tune', 'Display', 'Edit', 'Options', 'Setup', 'Orbits' and 'Help'. 'File' has the usual options, including 'Export' and 'Transmit'. 'Receive' offers various methods for reception including the change to the utility section of the program, and unattended operation. 'Tune' displays the tuning oscilloscope simulator. 'Display' provides image processing options, a zoom, 3D and other facilities. 'Edit' offers more sophisticated image processing options, including NOAA infra-red analysis and the map overlay. 'Setup' is used to configure video cards, printers and hardware parameters. File compression is also included. Orbits includes a satellite tracking facility - see Fig. 2 - as well as computing predictions. The 'Help' menu is comprehensive and provides information about map overlays.

An image processing suite is provided and contains the first example that I have seen of software which can overlay the image obtained from a polar orbiting satellite on to a Mercator projection.

Fig. 3: METEOR 3-5 composite on Mercator map.

The new software includes applications for utility decoding, for example it can receive and decode Baudot, RTTY, NAVTEX and Morse code. Enquiries about version four should be directed to Software Systems Consulting, San Clemente, California, USA. I believe the cost of software and manual is $65. Hilda mentioned that when the package was delivered, the UK Customs and Post Office had opened it and added import duty charges - totaling some £12! This may be a matter of 'chance' because I have received CD-ROMs carrying clearly marked 'satellite images' and 'astronomy' programs, and have not yet had such problems. Jim and Hilda enclosed various pictures, one of which - a stored image - was received from SICH-1

Fig. 5: METEOR 3-5 composite on Mercator map.

PC GOES/WEFAX Utility Decoding

Short Wave Magazine, November 1996
The Military NavSats

This group of COSMOS satellites is subdivided into six orbital planes (numbered one to six), and comprises several per group, with one operational satellite in each. The following list includes satellites on each plane during August were:

- **Plane 1**: Cosmos 2227 on 149.97 MHz
- **Plane 2**: Cosmos 2144 on 148.91 MHz
- **Plane 3**: Cosmos 2211 on 149.94 MHz
- **Plane 4**: Cosmos 2173 on 149.97 MHz
- **Plane 5**: Cosmos 2142 on 150.03 MHz
- **Plane 6**: Cosmos 2277 on 148.94 MHz

Civilian NavSats

This group transmit on 150.00 MHz, and the following are currently operational:

- Cosmos 2315, Nadezhda 3, Tskaido and Nadezhda 4, all on 150.00 MHz.
- Nadezhda means ‘hope’, and Tskaido means ‘chirping cricket’. The operational satellite in each group is occasionally changed.
- The listing shows that each of the six planes has four satellites operating on high frequency, but this established pattern seems to have been broken with the operation of COSMOS 2334.
- COSMOS 2142 has been the ‘plane 5’ satellite transmitting on 150.03 MHz. A replacement Cosmos 2233 was launched but failed or was turned off. COSMOS 2334 was launched in August, and whilst initially monitoring the formation to reflect the changes, I picked up the satellite transmitting on 150.03 MHz.
- Having more problems with my Internet connection, when I was finally able to send in a reception report, I was not aware of the special interest in COSMOS 2334.
- The significance of COSMOS 2334 is that it is in a ‘plane 1’ orbit.

The Russian Navigation Satellite Constellation

The Russian ‘Musson’ navigation satellites transmit in the 150MHz band and, like the WXSATs, they are usually easy to receive, they provide a good test of antenna and receiving equipment. Most general purpose scanners include the 150MHz band, so the frequencies 148.91, 149.94, 149.97 and 150.03 MHz can be programmed and monitored. The satellites simultaneously transmit on frequencies in the 400MHz band. I occasionally receive reports from people monitoring the 150MHz band, and regularly monitor it myself, though without attempting to decode the telemetry.

There is an interesting history to these satellites. During the 1980s a group of Russian experts led by Geoff Perry, based at Kettering (UK), specialised in monitoring Russian satellites, research which led to a number of surprising discoveries - not least, the identification - during the period of the ‘Cold War’ - of a hitherto unknown Russian launch site!
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HOWES KITS contain good quality printed circuit boards with screen printed parts locations, full, clear instructions and all board mounted components. Sales, constructional and technical advice are available by phone during office hours. Please send an SAE for our free catalogue and specific product data sheets. Delivery is normally within seven days.

73 from Dave G4KQH, Technical Manager.
Decode
All the Data Modes

Web Page
Here at last! Yes I've finally launched my Web page on the Internet. Other than just an ego trip, I will be using the page to help keep you up-to-date on the latest news and software. In its initial format, I've built the site with the hope that you can download the latest version of all the software mentioned in my reader's offers. For those of you interested in such things, I built the html page using Netscape's Navigator Gold WWW browser. This features an editor as well as probably the best browser available. One of the attractive points about the editor is the way you can design WWW pages without having the first idea about native html code. You can also see the page build-up and get it to look just the way you want.

Another attraction is the ability to steal pics and backgrounds from other sites and put them in your document. Whilst browsing around the Web you just select the graphic or background that takes your fancy and save it to disk. In addition to providing access to my software offers, I will be adding links to any shareware or demos that are mentioned in the column.

This is very quick and easy to do, so I should be able to keep the site bang up-to-date. I've also built a software offers, I will be adding section that provides links to lots of other Internet sites that offer software and data to help Decode readers. The final section is a readers letter page where I'll place letters that I need help with. Hopefully, other readers will then offer their solutions which I can publicise via the Web and this column. If you'd like to check out the site you can find me at: http://dialspace.pipex.com/mik.e.richards/ (don't forget the last slash) If you have any comments or suggestions on the site please drop me a line.

Hamcomm Terminal Unit
Leo Black of Bournemouth has recently visited a local rally and bought himself a second-hand Maplin TU-1000 terminal unit for a fiver (approx £7.4 new!) and wonders how he can put it into use. Leo would like to use the terminal unit with Hamcomm and JVFax, but hasn't had any luck so far. If you've been involved with RTTY for a few years you may well have come across terminal units, but for those who haven't, lets run through what they do.

The terminal unit evolved in the days before home computers were a practical proposition, so they have a long history. In those old days when men really were men, sending messages using RTTY required the use of an electromechanical teleprinter.

This was rather like a mechanised typewriter that converted a key stroke into an electrical signal that was then sent to a receiver need to be converted into a printed page. Whilst the receiving end, the two audio tones that emerge from the receiver need to be converted back into an electrical signal to operate the print magnets of the teleprinter. A terminal unit (e.g. the TU-1000) is simply the device that performs this conversion. In addition to being used to drive a teleprinter, they were also used to

readily available. One of the attractive points about the editor is the way you can design WWW pages without having the first idea about native html code. You can also see the page build-up and get it to look just the way you want.

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Hamcomm Terminal Unit
Leo Black of Bournemouth has recently visited a local rally and bought himself a second-hand Maplin TU-1000 terminal unit for a fiver (approx £7.4 new!) and wonders how he can put it into use. Leo would like to use the terminal unit with Hamcomm and JVFax, but hasn't had any luck so far. If you've been involved with RTTY for a few years you may well have come across terminal units, but for those who haven't, lets run through what they do.

The terminal unit evolved in the days before home computers were a practical proposition, so they have a long history. In those old days when men really were men, sending messages using RTTY required the use of an electromechanical teleprinter.

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Readers Special Offers
Those of you who've ordered recently may well have suffered rather long delays - I'm sorry for that but unfortunately demand has outstripped my ability to supply. I've therefore been trying to find a better way to handle the offers. As a result I've managed to secure a very special offer with the Public Domain and Shareware Library, PSDL. They have put together a library set of all five disks for just £20.00 all inclusive. Using PSDL also makes ordering simpler as you can order by phone and you don't even have to write a letter. So in future, please direct all requests for this disk set to PSDL Winscombe House, Beacon Road, Crowborough, Sussex TN6 1UL. Tel: (01892) 663298 and request library volume H00679abcde.

suffered problems because of the difficulty of making the p.i.i. fast enough to track the RTTY signal but not so fast that it would respond to noise.

Getting back to the TU-1000, this uses modern switched capacitor filters to produce a very flexible filter based terminal unit. The use of switched capacitor filters makes it very easy to alter the shift and the TU-1000 features both pre-set and variable frequency shifts. I've not used one myself, but it has all the makings of a very capable unit. Now that we're hopefully a little clearer on what a terminal unit does - lets look at how we can utilise it with Hamcomm and JVFax. As far as JVFax goes the answer is simple - you can't! This is because JVFax is set-up to handle all the decoding in software and just needs a simple comparator to clean-up and limit the amplitude of the incoming signal. Also, when receiving photographic images such as those from weather satellites, the various shades of

fig. 1. 10:1 Balun 470Q

fed computer decoding systems. This was necessary because early micro-processors and programming languages were not able to support internal analysis and decoding of raw audio signals.

Looking back at the range of terminal units produced over the years, there were basically two main decoding techniques that were used. The first involved the use of very narrow audio filters. Here, one of the filters was set to pass only the mark signal, whilst the other is set for the space frequency. The filtered signals were then applied to a form of detector known as a discriminator. This provided a d.c. voltage that swung from one extreme to the other in synchronisation with the received RTTY signal. This signal could then be amplified or used to control a relay to supply the necessary voltages to drive a computer or teleprinter. One of the most famous of these terminal units was the ST5 that was produced commercially in the US

and built by most radio amateurs with an interest in RTTY. Although a good filter terminal unit could provide superb performance they had the disadvantage that altering the shift required switching several critical components in each filter.

The second most common form of terminal unit used an electrical circuit known as a phase locked loop. I shan't go into the details of its operation as that would warrant an article in itself. A phase locked loop technology is to control the tuning in most modern receivers. Whilst there were some very good p.i.i. based terminal units, many
grey are transmitted by varying the carrier frequency from one extreme of the shift to the other - terminal units can only switch between two pre-set carrier frequencies. Although you might think this would work for FAX charts the response time of terminal units is generally far too slow to preserve any useful image detail. The same problems exists for the reception of SSTV signals. The good news is that you can use a terminal unit to give improved performance especially when dealing with weak or noisy signals. When using Hamcomm in its standard form, with a simple interface the computer has to do a lot of hard work. It first has to monitor and measure the zero crossings of the incoming signal then use this information to work out the frequency. Then it has to check to see if the frequency should be passed or rejected. All this has to be completed in less than 10 milliseconds and then followed by yet more processing to start to build and print the decoded message. By using an external terminal unit you have better control of the signal processing power to resolve the signal. This can be particularly useful if you have a very early PC with one of the slower 8086 processors. So how do you connect it up? This is actually very simple and can be found described on page 12 of the Hamcomm manual. All you have to do is connect the digital output from the terminal unit to the CTS pin of the serial interface. If you have the standard 25-way D-type connector pin 5 is the pin to use. Before doing this, you must be sure that your terminal unit uses TTL or RS-232 output levels - the Maplin unit is fine for this. To let Hamcomm know you have an external terminal unit, you have to change one line of the configuration file HC.CFG. First find the entry 'set extconv off' and change it to 'set extconv on'. The only snag with using an external converter is the loss of the oscilloscope and spectrum analysis functions. However, all is not lost as you can use both interfaces and have the best of both worlds! To do this you need to parallel-up the audio signal from the receiver so that it goes to both the interface and the terminal unit. Next you just need to take a lead from the output of the terminal unit and connect to the RTS pin of the simple control interface. Of course you also need to make the changes to the configuration file as described earlier. By using this system you have the powerful analysis tools of Hamcomm with potentially better decoding of weak RTTY and AMTOR signals. If you have any tips and tricks to improve decoding performance please drop me a line with the details.

T2FD - Ultimate Utility Antenna?

Many readers who read my 'if I won the Lottery' article last month have been bombarding me with queries on how to build the T2FD antenna. The response has been so overwhelming that I thought I'd better put some space aside in this column. I first came across the T2FD when I reviewed a copy of the World Radio and TV Handbook Equipment Buyers Guide (1993 edition). This is an extremely informative book that's essential reading for anyone contemplating setting up a Short Wave station. As we have lots of receiver reviews, this particular edition contained a very comprehensive review of a variety of antenna systems from a fairly basic long wire system through to the sophisticated active antenna systems. Each of the systems under test were subject to careful analysis over a wide range of short wave listening modes and then rated using the SINPO system. The results are very interesting and the T2FD turned out to be one of the best antennas for utilities over the range 3 to 30MHz. Its main benefit over many other designs was better rejection of man made noise. Incidentally, T2FD is not the calssign of the inventor, it's an acronym for Terminated Tilted Folded Dipole! If you're not mathematically inclined, the T2 means T squared or TT! You could also view it as a sort of squashed rhombic. Anyway it doesn't matter too much what it's called, just how to build it.

As you can see from the diagram, the antenna consists of a pair of wires evenly spaced, joined at the ends with a terminating resistor in the centre of one span and a feed point in the other. The resistor must be a carbon composite type and definitely not wire wound. This is because a wire wound resistor will act as an inductor and make a mess of the antenna's performance. The antenna dimensions are very easy to calculate as you just need to work out the overall length and the spacing between the wires. To find the length in metres you just divide the lowest frequency you want to cover by 100. When choosing the lower frequency you need to remember that the T2FD has a main operating range or bandwidth of 6:1. If you selected 7MHz as the lowest frequency the antenna would be at its best between 7 and 42MHz. The antenna will still operate outside that range, but the performance will gradually deteriorate. It may be better to lower the range to say 4.5 to 18MHz. At this reduced frequency the length becomes 100/4.5 i.e. 22.2m. The wire spacing is equally easy to work out and is simply the frequency in megahertz divided into 3. Continuing with my example, this gives a spacing of 3/4.5 i.e. 0.66m. I would strongly recommend using hard drawn copper wire for the antenna as it's very resilient. A good place to get this is at a radio rally, though most amateur radio suppliers keep stocks. The ends of the antenna can be secured using plastics water pipe drilled to accept the antenna and the guy wires. You will also need to include some insulated spacers to keep the spacing of the two wires even and stop them getting tangled in high winds. I had great success with the oval plastics tubing that's used to bury electrical cable in plaster. These are cheap, light and provide good support. You also need to take great care when mounting the resistor in the antenna. The resistor won't be able to take the stretching forces, so you need to secure the antenna with an insulator and solder a resistor between the two ends. You also need to make sure the resistor is well protected from the elements either with tape or perhaps some epoxy resin.

The next problem is the balun that's used to match the 5000 ohms of the antenna to a 50 ohm coaxial feeder. This requires a 10:1 balun of which there are very few published designs. (See 'Communique' for details of the Weilbrooks Systems and they produce two manufacturers I'm aware of is RF Systems and they produce two variants. The basic T2FD is 15m long, covers 3 to 35MHz and comes complete with all components (including 10:1 balun). A scan through the Web shows Gifer Shortwave in the US holds stocks and the current price is $239.95 for the basic T2FD and $389.95 for the DX Listener. This latter version includes an indoor control unit that extends the I.F. coverage down to 100KHz. For more info contact Gifer by 'phone: +1-201-391-7887, FAX: +1-201-391-7433 or E-mail info@gifer.com

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FactPack 5: On the Air with JVFX and HAMCOMM (Order Code FP5)
FactPack 6: Internet Starter (Order Code FP6).

For the printed literature just send a self-addressed sticky label plus 50p per item (£1.50 for four, £2.50 for 7 and £3.00 for 9).

Organiser Help

Norman Cuell writes from Ruislip asking if there's any decoding software available for the Psion hand-held computers. These computers are ideally suited to those travel and want to be able to take their decoding with them. Whilst you could use a lap-top PC, the Psion range are so much more compact. The down-side is that I'm not aware of any decoding software available for these computers. So, if you know of any suitable programs please let me know and I will pass on the details via the column.
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Short Wave Magazine, November 1996
Listening to the Amateurs

Letters

Mike Newell last wrote where we sported Lowe ads on the front cover and published from Welwyn, but since then he's acquired G1HGD and been playing packet radio. Recently though, the bug bit again and quite a bit of monitoring has gone on. Now he asks whatever happened to the Heard Prefixes Ladder since he went out of touch. Good Question! The Editor wasn't very keen on it, and he won, hi. For the more recent readers, the basic idea was to collect prefixes; a minimum of 200 different ones to start an entry, and some rules which we reprinted in the column every so often. Sones appeared alongside each piece, and the 'competitive thing' was simply to climb to the top. Unlike, say, country-chasing, you could never say "I've got the Lot" cos tomorrow a new prefix can appear from somewhere.

Anyway Mike who now lives in Kinlworth - I was at a do at the Helen Ley Home in Bericote Road a week or so back - has Big Questions. What does he see, if any, in the working of the Heard Prefixes Ladder? Where is it? According to the RSGB Prefix Guide Dutch St Maarten, Saba and St Eustatius are lumped together as one DXCC country, and the location around 18°N 63°W. The three islands make a triangle with Saba almost south of St Maarten; a line running south west from Anguilla and another going north west from St Kitts will cross in the right general area. Incidentally the French part of St Martin is a separate DXCC country.

Harry Richards writes from Barton-on-Humber to enquire about a group of American amateurs who use computers and refer to the 'Web'. From the context I would think they were talking about the Internet, which has certainly mushroomed in the States and is taking off in a big way over here, and "Web" is now in general use. The World Wide Web. For example RSGB has its own Web pages.

EMC problems afflict poor Dave Miller in Dawlish. It sounds like a car-engine ticking-over but alas it's there throughout the 24 hours. Seemingly it covers from around 3.5MHz right on up to the highest frequency Dennis has tried which was 14MHz. However, he did find a cause and that was 2A12P, ON4SZ and SM6ERON on Top Band, and for 3.5MHz EK6GC, FMSBH, N1ZZ, RW3AY, SU2MT, VE2AL, VE3MB and VPSJW were noted. At 7MHz, there were such as CM2S8, CP6RP, CQ1JG, CQ1TX, K0DL, L1AZU, HC6W, K44WG, VE2A, VE6LP, KG2EN, and YV1GM. Finally at 14MHz Dennis logged BV5CM, BV7GA, EY8MM, FMSGU, FR6FX, QA44WN, OH6MB, VI5X, ZC5OR. YU2DZ, W7FF in Arizona, YV6EL, ZD7P and S24RL.

Next we come to John Matthews in London SE8, who reports that twice he has been on 14.275MHz (August 26, 21.45UTC and September 1, 2100UTC) and heard a station calling itself the 'Radio Amateur Information Network'. There was a reference to an organisation calling itself the 'American Amateur Radio Association' and giving a telephone number for enquiries. To answer the question of the weak signal, since he was talking about Eastern Standard Time, he presumably was out west and to seaward, but somewhere between south through west, so he was being heard off the back or side. As to the organisation, I've never heard of it, but guess it is probably a small group of 'amis' dissatisfied with what ARRL do for them, but forgetting that ARRL is the only reason there is any amateur radio in USA. Having said that, we have to concede that no organisation run by humans can ever be perfect; the sensible thing to do is to stay in the organisation but try to improve it. If you meet one of the moaners and he is a current member, offer to second him for office and you won't see him for dust!

It was 14MHz and s.s.b. all the way for Colin Dean of Barnsley; Colin offers A41DL, A41ZJ, A71DX, AP3AC, AP2JLZ, AP2KGD, BV6SR, BV6EO, BV7CA, BV7DZ, C91CB, D2FR, EK6GC, KY7/EL2, ET3BT, E28BD, FR6FX, HLOY2, H51NCR, H56SR, H56RK, H56SY, NOSVYR, HZ7TA, JW7THA, JY6HE, OD0Y, SU1ER, SU1RJ, SU1SA, SU1SK, VG99WM, VR2BH, VR2XM, YB1XUR, Y1RZ, ZD7BJ, ZD7CRC, ZD7WRC, 22JE2, ZV6BB, 4L5SK, 4S7DR, 4S7EA, 4S7SA, 5A1A, 9G1BL, 9G7YR, 9K2HR, 9N1CU, 9N1KY, 9S1MM and 9V1YFE.

The first letter from Ted Trovel of the Isle of Sheppey seems to have been delayed in the post and missed the magazine's piece, so we look forward to things at the end of June and early July. The second refers to the August pickings. In this, Ted mentions c.w. around 0500z on 7MHz with KA4XQ, WXTZ, C22DPZ, T2WZ, J6SFPN, ZL2AG, ZL1PC, H0FZB, QO6JJT, QO6YQ and 9H3WR. At 0600 a shift to 10MHz saw ZL4SEA. Next, 14MHz where at 1500z he was found in 9Y1W, KNOZ, W0AK, TUXZX, 9H3WG before knocking off for a break. At 1800 battle was resumed with 9SOMC, 9K2/Y09HP, PY6AN, 9KCMU, and 9V1AS, the Wasoni Memorial station in Glouce Bay Nova Scotia; a final peep at 2100z found HK5YC. At 1500z on 18MHz Ted noted 9I3PF, TF6SP, OH0D/GE1AU, HJ1AB, RX10JX/F, KE0U, 9H3UF and E5BZY with a lone LU0HDX at 2000. Looking at 21MHz, at 0900 there was 9H1AL, up at 1800HG and at 1800PG7G. Back to the earlier letter (again all-c.w.), where we see 0700z on 7MHz for ZL2AG, YV5JDP and T2WZ.

Nothing noted on 10MHz but on 28MHz Ted found 9N1T, 9N1TV and 9N1U picking out JASSR8, PZ2FN, JZ2JT, SU2B, JA44H, TF3GC, 9K2MU, J68CMA, VU2AVG, ZPSALI, 4S7NR, 4S7VA, 4S7DX, OY3M6RKS, ZP6CW, and J41OQ (this chap sent his call as JV1OG at times, but was too good a signal to be from Outer Mongolia). At 1000z the log showed 320P/E, 9G6RMC, T77C, JB8PV, N5/S35KXAR, all around 1500, while at the same hour on 21MHz 9H3R, 9S4V, RV2EJ, 9I1AX, 9I5RX, W0AJ, W1AW/3 and TKJ/SJMY were noted. On 28MHz at 1500 Ted noted 9OYSN, and RX10FX/JL. Finally, 1900/1800 was occupied by ZD7BEZ. The W1AW/3 was a bit of a puzzler, as Ted has never heard the ARRL HQ station operating from other than the HQ area in all the years he's been around. On the Sideband front, Ted has been having a play with the six metre band and so far has Sandina as best DX.

Comparison of the two letters from Ted Trovel, which quote the operating times mentioned and were all c.w., is instructive and shows how conditions change from month to month.

Not from a letter, but by reading the Six and Ten Report from RSGB's Propagation Studies committee, it is interesting to notice that even at this moment the sunspot cycle is at its bottom and one of the expected major sunspot peaks could be expected in the near future. This would help - there really is so much to learn about these bands, and of course the incoming reports from all over the place are the raw data from which theories can be drawn and then checked. Contact G3USF if you can spare some time to help.
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Short Wave Magazine, November 1996

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Questions

Ian L writes asking for advice on buying a suitable receiver. He has a particular problem, about his home in the Severn Valley. He also lives near the bottom of a valley. Ian says that he wants something that covers 100kHz to 25kHz and is user friendly. Well, I must admit that those two requirements are probably not going to be answered within one piece of equipment. There are a few receivers on the market with the above coverage, but I would not recommend them to a novice user.

Ian has a particular budget in mind, but I think that I can make some suggestions which will easily keep within that. Reading between the lines in Ian's letter, I get the impression that you need an expensive all singing, all dancing receiver to pick-up utility signals. I know that this is not the case.

If Ian lives in such an awkward position, I would not suggest that he spends an enormous amount on a fancy set-up, only to find that he cannot hear any signals, gets rapidly disappointed and gives-up, and then blames me for wasting all his money! I would always suggest that you start with a small-scale set-up, and make sure that it works properly, before deciding if you want to expand into more expensive areas of utility listening. For Ian's situation, I would recommend a low priced Sony, Panasonic, Sangean or similar expensive digital receiver with a keypad and (most important) a b.f.o. control so that you can resolve s.s.b. signals. As for an antenna, Ian has a large garden, so I would suggest a long-wire, strung from house to the end of the garden, under the trees. As for an antenna, Ian has a large garden, so I would suggest a long-wire, strung from house to the end of the garden, under the trees.

As far as I can tell, station METAPHOR is some kind of GHFS frequencies, and METAPHOR said that their primary and secondary frequencies were 7.919 and 4.770MHz respectively. Clive listened to them trying to communicate on both frequencies, and they eventually changed to a third frequency - 14.882MHz. In short, Clive wants to know more about METAPHOR.

METAPHOR

Clive M. writes from the West Country to ask about a new US US government station that he heard recently. The station in question uses the callsign METAPHOR, and was heard on 7.919MHz. Clive found this station when he heard a USAF flight communicating with METAPHOR on one of the normal GHFS frequencies, and METAPHOR said that their primary and secondary frequencies were 7.919 and 4.770MHz respectively. Clive listened to them trying to communicate on both frequencies, and they eventually changed to a third frequency - 14.882MHz. In short, Clive wants to know more about METAPHOR.

As far as I can tell, station METAPHOR is some kind of Command Post situated at Ramstein Air Base in Germany, and it is connected with IFOR operations in the former Yugoslavia. It seems to be coordinating the transport flights of US military aircraft in and out of the country. Several aircraft have been heard using the HERKY callsigns while talking with METAPHOR, and on one occasion a SHADOW callsign was heard. Several contacts in Europe have reported signals involving METAPHOR, including one station who's lat./long. position was in the Balkans. METAPHOR has been heard on the following frequencies: 4.612, 4.770, 5.919, 6.819, 6.870 and 14.882MHz u.s.b.) I would be interested to hear if anyone finds any more frequencies for this station.

The Operations Room at Portishead Radio.
**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 August.

A broadcast from Radiotelevisione Italiana (RAI) via Caltanisseta, Italy (10kW) on 198kHz was received at 0202UTC on August 9 by Tony Stickells in Thornton Heath. He also disturbed weak sky waves from the station during two other evenings. In nearby Morden Sheila Hughes tried several times to log this low power outlet without success but she intends to keep trying. Down in Storrington Fred Pallant found the conditions favourable on August 19 and rated the transmission SI0222 at 0700 UTC.

**Medium Wave Reports**

The m.w. broadcasts from several stations in E Canada and USA reached the UK during some nights in August. Those from CJYQ in St. John's, NF on 930kHz and WNRB in Boston, MA on 1510 were heard every night around 0300UTC during the period 16th to 24th by David Sayles in Doncaster. Particular good conditions were evident on the 23rd and he was able to listen to a programme from CFBR in Toronto, ON on 1010 for a full hour! During that night he also heard WBBR in New York, NY on 1050 kHz at 0345; CJCH Halifax, NS on 920 at 0345; WTOP Washington, DC on 1500 at 0345; WEEI Boston, MA on 850 at 0320; CJCH Halifax, NS on 920 at 0345; WTOP at 0335; CJCH at 0400 at s.w. in MHz; Time in UTC.

**Short Wave Reports**

The 25MHz (11m) band is unlikely to be used for broadcasting during the sunspot cycle minimum period. Propagation in the 21MHz (13m) band is unpredictable. Reception from most areas was often poor during August. Sometimes R.Australia's broadcast to Asia via Darwin on 21.725 (Eng 0630-1100) reached the UK. It was rated SI0332 at 0615 in Deal. During the morning R.Australia via Karachi 17.900 (Eng 0800-0845) was 33443 at 0820 in Kilkeel; BBC via Ascension is 17.330 (Eng to W/C Africa) the 31st at 1330-1400 Mon -Sat) 23231 at 1354 in Storrington; REE via Noblesia 21.570 (Sp to S.America 1200-1800) to W/E/S.Africa 1100-1700) 25322 at 1520 by Tim Allison in Wallsend; 32213 at 0930 by Norman Thompson in Oadby; 0838-0853 [1st & 3rd Sun] 32333 at 0840 in Truro; AIR via Bangalore 17.387 (Eng to Pacific 1000-1100) 33333 at 1000 in Galasheilles; R-Pakistan via Karachi 17.900 (Eng to Eur 1100-1120) 54554 at 1115 in Oadby.

**Long Wave Chart**

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

**Listeners:**

1. Ted Harris, Manchester: (G) Tony Stickells, Thornton Heath.
2. Sheila Hughes, Morden: (E) Tom Smith, Co.Fermanagh.
3. Eddie McKiernan, Newton Heath: (F) Sheila Hughes, Morden.
4. George Millmore, Wootton, low.: (G) Tony Stickells, Thornton Heath.
5. Mike Reynolds, Truro: (E) David Sayles in Doncaster.

**Medium and Short Waves**

Brian Oddy G3FEX, Three Corners, Merryfield Way, Storrington, West Sussex RH20 4NS
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**Notes:***
- Entries marked * were logged during darkness. All other entries were logged during daylight or at dusk or dawn.

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**Simple Wave Chart**

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Tropical Bands Chart

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BBC via Meyerton
AIR Delhi
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AIR Lucknow
R.Sol de Los Andes
Channel Africa

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Vancouver.

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Each month we will be selecting five or six books that we feel will be of interest to you. They could be new ones just in or old favourites revised. This month we have a couple of brand new ones, a couple of revised editions and one that falls into both categories - if that’s possible. Don’t forget last month’s selection - they are still available from the SWM Book Store. To order any of these books please use the Order Form on page 87.

**The ARRL Electronics Data Book**
Doug DeMaw W1FB has completely revised and expanded the material in this reference book. Tables, charts and formulae rub shoulders with circuits for oscillators, mixers, amplifiers as well as active devices and their operating parameters. The large 276 x 208mm format has allowed Doug to get a lot of useful information in at a readable size.

The ARRL Electronics Data Book is very reasonably priced at £8.95 and should be alongside your copy of the ARRL Handbook - you have got a copy, haven’t you?

**The International Air Band Radio Handbook**
David Smith

Written by a professional air traffic controller, this companion volume to the very successful Air Band Radio Handbook presents a world overview of the subject.

The book explains how air traffic is regulated internationally and includes brief details of each country’s system with frequencies for all major airports. Many related subjects, including navigational aids, phraseology, flight plans, interception and emergency procedures, as well as weather reporting and an ICAO airport code letter listing are all covered.

At £9.99 the International Air Band Radio Handbook is well worth adding to your book shelves.
Marine SSB Operation
J. Michael Gale
Based on the author’s radio School, where thousands of sailors have qualified for their v.h.f. and s.s.b. certificates, this book covers everything necessary to gain the international ‘Restricted’ Certificate. It also contains a chapter on amateur radio with the emphasis on the increasingly important Maritime Mobile Nets. The range of Marine SSB set is potentially world-wide and is essential for anyone intending to sail blue water. If you need Marine SSB, you need this book.

Marine SSB Operation costs £11.95.

Electronics Hobbyists Data Book
R.A. Penfold
This very useful little book from the Babani Electronics Books stable provides an inexpensive source of a wide range of data. If you need details of a modern five-hand resistor colour code, or have an old-style tantalum bead capacitor and want to ‘read’ its value you will find it in this book.

Useful, even essential, formulae rub shoulders with basic data and leadout information for most types of discrete semiconductor as well as operational amplifiers, CMOS and TTL devices.

Electronics Hobbyists Data Book (BP 396) costs just £5.95.

The Complete DX’er
Bob Locher W9KNI
This is the ‘standard text’ for the rising DX hunter. Every significant aspect of DX’ing is covered from learning how to really listen, how to snatch the rare ones out of the pile-ups and how to get that elusive QSL all written in a very readable manner.

At £8.95 The Complete DX’er is a very good read.

Ship To Shore Radio Frequencies
Ken Davies
This new addition to the Ian Allan ‘abc’ series provides all those interested in sailing with a detailed handbook listing all the radio frequencies likely to be encountered whilst sailing round Britain’s shores.

Essential for sailors, useful for anyone else interested in marine radio.

Ship To Shore Radio Frequencies is priced at a reasonable £5.99.

Radio Data Code Manual
15th Edition
Klingenfuss
This new reference book replaces two former Klingenfuss books - Air and Meteo Code Manual and Radioteletype Manual and can be considered as the updated editions of both of these titles combined into one volume. One major innovation with this book is the introduction of Internet addresses for solar and geophysical data sources and World Wide Web homepages.


Newnes Guide to Satellite TV
D.J. Stephenson
The third edition of this practical guide to the installation and servicing of satellite TV receiving equipment is aimed at those professionally engaged in this growing field.

Completely rewritten and updated it includes topics such as digital television.

Even if you are not a professional this book is a mine of information to enable you to get the most out of your satellite television installation. Newnes Guide to Satellite TV is well worth the £18.95 cover price.
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PUBLISHED on the fourth Thursday of each month by PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW. Printed in England by Southernprint (Wessex) Ltd., Factory Road, Upton Industrial Estate, Poole, Dorset BH16 5SN. Distributed in Europe by Seymour, Windsor House, 1270 London Road, Norbury, London SW16 4DH Tel: 0181-679 1899, Fax: 0181-679 8907, Telex: 881245. Sole Agents for Australia and New Zealand - Gordon and Gotch (Asia) Ltd.; South Africa - Central News Agency Ltd. Subscriptions INLAND £25, EUROPE £28, OVERSEAS £30, payable to SHORT WAVE MAGAZINE, Subscription Department, PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW. SHORT WAVE MAGAZINE is sold subject to the following conditions, namely that it shall not without the written consent of the publishers first having been given, be lent, re-sold, hired out or otherwise disposed of by way of trade at more than the recommended retail price shown on the cover and that it shall not be lent, re-sold, hired out or otherwise disposed of or in any mutilated condition or in any unauthorised cover by way of trade, or affixed to or as part of any publication or advertising, literary or pictorial matter whatsoever.
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