Short Wave Magazine

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APRIL 1989

SWM SWM SWM SWM SWM SWM SWM

SCOOP PREVIEW

ICOM IC-R9000 COMMUNICATIONS RECEIVER

FREE PULL-OUT WALL CHART

GREAT CIRCLE MAP

For The Radio Listener

ICOM Count on us!

IC-R7000, 25-2000 MHz, Commercial quality scanning receiver

ICOM introduces the IC-R7000, advanced technology, continous coverage communications receiver. With 99 programmable memories the IC-R7000 covers aircraft, Marine, FM Broadcast, Amateur Radio, television and weather satellite bands. For simplified operation and quick tuning the IC-R7000 features direct keyboard entry. Precise frequencies can be selected by pushing the digit keys in sequence of the frequency or by turning the main tuning knob. FM wide/FM narrow/AM upper and lower SSB modes with six tuning speeds: 0.1, 1.0, 5, 10, 12.5, 25kHz. The IC-R7000 has 99 memories available to store your favourite frequencies including the operating mode. Memory channels can be called up by pressing the memory switch then rotating the memory channel knob, or by direct keyboard entry. A sophisticated scanning system provides instant access to the most used frequencies. By depressing the Auto-M switch, the IC-R7000 automatically memorises frequencies that are in use whilst it is in the scan mode, this allows you to recall freqencies that were in use. The scanning speed is adjustable and the scanning system includes the memory selected freqency ranges or priority channels. All functions including the memory channel readout are clearly shown on a dual-colour fluorescent display. Other features include dial-lock, noise blanker, attentuator, display dimmer and S-meter and optional RC-12 infra-red remote controller, voice synthesizer and HP 1 headphones.

IC-R71E, General coverage receiver.

The ICOM IC-R71E 100KHz to 30MHz general coverage receiver features keyboard freqency entry and infra-red remote controller (optional) with 32 programmable memory channels, SSB, AM, RTTY, CW and optional VFOs scanning, selectable AGC, noise blanker, pass band tuning and a deep notch filter. With a direct entry keyboard frequencies can be selected by pushing the digit keys in sequence of frequency. The frequency is altered without changing the main tuning control. Options include FM, voice synthesizer, RC-11 infra-red controller, CK70 DC adaptor for 12 volt operation, mobile mounting bracket, CW filters and a high stability crystal filter.

Helpline: Telephone us free-of-charge on 0800 521145, Mon-Fri 09.00-13.00 and 14.00-17.30. This service is strictly for obtaining information about or ordering Icom equipment. We regret this cannot be used by dealers or for repair eriquiries and parts orders, thank you.
Datapost: Despatch on same day whenever possible.
Access & Barclaycard: Telephone orders taken by our mail order dept, instant credit & interest-free H.P.

Icom (UK) Ltd.
Dept SW, Sea Street, Herne Bay, Kent CT6 8LD. Tel: 0227 363859. 24 Hour.

VOL. 47 ISSUE 4 APRIL 1989
ON SALE MARCH 23rd

MAY ISSUE ON SALE
APRIL 27

|12| **The latest receiver from Icom is the R-9000.**

Cover Geoff Arnold G3GSR previews the Icom R-9000 receiver so that readers of *Short Wave Magazine* can be the first to hear about it.

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Short Wave Magazine

REGULARS

SEEN & HEARD

GOOD LISTENING

A WORD IN EDGEWAYS

Sir
I am writing to you as a plea for help. Myself and other radio amateurs in the Corby area are suffering from severe interference that started approximately mid-1988 and has been with us ever since. It can be received on aircraft bands, 2m and even found between 88-108MHz.
I have received a written reply from the DTI Radio Investigation Service at Leicester which I find very difficult to believe as so many people are suffering. The DTI's suggestion is that BBC World Service from Daventry (7,325MHz) is mixing with the transmissions from a local radio-paging transmitter on 138.175MHz. (138,175 + 7.325 = 145.5). But Daventry is at least 35 miles away. We have checked our equipment and even tried a variety of radios such as Trio, FDK, Sony, Yaesu, etc. They all suffer the same problem. Narrow band pre-amps and pass band filters don't improve matters. The interference does, however, disappear when the BBC World Service drops carrier. I have contacted BBC direct and found them very helpful and they have even carried out tests themselves and agreed that there is a problem signal in Corby.
M. YORK
CORBY
NORTHAMPTONSHIRE

IF YOU HAVE ANY POINTS OF VIEW THAT YOU WANT TO AIR PLEASE WRITE TO THE EDITOR. IF YOUR LETTER IS USED YOU WILL RECEIVE A £5 VOUCHER TO SPEND ON ANY SWM SERVICE.

The Editor reserves the right to shorten any letters for publication but will try not to alter their sense. Letters must be original and not have been submitted to other magazines.

Sir
Just a quick reply for Mr D. Burton, Brighton, Sussex who asked in the February issue about the QSL information for 3W8DX. The address is as follows: E. Brunnthaler, PO Box 271, Vienna 1140, Austria. I hope that this proves useful.
MIKE BATH G3YAB
CRAWLEY
SUSSEX

Sir
I have been purchasing SWM for 18 months now, and pouring over my collection, one thing strikes me as strange. Why, when the magazine is so obviously aimed at the enthusiastic s.w.l., are we treated to review upon reviews of receivers produced for the ordinary, domestic market. I am of course aware that these receivers can be pressed into service, I used one myself for a number of years, and I'm sure many s.w.l.s start this way, but these types of receivers are not ideal, as I'm sure you will agree.
Since June 1987, we have seen reviewed, five travel/domestic portables, one of which, the Roberts RCS-80, does not even posses a short wave band! Five v.h.f./u.h.f. scanners, and only three receivers capable of resolving s.s.b. transmissions (surely a presequisite for a s.w.l.'s receiver?) and one of those was a kit, the Howes TRF-3. Now, whilst I'm aware that not everyone in these days of "increased personal prosperity" can afford, or even want, receivers that cost as much as those made by, say, JRC or Icom, there are plenty of other more affordable receivers made expressly for the keen s.w.l., the Lowe HF-125 and Realistic DX-440, to name but two. Whilst not wanting to sound like Edwina Currie, the second-hand receivers also abound, FRG-7s, FRG-7700s, Trio R-1000s, etc. Most of which are well within the price range of the domestic receivers reviewed in SWM and all of them, I suggest, offering better performance on the crowded short wave bands.
There seems to be no problem in reviewing "quality" v.h.f./u.h.f. scanners, I've yet to see my £20 Binatone 25-170MHz toy reviewed, so why not take a look at more "professional" short wave receivers, after all, you do call the magazine Short Wave Magazine.
Apart from the criticism, which I hope you don't mind, I would like to tell you how much I enjoy SWM every month. I find "Seen and Heard" most useful, and have been known to contribute on occasions. Thanks for an informative and useful read.
ANDREW KEDDIE
NORTH HYKEHAM
LINCOLN

Sir
I enclose four photocopies of plates showing some old types of radio equipment used in the 1920s. Fig. 1. shows the antenna used by Marconi is his first transatlantic test, Fig. 2. shows some early types of valves used between 1914 and 1916 contrasted with the modern types, a miscellaneous selection of modern valves is shown in Fig. 3. and the rear view of a home constructor's set is shown in Fig. 4., this type of set was described by J. Scott-Taggart in books such as The Manual of Modern Radio and The Book of Practical Radio (1933-1934).
I hope that these will be of interest to some of your readers, old and new, and wonder if G. E. W. Hewlett may or may not remember this type of equipment?
R. RAEBURN
MORAYSHIRE
SCOTLAND

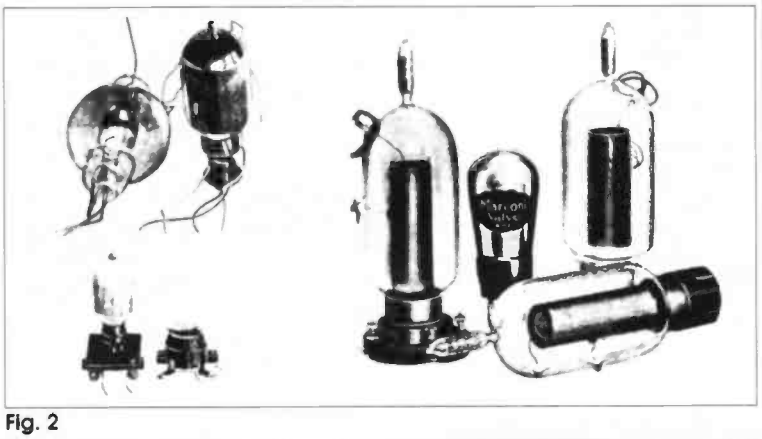


Fig. 2

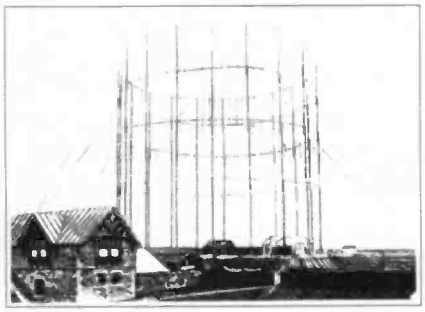


Fig. 1

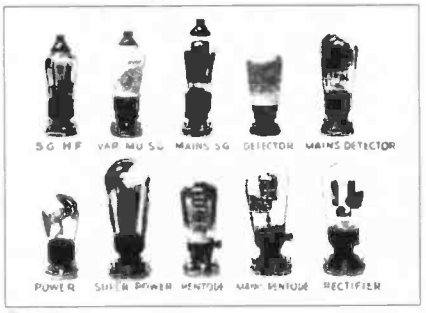


Fig. 3

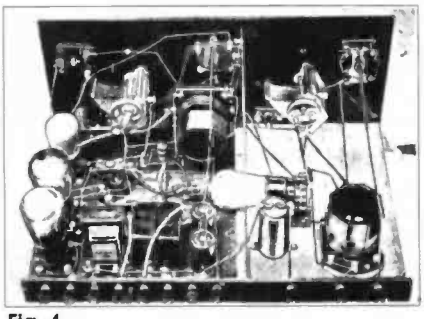


Fig. 4

WHAT'S NEW

Hello CQ ... Twoooo Emma Toc

A face, a voice and a past era of wireless history were brought vividly back to the present on Sunday March 5th at the Chalk Pits Museum, Amberley, Sussex when some 40 people gathered to witness the unveiling of a tribute.

The face and voice were those of the late Capt. Peter Eckersley, "father of the BBC" and its well-known first Chief Engineer; the voice, happily preserved on record, took us straight back to the heady days of crystal sets and horn loudspeakers and a signal tuned in with difficulty and accompanying static as we heard the famous announcement, "Hello CQ, Hello CQ, 2MT Writtle calling, Twoooo Emma Toc".

Forty invited guests, representing the Museum, the BBC, The British Vintage Wireless Society, *Short Wave Magazine*, *Practical Wireless*, the widow of Gerald Marcuse G2NM and the Eckersley family, not forgetting that delightful vintage lady from Marconi's, Edith Trott, who worked with both Capt. Eckersley and Capt. Round, were welcomed to the Wireless and Communications building by Myles Eckersley and Joan Le Grand (nee Eckersley) and the hosts, Ron Ham and David Rudram. Myles pulled aside the blue velvet curtain to reveal a large graphics board headed by a picture of Capt. Eckersley, and showing in detail his many achievements. The famous announcement was heard, as we stood surrounded by the Museum's unique collection of early crystal sets and valved receivers and faced by a large arrangement of wireless valves from from the Audion and bright emitters to broadcasting valves the size of a large loaf. In such surroundings, it was easy to evoke the atmosphere that the early listeners found so exciting, and to share their memories.

There was a small exhibition laid out in the "domestic" wireless section of the building, with photographs, "Eckersley Items" and a large scrapbook made by Capt. Eckersley himself during his lifetime, full of fascinating newscuttings, photographs, menus, programmes, liner tickets and other ephemera.

The guests were then conducted to the Museum's tea-shop, where a 1920's tea party (in keeping with the early days of wireless) with a special cake in honour of the occasion, were laid out. Ron Ham relived "Captain Peter's" life in his own, inimitable style and Myles Eckersley replied with some anecdotes on his father's career.

Then it was back to 1989 as the guests took their leave. The Chalk Pits has a permanent tribute to the man who gave us the BBC as we know it, and many other fine achievements. We hope that readers will visit the museum during the coming season and see it for themselves.

Joan Ham

International Radio Days 1989

If you are interested in the world of international broadcasting, then here is an event which will interest you! It's the 1989 International Radio Days, a celebration of world-wide radio broadcasting, with a major international exhibition and associated conference. Designed for everyone, from the novice short wave listener to the old hand at DXing, it is being held in West Berlin from May 26 through 29.

There will be new equipment on display, together with stands by numerous international radio stations including the BBC World Service, Radio Netherlands, Red Cross Broadcasting Service, Radio Canada International, Radio RSA, Deutsche Welle, Radio Sweden and Swiss Radio International to name but a few, and more stations are said to be booking stands every week!

Satellite television will be demonstrated, along with Radio Data Systems, and there will be the opportunity to meet with radio manufacturers and discuss what you, as a listener, need for your hobby. Short wave and DX clubs will be present, too.

The conference, which will be in English and German with simultaneous translation provided free of charge, will look at many aspects of international radio broadcasting including new technology, listening and DXing, audience research, news gathering by radio monitoring and much more besides.

Hundreds of listeners and broadcasters from all over the world will be at International Radio Days '89, and here is your chance to meet with them.

The conference fee is DM185 (which is around £60) and includes admission into the exhibition and conference, lunch on the Saturday and Sunday, the souvenir brochure and tea and coffee breaks during the day. Accommodation is also available in four different categories of hotel ranging from £25 to £70. For those who wish to drive to Berlin, special cross-channel ferry prices have been negotiated with P&O Ferries.

To get full details on IRD '89, telephone 010 32 2 345 2806 (24 hour answerphone) or write to: **International Radio Days 1989, World Trade Centre, Boulevard Emile Jacqmain 162, bte 12 B-1210, Brussels, Belgium**

HMS Plymouth Group

Members of the Royal Naval Amateur Radio Society living in the Devon and Cornwall area have formed an "HMS *Plymouth* Group" to be responsible for amateur radio operations from the Falklands veteran HMS *Plymouth* based at her namesake city.

The ship will be open to the public from March 29 until October and there will be a charge for admission.

The intention of the radio amateur group is to provide - a far as possible - a replica room (W/T office) and at the same time carry on with radio contacts which will be seen and heard by visitors. Frequencies in use will be the usual h.f. and v.h.f. bands and QSL cards will be sent to all contacts via the bureau. The callsign has yet to be allocated, but it is hoped to re-issue the old Devonport signal letters GUZ and the ship would then be using GB3GUZ.

Members of the RNARS both at home and abroad are invited to join the group at an annual subscription of £2. This should be sent to the **Hon. Treasurer, Chris Harper, 24 Cunningham Road, Tamerton Foliot, Plymouth PL5 4PS.** Other financial offers would be gratefully accepted and applied to the provision of additional equipment.

HMS *Plymouth*, the last of the Type 12 Frigates, is at present "in retirement" and was heading for a watery grave as a missile target. Since then the Warship Preservation Trust and a strong team of volunteers have worked small miracles to open the ship for public display.

Radio 4 in Londonderry

On January 6, BBC Radio 4 extended its f.m. service to the Londonderry area of Northern Ireland. Many Radio 4 programmes are now available on f.m. for the first time to about 120 000 listeners in and around Londonderry, Strabane, Clady, Drumquin, Newtownstewart, Sion Mills, Donemana, Claudy, Feeny, Eglington and along the eastern shoreline of Lough Foyle. The frequency in use is 94.9MHz.

Local Radio For Cambridge & Newmarket

Independent Local Radio on the v.h.f. f.m. band opened in Cambridge and Newmarket areas at 10am on Sunday February 12 with programmes from CN.FM 103 broadcast from a new IBA transmitting station reaching about 460 000 listeners. The programmes are broadcast in stereo on 103MHz v.h.f. f.m. from the transmitting site at Madingley. Consistently reliable stereo reception should be possible over a wide area including Cambridge, Newmarket, Royston and Godmanchester.

WHAT'S NEW

Triple DC Power Supply

The TS3023S is a laboratory quality triple output power supply. Two outputs each provide 0 to 2 amps at 0 to 30 volts and can be switched to be independent tracking. The third output provides up to 4 amps at 4 to 6 volts for logic circuits. All outputs have remote sensing.

Both 0-30V 2 A outputs have 0.5in $3^1/_2$ digit, liquid crystal displays which simultaneously display output voltage and output current. With the output switch OFF, the display can be used to preset the output voltage and current limit prior to connection of the load. The power supply operates in constant current or constant voltage modes with automatic cross-over. A display annunciator indicates constant current mode.

Coarse and fine controls permit the output voltage to be set within 5mV and the current limit control is logarithmic to give good resolution at low current settings. Load and line regulation are better then 0.01 per cent with ripple and noise typically better than 1mV. The two supplies can be switched to be independent or tracking.

The 4-6V 4A output has a single 0.5in $3^1/_2$ digit, liquid crystal display which displays either output voltage with the output switch OFF or output current with the output switch ON. Over-voltage protection is provided. The TS3023S sells at £385. For further information, please contact: **Thandar Electronics Ltd., 2 Glebe Road, Huntingdon, Cambridgeshire PE18 7DX. Tel: (0480) 412451.**

Awards

The Scottish Tourist Board (Amateur Radio) Expedition Group are fielding two awards this year. The first is the **Thistle Award** which can be obtained for working four of their special event stations this year. The second is the **Supreme Tartan Banner Award** which means you need to work all six of their stations. Short wave listeners can also apply for the certificates on a "heard" basis.

Details of the stations known about at the time of closing for press can be found in "Listen Out For" elsewhere in this issue.

The **Thistle Award** costs £1 including postage and claims should be sent to: **Robbie GM4UQG. PO Box 59, Hamilton, Scotland ML3 6QB.**

The **Marconi Award** requires you to work six of the seven special stations on during International Marconi Day (again details of the stations are in "Listen Out For"). QSL cards can be exchanged with any of the stations, either via the bureau, or if preferred directly (with stamps or costs to cover postage please).

All official award claims must be made via **CRAC, PO Box 100, Truro, Cornwall TR1 1RX.** They must be accompanied by either $5 (US), £2 (UK) or ten IRCs. The official award is for full two-way working only, but in addition this year, they are offering an extra award for short wave listeners. Again applications need to be via CRAC. Claimants will have to record at least six of the Marconi Day stations plus the stations being worked together with the times heard (UTC). The s.w.l. award will cost $3, £1.50 or six IRCs.

Operation this year will be voice only and preferred frequency segments will be: 3.77-3.78, 7.07-7.08, 14.26-14.28, 21.36-21.38, 28.36-28.38, 28.76-28.78, 29.36 (f.m.) and 50.26-50.28MHz.

Antex Precision Soldering Brochure

Antex (Electronics) Ltd., have just published a new brochure called *Precision Soldering*.

Apart from details of their product range, this brochure also covers soldering topics, the benefits of temperature-controlled soldering, safety in education and other topics.

The booklet is available from: **Antex (Electronics) Ltd., 2 Westbridge Industrial Estate, Tavistock, Devon PL19 8DE. Tel: (0822) 613565.**

Spikatcher

A new, UK-designed, low-cost, spike registering unit for use on ordinary mains electricity supply lines is now being manufactured by Matelect Ltd. The Spikatcher detects voltage fluctuations which might corrupt data on microcomputers or affect sensitive electronic equipment.

It operates when plugged into a mains socket and counts up to nine spikes which are 50 volts or more above the nominal 240 volts r.m.s. level, displaying the number by lighting the appropriate l.e.d. If there are more than nine events, then the number "9" l.e.d. will light up.

For more details on the Spikatcher, contact: Matelect **33 Bedford Gardens, London W8 7EF. Tel: 01-221 6784.**

ITU Membership Grows

The Instrument of Accession of the government of the Independent State of Western Samoa was deposited with the International Telecommunication Union (ITU) on 7 October 1988, making the country the 166th member.

Western Samoa is situated between 13° and 15° south latitude and 171° and 173° east longitude in the South Pacific. It comprises two large islands (Savai'i and Upolu), two smaller islands (Manono and Apolima) and several uninhabited islets. It has a land area of 2831 square kilometres and a population estimated at 161 000 inhabitants (1987). The capital, Apia, located on the island of Upolu, has a population of 34 000.

The International Telecommunication Union (ITU) was founded in 1865 and as such is the oldest inter-governmental organisation. In 1947, it became a specialised agency of the United Nations and now has a membership of 166 countries. It is the international organisation responsible for the regulation and planning of telecommunications worldwide, for the establishment of equipment and systems operating standards, for the co-ordination and dissemination of information required for the planning and operation of telecommunications services and for the promotion of and contribution to the development of telecommunications and the related infrastructures.

WHAT'S NEW

FM Receiver Tuner Sets

A new Larsholt range of f.m. receiver tuner sets, in stereo and mono versions, featuring an on-board audio amplifier is now available through Cirkit Distribution.

Suitable for applications in sound distribution systems, the three models all feature TDA1062-based front end, which combines good sensitivity with excellent large-signal handling, a frequency range of 87.5 - 108MHz, a.m. suppression of 50dB and image rejection of 70dB. Other advanced features include Varicap tuning, a.f.c. amplification and control, tuning and signal level meter, noise and deviation muting and oscillator output. The 7256 is supplied in stereo or mono versions with the 7260 having an on-board audio amplifier capable of delivering up to 6W into 4Ω with a signal-to-noise ratio better than 90dB. The unit only requires the addition of a few external components and a loudspeaker to make a complete f.m. receiver.

Diode-tuned and equipped with oscillator tap to make p.l.l. synthesis and digital display possible, the 7256 and 7260 are only half Euro-card size, with dimensions of 100 x 80mm and a maximum height of 25mm. Connection is via a 15-pin edge connector with 2.5mm spaced pins. For further information contact: Cirkit Distribution Ltd., **Park Lane, Broxbourne, Herts EN10 7NQ. Tel: (0992) 444111.**

For Homes With Three Televisions

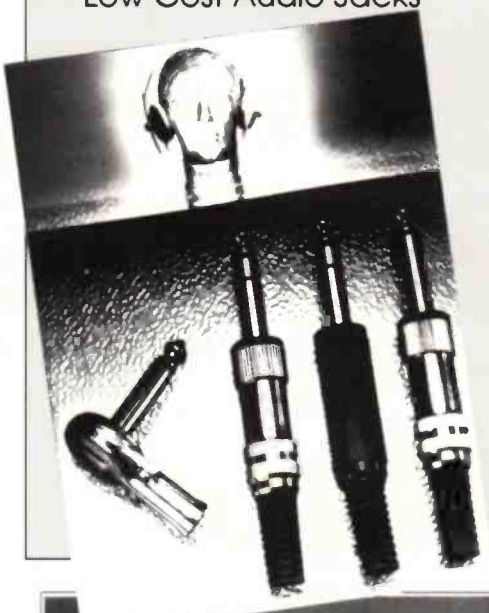
The CM7293 is a u.h.f./f.m. distribution amplifier for domestic u.h.f. TV, v.h.f. f.m. radio and video recorder applications. The mains operated CM7293 distributes u.h.f. signals to three TV sets from a single antenna and effectively boosts the available signal by approximately three times to each outlet.

Where a video recorder is in use, the CM7293 will normally distribute video playback at the same time so that each TV may display either a broadcast channel or video regardless of what is being viewed on the other sets.

With the aid of Labgear diplexers (CM9006), the CM7293 will simultaneously accept high quality f.m. radio signals and distribute them to each outlet for subsequent splitting.

The VCM7293 is neatly contained within a moulded case measuring 163 x 99 x 45mm. A variant designated CM7293/01 which gives full v.h.f. coverage (as opposed to f.m. Band II only) is also available. For more details, contact: **Labgear Cablevision Ltd., PO Box 182, Abbey Walk, Cambridge CB1 2QN. Tel: (0223) 66521.**

Low Cost Audio Jacks



High-quality, low-cost, stereo and mono jack plugs have been added to Rendar's wide range of audio components.

The company claim the range provides cost-effective reliability. The 6.3mm jacks are available with metal or thermoplastic bodies. Right-angled types can also be supplied and cable restraints are fitted to the majority of plugs in the range.

The plugs are suitable for all audio and intercomms applications, both mono and stereo, while the metal body types provide shielding of the plug. A gold-plated range is available catering for high specification applications. Both two and three-pole versions mate with standard 6.3mm jack sockets.

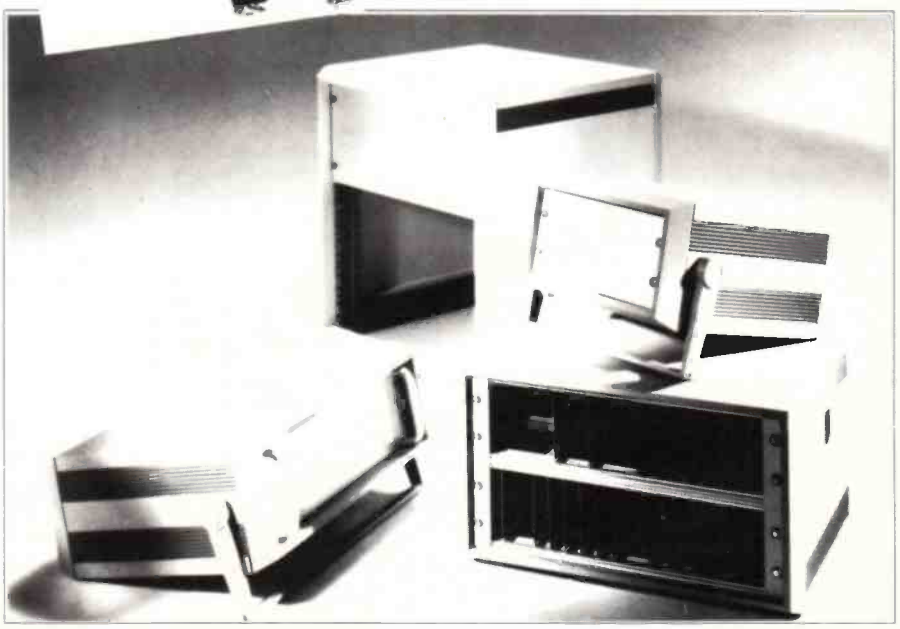
For further information, contact: **Rendar Ltd., Durban Road, South Berstead, Bognor Regis, West Sussex PO22 9RL. Tel: (0243) 825811.**

Rack Cases

Series C75 is the new 19in rack case system from West Hyde. It comprises a lightweight frame of high-strength aluminium extrusions with steel panels and no visible screw heads to spoil the appearance. The design of the case framework allows the front and rear panels to be positioned at any depth within the unit, and the top, bottom and side panels are all removable to provide maximum access. The top and bottom panels are removed by releasing a single, captive screw whilst the side panels detach by operating a spring-loaded catch.

All C75 cases are supplied with durable, high-quality, epoxy powder coated finish in two-tone grey. For ease of assembly, cases are delivered in sub-assembled flat packs. A rear panel in 1mm steel and self-adhesive, non-slip feet are included.

West Hyde 3U cases are optionally available with carrying handles to suit portable instruments; these handles lock in either the carrying position or so as to tilt the case front to a convenient viewing angle.



For more details, contact: **West Hyde Developments Ltd., 9-10 Park Street Industrial Estate, Aylesbury, Bucks HP20 1ET. Tel: (0296) 20441.**

GRASSROOTS

Lorna Mower

Chelmsford ARS meet 1st Tuesdays, 7.30pm at The Marconi College, Arbour Lane. April 4 is Computers, Some Amateur Radio Used G2HPF. Roy Martyr G3PMX on Chelmsford 353221 Ext. 3815.

York ARS meet Fridays, 7.30pm at the United Services Clubroom, 61 Micklegate. Keith Cass G3WVO at 4 Heworth Village, York YO3 0AF.

Brighton & District ARS have Aerials Anonymous G8IQX on April 5 and Home Brew p.c.b./Noise Bridge Club Project on the 19th. 1st & 3rd Wednesdays, 8pm at the Roast Beef Bar, Brighton Racecourse. Harold Lunson G3WR on Brighton 500110.

Keighley ARS meet Tuesdays, 8pm in the Clubroom, rear of Victoria Hall. March 28 is Visit to SMC, Leeds at 8 o'clock, April 4/18 are Natter Nights. On the 11th Bradford Club join them for a chat and the 25 is a Junk Sale. Kathy G1IGH on Bradford 496222.

Isle of Man ARS meet Mondays, 8pm at Howstrake Hotel, Harbour Rd, Onchan, Isle of Man. Mrs June Wrigley on Port Erin 834257.

Stourbridge & District ARS have a Natter/On-Air Night on April 11 and Burma-Siam Railway G3BA on the 18th. Meetings held twice monthly at the Robin Woods Centre, Beauty Bank. C. Brunn G1WAI on Hagley 885602.

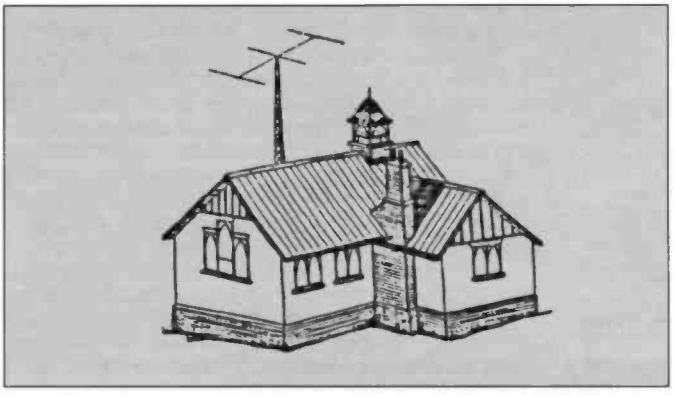
Verulam ARC meet 2nd & 4th Tuesdays, 7.30pm at RAFA HQ, New Kent Rd, St. Albans. On March 28 they have G3PAO Memorial lecture by Doctor Peter Duffet-Smith entitled Long Delayed Echos, starting time 8pm in the RAFA HQ. April 11 is an Activity Evening and on the 25th G4KQH will give a talk on home construction entitled Howes Constructon Kits. Hilary G4JKS on St. Albans 59318.

Sutton & Cheam RS have a Natter Night on April 3, their Annual Dinner at Stoneleigh Hotel on the 15th and a Junk Sale on the 21st. 3rd Fridays, 7.30pm at Downs Lawn Tennis Club, Holland Avenue, Cheam and Natter Nights are 1st Mondays in Downs Bar. John Puttock G0BWV on 01-644 9945.

Mid Ulster ARC meet 2nd Sundays, 3pm in the Guide Hall, Gilford, Co. Down. Jim GI1YGS on Annaghmore 851179.

Rugby ATS have a Test Gear evening on March 28 and their AGM on April 18. Tuesdays, 7.30pm at the Cricket Pavilion, outside Rugby Radio Station. Kevin Marriott G8TWH on Rugby 77986.

Wimbledon & District ARS meet 2nd & last Fridays, 7.30pm in St. Andrews Church Hall, Herbert Rd. March 31 is Bring & Buy your own Equipment G6AJY and April 14 is a Surplus Equipment Sale. Nick Lawlor G6AJY on 01-330 2703.



Wirral ARS have Radio controlled models, New Brighton Radio Control Club on April 5 and an Equipment Sale on the 19th. 1st & 3rd Wednesdays, 7.45pm at Ivy Farm, Arrowe Park Rd, Birkenhead (opposite Landican cemetery gates). Alec Seed G3FOO at 31 Withert Ave, Bebington, Wirral L63 5NE.

Southgate ARC meet 2nd & 4th Thursdays, 7.45pm at Holy Trinity Church Hall (Upper), Winchmore Hill. April 13 is a Grand Surplus Sale and the 27th is Introducing Youth into Amateur Radio. Brian Shelton on 01-360 2453.

Trowbridge & District ARC have a Surplus Equipment Sale on March 29, a Natter Night on April 12 and Residual Current Devices G0HFX on the 26th. Meet fortnightly on Wednesdays, 8pm at the TA Centre, Bythesea Rd. Ian Carter G0GRI on Bratton 830383.

Derby & District ARS meet Wednesdays, 7.30pm at 119 Green Lane. March 29 is Meteor-Scatter G4VVZ, April 5 a Junk Sale, the 12th is Noise - Illustrated talk by Tony Adams of NEI, the 19th is Night on the Air and the 26th is two talks by G3FDW on The Westmoorland v.h.f. Group and The Royal Omani ARS. Kevin Jones G4FPY on Derby 669157.

Norfolk ARC meet Wednesays, 7.30pm in The Norfolk Dumpling, The Livestock Market, Harford, Norwich. March 29/April 19 are Informal and Committee Meetings, April 5 is their AGM, the 12th is Sporadic-E, some new results G3YLA and the 26th is Home Construction Contest. Craig Joly G0BGD on Norwich 485784.

Hornsea RAC have a Natter Night on March 29, G4YTV Audio Visual on April 5 and s.w.l. Harry, Addu ATTOLL on the 12th. Wednesdays, 8pm at The Mill, Atwick Rd. Geoff G4IGY on 0964 533331.

Halifax & District ARS meet 1st & 3rd Tuesdays, 7.30pm at Running Man Public House, Pellon Lane. 1st Tuesdays are Noggin and Natter Nights. April 18 is Jack Ward G3JJ. David Moss on Halifax 202306.

Worksop ARS have Astronomy G4MDQ on March 28 and a Natter Night on April 4. Meet Tuesdays, time and place from Mrs Carole Gee G4ZUN on Worksop 486614.

Mansfield ARS have Foxhunt on March 24 and Guest Speaker on April 14. 2nd & 4th Fridays, 7.30pm at the Westfield Folk House, Westfield Lane. Keith Lawson on Mansfield 642719.

South East Kent (YMCA) ARC have Natter Nights on March 30/ April 5 and their AGM on April 12. Dover YMCA, Godwynehurst, Leyburne Rd. Des Edwards at 12 East Cliff, Dover, Kent CT16 1LX.

Dragon ARC have a talk/demo by GW4BWE on April 3. 1st & 3rd Mondays, 7.30pm at the Four Crosses, Pentraeth Rd, Menai Bridge. Tony Rees on Bethesda 600963.

Ipswich RC meet in the Red Lion, 284 Bramford Rd, 8pm. March 29 is South Anglia Repeater Group meeting - open to everyone interested in the operation of GB3PO and GB3IH. March 25-April 1 is HMS Belfast Activity Period, April 12 is Visit by Arrow Electronics Ltd, the 13th is Morse Test at Ipswich, the 18th is World Radio Amateurs Day and the 26th is their AGM. Jack Toothill G4IFF on Ipswich 464047.

Loughton & District ARS meet at 7.45pm in Room 20 of Loughton Hall, Rectory Lane. April 7 is their AGM and presentation of shield for best d.f. set. The 21st is RSGB Film Night. John Ray G8DZH on 01-508 3434.

Bath & District ARC meet alternate Wednesdays, 8pm at Englishcombe Inn, Englishcombe Lane. March 29 is Video Night, April 15 is their AGM. Eric G4GEV on Combe Down 832156.

Colchester RA's have Practicle Approach to Radio G4TZM/G8IUD on April 13 and Weather & Propagation G3YLA (Anglia TV) on the 27th. Room 15, Ground Floor, "C" Block, Gilberd School, Bringkley Lane, Highwoods. Mike G4YJN on Layer-de-la-Haye 348189.

Yeovil ARC have Natter Nights on March 30/April 27, Greyline Propagation G3MYM on April 6, Multimeters G3GC on the 13th and their AGM on the 20th. Thursdays, 7.30pm at The Recreation Centre, Chilton Grove. David Bailey G1MNM at 7 Thatchem Close, Yeovil, Somerset BA21 3BS.

Hastings Electronics & RC have a Junk Auction on April 19. 3rd Wednesdays, 7.45pm at West Hill Community Centre, Croft Rd. Fridays, 8pm in the Club Room at Ashdown Farm Community, Downey Close. Tim Anderson G0GTF on Hastings 437513.

Thornbury & District ARC have their AGM on April 5 and a Project Evening on the 19th. 1st & 3rd Wednesdays, 7.30pm in the United Reform Church, Chapel St. Tom Cromack G0FGI at Rose Cottage, The Naite, Oldbury-On-Severn, Bristol, Avon BS12 1RU.

Lothians RS meet 2nd & 4th Wednesdays, 7.30pm at Orwell Lodge Hotel, Polwarth Terrace, Edinburgh. April 12 is Faultfinding, including the Orwell d.f. Rx and the 26th is an Outside Visit. P. J. Dick GM4DTH at 21 West Maitland St. Edinburgh EH12 5EA.

Fylde ARS meet 2nd & 4th Thursdays at South Shore Tennis Club, Midgeland Lane. April 13 is Visit by RSGB Regional Liason Officer and the 27th is an Informal. F. Whitehead G4CSA on St. Annes 720867.

Cheshunt & District ARC have Natter Nights on March 29/April 12/ 26th. April 5 is HF Aerials-Basics G3TIK and the 19th is a Construction Contest. Wednesdays, 8pm in the Church Room, Church Lane, Wormley. Roger G4OAA on Hoddesdon 464795.

Vale of Evesham RAC have Sporadic-E and Meteor Scatter Propagation talk G3NAQ on April 6. 1st & 3rd Thursdays, 7.30pm at The Meb Club, Worcester Rd, Evesham. Formal meetings are 1st Thursdays. John G3DEF on Evesham 6407.

Radio Society of Harrow have their AGM on March 31, Activity Nights on April 7/21 and a Junk Sale on the 14th. Fridays, 8pm in Harrow Arts Centre, Uxbridge Rd, Hatch End. Chris Friel G4AUF on Ruislip 635522.

Dunstable Downs RC meet Fridays in Room 3 (upstairs) of Chews House, 77 High St South. April 1 is Bowling at Stevenage and the 14th is China G4ZJF. Tony Kelsey-Stead G0COQ on Luton 508259 (24hrs).

Coventry ARS meet Fridays, 8pm at Baden Powell House, 121 St. Nicholas St, Radford. March 24 is a talk from Bristol Amateur Television Club (provisional), March 31/April 14 are Nights on the Air & Morse tuition, on April 7 they have Mini lectures and the 21st is Cheese and Wine. Jonathan Ward G4HHT on Coventry 610408.

Biggin Hill ARC have SSTV on April 18. 3rd Tuesdays, 7.30pm at The Victory Social Club, Kechill Gardens, Hayes. Geoff Milne G3UMI on 01-462 2689.

LISTEN OUT FOR

GB2TVC: The Thames Valley College will be operating this special event station from April 14 to 28. This is to celebrate the college launch into the new Polytechnics and College Funding Council sector. from April 1 they will be an independent college from local authority control. The station will be operating on all h.f. bands and 144MHz using RTTY, AMTOR, s.s.b. and c.w. They welcome contacts especially from Universities and other Higher Education Institutions world-wide and a special QSL card will be sent to all contacts.

Following the success of the world-wide event last year, International Marconi Day will be held from 0001 to 2359 on April 22. Keep a look out for the following stations:

K1VV/IMD*: From the Cape Cod area where the first Europe to USA contact was made.

VE1IMD*: From Nova Scotia at the Marconi site where later this year the new Marconi Museum will be opened.

VO1IMD*: From St. Johns, Newfoundland, where the first transatlantic contact was made.

EI2IMD*: From near the location where the first Irish experiments took place.

IY4FGM*: From the official Marconi Club station in Italy.

GB0IMD*: From the area on the Isle of Wight where many experimental transmissions were made by Marconi and his colleagues.

GB4IMD*: The Cornwall Radio Amateurs' Club station operating from the original Marconi Site at Poldhu Cove on the Lizard Peninsula in Cornwall. There is an award available linked with the stations marked.*

GB2STB:** this station will be operational from March 25 to 27 at the New Lanark World Heritage Site, a cotton mill and village.

GB2DWR:** This station will be on the Distillers Whisky Route on April 29/30 from the Blain Athol Distillery, Pitlochry, Perthshire.

GB2RB:** Celebrating Robert Burns, this station will be on the air during May 27/28 from Burns House Museum, Mauchline, Ayrshire.

GB2RBC:** Located at Royal Balmoral Castle, Crathie, Aberdeenshire on June 24/25.

There are two awards available for working those station denoted by ** and other Scottish Special Event Stations for which the dates will be announced when we know them.

GB2NTS, GB2NTU, GB2NTW and **GB2NTE:** On July 29/30 four station will be on the air from different National Trust properties, one each in Scotland, Ulster, England and Wales. Hopefully Ireland will make up a fifth country (EI). If you live overseas and can contact two of these stations, or if you live in the UK/Ireland and contact three stations there is a Commemoration Certificate available. Overseas the cost is $1 or equivalent return postage by Air Mail, UK/Ireland it requires a 19p s.a.e. You need to send QSl cards or log extracts to: Scottish Tourist Board (Radio Amateur) Expedition Group, PO Box 59, Hamilton, Scotland ML3 6QB.

HMS *Warrior:* The Fareham & District ARC will be operating a Special Event Station with the callsign **GB4HMS** on board HMS *Warrior* during the spring and summer this year. The station will be active most weekends on v.h.f. and h.f. with the emphasis on 'phone operation.

HMS *Warrior* is a 3-masted, square-rigged, sailing ship also fitted with a twin-cylinder steam engine. Launched in December 1860, at a time when war with France seemed inevitable, HMS *Warrior* was Britain's first iron-clad warship and the fastest, largest and best armed warship in the world at that time.

After an 8-year restoration scheme, costing over £7 million, HMS *Warrior* is now on display in Portsmouth Dockyard.

The group running the special event station would like to thank both Portsmouth City Council and SMC for their help in getting the station on the air.

More information about the station from: Rodney Smith G0ERS. 59 High Street, Southwick, Fareham, Hants PO17 6EF.

GB2WW & GB4BOB: During 1989, the Bedford & District Amateur Radio Club plan to commemorate the outbreak of the Second World War by operating several Special Event Stations using the callsigns GB2WW and GB4BOB.

The locations will Incude a number of former RAF and USAAF stations in and around the Bedford area which were in use during the hostilities.

Further details can be obtained from the Special Events Manager: Ray G0EYM. 30 Cotswold Close, Putnoe, Bedford MK41 9LR. Tel: (0234) 244506.

GREAT CIRCLE MAP

In the centre of this issue you will find your free **Great Circle Map of the World**. This specially drawn map enables you to accurately measure the distance and compass bearing of any point on the world's surface from the UK. Although the map is centred on London, it is sufficiently accurate from any part of the British Isles.

Using Your Map

Carefully remove the complete centre section by opening up the staple and lifting the map out.

Having mounted the Map flat, put a drawing-pin at your UK location. Tie a thin cord to the drawing-pin, long enough to reach the corners of the map (about 300mm) and attach a small weight to the end of the cord to keep it taught.

You can now use the cord to read off the bearing of the station being worked or listened to. By putting your finger on the cord over the position of the station and swinging the cord round you can read off of the distance scale how far away the station is.

Example

You want to work, or listen to, a station in Sydney, Australia. Swing the cord round so that it passes over Sydney and note the compass bearing from the outer scale. (70°). Putting your finger on the cord at Sydney swing the cord round to align with the distance scale. You can now read from the scale the distance to Sydney. (17000km or 10500miles).

From the time scale along the lower part of the map you can determine what the time is around the world when it is 1200UTC (GMT) in the UK. (2200UTC or 10.00pm in Sydney)

The Map also shows that Sydney is in DX Zone 30. Further information on DX Zones and prefixes consult the *Radio Amateur Prefix-Country-Zone List* published by Geoff Watts, 62 Belmore Road, Norwich NR7 0PU.

Note that it is not possible to measure distance or direction accurately except from the UK as this Map is drawn on a great-circle projection centred on London.

When you are ready to graduate to real listening Look to Lowe

The NRD-525 from JRC

Those of you who have read about the NRD-525 will recall that I gave some background information about the JRC company. What I was trying to get across was the fact that a company with such a long history in the communications business can endow its products with a host of subtle details based on actual operating experience, JRC are in many ways similar to the Marconi Company (as it was), in that they can meet every possible need of their professional customers. Any owner of an NRD-525 will rejoice that a company such as JRC decided to bring their quality to the non-professional user.

But what of the NRD-525 itself? What will it do for you as a dedicated listener? In such a limited space as this page I cannot possibly cover all its outstanding features so I will draw some extracts from the Rainer Lichte review. Here's what he says about:-

Accuracy and stability.

"The tuning accuracy and the matching display are impressive indeed. Still the more impressive is this receiver's frequency stability. Drift is virtually non-existent, it was measured at less than 5Hz/hour."

And about dynamic range:-

"ICP 3rd order (3rd order intercept point) was measured at +17dBm at 7MHz and +14dBm at 25MHz. These are excellent values, and they are not the result of decreased sensitivity. The NRD-525 is amongst the most sensitive receivers I've measured so far. . . . Dynamic range was computed to 102dB, an equally outstanding value."

All very well you may say, but what does this technical jargon mean in real life? Let me quote Rainer Lichte again:—

"The signal quality under adverse conditions is remarkable, e.g. the 40 metre band here in Europe is fairly cluttered with high-power stations and most receivers just quit when you try to extract some intelligence from a weak radio amateur signal. The NRD-525 is unimpressed and functions in a truly professional manner."

In other words, there is virtually nothing you cannot resolve. If it cannot be received by the NRD-525, it cannot be received by anything. As a final quote from the review, let me give some conclusions:-

"This receiver is a joy to operate and a joy to listen to."

"The new NRD-525 very impressively manifests itself as the No. 1 receiver outside the commercial/military bracket."

"Performance-wise, the NRD-525 is way ahead of the competition because this receiver delivers outstanding results in all modes of operation."

What you will find about the NRD-525 is that with all its undoubted performance, it is so very easy to use and never thrusts itself at you like a knob bedecked military receiver. If you want to use it as a high quality broadcast receiver, then that is what it will be. As you discover more and more about the art of listening you find that the NRD-525 contains every operating feature and convenience that you might need, and there is almost nothing you cannot hear with it even when listening conditions are really difficult.

If you want to extend the use of the receiver, you will find a range of optional accessories to broaden the horizons, including a VHF/UHF converter which extends the already impressive 90kHz-34MHz range to include 34-60MHz, 114-174MHz, and 423-456MHz. (and the converter fits inside the receiver).

When you get deeper into the art, you may decide that specialised listening requires specialised receiver bandwidths, and a range of high performance filters is available for your choice.

One final comment from Rainer Lichte with which I totally agree is his remark that the internal speaker in the NRD-525 is really only suitable as a monitor, and does not do justice to the high quality available from the receiver. This being so, if voice communications are your forte I recommend the matching JRC loudspeaker the NVA-88. If however you really want to enjoy the audio from broadcast stations, we carried out a long series of tests and decided that the Wharfedale Diamond III loudspeaker produces the most excellent sound from this and many other receivers. Normally of course these loudspeakers are sold as pairs, for stereo listening, but we split the pairs and can sell you a single Diamond III to enhance your listening pleasure.

Truly happy listening. John Wilson

NRD-525 £1095 inc VAT

FREE

Send £1 to cover the postage and we will send you, by return of post, your FREE copy of "THE LISTENER'S GUIDE" (2nd edition), a commonsense look at radio listening on the LF, MF and HF bands. Its unique style will, I am sure, result in a "good read" but underneath the humour lies a wealth of experience and expertise. You will also receive detailed leaflets on our range of receivers and a copy of our current price list.

LOWE ELECTRONICS LIMITED

Chesterfield Road, Matlock, Derbyshire DE4 5LE Telephone 0629 580800 (4 lines) Fax 580020 Telex 377482

25 YEARS IN SHORTWAVE

There has never been a more exciting time for the VHF listener than right now. With the leading manufacturers making VHF and UHF receivers, and using microprocessor control which would have been impossible even five years ago, the keen listener can carry in his pocket the kind of receiving power that used to take up a nineteen inch rack, and consume enough electricity to light a small house.

We at Lowe Electonics have made it our task to seek out the best of these amazing radios, and bring them to you at attractive prices. We are the sole factory appointed importers for Signal, AOR, and WIN; all of whom represent the very best in scanning monitor receiver design and manufacture, and we show a small selection on this page. Not only do we stock and sell all these radios, we also offer you the best advice in the business, and we carry a full range of listeners' accessories from a humble egg insulator to RTTY and Morse decoders.

Let's start with what is acknowledged to be the finest wide range monitor receiver ever made; the AR-2002 from AOR. This receives in all modes, on frequencies from 25 to 550MHz, and also from 800 to 1300MHz, so there isn't much you cannot receive: airband both VHF and UHF, marine, amateur, FM broadcasts and TV sound, cellular radio, land mobile radio and so on. The AR-2002 is in use in professional installations all over the world, but is available at a price that the amateur can afford.

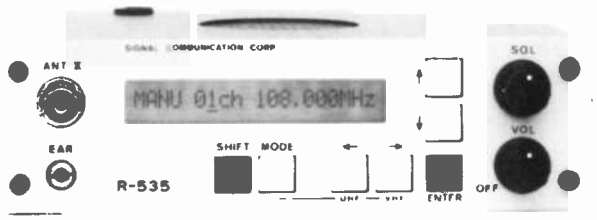
Coming very soon is the incredible AR-3000. 100kHz to 2036MHz — with no gaps, and in all modes including SSB. Watch this space.

AR-2002..... **£487**

Brand new from AOR is the AR-900; a delightful hand held scanner with more than a hint of airband in its specification. AM/FM reception in the bands 108-136MHz, 137-174MHz, 220-280MHz, 300 – 380MHz, 406-470MHz, and 830-950MHz, give the AR-900 a wide appeal, particularly to the UHF airband listener. New slim and elegant styling, an attractive price, and a wide range of facilities including 100 memory channels make the AR-900 unbeatable in the market.

AR-900..... **£235**

Signal Communications have always specialised in receivers for the airband, and we have often said that Mr. Hayakawa is one of those rare men who truly understand how to design VHF AM receivers. The audio quality which comes from any Signal airband receiver is outstandingly good, and the operating facilities are equally excellent. Top of the Signal range is the R-535, which covers not only the VHF airband from 108 to 136MHz (also 136 to 143MHz), but also the UHF airband from 220 to 380MHz. No less than 60 memory channels can store any frequency within the range of the receiver, and scanning takes place at very high speed, so you don't miss any of the action.



R-535..... **£249**

Signal also make the ideal starter receiver, the R-537S, which combines fully tunable operation for seaching around the VHF band and two channel crystal control for spot-on accuracy when you need it. A special version of the R-537S is in use by most parachute clubs where the instructor can talk directly to a falling pupil — helps to advise them that they should have opened the 'chute.

Our most successful airband receiver has been without doubt the WIN-108. Designed to incorporate all the features asked for by UK users over the years, the WIN-108 is the most convenient, powerful, and feature packed dedicated VHF airband receiver ever made available. Simply cannot be described in this space, but details of the WIN-108 and all our other models are available on request, enclosing £1 to cover post and packing. You will also receive our "Listeners' Guide" and "Airband Guide" free of charge.

Send right away, and see why you should "look to Lowe" for all your listening requirements.

R-537..... **£69.51**

WIN-108..... **£175**

25th Anniversary Prize Draw

Anyone making a purchase of more than £5 during this month will have the chance to win our "Gift of the Month" from the following: — TM-221E, R-535, AR-800, HF-125, TH-215E. All mail orders are automatically included. All shop sales will be recorded on cards, given to you by the manager.

Shops in **GLASGOW** Telephone 041-945 2626, **DARLINGTON** Telephone 0325 486121, **CAMBRIDGE** Telephone 0223 311230, **CARDIFF** Telephone 0222 464154, **LONDON** Telephone 01-429 3256, **BOURNEMOUTH** Telephone 0202 577760
All branches are closed all day Monday.

SCANNING

Alan Gardener

AOR News

Two of the products I mentioned some time ago are now becoming available,the first is the new AOR AR900 hand-held featuring almost complete coverage of the u.h.f. airband. I am sure that this will very quickly become a best selling hand-held scanner as it seems to feature just about everything most listeners want in a hand-held. I wonder what Uniden-Bearcat have got up their sleeves to challenge this model?.

AOR, not content with just the AR900, are now ready to launch the long awaited AR3000. This I believe is likely to set the trend in scanning receiver design over at least the next year and probably beyond. The preliminary information I have seen is very encouraging, with coverage from 100kHz to beyond 2GHz.

Examining the block diagram it is possible to see some of the more interesting features of the design. Looking first at the r.f. circuits, a total of 15 band pass filters are used to divide the very large frequency coverage into separate frequency bands. This should help to reduce some of problems that can sometimes occur with scanners offering continuous coverage.

These normally only appear if you live close to a radio or TV transmitting station, as the very strong signals from the local transmitter may overload the scanner. This is because the broad-band r.f. stages found in scanners of this design do not normally use tuned filters to separate the incoming signals - as is the case with scanners offering coverage in several distinct frequency bands.

By not separating the incoming signals any very strong signal present within the frequency range of the scanner can cause problems, even if the scanner is tuned to a frequency well away from that of the local signal. By using a series of band-pass filters the AOR designers may well have found a way around the problem without having to resort to the very complex arrangement of Varicap tuned stages common in non-continuous coverage scanners.

Sensitivity should be ensured by the use of low noise GaAsf.e.t. devices in the r.f. stages offering high sensitivity across the full frequency range. Even 1-2GHz, which should be particularly appealing to listeners interested in the 1.6GHz satellite band.

Another interesting feature of the design is in the frequency synthesiser. This offers tuning steps as low as 50Hz - important when listening to s.s.b. Only one crystal is used as the source of all the various conversion frequencies needed to provide such a large frequency coverage. This has two advantages: the first is to reduce the number of spurious signals present due to harmonics of crystal oscillators within the receiver, the second is to minimise tuning errors due to drift of several separate oscillator circuits. This can become a problem in the 1-2GHz region where only small errors at the oscillator frequency can become quite large when multiplied by factors of twenty or so to give the final frequency.

This month's column starts with a look at two new receivers from AOR. Alan's review of what you can hear has now reached the v.h.f. broadcast band and the airband just above it.

Fairly conventional circuitry is used in the i.f. stage of the receiver with one of three different first i.f. frequencies being used depending on the frequency range selected. The use of a high first i.f. frequency should ensure few image responses - usually a problem in most scanners. The second i.f. frequency is at around 45MHz with a final conversion to 455kHz where the narrow-band filtering is achieved. Nice to see a separate narrow filter for c.w. and s.s.b. reception.

Finally the heart of the receiver - the microprocessor controller. Yes, where would we be without the increasingly powerful Central Processing Unit. In addition to controlling the frequency synthesiser, this unit also sorts out commands entered from the keyboard, controls the liquid crystal display, provides a clock/timer and in addition gives 400 memory channels each capable of storing frequency, mode, and r.f. attenuator setting. As well as all the standard features found in models such as the AR2002 this receiver can lock-out individual frequencies within search bands. This is very handy if you want to ignore certain frequencies whilst using the search function, for example continuous carriers, repeater outputs or perhaps one of the few internally generated spurious signals.

If this was not enough the scanner has a built-in RS232 computer interface. This will allow remote control of the receiver frequency and mode, frequency steps size, memories, squelch and attenuator on/off and signal strength. Ideal if you want to automate your scanning activities.

By now you may have the idea that I am impressed by the design of the receiver - and you would be quite right! However looking at the design and actually using the receiver are two separate things. I will be very interested to read readers comments once the receiver becomes available -it is only then that any operating problems come to light. One thing I would like to have seen mentioned in the publicity material is a socket for the control of a tape recorder from either the receiver squelch circuit or timer. This I feel would be a very useful facility, particularly for recording foreign short wave broadcast stations. Perhaps this will be available on production models - we will soon see.

Rumours

How the other manufacturers intend to compete with the AOR challenge is not clear. As well as new super-scanners from Icom, Standard and Uniden-Bearcat. I have heard several rumours about a possible replacement for the Yaesu 9600 and even a new model from Kenwood! In addition to this, several new names are starting to appear on the American market so it will be interesting to see if they make it across the Atlantic.

As I have mentioned in this column before, many of these rumours are based on experimental or pre-production models shown to dealers for their comments. Quite a lot of designs never make it - usually on cost grounds as new designs take a lot of money to develop. Many manufactures have in the past preferred to re-package old designs, however this trend may now be changing with listeners' expectations of new models increasing.

New Products

As well as new receivers several other products have become available including active antennas and pre-amps from both Waters & Stanton and Nevada. The subject of pre-amplifiers was covered in the November 1988 column so it may be worth taking a look before buying one.

Sandpiper Communications have also been busy with a two new base station versions of the mobile scanner antenna featured in the August 1988 *SWM*. One is a glass fibre version designed for receive only, the other is produced in aluminium and additionally permits transmission on the 144MHz (2m) and 430MHz (70cm) amateur bands. The original mobile model has also seen some changes so it may be worthwhile contacting the manufacturer for further details: **Sandpiper Communications,** Pentwyn House, Penyard, Llwydcoed, Aberdare, Mid-Glamorgan CF44 0TU. Tel: (0685) 870425.

What Can I Hear? Part 3

In the third part of this feature we reach the dizzy heights of 88MHz and the start of the f.m. broadcast band. Although perhaps of little interest to readers without the facility for wide-band f.m. on their scanner it can be quite surprising over what distances signals can be received especially during enhanced propagation conditions.

A major re-organisation of the band has taken place over the past few years with subdivision into several different blocks, each one being set aside for various broadcast services. At the moment UK broadcasters use 100kHz channel spacings but this may change once the proposed community stations start operating. Indeed, some pirate stations already use 25kHz channel spacings in order to slot between existing stations but this can cause interference unless properly planned.

The middle section of the band used to be allocated to Police and Fire Brigade Base station transmitters but these are now being phased out to make way for stations such as BBC Radio1 amongst others.

The top end of the band is at 105MHz. In Europe the allocation extends all the way up to 108MHz, so the next stage of

SCANNING

The AOR AR3000 could set the trend for the next generation of scanners.

expansion for the f.m. broadcast band will require the current users of 105-108MHz to move. At present this is used as the mobile transmit segment of the p.m.r. "Mid Band", the base transmit being 33MHz higher in frequency. The p.m.r. users include the national fuel and power industries as well as train and bus operators. The search for new frequencies has led to a new allocation at around 148MHz as well as a move to Band III for some of the operators

Part of the v.h.f. airband is 108-118MHz, this segment being set aside for Radio Navigation aids such as v.o.r. and i.l.s.. These are allocated 50kHz channel spacings and are used as beacons for aircraft landing systems. This is part of an overall navigation system combined with marker beacons at 75MHz, Glideslope information at around 330MHz and TACAN and d.m.e. transmissions at around 1GHz.

Perhaps one of the more interesting signals in this part of the band is that of the Instrument Landing System otherwise known as i.l.s. or localiser. This permits a pilot with a suitable receiver to determine if he is on the runway centre line. This is achieved by transmitting two overlapping beams of signal along the runway. One signal is modulated with a 90Hz tone the other with a 150Hz tone. The receiver filters out each tone separately and displays the resultant signal on a meter in the cabin. Depending on the received strength of each tone the meter either swings to the left or the right, when both tones are received at the same strength the meter stays in the middle indicating the plane is on the centre line.

In addition to the two tones, a Morse code call sign is also transmitted in order to permit identification of the beacon. Listening to these beacons can be quite interesting particularly if you live near an airport and have a scanner in your car. When you have found the frequency of your local i.l.s. beacon try driving around the airport perimeter listening to the tones. When you cross the path of the the runway centre line you should hear the tones at about the same level. As you drive further around one of the tones should become more dominant 90Hz to the left and 150Hz to the right of the centre line. Please do not try this listening to Heathrow whilst driving around the M25. I don't think the police officer would believe you if you told him!

For aircraft radio communication, 118-136MHz is used. Until recently this used to be based on 50kHz channel spacings. However this has now been reduced to 25kHz in order to give more channels. One problem many listeners experience is that of the ground stations appearing to be off frequency causing them to sound distorted. This is because in order to give good coverage many signals are transmitted on the same channel from different sites throughout the country.

In order to permit reception without the signals interfering with each other each transmission is offset from the other by a few kHz. For example London Volmet (Main) on 135.375. If I use a receiver with a narrow a.m. filter I can hear two separate stations transmitting the same information, one fairly strong on 135.368MHz the other a lot weaker on 135.382MHz. If I tune to 135.375MHz using the same filter I cannot hear either of the transmissions and yetthat is the published frequency!

Switching to a wider bandwidth filter permits good reception - both signals being combined by the receiver. If you find reception of some stations poor try tuning in narrower frequency steps - you may be surprised at the difference.

I don't intend listing all of the aircraft frequencies here but it may be interesting to mention just a few that are worth putting in your scanner's memory bank. International distress frequency 121.5MHz, Fire and Rescue frequency 121.6MHz, Search and rescue frequency 123.1MHz and finally Unofficial air-to-air chat frequency 123.45MHz.

As well as navigational information many companies have their own channels for the exchange of operational information. These usually lie in the region of 130-132MHz and make very interesting listening, especially when used to describe aircraft faults to the maintenance crews before landing.

Finally at the top end of the band 133.3-136MHz more channels are allocated for Radio Navigation purposes with the odd communication channel in between. □

Well that's it for another month. I seem to have run out of space again so until next month, good listening and keep those letters coming to **PO Box 1000, Eastleigh, Hants SO5 5HB.**

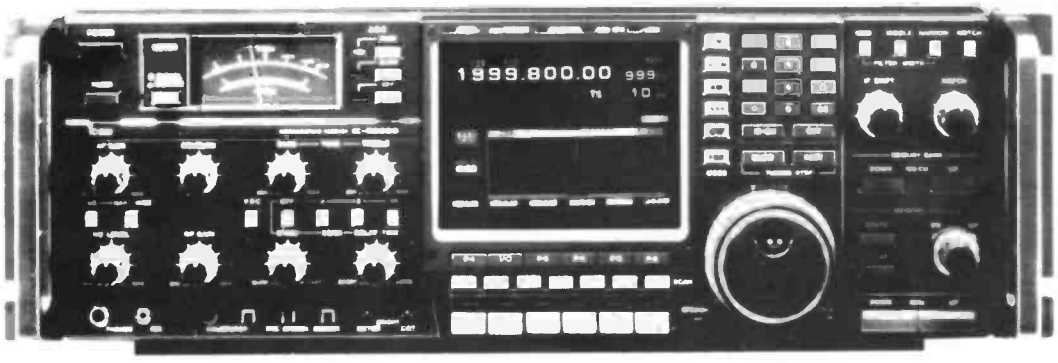
Frequency Allocations 88-136MHz

Frequency (MHz)	Service
88.00	f.m. Broadcast Band BBC Radio 1/2
90.20	f.m. Broadcast Band BBC Radio 3
92.40	f.m. Broadcast Band BBC Radio 4 & National Regional Radio
94.60	f.m. Broadcast Band BBC Local Radio
96.10	f.m. Broadcast Band IBA Local Radio
99.80	f.m. Broadcast Band National Radio
102.00	f.m. Broadcast Band IBA Local Radio
103.50	f.m. Broadcast Band BBC Local Radio
105.00	f.m. Broadcast Band Community Radio
108.00	Aeronautical Radio Navigation
118.00	Aeronautical Radio Communication
130.00	Aeronautical Radio Communication & Company Channels
132.00	Aeronautical Radio Communication
133.30	Aeronautical Radio Communication & Navigation
136.00	

Abbreviations	
a.m.	amplitude modulation
cm	centimetre
c.w.	continuous wave (meaning morse code)
f.m.	frequency modulation
GHz	gigahertz
Hz	hertz
i.f.	intermediate frequency
i.l.s.	instrument landing system
kHz	kilohertz
l.c.d.	liquid crystal display
m	metre
MHz	megahertz
p.m.r.	private mobile radio
r.f.	radio frequency
s.s.b.	single-sideband
u.h.f.	ultra high frequency
v.h.f.	very high frequency

ICOM R-9000 PREVIEW

Geoff Arnold G3GSR



On our front cover this month we bring you a scoop preview of the new professional-grade h.f. receiver from the Icom stable, the IC-R9000, with a frequency range of 100kHz to 1999.8MHz, and s.s.b., c.w., a.m., f.m., wide-band f.m. and f.s.k. modes as standard. Geoff Arnold G3GSR, Editor of our sister magazine *Practical Wireless*, takes a quick look at the specifications of the new set.

The front-end circuits have 11 separate bandpass filters in the 100kHz - 30MHz range, and tuning bandpass filters using GaAs-f.e.t.s for the v.h.f. and u.h.f. bands. The large 5in c.r.t. display first used on the IC-781 last year is also used on the IC-R9000. Apart from the frequency readout, this can display memory lists, a dual clock, weekly and daily timers, and an external video input. It can also be used as a spectrum scope, displaying signals up to 100kHz from the receive frequency, with a sensitivity of approximately 1µV and a dynamic range of 60dB, or as a terminal monitor.

Tuning is controlled by means of a high-stability direct digital synthesiser for high carrier to noise ratio with high-speed lockup time and high scan speeds. Both keypad and rotary knob tuning are provided, with tuning steps of 10 or 100Hz, and 1, 5, 9, 10, 12.5, 25 or 100kHz. Stability over the usable temperature range -10°C to +50°C is 25Hz up to 30MHz, and 0.25 p.p.m. above 30MHz.

Sensitivity for 10dB S:N is from 0.16µV to 1µV on s.s.b., c.w. and f.s.k., from 0.5µV to 6.3µV on a.m., and for 12dB SINAD is from 0.5µV to 1.4µV on f.m., and from 1µV to 5.6µV on wide-band f.m., depending on the band in use. Separate antenna sockets are provided for h.f., v.h.f./u.h.f. and 1GHz plus ranges. A noise-blanker with adjustable threshold and width, notch filter, i.f. shift, and noise operated squelch are provided. An Icom CI-V communications interface allows computer control of the IC-R9000, with new commands added for control of the squelch level and r.f. and a.f. gain, plus read-out of the S-meter.

A total of 1000 memory channels, in 10 banks of 100, each store frequency, mode and tuning-step increment information, plus a reference note of up to 8 characters. A memory editor allows memory contents to be moved, copied or deleted at any time.

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The IC-R9000 measures 424(w) x 150(h) x 340(d) mm, excluding projections, and weighs approximately 20kg. As to the price, you'll have guessed by the features it includes, that this top-of-the-line receiver is not going to be cheap - exactly how much should be decided shortly. Further details from: **Icom (UK) Ltd., Sea Street, Herne Bay, Kent CT6 8LD, Tel: (0227) 363859.**

□

RIG OF THE MONTH

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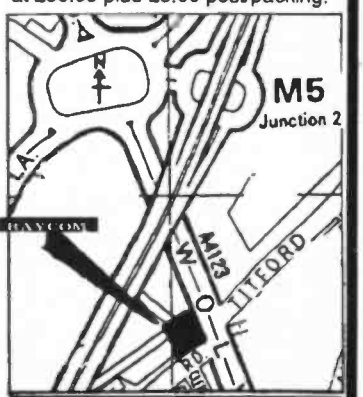

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BANDSCAN

Peter Laughton

This month Peter Laughton looks at the world-wide broadcasting scene, including the possibility of the BBC's World Service programmes being broadcast via Sky Channel's satellite channels on Astra.

IRRS Starts Commercial Operation

The Italian Radio Relay Service in Italy has now ended its series of test transmissions, and is relaying programmes commercially. It seems that United Nations Radio is one of the paying customers. IRRS appears on Sundays only between 0800 and 1400UTC on 9.860MHz. IRRS doesn't make any of its own programmes so be prepared for several different station identifications in the course of Sunday mornings.

BBC World Service On Astra?

There may be a future link between the BBC and the four new Rupert Murdoch TV channels which started broadcasting at 1800UTC on February 5. The chairman of Sky Television, Andrew Neil, made an interesting remark at the press launch of the new service. Neil said that starting as soon as logistically possible, Sky would put the world service of BBC onto one of the subcarriers it has leased from Astra. This service would cost the BBC nothing at all, and Neil went on to state "it would allow one of the world's best radio stations to be heard in stereo across Europe".

It seems that putting the BBC World Service onto Astra is a bit more complicated than connecting a few wires, though both Sky and the BBC seem keen to make it become reality in the near future. I'm not sure how they'll get the world service in stereo though. Sky seems to think that other transponders may be leased to radio broadcasters interested in European coverage.

There appears to be no great enthusiasm for satellite TV in Britain. In a recent survey conducted by the Independent Broadcasting Authority, a representative sample of just over 1000 people were interviewed. Of those 1000, 63 per cent said they weren't interested in renting or buying satellite receiving equipment - at least not yet.

Hunting For Harmonics

No broadcast transmitter is perfect, and as well as transmitting on, say, 7MHz, the transmitter will also produce a much lower power signal at 14MHz. International regulations specify that harmonics as they are called must be filtered out at the transmitter site. However, when you're dealing with powers of half a million watts, the legal permissable harmonic level may be as much as a 2 or 3kW.

As we head towards sunspot maximum, it is interesting to check for stations at double the frequency they should be operating on. If that frequency falls outside the broadcast bands it can sometimes be heard around the world. At 1715UTC for instance, Radio Yugoslavia can be heard in Europe on 12.200MHz with an excellent signal, twice 6.100MHz. It may be due to a transmitter fault, or just good conditions favouring that weak harmonic signal. You can look for other examples around 30MHz when conditions are good.

Radio Moscow's Russian World Service

There's a new interval signal on the airwaves which is quite easy to find. It belongs to Radio Moscow's Russian World Service, targeted at Russian speakers living abroad. Of course Radio Moscow has been broadcasting its Russian domestic service programmes on s.w. for decades, but not targeting the programmes at a foreign audience. At 1800UTC you can hear the 60 minute transmission on 7.400MHz. There are similar one hour blocks from Moscow's Russian World Service going out through the day

Paraguay Improves External Service

Paraguay's external service has been somewhat erratic in the past. But since the coup which toppled dictator Alfredo Stroessner, Radio Nacional de Paraguay has been heard nightly in Europe on 9.735MHz. The signal is just audible here at 2200UTC. In the beginning of February Paraguay's new government said it was lifting restrictions on a national newspaper, and would allow Radio Nandutl to return to the airwaves. The radio station will have to file a formal request to re-open. Radio Naduti has been off the air since January 1987 because it broadcast material openly hostile to Stroessner. The owners say they hope to return to 1.020MHz m.w.

Mongolian Musings

Mongolia's external service is difficult to hear in Europe at the best of times, but two new frequencies for the French service are providing fair results here at the moment. Sign-on is at 1720UTC on new 9.985 and 11.820MHz. The programme is repeated at 1755UTC. At 1825UTC the service closes down. Twenty minutes later at 1840, Radio Ulan Bator is back on 9.985MHz only, with French again, followed by English at 1940 until 2015UTC. Traditionally, Ulan Bator's external service in those languages only appears on Mondays, Wednesdays and Fridays, but it might have been extended to include Tuesdays and Thursdays as well. Propagation hasn't been favourable enough to confirm the situation.

Ireland

Now to an update on the Irish radio situation. New legislation effective since the start of the year imposes very heavy fines on those private entrepeneurs who continue to transmit without a licence. Eamon Cooke, owner of Radio Dublin, received a government notice at the start of January saying that unless he ceased broadcasting within 14 days, his phone and electricity would be cut off. Cooke went to court in the middle of the month saying that the government didn't have the power to disconnect the electricty and phone lines from his private house, where Radio Dublin just happened to be based. He won, but the court injuction expired on February 1, so on that day Cooke went back to court, but this time the justice dismissed Cooke's reasoning. On February 4, the Irish supreme court did the same thing.

At six o'clock the following morning, nineteen people banged on the door of number 58 Inchicore Road in Dublin armed with a search warrant. Two trucks, one with a crane, were parked outside. A few years ago Eamonn Cooke took the precaution of cementing the 10kW m.w. transmitter into the foundations of the house, so the Department of Communications officials stripped the transmitter bare and took away the f.m. and s.w. transmitters. The Irish authorities confiscated equipment to the value of 12 000 Irish pounds, but by 3pm the same day Radio Dublin returned to the airwaves using a 150W f.m. transmitter on 100.9MHz.

The Irish government is busy interviewing prospective licencee holders for its new legal local radio scheme, but it is not clear at present when that will start. The only other stations still operating are along the border between the Irish republic and Northern Ireland.

Radio Japan Via Sri Lanka

There has been a long standing media link between Japan and Sri Lanka. After the second world war, the government in Columbo was one of the first to restore diplomatic relations with Tokyo. Decades later Japan provided funds and equipment to build the Rupavani government TV station which serves Sri Lanka from Columbo. It is interesting to note that Sri Lanka opted for the better quality European PAL colour system instead of the Japanese NTSC. Now Japan is working with the Sri Lanka broadcasting corporation with an international radio project. They will rebuild the transmitter site at Ekala with at least two 300kW s.w. transmitters. We can expect test transmissions in the course of next year.

Austrian Mystery Echo

Way up on 21 and 25MHz you can often hear signals with a pronounced echo as your antenna picks up the signal directly from the transmitter site and again when its travelled round the world, but that takes milliseconds not seconds. Several readers of this column have reported hearing Radio Austria International apparently interfering with itself, with two versions of the media programme *Austrian SW Panorama* running about 15 seconds apart on 13.370MHz on Sunday mornings. We contacted Wolf Harranth, media Editor of *KW Panaorama* on the German service for an explanation. He told us that, on paper, one transmitter is beamed

to Europe, and the other, on the same frequency is beamed using a directional antenna to Asia. In theory there shouldn't be any interference. In practice, however, there is severe overlap, especially when the transmitters are carrying different programmes. Sometimes two different continuity studios are used playing the same tape, but because they are not synchronised, the difference between the two programmes can be as much as 30 seconds. Radio Austria International's answerline number has changed slightly. It is now 010 43 1 82 91 36 36. You can dial that number and leave a message for the programme producers.

In April Radio Austria International will broadcast to North America between 0500 and 6000UTC on 6.015MHz via Radio Canada International's Sackville facility. Slightly earlier in the evening, RCI will put out Radio Beijing too. From 0300-0400hrs 11.845MHz is being planned in April for South America, and 0400-0500UTC for North America on 5.960MHz.

Secret List

If clandestine stations interest you, then the recent 12 page publication by the Danish Short wave Clubs International should be of interest. Editor, Finn Krone, has done a remarkable job in compiling an international survey of radio broadcasts which either come from secret locations, or from friendly countries that support the same political viewpoint. The *Clandestine Station List* is in both time and frequency order. It costs 4 IRCs seamail, or 5 IRCs airmail from the Danish Short Wave Clubs International, D-2670, Greve Strand, Denmark.

Indian Update

A while back we reported that All India Radio was working on a scheme to improve its external s.w. service. Here is an update.

When you think of India, you tend to think of the mainland. But India has two island groups. The new 10kW high frequency transmitter at Port Blair in the Andaman and Nicobar Islands finally began testing on 22 December 1988. It is currently testing during the local daytime on 7.180MHz. In addition they use 4.760MHz in the early morning and the local evening. This transmitter has been designed to serve the outlying islands in the Union territory of Andaman and Nicobar Islands and will initially carry the home service of All India Radio.

Meanwhile, at the Khanpur/Nangali transmitter complex just outside the capital Delhi, two 250kW s.w. transmitters will go on air shortly. The installation work is complete and the new antenna arrays are being assembled at the Kingsway camp, Delhi. Four 50kW s.w. transmitters have gone into full operation over the past twelve months, and the ancient 20kW transmitters have been relegated to a standby status. One of the six 100kW s.w. transmitters at the same Dehli site has been withdrawn from the service due to old age.

The 250kW h.f. transmitters at Aligarh are presently running at 150kW only due to energy supply problems at the Uttar Pradesh state electricity board. This is, however, a temporary situation and is expected to improve soon.

The new external services transmitter site at Dodhaballapur, 60km from Banglore is nearing completion. The first of its 500kW h.f. Marconi built transmitters is expected to being testing very shortly. Also, in Gorkhpur, Uttar Pradesh, the 50kW s.w. transmitter designed to serve Nepal exclusively has been installed and on-air testing is also expected shortly.

Another external services site consisting of two 100kW m.w. transmitters is being constructed to serve Sri Lanka. This is at a place called Tuticorin, at the tip of Pannansuir India. Work at the external service transmitter site at Panaji to serve the Gulf countries is due to start next year, though it may well be delayed.

Finally there is a change for All India Radio's external services. There is a new Hindi service being broadcast to the Western Europe from 1945 to 2045UTC on 11.620, 9.910 and 7.412MHz. □

Abbreviations

f.m.	frequency modulation
h.f.	high frequency
IRRS	Italian Radio Relay Service
kW	kilowatt
MHz	megahertz
m.w.	medium wave
s.w.	short wave
TV	television
UTC	Co-ordinated Universal Time (=GMT)
W	watt

INTRODUCTION TO DX-TV

Keith Hamer & Garry Smith
Part 17

Analysis of Solar Cycle 21

When F2-layer activity commenced in 1978, it was initially thought that the reception of television signals would appear at very infrequent intervals and that enhanced conditions would prevail only for a year or so. Naturally, the very mention of television signals spanning distances in excess of 5000 miles conjures up a rare and one-off event to most DX-TV enthusiasts only familiar with tropospheric or Sporadic-E reception.

In reality, the number of days when F2 propagation supported ultra-long range television signals, along with other forms of communication at Band I frequencies, topped an incredible 180 days throughout the period October 1978 to April 1982! Some of the openings were prolonged; it was not uncommon to find signals flooding in before the crack of dawn and continuing throughout the day right up until the evening newspaper plopped onto the doormat.

F2-layer Study

Past log reports and log entries for that particular period during solar cycle 21 makes for interesting reading. It is surprising how easily one forgets past intances of exotic reception achievements and the various unsolved mysteries. It is not until the log entries are scrutinised in detail that a far truer picture of the last F2 cycle emerges. The authors did this recently and were surprised to discover various reception trends which were apparent throughout the period. In many respects, these trends followed text book theory very closely, even from one year to the next. This is certainly a complete contrast from the behaviour of Sporadic-E propagation!

The next solar cycle peak is just around the corner so don't despair if you're cheesed off at the moment brought on by lack of winter DX reception. Throughout the course of four winters during the solar cycle peak of the late seventies, F2 openings provided DXers with more entertainment than a Sporadic-E season!

Equipment Used

All the F2 reception during solar cycle 21 was accomplished using "standard" DX-TV equipment. This consisted of a 4-element Band I array, of wideband design, mounted just above the rotator some 9m above the ground. The television receivers in use a decade ago by both authors comprised mainly of Bush TV125 dual standard sets of 1963 vintage. These had been internally modified to perform at v.h.f. frequencies but on 625 lines, while still retaining the narrow band i.f. circuitry of the "405-line" section of the vision i.f. strip. This enhanced the selectivity and gain of the system which was, and still is, considered normal practice by many enthusiasts. Varicap tuner modules were fitted and the original valve tuner units were modified in order to provide additional i.f. amplification. Towards the end of the solar cycle peak, one of the authors acquired a JVC CX610 GB small-screen multi-standard portable colour receiver. Experiments with this proved that reception of colour and sound was possible via F2-layer propagation despite its unfavourable characteristics.

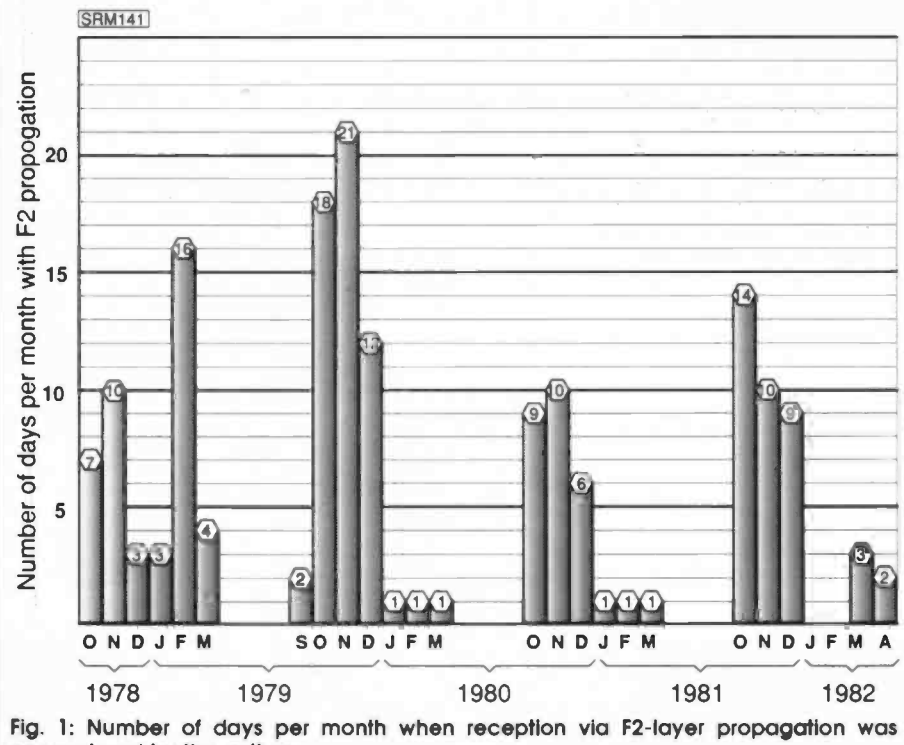

Fig. 1: Number of days per month when reception via F2-layer propagation was encountered by the authors.

Certain Months

Fig. 1. indicates the number of days per month on which television signals were received due to refraction via the F2-layer. Ionisation of the F2-layer is at its maximum level during the winter months but it was found that October, November and December were the more productive months with fewer "good" days during January, February and March. A peak in reception was noticed when signals would be encountered on several consecutive days followed by a lull with much lower m.u.f.s (maximum usable frequencies). There was a tendency for this pattern to recur after approximately 27 days.

Frequencies

The frequencies which could successfully be propagated were surprisingly high. From reports and observations made throughout the world during previous solar cycle peaks, it was accepted that BBC1 transmissions from the UK on channel B1, and France on channel F2, would be well received throughout the world and that channels E2 and R1, located just below 50MHz, might be propagated on rare occasions. In practice, activity on channels E2 and R1 were observed in the UK on well over 120 days during solar cycle 21.

On rare occasions channels E3/A2 at 55.25MHz were affected with broadcasts from the Middle East, Canada and the USA. However, it was not expected that the m.u.f. would rise sufficiently high enough to allow USA channel A3 at 61.25MHz vision to be propagated over such vast distances approaching 7000km. In conclusion it may be fair to assume that the highest frequency which could regulary be propagated was in the region of 50MHz. The highest m.u.f.s were found to occur towards the end of each year with the greatest number of encounters taking place in December. In December 1979, American and Canadian signals were observed on six, almost consecutive, days!

Time of Day

Theoretically, F2 reception is best when noon is at a point approximately midway between the transmitter and the receiving site. Up to a point this was found to be correct and , as anticipated, signals from the east were confined to the morning period while those from the west occurred during the afternoon. There were a few exceptions and on several occasions, the USSR channel R1 was active until well into the afternoon. In general, signals that had travelled the greatest distance on a path roughly east-west showed at the extremes of the day, namely early morning or late afternoon - see Fig. 2. Of course, there were relatively fewer instances of late afternoon television reception from Canada and the USA in the west because of the higher transmission frequencies involved.

INTRODUCTION TO DX-TV

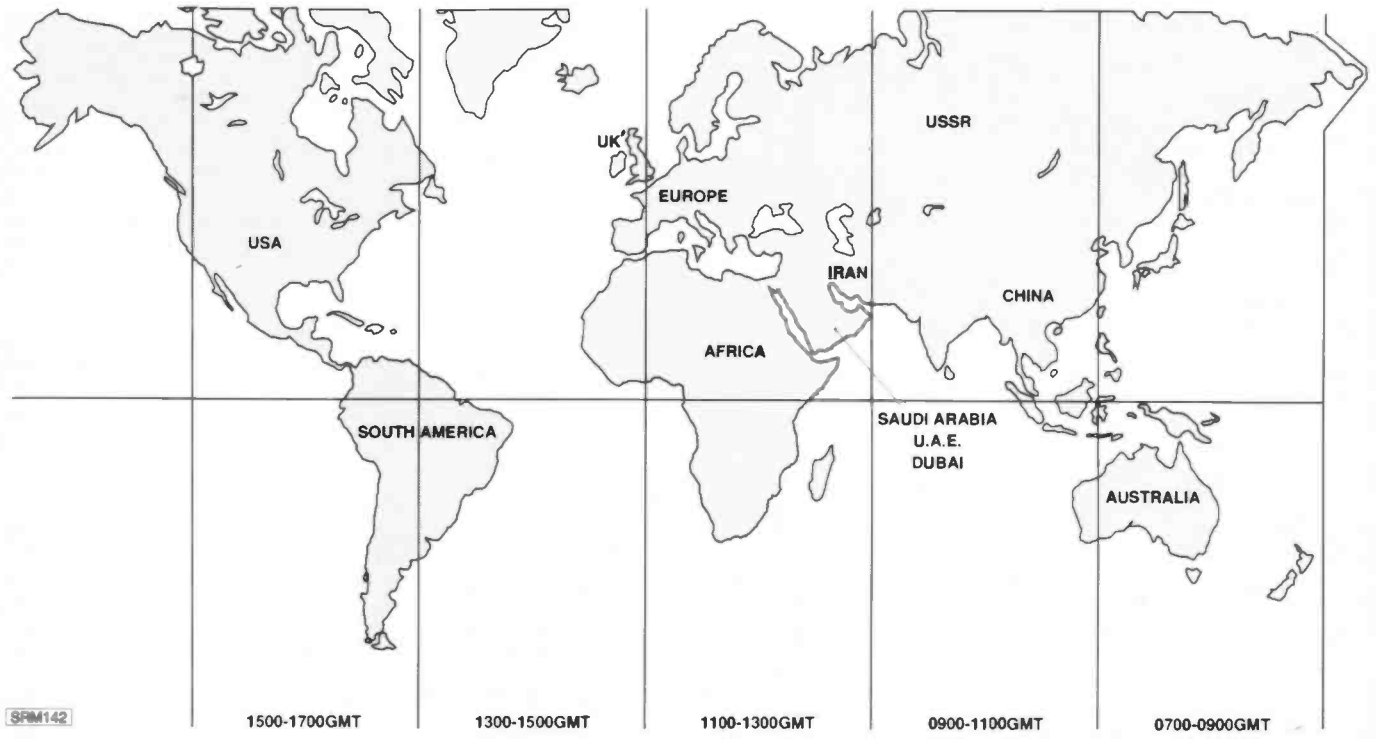

Fig. 2: Anticipated reception times for various parts of the world.

Signal Identification

Despite years of involvement with long-distance reception, many enthusiasts at the time of the last solar cycle were at a loss as to where many of the signals originated. This was mainly due to the characteristic smeary nature of the pictures which prevented definite identification when text or captions appeared. Clock captions were useful to some degree when calculating in which time zone the station was located. Unfortunately, with the multiple images present, many clocks seemed to gain a few extra hands here and there! In lots of cases, the origin of a signal was simply guesswork. Sometimes identification was possible by a process of elimination since channels E2 and E3 are not in common usage outside Europe. As we have already mentioned, the time of day had a part to play and this reduced the number of possibilities even further.

Maps

A globe of the Earth, or a special circular (Great Circle) map of the world (centred on the UK) was most useful for assessing the theoretical direction of an incoming signal from a given country or continent. An ordinary atlas was of limited use in this respect because of the distortions imposed by the types of projection used. However, antenna direction could not be relied upon fully because backscatter and sidescatter could deflect signals and consequently these would not arrive from their true direction.

Australasian Reception

Band I signals originating in Australia were always resolved in the United Kingdom between 0700 and 0930GMT but they seldom lingered beyond this period. As expected, Australian signals were never present within the United Kingdom at lunchtime or during the afternoon period. Only the lowest Band I allocation was encountered; this was channel A0 with a vision carrier of 46.25MHz and sound channel at 50.75MHz. Receiving equipment with narrow i.f. bandwidths and high selectivity was considered essential in order to capture Australian signals. This was not because they were weak, but simply because of the presence of high-level interference caused by Russian Forward Scatter networks operating in the lower portion of Band I

It is interesting to note that Australian signals were encountered during most of the winter months in the UK, which corresponds to the summer period in the southern hemisphere. Theoretically, this is the least likely time of the year for F2-layer propagation to occur!

Easy to Locate

The Australian channel A0 was reasonably easy to identify thanks to its handy location just below European channel E2. In the case of the authors, only fleeting glimpses of pictures were observed because of the problems caused by the high levels of interference as mentioned above, despite the use of reduced i.f. bandwidths. Unfortunately, no identification captions were seen but on 9 November 1981 a newsreader was present between 0758 and 0800GMT. Fortunately, during the compilation of this article, a copy of an Australian TV guide for this period came into the possession of one of the authors quite by chance. Further investigations revealed that the period of reception corresponded to a two-minute news bulletin shown by the ABC network! The ABC transmitter on channel 0 is located at Wagga Wagga in New South Wales and its callsign is ABMN-0.

TVQ-0, a commercial station operating in Queensland, was the only other high-power transmiter in Australia using this channel. Other enthusiasts in the United Kingdom frequently noted TVQ-0 screening its almost daily dose of "M*A*S*H". The reception of TVQ-0 is now history because it has recently swapped channels with DDQ-10, another commercial station in Queensland. Any reception encountered on this channel from Australia during the coming solar peak will therefore emanate from AMMN-0 or DDQ-0. Unfortunately, there are rumours that both the channel 0 stations will be transferred to higher frequency allocations within the next four to five years.

USSR Frequently Received

By studying the table (Fig. 3.) it can be seen that the USSR channel R1 (49.25MHz vision) was the most frequenty received station with a total of at least 125 early morning appearances.

All the sightings were not necessarily of USSR origin because many Chinese stations share the same frequency (channel C1). During the early part of the morning, some of the announcers were of Chinese appearance which suggests that reception had originated from channel R1 transmitters located in the central and eastern regions of Russia or the People's Republic of China.

Chinese Possibility

Unfortunately, positive identification of Chinese television was not possible

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Origin		1978			1979							1980						1981						Total No. Country
		OCT	NOV	DEC	JAN	FEB	MAR	SEP	OCT	NOV	DEC	JAN	FEB	MAR	OCT	NOV	DEC	JAN	FEB	MAR	OCT	NOV	DEC	
USSR Ch R1	AM	1	2		1	14			16	25	11	1	1		9	10	6		1	1	8	11	7	125
	MID-DAY	1				1				1	1										1	2		7
CHINA Ch C1	PM								1	2	2											1		6
MIDDLE EAST	AM																				1			1
ChE2/3	MID-DAY														1						1			2
	PM																					1		1
AUSTRALIA	AM								2		1										1	2		6
Ch AO	MID-DAY																							-
	PM																							-
ZIMBABWE	AM																				1			1
Ch E2	MID-DAY		1				1								1						2			5
	PM		1			1	2	2	2	1				1			1				1			12
UNIDENTIFIED	AM								1		4													5
AFRICAN TX	MID-DAY					1									1						1			3
Ch E2	PM		6			2	2								1	1					2		2	16
CANADA/USA	AM																							-
Ch A2	MID-DAY										2													2
	PM										5												2	7
USSR	AM	4	4	2	2	4			1												2			19
Forward	MID-DAY	1				1																		2
Scatter	PM																							-
Networks																								
USA	AM			1					1															2
Highway	MID-DAY																							-
Patrol, etc.	PM	2	2								1													5

AM = 0700-1100 MID-DAY = 1100-1300 PM = 1300-1800

Fig. 3: Analysis of the time of day when various countries or areas were observed.

because the colour test card (resembling an upside-down PM5544I) was not seen although various captions appeared from time-to-time which resembled Chinese writing. However, a white cross-hatch and a chequerboard test pattern composed of small squares were frequently resolved between 0800 and 0830GMT, especially during November 1979. During the late seventies, some Chinese stations on channel R1 were frequently broadcasting chequerboard patterns with various square sizes. The white cross-hatch pattern and colour bars were also aired during test transmissions, according to DXers in Japan.

Reversed Video

A few mystery transmissions were in evidence during the progress of these openings from the east. At times, reversed video information was encountered on channels E2 and R1. Sometimes this would take the form of a very fine grid pattern producing an effect not unlike the interference which v.d.u.'s and computers cause on v.h.f. TV frequencies. Reversing the video detector helped but the image could still not successfully be resolved.

Frequencies

In the majority of cases, reception from the east was confined to the lower Band I channels E2 and R1. Reception was more predominant on the latter because of its widespread usage throughout the USSR and China. Despite the high number of channel R2 outlets in the USSR, these were seldom received which suggests that the m.u.f. rarely rose above about 50MHz during the course of such openings. Channel E3 transmissions which were thought to have originated in the Middle East were evident but infrequent. There were no reports of the Chinese channel C2 which is located just above the E3 vision carrier frequency at 57.75MHz.

Time Zones

F2-layer propagation from the USSR was interesting in that there were sometimes distinct groupings of reception. In the early morning from approximately 0700GMT the reception would be from deep inside the USSR (as verified by clock captions showing GMT + 6 hours or more), or possibly China, with a rapid fade-out at around 1000GMT. After a short pause in signals of, say, twenty minutes, activity would rapidly build up but from a different populated zone, one closer to Europe. In turn these signals would tend to be replaced a little later with signals from transmitters located even closer, usually those to the west of the Ural Mountains. On one occasion the "BAKY" studio identification on a Russian test pattern was clearly readable.

Abbreviations	
GMT	Greenwich Mean Time (= UTC)
i.f.	intermediate frequency
m	metre
MHz	megahertz
m.u.f.	maximum usable frequency
v.d.u.	visual display unit
v.h.f.	very high frequency

Middle East Reception

Activity on channel E2 from the United Arab Emirates (Abu Dhabi or RCTV-Dubai) occurred mainly around noon although on a few occasions test cards and captions were deciphered as early as 0900 or as late as 1300GMT. The PM5544 test pattern was recognised by other enthusiasts from time-to-time but the characteristic multiple images presented immense problems when trying to decipher its identification at the top and bottom of the pattern. On a couple of occasions the authors received cartoons and programmes with Arabic subtitles but having no access to programme schedules these were never identified.

African Signals

Reception on a north-south path from the African continent was rather more unpredictable. Transmissions occurred not

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only around midday but sometimes from the mid-afternoon period onwards. In the next article the irregularities of African reception will be discussed in greater detail.

Trans-Atlantic Reception

As anticipated, reception from the USA and Canada on channel A2 (55.25MHz vision) prevailed during the early to mid-afternoon period, sometimes continuing until 1630GMT, or even later. The time difference meant that it coincided with morning transmissions. Some enthusiasts were fortunate enough to witness truly exotic test cards such as the Indian Head monoscope. Other DXers, including one of the authors, had to be content with a boring colour-bar type test pattern! Reception from the USA and Canada was more predominant during December '79 and December '81 and many a lunchtime was brightened up with yet another glimpse of the "Canada AM" news programme! Channel A2 reception featured in most DXers log books, although on rare occasions a few lucky enthusiasts resolved video and audio on the higher frequency A3 channel. Surprisingly, there were no reported sightings of possible Caribbean or South American transmitters on these channels, despite their widespread use. □

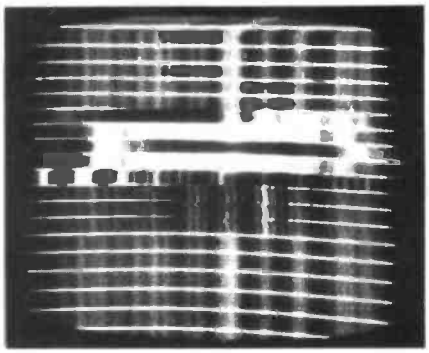


Fig. 4: The "letterbox" test pattern from an unknown region of the USSR.

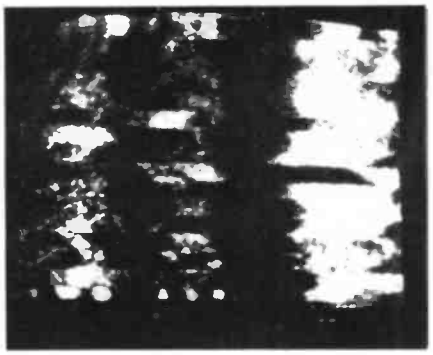


Fig. 5: A testcard of some description! This photograph illustrates how distorted F2 reception can be thus making identification almost impossible.

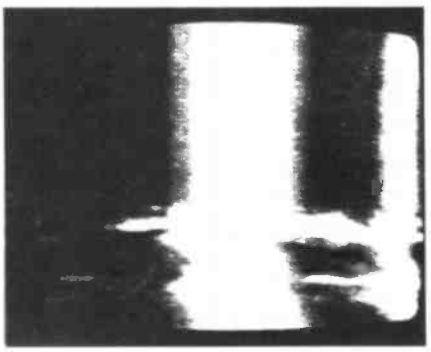


Fig. 6: Arabic subtitles received on channel E2 during an opening from the Middle East. The most likeliest source of transmission is Dubai.

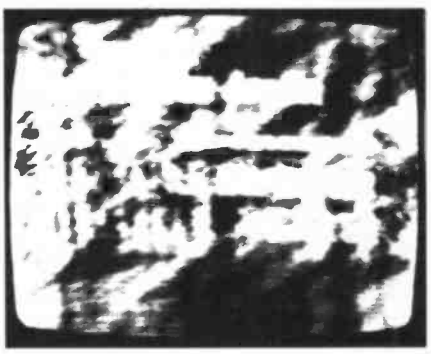


Fig. 7: A caption seen on channel R1 which is thought to have originated from a transmitter in the People's Republic of China.

GRUNDIG SATELLIT INTERNATIONAL 650

John Waite

The Grundig Satellit International 650 is a very versatile receiver being equally at home as a high quality portable or as a communications receiver. The frequency coverage includes l.w., m.w., v.h.f. f.m. and short wave from 1.6MHz to 30MHz.

My first surprise when the International 650 arrived was the size of the parcel which was about 600 x 340 x 270mm. Although there was plenty of protective packaging, the receiver itself was quite large at 504 x 242 x 202mm.

Once I had unpacked it, I sat down and read the manual, a good quality, A4 booklet with 54 pages. As is usual with this type of receiver, the manual was multilingual with six pages devoted to each language. Despite this seemingly small allocation, the features of the International 650 were explained adequately. There was also a fold-out sheet inside the front cover which could be referred to in order to locate the various controls.

I was delighted to see that the International 650 was able to work with a wide range of power sources. Probably the most common selection for this size of radio would be to use mains power. The International 650 was very well equipped being able to handle 110-127V and 220-240V a.c. at 50 or 60Hz. This should enable the receiver to be used almost anywhere in the world without any difficulties, which is a big plus point for the traveller. There was even a neat compartment next to the battery section which could be used to store the mains lead, though it wasn't quite big enough to hold the lead and a 13A mains plug!

If you enjoy working portable, there are yet more options as the International 650 can either operate from an external 10-16V d.c. supply or from internal batteries. When using batteries you have two options - either fit six R6 cells in the battery compartment or use a Dry-fit lead-acid battery. This latter option is very unusual on domestic equipment, but can be extremely useful as it allows extended periods of operation.

Regardless of which power source you use you will need to fit two R6 cells to provide back-up power for the clock and memories.

Having sorted out the power the next stage was to set-up an antenna. The simplest solution of course is to use the internal antennas which comprised the usual feritte rod for l.w. and m.w. and a 1440mm telescopic antenna for v.h.f. and the short waves. An interesting point with this antenna is that there is a stop at 810mm which is designed to be used for v.h.f. reception whilst the full length is used for short wave listening. Although these antennas work well within their limitations, best performance, on short wave can only really be obtained by using an external antenna. The connection for the external antenna could either be made via an unusual (at least in the UK) DIN 45325/75 type or alternatively wire connectors for antenna and earth.

The main benefits of using an external antenna are the potential reduction in interference, achieved by careful placing of the antenna, combined with increased signal strength. In order to realise these benefits, it is essential that the internal antenna is disconnected when using an external antenna. This is achieved on the International 650 by operating a small push-button next to the antenna sockets which selects either internal or external antenna. When receiving stations on l.w. it can be useful to be able to rotate the antenna for best reception. The sheer size and weight of the International 650 make it impractical to turn the receiver around so Grundig have fitted an additional socket and switch on the front panel marked DF to allow the connection of an optional, external l.w. directional antenna. This is a rather neat solution to this problem.

In addition to these basic connections the International 650 has one or two other useful features. The first is the provision of phono jacks on the rear panel for line in and out, this is matched with a DIN socket which is configured for connection to a tape recorder or record player. These sockets make it very easy to make recordings off air. One other feature is an external speaker socket which is designed for a 4Ω speaker, though it will work quite happily with the more common 8Ω types. Once an external speaker has been connected you can switch between internal, external or both speakers using a three way switch on the front panel.

Operation

The front panel is positively bristling with controls and buttons, 44 in all!. The power switch has three positions, centre off, down for on and up for timer. The timer option is quite versatile as it allows up to three separate on - off sequences to be programmed using the internal clock.

There is a choice of three speaker options, external speaker only, internal speaker and internal speaker with tweeter. I must say it's unusual to have a switchable tweeter but this could of course be useful when listening to poorer quality signals where disabling the tweeter will reduce the hiss.

If you're using the International 650 with batteries, there is a useful battery check switch on the front panel which when ooperated gives an indication of the battery condition on the S meter. This feature has been well thought out as there are two markings on the meter one for use with dry cells and the other for Dry-fit lead acid batteries. The second position on this centre weighted switch turns on the panel illumination, making the frequency scales and S meter very easy to read. If you are using mains power, where economy is not so important, the panel illumination remains on permanently.

Separate volume, treble and bass controls are provided to allow the user maximum control of the sound quality, which seems to be a hallmark of Grundig. In addition to providing good control of music on v.h.f. signals, these controls are also very useful on short wave as you can tailor the response to suit the signal. There was also a very useful three position bandwidth control which gave a choice of narrow, wide or extra wide i.f. response. This filtering is very useful for reducing interference from adjacent stations on the crowded short wave bands.

No short wave communications receiver would be complete without the ability to receive s.s.b. and c.w. transmissions and the International 650 achieves this using the familiar b.f.o. The selection of s.s.b. is done with a three position rotary switch on the front panel which caters for a.m., l.s.b. and u.s.b. The b.f.o. tuning control is immediately to the right of this control has has quite a wide range. This wide b.f.o. tuning range is

GRUNDIG SATELLIT INTERNATIONAL 650

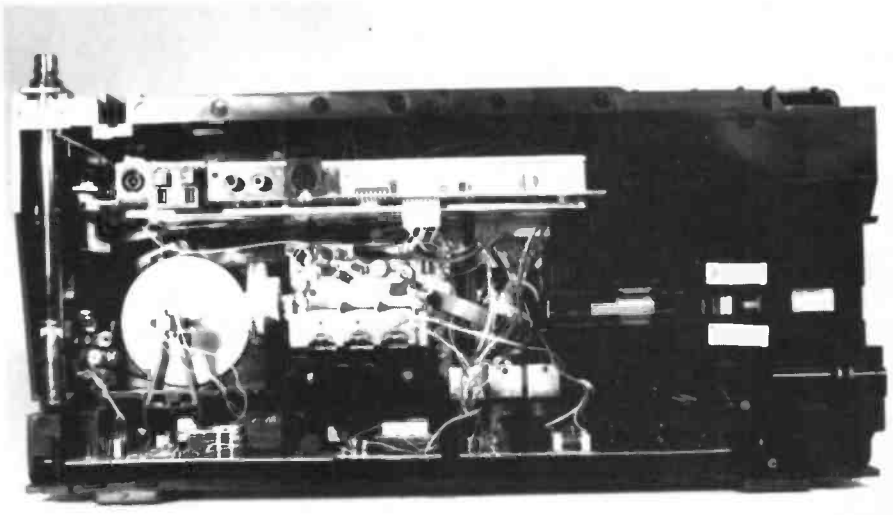
necessary as the smallest receiver tuning steps available are 1kHz. From this you can see that a b.f.o. range of at least 1kHz is required to fill in the gaps.

Another useful feature for s.s.b. and c.w. reception was the provision of a manual r.f. gain control. This rotary control can either be turned fully counter clock wise past the click stop for normal automatic gain control or advanced for manual r.f. gain control. Its main use is to reduce the r.f. gain in the presence of very strong signals and thus reduce the risk of internally generated interfering signals.

The final aid to reception was the provision of an automatic noise limiter. This was enabled by a switch on the front panel and was mainly of use on the short wave bands to reduce impulsive interference.

The International 650 was also equipped with an internal clock and timer functions. The provision of a timer can be very useful either as an alarm clock (though you would need a pretty big bedside table!) or for recording programs when you are away from home. The timer can be set for up to three separate on/off sequences during any 24 hour period. Unfortunately these sequences cannot be spread over more than one day. This limitation seems rather a shame as the International 650's clock also has a calendar, so it knows what day it is!

If you happen to own a Grundig tape recorder with remote start/stop facility, you can use a special lead to connect the tape recorder to the radio so that it automatically starts recording when the radio turns on.



Tuning

The International 650 features some interesting and well thought out tuning options. The choice of band was achieved by five pushbuttons on the front panel for l.w., m.w., s.w. and v.h.f. The fifth button was marked AUX and, if selected, allowed an external tape recorder or record player to be played through the International 650's audio stages.

Probably the most common tuning mode is manual and this is accomplished using the large knob on the front panel. The first thing you notice about this knob is that it is of the dual concentric type with the outer controlling the frequency, whilst the inner tunes an r.f. preselector covering the short wave bands. Separately tuned preselectors are something of a rarity these days, though they used to be very popular.

For those who have never come across a preselector, it is simply a set of tuned circuits close to the antenna input which act as a variable band pass filter. The object is to prevent all but the wanted signal from entering the signal processing stages of the receiver. By doing this you help to minimise distortion generated within the receiver. The International 650 displays the pre-selector tuning on a conventional analogue tuning scale which is some 250mm long and is placed at the top of the front panel.

I'm sure many of you are now thinking that in order to tune around the bands you have to tune both the main dial and the preselector. Fortunately, Grundig noticed this problem and have provided a neat solution in the form of a switchable motorised drive for the preselector. The default condition is for the drive to be on and this is indicated by the words AUT PRESEL appearing on the digital frequency display. When in this mode, the pre-selector dial automatically tracks the main tuning frequency. The tracking is not continuous, but follows the main frequency in approximately 50kHz steps. If you want to disable the automatic tracking and return to manual control you simply press the large button in the centre of the tuning knob. Actually, I found the auto-tracking quite fascinating and it's certainly a feature to impress your friends with!

Getting back to the tuning options, the frequency is shown by a five digit digital liquid crystal display near the centre of the front panel. The digits on this display are 16mm high so they are very easy to read, even under quite difficult lighting conditions. The resolution of the display was 1kHz on l.w., m.w. and s.w. whilst on v.h.f. it was reduced to 10kHz.

The second tuning option is to use direct frequency entry via the numerical keypad, again on the front panel. This method is particularly useful for large frequency changes and involves entering the most significant digits of the required frequency and pressing the red frequency set button. Like most modern receivers, the International 650 automatically inserts the trailing zeros.

Most modern receivers with digital tuning feature some form of frequency memory and the International 650 is no exception. In this case there are a total of 60 memories called station stores which are allocated to particular bands as shown here: l.w. 4 memories; m.w. 8 memories, v.h.f. 16 memories and s.w. 32 memories. This seems to be a pretty reasonable allocation which should prove adequate for most listeners. Entering a frequency into a memory was very simple and involved tuning to the required frequency entering the memory number on the key pad and pressing STATION STORE button. Unlike many receivers, there was no facility provided to scan through the memories which may dissappoint some readers.

Performance

Once I had made room for the International 650 in the shack it did perform remarably well. I mentioned earlier that Grundig are well know for producing portable radios with good sound quality and this was born out with the International 650. Fairly obviously, the best sound quality was obtained when listening to a local v.h.f. f.m. broadcast station. The 150mm speaker combined with the large case meant that the bass response was very healthy without being too boomy. The use of a separate tweeter also added clarity to the higher frequencies. When listening to a.m. broadcast stations I found it very easy to obtain optimum quality by careful adjustment of the bandwidth and tone controls. The bandwidth control was also very effective for reducing interference from adjacent stations.

The sensitivity was also very good and I was pleasantly surprised by the performance on the internal antenna. When connected to an external antenna, in my case a nest of dipoles covering from 3.5MHz to 28MHz, the performance was also very good. I did find that when used with an efficient external antenna system it was very easy to overload the receiver and cause all manner of spurious signals to appear. The newcommer can easily confuse this with appently good performance as there appears to be more stations on the band, the snag is that they are birdies. The solution to this problem is either to include a switchable attenuator in the antenna lead or to revert to manual r.f. gain control. The snag with using the manual gain control is that you experience the full effect of any fading and this can make to station very difficult to listen to. I think a receiver of this quality really ought to have an attenuator built in as standard. Despite my criticism, if you

GRUNDIG SATELLIT INTERNATIONAL 650

use the International 650 with its internal antenna or a relatively short external antenna you will rarely have a problem.

Moving on to s.s.b. reception, I tried the International 650 on various amateur and commercial signals and managed to resolve all signals with very little difficulty. I did find that I needed some practice before I could resolve all signals. The main problem was the 1kHz main tuning steps as it was very easy to tune either side of the signal but not quite hit the right point. The secret was to use the wide tuning range of the b.f.o. to fill-in the gaps betwen the 1kHz slots. The recovered audio quality was good when receiving strong signals but tended to be rather warbly with weak signals, though they were still quite readable. I found that the narrow bandwidth position was best suited to s.s.b. reception.

As the International 650 is capable of receiving utility transmissions, the next operation was to check c.w. RTTY, FAX and Packet data modes. The reception of these modes is very similar to receiveing s.s.b. but you need some additional decoding equipment. The one exception to this of course is c.w. which can be read by ear. I found that it was very easy to produce a good stable note using the b.f.o., which was fine for human or computer c.w. decoding.

Moving on to RTTY, I connected-up my BBC B computer, G3LIV terminal unit and G3WHO software to the audio output available from the DIN socket on the rear panel. The provision of this socket is particularly useful to the utility listener as the output level is independant of the volume control setting so you can turn the volume right down and still decode RTTY etc. Whilst testing the performance on RTTY I tried all the common frequency shifts of 170Hz, 425Hz and 850Hz and with careful use of the b.f.o. I was able to decode all modes with no particular problems. FAX and amateur Packet reception was also successful using an ICS Electronics FAX-1 and a Siskin Electronics TNC-220.

I found the tuning options to work very well and it was very easy to quickly change frequency by using direct frequency entry. The automatic preselector tuning was quite effective but never seemed to be quite in tune and a small manual adjustment was usually required to give best sensitivity.

One point I did find rather irritating was the two stage tuning control. If the tuning control was moved quickly the control logic selected a higher tuning rate of 3kHz steps on l.w., 5kHz on s.w., 110kHz on v.h.f. On s.w. there was a two stage shift of 111kHz followed by 111kHz. In addition to the higher tuning rate the audio stages are muted. Although this does allow fast and silent frequency changes, I found that the threshold was set far too low and it was very easy to all of a sudden find yourself way off frequency. The problem may have been due to me being too impatient, but I think prospective purchasers should bear this in mind when testing the receiver prior to purchase.

Summary

Although I had a few minor moans, if you fancy a top of the range Grundig then this model is certainly a very capable receiver. The performance on broadcast reception was very good and it has the potential for utility station monitoring, making it a good all round performer. The versatile power supply options are a big plus point and mean that it can operate in a wide range of conditions. I can well imagine the International 650 being used by people living in isolated areas anywhere in the world.

The International 650 is available from any Grundig dealer price £450. My thanks to Grundig UK and Johnsons Shortwave Radio for the loan of the review model.□

Specifications

Frequency Range:	f.m. 87.5 - 108MHz l.w. 148 - 420kHz m.w. 510 - 1620kHz s.w. 1.6 - 30MHz
Filters:	f.m. 3 ceramic. a.m. 2 crystal + 1 ceramic.
Output:	30 watts peak
Power Requirements:	220-240V a.c. 50/60Hz 110-127V a.c. 50/60Hz 10-16V d.c. 6 x R20 cells Grundig Dry-fit lead-acid
Dimensions:	504 (w) x 242 (h) x 202mm (d)
Weight:	8.5kg without batteries.

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It is surprising how much more pleasant copy can be on noisy, or crowded bands, by adding the ASL5 to what was previously regarded as a well filtered set! Many letters from customers confirm our findings that the popular general coverage receivers and transceivers show a very cost effective improvement with this filter. If you need any further convincing, read the review in the April 87 Shortwave Magazine!

ASL5 Kit: £14.90 **Assembled PCB Module: £22.50**

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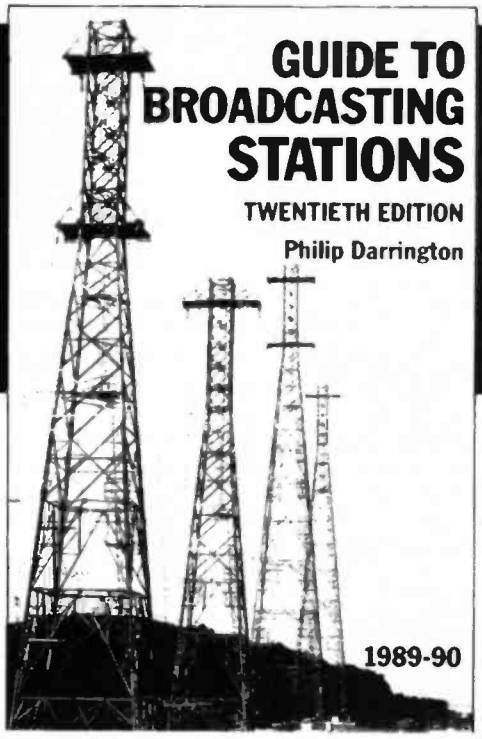

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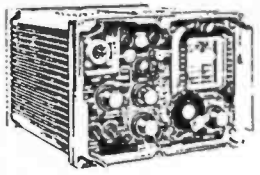

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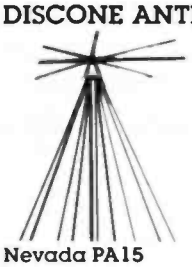

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ANTENNAS

F. C. Judd G2BCX
Part 4

This month Fred Judd completes the sections on radiation patterns and begins on "directivity gain" - with some simple calculations!

Vertical Antenna, Horizontal Radiation Pattern

All single vertical antennas have a "circular" horizontal radiation pattern, which means that the magnitude of radiation in all directions through 360 degrees is constant. Hence such antennas are omni-directional. This magnitude is, however, directly related to the magnitude of maximum for vertical radiation which actually becomes the radius of the circular pattern. The magnitude figure of 100 (see Part 3) used as maximum for the example horizontal radiation pattern, Fig. 3.2, would be the same for the vertical angle radiation from this antenna and becomes the radius for the otherwise circular pattern. Refer to Part 1, Fig. 1.4.

Multi-Element Antennas

Calculating radiation patterns for antennas with a number of active (driven) elements, or uni-directional antennas with one and sometimes two driven elements, a reflector and a number of directors (parasitic beam antennas), involves trigonometry that can become complicated. For those interested in pursuing this subject some books are recommended (6, 7, 8). Computer-produced radiation patterns for some multi-element antennas will be included later as and where applicable.

When antennas consist of a number of active and/or passive elements, radiation may be concentrated in one or, perhaps two, main directions. Radiation so directed may be much greater than that from, say, a dipole, even though the r.f. power fed to the highly directive antenna is the same as that fed to the dipole. This has brought about the use of the term "gain" but which is often expressed in a way that can be very misleading.

Directivity Gain

It has been illustrated that all antennas are directive in one way or another. With certain types of antenna the power radiated in 1, or perhaps 2, directions may be much greater than the power supplied to the antenna. From this it might be assumed - wrongly - that an antenna is capable of amplifying the power supplied to it, in the same way that a valved or transistorised amplifier can amplify a small a.c. voltage at its input and produce a replica of that voltage 100 times greater at its output. The latter is an "active" device, whereas an antenna is passive: it cannot amplify anything. The so-called "gain-factor" is purely relative and it all begins with a hypothetical antenna known as an isotropic radiator, sometimes called a "point source" radiator which is assumed to radiate (hypothetical) power equally in all directions around it.

An isotropic, or point source, radiator might be visualised as being at the centre of a sphere, as illustrated in Fig. 4.1(a), the sphere having a surface area equal to $4\pi r^2$. If the power radiated from the source is (Pr) then, for the distance (r) to a point (p) anywhere on the surface of the sphere, the unit power (Pu) will be $Pu/4\pi r^2$. Because the radiation from an isotropic radiator can be regarded as uniform in all directions, its gain (more correctly "directivity gain") would be absolute unity.

This otherwise non-existent radiator is a useful reference by which the directivity gain of all other antennas can be compared. For example, if the isotropic could be replaced by a uni-directional antenna, such as a parasitic beam, the radiation from this reaching the surface of the sphere, Fig. 4.1(b), would be concentrated over an area formed by the cross-section of that radiation taken between the angles intersecting the points where the magnitude of the radiation is 0.707 of maximum, *i.e.* -3dB. If the cross-section is circular as in Fig. 4.1(b) and with a diameter of, say, 30 degrees its area is:

$\pi/4 \times d^2 = \pi/4 \times 30^2 = 706.8$ sq. degrees.

The ratio of this area to that of the sphere, also in square degrees, is a direct ratio of the directivity of the real antenna with reference to the isotropic source. The "directivity gain" of the real antenna can now be determined with reference to an isotropic source as well as to a half-wave dipole.

First, the surface area of a sphere is found from:

$4\pi \times 57.295^2 = 41252$ sq. degrees.

Next we obtain the gain in radiated power due to directivity from the surface area of the sphere divided by the cross-sectional area of radiation at -3dB, as above:

$41252/706.8 = 58.36$.

This is known as the "power gain" of the antenna which, incidently, is used to obtain the effective radiated power (e.r.p.). However, the directivity gain in dBi, that is gain with reference to an isotropic source for the example will be:

$10 \log_{10} 58.38 = 17.66$dBi.

The letter "i" is used to indicate that the figure quoted for gain is with reference to an isotropic radiator.

We will conclude this topic next month. □

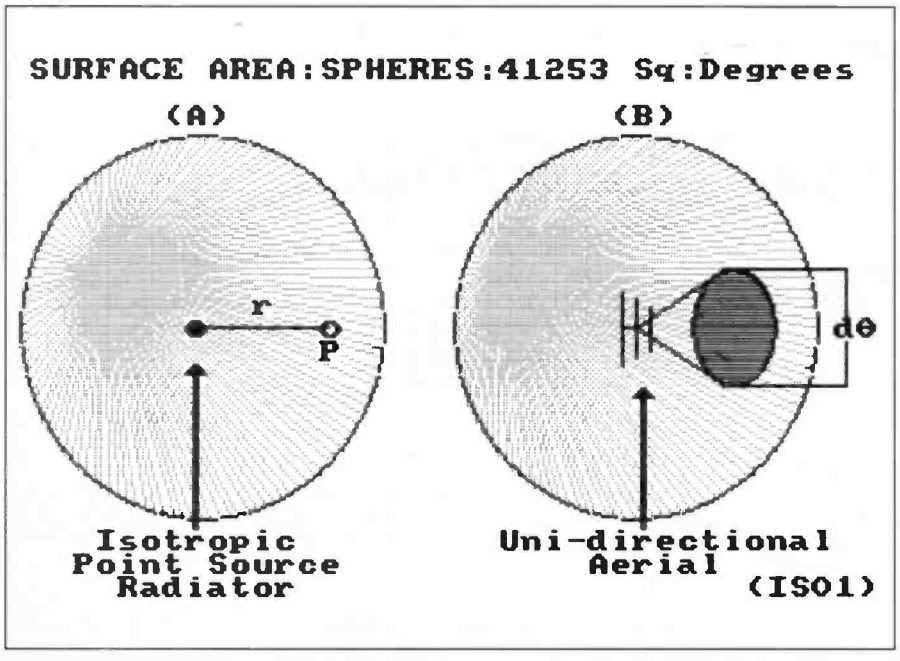

Fig. 4.1: The isotropic (point source) radiator. Annotations and text describe the theory.

References

(6) *The Services Textbook of Radio, Vol.5*, HMSO 1958.
(7) *Antennas*, John D. Kraus, McGraw-Hill Book Co.
(8) *Beam Antenna Handbook*, W.I.Orr W6SAI, Radio Publications Inc. (available from *SWM* Book Service).

Abbreviations	
a.c.	alternating current
dBi	decibels referenced to an isotropic radiator
e.r.p.	effective radiated power
r.f.	radio frequency

A HEXAGONAL LOOP ANTENNA

John Ratcliffe

A good loop antenna is perhaps the most important item of equipment used by the serious l.w. or m.w. DXer since its directional properties can be employed to "null-out" an unwanted signal. After much experimenting, John Ratcliffe decided to adopt a hexagonal shape for his latest m.w. loop, the performance of which exceeded all his expectations.

The key to success with any loop design lies in utilising low-loss construction. Some reduction in the losses can be achieved by using good quality components and by making as much use as possible of air spacing for the main loop winding, but the nature of the conductor used for the main winding is really the most important consideration if the losses are to be significantly reduced.

It has been known for many years that a much better performance can be obtained from a tuning coil by reducing the high frequency resistance of the conductor used for the winding. Since a loop antenna is just a large version of a tuning coil, reducing the high frequency resistance of the conductor used for the main loop winding will greatly improve the performance. This can be achieved by winding the main loop with Litz wire instead of using the plastic covered "hook-up" wire so frequently employed for the purpose. Unfortunately, commercially made Litz wire is often difficult to obtain in small quantities, so it may be necessary to fabricate your own by twisting together a number of insulated strands of wire.

I made up about 30m of 16 strand Litz wire by adopting the following technique. Firstly, I walked to the end of my backyard and drove a 50mm nail halfway into a fence post. I then moved to another fence post some 30m away and drove another nail halfway into it. Armed with a reel of 36 s.w.g. enamelled wire, I tied the end of the wire to one of the nails and using a large screwdriver as a spindle for the reel, I walked to the other nail, passed the wire around it and then walked back to the first nail, unrolling the wire, and passed the wire around it. This process was repeated until there were 16 lengths of wire between the nails. I then put a binding around one end of the wires and placed it in the chuck of an electric drill. While keeping some tension on the wires to avoid them touching the ground, I then turned on the drill so as to twist the strands into a rope. My drill operates at 1500 r.p.m., so I left it running for about a minute to obtain the required amount of twist. Whilst applying some tension to the wire so as to avoid it forming a tangle of loops, it was carefully removed from the drill chuck. Still maintaining the tension, I then wound it on to an empty reel while moving towards the far end of the wire.

Making The Frame

Having made the Litz wire, the next job is to make the frame. Although the frame for the prototype was made from 15mm dowelling, 20mm square section timber could be used if preferred. Three lengths are required, one for the upright, which is 1220mm long and two for the cross-arms and which are 610mm long - see Fig. 1.

The first stage in making the frame is to mark the upright at a point 305mm from its upper end with a pencil, so as to indicate the centre line of the upper cross arm. A similar pencil mark is made 305mm from the lower end of the upright to indicate the centre line of the lower cross arm. The cross-arms are attached to the upright at these centre lines by means of

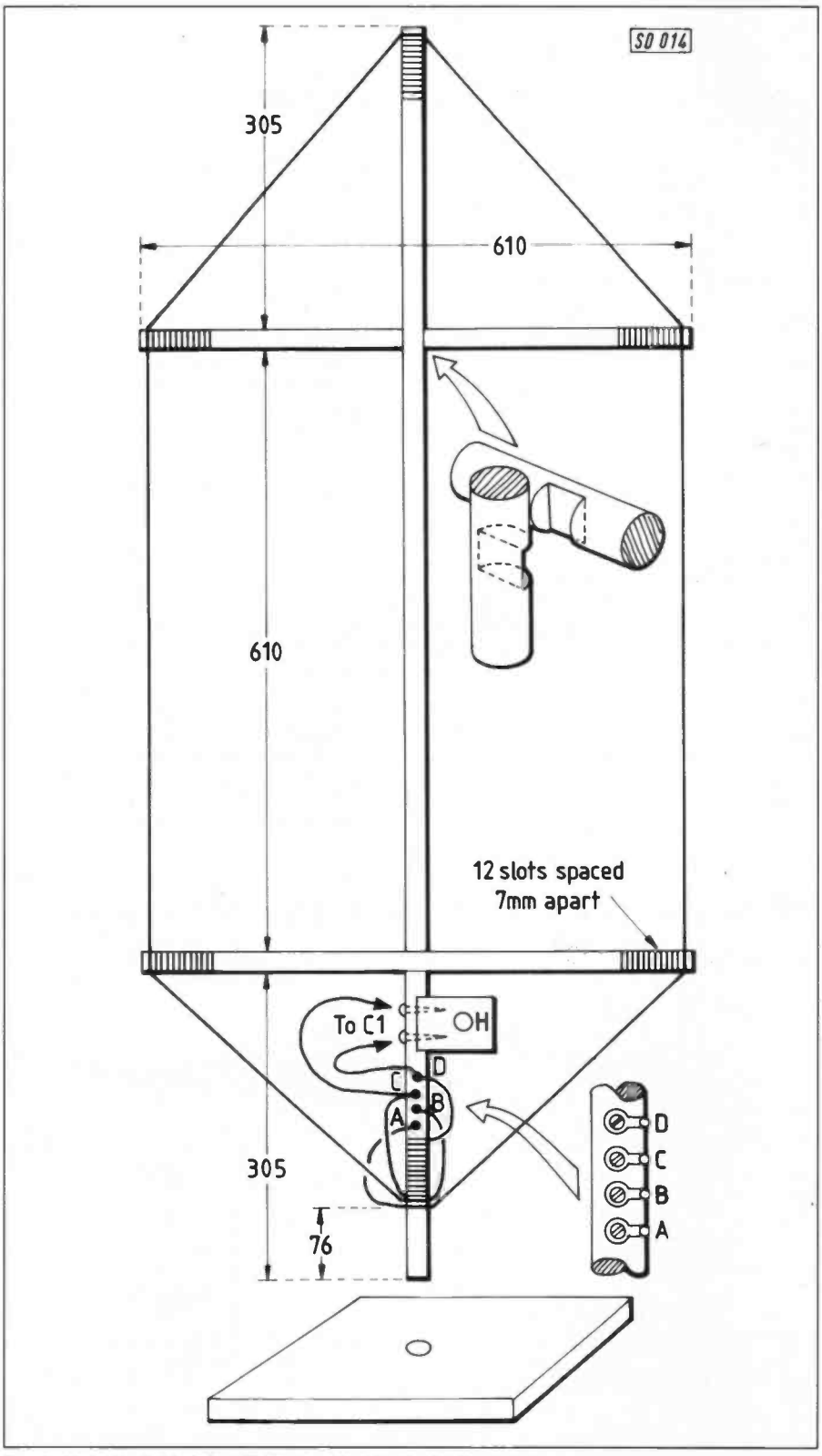

Fig. 1. Note that 14 slots will be needed in the bottom arm.

A HEXAGONAL LOOP ANTENNA

glued, halved joints as shown in the drawing.

The halved joints on the upright are made by using a fine saw to make cuts across the dowel 7.5mm above and below the two marked cross-arm centre lines - the depth of each cut must not exceed half the diameter of the dowel. The wood between the saw cuts is then removed with a file so as to form a half joint. To ensure that both half joints lie in the same plain on the upright it is essential to prevent the dowel from rotating during the whole of these operations.

To make the halved joint at the centre of each cross arm, mark the centre point of the arm with a pencil and then make saw cuts 7.5mm on either side of it to a depth of half the diameter of the dowel. File out the wood between the cuts. Apply wood glue to all joint surfaces and when tacky assemble the frame. Check the symmetry with a square and clamp the joints together for at least twelve hours.

The next job is to mark out the positions of the slots for the wire turns. Starting at the upper extremity of the upright, mark out with a pencil and ruler twelve slot positions spaced 7mm apart down its face. Repeat the procedure, starting at both extremities of the cross-arms and. Note that the slot positions at the lower end of the upright commence at a point 76mm up from its lower end - this leaves sufficient dowel free to enable the frame to be rotated in a 15mm hole drilled in a square mounting block.

Using a fine-toothed tenon saw, cut twelve 4mm deep slots into each arm of the frame (14 in the bottom arm) - they should be just wide enough to allow the Litz wire to be pressed into them and then wedged with match sticks.

Winding The Loop

Starting with the innermost slot at the lower end of upright, fit one turn of Litz wire around the innermost slots of the frame to form a pick up winding. Pull the wire tightly into position so as to remove any sag and then wedge it into the slots with match sticks coated in glue. Make sure that the type of glue used will not dissolve the insulation on the wires - polystyrene cement may be suitable. Next, carefully remove the insulation from the ends of each strand of the Litz wire so that they can be soldered to the anchor tags A and B. These tags are subsequently connected to the antenna and earth terminals of your receiver as described later.

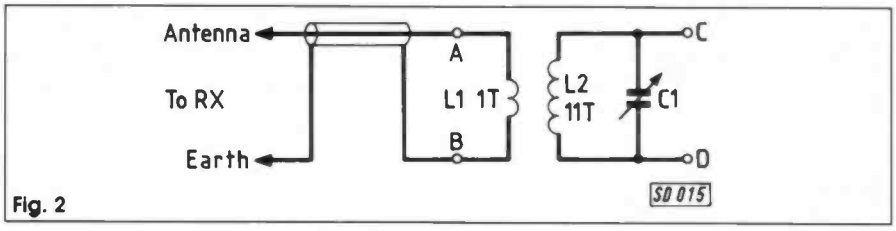

Fig. 2

The main winding is wound in exactly the same way, starting at the innermost slot in the lower end of the upright, adjacent to the coupling turn. Apply a little tension to each turn as it is wound so as to remove any sag and secure it in place in the slots in the upright and cross arms with matchsticks coated in glue. If a 500pF variable capacitor is to be used, 10 turns will be required to cover the m.w. band. This will leave one slot spare at the outer ends. If the variable capacitor has a maximum capacitance of only 350 to 400pF, 11 turns will be required, so make use of the spare slot for the extra turn. Finally, remove the insulation from the ends of each strand of the Litz wire and solder them to the anchor tags C and D.

Next, the small wooden panel used to support the variable capacitor should be prepared. The dimensions of this panel and the holes required have not been detailed as they will depend upon the type of variable capacitor employed, but it should be of sufficient thickness to allow it to be attached to the upright, just below the lower cross member, with glue and two small woodscrews. To ensure a rigid joint, use a rat- tail file to form a concave recess along the edge of the panel where it butts against the upright.

The two terminals on the variable capacitor should now be connected via two short lengths of wire to the anchor tags of the main winding C and D. It may be advisable to fit a slow-motion drive to the capacitor, as the tuning is sharp.

Using the Loop

Providing the receiver in use has either antenna and earth terminals or a coaxial antenna socket, a metre or two of coaxial cable can be used to link the loop with the set. The inner conductor of the coaxial cable should be connected to tag A and the outer braiding to tag B of the loop coupling winding. At the receiver end, the inner conductor is attached to the antenna terminal and the outer braid goes to the earth terminal, or a coaxial plug can be fitted to the end of the cable if a suitable socket exists. The loop may also be used with receivers which have a built-in ferrite rod antenna but lack external antenna and earth connections. In this case the loop is placed near to the receiver, but note that there is an optimum spacing which results in maximum gain without introducing spurious whistles and "birdies". In my case this was between 200 and 250mm. To find the best position, adopt the following procedure. Start with the loop well away from the receiver and tune in a weak station. Rotate the set so as to obtain the best signal strength. Now bring the loop near to the set and tune and rotate it for maximum signal - the improvement will be sensational! Finally, readjust the position of the loop for optimum performance. Once you get used to operating the set and the loop in this way, they can both be tuned simultaneously.

As described, the loop is suitable for m.w. work. For short wave and Tropical Band use, wind on only four turns initially for the main winding and check the range covered. More turns can be added if necessary, indeed, 5 or 6 may be needed to cover the Tropical Band, but with this type of construction it is quite easy to add or subtract turns. □

AIRBAND

Godfrey Manning G4GLM

Of the 31 entries to the competition 12 were outstandingly detailed. One of these was selected at random as the prizewinner. The prize, a radio-magnetic indicator (see photograph) is now on its way to **C.P. Andrew G8YKE** (Kettering, Northamptonshire) - congratulations!

The object was to describe the aeronautical landmark shown in the January "Airband." It is the No. 1 Hangar, Cardington Aerodrome, Bedfordshire, and its association is with airships. Although built for earlier projects and involving the Shorts company it is best remembered for the construction of the R101 which crashed in France on 5 October 1930. Since those days the hangar has been used as a depot through which many of you passed on war or national service; and more recently has become home to the Skyship series of aircraft built by Airship Industries (UK) Ltd. to whom our thanks are extended for permitting the taking of the photo. You'll find a lively account of the R101 affair in *Air Disasters* by Stanley Stewart (Ian Allan).

You Write

Welcome to new reader **Jeremy Cottingham** (Gainsborough, Lincolnshire) who has started flying lessons at Humberside - hope you'll tell us more, and good luck for the general flying test as well as your ambition to become an air traffic controller. Jeremy thinks that the former RAF Binbrook site (once home of the Lightnings) will go for either housing or a prison. Around my part of the world, the remnants of RAF Hendon are disappearing as the Joint Services Air Trooping Centre is flattened to serve the relentless needs of the property developers.

Lucky **Paul Whiteley** (Poulton-le-Fylde, Lancashire) had a winter holiday in Lanzarote but the return flight by Orion Boeing 737 was turbulent owing to restrictions to FL310 to fit in with traffic in the Seville area. Not too good for the fuel consumption either.

To answer your questions, controllers and pilots working international flights need to demonstrate their ability at radiotelephony in English but this doesn't to my knowledge involve an enforced training in an English-speaking country. The calibration of the instrument landing systems (i.l.s.) at civil airports is done by a Civil Aviation Authority (CAA) HS.748 (the RAF have their own).

Lastly, there are two maintenance schedules for aircraft: "planned" and "on condition". The period between "planned" overhauls depends on the life of the component in question and is laid down in the manufacturer's schedule for individual aircraft types. "On condition" applies to those components where they are monitored and dealt with when they show problems.

"Where is the Liberty holding point for Lakenheath & Mildenhall?" asks **Paul Field** (Park Street, Hertfordshire) - answers please, as this might be an ideal place to do a bit of spotting. Paul lives near the disused Radlett airfield, once part of the Handley Page empire and a couple of years ago re-opened for Skyship tours. From home Paul sees traffic for Elstree, Leavesden and Hatfield - to the latter, Heavylift Belfasts are visible approaching 06 with cargos of airframe components for British Aerospace: an impressive sight!

Godfrey announces the winner of the Christmas Competition! Your letters, together with a feature on altimeters, and more frequency news make up this month's column.

The competition prize was this radio magnetic indicator (r.m.i.) which has been sent to the winner courtesy of the Godfrey Manning Aircraft Museum.

Frequency and Operational Information

From the CAA *General Aviation Safety Information Leaflet* 1/89 I see that the Dunsfold (Surrey) n.d.b. on 401kHz has been withdrawn as has Foulsham aerodrome in Norfolk, where the runway has also been removed. At Gaydon (Warwickshire), the old V-bomber base, there is still a runway but this is divided up as a vehicle test track - aircraft keep off! At Aylesbury/Thame airborne visitors are no longer welcome but there is still gliding at weekends. The Cardiff special rules zone now has two new visual reporting points at St. Hilary TV mast and Cowbridge.

A new eastbound airway, W1, now joins the Daventry, Clacton and Dover v.o.r.s and it has OLNET, HEIDI, POTON and JACKO as on-request reporting points. This news was in January's *Air-Strip*, the journal of the Midland Counties Aviation Society; to join, send £9.50 to the Registrar, R. Queenborough, 17 Leylan Croft, Birmingham B13 0DB.

CAA Aeronautical Information Circular (AIC) 100/1988 warns that at London (Stansted) pilots can hear the ground controller on 118.15MHz talking to aerodrome vehicles, but that drivers' replies are NOT audible to pilots. Pilots must take care not to respond to instructions prefixed "Vehicle" in the mistaken belief that the controller is talking to them.

AIC 15/1989 describes various radio problems including the warning not to accidentally leave an aircraft transceiver on transmit - even placing a headset to one side could cause it to land on the transmit switch. Co-channel mutual interference is minimised by not re-allocating an airport's frequency to any other service that would reduce the protection range to below 25nm under normal propagation conditions. For full details of all the above, please see the relevant *AIC* or NOTAMS.

Follow-Ups

In the February "Airband" the longitude of the IBY v.o.r. was meant to be 001°44'40"W. On page 34 is a photo of me about to board Skyship 500HL G-SKSB in the hangar at Cardington and on the opposite page that's me in the foreground pre-flight checking Alouette II F-GCQX prior to a short flight at Quiberon, France. Both photos were by Christine Mlynek.

The "killer" altimeter was described in the March "Airband", **Glenn Davies** (Thames Ditton, Surrey) has obtained a clearer-reading, but faulty, altimeter from Parkhouse Aviation, Tel: (0276) 33067 for details.

The fault is invariably with the spindle that connects to the aneroid capsule and runs parallel to the length of the instrument: the bearings at each end break off. The rear bearing passes through the internal frame of the instrument, the front one is part of the spindle; both can be replaced by sewing needle points glued in with two-part epoxy. If the hole in the frame is too big for the needle, fill the space with an additional pin. If you install this in a car, don't forget to reset to 1013mB if you drive up a hill higher than the transition altitude! Do-it-yourself repairs are NOT to be installed in aircraft or used for parachuting!

Bill Symes G8AIV is professionally involved in aeronautical radio and adds more company h.f. stations to those listed in January's "Airband:" Berne Radio 10.069kHz, and Schevening Radio. The 5.680MHz emergency frequency is backed up by secondaries on 3.023, 5.695 and 4.822MHz.

The problem with breakthrough on the Sony ICF-2001D (February "Airband") has also been experienced by **D. Paget - Wideangle on c.b.** (Farnborough, Hampshire). This occurs when using the Sony AN-1 wide range antenna and I wonder just what's in this antenna that might cause this? Any details appreciated.

David Edwardson (Newcastle upon Tyne) need not lament the absence of Scottish airports from the VOLMET broadcasts; the new frequency for Scottish Volmet (125.725MHz) was fully described in the March "Airband." I believe that airborne v.h.f. transmitters use a few tens of watts, and h.f. sets might run 100W or more although, as has been previously noted, the antennas used are so short compared to a wavelength on h.f. and so inefficient that the effective radiated power is small. Does anyone know the power of the London Air Traffic Control Centre relays?

Information & Sources

In Kenilworth, Warwickshire **Mike Newell G1HGD** is ready equipped to descend on his local airports armed with camera, binoculars, etc. On this subject let me repeat the usual plea: no matter what sort of radio you are listening to in a public place like an airport, please LISTEN THROUGH THE EARPIECE! Mike has found the coveted *ABC World Airways Guide* in two volumes. Travel agents receive monthly updates so you might be able to persuade your local agent to part with a back-number. Apparently every flight in the world is listed in this comprehensive timetable.

Elsewhere in this magazine (Seen & Heard, Nov 88, Feb 89 and quarterly), you will find that interest is being stimulated in marine navigational beacons. These are similar to n.d.b.s but tend to have suitable coastal locations. Bearing finding is typically with a hand-held directional receiver equipped with a compass.

Aeronautical n.d.b.s sited near the coast can also be used by mariners so there is some overlap. **Phillip Rambaut** (Macclesfield, Cheshire) points out that *Reed's Nautical Almanac* lists the beacons within range of the coast but both he and **Leslie Biss** (Knaresborough, N. Yorkshire) would like to know where aircraft n.d.b.s are listed in full. The answer is in the various supplements produced by a number of organisations. Last month's "Airband" listed the addresses of Aerad, Jeppesen and the RAF. If you're interested in n.d.b.s then I would recommend the RAF *En Route Supplement* that covers the geographical area you require. Just as a reminder, they are sold to the public by 1 AIDU at RAF Northolt (Tel: 01-845 2300 X209).

I must point out that with regret I am unable to reply directly to letters; not only are there too many of them (thanks to all of you for your encouraging response!) but I do like to share the answers with everybody by printing them in this column.

Lastly, Leslie can't identify certain beacons from their callsigns. Here are the missing ones: 335kHz OTR Ottringham (just east of Kingston-upon-Hull); 344kHz OLD Oldham; 408.5kHz FY Finningley; 365kHz HMS Humberside; 389kHz BV Las Palmas (Canary Islands); 381kHz SPY Spijkerboor (near Amsterdam). Can anyone identify TTN on 348kHz?

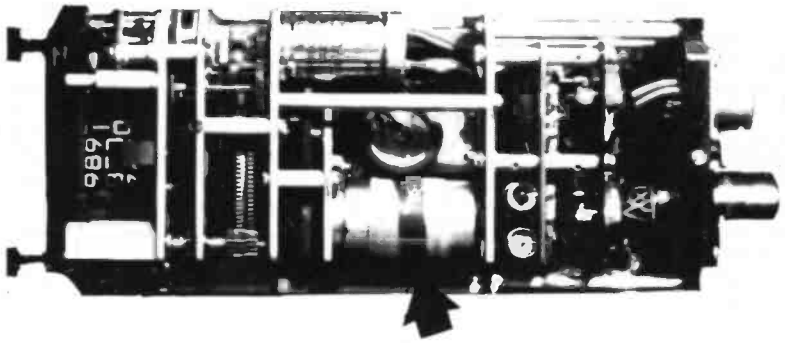

Fig. 4: The mechanism inside a servo electronic altimeter. The arrow points to a shaft encoder which supplies the radar transponder height information.

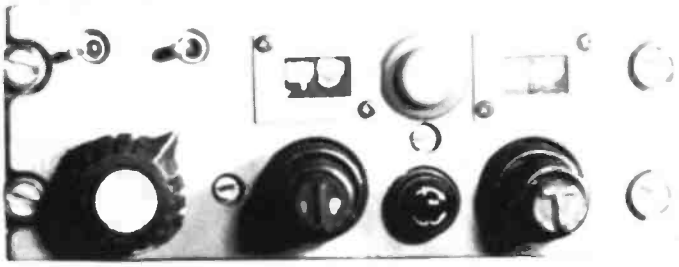

Fig. 5: Cockpit controller for a secondary surveillance radar transponder; squawking 4321 in mode C.

Altimeter Settings

Altitude is one of the most important items of information exchanged in the constant dialogue between pilot and air traffic controller. Close to the ground, larger aircraft use radio altimeters in the final stages of landing but for air traffic control purposes altitude is deduced indirectly by measuring the outside air (static) pressure. This pressure decreases with altitude in a known way, being about half that at sea level on reaching 18000ft. The foot is used for altitude measurement in nearly all countries.

One problem with air pressure is that it varies at any given place with the weather. The pressure altimeter has an adjustment in the form of a barometric subscale in order to compensate for this. The barometric pressure setting is given to the pilot by the controller (who in turn is equipped with a barometer).

Looking at Fig. 1. the aircraft is on the ground; setting 995mb on the subscale gives a reading of zero. This setting is given by the controller as the QFE: it is different from one airfield to the next, because no matter how high the airfield is above sea level, the local QFE always gives a reading of zero on the altimeter whilst on the ground. The simulation here is for Belfast (Aldergrove) airport; without moving the aircraft from its parking place, a QNH setting of 1004mb (Fig. 2.) gives

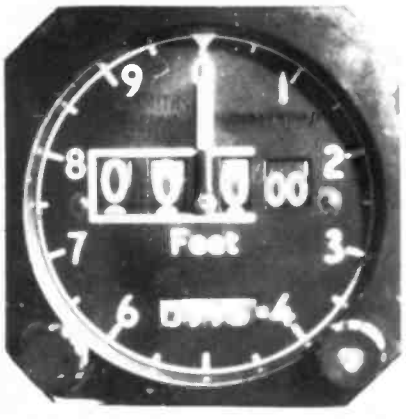

Fig. 1: QFE set to 995mb. On the ground altimeter reads zero feet.

Fig. 2: QNH set to 1004mb. On the ground, altimeter reads airfild elevation of 267ft.

Fig. 3: QNE (1013.25mm) set. Airborne, altimeter reads FL170.

the airfield's height above sea level: 267ft.

The QNH is the same for all airfields within the same weather zone: once set on the altimeter, height shown is that above sea level. QFE is useful for landing (because you touch down when the altimeter reads zero) and QNH for en route flights at the lower levels - because you know your height above sea level, and also that of the surrounding terrain, so you can tell if you're in danger of colliding with any hillsides.

At higher levels, small errors in actual height above sea level don't matter - the hilltops now being safely below you. So correcting for changes due to the weather is less important. What does matter, though, is that everybody sets their altimeters the same: if I'm flying 1000ft above you there's no danger of a mid-air collision. But by adjusting the altimeter setting you can make the instrument read almost anything you want. What if mine's set differently to yours? They might show a 1000ft difference even if we're actually at the same altitude! So for higher levels the QNE standard of 1013.25mb is adopted by all aircraft.

The transition altitude (above which the change from QNH to QNE is made) varies from one air traffic control zone to the next. Fig. 3. shows a reading of FL170, because with QNH set, the last two digits are ignored and the flight level (there's one every 100ft) is used instead.

In fact the altimeter in the photos is an airliner type electronic variety from my museum. Its workings are seen in Fig. 4; an arrow points to a shaft encoder which is connected via a socket to the secondary surveillance radar transponder (Fig. 5.). Radar is another subject on its own; but just note that secondary radar transmits the altimeter reading to the controller for display on his radar screen. This reading always appears as if the altimeter were set to QNE. □

Abbreviations

CAA	Civil Aviation Authority
FL	flight level
ft	feet
h.f.	high frequency
kHz	kilohertz
mb	millibar
MHz	megahertz
n.d.b.	non-directional beacon
nm	nautical mile
QFE	height above airfield
QNE	standard pressure setting
QNH	altitude
v.h.f.	very high frequency
v.o.r.	v.h.f. omni-directional radio range
W	watt

This is **NOT** a competition- but who can explain the purpose and operation of this altimeter? ICAN stands for International Commission for Aerial Navigation. The pointer only gives a coarse reading- to the nearest couple of hundered feet- and there is a setting knob which moves an index mark in a small window.

DRAKE R-4C RECEIVER

Ken Michaelson G3RDG

Nostalgia is the name of the game for many of our readers and when Jim Chambers G4IBK offered to let Ken Michaelson look at his Drake R-4C vintage receiver he couldn't resist. The R-4C dates back to the mid-70s and Ken was obviously very impressed.

The R-4C was manufactured by the R L Drake Company of Miamisburg, Ohio in the years between 1973 and 1978 and retailed at around £500 at the end of its production life. On the second-hand market it currently commands a price-tag of around £140. Jim Chambers' receiver, serial number 24414, is in pristine condition and even has its original box and instruction manual.

To show the differences between the R-4C and the latest generation of receivers such as the Icom IC-R71E, the Drake has 6 valves, 15 transistors and 22 diodes compared to the Icom's 90 transistors, 19 f.e.t.s, 237 diodes and 47 i.c.s — a measure of progress?

First Impressions

My first impressions were of solidity followed by the thought that it had been designed "for people with standard size fingers". There is no internal speaker, so that you have to provide either an external one or use headphones and I chose the former. I also found it necessary to read the excellent instruction manual before attempting to operate it, mainly because it is so different to present day receivers.

In my opinion the tuning knob is the heart of a receiver and on the R-4C this control is a pleasure to use. About 45mm in diameter it has a plain knurl moulded round the outside and an aluminium sleeve on the inner edge which is only connected to the knob by friction. This sleeve is used in conjunction with the knob to achieve the correct dial setting. A finger dimple on the front face of the main tuning knob makes it easy to spin the knob for fast tuning.

The display, if it can be called that, has two transparent discs which show concentric scales and rotate at different rates. The outer disc indicates up to 100kHz while the inner one shows hundreds of kHz. The frequency tuned is the sum of the readings shown on the two discs plus the setting of the BAND switch at the bottom left of the front panel. As an example if the BAND switch is set to 3.5MHz the outer dial reads 100 and the inner 36, the frequency set is 3.630MHz. It takes a bit of getting used to, especially after digital readouts! Each complete revolution of the tuning knob covers 25kHz and the word STOP appears at either end of the travel surrounded by radial lines similar to those used at the approach to roundabouts on fast roads. The only awkward thing about the tuning knob is that it works in reverse to all the other rigs that I have used recently. To increase frequency the knob is turned anti-clockwise.

The Circuit

The straightforward circuitry takes me back to the days when it was possible for an enthusiastic amateur to construct his own receiver without too much difficulty. There is the familiar superhet lineup of r.f. amplifier, frequency changer, i.f. amplifier, detector and audio amplifier with none of those dozens of transistors and i.c.s which I find so complicated and difficult to understand! Signals from the antenna are fed to a permeability transformer and are then applied to the grid of V1 — a 6BA6 r.f. amplifier. The amplified signal is taken from the anode of V1 to the grid of the first mixer, a 6EJ7, through transformer T2. The pre-mixer circuitry includes a transistorised, permeability tuned v.f.o., crystal controlled oscillator Q12, pre-mixer valve V6 and the outputs T3 and T4 and their associated tuning and coupling capacitors. The permeability tuned oscillator (p.t.o.) tunes from 4.995 to 5.455MHz and its output is applied to the cathode of the pre-mixer valve, V6. The output of the crystal controlled oscillator is also applied to the grid of V6. The crystal controlling the oscillator is selected by the XTALS and BAND switches on the front panel. The essence is that the crystal frequency selected will always be such that the difference frequency obtained by heterodyning the output of the p.t.o. with the output of the crystal controlled oscillator will be 5.645MHz higher than the desired signal frequency.

The output of the pre-mixer valve is coupled to the first mixer V2 through the output coils and their associated capacitors. Heterodyning of this output and the r.f. amplifier output in V2 results in a difference frequency of 5.645MHz from V2. The tuning of the r.f. coils and the pre-mixer output coils is ganged to maintain a fixed frequency relationship in the circuitry and the output from V2 is then applied to the input of a four-pole crystal lattice filter with an approximate bandwidth of 8kHz. The output from this filter is applied to the gate of Q1, the 5.645MHz i.f. amplifier and from here through a noise blanker if fitted — it was not on the example I tried — arriving at grid 1 of V3, the second mixer (6BE6). Here the 5.645MHz signal is mixed with the b.f.o. output.

In the s.s.b. and c.w. modes the output of V3 is the sum of the 5.645MHz and b.f.o. output, or approximately 5.695MHz, depending on the setting of the PASSBAND TUNING control. In the a.m. mode, however, the b.f.o. is switched off and V3 functions as a buffer amplifier with the output at 5.645MHz. As the frequency of the b.f.o. is varied by the PASSBAND TUNING control the wanted sideband or portion of the 5.645MHz i.f. signal is positioned within the passband of the 5.695MHz crystal filter. The output from this is now applied to the grid of V4 through the MODE switch. The 5.695MHz signal is mixed with the 5.645MHz oscillator in V4 and the output of V4 tuned to the 50kHz difference frequency by i.f. transformer T7C. The *Q* of T7C is changed by the position of the MODE switch and in the CW .5 or CW .25 positions the high *Q* tap is connected to provide additional selectivity.

The 50kHz signal from T7C is coupled to the grid of V5 through "T-notch" filter T8 and its associated circuitry. V5 further amplifies the signal before it reaches the detectors. The signal route from i.f. transformer T10 is decided by the MODE switch. In the a.m. mode the b.f.o. is off and detection is effected by diode CR4 with the resulting audio amplified by Q6. In the s.s.b. and c.w. modes the b.f.o. is on and both the b.f.o. and i.f. outputs feed the product detector CR2 and CR3. The audio amplifier is straightforward consisting of a direct coupled Class A transformer output audio amplifier. The output transformer, T13, has two secondary windings with one being used to match into speaker or headphones and the other to provide "anti-vox" for use

DRAKE R-4C RECEIVER

Part 1

when used with a transmitter. Some negative feedback is introduced to reduce audio distortion and increase the stability of the amplifier.

Power Supply

The power supply is conventional with a full-wave centre-tapped rectifier supplying 150V d.c. and another full-wave rectifier providing the 12V d.c. for the solid-state stages. This supply has a filter to reduce the ripple and the negative bias is obtained from a half-wave rectifier.

The a.g.c. circuit takes its voltage from the output of the 50kHz i.f. amplifier which is applied to the a.g.c. detector, Q7, biassed past cut-off under no-signal conditions. As the amplitude of the signal from V5 is increased, a point is reached where Q7 begins to conduct during a portion of each cycle, resulting in a negative voltage being developed across R50. This is applied to various filtering and delay networks and to the grids of V1, 2 and 5. The a.g.c. can be changed to give FAST, MEDIUM, SLOW or OFF operation.

A crystal calibrator is fitted which is brought into use by turning the FUNCTION switch CAL. This provides a 25kHz square wave which is fed to the antenna socket of the receiver through a coupling network, giving a marker at 25kHz intervals throughout the tuning range. I found that when the dial was aligned to the marker at the zero reading, it was 2kHz high at the end of the band 500kHz up. This is a pity, but could possibly be eliminated by careful re-alignment.

The review will continue in part 2. □

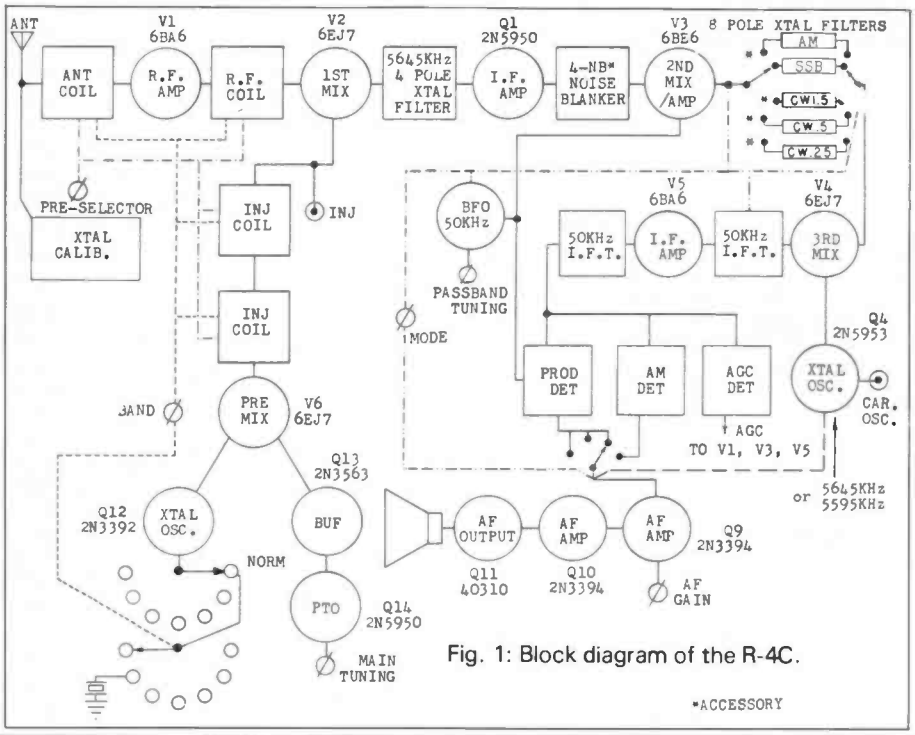

Fig. 1: Block diagram of the R-4C.

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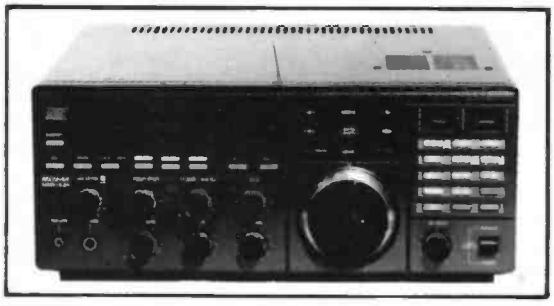

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STARTING OUT

Brian Oddy G3FEX

A few of the accessories which operate at radio frequencies may be simply loosely coupled to either the built-in or external antenna used with the set, but the majority of them have to be installed between the antenna and the external antenna and earth terminals fitted to the set. The performance of some of the add-on r.f. units will be seriously impaired unless a screened cable is used to link them to the set. Provided attention is paid to impedance matching, any length of 50Ω coaxial cable may be used between the external unit and the receiver. A number of useful accessories which operate at audio frequencies can also be employed. They are usually connected between the receiver audio output and a pair of headphones, so either a headphone or an external loudspeaker socket will be required.

Some of the techniques which are employed in the more advanced receiver designs to enhance their performance have already been outlined in this series. Owners of some of the less complex types of receiver can often obtain better results and extend the coverage of their sets by either making or purchasing some external units and accessories.

Crystal Calibrator

One of the most frequently encountered problems associated with the simpler s.w. receivers is that of inaccurate dial calibration. By adding a **logging scale** and making use of the transmissions on known frequencies from broadcast stations, a set of fairly accurate **calibration graphs** may be prepared - see *SWM*, September '87. Another approach is to employ an accessory known as a **crystal calibrator** which, in its simplest form, is a quartz crystal controlled oscillator operating at a fundamental frequency of 1MHz, whose output is rich in harmonics. Harmonics are odd and even multiples of the fundamental frequency, so the output will consist of a series of signals spaced exactly 1MHz apart, which will extend from 1 to 30MHz and beyond.

When in use, the calibrator output is loosely coupled to the receiver antenna terminal. Initially the fundamental frequency of the oscillator must be set to exactly 1MHz. This can be achieved by listening to one of the official standard frequency transmissions on 5, 10, 15 or 20MHz and adjusting a small trimmer in the oscillator crystal circuit until the calibrator output is "zero beat" with the standard signal. The 1MHz markers from the calibrator will then have good short term accuracy and they may be used to check the calibration of the receiver dial every 1MHz throughout its range.

Although 1MHz markers are very useful, the spacing between them is too great to enable a receiver to be set up accurately on a particular frequency between them. One way of overcoming this problem would be to use the markers to prepare a set of calibration graphs, but a far more accurate approach is to route the calibrator output into a divider chain so that marker signals at 500, 100, 50, 25 or 5kHz may be selected. By noting the position of these markers it will be easy to locate any desired frequency to the nearest 5kHz, which is very handy since most s.w. broadcasts are spaced 5kHz apart. By using integrated circuits, a very simple and inexpensive unit can be built around a 1MHz HC6U crystal. Use a 7400 for the oscillator and three 7490s for the divider chain - see Fig. 1.

Preselector

Another problem, which is usually associated with single conversion superhet designs, is that "image" signals appear on the higher s.w. ranges of the receiver. They stem from a point twice the intermediate frequency (i.f.) away from the wanted signal and on the same side as the local oscillator. The cause of these effects has already been covered in some detail in this series - see *SWM* February '88. One way of reducing them is to install a tuned r.f. amplifier, called a **preselector**, ahead of the receiver. The selectivity provided by the input and output tuned circuits of the preselector and the additional amplification at the wanted signal frequency will alter the ratio between the wanted and unwanted signals and thereby improve the image response.

The layout of a typical preselector is shown in Fig. 2. The appropriate coils are selected with a wavechange switch and a ganged variable capacitor is often employed to keep the tuning of the input and output circuits in step. Each time the main receiver is tuned to an incoming signal the preselector tuning must be peaked up to secure optimum performance and maximum image rejection, so a slow motion drive coupled to a calibrated dial is usually provided. It may be desirable to reduce the amplification of the preselector when a very potent signal is encountered, so a front panel r.f. gain control is provided in some designs. The output of the preselector must be coupled to the receiver via a short length of screened (coaxial) cable.

A variety of valve type preselectors have been manufactured over the years, some of which incorporated a built-in power supply to help simplify their installation. A good valve preselector with built-in power supply still has much to offer the s.w.l., because the signal handling capacity of most valve r.f. amplifiers is superior to their modern transistor counterparts. The performance of the type which employ a low noise frame-grid (EF183) valve is particularly good and they can often be obtained secondhand at a relatively low cost

Modern preselectors are designed around semiconductors rather than

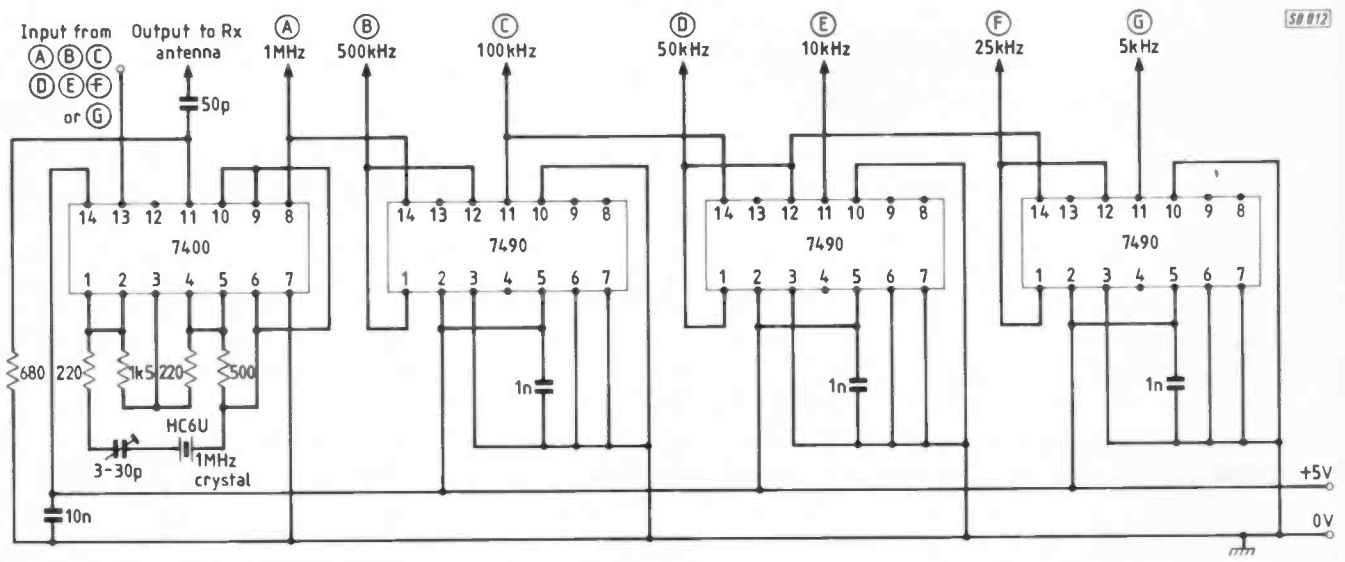


Fig. 1

STARTING OUT

valves because they are more reliable, less subject to aging, small in size, simplify construction and their low operating voltage requirements eliminate the need for an expensive internal power supply. However, a number of difficulties arise when using them in the front end of a receiver, not the least of which is obtaining a really wide **dynamic range**, so that both very weak and very strong signals can be handled without introducing various forms of cross-modulation or blocking.

Such effects often occur when a **bipolar transistor** is employed in a preselector or in the r.f. stage of a receiver. Other problems may also be introduced because their low input impedance will load the first tuned circuit and their internal capacitance may result in self-oscillation unless they are neutralised. There is also a need to pay attention to impedance matching if stability is to be assured.

The use of a **field effect transistor (f.e.t.)** will help to overcome some of these problems since these devices have a very high input impedance and characteristics which make them a great deal less susceptible to cross modulation. Although a single f.e.t. (2N3819) forms the basis of many preselector designs, cascode amplifiers using two junction f.e.t.s or a single dual gate **m.o.s.f.e.t.** (40673) are capable of providing even better cross-modulation characteristics and a low noise performance which may extend well into the ultra high frequency (u.h.f.) region.

Unless some form of protection is incorporated into a design, the performance of some types of m.o.s.f.e.t. can be permanently impaired by allowing static charges, high r.f. voltages from a local transmitter and high levels of impulse interference to reach them via an antenna. They can also be damaged if static charges are allowed to build up across their very high input impedance when installing them in equipment, since they are liable to puncture the insulation layer. To alleviate these problems it is customary for semiconductor manufacturers to supply these devices with their leads shorted together by a short length of bare wire or a special spring clip, which should not be removed until the wiring is complete. Some of the latest types have built-in diode protection against static charges, but care is still needed if permanent damage is to be avoided.

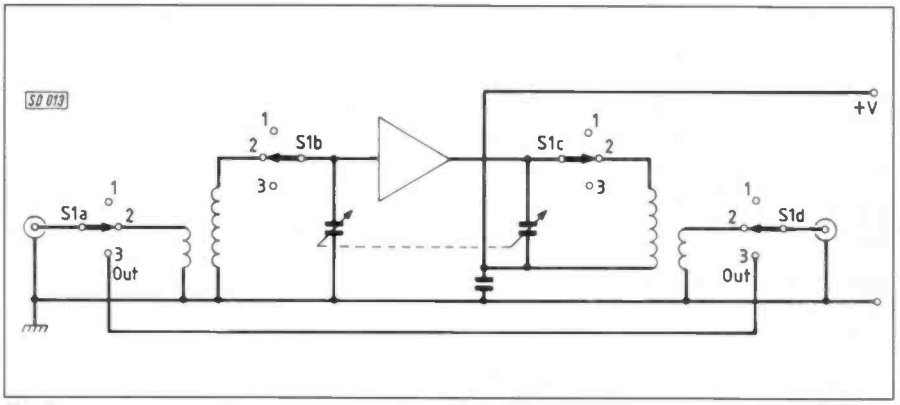


Fig. 2

The signal-to-noise ratio in many of the older valved communication receivers is usually adequate up to about 20MHz, but the type of valves used in the r.f. and mixer stages and losses in the coil formers, wavechange switch wafers and valve holders all contribute to a loss of efficiency at the higher frequencies. A dramatic improvement can often be obtained by adding a low noise preselector ahead of these receivers, but it must be removed on the lower frequency ranges as the extra gain will almost certainly overload the front end of most of these receivers and result in cross-modulation, blocking and other undesirable effects. It is a common mistake to assume that because an S-meter reads higher on a particular signal when a preselector is in circuit, that reception has been improved. Its effect on the signal-to-noise ratio is the all-important factor.

Monoband Pre-amplifiers

It may only be necessary to improve the signal-to-noise ratio at the upper limit of the receiver's coverage, so a **monoband r.f. pre-amplifier** may be employed. The elimination of the switched tuned circuits used in a multiband preselector will help to improve the overall efficiency and it may be possible to eliminate the external tuning control by making use of **broadband tuning**. Although a broadband pre-amplifier may improve the signal-to-noise ratio, it will not improve the image response of a receiver employing a low i.f. since the unwanted image signal will lie within the passband of the pre-amplifier tuned circuits.

Provided an impedance match exists between the antenna, the coaxial transmission line and the receiver, it is possible to install a broadband r.f. pre-amplifier at any point along the transmission line. This may be advantageous at v.h.f. and u.h.f. because the losses introduced by a long coaxial transmission line may severely attenuate the incoming signals before they can reach the receiver. By mounting the pre-amplifier at the antenna terminals these difficulties will be largely overcome.

Some of the add-on units which may be used to extend the range of an existing receiver will be described next month. □

Abbreviations

f.e.t.	field effect transistor
i.f.	intermediate frequency
kHz	kilohertz
MHz	megahertz
m.o.s.f.e.t.	metal oxide silicon field effect transistor
r.f.	radio frequency
s.w.	short wave
s.w.l.	short wave listener
u.h.f.	ultra high frequency
v.h.f.	very high frequency
Ω	ohm

RALLIES

March 26: The Cunningham & District ARC are starting a new rally at the Magnum Leisure Centre in Irvine to combat the shortage of rallies for Scottish amateurs. Doors open at 10.30am. More details from: Bob Low on (0563) 35738.

April 30: The Kelso ARS will be hosting the 6th Anglo-Scottish Rally in the Tait Hall, Kelso. The rally is open from 11am to 5pm. There will be the usual stands, talk-in on S22, Morse tests (booked through the RSGB), bar, hot and cold snacks, raffles, etc. the entrance fee is £1, junior ops, YLs and XYLs are welcome and admitted free. For further information, contact: Bruce Cavers. Tel: Kelso 24654.

April 30: The British Amateur Television Club will be holding their 1989 rally in new and larger premises. This year they'll be using the Founders Suite at the Coventry Crest Hotel, located on the A46, about 450m south of Junction 2 of the M6. There will be the usual wide range of trade stands and demonstrations covering all aspects of both amateur and satellite TV equipment. The hotel training centre has been made available for technical lectures which are to be given in the afternoon. There is ample parking and the rally opens at 10am. Admission is free to BATC members who bring their ticket from CQTV and 50p to non members.

May 7: The Southend & District Mobile Rally and Boot Sale will be held at Roach Way Youth Centre, Rochford, Essex. Doors open at 10am. More details from: Ted G4TUO. Tel: (0702) 202129.

May 21: The "Hobbies Fair" is the first event in the Science Museum's Wroughton 1989 season. As well as radio, this event covers a wide range of interesting hobbies and also offers the rare opportunity to see some of the Science Museum's stock of aircraft and other transport items which are stored in the hangers. Wroughton Airfield.Is south of Swindon, Wiltshire and easily reached by road.

May 21: The Parkanaur Rally, organised by the Mid-Ulster Amateur Radio Club will be held at the same venue as last year, the Silverwood Hotel, Lurgan, Co. Armagh. Doors open at 12.0 and the entrance fee is £1. The usual trade stands, bring & buy, bookstall, QSL Bureau will be there and talk-in will be on S22. Proceeds from this rally go to the Stanley Eakins Memorial Fund, Parkanaur, near Dungannon, so the club hope for a really good turnout of everyone interested in all aspects of radio and electronics.

May 28: The 13th Annual East Sussex Wireless Revival will take place at the usual venue of the Civil Service Sportsground, Straight Road, Bucklesham, Ipswich. That's between Bucklesham Road and Felixstowe Road (now the A1156)k stand, and antenna testing range, Bring & Buy, car boot sale, transceiver clinic, etc., plus non-radio stands, a children's play area and a model flying display. Doors open at 10am. Further

*** SWM in attendance**

information from: Colin Ranson G8LBS, 100 Stone Lodge Lane West, Ipswich IP2 9HR. Tel: (0473) 464047.

May 28: The rally will be at the Maidstone (YMCA) Sportscentre on the A229 at Loose Village. Admission is £1 at 10.30am, but disabled visitors can get in free at 10am. There is also free overnight parking with a snack bar, showers, etc., available. there are children's videos and a playroom, GB2YSC active on all bands, ATV demo, a beer tent and all the usual trade stands. For more details, contact: G6FZD Tel: (0622) 50709.

May 28: Plymouth Radio Club are holding their Mobile Rally at Plymstock School, Church Road, Plymstock, Plymouth. Doors open at 10.00 a.m. and there is a large, free car park, refreshments, raffle, trade stands, demonstrations and talk-in on S22. Full details from Joe G1RXR on (0752) 509855.

May 29: The Doncaster Radio Rally will be held at the Bircotes Sports Centre, near Bawtry, Doncaster. This rally is organised by the Doncaster RAYNET Group and they rely on this rally for their source of income to keep the group running.

***June 11:** The Royal Naval Amateur Radio Society's Annual Rally is scheduled to be held at HMS Mercury again this year. More details nearer the date.

June 11: Mid Lanark Amateur radio society are having their Open day at the Community Education Centre, Newarthill, by Motherwell. This is on the A723, 12km south of the Newhouse interchange on the M8. There will be trade stands, bring & buy stall, demonstrations of packet radio, RTTY and QRP together with lectures and the award of the Society's annual EHI Trophy. Talk-in on S22 and refreshments will be available.

***June 25:** The 32nd Longleat Amateur Radio Rally will be held as usual in the grounds of Longleat House, Warminster, Wiltshire. This rally is always popular as it offers something for the whole family. More details from the Rally Manager, Shaun O'Sullivan G8VPG, 15 Witney Close, Saltford, Bristol BS18 3DX.

July 9: The 1989 Droitwich Strawberry Rally will take place at the High School, Droitwich. There will be trade stands, a Bring & Buy, family entertainment and strawberry fields (weather permitting). Entrance and car parking are both free. Dereck Batchelor G4RBD. Tel: Worcester 641733.

***July 15:** The Cornish Radio Amateur Club are holding their 1989 rally at a new and larger venue - the Richard Lander School, Truro and is being held on a Saturday to coincide with the school's Summer Fair so there will be something for all the family. The usual trade stands, bring & buy, computer display and demo, refreshments and good, free parking. Details from Rolf Little, (0872) 72554.

***July 30:** Scarborough ARS are holding their annual Rally at the Spa, on the South Shore Seafront, Scarborough. This is close to the beach and all the entertainment so that there will be something for all the family. Doors open at 11a.m.. Trade stands, bring & buy, refreshments and bar with talk-in on S22. Details from Ian G4UQP (0723) 376847.

***August 13:** Hamfest '89 will be held at the Flight Refuelling Sports Ground, Wimborne, Dorset. Gates open at 10am and there's free car parking as well as overnight camping facilities. The day will feature radio and electronics trade stands, field displays and a craft and gift fair. More details from: Bob G6DUN. Tel: (0202) 479038.

August 13: The annual Derby Radio Rally will be held once again at the Lower Bemrose School, Saint Albans Road, Derby with all the usual attractions including the famous Monster Junk Sale. Details from Martin G3SZJ (0332) 556875.

August 28: JUNK 89 - the junk sale with a diference. Huntingdonshire ARS are holding this event at the Medway Centre, Coneygeare Road, Huntingdon, Cambs starting at 10.30am and closing at 5.00pm. Food and drink will be available all day with talk-in on S22 and through GB3OV on RB5. The organisers suggest that bringing the XYL to this event should be preferable to braving the inevitable Bank Holiday rain and traipsing round the d.i.y. stores and furniture warehouses. If you want to rent a table and sell your unwanted junk it will cost you £5. Further details from G1YVS on (0487) 830212 during the day or (0480) 56772 evenings.

***September 10:** The 6th National Amateur Radio Car Boot Sale will be held at the Shuttleworth Collection, Old Warden Aerodrome, near Biggleswade. Trading starts at 10am. Fly-in is available and permission can be obtained on Northill 288. Further details on the boot sale can be obtained from: Tony Kelsey-Stead. Tel: (0582) 508259.

November 19: The Bridgend & District Amateur Radio Club will be holding their 1989 Rally at the Bridgend Recreation Centre, Angel Street, Bridgend, Mid-Glamorgan. Doors open at 11.00 a.m.

If you are organising a rally and would like it mentioned in *Short Wave Magazine*, then drop us a line, preferably as soon as you have fixed the date but no later than 6 weeks in advance (marking your envelope "SWM Rally Calendar") and we will do the rest. Please make sure that you include all essential details such as the venue, starting time, special features and a contact for further information.

AMATEUR BANDS ROUND-UP

Paul Essery GW3KFE
PO Box 4, Newtown, Powys SY16 1ZZ

Merits

Most of you stick solidly to s.s.b. telephony for your listening, but it is worth considering whether or not you are limiting yourselves needlessly. It doesn't need a genius to guess that, at peak, an s.s.b. signal should be on the order of 10dB above the receiver noise if it is to be copied fully, given a clear channel. In QRM the position may be quite a lot worse. If now we turn to c.w., we find that a competent listener can copy a signal that lies below the noise level; and indeed if you put an oscilloscope across the audio terminals you can see the signal. A good RTTY decoder can cope with a pretty low signal-noise ratio. If we experiment with an f.m. receiver we find that the squelch circuit will recognise the presence of speech and "open" for a signal-noise ratio far too poor for the human ear to make sense of. Again, on a clear channel dear old BC-station type a.m. can be copied at DX if s.s.b. can get through, and so indeed could narrow-band f.m.

It's when we start talking about the real world, where QRM comes up on top of DX and the listener is "scratching about a bit" that each mode comes into its own. Back in the old days of a.m. telephony, the amateur 'phone bands were dominated when open by a cacophony of carrier whistles; if your bit of DX was being QRMed by another station close by, first you would have this infernal carrier whistle or whistles to cope with; then, as the two signals faded, so one carrier or the other would be the stronger. Both sets of sidebands would always be demodulated against the bigger carrier wave, so maybe your man would be audible, giving his QSL route and suddenly he would turn into gibberish and a different voice would be heard giving a report, or maybe both stations would be uncopiable for a moment or two despite their both being well above the receiver noise floor.

When s.s.b. came along, we replaced the missing carrier by our own beat oscillator, far stronger than the old a.m. station's carrier, to guarantee that we would always demodulate anything against our own oscillator; hence no matter how our bit of DX faded, so long as it stayed above the noise, we could always be sure that among the monkey chatter there would be some sounds that made sense if our ears were keen enough; and of course as everyone went to s.s.b., so those infernal heterodyne whistles disappeared. Thus, 'phone DX became a general pleasure rather than a masochist's activity.

For the average amateur a.m. 'phone was useless for DX and a misery to listen to so he stuck to c.w., where at least by juggling his gain controls and selectivity he could usually manage to copy reasonably. And, of course with s.s.b., the useful radiated "talk" power went up by several dB for a given output valve or transistor, while the practical people noted that three s.s.b. signals would take up the same amount of spectrum space given a little "monkey chatter" as one old-fashioned a.m. signal, albeit given a certain loss of naturalness in the speech. As for RTTY, one used a surplus teleprinter and tolerated the noise of all the bellcranks banging away in the shack.

Then we moved first to transistors and then i.c.s, and RTTY became a much more civilised business, certainly for the rest of the family, while the increased stability of receivers enforced by widespread use of s.s.b. made a QSO no longer a matter of chasing your signal round the dial as one end or the other drifted. As for f.m. it was OK on a clear channel, but it's "capture effect" caused it to totally disappear in the presence of any QRM. The latter of course is the very reason why it is so successful on the local repeater — a distant signal from someone using another repeater just disappears totally when a big signal appears; when someone "doubles" the strongest signal is good copy and the one beneath just disappears. So — what it comes to is this: each of the modes of transmission used by amateurs has its good and weak points. Of course, as manufacturers made receivers for the mass market, they had to become useful in all these modes so the receivers themselves improved. To be sure, though, the early solid-state receivers were a marked step backwards in the matter of their ability to cope with a small signal in the presence of a nearby big 'un.

So, it is worth while investigating c.w. reception as an s.w.l. Perhaps the biggest problem is that while learning Morse, one is aiming for 100 per cent letter-perfect copy and struggling a bit. However, if you accept that on 'phone you often lose a bit of the speech to a bust of QRM and "put the sense back" without even thinking about it, then the same philosophy goes for c.w. too! If you miss a letter, it's not the end of the world, the more so as the average c.w. contact repeats the important bits anyway. Relax, accept that c.w. is as likely as 'phone to lose a letter, and take it as it comes. The same goes with RTTY; we have seen an operator receive a corrupted group causing a Figure Shift to turn a whole line or more back into common sense by thinking a bit and knowing his keyboard. Of course, if you have a truly poor antenna situation, it is quite likely that while a ZL on s.s.b. is too weak for you to copy, a ZL on c.w. might be weak but solid and a new country for you!

In sum, never say die, but give it a whirl!

DX

Often people ask about how one gets to know when a new country is likely to appear — in other words, is there a "jungle telegraph"? Yes, there are various ways in which the experts get to known, First, one can have a read of the DX column in *Practical Wireless;* second, since many DXpeditions pop up at short notice for one reason or another, you can take out a sub to RSGB's *DX News Sheet* weekly with its useful hotline service and maybe the American *The DX Bulletin* too. Third, you can listen to the known DX Nets, where not only do some rare ones pop up, but word is sometimes passed of a new one. Fourth, if you are located anywhere near a known hot-shot DXer, you can follow him around a bit, then perhaps telephone him when a hot one appears to let him know; with a bit of luck, you might be able to hunt DX "in double harness". This involves one of you listening for the guy the DX is working, or his listening pattern, while the other monitors the DX transmitting frequency with an open landline between the two hunters. Fifth, find out if there is a v.h.f. "hot line" used by local DXers to alert each other and put yourself on that. Make no mistake, an s.w.l. who leads a transmitting DXer to a "new one" will be a very popular person and will soon be receiving alerts as well as giving them!

Of course, this doesn't apply to the run-of-the-mill DX. For example, ZL is about as far as you can go in purely mileage terms, but at, say 0800 on 14MHz s.s.b., one can almost guarantee to find ZLs at good strength. A good s.w.l. should be able to trawl up 200 prefixes or 100 countries in a big contest single weekend if he applies himself to things using, say, an old HRO, or AR88D or anything better. At the end, a check through the log will probably demonstrate that there is almost nothing that is really rare!

Letters

P. Newton is one of the diminishing breed of dedicated s.w.l.s; he hardly ever thinks of transmitting. Living as he does in a rented property, with a postage stamp garden, there seems little opportunity for antenna farming. A TA32 beam has to be "parked" looking south-west or north-east, or it overhangs the garden; draped around a 7.5m square there is a Best Bent Wire of 40m fed at one end and so thin as to be all but invisible, against a good ground of plenty of short wire radials; while for 7MHz there is a dipole carefully attached to the barge-boards of the house with the ends allowed to hang down and pruned carefully to the centre of the band. Up in the loft there is another beam; this one, for 14MHz is of diamond shape (to make it fit!) and arranged to be reversible, firing east or west to choice at the tweak of a piece of string.

As Paul says, the important thing for the station is always the antenna, and he is currently looking out for a better scheme for his 3.5MHz activity. As he says, nobody notices any of the antennas save for the outside mast and beam. As for what this lot can actually do, Top Band and 3.5MHz are comparatively poor, mainly because of the high radiation angle. On 7MHz some 170 countries are in the log, with in excess of 200 on each 14/21/28MHz — and so far as I know, not a phoney among the lot! Paul can also use 144 and 432MHz, but is considerably handicapped by the mountains all round and the lack of local activity.

On a different tack, Paul doesn't bother chasing the QSLs; he says if he hears some DX, he sticks around until he is certain he has got his man nailed, and has copied down the station's QSL details. He then checks with the local grapevine and *DXNS*, when he has certainty, then that one goes on to the countries heard list. As Paul says, this is important, because whenever a DX station of any consequence appears he almost invariably has a phoney *"alter ego"* either on the same or a different band.

Cliff Stapleton (Torquay) wrote with an enclosed letter to be forwarded on to D. H. Travis of Guiseley. Alas, my vaunted filing system-cum-database has chosen this very spot to go on the blink, so if Mr. Travis will drop me a line I will pass on this letter with pleasure.

Now to **D. Peat** (Mansfield), who missed last time due to a combination of RAE studies and work. David is learning about propagation and seems to be in a bit of a tangle. Let me try and sum it up: The higher bands, 14/21/28MHz are in essence daylight bands; at the peak of the sunspot cycle 14MHz may show activity right round the clock, at the bottom of the cycle 28MHz may only show propagation by v.h.f.-type modes. For the lower frequencies, the active DX time is after dark; though 7MHz may show times round the sunspot null years when it is open in the day.

It is generally argued that the lower bands are less effective anyway during peak years, but this seems to be at least to a degree a matter of activity. The lower bands are generally noisier, which brings us to David's next question which is what causes the noise on the bands after dark . . . usually the plethora of d.i.y. experts and TV viewers who crawl out of the woodwork after work! Seriously, the TV line timebase harmonics appear every 15kHz up the band and so are easily identified, but there are always such things as electric drills, heating thermostats and pumps, not to mention home computers, car ignitions and — often not even suspected — the fruit machine and electronic games in the pub over the road! Some of those electric light dimmers can kick up a fair old row too.

Turning to David Pleat's list we find his Philips D2999 receiver coupled to thirty metres of wire pointing N-S, plus a half-size G5RV and a.t.u. to extract the maximum. Mostly it has been strings of Ws on 28MHz, but a great cheer went up when the first Pacific signal was booked in — KG6JJH from Guam, on January 16 on 28MHz. Actually the scarcity of Pacific signals is, in essence caused by the scarcity of Pacific stations to create signals! If you take a peek at the map, you will see this enormous area, dotted with small groups of islands here and there; so of course there will be propagation to us from only a small proportion of the vastness at any given time; and if the only two operators in the area from which propagation exists are both having their meal . . .!

A nice letter form **Robert Cummings** (Co. Armagh) mentions that he is mainly active on 28MHz, and in January he managed TG9NX, I5JHW/VP5 (Turks & Caicos Is), Ws, VEs, SV2ADP, 5Z4BH, ZB2ER, ZD8MAC, OD5VT, EL2BY, 9H1JF, VU2QQ, C30BMA, VO2AP, 5T5EV, CU3AY, UM8MO, H13CAA, HI8FHD, XE1HON, VP5/G0AZT, CO7ER, CX1PE, OY9JD by blackscatter, XE1PCP, AP5HQ, OH0RJ (Aland Is), ON5NT/6W1, ZF1HJ, AP2JZB, UV3CC/UV1P (Franz Josef), a load of JAs, TN4NW in a positively huge pile-up, UA9s, VK, BY5RT, UD6DBW, EA9KG, UF7, G4DUW/DU1 (Phillipines) and OX10 for the first Greenland station. After that the other bands were a bit of an anticlimax, but on 7MHz, JA, VE, JX1UG, UI9BWE, UA4LCQ/UG, UZ9OWC/UG (Armenia), PZ5JR,

SEEN & HEARD

VP2M/F2JD, 4Z4DX, UI8LAD, CU7AC, VEs, V29C (Antigua), HI3GNR, HH7PV, JY9LC, VP8BUO for the Prize of the Month and of course the usual crop of smaller fry. Notably, one notes among this list some c.w. On 21MHz, V47RF, ED0MA a special-event station, KD8RP/TF, 9J2BO, VE and W, plus again the small fry.

So, to **T. Galt** (Glasgow) who runs a Vega which has a wide bandwidth position for a.m. telephony, which is too broad for s.s.b. and he wonders whether he could improve things with a slow-motion drive on the tuning. Alas, no. The superhet with a wide i.f. bandwidth will let more than an s.s.b. signal through, and in essence a slower dial won't stop that happening. The answer is to narrow the bandwidth down for s.s.b. and to take any a.m. signals by the "exhalted carrier" technique leaving the b.f.o. on at all times.

However, once one narrows the i.f. bandwidth down, then, one may find the need for an outboard slow-motion drive, because a signal can shoot right through the narrowed bandwidth before you realise it! A peek at the circuit diagram would show whether you could get away with adding extra ceramic filtering to narrow down the i.f., or, more likely, replace broad filters by narrow. However, there will already be a slow-motion drive built in; adding an extra one "outboard" needs to be done very carefully, or the increase in "backlash" as the extra gears operate may mean the result is worse than the original problem! Perhaps the best way in fact is to get the existing mechanical arrangements as near perfect as you can, and practice carefully tuning with that before you do anything with an outboard drive, as obviously if the built-in drive has backlash, it will be "magnified" by the outboard one.

The next three deadlines are: April 17, May 15 and June 19

Finale

It's really important that letters reach me by the dates shown in the boxes, those aren't the posting dates. If letters arrive after the dates given I may not be able to include them when they are current news. So, lots of letters please, with your problems, chuckles or whatever, which all help to make a more interesting column written by yourselves.

DECODE

Mike Richards G4WNC
200 Christchurch Road, Ringwood, Hants BH24 3AS

I have received a bumper postbag this month so I'll get straight on with it.

Victor **Spitari, Gibralta** has sent a very interesting letter describing his station which comprises several receivers namely — Kenwood R-1000, Sony 2001D and Yeasu FR-50B for h.f. as well as a Bearcat 145XL for v.h.f./u.h.f. The antenna is a G5RV or tuned doublet with a Mizuho KX-1 antenna tuning unit. For utility station decoding Victor uses a Commodore-64 computer and an MFJ-1278 multi-mode data controller. Victor's only problem at the moment is that he is suffering quite severe local interference, but he has ordered a QRM eliminator from SEM so hopefully he will be fully operational soon.

I'm sure many of you remember that I have had several queries regarding the printing of FAX pictures from the J & P Electronics FAX program. Well, Harold Pinkney has written reporting success and there should be a sample print-out in the column. Harold used the J & P program called "Decode" to produce his print and he says that J & P were very helpful, which is good to hear.

I've also received a letter from a local listener, **Mike Else** of West Lulworth who uses a Kenwood R-5000 receiver for utility monitoring. Mike uses a double size G5RV antenna, i.e., a tuned doublet with two 30m legs. Other equipment in use is a Howes antenna tuning unit, Aftronics digital filter, BARTG ST5MC terminal unit and a Commodore 64 computer. Unfortunately at the time of writing Mike was laid-up in bed with back problems and about to go into hospital. Hopefully all will be well by now and he should be enjoying a six week convalescent period. Naturally I will expect to see a pretty impressive log in the near future!

George Reed must be one of my most experienced listeners as he has been listening for nearly 65 years. George built his first Crystal set in 1925 and has retained an active interest up to the present day. George currently uses a Yaesu FRG-7700 and an FRG-7 with a long wire antenna. Decoding is achieved using a Scarab Nite 2 for RTTY and a Spectrum computer. Good luck to you George and I look forward to receiving more reports from you in the future.

Decoding News

Several items of equipment and software news this month, so I thought I would put them all together.

The first comes from **Barry Dale** who has written a program to allow the Yaesu FRG-8800 receiver to be controlled by a BBC Master series computer. The program appears to be very comprehensive and includes a very powerful database for its log book. This database lets you sort the data on any entry, i.e., you could print out your log in frequency order or alternatively in the more conventional date order. One big advantage that this program has over many others is that it includes a serial driver to allow an intelligent terminal unit (PK-232 and the like) to be used. This is a big plus point as often these programs completely tie up the computer and completely preclude the use of any utility decoding programs.

If you would like to use this program you will need a BBC Master 128 with Viewstore ROM and 80 track twin disk drives in addition to the Yaesu FIF-232C interface. To obtain your copy send Barry[1] two floppy disks formatted for 80T ADFS along with a cheque for £12.

The next little gem comes from John **Davies** who has a public domain RTTY program for the Atari ST computer. I don't have any further details, but if you want a copy, send John[2] a formatted disk along with sufficient return postage.

Also from John comes news of an economical RTTY, c.w. and ASCII decoder from R. Withers Communications. This device, called a MFJ-1225 can handle RTTY and ASCII with 170, 425 or 850Hz shift which covers most of the common modes. Although this device is not actually new on the market, it is new to me so I would be pleased to hear from anyone else who is using one. The price is about £80 which sounds pretty reasonable to me.

John's last message is a request for c.w. decoding software for the Atari ST, can anyone help? If so, please drop me a line and I will pass on the details to John.

CW Monitoring

Jan Nieuwenhuis is a regular contributor and this month has sent me some samples of his c.w. QSL cards. Jan has been very active with all the utility modes for quite some time and has amassed an excellent collection of QSL cards. One good point about QSL cards is that they are a very useful source of station information, in fact all the following details of c.w. stations were extracted from QSL cards:

Shannon Coast Radio Station Callsign — XSG3; Mode — c.w. A1A; Power — 10kW; Frequency — 12.8715MHz.

Arabian & American Oil Company (ARAMCO) Callsign — HZY; Mode — c.w. A1A; Power — 1kW; Frequency — 8.48MHz; Antenna — h.f. broadband.

Hellenic telecommunication Organisation (Athens) Callsign — SVB6; Mode — c.w. A1A; Power — 10kW (Philips 8RZ-506); Frequency — 17.1944MHz; Antenna — Vertical dipole.

Radio Suisse Berne Radio Callsign — HEB4; Mode — c.w. A1A; Frequency — 4.259MHz.

Paramaribo Radio Suriname Callsign — PZN4; Mode — c.w. A1A; Power — 5kW; Frequency — 13.046MHz; Antenna — Conical (inverted cone).

Unusual Modes

I'm sure many of you have seen mention of various unusual or advanced transmission modes in the frequency lists. I thought it was about time I gave an outline of a couple of them.

One of the first things to remember is that these modes are quite difficult for the short wave listener to resolve and require the use of specialist and expensive decoding equipment. Nevertheless, I think it would be interesting to have an outline understanding of how they work.

A good starting point would be to establish why these modes are used in preference to ARQ. It comes down to the usual reasons of finance. Having established an expensive commercial radio link there is obviously great pressure to make as much use of it as possible. If normal ARQ was used then only one channel of information would be available at any one time. What is needed is a way of utilising the link to its full with several communication channels if possible.

Let's start with f.d.m. (frequently division multiplex) or v.f.t. (voice frequency telegraph) as it is often known. This mode was originally developed for use with land lines and made use of the fact that a telegraph signal required significantly less bandwidth than the normal speech channel (300 - 3400Hz) allocated to it. Systems were developed that allowed up to twelve 100 baud signals or twenty-four 50 baud signals to be fed over one speech channel.

The technique used is to allocate a small portion of the available speech band to each telegraph signal. Typical allocations would be 120Hz wide slots for 50 baud and 240Hz for 100 baud. The use of this technique obviously brings considerable commercial advantage from the point of view of efficiency.

The next step was to implement this system over a radio link to enable maximum use of this valuable resource. There are many additional problems in using a radio link as the signal often undergoes various types of fading and multipath distortion which can make decoding very difficult.

The most common type of f.d.m. on h.f. is sixteen channel and is known as Mode B. The reason for the restricted number of channels is that not all channels run at the same speed and these systems usually consist of a mixture of 50 and 75 baud channels.

As I'm sure you can imagine, resolving this type of transmission can be quite difficult and you need some very tight filtering to extract one 120Hz slot from twenty-four! Your next question is probably going to be, what are these systems used for? Well, they

QSL card received by Jan Nieuwenhuis

are used to carry all manner of information, though it is quite common to find press on channel 1, weather on channels 2 and 3, with the remaining channels being encrypted. One of the main users of this system are the press agencies.

If you happen to be fortunate enough to own decoding equipment which can resolve this mode, it can be recognised very easily by its characteristic buzzing sound, rather like a swarm of bees.

The second "advanced" mode for this month is t.d.m. (time division multiplex) or ARQ Moore. This again is a multi-channel system, only this time the signals are spaced in time rather than frequency and only two or four channels are used. The time spacing is very simple in that the first channel A sends three characters which is followed by channel B sending three characters and so on. Those of you who read my column last month will remember that ARQ modes are error correcting and require each station to send an acknowlegement after every three characters have been received. The same is true with t.d.m. but in this case, two frequencies are used — one for the main transmission and the other for the acknowledgements. This system is known as full duplex. The advantage of this system over normal ARQ modes like SITOR are in transmission speeds which can be as high as 200 baud. The common t.d.m. standards are:

2 channel 86 baud
2 channel 96 baud
2 channel 100 baud
4 channel 172 baud
4 channel 192 baud
4 channel 200 baud

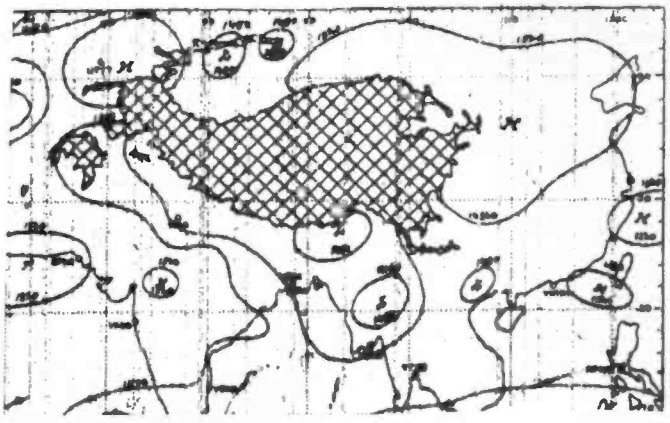
One of the characteristics of this mode is that it is quite common for stations to be idle and sending only synchronisation characters for long periods, data transmissions being generally quite short. This makes these transmissions even more difficult to resolve, as even when you are correctly tuned you may not actually receive any information!

Frequency List

Finally this month, if you would like a copy of my frequency list, which currently comprises about 600 stations, just send three first or second class stamps along with your name and address to the address at the head of the column.

Now on to a selection of frequencies sent in by readers, the format is as usual, i.e. frequency, mode, speed, shift, callsign, name and time of logging in UTC.

0.1342MHz FAX 120/576, DCF54, Offenbach Meteo, 0931
3.855MHz FAX 120/576, DDH3, Hamburg Meteo, 2030
4.2686MHz ARQ 100/170, SAB23, Goeteborg, 1935
6.467MHz c.w. —/— LFU, Rogland Norway, 1855



FAX picture received by John Pyle

8.618MHz c.w. —/— EDZ4, Aranjuez 1946
9.114MHz RTTY 50/425 MTI, Hungarian News, 1700
12.285MHz RTTY 50/425, RKU74, TASS Moscow, 1914
13.6475MHz RTTY 50/850, OL15, CTK Prague, 1500
14.9825MHz FAX 288/576, RBV76, Tashkent Meteo, 1700
16.185MHz FEC 96/170, ?, German government press service, 1030
16.3975MHz RTTY 50/850, FTQ39, Diplo Paris, 1000

1 Barry Dale, "Cimbri Glimpse", Powfoot, By Annan, Dumfriesshire DG12 5PS.
2 John Davies, 14 Bullivents Close, Bentley Heath. Solihull, West Midlands B93 9BT.

The next three deadlines are: April 17, May 15 and June 19

INFO IN ORBIT

Pat Gowen G3IOR
17 Heath Crescent, Hellesdon, Norwich, Norfolk NR6 6XD

MIR Movements

The hectic activity on the Soviet MIR manned space station on the 143.625MHz f.m. v.h.f. communications frequency showed that the work load has been very heavy for the past month. Such was the duty activity that the new cosmonauts were too tied up with their scientific rota to be able to study for their amateur radio licence, and even medical doctor Valery Polyakov had little time to come on the 145MHz f.m. band with the 2 watt amateur radio transceiver.

He was able to make a few QSOs during late January whilst over the USA and OK3AU reported that he came up as U3MIR on 145.650MHz simplex f.m. at 1847 on Monday January 23 and Thursday January 26 at similar times on the same frequency. OH5LK reports a contact on the same frequency at 1420UTC on Tuesday January 31, which resulted in considerable confusion when the Finnish amateurs thought that he was on the local repeater and thus called him through this medium! Valery came on again whilst over Europe during the early evenings of some following days.

Up until February 6, the new cosmonauts (now crew with Valery) had not received their licences. This was soon accomplished, as on Thursday February 9 up came Alexander Volkov using the callsign U4MIR to work OH5LK. On Friday February 10 at 1550UTC, U4MIR was on again calling in the Russian language on 145.600MHz simplex. The operation continued over much of the following day, with a real solid burst of activity on the Saturday to work several stations in South Africa, including ZS1EK on 145.650MHz, later changing his frequency selection choice later in the day to 145.550MHz.

The following day, Sunday February 12, he was very active over Europe on the afternoon passes, G4UAM reports excellent 145.550MHz (S22) signals from him from 1638 to 1644UTC, whilst your columnist had a brief exchange in Russian during the following pass at 1816UTC on the same frequency. VE3EFX worked him also on the Sunday and reports, ". . . Alex is obviously having a hard time trying to speak English. . .". Alex also had a short QSO with F8XJ, this time having an attempt at speaking French, so it is obvious that he is trying hard to fulfil a fair quota of international obligations.

Orbital changes to MIR were made on January 22 and 28, placing the space station into a much higher orbit again, the increasing atmosphere heating having enlarged the drag factor considerably. This was performed by using the remaining fuel of *Progress-39*, which was then separated to make room for *Progress-40*, which was launched at 0854UTC on February 10, to dock at around 1030UTC on February 12. The next automatic docking will be *Progress-41*, which will lift off on March 16 to dock with MIR on March 18. It was expected that this launch would be carrying the new very large 12 metre long 20 metric tonne mass module, which is equipped with its own solar cells. It is now understood that some technical problems have arisen that will mean the delay of this delivery until April, when it will be carried aloft by *Progress-42*. After docking, this will be manoeuvred to one of the side-ports by the long arm manipulator. It is anticipated that a further large module may go up later in order to achieve symmetry and stability, but no details have been given as yet. In the meantime, *Progress-41* will still be set for liaison, only probably now to carry the usual mail, tapes, papers, parts, food, etc.

Also in April it is expected that a new crew, consisting of cosmonauts Viktorenko and Serebrov will go up by Soyuz to MIR to replace the current pair and Valery Polyakov. Just to add to the confusion, it is understood that both of them are called Alex. They are currently receiving their training in the art and practice of amateur radio, so will have their licences before they go up into orbit.

It has been noted by your columnist and a number of MIR watchers that the v.h.f. communications over the latter part of the prior week-end and on Monday February 13 were very dramatic, and far more tense than the usual relaxed type of conversations, it was also observed that on a number of occasions, the speech was scrambled, a form never noticed before. Just what this portends is difficult to assume, but it is apparent that all is not well at the time of writing this column in early February.

The very latest set of Keplerian elements for MIR are as follows:

Epoch Year:	1989
Epoch Day:	38.01336865
Decay or Drag Factor	7.2788E-4

Fig. 1

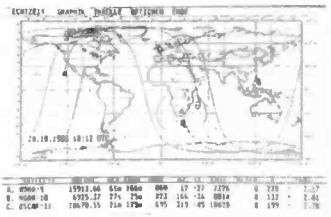


Fig. 2

Fig. 3

SEEN & HEARD

Inclination:	51.6229
Right Ascension of Ascending Node:	300.3824
Eccentricity:	0.0011778
Argument of Perigee:	246.0798
Mean Anomaly:	113.9832
Mean Motion:	15.70573342
Orbit No. or Epoch Rev:	17082

Whilst at the time of writing, these are giving precise tracking within seconds, the varying drag factor, plus the fact that the *Progress-40* will undoubtedly be employed to boost the orbit on about March 10 prior to its release to make room for *Progress-41*, will mean the pass times tracked from this set will be out by perhaps as much as 18 minutes. They will, however, give a good indication of the general period when MIR is to be expected.

Microsats

The series of microsats, of which full details appear in the current "Amateur Satellites" column in *Practical Wireless*, would now appear to be suffering a slight launch postponement. The period is now given by ESA as being "between July and October this year". AMSAT is asking if any enthusiast would like to try to design a logo for the new satellites, which will, if selected, be used as a common symbol and also as a decal for the Ariane rocket carrying the payload. If you fancy your design orbiting over your head many times per day, send your design to John Champer K8OCL, AMSAT Vice President for Operations, 7800 Hartwell Street, Deerborn, Michigan 48126, USA.

Weather Sats

The pictures this month came from **Heinz Hildenbrand DL1CF** of Hildesheim in West Germany, whose impressive radio shack is seen on Fig. 1 with the weather satellite receiver high resolution monitor screen in the centre. Heinz is a very keen satellite enthusiast indeed, as can be vouchsafed from the fact that G3IOR has spoken with him on 14 different amateur radio communication satellites many times over. When he comes up on them, or talks over the AMSAT nets Heinz invariably tells his communicants what the weather is like — over their area!

His receiver and memory for the weather satellites is entirely home-made, and he uses his pair of 7-element vertically polarised 144 MHz Yagis for the satellites also.

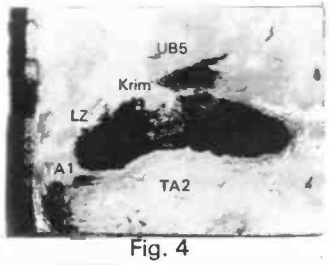


Fig. 4

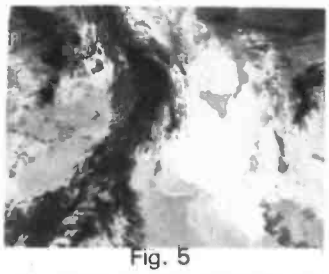


Fig. 5

The tracking for all amateur radio and weather satellites is carried out by his Atari-ST-520 computer with its 1M of memory, using a program written by DF5AI. The screen of this is seen in Fig. 2, showing the track and positions of three (NOAA-9, NOAA-10 and OSCAR-11) of the 18 satellites that can be tracked at any one time, all within 2 seconds!

A NOAA-10 picture taken of France, England and Germany on 30 October 1988 is shown in Fig. 3, with the land masses and clouds clearly visible.

Being in Germany, Heinz can see a little further afield than we can in the UK. His photograph given as our Fig. 4 demonstrates this, giving views of both European and Asiatic Turkey labelled

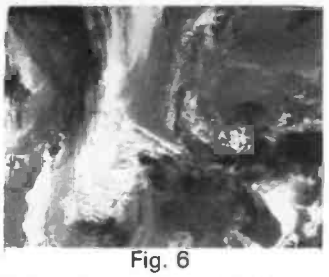


Fig. 6

TA1 and TA2, with Bulgaria, LZ jt to the North, then Krim, with Ukrainian SSR, marked UB5 to the far North. It was taken from a Meteor satellite on 137.045MHz using visible light pictures at 0915UTC on 22 June 1986.

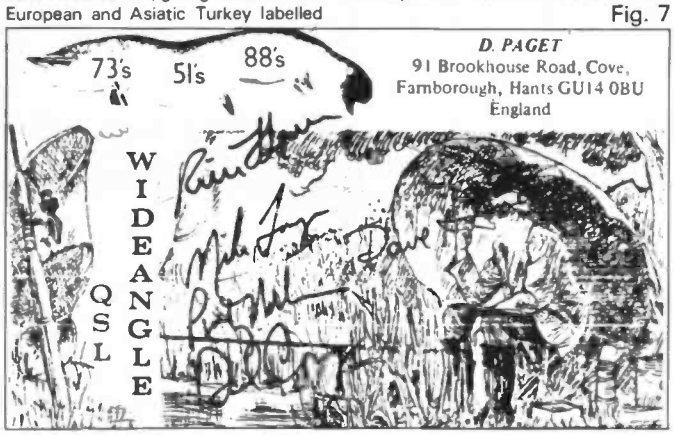
NOAA-10 gave the photograph of the screen taken on 30 October 1988 of Libya, Tunisia and Algeria, our Fig. 5, whilst a rare view of Spitzbergen is shown on Fig. 6. This too was taken on 30 October 1988, but from NOAA-11.

Propagation

Strange effects may be noticed now on the satellites, especially those taken on low elevation angles and particularly during the highest periods of solar activity. Sporadic-E could mean the loss of lines, multipath reception may give distorted pictures, and when auroral activity is present during the spring equinox, considerable signal flutter and multi-doppler effects could give many resolving difficulties.

Whilst this can be a curse to those seeking high photographic definition, it can give valuable indications of ionospheric disturbances and also probably the opportunity of capturing signals from satellites below the users horizons. This column would appreciate any such pictures and findings of anomalous propagation, with the source details, from any reader enthusiasts who may have the chance to capture such results over this period of escalating solar flux. The effects of oxone depletion and increasing irradiation of the lower atmosphere may also well have some marked effects upon signals coming through zones that previously had little propagational effect.

Fig. 7



Shuttle QSL

From **Dave Paget** of Cove, near Farnborough, comes news that he too, like Leslie Sargent, managed to hear the communications while *Discovery* was over Hawaii on the evening of Friday September 30 at 2156UTC. "I also heard the communications between the shuttle and the Houston mission control the previous evening between 2015 and 2130BST" writes Dave. "It consisted of a lot of technical data content about the load trim and the post burn action, which I saved on my tape recorder and followed up by sending a letter, plus one of my QSL cards for NASA and one for each of the crew of five".

Dave received a nice Christmas present, for on December 30 he had delivered a NASA embossed envelope, with a customs document stating that it had been opened. "I have never had this happen before" says Dave. "I have had mail from radio stations in Moscow, China, Germany, USA, Canada, but none had been opened". "Inside was one of my CB band QSL cards I had sent, and all the members of the *Discovery* crew had signed it for me. Dave encloses a copy which is our Fig. 7 this month. The original is now framed and hanging in pride of place on his wall.

Late News

From **Lawrence Harris** by telephone comes stop press news of changes on METEOR-3/2. "MET 3/2 was off through Saturday 11 to Sunday February 12, coming back with a continuous tone carrier on Monday February 13," said Lawrence. "On the following day it came back transmitting pictures but on a new frequency, 137.400MHz. "More information from Lawrence will appear in next month's column.

BAND II DX

Ron Ham

Faraday, Greyfriars, Storrington, West Sussex RH20 4HE

Whenever Joan and I go out for the day, we normally have my Minolta 5000AF camera and the Plustron TVR5D, with its telescopic antenna, in the car just in case I should come across something, or someone, that will be of interest.

One subject very much allied to v.h.f. radio is the prevailing weather and the wide variety of instruments, such as barometers, barographs, humidity meters, radio sondes, rain gauges, sunshine recorders, thermometers, thermographs and wind direction and speed indicators, Fig. 1, that are used daily to record its many aspects.

The main cause of Band II DX during these winter months has been tropospheric and it's interesting to note that, except for a 10 hour period between 0200 and 1200 on January 6, the atmospheric pressure was above 30.0in (1015mb) for more than 70 days from 0600 on December 6 to the close of this column at midnight on February 14. Furthermore, for 33 of those days my barograph was at, or above 30.5in (1032mb).

In addition to the ex-military R216, housed on another bookshelf for use mainly during the Sporadic-E season, the current work in my office at home, Fig. 2, is carried by a JVC3060 and a recently acquired Saisho T525 installed next to the Amstrad PCWs on which my columns are prepared. The JVC (lower) covers Band II and the DXTV Bands I and III and the Saisho has a digital readout for Band II and its stereo player provides me with music (brass band or country and western) while I work, hi!

Reports

The prevailing high atmospheric pressure (30.6in) was just beginning to fall during the evening of January 18 when a variety of foreign voices and co-channel "warbles" were coming up throughout the band. Overnight the temperature plummeted to 23 degs F and early the following morning some of these stations, predominantly Dutch, were booming in. From Arundel car-park, at noon, I tuned the band with the v.h.f. radio section of my Plustron TVR5D and, using its own rod antenna the continentals were still strong. However, by 1330, the temperature had risen, a fog came down and the DX had gone. I again logged French, Dutch and German stations on several spots between 87.5 and 104MHz during the evening of the 24th.

"January 24/25 yielded some interesting Band II catches from Eire, Scandinavia, West and East Germany, France and the Benelux countries, far too many to itemise!" wrote Simon **Hamer** from New Radnor.

The next opening came on the 31st when **Mike Bennett**, (Slough) using his DX 100 deluxe, heard Radio Cymru for the first time, various French stations around 97MHz and Flemish on 100.1MHz. Between 1300 and 1415, **Stephen Sproule** (Co. Antrim) logged BBC Radio Devon on his receiver with its built in telescopic antenna. When Stephen uses an external antenna he finds that more local stations can block out everything else. This can happen

ADVANCE INFORMATION

AMATERMINAL
THE REVOLUTIONARY HF TRANSCEIVER

No tuning, band or gain controls? No need to waste time in the shack searching for those elusive signals . . *once programmed, the AMATERMINAL will automatically search, lock-on and QSO (using your own QSO disc or tape if the internal dialogue should ever be found to be inadequate) thus leaving the operator to pursue other interests like painting the shack, walking the dog or going on holiday.* *

** Datalink available for dialling the rig from ANY location!*

Want to work exotic calls? Just take a trip to the appropriate location and make your very own QSOs back to your AMATERMINAL base station.

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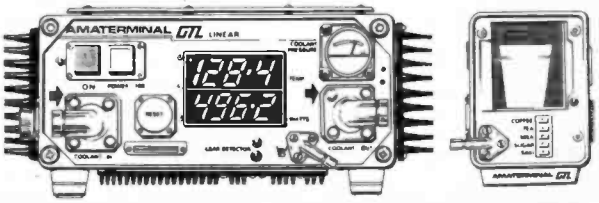

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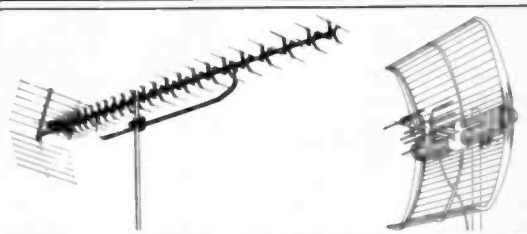

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SEEN & HEARD

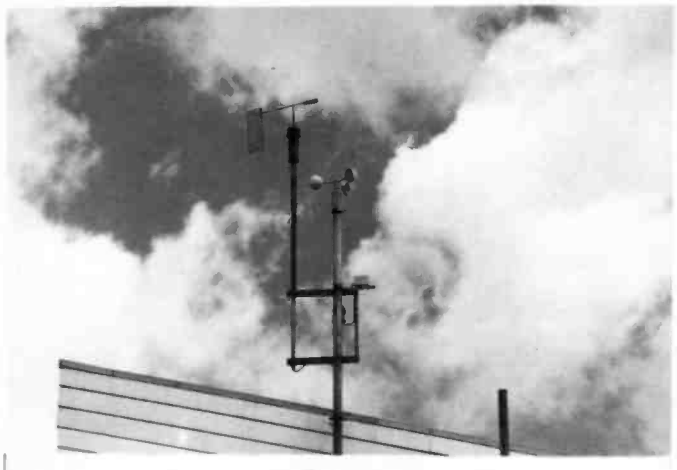

Fig. 1

Fig. 2

with modern sets, Stephen, because many of them are so sensitive that the extra gain from a large antenna can cause overload and spoil their performance. Perhaps you can install one of those coaxial switch sockets so that you can isolate the external antenna when not required.

I found a variety of continental and possibly Scandinavian voices in the band during the evening of January 31 and the morning of February 1. While parked in Chichester around noon, at almost sea level, I tuned the Plustron and with its short vertical rod and shielded by local buildings and part of the South Downs, I heard BBC Radio Kent and ILR 210 in Reading. I turned the antenna horizontal and improved the reception of both stations.

BBC Radio Nottingham

A new 2kW e.r.p. transmitter, with mixed polarisation, at Fishponds Hill is due to commence operation for BBC Radio Nottingham on 95.5MHz, on February 14. "This should transform our signal in Mansfield from unreadable to S9+," wrote **Richard Buckby**. Later in the month their new transmitter in Nottingham, known as Mapperley Ridge, opens up with 1kW e.r.p., mixed polarisation on 103.8MHz, from a location some 33m higher than their old Colwick Woods site. "Reception reports on the new transmitters would be appreciated," said Richard and they should be sent to The Engineer in Charge, BBC Radio Nottingham, PO Box 222, Nottingham NG1 3HZ. Enclose an s.a.e. if you want a QSL card.

I am always pleased to have information for this column about broadcasting from the Engineers of BBC and/or ILR national or local stations.

The next three deadlines are: April 17, May 15 and June 19

TELEVISION

Ron Ham
Faraday, Greyfriars, Storrington, West Sussex RH20 4HE

My thanks to John **Murphy** (Wexford) for further information about that unidentified picture, Fig. 8, in my January column. John points out the Yugoslavian flag on the screen and suggests that it comes from Televizija Ljubljana because it appears to be the nearest station to Rijeka.

Now for another mystery to solve: Between 1339 and 1511 on January 25 **Alan Gibson** (Grantham) saw a testcard, travelling from left to right, behind the BBC1 programmes from Belmont. "The station name was Tommerup, It had the time card with hours minutes and seconds. In the upper left quarter was a horn (hunting type) with a crown slightly above. In the bottom centre was a legend, possibly T12, TR or TB," said Alan. He also reports that there was an east-west opening to Germany and Scandinavia in progress at the time.

Band I

Les Jenkins (Godalming) noted several unidentified eastern Europe pictures during the last few days of December. While auroral events were in progress around 1945 on Janary 11 and 2155 on the 15th, **Dave Coggins** (Knutsford) saw video bars and unreadable pictures on Chs. E2 (48.25MHz), Ia (53.75MHz) and R1 (49.75MHz).

Signals via the F2 region of the ionosphere were logged on Ch. E2 by **Bob Brooks** (Great Sutton) who recognised Arabic captions and programmes (possibly from Dubai or Iran) early on January 13 and **Mike Bennett** (Slough) saw smeary multiple images of dancing on the 15th. **Simon Hamer** (New Radnor) also received smeary pictures from an unidentified source, on Ch. R1, at 1230 on the 26th and in Belper, **Edwina** and **Tony Mancini** noted a testcard on January 23, 27 and 30 around Ch. E2/R1, it was too fuzzy to see the ident. "It was definitely F2," they said and added, "It was a PM5544 with a digital clock as per SVT but only writing at the bottom with blank at the top. Also it was on a black and white chequer board background."

Testcards, via Sporadic-E, were logged by Bob Brooks from Norway (Steigen) and Sweden (SVT Kanal 1) around noon on the 10th and the USSR (with clock) on the 23rd. Austria (ORF FS1) and Czechoslovakia (RS-KH) were seen by Simon Hamer on February 3. Between January 16 and February 8, the Mancinis received pictures from Germany, Holland, Poland (TVP1), Spain (TVE1), all countries in Scandinavia and watched a documentary about the world, an animated film, the HOBOCTN (news) clock caption with sound and in colour and a testcard from the USSR.

Tropospheric

"With all this high pressure system about over southern England and Europe I decided to rebuild an old Band III six-element antenna," wrote **John Woodcock** (Basingstoke). He installed it in his loft, pointing towards northern Europe, and between January 24 and February 6 he logged pictures on most days from stations in France (Canal+) and Germany (WDR) on an old Bush receiver.

"This month has been a very good month for tropo-events," said Mike Bennett on February 8, having logged testcards and a variety of programmes in Band III from Belgium (BRT and RTBF), West Germany (ARD WDR, ZDF), Holland (PTT NED 1) and Luxembourg (RTL) on January 19; Belgium, West Germany and Luxembourg on the 24th; Belgium, Denmark (DR) for the first time and Luxembourg on the 25th; France (Canal+), Belgium and Luxembourg on the 29th; Belgium and Luxembourg on the 31st as well as Belgium and West Germany (SDR Stutgart 1) on February 1. Mike told me that the weather was frosty and foggy on the 19th and 29th and that he watched a disco show from France (FR3), in colour, on Ch. 21 at 2134 on the 24th. Similar Band III reports came from Bob Brooks and Simon Hamer with the addition of testcards from East Germany (DFF-1), Ireland's Radio Telefis Eireann (RTE), Norweglan regionals (Bokn and Stord), Sweden (Kanal 1 Sverige) and Switzerland (+PTT SRG1) Swiss German sometimes in colour, on days 15, 18, 22 and 31.

Simon had a good u.h.f. haul on January 24/25 when he found pictures on many channels from Belgium (BRT1/2 and RTBF Tele 21), Denmark (TV2 Hedensted and KBH Vest), France (TDF Canal+), West Germany (HR3, NDR3, West3/WDR3 and ZDF), Holland (NED 1/2/3), Ireland (RTE-1 and Network 2), Sweden (TV2 Sverige) and Switzerland (+PTT TSI) Swiss Italian.

"What an amazing end to January with the pressure here in Birkenhead reading 30.9in (1046mb)," wrote **Andrew Jackson**. He tuned through the u.h.f. band during the morning of the 30th and found nothing, however, at 1900 the DX began to appear and Andrew logged Anglia TV on Ch. 24, Border TV Ch. 28, Germany (ZDF) Ch. 35, Tyne-Tees Ch. 29 and Ulster Ch. 24. "Canal+ was everywhere and pictures as good as local from RTL Luxembourg on Ch. 21 and 27," said Andrew. He also received stations from France and Luxembourg in Band III. At 1000 on the 31st, he again tuned the u.h.f. band and found testcards from Germany's SW3 Badn on Chs. 46 and 56 and Luxembourg's RTL, scribed "Ecoulez RTL", on Chs. 21 and 27 mingling with a programme from BBC2. Later, Andrew added Anglia TV, BBC-1 South and Northern Ireland, TVS-east and Nederlands 1/2/3 to the days score.

Edwina and Tony had a good Band III haul between January 24 and 31, when they logged pictures, some in

The next three deadlines are: April 17, May 15 and June 19

SEEN & HEARD

Fig. 1: Frost on cobwebs. UHF Dipole

Fig. 2: Lahore

Fig. 3: Lahore

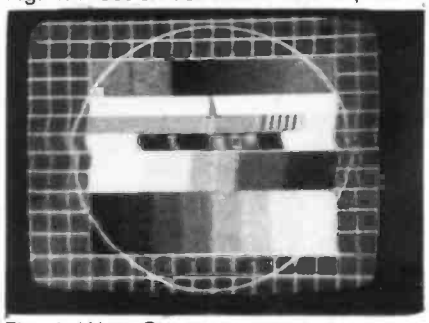

Fig. 4: West Germany

Fig. 5: Sporadic-E Distortion

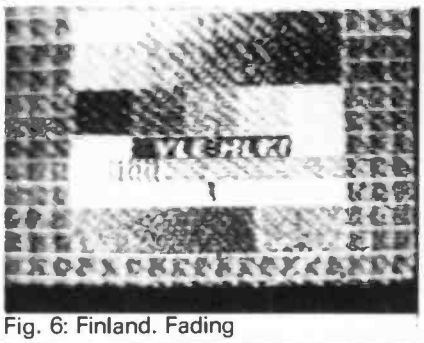

Fig. 6: Finland. Fading

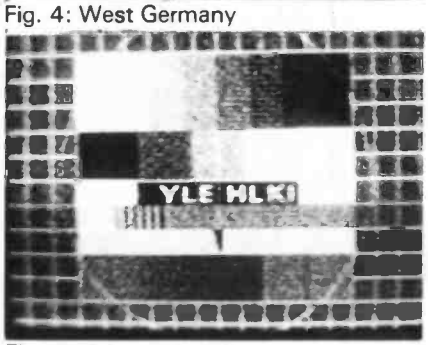

Fig. 7: Finland at peak

Fig. 8: JVC 3060

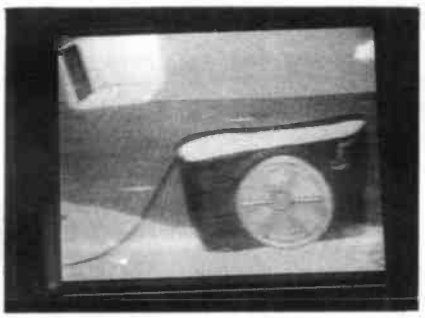

Fig. 9: Poland

Fig. 10: Spain

Fig. 11: Spain

Fig. 12: Austria

colour and with sound, from Belgium, Czechoslovakia (CST1, identified from credits and CST logo), Denmark (various programmes), France (Canal + — CBS news, film review, football — Bayern Muchen V Barcelona — and cartoons), West Germany (various programmes) and Ireland (RTE).

"Highlights of my tropospherics were the Danish (TV2 Hedensted) testcard appearing in colour for the first time on Ch. 30, a second TV2 testcard from Abbenraa drifting across the local(ish) BBC2 programme from Craigkelly on Ch. 27 (both on the 25th) and Thames TV in strong colour, overpowering Bilsdale on channel 23, on the 31st," reports **David Glenday** from Arbroath. David also logged u.h.f. signals from Holland (PTT NED 2/3 and Nederland 3) on January 31 and added Belgium (BRT TV1) and France on the following day. On both days he found signals from these countries co-channelling with a variety of UK stations.

During the evening of January 18, the high atmospheric pressure of 30.6in (1036mb) was beginning to fall and co-channel interference was appearing in the u.h.f. band. It was very cold overnight, 23 degs F, and at noon on the 19th the frost was still on the cobwebs around the u.h.f. dipole, Fig. 1, which feeds signals to my video recorder from the Midhurst transmitter. I can actually see the mast on the horizon from my window. At 0800, I logged negative pictures from France and a testcard from Holland (PTT NED-1) in Band III and around 1245, while using my Plustron TVR5D in Arundel car-park, the French signal was still strong and the set was using its rod antenna. However, the temperature came up, a fog came down and by 1330 the DX was gone.

This must have been a critical point which affected propagation, I checked the band, while the temperature was rising, at various locations during the afternoon but no further DX was found. I again logged some co-channel interference in the u.h.f. band and French pictures in Band III during the evening of the 24th. At midday on the 31st the very high pressure of 30.8in (1043mb) began to decline and at 1559, I received the Norweglan NRK logo on Ch. E11 in Band III. During the evening and the following day, I noted co-channel interference on some transmissions in the u.h.f. band and pictures, fluctuating in strength around Ch. E11.

The horizontal lines, often a symptom of co-channel interference, can be seen on the picture from Lahore TV, Figs. 2 and 3 received in Band III by **Lt. Col. Rana Roy** in Meerut, India and back in 1983, **Roger Wallis** caught a disturbance, possibly fading, across the centre of the German WDR-1 testcard on Ch. E32, Fig. 4.

Picture Archives

I searched my archives for an example of pictures being influenced by the rapid and deep fading which usually occurs at the onset of or shortly before the end of a Sporadic-E opening. Back in 1978, I captured two examples with the camera, the first, a picture from Czechoslovakia or Poland, showing a typical double sideways image plus co-channel interference, Fig. 5 and the second, a pair of testcards from Finland (YLE HLKI) taken on the upward slope and at the peak of a fade, Figs. 6 and 7, respectively. These signals were most likely received on a JVC3060 multi-band portable, Fig. 8, with an outside antenna which still works very well today. In addition to the DX, many readers are interested in the programme content and in June 1986, the late **Len Eastman** (Bristol) saw adverts from Poland, Fig. 9 and watched a parade of the international games competitors from Spain (TVE), Fig. 10. Last June, David Glenday saw an advert for Spain's National Lottery (Loteria Nacional"), Fig. 11. Readers logs often list pictures from Austria on Ch. E2A (49.75MHz) and **Garry Smith** (Derby) sent a photograph, Fig. 12, of their ORF FS1 testcard behind a programme schedule.

SEEN & HEARD

LONG MEDIUM & SHORT

Brian Oddy G3FEX
Three Corners, Merryfield Way, Storrington,
West Sussex RH20 4NS

Many interesting reports arrive here each day from regular contributors and their support is much appreciated. The series is not run as a DX race but as a guide to the prevailing reception conditions, what you can expect to hear and what other readers have in fact been hearing during the period prior to sending along their report.

It is always nice to welcome new contributors to the series and exchange news and views with them. If you would like to join the other DXers and send along a report it will be very welcome.

Long Wave DX

Note: l.w. & m.w. frequencies in kHz, s.w. in MHz, Time in UTC (=GMT).

Morocco has now complied with the second stage of the three part l.w. band plan, which was implemented on 1 February 1988, by moving their transmission via Azilal to 207kHz.

Finding a suitable receiver for DXing can present a problem as the l.w. performance of many domestic sets leaves much to be desired. Unfortunately some communication receivers do not cover the band, but it is worth remembering that by adding a v.l.f. convertor their coverage can be extended. This may also be advantageous when the l.w. performance of an existing receiver is poor. David Edwardson (Wallsend) encountered this problem with his receiver and added a home-built *PW* v.l.f. converter to improve the sensitivity.

An unusual approach to this problem has been adopted by Max Wustrau in Bedford. All incoming l.w. signals are up-converted to the 144MHz (2m) amateur band with a Datong general coverage convertor and processed in the receiving section of an FDK 750X multimode transceiver! All signals have to be demodulated in either the l.s.b. or u.s.b. mode.

In Hayes, Matthew King used the JVC DR-E2L radio in his cassette deck to compile his first log because his Sony ICF 7600DS suffers from unwanted "image" signals and is unsuitable for l.w. DXing. Although the bandwidth of the JVC receiver is rather wide, he says the external loop antenna fitted to the unit is ideal for nulling out unwanted signals.

Writing from Newcastle-upon-Tyne, Neil Wheatley says when he uses his Sangean ATS-803 on the low frequencies there seems to be quite a high level of "hash" present on weak signals and it is especially noticeable on empty channels. He thinks this may be due to poor smoothing in the power supply used with the set.

An experimental l.w. loop has been built by Mike Evans in Buckhurst Hill. The frame is made from strips of plywood 76mm wide and measures 407 x 350mm. The main loop winding consists of 56 turns of 24 s.w.g. enamel wire, which is tuned by a 500pF capacitor. The loop covers the range of 135 to 558kHz. A plug in pre-amp is now under construction so that it can be used with this loop or the m.w. loop.

MW Transatlantic DX

Although interesting signals from Canada and the USA were heard, very few from the Caribbean and South America were. The most potent signal stemmed from our regular pointer to reception conditions, CJYQ in St Johns, NF on 930. Listening in Grimsby, Jim Willett rated them as 33333 at 0100. A close runner up was WCAU in Philadelphia, PA on 1210 which peaked 33233 at 0140. In view of the lack of other signals from the Caribbean areas it is surprising that the Atlantic Beacon 1570 and the Caribbean Beacon 1610 both rated as 32222.

Tim Shirley (Bristol) says the best time to start listening for WINS in New York 1010 is from 2300, but from time to time it may be heard earlier. Another transmission reaching the UK before midnight is VOCM in St Johns, NF on 590. Tim has been hearing them around 2330 and by 0135 Jim Willett rated it as 32233. Broadcasts from WLS in Chicago, IL on 890 were received for the first time by Tim and he is now awaiting their QSL. Early risers may be interested to know that some transatlantic signals have been reaching Tim between 0500 and 0600. A QSL has been received from CFCN in Calgary, Alberta confirming their broadcasts on 1060.

Matthew King writes, "I haven't as yet had any luck with transatlantic DXing, not even a squeak of CJYQ or WINS!". Several other readers have also been disappointed by their lack of success. Late night listening and getting up early for work are not exactly compatible. One or two listeners intend to get round the problem by monitoring a specific DX frequency with a receiver connected to a cassette tape recorder and powered via a time switch!

Other MW DX

The new m.w. DX chart seems to be popular with many readers. Writing from Wootton, IOW, George Millmore says, "I think the new m.w. chart is an excellent idea". To keep it going, he used a Racal RA17 receiver with his "Long Arm" loop to log an impressive number of stations between 1100 and 1330. Neil Wheatley says that the first chart enabled him to hear two stations in Yugoslavia for the first time. His latest log includes Algiers, Algeria 891 (600/300kW) which is a long haul from Newcastle-upon-Tyne.

High levels of radio frequency interference (r.f.i.) from passing electric trains tend to spoil the pleasures of DXing for Phil Townsend in London, so he has been trying to reduce them with an SEM QRM eliminator. A number of auxiliary antennas have been tried with the device, but so far he has been disappointed. Despite these problems, Phil compiled an impressive list using an old Philips domestic transistor receiver which he "rescued" and restored to good working order.

Reporting from Southport in Queensland, Australia, John Ratcliffe says that m.w. DXing is almost impossible because of the high static levels from tropical storms. The congested state of the band also presents a problem, but some relief can be obtained by exploiting the directional properties of a good loop antenna. As an example, John mentioned 567kHz, which is shared by six relatively low power Australian transmitters and a higher power station (2YA) in Wellington, New Zealand. When his receiver is connected to an outdoor wire antenna reception is hopeless, but 2YA can be heard loud and clear after dark by replacing the wire antenna with a hexagon spiral loop.

Freq kHz	Station	Country	Power (kW)	DXer
153	DLF Donebach	Germany (W)	500	A,B,D,E,G,H,K*
153	Brasov	Romania	1200	B*,D*,E*,G*
162	Allouis	France	2000	A,B,C*,D,E,F,H,I,J,K*
171	Medi 1-Nador	Morocco	1200	D*,E
171	Kaliningrad	USSR	1000	B,D,E,G,H*,I
177	Oranienburg	Germany (E)	750	B,D*,E,H*,I,K*
183	Saarlouis	Germany (W)	2000	A,B,D,E,H,I,J,K
189	Motala	Sweden	300	A,B*,E,H*,I,J
198	BBC Droitwich	UK	400	A,B,D,E,F,H,I,K*
207	DLF Munich	Germany (W)	500	A,B,C*,D,E,H,I*,K*
207	Azilal	Morocco	800	E*
216	Roumoules	Monaco	1400	A,B,D,E,H,I,J,K*
216	Oslo	Norway	200	B*,C*,E*,I*
225	Konstantinow	Poland	2000	A,B,C*,D,E,H,I
234	Junglinster	Luxembourg	2000	A,B,D,E,H,I,J,K*
234	Kishinev	USSR	1000	B,I*
245	Kalundborg	Denmark	300	A,B,D,E,F,H,I,J,K*
254	Tipaza	Algeria	1500	A,B,C*,D,E,H*,I*,J*,K*
254	Lahti	Finland	200	B,E*,I*
263	Burg	Germany (E)	200	A,B,E,H
263	Moscow	USSR	2000	B*,D,K*
272	Topolna	Czechoslovakia	1500	A,B,C*,D,E,I,K*
281	Minsk	USSR	500	A,B*,D,E

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

Loop antennas may also be used to good effect in the UK to null-out unwanted signals. In Morden, Sheila Hughes has been using her home-built loop with a portable to enhance broadcasters on the Continent and in Scandinavia. Using an Eddystone 680X with a loop built to the G2VF design, Darran Taplin picked up the ground wave signal from Paris, France 738 (4kW) rated as 33423 at 1243.

MW Local Radio DX

A number of stations have been heard for the first time and some attractive QSL cards and informative QSL letters have been received by several DXers.

Listening in Sunderland, Leo Barr heard, for the first time, ILR Hereward Radio via Gunthorpe 1332 (0.6kW) 24422 at 2238 and the Derby relay of ILR R. Trent on 945 (0.2kW) 22222. Their transmission from Derby was also heard for the first time by Chris Nykiel in Leeds. Using the directional properties of the built-in antenna in his receiver he managed to null-out the potent signal from the BBC R. Lancashire transmitter in Preston 855 (0.5kW) and hear BBC R. Norfolk via Postwick 855 (1kW). Chris also picked up the 0.5kW signal from BBC R. Cambridgeshire on 1026 for the first time.

Prominent fading was observed on the signal from the BBC R. Kent Rusthall transmitter on 1602 (0.25kW) by John Parry in Northwich at 0755, which suggests that it may have reached him via sky wave and ground wave paths.

John Womersley (Bradford) tells me that ILR R. Tees has changed its name to TFM 9660. Their 0.32kW transmitter on 1170 is located at Stockton and uses an omni-directional antenna. John has received a nice QSL card from ILR Essex R., confirming his reception via their Rayleigh transmitter on 1431 (0.35kW) at 2300 on October 30.

Short Wave DX

Five broadcasters are using the 25MHz (11m) band now: RNI Oslo, Norway 25.730 (Eng Sundays only 1000-1030, Norw, to Africa 1000-1030 and 1200-1250); BBC via Daventry, UK 25.750 (Eng to Africa, Asia 1100-1515); R. RSA Johannesburg, S. Africa 25.790 (Eng to UK, S. Ireland 1400-1556); RFI Paris, France 25.820 (Fr to Africa 0900 – 1545); R. Denmark, Copenhagen 25.850 (Dan to Africa 1400-1455).

DXers:
A: David Edwardson, Wallsend.
B: Matthew King, Hayes.
C: David Middlemiss, Eyemouth.
D: Fred Pallant, Storrington.
E: Philip Rambaut, Macclesfield.
F: Mark Selby, Aldershot.
G: Tim Shirley, Bristol.
H: Phil Townsend, London
I: Neil Wheatley, Newcastle-on-Tyne.
J: John Womersley, Bradford.
K: Max Wustrau, Bedford.

Dick Moon (George, S. Africa) noted the BBC World Service broadcasts 25.750 as 45444 in the afternoon. In contrast, broadcasts from R. France International 25.820 were 34433. In the reverse direction, R. RSA 25.790 has been reaching the UK at remarkable strength. Using a 25m random wire antenna with his receiver, Darran Taplin rated them as 55555 at 1520.

Despite mostly being beamed to other areas, all the 11m signals are being received in Quebec, Canada by Alan Roberts. RNI 25.730 becomes audible around 1230 and rates as 14331, between 1230 and 1500 the transmissions from the BBC 25,750 are often received at 25442, but those from RFI 25.820 are usually stronger, being typically 35443. Although the transmission from R. Denmark 25.850 can be heard at 1400, it usually rates as only 14331. Until mid-December the signal from R. RSA Johannesburg, S. Africa 25.790 was by far the strongest, but since then Alan has noted a deterioration and it now rates as 24332.

In contrast, John Ratcliffe in Queensland indicates that the 11m band has been as "dead as the dodo" there during recent weeks. John uses a home-built reflex receiver with a short vertical antenna.

SEEN & HEARD

Freq kHz	Station	ILR BBC	Power (kW)	DXer
585	R. Solway	B	2.00	G,K,M
603	Invicta Sound	I	0.10	C,E,I,J,L*,O,P*
603	R. Gloucester	B	?	C,E,J,K,O
630	R. Bedfordshire	B	0.30	C,E,F,G,I,J,K, L*,O,P*
630	R. Cornwall	B	2.00	F
657	R. Clwyd	B	2.00	D,E,F,I,N,O
666	DevonAir R.	I	0.34	C,E,F,I,O
666	R. York	B	0.50	B,E,G,I,M,N,O
729	BBC Essex	B	0.10	C,E,J,L*,O
756	R. Cumbria	B	1.00	B,M,N,O
756	R. Shropshire	B	1.00	C,E,F,O
765	BBC Essex	B	0.50	C,E,J,K,L*,O
774	R. Kent	B	0.70	C,D*,E,F,I,J, L*,O
774	R. Leeds	B	1.00	G,M,N
774	Severn Sound	I	0.14	I
792	Chiltern R.	I	0.27	C,E,F,G,I,J,O
801	R. Devon	B	2.00	C,E,F,O
828	2CR	I	0.27	F
828	R. Aire	I	0.12	B,G
828	Chiltern R.	I	0.20	C,E,I,J,L*,O
837	R. Cumbria	B	1.00	A
837	R. Furness	B	1.00	G,M
837	R. Leicester	B	0.70	C,D,E,F,I,J,M,O
855	R. Devon	B	1.00	F
855	R. Norfolk	B	1.00	C,D,E,G,I,J,L*,O
855	R. Lancashire	B	1.00	G,N
873	R. Norfolk	B	0.25	B,C,D,E,F,G,I, J,L*,N,O
936	Brunel R (GWR)	I	0.18	C,E,F,J,O
945	GEM-AM (R. Trent)	I	?	A,C,E,G,J,N,O
954	DevonAir R.	I	0.32	C,F,I
954	R. Wyvern	I	0.16	C,E*,O
990	R. Aberdeen	B	1.00	M
990	Beacon R.	I	0.09	C,E
990	R. Devon	B	1.00	C
990	Hallam R.	I	0.25	C,G,N,O
999	Red Rose R.	I	0.80	G,M*,N
999	R. Solent	B	1.00	C,D,E,F,I,J,K,O
999	GEM-AM (R. Trent)	I	0.25	C,O
1026	Cambridgeshire	B	0.50	C,D,E,G,I,J,O,P*
1026	R. Jersey	B	1.00	C,E,F
1035	R. Kent	B	1.00	C,D,E,F,I,J,L*,O
1035	Northsound R.	I	0.78	B,M*
1035	R. Sheffield	B	1.00	G
1107	Moray Firth R	I	1.50	N*
1107	R. Northampton	B	0.50	C,D,E,F,I,J,O
1116	R. Derby	B	0.50	B,E,I,N,O
1116	R. Guernsey	B	0.50	C,D,F,J,O
1152	R. Broadland	I	0.83	N*,O
1152	LBC	I	23.50	C,D*,E,F,J,O
1152	Metro R.	I	1.80	M
1152	Piccadilly R	I	1.50	G,N
1161	R. Bedfordshire	B	0.08	C,E,I,J,O
1161	Brunel R. (GWR)	I	0.16	D,E
1161	R. Sussex	B	1.00	C,D,E,F,J
1161	Viking Gold	I	0.35	G,N,O
1170	R. Orwell	I	0.28	E,I,O
1170	Swansea Sound	I	0.58	E*
1170	TFM 9660 (R. Tees)	I	0.32	C,G,M,N
1170	Ocean Sound	I	0.12	D,F,J
1242	Invicta Sound	I	0.32	C,D,E,F,J,O
1251	Saxon R.	I	0.76	D,E,F,I,O
1260	Brunel R (GWR)	I	1.60	C,D,F,J
1260	Leicester Sound	I	0.29	E
1260	R. York	B	0.50	B,G
1278	Pennine R	I	0.43	C,G,N
1305	R. Hallam	I	0.15	C,E*,G,N,O
1305	Red Dragon R.	I	0.20	C,E*,F,I,O
1323	R. Bristol	B	1.00	E*,N*,O
1323	Southern Sound	I	0.50	C,E,F,I,J,O
1332	Hereward R.	I	0.60	A*,C,E,F,I,O
1359	Essex R.	I	0.28	C,E,I,J,L*,O
1359	Mercia Sound	I	0.27	O
1359	R. Solent	B	0.25	C,E*,F,J
1368	R. Lincolnshire	B	2.00	G,I,N,O
1368	R. Sussex	B	0.50	C,E,F,J
1431	Essex R.	I	0.35	C,E,I,J,L*,O
1431	Radio 210	I	0.14	C,E,F,I,J
1449	R. Cambridgeshire	B	0.15	C,F,I,O
1458	R. Devon	B	1.00	F
1458	GLR	B	50.00	C,D*,E,F,I,J, L*,N*,O,P
1458	R. Newcastle	B	2.00	G,M
1458	GMR	B	5.00	N
1458	Radio WM	B	5.00	O
1476	County Sound Gold	I	0.50	C,E,F,J,O
1485	R. Humberside	B	1.00	G,I,N,O
1485	R. Oxford	B	0.50	C,E,I,J,O
1485	R. Sussex	B	1.00	C,D*,E,F,J
1503	R. Stoke-on-Trent	B	0.50	C,E*,F,G,M*,O
1521	Mercury	I	0.64	C,E,F,J,O
1521	R. Nottingham	B	0.50	E*,I,O
1530	R. Essex	B	0.10	E,F,I,J,O
1530	Pennine R	I	0.74	E*,G,N
1530	R. Wyvern	I	0.52	E*,F,O
1548	R. Bristol	B	5.00	E
1548	Capital (Gold)	I	97.50	C,D*,E,F,I,J, L*,O
1548	R. Cleveland	B	1.00	G,M
1548	R. Hallam	I	0.74	O
1557	R. Lancashire	B	0.25	E*
1557	Northants 96	I	0.76	E,I,N*,O
1557	Ocean Sound	I	0.50	C,E*,F,J
1584	R. Nottingham	B	1.00	C,E*,G,I,O
1584	R. Shropshire	B	0.30	C,E*,F
1602	R. Kent	B	0.25	C,D,E,F,H,I,O

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

DXers:
- A: Leo Barr, Sunderland.
- B: Alan Curry, Stockton-on-Tees.
- C: Ray Howgego, Caterham.
- D: Sheila Hughes, Morden.
- E: Matthew King, Hayes.
- F: George Millmore, Wootton, I.O.W.
- G: Chris Nykiel, Leeds.
- H: John Parry, Northwich.
- I: Christian Pritchard, Cambridge.
- J: Mark Selby, Aldershot.
- K: Tim Shirley, Bristol.
- L: Phil Townsend, London.
- M: Neil Wheatley, Newcastle-upon-Tyne.
- N: John Womersley, Bradford.
- O: David Wratten, Cambridge.
- P: Max Wustrau, Bedford.

Equipment Used:

David Edwardson: Trio R600 & Trap dipole
Max Wustrau: FDK-750 & Datong general coverage converter
Matthew King: JVC DR-E2L radio cassette/Sony ICF-7600DS
Neil Wheatley: Sangean ATS-803
George Millmore: Racal RA-17
Philip Rambaut: International Marine Radio R100
Sheila Hughes: Vega 206
Darran Taplin: Eddystone 680X
David Wratten: Philips D2999 & loop antenna (m.w.)/R2000 & 30m wire antenna (s.w.)
Christian Pritchard: Kenwood R5000, random wire & a.t.u.
John Wormersley: Sangean ATS-803A
Alan Curry: Icom R-71
John Nash: Kenwood R5000
Peter Lewis: Matsui MR-4099
Kenneth Reece: JRC NRD525 & vertical antenna
Sheila Hughes: Sony ICF-7600DS
Ken Whayman: Panasonic RF-2200 & 10m sloper
Richard Radford-Reynolds: Sangean ATS-803A & 3m wire
Alan Smith: Touroport receiver
John Evans: Racal RA17L, a.t.u. & 40m wire
Ian Baxter: Sangean ATS-803A
Mal Tedds: Matsui MR-4099
Simon Hamer: Grundig Satellit 1400
Bill Griffith: Sony ICF-2002
Roy Patrick: Lowe HF-125
Leo Barr: Matsui MR-4099
Robert Cowell: Hammarlund HQ180XE
Martin De Ferdy: JRC NRD 525 & Datong AD370 active antenna
Peter Perkins: Lowe HF-125 & 11m random antenna
Julian Wood: Kenwood R1000

Back scatter and other propagation enable signals from RFI, RNI and R. Denmark to reach some listeners in the UK but rapid changes in signal level spoil reception. Pronounced echo effects are usually evident on the BBC transmission via Daventry, which tend to make the programme content almost unintelligible.

Sunspots are increasing at an unprecedented rate just now, so it is not so surprising that conditions in the higher frequency bands have been disturbed from time to time by solar activity (flares). Despite the disturbances, many interesting signals have been logged in the **21MHz (13m)** band.

George Hewlett monitors most of the transmissions from R. Australia on a daily basis in Torquay on behalf of Telecom Australia. He says R. Australia are now using the 13m band to reach listeners in Fiji, Samoa and the surrounding islands. Their broadcasts on 21.740 (2200-0730 and 1130-1400) are on a beam heading of 63 degrees which is not favourable for the UK but, their signals may become audible in the early morning. Later in the morning R. Liberty, Munich occupies 21.740 and their signal is very potent here.

Broadcasts beamed to Europe heard during the day were mentioned. They stem from UAE R. Dubai 21.605 (Ar, Eng 0615-1400) 43333 at 1045 by **Alan Curry** in Stockton-on-Tees; R. Japan via Moyabi, Gabon 21.695 (Eng, Jap 0700-0830) 54444 at 0735 by **Mark Selby** in Aldershot; R. Pakistan, Islamabad 21.490 (Ur, Eng) 42442 at 0800 by **David Wratten** (Cambridge); R. RSA Johannesburg, S. Africa 21.590 (Eng 1400-1600) 54554 at 1430 by **John Nash** in Brighton; R. Japan via Moyabi, Gabon 21.700 (Eng, Jap 1500-1700) 35543 at 1552 by David Edwardson; R. RSA Johannesburg, S. Africa 21.590 (Fr 1800-2000) at 1800 by **Simon Hamer** in New Radnor.

Broadcasts in a variety of languages to other areas were logged during the day: R. Finland, Helsinki 21.550 (Fin, Sw, Eng to Australia, SE. Asia 0800-0925) 444 at 0912 by **Peter Lewis** in Ivybridge; BBC via Limassol, Cyprus 21.470 (Eng to E. Africa 0500-1615) 34433 at 0941 by **Kenneth Reece** in Prenton; Vatican R., Rome 21.485 (Fr, Eng, Port to Africa 1100-1220) 44444 at 1115 by Sheila Hughes; R. DW via Sines, Portugal 21.680 (Ger to S. Asia, Middle East 1200-1400) 55455 at 1206 by Max Wustrau; R. Liberty via Gloria, Portugal 21.500 (Taj, Kaz, Tu, Pa, Russ to C. Asia 11-1600) at 1420 by John **Coulter** in Winchester; R. DW via Wertachtal, W. Germany 21.600 (Eng, Swa, Fr to Africa 1500-1750) 54433 at 1600 by Christian Pritchard (Cambridge); WCSN Scotts Corner, Maine 21.640 (Eng, Fr, Ger to Africa 1600-1955) 55444 at 1600 by **Ken Whayman** in Bexleyheath; BBC via Ascension Island 21.470 (Eng to C. Africa 1615-1745) 333 at 1700 by **Philip Rambaut** (Macclesfield); WYFR via Okeechobee, Florida 21.525 (Eng, Ar, Fr, Port to W. Africa 1600-2000) 343 at 1700 by **Kenneth Buck** in Edinburgh.

There is plenty to interest the DXer on the **17MHz (16m)** band. Broadcasts from R. New Zealand, Wellington 17.705 (Eng to Pacific area 2345-0730) have attracted the attention of many listeners. Their 7.5kW transmissions have been logged around 0500 by UK listeners and the 21121 rating by Christian Pritchard is typical.

Many broadcasters use this band to reach listeners in Europe during the day. They include UAE R. Dubai 17.865 (Ar, Eng 0615-1500) 44444 at 1015 by Darran Taplin; R. Pakistan, Islamabad 17.660 (Ur, Eng 0715-1129) 34444 at 1040 by David Wratten; R. Bangladesh, Dacca 17.710 (Eng 1230-1300) 44343 at 1230 by Christian Pritchard; Voice of UAE, Abu Dhabi 17.705 (Ar 1200-1600) 433 at 1245 by Philip Rambaut; RCI via Sackville, E. Canada 17.820 (Russ, Uk, Fr, Eng, Pol, Ger 1430-1800) 454 at 1720 by Kenneth Buck; R. RSA Johannesburg, S. Africa 17.755 (Ger, Du 1700-1900) 45434 at 1742 by **Richard Radford-Reynolds** in Southampton; R. RSA Johannesburg, S. Africa 17.795 (Eng 1800-1900) 534 at 1850 by **Alan Smith** in Northampton; RCI via Sackville, E. Canada 17.875 (Hung, Cz, Uk, Eng, Fr, Russ 1800-2100) 444 at 1900 by **Alf Gray** in Birmingham; R. HCJB Quito, Ecuador 17.790 (Cz, Ger, Fr, Eng 1800-2230) 333 at 2200 by Peter Lewis.

Broadcasts to other areas included R. Bucharest, Romania 17.805 (Eng to Australia 0645-0715) 55555 at 0710 by Mark Selby; KYOI Saipan, N. Mariana Islands 17.780 (Eng to E. Asia 0200-0800) 233 at 0700 by **John Evans** in Shawforth; BBC via Daventry, UK 18.080 (Eng to Middle East, E. Europe 0900-1615) noted as "good" by Alan Roberts in Quebec; R. Afghanistan via USSR 17.720 (Pa, Eng to SE. Asia 0430-1230) 22222 at 1039 by **Ian Baxter** in Blackburn; R. Moscow, USSR 17.565 (Eng, Fr to Africa 1000-1600) 444 at 1050 by **Ian Bond** (Wirral); VOA via Greenville, E. USA 17.785 (Eng to W. Africa 1600-2200) 34433 at 1600 by John Nash; RTM Tangler, Morocco 17.595 (Fr, Eng to N. Africa 1400-1700) 53444 at 1610 by Ken Whayman; R. Cairo, Egypt 17.670 (Ar to N. Africa 1300-1900) 55545 at 1657 by John Coulter; R. Nederlands via Bonaire,

SEEN & HEARD

Ned. Antilles 17.605 (Eng, Fr, Du to W. Africa 1830-2125) 332 at 1834 by **Mal Tedds** in Nottingham; VOA via Tinang, Philippines 17.735 (Eng to SE. Asia, Australia 2200-0100) 33333 at 0042 by Max Wustrau.

The conditions in the **15MHz (19m)** band have enabled New Zealand to reach the UK during the early hours of the morning. From time to time the conditions have been disturbed by solar events, but reception has been generally good.

Simon Hamer picked up the broadcasts in English from R. New Zealand, Wellington 15.150 at 0500. Their 7.5kW transmission from 2345 until 0730 is intended for listeners in Australia, so if you intend to listen for their signal for the first time do bear in mind that it may be weak or even non-existent. During good conditions the 35232 rating noted by John Nash at 0400 may be typical.

Some 19m broadcasts from R. Australia have also reached the UK. Their transmission to S. Asia via Carnarvon 15.240 (Eng 2200-0100) was heard at 0000 by Simon Hamer. In addition to their regular broadcasts they have been testing on 15.140 (Eng 1430-1800). Matthew King rated their test transmission as 54545 at 1430.

The latest logs included RFO Papeete, Tahiti 15.170 (Fr, Tah to Pacific area 1600-0930) 242 at 0510 by John Evans; R. Japan via Yamata, Japan 15.270 (Eng, Jap to Australia 0500-1000) 43433 at 0745 by Kenneth Reece; R. Norway, Oslo 15.235 (Norw, Eng, Sp to W. Africa 1000-1045) 55555 at 1000 by Alan Curry; TWR via Bonaire, Ned. Antilles 15.345 (Eng to USA 1115-1400) 24222 at 1120 by John Nash; R. Bejing, China 15.165 (Eng to S. Asia 1400-1555) at 1445 by **Bill Griffith** in Baroda, C. India; R. Prague, Czechoslovakia 15.155 (Cz, Eng, Ar to W. Africa 1430-1725) 433 at 1610 by Ian Bond; R. Sweden, Stockholm 15.240 (Eng to Africa 1530-1600) 54444 at 1557 by Darran Taplin; BBC via Kranji, Singapore 15.310 (Eng to S. Asia 1615-1830) 333 at 1652 by Alan Smith; R. Nederlands via Talata Volon, Madagascar (Du to E. Africa 1730-1825) 55544 at 1730 by Richard Radford-Reynolds; KUSW Salt Lake City, USA 15.650 (Eng to E. USA 1500-2200) at 1800 by **Roy Patrick** in Derby; BBC via Kranji, Singapore 15.310 (Eng to S. Asia 1615-1830) 222 at 1820 by Philip Rambaut; Voice of Greece, Athens 15.630 (Gr, Eng to Africa 1800-1850) 444 at 1840 by Mal Tedds; Africa No. 1. Gabon 15.200 (Fr, Eng to W. Africa 1705-2110) 45554 at 2100 by John Parry; VOA via Monrovia, Liberia 15.445 (Eng to C. Africa 1600-2200) 33233 at 2112 by Leo Barr; KUSW Salt Lake City, USA 15.580 (Eng to E. USA 2200-0100) 33232 at 0015 by Max Wustrau.

Broadcasts to Europe were noted in the reports: RCI via Sines, Portugal 15.315 Russ, Uk, Fr, Eng 1430-1600) 54444 at 1545 by **Robert Cowell** in Blackpool; R. Moscow, USSR 15.475 (Eng 0700-1700) 54444 at 1550 by Mark Selby; R. Moscow, USSR 15.540 (Eng 1100-1600) 55555 at 1500 by Ken Whayman; R. RSA Johannesburg, S. Africa 15.365 (Eng 1800-2100) 333 at 1800 by Alf Gray; RN8 Brasilia, Brazil 15.265 (Eng, Ger 1800-1950) 33333 at 1800 by David Wratten; WINB Red Lion, USA 15.185 (Eng 2003-2245) 333 at 2010 by Kenneth Buck; R. HCJB Quito, Ecuador 15.270

Freq MHz	Station	Country	UTC	DXer
2.340	Fuzhou	China	2050	M
2.470	R. Cacique	Brazil	0130	U
2.485	ABC Katherine	Australia	2048	G,U
3.205	AIR Lucknow	India	1730	H
3.210	R. Mozambique	Mozambique	1910	Y
3.215	R. Orange	S. Africa	0430	P,Y
3.230	R. Nepal	Kathmandu	1750	F,Y
3.230	ELWA Monrovia	Liberia	1625	B
3.325	AIR Gauhati	India	1626	B
3.260	ORTN Niamey	Niger	0500	P
3.270	AIR Kohina	India	1730	H
3.270	SWABC 1, Namibia	SW. Africa	2023	P,Q,Y
3.300	R. Cultural	Guatemala	0430	B
3.310	PBS Jilin	China	2235	L
3.315	AIR Bhopal	India	0120	G
3.325	FRCN Lagos	Nigeria	2030	Y
3.330	R. Kigali	Rwanda	1820	Y
3.355	R. Botswana	Gabarone	1800	Y
3.355	AIR Kurseong	India	1732	H
3.365	AIR New Delhi	India	1733	G,H
3.365	GBC Radio 2	Ghana	2008	G,K,R
3.375	AIR Gauhati	India	1734	H
3.380	Austrian Army R	Austria	1550	L
3.535	Vos 1, Fuzhou	China	1635	O
3.905	AIR Delhi	India	1658	L
3.909	R. Beijing	China	2359	P
3.915	BBC Kranji	Singapore	2000	K,L,M,Q,V
3.925	AIR Delhi	India	1731	G,H
3.940	PBS Hubei Wuhan	China	2229	B
3.950	PBS Qinghai Xining	China	2350	Y
3.955	BBC Daventry	England	1927	C,E,N,P,R S,W,X
3.955	R. Orion	S. Africa	0200	S
3.960	R. L. Munich	W. Germany	0013	I,X
3.965	RFI Paris	France	2130	M,P,S
3.965	R. Afghanistan	via USSR	1730	B,H
3.970	RFE Munich	W. Germany	2100	P,X
3.980	VOA Munich	W. Germany	2150	L,M,S,X
3.985	R. Beijing China	via SRI Berne	2200	E,L,M,T,W,X
3.985	SRI Berne	Switzerland	1830	I,M,R,W
3.990	RFE Munich	W. Germany	2020	M,X
3.995	DW Cologne (Julich)	W. Germany	2200	M,N,S,T,X
4.040	Yerevan	USSR	1608	B
4.050	R. Frunze	USSR	1710	L,O
4.055	Kalinin	USSR	0002	L,X
4.060	R. Moscow Kharkov	USSR	2140	M,P,R,W
4.080	R. Ulan Bator	Mongolia	2200	U
4.220	PBS Xinjiang	China	2221	B,G,T
4.330	PBS Xinjiang	China	1545	G
4.460	R. Beijing	China	2150	L
4.500	Xinjiang	China	1640	G,L
4.520	Khanty Mansiysk	USSR	0010	Y
4.635	R. Dushanbe Tadzhik	USSR	0045	G,H,O
4.720	RRI	Indonesia	2215	L,Y
4.735	Xinjiang	China	1550	G,L,X
4.740	R. Afghanistan	via USSR	1802	B,L,Q
4.750	R. Bertoura	Cameroon	2030	M
4.755	Caracol Neiva	Columbia	0623	B,L,N,O,R
4.755	Sani Radio	Honduras	0145	Y
4.760	Yunnan Kumming	China	2221	B
4.760	ELWA Monrovia	Liberia	0615	I,R,Y
4.760	TWA	Swaziland	1630	L
4.760	R. Afghanistan	via USSR	1900	D,E,N,Q,W
4.765	R. Moscow	via Cuba	0732	L
4.770	FRCN Kaduna	Nigeria	2145	P,R,Y
4.775	AIR Gauhati	India	2010	M
4.780	RTD	Djibouti	0305	O
4.780	R. Moscow, Petrozavd	USSR	1555	L
4.785	RTM Bamako	Mali	2110	B,R,Y
4.790	Azad Kashmir R	Pakistan	1635	L
4.790	R. Atlantida	Peru	0130	U
4.795	R. Moscow	USSR	2115	A,D,P,R,X
4.795	R. Moscow, Ulan Ude	USSR	2145	L,M
4.800	AIR Hyderabad	India	1735	H,L,O
4.800	LNBS Lesotho	Maseru	1648	L
4.805	R. Nac. Amazonas	Brazil	2202	L,Y
4.810	R. Yerevan	USSR	1930	G,M,P
4.815	R. Nac. Tabatinga	Brazil	0600	Y
4.815	R. diff TV Burkina	Ouagadougou	2040	M,O,R,Y
4.820	R. Botswana	Botswana	2000	P,Y
4.820	La Voz Evangelica	Honduras	?	K
4.820	Khanty-Mansiysk	USSR	0130	L,O
4.825	R. Ashkhabad	USSR	2145	M
4.830	Africa No. 1	Gabon	2000	A,G,I,M,N,O P,Q,R,V,X
4.830	R. Tachira	Venezuela	0005	G,I,O,P,Y
4.832	R. Reloj	Costa Rica	0630	Y
4.835	RTM Bamako	Mali	2100	A,B,D,I,L,M,O P,Q,R,X,Y
4.845	R. Nacional, Manus	Brazil	0135	K,O
4.845	ORTM Nouakchott	Mauritania	1920	A,B,F,G,L M,O,P,R,Y
4.850	R. Yaounde	Cameroon	1800	N,Y
4.850	R. Capital, Caracus	Venezuela	0741	B,F,G,I
4.855	R. Mozambique	Mozambique	0250	O
4.855	R. Sana Yemem	Yemen	0409	B
4.860	AIR New Delhi	India	1730	G,H
4.860	Kalinin	USSR	2100	B,E,I,J,M,O,W
4.865	PBS Lanzhou	China	2210	L,O,T
4.865	V of Cinaruco	Columbia	0645	B,F,G,L,O,R
4.870	R. Cotonou	Benin	2116	I,M,Q,Y
4.875	R. Jornal do Brazil	Brazil	1650	L
4.875	Uraisk	USSR	2100	M
4.880	SABC Radio 5	S. Africa	2000	L,M,O,P,Q,Y
4.885	R. Clube do Para	Brazil	0729	B,G,L
4.885	R. Beijing	China	2210	L
4.890	RFI Paris	via Gabon	0530	R,T,Y
4.890	ORTS Dakar	Senegal	1930	L,M,O,R
4.895	Ondas del Meta	Columbia	0349	F
4.895	R. Ashkabad	USSR	2100	J,L,M
4.895	R. Moscow, Kalinin	USSR	2137	D,E,P,T,X
4.898	La Voz de Rio, Arauca	Columbia	0400	B
4.905	R. Relogio, Rio	Brazil	0732	L
4.905	R. Nat. N'djamena	Chad	2049	G,L,Q,X,Y
4.905	R. Beijing	China	2210	M
4.910	R. Zambia, Lusaka	Zambia	1816	L,Q
4.915	R. Ghana, Accra	Ghana	2000	A,M,R,Y
4.920	ABC Brisbane	Australia	1920	Y
4.920	R. Moscow B, Yakutsk	USSR	1930	L,O
4.930	RRI Surakarta, Java	Indonesia	1555	L
4.930	R. Moscow, Ashkhabad	USSR	2115	L,M,X
4.935	Voice of Kenya	Kenya	1800	G,H
4.940	R. Kiev	USSR	2150	M,P,X
4.940	R. Moscow, Yakutsk	USSR	0533	R
4.940	R. Yaracuy, S. Felipe	Venezuela	0712	L
9.945	Caracol, Neiva	Columbia	0645	L,R
4.950	R. Nac. Luanda	Angola	2015	Y
4.955	R. Marajoara, Belem	Brazil	2220	G,L
4.960	R. Baku	USSR	2100	O
4.970	R. Rumbos, Caracas	Venezuela	0015	F,O,Y
4.975	R. Timbre, Sao Luiz	Brazil	2145	L
4.975	R. Uganda, Kampala	Uganda	1940	M,Y
4.975	R. Dushanbe	USSR	1730	H
4.980	Ecos del Torbes	Venezuela	2232	F,I,L
4.985	R. Brazil Central	Brazil	2235	L
4.990	FRCN Lagos	Nigeria	0500	P,T,X,Y
4.990	R. Ancash, Huaraz	Peru	0335	K,L
4.990	R. Yerevan	USSR	1654	L
5.005	R. Nacional, Bata	Eq. Guinea	2150	A,F,H,M,R,X,Y
5.005	R. Nepal, Kathmandu	Nepal	1750	F,L,O
5.010	R. Garoua	Cameroon	1830	L,R,Y
5.010	SBC Singapore	Singapore	2300	H
5.015	R. Moscow Arkhangelsk	USSR	1950	F,L,M
5.020	ORTN Niamey	Niger	2100	L,R,Y
5.025	R. Rebelde, Habana	Cuba	0120	Y
5.030	R. Impacto	Costa Rica	0558	B,F,I,K,R
5.035	Schulungssender	Austria	1545	L
5.035	R. Bangui	C. Africa	1940	B,F,M,Y
5.040	R. Tbilisi	USSR	2000	L,M
5.045	R. Cultura do Para	Brazil	0700	F,K,L,O,R
5.045	RRI Yogyakarta, Java	Indonesia	1600	L
5.045	R. Rioja	Peru	0717	R
5.045	R. Togo, Lome	Togo	0545	P,R,Y
5.050	Voz de Yopal, Yopal	Columbia	0335	F
5.050	SBC Singapore	Singapore	2300	H
5.050	R. Mundial, Caracas	Venezuela	0700	B,L
5.055	Faro del Caribe	Costa Rica	2230	A
5.057	R. Tirana Gjirokaster	Albania	2150	M,R,X
5.060	PBS Xinjiang	China	1940	G,M
5.065	R. Candip, Bunia	Zaire	0428	B
5.075	R. Beijing	China	2150	L,M
5.085	R. Pakistan, Karachi	Pakistan	0300	H
5.090	R. Pakistan Islamabad	Pakistan	0240	O
5.095	R. Sutatenza, Bogata	Colombia	2225	L,Y
5.256	RRI Sibolga, Sumatra	Indonesia	1610	L
5.260	R. Alma Ata	USSR	1616	L
5.275	WYFR Oakland, CA	via Taiwan	1529	L
5.290	R. Moscow Krasnoyarsk	USSR	2340	L,O
5.440	PBS Xinjiang	China	0005	G,L
5.800	PBS Xinjiang	China	0005	X

DXers:

A: Leo Barr, Sunderland.
B: Ian Baxter, Blackburn.
C: Ian Bond, Wirral.
D: Robert Cowell, Blackpool.
E: Alan Curry, Stockton-on-Tees.
F: Ferdy De Martin, Cortaillod, Switzerland.
G: David Edwardson, Wallsend.
H: Bill Griffith, Baroda, India.
I: Sheila Hughes, Morden.
J: David Middlemiss, Eyemouth.
K: Dick Moon, George, South Africa.
L: John Nash, Brighton.
M: Fred Pallant, Storrington.
N: Roy Patrick, Derby.
O: Peter Perkins, Hemel Hempstead.
P: Christian Pritchard, Cambridge.
Q: Richard Radford-Reynolds, Southampton.
R: Kenneth Reece, Prenton.
S: Alan Roberts, Quebec.
T: Mark Selby, Aldershot.
U: Tim Shirley, Bristol.
V: Alan Smith, Northampton.
W: Mal Tedds, Nottingham.
X: Neil Wheatley, Newcastle-upon-Tyne.
Y: Jim Willett, Grimsby.

SEEN & HEARD

(Cz, Ger, Eng, Fr, 1800-2200) 44434 at 2130 by Peter Lewis; RAE Buenos Aires, Argentina 15.345 (Ar, Eng, Ger, Fr, It, Sp 1700-2300) 33333 at 2240 by Christian Pritchard.

Some broadcasters beam programmes to Europe in the 13MHz (22m) band during the day. They include R. Austria, Vienna 13.730 (Ger, Fr, Eng, Sp 0700-1700) 43434 at 0800 by Peter Lewis; WCSN Scotts Corner, Maine 13.760 (Eng, Fr, Ger 1400-1555) 333 at 1440 by Alan Smith; WHRI South Bend, USA 13.760 (Eng 1500-2100) 423 at 1947 by Mal Tedds.

Many broadcasts to other areas also reach the UK well; WYFR via Okeechobee, FL 13.695 (Eng to Africa 0400-0600) 44343 at 0530 by Kenneth Reece; SRI Berne, Switzerland 13.685 (It, Eng, Ger, Fr to Australia, Pacific area 0745-1030) 55444 at 0830 by David Wratten; R. Pakistan, Karachi 13.675 (Ur, Eng to Middle East 1315-1630) 35534 at 1614 by Darran Taplin; R. Prague, Czechoslovakia 13.715 (Eng, Cz, Ar, Fr to S. Asia, Middle East 1430-2125) 43344 at 1734 by Max Waustrau.

There is plenty to interest the DXer on the 11MHz (25m) band by day or night. Broadcasts in English from R. New Zealand are beamed to the Pacific area on 11.780 from 0900 until 1115, some mornings they have been reaching the UK. Matthew King has been monitoring their transmissions and often found reception to be good, at best, as 33333 at 0930. The broadcasts from R. Australia via Shepparton 11.720 (Eng to C. Pacific area 0730-0930) have also been reaching the UK. David Edwardson noted them as 33433 at 0900.

Some other broadcasts to areas outside Europe were also logged: R. Finland, Helsinki 11.855 (Eng, Fin, Sw to E. Asia 0930-1100) 44433 at 0930 by Sheila Hughes; SBC Singapore 11.940 (Eng, Chin to SE. Asia 2200-1605) 22222 at 1043 by Ian Baxter; AWR Agat, Guam 11.980 (Chin, Kor, Jap to C. Asia 0900-1500) 21432 at 1104 by Richard Radford-Reynolds; SLBC Colombo, Sri Lanka 11.835 (Eng, Jap, Si to SE. Asia, Australia 1030-1130) 25222 at 1125 by John Nash; Voice of Mediterranean, Valetta, Malta 11.925 (Eng, Ar to N. Africa, S. Europe 1400-1600) 44333 at 1400 by Christian Pritchard; BBC via Kranji, Singapore 11.750 (Eng to SE. Asia 1745-2200) 222 at 1830 by Philip Rambaut; RTM Tangler, Morocco 11.920 (Eng, Fr to W. Africa 1900-0100) at 1900 by Tim Shirley; R. Damascus, Syria 12.085 (Eng to SE. Asia, Australia 2110-2210) at 2112 by Ted Walden-Vincent in Great Yarmouth; RAE Gral Pacheco, Argentina 11.710 (Ger, Sp to S. America 1900-2200) 333 at 2017 by Mal Tedds; R. Globo Rio de Janeiro, Brazil 11.805 (Port to SE. Brazil 0800-0200) at 2330 by Roy Patrick; R. Bandeirantes, Brazil 11.925 (Port to SE. Brazil 0600-0230) 32333 at 2130 by Martin De Ferdy in Cortaillod, Switzerland; Voice of UAE, Abu Dhabi 11.965 (Eng to USA 2200-0200) 54444 at 2332 by Alan Curry; UAE R. Dubai 11.940 (Ar, Eng to USA 0230-0400) 45444 at 0350 in C. India by Bill Griffith; R. RSA Johannesburg, S. Africa 11.900 (Eng to E. Africa, Middle East 0400-0426) 23322 at 0400 by Mark Selby.

At some time during the day, many broadcasters beam their programmes towards Europe. Mentioned were: R. Jordan via Al Karanah, Jordan 11.955 (Eng 0615-1415) 44534 at 0647 by Kenneth Reece; Voice of Greece, Athens 11.645 (Gr, Eng, Sw 1500-1550) 54444 at 1535 by David Wratten; R. Pakistan, Islamabad 11.570 (Ur, Eng, Fr 1645-2015) 43553 at 1700 by John Parry; R. Bangladesh, Dakar 11.510 (Eng, Beng 1815-2000) 454 at 1859 by John Coulter; RCI via Sackville, E. Canada 11.945 (Hung, Cz, Uk, Eng, Fr, Russ, Pol 1830-2300) 443 at 1930 by Kenneth Buck; REE via Arganda, Spain 11.790 (Fr, Eng 1800-2200) 34333 at 1931 by Peter Lewis; AIR via Aligarh, India 11.620 (Eng 1845-2230) 434 at 1945 by Alan Smith; R. Damascus, Syria 12.085 (Ger, Fr, Eng 1835-2105) 55544 at 2016 by Darran Taplin; R. Kuwait, State of Kuwait 11.665 (Eng 1800-2100) 54444 at 2035 by Ken Whayman; Voice of Israel, Jerusalem 11.585 (Russ, Yid, Lad, Eng, Fr, Heb 1100-2300) 43324 at 2253 by Max Wustrau R. Japan via Moyabi, Gabon 11.800 (Japan, Eng 2200-0000) 23222 at 2300 by Leo Barr.

The 9MHz (31m) band attracted many UK listeners around 0900 because the broadcasts from R. New Zealand, Wellington 9.850 (Eng to Australia 0900-1115) have been frequently audible here. Peter Perkins found their signal to be quite readable in Hemel Hempstead at 0900 on successive mornings. The 22222 noted by Alan Curry at 0900 is a typical rating.

The report from George Hewlett

Alf Gray's Listening Post

indicates that this band also provides the best reception from R. Australia at the moment. Although their transmission via Shepparton on 9.655 (Eng to Europe, S. Pacific area 0700-1000) is marred by adjacent channel interference from R. Moscow on 9.650 (Fr to Africa 0500-0800) at first, from 0800 reception is generally good. The 53344 noted by Mark Selby is a typical rating at 0830. George has also been checking two of their other transmissions from Shepparton: 9.580 (Eng to C. Pacific, USA 0800-2130) usually as 433 between 0800 and 1000 and 9.770 (Eng to SE. Asia) which often peaks 434 around 1000.

At 0900, Simon Hamer picked up the broadcasts to NE. Australia from ABC in Brisbane on 9.660. Their transmissions in English are on the air 24 hours a day, but they seldom reach the UK and may well be one to add to your DX list. During the evening, Alan Smith has been listening to R. Australia via Shepparton on 9.620 (Eng to E. Asia, W. Pacific area 2000-2130). He noted 434 in his log at 2012.

Many broadcasters use 31m to reach Europe both day and night. They include R. Tirana Lushnje, Albania 9.500 (Eng 0630-0700) 55545 at 0630 by Mark Selby; R. HCJB Quito, Ecuador 9.610 (Cz, Sw, Norw, Ger, Eng 0500-0800) noted as "good" at 0730 by Roy Patrick; SRI via Lenk, Switzerland 9.535 (Fr, Ger, It, Eng, Sp 0600-2045) 444 at 1315 by Peter Lewis; Voice of Vietnam, Hanoi 9.840 (Fr, Eng 1300-1400) 42333 at 1330 by John Nash; RNI Oslo, Norway 9.655 (Norw, Eng, Sp 1700-1745) 43333 at 1700 by Christian Pritchard; Voice of Revl. Addis Ababa, Ethiopia 9.660 (Eng 1800-1900) 33443 at 1830 by David Wratten; Voice of Greece, Athens 9.395 (Gr, Eng, Fr 1900-1950) 45544 at 1933 by David Edwardson; R. Jordan via Al Karanah 9.560 (Eng 1430-2200) 333 at 2105 by Mal Tedds; R. Baghdad, Iraq 9.770 (Fr, Ger, Eng 1900-2255) at 2053 by Ted Walden-Vincent; R. Cairo, Egypt 9.900 (Alb, It, Ger, Fr, Eng 1730-2245) 44333 at 2200 by Robert Cowell; VOFC Taipei, Taiwan 9.955 (Eng, Sp 2200-0000) 322 at 2245 by Philip Rambaut; Voice of Israel, Jerusalem 9.445 (Fr, Eng, Yid, Sp 2200-2355) 44444 at 2304 by Ian Bond.

Logs mentioned the BBC via Antigua, W. Indies 9.510 (Eng to C. and N. America 0430-0545) 33433 at 0529 by Kenneth Reece; R. HCJB Quito, Ecuador 9.745 (Eng to Australia, S. Pacific 0700-1030) 53433 a 0812 by Leo Barr; TWR Agana, Guam 9.820 (Chin to C. Asia 0900-1500) 343 at 0955 by John Evans; SLBC Colombo, Sri Lanka 9.720 (Eng, Hi to S. Asia 1230-1730) 33333 at 1532 by Ian Baxter; BBC via Kranji, Singapore 9.570 (Eng, Russ to Australia, SE. Asia 1945-0045) 333 at 2010 by Alan Smith; R. Nacional, Paraguay 9.735 (Sp, Gu to S. America 2100-0200) 33433 at 2130 by Martin De Ferdy in Switzerland; Voice of UAE, Abu Dhabi 9.597 (Eng to USA 2200-0200) 454 at 2201 by Kenneth Buck; BRT via Wavre, Belgium 9.925 (Eng, Fr, Du, Sp to E. USA 2200-0055) 444 at 2225 by David Middlemiss in Eyemouth; AIR via Aligarh, India 9.535 (Eng to SE. Asia 2245-0115) 33333 at 2305 by Alan Curry; WCSN Scotts Corner, Maine 9.850 (Eng, Fr, Ger to Africa 0000-0155) 54444 to 0130 by Ken Whayman; R. Thailand, Bangkok 9.655 (Eng to SE. Asia 2300-0410) 44444 at 0030 by Bill Griffith while in C. India; TWR via Bonaire, Ned. Antilles 9.535 (Eng to USA 0300-0530) 44444 at 0330 by Sheila Hughes.

Many broadcasters make extensive use of the 7MHz (41m) band to reach Europe. They include RTV Tunis, Tunisia 7.475 (Ar 0330-0600) 44544 at 0540 by Kenneth Reece; WYFR via Okeechobee, FL 7.355 (Russ, Ger, Eng 0400-0745) 54455 at 0700 by Mark Selby; WHRI South Bend, USA 7.355 (Eng 0800-1100) 44444 at 0900 by Sheila Hughes; AWR via Forli, Italy 7.255 (Fr, It, Ger, Eng, Hung, Bul, Yu 1400-1600) at 1414 by Ted Walden-Vincent; RBI via Nauen, E. Germany 7.295 (Eng, Ger 1645-1800) 54444 at 1645 by David Wratten; R. Prague, Czechoslovakia 7.345 (Ar, Fr, Eng, Sp 1630-2145) at 1900 by Julian Wood in Buckle; R. Australia via Carnarvon 7.205 (Eng 1430-2030) 222 at 1910 by John Evans; Voice of Greece, Athens 7.430 (Gr, Eng Fr, Ger 1900-1950) 45554 at 1929 by David Edwardson; AIR via Delhi 7.412 (Eng 1845-2230) 322 at 1940 by Alan Smith; REE via Arganda, Spain 7.450 (Sp 1630-2130) 333 at 1940 by David Middlemiss; R. Moscow, USSR 7.150 (Eng 1700-2300) 434 at 1942 by Ian Bond; IBRA R. via Cyclops 7.110 (Pol, Ger, Eng 2000-2115) 43334 at 2048 by Peter Lewis; Vatican R., Rome 7.250 (It, Fr, Eng 2010-2110) 44444 at 2105 by Leo Barr; R. Polonia, Warsaw 7.270 (Ger, Fr, Eng 1900-

Freq kHz	Station	Location	Time (UTC)	DXer
		USA		
690	KHEY	El Paso, TX	0230	A
770	WJMW	Athens, AL	0330	A
860	WOAY	Oak Hill, W. VA	2100	A
890	WLS	Chicago, IL	?	A
1010	WINS	New York, NY	2100	A,B
1050	WFAN	New York, NY	0300	B
1210	WCAU	Philadelphia, PA	0140	B
1220	WGAR	Cleveland, OH	0155	B
1510	WSSH	Boston, MA	0430	B
1520	KSGO	Portland, OR	0330	A
		Canada		
580	CFRA	Ottawa, ON	0600	A
590	VOCM	St. John's, NF	2330	A,B
610	CKYQ	Grand Bank, NF	0200	A
620	CKCM	Grand Falls, NF	0310	B
820	CHAM	Hamilton, ON	0500	A
930	CJYQ	St. John's, NF	0100	B
1110	CBD	St. John, NB	0150	B
		C. America & Caribbean		
1570	Atlantic Beacon	Turks & Caicos Is	0200	B
1610	Caribbean Beacon	Anguilla	0400	B
		South America		
1220	R. Globo	Rio, Brazil	0230	B

DXers:
A: Tim Shirley, Bristol.
B: Jim Willett, Grimsby.

QSL from Edward Broadsmith

SEEN & HEARD

Freq kHz	Station	Country	Power (kW)	DXer
531	Ain Beida	Algeria	600	D*
540	BRT-2 Wavre	Belgium	150/50	E*,K*
540	Solt	Hungary	2000	H*
540	Sidi Bennour	Morocco	600	D*
549	Les Trembles	Algeria	600	D*,H*
549	DLF Beyreuth	W. Germany	200	E,K*,L*
567	RTE-1 Tullamore	S. Ireland	500	E,F,J,K*,M*
576	Stuttgart	W. Germany	300	E,H*
585	FIP Paris	France	8	E,J
585	RNE-1 Madrid	Spain	200	H*,J,K*
594	HRF Frankfurt	W. Germany	400	E,H*
612	RTE-2 Athlone	S. Ireland	100	E,F,J
621	RTBF-1 Wavre	Belgium	300	E,H*,K*
630	Vigra	Norway	100	D*
639	Liblice	Czechoslovakia	1500	E
639	La Coruna	Spain	100	H*
648	BBC Orfordness	UK	500	I*,K*
657	BBC Wales	UK	2	J
666	Bodenseesender	W.Germany	300/180	H*,I*
675	Marseille	France	600	I*
675	Hilversum-3 Lopic	Holland	120	E,H*,K*
684	RNE-1 Sevilla	Spain	250	H*,L*
684	Beograd	Yugoslavia	2000	I*
693	BBC Droitwich	UK	150	I*
711	Rennes 1	France	300	E
720	BBC Lots Road	UK	0.5	K*
738	Paris	France	4	E,J
738	Poznan	Poland	300	A*
747	Hilversum-2 Flevo	Holland	400	E,H*,I*,K*
756	Brunswick	W. Germany	800/200	E,K*
765	Sottens	Switzerland	500	H*,I*
783	Burg	E. Germany	1000	E,H*,I*,K*
792	Sevilla	Spain	20	K*
801	BRF via Munich	W. Germany	420	H*,K*
810	BBC Westerglen	UK	100	E
846	Rome	Italy	540	H*,K*,L*
855	RAIS Berlin	W. Germany	100	M*
864	Paris	France	300	H*
873	Zaragoza	Spain	20	H*
873	AFN Frankfurt	W. Germany	150	I*
882	BBC Washford	UK	70	K*
891	Algiers	Algeria	600/300	D*,H*,L*
900	Milan	Italy	600	A*,H*,L*
918	R. Intercont. Madrid	Spain	20	E
918	R. Ljubljana	Yugoslavia	600/100	H*,L*
927	BRT-1 Wolvertem	Belgium	300	E,H*,K*
936	Radio Bremen	W. Germany	100	H*,I*,M*
945	Toulouse	France	300	I*
963	Pori	Finland	600	D*,H*
972	NDR/WDR Hamburg	W. Germany	300	E,H*,I*,L*,M*
981	Algiers	Algeria	600/300	D*,H*
999	R. Popular, Madrid	Spain	20	H*
1008	Hilversum-5 Flevo	Holland	400	E,H*,K*
1017	Wolfsheim	W. Germany	600	E,H*
1035	Milan	Italy	50	H*
1044	DDR-1 Burg	E. Germany	250	H*
1044	Sebaa Aioun	Morocco	300	D*
1062	Kalundborg	Denmark	250	D*,H*,K*
1071	Brest	France	20	E
1071	Lille	France	40	H*
1098	Velke Kostolany	Czechoslavakia	400	H*
1107	AFN via Munich	W. Germany	40	D*,L*
1125	La Louviere	Belgium	20	E,L*
1134	Valencia	Spain	10	E
1134	Zagreb	Yugoslavia	300	L*
1143	AFN via Stuttgart	W. Germany	10	H*,I*
1143	Kaliningrad	USSR	150	C*,K*
1161	Strasbourg	France	200	H*
1179	Solvesborg	Sweden	600	C*,D*,E,K*,M*
1188	Kuurne	Belgium	5	E
1197	BBC-R3 Bournemouth	UK	0.5	E
1197	VOA via Munich	W. Germany	300	H*
1206	Bordeaux	France	100	H*
1206	Wroclaw	Poland	200	C*
1224	COPE Madrid	Spain	20	E,H*
1233	Liege	Belgium	5	E
1233	Prague	Czechoslovakia	400	H*
1242	Marseille	France	150	H*
1269	Neuminster	W. Germany	600	E,H*,I*,K*
1278	RTE-2 Dublin/Cork	S. Ireland	10	A*
1287	Litomysl/Liblice	Czechoslovakia	300/200	A*,C*,E,H*
1296	BBC Orfordness	UK	500	L*
1314	Kvitsoy	Norway	1200	D*,E,H*,I*,K*
1323	R. Moscow via Leipzig	E. Germany	150	A*,H*
1332	Rome	Italy	300	H*,K*
1341	BBC Lisnagarvey	N. Ireland	100	E
1350	Nancy/Nice	France	100	E,H*,J*,K*
1359	RBI Berlin	E. Germany	250/100	C*
1368	Manx Radio, Foxdale	I.O.M.	20	A,L*
1377	Lille	France	300	H*
1386	Kaunas	USSR	1000	E,K*,L*
1395	R. Tirana via Lushnje	Albania	1000	L*
1395	Alicante	Spain	2	A*,H*
1404	Brest	France	20	E,H*,K*
1413	BBC via Maslrah Is	Oman	?	B*
1422	Saarbrucken	W. Germany	1200/600	E,H*,K*
1440	Marnach	Luxembourg	1200	E,H*,I,K*
1467	TWR Monte Carlo	Monaco	1000/400	C*,H*,L*
1476	Wien-Bisamberg	Austria	600	K*,L*
1503	Stargard	Poland	300	K*
1512	BRT Wolvertem	Belgium	600	A*,C*,E,H*,I
1521	Kosice	Czechoslovakia	600	L*
1530	Vatican Radio, Rome	Italy	150/450	C*,J*
1539	DLF Mainflingen	W. Germany	700	E,H*,I,M*
1566	Sarnen	Switzerland	300	H*,M*
1575	RBI via Burg	E. Germany	250	J*,K*,M*
1575	Genoa	Italy	50	H*
1593	Langenberg	W. Germany	400/600	E,H*,K*,M*
1611	Vatican Radio, Rome	Italy	?	G*

Abbrv	Language
Alb	Albanian
Ar	Arabic
Beng	Bengali
Bul	Bulgarian
Chin	Chinese
Cz	Czechoslovakian
Dan	Danish
Du	Dutch
Eng	English
Fin	Finnish
Fr	French
Ger	German
Gr	Greek
Gu	Guarani
Heb	Hebrew
Hi	Hindi
Hung	Hungarian
It	Italian
Jap	Japanese
Kaz	Kazakh
Kor	Korean
Lad	Ladino
Pa	Pashto
Pol	Polish
Port	Portuguese
Russ	Russian
Si	Sinhala
Sp	Spanish
Sw	Swedish
Swa	Swahili
Tah	Tahitian
Taj	Tajik
Tu	Turkman
Uk	Ukranian
Ur	Urdu
Yid	Yiddish
Yu	Yugoslavian

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

2355) 55444 at 2230 by Alan Curry.

The level of co-channel and adjacent channel interference on this band is very high, but with careful listening broadcasts to other areas may be heard, including RFO Noumea, New Caledonia 7.170 (Fr to S. Pacific area 24hrs) at 0800 by Simon Hamer; BBC via Tsang Tusi, Hong Kong 7.180 (Eng, Russ, Chin, Jap to C. Asia 0815-1615) 35233 at 1355 by John Nash; R. Korea, Seoul 7.550 (It, Fr, Kor, Ar, Ger, Eng, Sp, Port to E. Africa, Middle East 1545-2345) 433 at 1758 by Philip Rambaut; R. Beijing, China 7.800 (Fr, Chin to N. Africa 1730-2225) 323 at 2149 by Mal Tedds; WRNO New Orleans, USA 7.355 (Eng to E. USA 0000-0300) 34433 at 0059 by Darran Taplin; R. Sophia, Bulgaria 7.115 (Eng to USA 0400-0500) 55545 at 0440 by Ian Baxter.

During the early morning and after dark, DXers also logged some of the 6MHz (49m) broadcasts to areas outside Europe. Kenneth Reece noted R. HCJB, Quito 6.230 (Eng to USA 0500-0700) 33433 at 0502; Peter Perkins heard KNLS Anchor Point, Alaska 6.065 (Eng, Russ, Jap to Asia 0800-1100) at 0800; John Nash logged KUSW Salt Lake City, USA 6.135 (Eng to E. USA 0700-1100) as 33443 at 0835. At 1846, Ian Baxter heard the Voice of Lebanon, Beirut 6.550 (Ar, Eng, Fr to Middle East 0300-2300) 34323 and later, the King of Hope, S. Lebanon 6.280 (Eng, Russ, Uk, Gr, Sw, Yu, Hung, Eng, Fr to Middle East, SE. Europe 1430-2300) 24333 at 2148 by David Wratten. The Voice of UAE, Abu Dhabi 6.170 (Eng to USA 2200-0200) was 53454 at 2300 by Matthew King.

This band is used by broadcasters to reach Europe. They include VOA via Tangier, Morocco 5.995 (Eng 0400-0700) 433 at 0655 by Alan Smith; WHRI South Bend, USA 6.100 (Eng 0600-0800) 43344 at 0754 by Mark Selby. R. Nederlands via Flevo 5.955 (Du, Eng 1330-1525) 55545 at 1430 by Ken Whayman; RFI via Allouis, France 6.175 (Fr, Eng 0500-2200) 43334 at 1606 by Ian Bond; R. Prague, Czechoslovakia 5.930 (Fr, Eng, Sp, Port 1730-2125) 333 at 1802 by Mal Tedds; R. Afghanistan via USSR 6.020 (Pa, Ger, Eng 1730-1930) 54444 at 1851 by Richard Radford-Reynolds; SRI via Sarnen, Switzerland 6.165 (It, Ger, Eng, Fr, Sp, Port, Ar 1330-2045) 33333 at 1852 by Leo Barr; BBC via Limassol, Cyprus 6.180 (Eng 1500-2315) 333 at 1925 by David Middlemiss; R. Sweden, Stockholm 6.065 (Sw, Sp, Pol, Eng, Russ, Fr, Ger 1600-2230) 43433 at 2100 by Peter Lewis; R. DW via Sines, Portugal 6.075 (Ger 2200-0200) 52245 at 2347 by Max Wustrau; R. Yugoslavia, Belgrade 5.980 (Fr, Eng 0030-0145) 44444 at 0105 by Sheila Hughes.

DXers:

A:	Leo Barr, Sunderland.
B:	Bill Griffith, Baroda, C. India.
C:	Sheila Hughes, Morden.
D:	Matthew King, Hayes.
E:	George Millmore, Wootton I.O.W.
F:	Chris Nykiel, Leeds.
G:	John Parry, Northwich.
H:	Philip Rambaut, Macclesfield.
I:	Mark Selby, Aldershot.
J:	Darran Taplin, Tunbridge Wells.
K:	Phil Townsend, London.
L:	Neil Wheatley, Newcastle-upon-Tyne.
M:	Max Wustrau, Bedford.

Station Addresses

BBC Radio Lancashire, King Street, Blackburn BB2 2EA.

ILR Red Rose Radio, PO Box 301, St. Paul's Square, Preston PR1 1YE.

Radio Bucharest, PO Box 111, Bucharest, Romania.

Radio Kiev, External Service, Radio Centre, Kiev, Ukrainian, SSR, USSR.

Radio Tunis, Service des Relat. Exterieurs, 71 Avenue de la Liberte, Tunis, Tunisia.

Trans World Radio, PO Box Box 64, Manzini, Swaziland.

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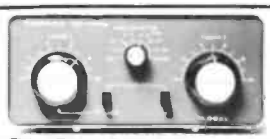

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"They said I couldn't work DX with just 100 watts. Especially with a radio that has less than 1000 switches on the front panel.

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You see, my no-nonsense FT-747GX was designed with me in mind, so I can hop around the band fast to nail those DX stations. While the other hams are warming up their amplifiers, I'm working the new country!

My FT-747GX has a super receiver, with a directly-driven mixer for great overload protection. And, Yaesu included the CW filter in the purchase price (I used the money I saved on postage for the QSL cards!).

And my FT-747GX is loaded with other features. The receiver works from 100kHz straight through 30MHz, and it's a fantastic shortwave broadcast receiver. I can use all twenty memories for that alone! Plus it's got dual VFOs. A noise blanker. Split frequency operation for the pile-ups. And scanning up the band helps me check out openings as they happen.

I just put in the optional crystal oven, and next month I'm going to pick up the FM board.

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Thanks, Yaesu. You've made a rig that makes sense, at a price I can afford."

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