Reviewed
ICS SYNOP III Meteo-RTTY Plot System
Grundig Yacht Boy 500 World Receiver

Plus Regular Features Covering
Airband, Scanning, Junior Listeners,
SSB Utility Listening, Propagation,
Amateur Bands, Long, Medium & Short
Waves, Satellite TV Reports, Weather
Satellites and more.

The Lizard in the Field of Radio
And A Look at Facsimile Reception
Build
A Computer Interface for CW Decoding
VT-225 CIVIL/MILITARY AIRBAND

By covering just Civil and Military Airband, receiver performance is optimised allowing reception of long distance signals. The set is easy to use and has excellent audio quality.

- Civil, Military & Marine Band
- 108-142, 149.5-160, 222-391 MHz
- AM & FM Modes
- Fast Search
- 100 Memory Channels
- Signal Strength meter
- Supplied with N/Cads, Charger, Earphone, Belt Clip
- Optional Leatherette Case available
- Price: £249

**MVT-7100 WIDEBAND WITH SSB**
The ultimate in Scanning Receivers - with true SSB reception using carrier insertion for effortless reception of both USB, LSB or CW. A rotary tune knob allows normal receiver tuning across the entire wideband frequency range. It's exceptional sensitivity and ease of use has made this the UK's number one scanning receiver.

- 100KHz-1650MHz
- All mode reception
- AM/FM/WFM/USB/LSB/CW
- Supplied with N/Cads, Charger, Earphone, Belt Clip
- Optional Leatherette Case available
- Price: £389

VT-125 CIVIL AIRBAND

Being dedicated to one specialist band has enabled Yupiteru to optimise the performance of this radio - sensitivity is outstanding, enabling reception of long distance aircraft, inaudible on other scanners.

- 108-142MHz
- 30 memory channels
- AM mode reception
- Signal meter
- Supplied with N/Cads, Charger, Earphone, Belt Clip
- Optional Leatherette Case available
- Price: £189

**MVT-7000 WIDEBAND**
The exceptional receiver performance of this handheld has to be heard to be believed. It's ease of use and instant results with only minimum programming make it one of the best in its class.

- Continuous coverage (100KHz - 1300MHz)
- Signal bar graph meter
- 200 memory channels
- AM/FM/WFM modes
- Rotary or keypad frequency control
- Supplied with all accessories
- Price: £325

**MVT-8000 BASE/MOBILE**
This base version of the MVT-7000 incorporates all the facilities of the handheld in a stylish metal case. Again, it can be controlled by either direct keypad or rotary tuning knob. Easy read full function LCD display makes this model a dream to use, and produces stunning results on the air.

- 100KHz-1300MHz
- Direct keypad and rotary control
- 200 memory channels
- Supplied with UK Mains Power Supply and Mobile Mount Bracket
- AM/FM/WFM modes
- The best base available! Price: £369

Available from your Local Dealer or Direct:

Order hotline (0705) 662145
or Fax (0705) 690626

YUPITERU FACTORY APPOINTED DISTRIBUTORS:

Nevada Communications

189 London Road North End Portsmouth PO2 9AE

WARNING:-- ALL OF THE ABOVE MODELS ARE PRODUCED BY YUPITERU FOR THE UK AND COME COMPLETE WITH ORIGIANL YUPITERU GLOSSY HANDBOOK IN ENGLISH. PLUS AN APPROVED 12V SCANMASTER UK CHARGER. MODELS PRODUCED FOR THE JAPANESE DOMESTIC MARKET DO NOT INCLUDE THESE AND HAVE CERTAIN FREQUENCY COVERAGE REMOVED.
Features

10 The Lizard in the Field of Radio
   Robert Whistler

12 Grundig YB-500 Reviewed
   Peter Shore

16 Overload Interference
   Joseph J. Carr K4IPV

26 Computer-Receiver Interface for CW Decoding
   Gareth Jones GW4KJW

29 Facts On FAX!
   Mike Richards G4WNC

37 Breaking The Bands
   Tony Hopwood

38 ICS Synop III Data Plotting
   Software Review
   Mike Richards

Regular Columns

6 News
66 Off The Record
74 PCB Service
42 Propagation
43 Satellite TV News
52 Scanning
2 Services
49 SSB Utility Listening
73 SWM Subscribers’ Club
68 Trading Post

Cover Subject

Grundig International supplied the impressive photograph of our review subject, the new Grundig Yacht Boy-500, World Receiver. The inset picture shows the Marconi Memorial at Poldhu Point on The Lizard.

DISCLAIMER. Some of the products offered for sale in advertisements in this magazine may have been obtained from abroad or from unauthorised sources. Short Wave Magazine advises readers contemplating mail order to ensure whether the products are suitable for use in the UK and have full after-sales back-up available. The Publishers of Short Wave Magazine wish to point out, that it is the responsibility of readers to ascertain the legality or otherwise of items offered for sale by advertisers in this magazine.
editorial

A large number of you have returned completed Reader Survey forms and, although they have not yet been analysed, I have had a quick look at what you are saying. As a result, you will find that the regular columns have been redesigned. Steve, my Art Editor, assures me that the amount of information that can be fitted in is exactly the same as before, so you are not losing out. I hope that you find that the change is for the better.

Distribution Problems

I understand that there was a distribution problem with the March 94 issue of SWM. Although it was published on time, certain areas did not receive their normal supplies of the magazine. If you had problems getting your copy, please write and let me know. We can supply limited numbers of this issue from the Editorial Offices on receipt of £1.30 - but only if you live in the areas affected.

Of course, taking out a subscription not only prevents you missing out when this sort of thing happens, it also saves you money. The Editorial Staff on all of our magazines pride themselves on getting the issues out on time. If you find that your newsagent cannot supply you with your copy of SWM on the fourth Thursday of the month, please do let me know. I need the name and address of the newsagent concerned, along with the explanation given by the newsagent, so that I can take it up with Seymour, our Distributors.

Dick Ganderton G8VHF

letters

IF YOU HAVE ANY POINTS OF VIEW THAT YOU WANT TO AIR PLEASE WRITE TO THE EDITOR. IF YOUR LETTER US PUBLISHED 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 any other magazines. The views expressed in letters published in this magazine are not necessarily those of Short Wave Magazine.

Dear Sir

I'm not the most enthusiastic of letter writers, but your comments regarding the new AOR AR3030 receiver forces me to put pen to paper. You say that "Every once in a while, a manufacturer produces something radically different and surprises us all." It's comments like that, plus over enthusiastic reviews that actually stop manufacturers producing good general coverage h.f. receivers.

The only radical thing about the AR3030 is the use of 6kHz mechanical filter for a.m. The rest of it is pretty run of the mill.

I could never see the point in having memory banks and scanning on a h.f. RX. Why not put the cost of these into fitting a full set of good filters as standard. Paying for the optional filters plus the AR3030 alongside the Drake R8E on the price and I know which I would rather have. When everything else produced in America is expensive, the R8E seems to be really good value.

I run a Yaesu FR101, but, like the Kenwood 820, it is only partial coverage. After a five year lay off, I'm back on the bands and decided a few weeks ago it would be nice to find out what goes on the other bands and started shopping around.

I've read every word in the SWM and PW magazines, scanned every available catalogue, but the only RX that comes anywhere near the FR101 is the Lowe HF-225 Europa. The rest are just not worth considering.

Take the Yaesu FRG-100, voted RX of the year yet it hasn't even got synchronous a.m. detection. Someone is even fitting s.s.b. to the Icom R100 with a filter width of 6kHz! That's worse than the slapped off FRG-71!

Lowe Electronics seem to be the only manufacturer making an effort to produce a good basic RX, but even they could do better by getting rid of the gimmicks.

When will someone be brave enough to forget memory banks and scanning and fill as standard really useful aids, like passband tuning, variable i.f. filters, p.i.p. good sensitivity and dynamic range, built-in switchable pre-amp, etc., for around £700. I think AOR have missed out on a golden opportunity.

I am 59 years old and retired, but would be waiting for the showrooms to open to purchase such a RX. I would even give up smoking to pay for it!!

PS. What happened to the HPX Ladder? P. Ford Gloucester

You cannot please everyone! Air testing a receiver must be just like road testing a car. Motorists will argue for hours over the relative merits and demerits of their own particular favourite make of car. What suits one driver will not suit another, even though they will all get you from A to B. I know what radios I like and what ones I do not like - but I will keep that information to myself. The HPX ladder was dropped to provide some of the space needed for all the developments that I felt were needed to turn SWM into a listeners' magazine. Editor.
Dear Sir
I have two reasons for writing to you. Firstly, I have been a radio enthusiast, on and off for many decades, and within the last few years have returned to the fold, so to speak. In October of last year, I was very fortunate to hear an Amateur Radio station in the Sudan, Khartoum to be precise. His name is Ali and his call sign is ST2/G40JW. He was QRP at 15W using an IC735 into a dipole. I was very helpful to receive a response to the card and letter I sent to Ali and in return he asked me to make known in the UK the following information.

In his letter Ali states that for many decades there have been no legally licensed operators in the Sudan and after recent demonstrations that he gave to his authorities they are now prepared to issue formal licences. The first licensed operators is a club with the call sign STOK and all QSL cards should be sent to the following address:

PO Box 617
Khartoum
Sudan

However, your readers may like to be aware that ICARS are not easy to exchange, though not impossible, and any QSL exchanges should be supported by a s.a.e. and preferably $1 US or 2 IRCs. STOK can be heard usually between 0600-1200Z in c.w. or 18.069, 21.002 or 24.895-MHz and 28MHz when open every day except Friday. The club's QTH is 100 watts to a dipole, and for the record, I heard Ali on 14.06146MHz at 1957Z on 8th October 93. I hope that this information is useful to your readers.

Secondly, I have been following closely recently the 'Great Debate' on the need for Morse code for Amateur A class license holders. As a professionally trained Morse operator, I feel that very little advice has been given on how to succeed in training and passing the test.

In my view, nothing short of hard work will achieve the goal plus a positive approach to the subject. When I was under training, lessons were at least five hours per day for three months, achieving speeds of 20w.p.m. plus. I disagree with the old methods of learning characters at a very low speed and working up to the target speed. This leads to the 'blocks' at certain speeds and can result in partial lack of confidence when these 'blocks' are encountered. I currently use a Datong Morse tutor to teach pupils. I find the ability of this super machine to send characters at speed but varying the space between characters ideal. This removes the pupil off with the sound of characters at the actual speed they are trying to achieve, whilst giving them breathing space to identify the characters. As a result, they are not hampered by learning a new speed every so often, and the gradual introduction of time in between characters becomes unnoticeable.

I have had excellent results using this method with pupils achieving fairly good results with only a couple of hours practice per week. However, at the end of the day, its diligence and practice that makes perfect, the more time spent, the quicker you will achieve the desired result.

In conclusion, may I say that as someone who is presently doing self-study in preparation for the RAE, I wholeheartedly agree with Chris Carrington's comments. I could say that as a professional communications operator for over two decades, why should I have to sit and pass the RAE! This, of course, is not the attitude to take. If its worth having, it's worth studying for, and at the end of the day, if you have someone on an h.f. band without a Morse qualification, then how could they deal with a distress situation in Morse code to identify someone who is causing harmful interference to their station with a Morse key?

I rest my case. Thank you for producing a high grade magazine. I wish you is continued success with what is probably the best all round communications magazine on sale.

PS. Ali is not a member of the RSGB.

John Ireland G-20603
Buckinghamshire

Dear Sir
I have just read a most interesting article in the latest issue of SWM on building a valve airband receiver. Unfortunately, the article does not give pin numbers and unless your readers already have this information to hand, it is very unlikely that they will be able to obtain it.

It would be helpful therefore if you would publish the necessary information, or perhaps state where one may get such data. Without such information, the article fails to be of any use!

Although I am currently not an airband listener, I found this particular issue extremely interesting and the information therein well presented, keep up the good work!

E. F. C. Owen
Surrey

I am pleased that readers have found constructive articles, such as this one, interesting. Unfortunately, some errors crept into the circuit diagram: The screen and control grids of V1 got mixed up, C30 should be connected between chassis and R22/26 junction, C15 should decouple the heater of V2 and R24 goes to HT+ not HT+ Stab. If you are contemplating building this project an s.a.e. to the Editorial Offices will get you a corrected copy of the circuit diagram with valve pin connections added. Editor.

Dear Sir
The BP254 transistor referred to by W. Calley of London in the March '94 'Airband' issue is listed in Electrovalue's 1993-4 catalogue pg.101.

Electrovalue's telephone number is (0784) 442253; Fax: (0784) 460320.

G. Morgan
Oxon

Dear Sir
Recently I wrote requesting some help with a project described in SWM June and July 1991, the Experimental Super-Regenerative VHF Receiver. Further to this I was fortunate to meet an acquaintance with a little more technical skill than myself on Saturday who looked over my circuit. We decided to replace the 2N2646 transistor and rewind the tiny radio frequency choke, and sure enough the set sprang to life, for my amazement and delight.

Connected to a dipole in the loft, it can receive our local radio stations, Classic FM, a great deal of interesting Airband traffic, the 144MHz band and some other v.h.f. channels. Well worth the effort, I think.

So, thanks for your interesting article and thanks for a most enjoyable magazine, unmissable!

M. Smith
Warwickshire

I am pleased that you like the magazine and have tried building one of our simple projects. There is nothing quite like the feeling you get when your creation springs to life and plucks a signal out of the air for the first time. Well done! Editor.

Dear Sir
All is REVEALED! I now know where it's all at in the scanning world. Haydon Communications and AOR have solved it.

I see from the advert on Page 17 of SWM, Dec 1993 that the new AOR 3000A covers a part of the radio spectrum that probably none of us knew was very active:- 0.1 to 26Hz! I just can't wait to get one!

Do AOR and Haydon know something that the rest of us don't, or has April 1st arrived early?

Happy Christmas to all, CAUGN on 3.5Hz QRP!?!?

R. Galliers
London

Covering letter from Royal Mail

I regret that the enclosed magazine has been delayed due to the sack in which it was included being misdelivered to our Blue Peter Appeal depot.
**Grassroots**

**Sunday Journal, 2 April 1994**

**Short Wave Magazine, April 1994**

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

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

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**Wiltshire**


**Norfolk**

Northwich March 30 (formal) - AGM, April 6 (informal) - Committee meeting, on air G9PB (formal) - Basic digital electronics by Mike G4ELO, 20th (informal) - Night on air, construction G9PS (informal) - A new dimension. Mary GONZA, (0922) 195388.

**Oxford**


**Shropshire**

Salep ARS: Fridays, 8pm. Hotel Oak, Shrewsbury. March 24 - A second construction evening, advice and discussion, leading to a further construction evening, 31st - Talk 'Contests', 27th - A specialist antenna evening, 4th - The former RAF radio station, 13th - Marconi Day, 20th - Talk on Packet, 27th - A talk on specialist antennas, 24th - Foxhunt, 30th - A talk by a bangers and mash supper, 20th - The under a further construction competition. Sheila Blumfield G0YIS. (0743) 813919.

**Berkshire**

**Berkshire AM Club**: Every Sunday. 11am. For information contact Mike G4EUB. (0462) 897777.

**Berkshire FM Club**: Every Sunday. 11am. For information contact G3QHA. (0462) 897777.

**Berkshire DARC**: Every Sunday. 11am. For information contact G3QHA. (0462) 897777.

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**Rally 27**: Bugundy Amateur Radio Club will be holding its 4th Annual Rally at Launceston College. Doors open at 11am, 10.30 for disabled, Bring & Buy, bookstall, licensed bar and refreshments, Morse tests, tombola, traders, car boot spaces available. Admission £5 adult, £3 child. For more information ring (0273) 272002. "Keep the details as brief as possible.

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**ACV**

**RSGB City of Bristol Group**: first Tuesday, 7pm. New Friends Hall, Purdown, Bell, Stapleton, Bristol BS5 1BG. March 28 - Donnington Park Farm Rally, April 28 - Somerset range of kits. Dave (0272) 672124.

**Shirehampton ARS**: Fridays, March 25 - Chat night, April 15 - Digital direction finding, 22nd - Chat night, Ron Ford (0437) 777054.

**South Bristol ARS**: Wednesdays. Whitchurch Folkhouse Assoc., Bridge Farm House, East Dundy Rd, Whitchurch. March 25 - How to build your own PC, April 6 - 40m activity evening, 13th - 1GHz exhibition, 20th - Radio controlled model boat exhibition, 27th - History of WD & HD Wills. For more information ring (0275) 834282 on a Wednesday evening.

**BEDFORDSHIRE**


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**CENTRAL REGION**

**Stirling & DARS**: Thursdays, 7.30pm. The Clubrooms, Banstead Industrial Estate, Throsk, Nr Stirling. March 31 - Video presentation on Expedition 8605, Brian Mulleady GM6KVK (0324) 636235.

**Dollar Academy Club**: The clubs meet most afternoons at the Academy after 3.30pm. Geoff Collie GM4LDJ, Tail House, Academy Place, Dollar FK4 1JF. (0595) 742126.

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**DEVON**

**Torbay ARS**: Fridays, 7.30pm. Ecc Social Club, Highweek, Newton Abbot. April 22 - Monthly meeting. Peter GA4TUD. (0836) 864529.

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**ESSEX**

**Verge ARS**: Thursdays 9pm, Barnstable Community Centre, Long Riding, Basildon, Essex. April 7 - Junk sale, 14th - Steam trains by Bob GJ7JXN. Dons (0282) 552566.

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**FIFE**


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**Dunfermline & DARS**: Thursdays, 7.30pm. The former RAF radio station, Guth Muir, located by the A823 Dunfermline & DARC: 7th annual sale, Kinson City Centre, Leamington Road, Kinson, Bournemouth. Many traders, Bring & Buy, refreshments, meals and a cafeteria. (0462) 720002.

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**Lincoln**


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**Hertfordshire**

**Hoddesdon RC**: Alternate Thursdays. 8pm. Conservative Club, Rye Road, Hoddesdon. March 31 - Talk and demonstration on fast scan ATV by Adrian G8OJY, 14th - Inter-club dart match (no doubt Stevanage & Dist. ARC regional), 28th - Talk by John Taylor and colleague from the Radiocommunications Agency Radio Investigation Service with video. John G7KI (0296) 466539.

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**Kent**

**Hillerstone RS**: Fridays, 7.30pm. Hinckley College, St. Peter's Road, Broadstairs, Kent CT10 2AQ. April 25 - Quiz. (0843) 869812.

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**Medway AR & FS**: Thursdays, 6pm. Tunbury Hall Catkin Close, Tunbury Avenue, Waldringfield, Chatham. April 1 - Yes, really, it is a meeting night, 15th - Alistair Dunlop, "Radio the heavy weight radio?" Gloria. (0334) 710023.

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**West Kent ARS**: 1st and 3rd Fridays. The School Annex, Camden Road, Tunbridge Wells. April 15 - AGM. John Taylor G3OHV. (0825) 864960.

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**Lancashire**

**Preston ARS**: Thursdays, 8pm. The Lonsete Sports & Social Club, Fulwood Hall Lane, Fulwood, Preston. March. Eric Eastwood GW2CD (0772) 687080.

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**Norfolk**

Norfolk ARS: Wednesdays, 7.30pm. Formal meetings: University Arms, South Park Avenue, Norwich, Informal meetings: Hewett School, Hall Road, Norwich. March 30 (formal) - AGM, April 6 (informal) - Committee meeting, on air G9PB (formal) - Basic digital electronics by Mike G4ELO, 20th (informal) - Night on air, construction G9PS (informal) - A new dimension. Mary GONZA, (0922) 195388.

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**Wiltshire**

junior listener

Welcome to my first Junior Listener. After talks with the Editor, I have decided to extend the scope of Junior Listener to cover anyone who is a ‘junior’ in radio terms, whether 6, 66 or even older. Also I want to include basic information – so I’ll be listing what you can expect to receive with your simple short wave radio and how to improve this. Then I’ll look at using a more dedicated short wave radio. I also want to start looking at the listening clubs you can join and what they can do for you. If there’s anything you would like discussed, or if you’re involved with a listeners’ club, please write and tell me all about it.

I’m aiming to clear the last of the letters sent to Jon. He’s passed everything onto me and I hope to reply to you all when this copy is safely off.

Elaine Richards

Jargon Busting

Following a letter to Jon from Basil Parylo I’m sure that many of you have, at some time, been confused by the way the radio spectrum seems to be divided up into broad bands and given names instead of frequencies. This month I’ll attempt to tidy-up this area and briefly explain how they all fit together and why they’re used. Let’s start with a simple table showing how the band names align to frequencies.

<table>
<thead>
<tr>
<th>Band Name</th>
<th>Frequency Range</th>
<th>Main Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Low Frequency (v.l.f.)</td>
<td>3-30kHz</td>
<td>Maritime &amp; navigation</td>
</tr>
<tr>
<td>Low Frequency (l.f.)</td>
<td>30-300kHz</td>
<td>As v.l.f. plus broadcast</td>
</tr>
<tr>
<td>Medium Frequency (m.f.)</td>
<td>300kHz-3MHz</td>
<td>Broadcast plus maritime</td>
</tr>
<tr>
<td>High Frequency (h.f.)</td>
<td>3-30MHz</td>
<td>Varied</td>
</tr>
<tr>
<td>Very High Frequency (v.h.f.)</td>
<td>30-300MHz</td>
<td>Broadcast plus various</td>
</tr>
<tr>
<td>Ultra High Frequency (u.h.f.)</td>
<td>300-3000MHz (3GHz)</td>
<td>Commercial plus space</td>
</tr>
<tr>
<td>Super High Frequency (s.h.f.)</td>
<td>3-3GHz</td>
<td>Radar plus space</td>
</tr>
<tr>
<td>Extra High Frequency (e.h.f.)</td>
<td>all above 3GHz</td>
<td>Special</td>
</tr>
</tbody>
</table>

In addition to these band names you will find another set associated with what are known as microwave transmissions. Just to make this really confusing there are two different naming systems - USA and the European (NATO) system. For the European version, microwaves are the band of frequencies between 1 and 90GHz. The USA system on the other hand covers 0.4GHz through to 100GHz. Within each of these large bands are a number of smaller bands that are defined by band letters. Although you might expect the European system to prevail in this country, you will find the USA system in common use for domestic/amateur applications. Here’s how the systems works.

Band Name | Frequency Range | Main Usage
-----------|----------------|---------------------
L           | 0.4-1.5GHz     |...
S           | 1.5-5.2GHz     |...
C           | 3.7-6.2GHz     |...
X           | 5.2-10.9GHz    |...
K           | 10.9-36GHz     |...
Ku          | 11.7-12.7GHz   |...
Q           | 36-46GHz       |...
V           | 46-56GHz       |...
W           | 56-100GHz      |...

If you’re involved in satellite TV you will recognise the Ku band as the main band used.

DW Computer Programme

The English Service of Deutsche Welle has recently started broadcasting a new programme called Headcrash. It’s aimed at all computer users between 14 and 41. Headcrash tries to be system-independent and deals with MS-DOS, Apple and Amiga news. They also broadcast tips and tricks to try, hardware and software tests as well as news on Public Domain and Shareware programs.

Headcrash is broadcast once a month in the Science and Technology slot. They even have regular quiz competitions with ‘attractive prizes’. I’m not sure which Wednesday in the month it’s broadcast, but you’ll find it between 2000 and 2050UTC on 5.960 and 7.285MHz beamed to Europe.

The British DX Club

The British DX Club was founded in 1974, calling itself the Twickenham DX Club. The name British DX Club was adopted in 1979 and, apparently, they now have the largest UK-based membership of any DX club. The club specialises in all aspects of DXing on short wave, medium wave as well as the v.h.f. f.m. bands. The only requirement for joining is that you have an interest in DXing - age or experience doesn’t matter.

The BDXC are a non-profit making group and is run by a Board and Editorial team - all are non-paid volunteers. If you join the BDXC, they encourage you to attend meetings to debate issues relevant to the club. Also contributions to Communication, the monthly journal are welcome.

Communication is an A5 booklet of about 40 or so pages and is posted to all members. It’s published around the first week of each month and because of a short schedule is kept up-to-date. It has several regular sections and these include (amongst others);

- OSL Report’ where details of verifications received are given, tips on how to get the best cards and also pictures of some of the more unusual ones appear.
- ‘Mailbox’ is where members get to express their own views on all aspects of the hobby.

Guide to DX Programmes

is a comprehensive guide with times and frequencies of all main DX/media programmes. This regularly appears bi-monthly.

- ‘Logbooks’ is a very large section of the booklet and is a record of the loggings sent in by members. It’s split into several sub-sections, Tropical logbook, HF Logbook, Beyond the Horizon (f.m., and TV bands) and Medium Wave Logbook that also covers the long wave bands.

- Now the crunch bit, how much does all the service cost? If you live in the UK or have a BFPO address then the annual subscription at the moment is £9, Eire members have a BFPO address then the annual subscription at the moment is £9, Eire members have a BFPO address then the annual subscription at the moment is £9, Eire members have a BFPO address then the annual subscription at the moment is £9, Eire members have a BFPO address then the annual subscription at the moment is £9, Eire members have a BFPO address then the annual subscription at the moment is £9, Eire members have a BFPO address then the annual subscription at the moment is £9, Eire members have a BFPO address then the annual subscription at the moment is £9, Eire members have a BFPO address then the annual subscription at the moment is £9, Eire members have a BFPO address then the annual subscription at the moment is £9, Eire members have a BFPO address then the annual subscription at the moment is £9, Eire members have a BFPO address then the annual subscription at the moment is £9, Eire members have a BFPO address then the annual subscription at the moment is £9, Eire members have a BFPO address then the annual subscription at the moment is £9, Eire members have a BFPO address then the annual subscription at the moment is £9, Eire members have a BFPO address then the annual subscription at the moment is £9, Eire members have a BFPO address then the annual subscription at the moment is £9, Eire members have a BFPO address then the annual subscription at the moment is £9. Eire members have a BFPO address then the annual subscription at the moment is £9, Eire members have a BFPO address then the annual subscription at the moment is £9, Eire members have a BFPO address then the annual subscription at the moment is £9.

If you’re interested, the address you need is: Dave Kenny, The Treasurer, British DX Club, 10 Hemdean Hill, Reading RG4 7SB.

That’s it for this month, send your letters to: Junior Listener, PO Box 1863, Ringwood, Hants BH24 3XD.
New Drake Receiver

Nevada have just told us of the new Drake SW8 communications receiver. Claiming professional desktop top performance in a reasonably priced portable package the new receiver gives full short wave coverage (500kHz to 30MHz), but with the addition of the v.h.f. airband and stereo broadcast band. Microprocessor controlled, of course, with a large liquid crystal display, 70 memories, dual mode clock timer a.m., f.m. and s.s.b. modes plus synchronous a.m. detection. This should be a popular receiver. SWM will, of course, review it as soon as we can get our hands on one.

Ray GOEYM on (0234) 344506 or Richard on (0234) 344505. Further details of new modes and frequencies will be available nearer the time.

Staughton, which was the home of 'The Pathfinders'. Details of the London Amateur Radio & Computer Show.

Special Price

Tandy PRO-44

Tandy dealers nationwide have available for a limited time stocks of the Netset PRO-44 Scanner at a special price of £99.99.

The Netset PRO-44 is a 50 channel direct entry programmable scanner with features including a two second scan delay, memory back-up, lock-out function and monitor memory. Frequency coverage of the PRO-44 is 58 to 121MHz.

The normal price of the Netset PRO-44 is £149.99 but from March 21 to April 23 Tandy stores nationwide will be selling it for just £99.99.

Operation Overlord

Ray GOEYM and Richard GORN together with Bedford and District ARC are planning to activate GB50OL (Overlord) to celebrate the 50th anniversary of Operation Overlord, the D-Day Landings.

It is proposed to activate GB50OL from June 3 to 7th 1994 from the control tower of the former RAF station of Little Staughton, which was the home of 'The Pathfinders'. Details of modes and frequencies will be available nearer the time.

For more information on Operation Overlord contact Ray GOEYM on (0234) 344506 or Richard on (0234) 781862.

Communications Catalogue

Waters & Stanton Electronics have recently published their Spring 1994 Radio Communications Catalogue. The 64 page A4 sized catalogue is in its second edition and contains many of the most popular products from the Waters & Stanton range. It also includes helpful hints and tips for both short wave listeners and radio amateurs.

To obtain a copy of the Radio Communications Catalogue just send two first class stamps (UK customers, overseas customers please send £2) together with your name and address to Waters & Stanton Electronics, 22 Main Road, Hockley, Essex SS5 4QS.

ERA In Liquidation

Short Wave Magazine has recently been informed that Enterprise Radio Applications Limited have gone into voluntary liquidation. However, one of ERA's former employers Alan John Ryan has taken over the manufacture of the popular Microreader and other related products.

Alan is hoping to be able to continue operation from the existing ERA address. He asks potential customers to be patient if they have difficulty in getting through on the telephone or have to wait a while for their letters to be answered.

As soon as SWM receives more details we will pass them on to you through the News columns.

New AOR Hand-Held

By the time this issue of SWM hits the bookshelves the AOR AR8000 hand-held receiver should be available after its launch at the London Amateur Radio & Computer Show.

Derbyshire based AOR have been busy finalising the design of the AR8000 which has a frequency coverage of 100kHz to 2Hz, 100 channels arranged in 20 banks of 50, as well as two new operating modes, 'Expert' and 'Newuser'. The Newuser mode is designed to restrict the number of ways the receiver is programmed, to make operation simpler for the less experienced operator. The idea behind the Expert mode is to permit access across the full range once the basics have been mastered.

At the time of going to press the AR8000 was so new that SWM had very few details on this new receiver. However, AOR (UK) Ltd., will be happy to give you more information (see 'Scanning' in this issue for additional comments on the AR8000).

AOR can be contacted at the Adam Bede High Tech Centre, Derby Road, Wirksworth, Derbyshire DE4 4BG. Tel: (0629) 825926.

New Microreader Distributor

Following the demise of Enterprise Radio Applications Ltd., Nevada Communications of Portsmouth have been appointed distributors for the ERA Microreader.

Nevada are now able to supply from stock the new Mk IV version of the Microreader with software. For more details contact Nevada Communications, 189 London Road, North End, Portsmouth PO2 9AE. Tel: (0705) 662145.

BBC World Service News

Dr. Michael Williams of the BBC World Service has recently been appointed the Director of Information for the United Nations Protection Force in the former Yugoslavia.

Dr. Williams is the Editor of Dateline East Asia which is the BBC World Service's current affairs programme for East Asia. His new appointment will mean him taking a six months leave of absence from the BBC to take up his post in Zagreb.

While in Zagreb Dr. Williams will be responsible for the public information office, which supplies information to the international press and to the UN's internal information network.

The BBC's Albanian Service has a new deputy head. Linda Crammond recently took as deputy head from Gabriel Partos, a post she will hold for six months.

Linda has worked for the BBC World Service since 1978, during this time her jobs have included working as Senior Duty Editor in the BBC newsroom.

Voice Of China

The latest edition of Voice Of Free China which is published by the Broadcasting Corporation of China has recently arrived in the SWM Editorial offices.

Voice Of Free China contains features published in English, French, Dutch, Spanish and Indonesian and is available on subscription for US$4 or is free of charge to listeners of Voice Of Free China broadcasts.

For more information on how to obtain a copy write to Voice Of Free China, Broadcasting Corporation of China, PO Box 24-38, Taipei, Taiwan, Republic Of China.

Short Wave Magazine, April 1994
International Marconi Day

The Cornish Amateur Radio Club will be celebrating what is perhaps the most important event in the Amateur Radio Calendar on April 23 1994. International Marconi Day celebrates Marconi's achievements in wireless communications and for the first time ever an English station will be participating using only the Amateur Radio Satellite Service for working DX. The callsign GB1IMD will be in operation for as long as possible during the 24 hour period commencing on April 23 at 0001UTC. John Heath G7HIA and Robert Turlington G8ATE who are members of AMSAT UK will be operating the station. Operating details are expected to be: Main activity on AO-13 Mode B on a downlink frequency close to 145.930 U.S.B. Uplink 435MHz using 40W into a 21- elecro crossed Yagi. Downlink antenna will be a 5-elecro crossed Yagi with a GaAsFET pre-amp mounted at the antenna. The station may also be active on Mode S using a 56cm dish with helical feed for the 2.4GHz downlink. There will also be additional operations via the Russian Satellite RS10 on a downlink frequency of 28.385. The uplink will be 145MHz using between 2 and 20W into a turnstile antenna. The downlink antenna will be a wire dipole for 28MHz. All Marconi Day transmissions will be made from locations with a Marconi connection wherever possible.

For more information contact John Heath, Chestnuts, Desford Lane, Kirby Mallett, Leicestershire LE9 7QF or via Packet Radio @GB75DC. #25.GBR.EU.

Radio and TV DX News

The Sri Lankan broadcaster ETV is now broadcasting the BBC WSTV terrestrial from Kandy (Mt. Hantane) on ch.E33 (ETV-1) and Prime Sports (ex Star TV) on ch.E56 (ETV-2). The state owned TV service intends to reopen transmitters in Northern Sri Lanka by mid-summer '94 from the repeater station at Kokavil (Madukanda) and Palali (Vavuniya).

The transmitters had been put off the air by terrorists some years ago. There is 'great excitement' in the region with the high power u.h.f. satellite transmissions of ch.E54 Asianet (PAL) which allows cheap receivers to be used for this and the Russian Orbita 1 ch.E51 service (SECAM). NB. We hope to feature a cheap, cheerful but efficient circuit of the u.h.f. satellite receiver shortly courtesy Bandula Gunasekera.

The BBC have now successfully completed test transmissions of Digital Audio Broadcasting (DAB) across London of both Band 3 and Band 3. The u.h.f. transmissions were on an unused Group A TV channel from Crystal Palace and relaying Radios 1-5.

Following on this news the DTI have now confirmed the establishment of a Band 3 DAB band from 217- 230MHz, which will allow many additional radio channels and the duplication of both a.m. and f.m. services to a new high quality band. It's possible that transmissions will be on the air before end 1995 and allow manufacturers to plan for domestic scale factory production. The use of DAB in the Netherlands will be introduced between 1997-2000 and current thoughts are to use the 191-193MHz band.

With the announcement of upper Band 3 going to DAB there is to be a review into the use of the remaining parts of Band 3 (Sub bands 1, 2) following changes in ownership and use by public and private operators. National Banc Telecom have recently obtained three networks from Motorola and decisions will be made for new regional licences in London, Manchester and Birmingham.

The UK's Classic FM is going continental following the Netherlands awarding them a terrestrial licence to the PRO 7 network following a period of political resistance against the station. The longest subsa fibre cable laid by UK firm COE supporting five colour video channels and a radar channel over 70km is now operational from a North Sea platform to mainland Norway. Lithuania is to cease using the SECAM colour standard by the year 2000 in favour of PAL.

Sweden's national commercial TV channel TV4 will be running 24 hours a day by 1995 and is gaining viewing figures of 22-27% against public network SVT.

Belgium 50MHz amateur operators will continue to operate throughout 1994 with a review early 1995 as to a general release of the band, there still transmits ch.E2 TV in

news

Grundig Ocean Boy

Grundig International Ltd. have launched a replacement for the Ocean Boy 330, the Ocean Boy 340. The Ocean Boy 340 is a compact portable radio which covers fm., m.w., l.w. and s.w. bands.

Features of the Ocean Boy 340 include P.L.F. frequency synthesiser tuning, automatic and manual station search, 20 memory facilities (five per band), built-in clock/timer and multi-function I.c. display. Power is supplied through battery or mains power (using an adapter which is not supplied) and the radio can be used with headphones if required.

The Ocean Boy 340 is available now for £42.99. Additional information can be obtained from Grundig International Ltd, Mill Road, Rugby, Warwickshire CV21 1PR.

Radio and TV DX News Continued

More particularly with the State of Schleswig-Holstein awarding a terrestrial licence to the PRO 7 network following a period of political resistance against the station. The longest subsa fibre cable laid by UK firm COE supporting five colour video channels and a radar channel over 70km is now operational from a North Sea platform to mainland Norway. Lithuania is to cease using the SECAM colour standard by the year 2000 in favour of PAL.

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In Czechoslovakia TV NOVA is now on air using the CT2 transmitter network. An identification logo 'CT1' or 'CT2' is carried in the top left hand corner of the screen. The former CT2 network is using the 8th in former OK3/CT3 network of transmitters, this will be supplemented this coming year with the following, all on air by November '94: Jesenik ch.R50 200kW ERP; Brno ch.R46 200kW; Trutnov ch.R40 200kW; Pizen ch.R48 200kW; Jihlava ch.R42 100kW; Chomutov ch.R35 50kW and Hradec-Kralove ch.R57 200kW.

New Frequency Schedule

Radio New Zealand International's latest frequency shedule is as follows:

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<tr>
<th>Frequency (kHz)</th>
<th>Time (UTC)</th>
<th>Comments</th>
</tr>
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<td>6035</td>
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<td>Mon-Fri</td>
</tr>
<tr>
<td>11735</td>
<td>1850-2137</td>
<td>Daily</td>
</tr>
<tr>
<td>15115</td>
<td>2138-0756</td>
<td>Daily</td>
</tr>
<tr>
<td>9700</td>
<td>0759-1206</td>
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<tr>
<td>9655</td>
<td>1206-1307</td>
<td>Occasional use</td>
</tr>
<tr>
<td>9655</td>
<td>1307-1649</td>
<td>Occasional use</td>
</tr>
</tbody>
</table>

This frequency schedule is effective from March 19 - May 1 1994 at 1900UTC.
DSP NOISE REDUCTION PRODUCTS FROM JPS COMMUNICATIONS!

JPS Communications specialises in low cost Digital Signal Processors - the hi-tech way to filter out noise and heterodynes and what's more, they'll work with anything from your home-brewed short-wave receiver to the latest all-singing all-dancing receivers and scanners on any band you care to mention! Ideal for voice, Morse, RTTY and FAX. JPS make a whole family of DSP filters so there's something for everyone.

NRF7
General purpose noise remover and filter

The NRF7 reduces atmospheric noise through dynamic peaking and removes multiple tones from voice signals. High performance voice filters and CW filters with selectable centre frequency

Just £279.00......Carriage £10.00

All JPS DSP filters work off receiver audio so there's no mods to be done to your rig - just plug into the speaker socket, hook up your headphones or an extension speaker and you are in business.

NIR10
Noise / Interference reduction unit

The NIR10 allows reception of difficult to read signals. NIR mode helps to reduce or even eliminate heterodynes, white or ignition noise, RTTY interference and power line noise. PEAK function reduces white noise interference. NOTCH FILTER mode removes multiple heterodynes and acts in 3 milliseconds! BANDPASS mode has a continuously adjustable centre frequency

Just £399.00......Carriage £10.00

NTR1
Wide band noise and tone remover

The NTR1 provides wideband operation for AM or FM reception and narrow band operation for SSB, CW or Data reception. State-of-the-art DSP rapidly removes multiple tones.

Just £199.00......Carriage £10.00

All JPS DSP filters require a 12V power supply to run from the mains but it needs to be fairly beefy. Run it from your shack supply or from our dedicated 1 Amp PSU available at £29.95
SIX OF THE BEST!
HALF A DOZEN BELTING GOOD RADIOS!

NRD535 - £1695
If you're looking for top performance, this has to be the one! Great on its own - but we can make it better!

HF225 - £479
Still the most popular choice for many serious DXers. Superb AM and SSB performance and it's made in the UK!

HF225 EUROPA - £699
Superior performance version of HF225, ideally suited to the dedicated BC band DXer

HF150 - £389
Very popular with raw beginners because it is so easy to use but highly praised by the more experienced.

FRG100 - £529
Good performance from this popular set from Yaesu, drawing on their many years of design experience

R5000 - £999
Despite its age, still sought after by those that really know its capabilities

HEATHROW MOVES TO NEWBURY

As one door closes, another one opens...
A warm welcome awaits customers old and new at Lowe's new branch in Newbury, Berkshire, not all that far away from our old Heathrow shop. You can find us at:
3, Weavers Walk, Northbrook Street, Newbury, Berkshire, RG13 1AL Tel. 0635 522122
Our new branch will be under the watchful eye of Julian, G1DFI who is waiting there with our customary warm greetings and friendly service!

YORKSHIRE
34, New Briggate
Leeds,
Tel 0532 452657

WALES & WEST
79/81 Gloucester Road
Patchway,
Bristol,
Tel 0272 315263

NORTH EAST
Mitford House
Newcastle Int'l Airport
Newcastle upon Tyne
Tel 0661 860418

SOUTH WEST
117, Beaumont Road
St. Judes
Plymouth,
Tel 0752 607284

SCOTLAND
Cumbernauld Airport
Cumbernauld
Strathclyde
Tel 0236 721004

SOUTH EAST
Communications House
Chatham Road
Sandling, Maidstone,
Tel 0222 692773

SOUTH COAST
27, Gillam Road,
Northbourne,
Bournemouth,
Tel 0202 577760

EAST ANGLIA
152, High Street,
Chesterton,
Cambridge,
Tel 0223 311230

OPENING HOURS MON - FRI: 9.30 TO 5.00, SAT: 10.00 TO 4.00
Today you can dial almost any country in the world and feel somewhat impatient if the call does not get through within a few seconds, thanks to the satellite network. But let us look back a bit and see where The Lizard fits into all this. We go to Cornwall, to Helston, the home of the Floral Dance, and proceed south to The Lizard. It was here that some very important milestones were laid along the path of long-distance radio communications over the past 90 years. From the hesitant beginnings in 1900 to today’s worldwide high tech network of data, voice and television.

About 4km from Helston on the A3083, a turning on the right leads to Curry and on to Poldu Cove, an attractive cove with good parking and a sandy beach - and within easy walking distance to the site chosen in 1900 by Guglielmo Marconi for an important wireless station near Poldu Point. A steep cliff path passes the residential Poldu Hotel and on to the Marconi Memorial at Poldu Point. The memorial was erected in the 1950s by the Marconi Company to commemorate and identify the nearby site of the wireless station that was such an important milestone in the very early development of long-distance radio communication.

Marconi’s objective in 1900 was to prove that it was possible to communicate across the Atlantic Ocean by wireless. Having established the transmitting station at Poldu, he and his team crossed the Atlantic by ship to Newfoundland where they set up a receiving station on the east coast near St John, some 3600km from Poldu. The equipment was, by today’s standards, very rudimentary. A ‘spark gap’ transmitter connected to a long wire antenna at Poldu, while in Newfoundland the receiver was a ‘Coherer Detector’ (invented by a French engineer Edward Branley in 1896 and then the state of the art) and a similar antenna to that at Poldu.

On 12th December 1901 the Morse letter ‘S’ (...) was transmitted from the Poldu station and successfully received at the receiver site in Newfoundland. This was the first time that a wireless signal had ever been received over such a large distance and the success of this test was a breakthrough for long-distance communications. It was made possible in part by Marconi’s decision to site the stations on the coast. The wide expanse of sea water between Poldu and St Johns minimised the loss of the weak wireless waves as they travelled across the earth’s surface at the speed of light.
Another Milestone

Some years later, after wireless communication had been further developed using long wave and medium wave propagation over the earth's surface, the Lizard was again involved in another notable milestone in long-distance wireless (or radio as it is called today) paths.

The existence of 'ionised' layers above the earth at heights of up to 240km had been identified in the early 1920s by three physicists and one of them, Edward Appleton (later Sir Edward Appleton), had suggested in 1923 that using higher radio frequencies (or shorter waves) than the long and medium radio waves used at that time, some of these radio waves may 'bounce off' these ionised layers and return to earth.

An experiment to investigate this was carried out in 1923 by Guglielmo Marconi from the same radio station at Poldu. To increase the power radiated from Poldu towards the ionised layers, he contacted Charles Franklin, an engineer who had experimented with the design of antennas (or aerials as they were then called). He designed a directional short wave antenna by positioning the antenna wires in such a way that the radiation would be directed forwards at a low angle. This antenna was installed, between tall masts, at the Poldu site. Meanwhile Marconi sailed south in his yacht Electra and successful communication was established between the Poldu station and the yacht while it was cruising in the South Atlantic at distances of up to 11200km away.

This was a remarkable achievement. The curvature of the earth is such that, if the radio signals are being bounced off the ionised layers at heights of up to 240km above the earth, the maximum distance that would be covered in one 'hop' would be approximately 3200km.

The surface wave propagation used at long and medium wavelengths would not account for these results, particularly at the shorter wavelengths, because of the attenuation over the earth's surface.

To receive a radio signal at a distance of over 3200km meant, therefore, that there must have been more than one 'bounce' off the ionosphere. To travel 11200km, at least three and possibly four bounces must have occurred, the radio signal being returned back to the ionosphere by reflection off the sea after each bounce (or hop) on the way. These important experiments proved that not only was single hop skywave propagation possible, but that multi-hop skywave radio paths could greatly extend the distances that could be covered by short wave (now more commonly called high frequency or h.f.) radio paths. This led to worldwide radio communications using this skywave propagation. As in 1901, the sea played an important part in these relatively low-powered experiments, this time by acting as a low-loss reflector to return the radio waves back to the ionosphere.

Marconi Memorial

The Poldu station remained in commercial use until 1935 and the site is now preserved by the National Trust. Besides the Marconi Memorial, the concrete mast and anchor bases, together with the foundations of the station buildings, can be seen in a field kept ship-shape by sheep. However, that was not to be the end of The Lizard's involvement in making radio history.

Satellites

Another radio station was opened in the mid-1960s some 7km from the Poldu site. The Goonhilly Satellite Station hearked another evolution in long-distance radio communications. The selection of Goonhilly had one thing in common with the Poldu site - a quiet electrical environment. But here the closeness of the sea was not of prime importance - minimum noise and a flat, hill-free site were the key requirements. The windswept Goonhilly Downs, presenting an area of some 25 square kilometres of gorse, grass and bracken, was an ideal site for the large parabolic dish antennas needed to communicate via satellite relay stations high in space. These operate at very much higher frequencies - with wavelengths measured in centimetres - than Marconi could ever have dreamed of when he first went to The Lizard. The success and growth of the Goonhilly Station is vividly illustrated by the array of the many parabolic dish antennas, which have today become a local landmark.

Unique

The Lizard Peninsular is unique in the field of radio. It has witnessed the major advances in long-distance radio communications from the early hesitant beginnings of radio communications to the first time across the Atlantic by radio. It established the feasibility of multi-hop skywave radio transmissions and now plays an active part in the international satellite network, providing the telephone, TV and data transmissions that today we take for granted.
GRUNDIG
YACHT BOY 500
WORLD
RECEIVER

Described in the Grundig catalogue as a small, handy world receiver, the Yacht Boy 500 sets a new standard in short wave radio styling at the very least. Peter Shore puts this new radio through its paces.

Grundig’s Yacht Boy receivers have always provided budget short wave reception with portable sets designed for the holiday maker or occasional business traveller. Last summer, the company broke that tradition by launching the revolutionary YB 500 at the Funkausstellung, the Berlin consumer electronics fair. The receiver looks unlike any other set on the market at present, with vertical styling as opposed to the conventional horizontal looks of competing radios. Grundig called in top designers to come up with a set that looked different yet pleasing. The new receiver is built at the Grundig factory in Portugal in which the high quality Satellit range of short wave radios has been built for many years. Unpacking the set from the box I was struck, despite the radio’s light weight, by the solidity of its construction. It feels well built - unsurprising as the Portuguese factory currently produces only a matter of a few hundred sets each week, with considerable amounts of work still carried out by hand.

Controls

The front panel has a large liquid crystal data monitor that displays the time even when the set is switched off. Beneath that is the main keypad, with numeric keys, band selectors, manual tuning buttons and memory and clear keys. Below that is the sliding volume control. Running up the right hand side is a line of buttons that control all the ancillary functions. The main on/off switch is at the top right of the front panel and this has a built-in lock to prevent accidental switch-on during travel. The loudspeaker grill takes up the remaining half of the front panel. On the left hand side panel are sockets to connect an external power source, headphones, a line to a tape recorder and a remote tape start. The whip antenna is hidden away in a recess on the right hand side of the receiver. Curiously its hinge is at the base of the set rather than the top. This means that if you sit the receiver flat on a tabletop, for example, or at 45° using the built-in stand, the antenna sticks up at the front and can hinder access to the controls.

Facilities

The YB 500 has inherited many of the facilities that its bigger brother, the Satellit 700, has. There is an integrated ROM (read only memory) table which has up to 16 frequencies of nine European international stations pre-programmed at the factory. Deutsche Welle, BBC World Service, Radio Austria International, Swiss Radio International, Radio Netherlands, Radio France, RA, Radio Moscow and Radio Exterior de Espana are assigned to ROM pages 1 to 9. To call up Radio Netherlands, simply press the ‘0’ROM button on the keypad, followed by button ‘5’ and then ‘MEMORY’. The first pre-programmed frequency is then tuned - in this case 5.955MHz - and the data monitor displays RNED HOL and 5 ROM to confirm the operation. To access the other pre-programmed frequencies for one particular station, repeated pressing of the button marked ‘MON/ROM/AF’ is all that is required. The frequency is displayed for about five seconds, and then the display reverts to the station name. The frequencies programmed into the ROM cannot be altered which is not too much of a problem for stations such as the BBC and Deutsche Welle, but I wonder whether it was really such a good idea to include Radio Moscow as many of the frequencies are not used by the station now, although the first channel of 5.905MHz does carry Radio Netherlands, Radio Australia’s frequency of 9.77MHz, you can also enter up to eight characters, such as AUSTRALI.

Tuning

Manual tuning on all bands is done with the TUNE and TUNE - buttons. On short wave single pushes change the frequency in 1kHz steps, longer depression of the buttons changes the increment to 5kHz steps. Holding the button for a second or two starts the scanning function and the set will scan along the band in 5kHz steps, stopping on each frequency for about a second whether or not a station is audible. The scanning function only operates within the limits of a broadcast band: try to start scanning on 13.500MHz, for example, and the set skips automatically to 13.600MHz, the lower end of the 22m band. However, if you have tuned to a frequency in one of the amateur bands, the set will start to scan through that band already stored, the set alerts you to that, displaying * MEMO. Hold the STORE button for a second or two and any free memory positions are displayed on the data monitor, although if all 40 are occupied, * FULL will appear on the screen. Unlike the ROM table, user memories can be overwritten as and when you want to. Recalling memorised frequencies is simple: tap in the memory number, followed by MEMORY. Alternatively, you can scan all the stored frequencies by repeatedly pressing the MEMORY key. For rapid deletion of a stored frequency, call up the appropriate memory number and then hold the CLEAR key for several seconds. Confirmation of erasure comes when * FREE is shown on the screen.

Memories

A further 40 frequencies can be programmed in by the user, and on short wave the receiving mode (a.m., u.s.b. or I.s.b.) is also stored automatically making it a useful feature for radio amateurs as well as broadcast listeners. In addition, individual alphanumeric titles can be assigned. So, if you store Radio Australia’s frequency of 9.77MHz, you can also enter up to eight characters, such as AUSTRALI. If you select a frequency that is pre-programmed in by the user, and on short wave the receiving mode (a.m., u.s.b. or I.s.b.) is also stored automatically making it a useful feature for radio amateurs as well as broadcast listeners. In addition, individual alphanumeric titles can be assigned. So, if you store Radio Australia’s frequency of 9.77MHz, you can also enter up to eight characters, such as AUSTRALI. If you select a frequency that is already stored, the set alerts you to that, displaying * MEMO. Hold the STORE button for a second or two and any free memory positions are displayed on the data monitor, although if all 40 are occupied, * FULL will appear on the screen. Unlike the ROM table, user memories can be overwritten as and when you want to. Recalling memorised frequencies is simple: tap in the memory number, followed by MEMORY. Alternatively, you can scan all the stored frequencies by repeatedly pressing the MEMORY key. For rapid deletion of a stored frequency, call up the appropriate memory number and then hold the CLEAR key for several seconds. Confirmation of erasure comes when * FREE is shown on the screen.

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We aim to give the best prices on all major brands and we will endeavour to match any competitors genuine offer on Icom, Kenwood, AOR & Yaesu receivers.

**Massive Savings on Yaesu, Kenwood, ICOM, AOR & Yupiteru**

**Yaesu – FRG-100 Receiver**

- 50kHz – 30MHz
- s.s.b., c.w., a.m., f.m.*
- 52 memory channels

**SMC Price £499**

**FREE AC PSU**

*fm unit optional  Includes FREE PAICC mains power unit list price £39 Carriage D.

**Icom**

- **ICR-7100 RCVR**
  - SMC Price £1255

- **ICR-100 RCVR**
  - SMC Price £565

**Icom ICR-71E RCVR**

- SMC Price £985

**Icom ICR-72 RCVR**

- SMC Price £769

**Icom ICR-1 RCVR**

- SMC Price £355

**Massive Savings on Yaesu, Kenwood, ICOM, AOR & Yupiteru**

**Yupiteru MVT-7100**

Multimode scanning receiver.

- 530kHz – 1650MHz
- incl’s ssb

**Now only £389**

Carriage B

**SONY. Shortwave Radios**

<table>
<thead>
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<th>Model</th>
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<td>£399</td>
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14
Short Wave Magazine, April 1994
but this time in more helpful 1kHz steps. There is a fine tuning wheel on top of the right hand panel of the YB 500 that works on the short wave bands. On the f.m. band, automatic search mode is started by a long depression of the tuning buttons. The radio tunes in 100kHz steps, but will stop as soon as a signal is reached. Manual tuning steps, meanwhile, are 25kHz. On f.m., reception is automatically switched to RDS (Radio Data System) as soon as an RDS signal is detected. This provides the station name in the data monitor (eg BBC 3 FM or KISS 100). An additional feature, also found on the larger and more expensive Satellit 700, is RDS test mode. To activate this, key in "5 4 3 2 1" and then switch the set on. Then tune in f.m. station transmitting RDS and the different segments of the station name will appear in the display in the order they are received. For example, on BBC Radio 3, the order is FM, then C3 and finally BB. Press the 'LSB/USB' key once and the PI code and TP/TA flags appear. This might show as C203, and Grundig have made exceedingly novel use of the stereo amplifier to improve sound output on the built-in mono loudspeaker. A switch immediately above the two position tone control (high for music and low for speech) on the front panel labelled SOUND NORMAL/BOOST combines the output of the two stereo headphone amplifiers with that of the ordinary mono amplifier for the built-in speaker, increasing sound output from 1.5W to 3W music power. It makes a considerable difference to the audio level, without causing any noticeable distortion unless the volume control is cranked fully up.

Clock

Naturally there is a clock, with dual time facility, and this can also be programmed with two discrete on and off times. It is possible to ask the radio to come on automatically using the timer, or for a buzzer to be sounded or if you are a particularly sound sleeper both. If you want to make unattended recordings, perhaps to record Radio Netherlands' Media Network programme at 1155 on Thursday mornings, then all you have to do is tune in the appropriate frequency (in this case from the fifth page of the ROM table), set the on and off time, plug one end of a lead into the output switch jack and then switch the set on. Then tune in with 'Boost' (battery powered) 1W with 'Boost' (battery powered) 0.3W (battery powered) 1W with 'Boost' (battery powered) 1W (mains powered) 2W with 'Boost' (mains powered) 0.3W (battery powered) DC IN 9V (3.5mm coxial) Output switching (3.5mm jack) 20h approx. Power: 9V d.c. (external) 4 x 1.5V AA batteries (internal) Battery Life: 21h approx. Size: 113 x 186 x 41mm Weight: 560g (excl. batteries)
Almost everyone who spends a lot of time listening to radio receivers will encounter a strong local interfering signal from time to time. Joseph J. Carr K4IPV offers some advice on how to deal with this problem.

One of the differences between low priced and high priced, or at least high quality, short wave and monitor/scanner receivers is how they handle overload from strong local signals. These signals, which can come from a.m. and f.m. broadcast stations, amateur operators and land or mobile (police, taxicab and business radio) transmitters. Virtually everyone who spends a lot of time listening to radio receivers will encounter a strong local interfering signal from time to time.

The receiver specification that characterises this is the dynamic range. Unfortunately, neither dynamic range nor the price of the radio actually tells us very much about the quality of reception. However, low cost radio receivers that have a low dynamic range will be affected by strong local signals.

There are several different types of interference seen. Strong co-channel interference is from a transmitter on the same frequency as another station that you want to listen to. The receiver will tend to capture on the stronger signal, making the weaker signal inaudible. The only practical cure for this form of interference is to use a highly directional antenna.

Dipoles and loops have bidirectional patterns, similar to Fig. 1., that have two main lobes in which maximum reception occurs, and two nulls in which nulls occur. The maximum null is on the order of -30dB for a well designed, properly installed antenna, although 18 to 25dB is more likely in practical antennas. A beam antenna (e.g., Yagi, quad, phased array) has a unidirectional pattern in which the main lobe is opposite the main null.

The idea is to place the null of the loop in the direction of the offending station, causing its received signal to be considerably less than that of the desired station. Of course, the idea is to have the desired station in the deepest part of the null. In general, however, because the null is much sharper than the peak of the main beam, it is usually best to position the null on the interfering signal. The desired signal is not received as strong as it might otherwise be, but the signal-to-strength ratio is considerably better and the result is reception when before it was impossible.

A related form of interference is near-co-channel, i.e., an interfering signal that is not on the exact frequency as the desired signal, but is so close that it falls at least partially within the passband of the receiver. This type of interference is probably more common than straight co-channel interference because even co-channel transmitters often differ slightly in actual operating frequency. The output of the receiver may be a loud whistle caused by the two signals heterodyning together. The squeal or whistle represents the difference between the two signal frequencies. One solution to this problem is to use an audio notch filter at the output of the receiver audio selection. The best solution is to use a directional antenna to get rid of the offending signal.

Still a third form of interference is probably even more common than the two types mentioned above: basic overload. It can occur on channel or off-channel. This form of interference exists when a very strong local signal enters the antenna via the antenna transmission line. The problem comes from the fact that the input protection diodes and in the input r.f. amplifier (which is usually a transistor or integrated circuit) inside the receiver become heavily biased by the strong local signal.

Several different effects are seen. First, the receiver may become desensitised. The receiver r.f. amplifier may be biased so far up its curve that the gain is reduced considerably and normal signals are not able to be heard. The offending signal may or may not be audible in the receiver output, so don’t take the absence of audible interfering signal as proof that no interference is taking place.

Another effect is the generation of harmonics of the offending signal (most likely) or other local signals. When the strong local signal is received in the radio front end, it may drive the r.f. amplifier or the protection diodes far enough into conduction that a non-linear situation is created. Under this condition the harmonics of the offending signal may show up on the receiver dial. It is fairly common in the bands that are under 7MHz, but above 1.6MHz, to hear a.m. broadcasting station harmonics. The actual harmonic output of the radio station’s transmitter is quite low (our USA standard is -60dB or lower), but the receiver generates harmonics that are not normally present.

The harmonic generation phenomenon is often seen in v.h.f./u.h.f. television preamplifiers where there is a strong local v.h.f. station (for example, an f.m. broadcaster). I’ve even seen it create television interference (TVI). In one case, an amateur operator used a 1kW c.w. transmitter and its signal (which was legally clean of harmonics), generated a harmonic in a TV mast-mounted preamplifier. Unfortunately, the tuned antenna on the TV system re-radiated the harmonic to other nearby sets! It was strange to see a case where disconnecting a TV antenna preamplifier...
eliminated interference from a local transmitter! But it happened in a local townhouse development in which each quadrant of individual houses had its own common antenna and an MATV amplifier distribution system.

When the strong local signal is also the desired station, as it might be when using a sensitive short wave receiver in the broadcast band (and there is a nearby a.m. station you like). The strong local, but desired signal, might well be distorted beyond comfort, or may overlap several channels ('splatter' because of the non-linear effects of the signal on the r.f. amplifier.

Still another form of interference is the matter of intermodulation, i.e., when two signals (or their harmonics) mix in the non-linear receive to manufacture other signals at different frequencies. The general case is that the new frequencies will be:

\[ F_{\text{new}} = mF_1 + nF_2 \]  

Where: \( m \) and \( n \) are integers (1, 2, 3, etc) and \( F_1 \) and \( F_2 \) are the two frequencies involved. This type of interference could easily occur where there are two or more local signals. There is a hill close to my home that local radio technicians and amateur operators refer to as 'intermod hill' because of the radio installations there: two f.m. broadcasters, an a.m. broadcaster (who shares a tower with one of the f.m. stations), a hospital security and paging system, scores of landmobile stations that hire antenna space on the broadcast towers and a telephone company microwave relay station.

I've sat outside of the hospital on intermod hill listening to my 144MHz band amateur radio receiver, monitoring telephone calls! The rig was tuned to 146.91MHz, but local interfering signal heterodyned a mobile telephone channel into the amateur band.

Years ago, when I was repairing biomedical electronic equipment for a living, we had a case where the nurses claimed that a patient's c.c.g. radio telemetry signals was appearing simultaneously on two channels of the central console oscilloscope. These radio signals were from 4mW v.h.f. telemetry transmitters attached to the patients to allow them mobility. It turned out to be true, although I was at first skeptical as I went to work at 3am to fix it! It seems that the nurses were using an f.m. broadcast radio receiver for entertainment throughout the long night shift. The local oscillator (I.o.) circuit inside the f.m. receiver was providing a local interfering signal to beat against some other, as yet unidentified, signal to the frequency shift Mr Jones onto Mr Smith's channel as well as his own. The radiated I.o. signal was picked up by a 400mm telemetry whip antenna that was sticking out of the ceiling tiles about 1.5m above the f.m. broadcast radio whip. The f.m. receiver's I.o. signal was then mixed with other signals to produce a different signal that happened to nearly coincide with the frequency of another telemetry channel. Retuning (then turning off) the f.m. radio receiver sent Mr Jones back to his own channel exclusively.

Most of the problems with local interference can be solved by one of the methods shown in the rest of this section. There are three approaches: attenuators, filters and antenna tuning units (a.t.u.).

**Attenuator Approach**

An attenuator is a circuit or component that has the effect of linearly reducing the level of a signal. In other words, it is the opposite of an amplifier; its output is less than its input. The attenuator is used when you want to listen to a very strong signal that is too strong for the receiver. It is also useful when listening to the signals because, although it cuts all signals down to the same amount, it is often the case that the strong signal is dropped below a critical threshold where the receiver can handle the signal successfully.

An attenuator is placed in the antenna transmission line between the antenna and the receiver’s antenna input terminals. In general, it is better to place the attenuator close to the receiver in order to prevent pick up of the strong local signal by the imperfectly shielded transmission line between the attenuator and the receiver. A few inches is considered a good bet. The attenuator should contain a switch that allows it to be connected in or out of the circuit as demanded by the situation. Some car radios have this feature under the guise of a 'town/country' switch, while many short wave and monitor/scanner receivers call it the 'local/DX' switch. But if your radio lacks this switch, then one can be added externally.

The circuit for a switchable attenuator pad is shown in Fig. 3. The attenuator selected should have the required attenuation factor (6, 10 & 20dB are common values selected), and be designed for the standard 50Ω impedance used by r.f. systems. An attenuator designed for say, 600Ω audio work will not perform as advertised in r.f. work.

The attenuator in Fig. 3 is connected to a double pole double throw (d.p.d.t.) switch. When the switch is in the position shown, the attenuator is placed in series with the signal line. 

---

**Fig. 2.**

**Fig. 3.**

**Fig. 4a.**

**Fig. 4b.**

---

**Table:**

<table>
<thead>
<tr>
<th>Attenuation (dB)</th>
<th>( R_A ) (Ω)</th>
<th>( R_B ) (Ω)</th>
</tr>
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<tr>
<td>-20</td>
<td>270</td>
<td>68</td>
</tr>
<tr>
<td>-10</td>
<td>75</td>
<td>100</td>
</tr>
<tr>
<td>-5</td>
<td>33</td>
<td>200</td>
</tr>
<tr>
<td>-3</td>
<td>18</td>
<td>300</td>
</tr>
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</table>

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Short Wave Magazine, April 1994
But when the d.p.d.t. switch is placed in the opposite position, the signal line is shortened straight through from the input connector (J1) to output connector (J2). Note that the attenuator is built inside a screened box - no shield, no work!

I've used the Mini Circuits AT-x and MAT-x devices for this application*. They are fixed attenuators designed for mounting on printed circuit boards, and match the 0.1n d.p spacing commonly seen on boards for i.c. installation. Other attenuators are built inside a coaxial housing, and typically have a female BNC or SO-239 at either end. They provide a fixed attenuation (see label for amount). Readers who don't want to buy an attenuator may be interested in building their own. Fig. 4a shows the circuit for a resistive attenuator pad that will provide a fixed attenuation with 500 unbalanced (i.e. coaxial) input and output impedances. Fig. 4b shows the values of Ra and Rb that give in close to the desired standard attenuation. Use 5%, or better, carbon composition or metal film quarter watt resistors for this circuit.

A crude method that is used on a lot of different receivers is the simple series resistor of Fig. 5a. In this type of attenuator circuit, a 'brute force' approach is taken: a resistor placed in series with the antenna signal line. A value of 300Ω to 5kΩ is typically used, depending on just how much attenuation is needed. A single pole single throw (s.p.s.t.) switch is used to short out the resistor when it is not used. This circuit is the basis for most 'town/community' or 'local/DX' switches in low-cost radio receivers.

An alternate form of 'brute force' attenuator is the variable type shown in Fig. 5b. In this circuit, a 5kΩ linear potentiometer is placed across the antenna terminals. The antenna is connected to the wiper, so the amount of signal applied to the receiver depends on the setting of the potentiometer. A single pole double throw (s.p.s.t.) switch is used to connect the potentiometer into and out of the circuit. At least one model of the Ramsey short wave receiver kit uses this type of circuit as a crude but reasonably effective 'r.f. gain' control.

**FILTER APPROACHES**

The attenuator has its place, especially if attenuators matched to 50Ω are used. But the attenuator, no matter how good it is, is still a bit of a tacky method because it doesn't discriminate between unwanted and wanted signals. It is an equal opportunity hammer for all size nails. A more elegant approach is to use a selective filter that will remove signals in undesired bands, while passing signals within the desired band. A passive filter, made from inductive (L) and capacitive (C) elements may be what is needed. These LC filters come in four flavours: high pass, low pass, band pass, and wavetrap.

There is no such thing as a passive filters that doesn't reduce the desired signal at least somewhat. This loss is called insertion loss. But the ratio of out-of-band loss to insertion loss is very high, so the passive LC filter very definitely discriminates against undesired signals more than desired signals.

Fig. 6 shows the circuit for a simple high-pass filter that will discriminate against signals in the a.m. broadcast band because it has a 1.6MHz cut-off frequency. Strong a.m. signals can adversely affect both short wave receivers and monitor/scanner receivers (the latter especially in the low v.h.f. bands). Although not the best possible high-pass filter, the circuit of Fig. 6 uses easily obtained common parts and offers acceptable performance.

The capacitors used in the filter of Fig. 6 are NPO disc ceramic units. While silvered mica capacitors are also visible, they tend to be a bit more expensive than NPO disc ceramics in the values shown. The inductors can be universal slug tuned or fixed inductor such as Toko 332PN-3416VN (Cirkit part no. 35-50340 **). Alternatively, the coils can be wound on toroidal cores, such as the Amidon 780PF capacitor at C1 can be made by connecting 560PF and 220PF in parallel. These capacitors should be NPO disc ceramic or silvered mica units.

The coils can be either fixed or adjustable coils from a source such as Tokyo, or be wound on the same type of T-50-2 (red) toroidal coil form as used in 

---

*Fig. 5b.*

**Fig. 6.**

The coils can be either fixed or adjustable coils from a source such as Tokyo, or be wound on the same type of T-50-2 (red) toroidal coil form as used in.
Overload interference

Fig. 6. For the three coils, Table 1 lists the number of turns required for each coil. Each section of this filter is built inside its own screened enclosure. A screened box is used for the filter, divided into three screened compartments. A 10mm hole in each internal screen is used to pass the wire from one section to the next.

The internal screens, indeed the entire box if you're so inclined, can be constructed from hobby brass stock. Hobby shops, the kind that deal with model builders, often stock brass sheet in sizes from 6mm wide upwards, in thickness from those that act like gold foil to tank armour - well, almost. They also typically stock angles, round tubing, square tubing and solid wire. Look near the balsa wood display in model shops, at least that's where the brass was in several that I've visited.

To pass filtered signals below 32MHz, or so, and attenuate those above 32MHz. It will guard a high frequency short wave receiver from interference by signals in the v.h.f. region. If your receiver must operate near an TV or f.m. broadcast station, a landmobile or public service two-way transmitter, or a v.h.f. amateur radio operator, then this filter may well eliminate some of the problems that you can experience with those transmitters.

Like the other filter above, Fig. 8. is made from disc ceramic or silvered mica capacitors, and coils wound on T-50-2 (red) toroidal formers with 8 turns of 24 or 26sw.g. enamelled wire. Alternatively, because of the frequency, you can also use the T-50-6 (yellow) forms, but then you must use 9 turns of wire.

A viable alternative for short wave listening is to buy a amateur radio low-pass filter for this application. Amateurs use these filters to prevent the harmonics (if any) from their h.f. rigs causing television interference. Normally, s.w.l.s don't like to use amateur filters because they are much larger, due to power handling considerations. But the 250 to 300W size low-pass filters will not overburden most receiver installations. Several companies make a.t.u.s for fixed and mobile operation that will work nicely for s.w.l. receivers.

A bandpass filter is shown in Fig. 9. This filter will pass signals between approximately 1.8 and 30MHz, while attenuating those below 1.8MHz and above 30MHz. It, therefore, combines the charms of the other filters discussed in this article. The capacitors are common values, and should be either NPO discs or silvered mica units. The coil specifications are similar to the above: L1 and L4 and 5 turns of 24 or 26sw.g. enamelled wire on T-50-2 (red) toroidal formers, while L2 and L3 are 8 turns of the same wire on T-50-2 (red) formers.

A wavetrap is a special filter that takes out one frequency while passing all others. Fig. 10 shows the basic wavetrap circuit. No values are given for the inductors and capacitors because these depend on the frequency being exorcised. The resonant frequency of each trap section (C1/L1, C2/L2, C3/L3, C4/L4 and C5/L5) is found from:

\[ F = \frac{1}{2\pi f \sqrt{(LC)}} \]  

For the most common case, a.m. station close to your home, try 365pF variable capacitors and 220µH inductors. Traps for the f.m. broadcast band are available at 75Ω impedance - which should work well enough in 50Ω circuits. It seems that f.m. stations occasionally wallop TV signals.

Fig. 11 shows two of the possibilities. Fig. 11a is based on using a pair of quarter wave open circuited stubs tuned to the offending frequency, while the filter of Fig. 11b uses a half wave shorted stub to accomplish the same purpose. The physical length of coaxial cable is shorter than its electrical length by the velocity factor

**Table 1.**

<table>
<thead>
<tr>
<th>Coil</th>
<th>Inductance (µH)</th>
<th>Turns</th>
</tr>
</thead>
<tbody>
<tr>
<td>L1</td>
<td>6.3</td>
<td>36</td>
</tr>
<tr>
<td>L2</td>
<td>7.1</td>
<td>38</td>
</tr>
<tr>
<td>L3</td>
<td>4.0</td>
<td>8</td>
</tr>
</tbody>
</table>

**Fig. 11a.**

**Fig. 11b.**

Short Wave Magazine, April 1994
\( V \), i.e., the percentage of the speed of light at which signals propagate in the cable. Typical values of \( V \) are 0.66 for regular polyethylene coaxial cable and 0.80 for polyfoam. Some Teflon cables are listed as \( V = 0.70 \). For the half wave case:

\[
L = \frac{14996V}{F} \tag{3}
\]

\( L \) is in mm, \( F \) is in MHz.

For the quarter wave stubs divide the value obtained from Equation (3) by two. Keep in mind that the quarter wave stubs (Fig. 11a) are open-circuit, while the half wave stubs (Fig. 11b) are short-circuit at the free end.

**Antenna Tuning Units**

Antenna tuners are used to match antenna to receiver and transmitters. Smart amateurs always use them in the h.f. bands for both matching and harmonic suppression. A typical ‘line flattener’ style circuit that is intended to match 50Ω to 50Ω systems is shown in Fig. 12. Many tuners on the market lack capacitor C3, so are essentially high-pass filters. These are not the best selection for many applications, but will do. In some cases, where C3 is used, capacitors C1 and C2 are mechanically ganged together on a common shaft. The inductor is either 18 or 28μH (use the larger if lower bands are to be covered), and is tapped at least at four positions to provide different bands. A good choice for the inductor is 45 turns or bare 14s.w.g. solid wire, spaced equally over 75mm of length on a 25mm air cored former. A suitable former is 1in pvc waste pipe. Note, however, that pvc pipe may not be suitable for transmitter a.t.u. coils, even at low power levels.

An alternative is to use a 250W fixed to mobile antenna tuner intended for amateur radio operation. Although designed to operate on the amateur bands, these units will usually accommodate the nearby short wave bands. Alternatively, they can be modified by adding fixed capacitors of a few picofarads across each variable capacitor, or by using different taps on the inductor.

**Conclusion**

Overload and interference problems can be annoying, damaging and are often dauntingly difficult to solve. But the listener who tries the solutions given here will achieve good results most of the time.

**References**

* Mini Circuits/Dale, Dale Electronics Ltd., Dale House, Wharf Road, Firmley Green, Camberley, Surrey GU16 6LF; (0252) 835094
* **Cirkit, Park Lane, Broxbourne, Herts. EN10 7HN Tel: (0992) 444111.
* *** Amidon Associates, PO Box 956, Torrance, CA 90508, USA.
* *** Ferromagnetics, PO Box 577, Mold, Clwyd CH7 1AH.

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One of the most popular uses for home computers by short wave listeners seems to be the decoding of Morse code and RTTY transmissions and it's a task for which a computer is highly suitable - providing you can find a way to connect it to your radio receiver. Gareth Jones GW4KJW offers this simple interface.

Home computers, be they humble Sinclair, mighty IBM, or anything between, are digital devices, internally, all of the address lines, data lines, RAM and ROM are busy communicating with each other in a stream of Ones and Zeros - ONs and OFFs - Digital. Morse code is a form of digital communication so you might be forgiven for thinking it's a simple matter of plugging a lead between your receiver and computer to transfer the Morse code signals received directly into it for decoding.

Life is seldom that straightforward. When you tune your receiver into a station transmitting Morse, with its b.f.o. or carrier insertion oscillator turned off, all you hear is a series of clicks as the carrier wave is turned on and off by the Morse key. Just hearing these clicks isn't much good, you have to hear the carrier or rather to hear the difference between short periods of carrier - 'dots' and longer periods of carrier - 'dashes'. Unless you're into walking on water, reading Morse just by listening to these clicks isn't practicable, you need the help of the audio tone produced by the heterodyne effect of the b.f.o. on these periods of carrier.

So what's needed is a way to get the information conveyed by the length of these audio tones into the computer - forget the pattern for now, the software will handle that - all the computer needs to know is if the signal it's receiving is longer, shorter or the same as the previous one.

**The Circuit**

The circuit for a simple interface to fit between the receiver and computer to achieve this is shown in Fig. 1. It's a tone-gate circuit based on the NE567 p.i.l. integrated circuit and is not particularly difficult to build. A suggested p.c.b. design is shown in Fig. 2, although you could build it on a piece of Veroboard if you wish. The component layout is also shown in Fig.

---

**Fig. 1: Circuit diagram of the simple interface.**

---

2. Capacitor C3 is optional, and may be connected across the headphone socket if required.

The unit is powered by a PP3, or similar, 9V battery, the battery drain being acceptably low. The audio signal from the receiver's output is applied, eventually, to the input (pin 3) of the NE567 p.i.l. chip. The resistance between pins 5 and 6 on this chip allows the pitch at which the tone-gate is activated to be varied so as to match the output pitch of the input signal. When this is matched, the tone-gate will switch the base of the BC477 transistor. The output from this transistor powers a small d.i.l. encapsulated relay which will operate in time with the audio tones on the input to the chip, the 'cold' side of the relay goes to deck via a small i.e.d., which flashes in time with the audio tones as the relay is powered. The output from the relay is used to 'key' a port or line on the computer. It is this switching between 'high' and 'low' states that the
computer program reads, decoding the received Morse signal.

**Decoding**

To get it all working turn on the computer and load a c.w. decoding program into the computer. Turn on the receiver and connect the interface. Now tune into a fairly strong Morse signal - using a strongish station will help whilst you are getting used to the interface. You will find, after some practice, that the p.l.i. can cope with surprisingly weak signals and even sort out transmissions that are close together. As long as you can hear a difference in pitch between two or more signals the p.l.i. can be tuned to distinguish one from the others. Tune the interface until the i.e.d. starts to flash in time with the audio, run the computer program and you should find that the Morse signal is decoded with the plain language displayed on the screen.

When the interface is connected to the receiver the receiver's internal loudspeaker may be muted, leaving no way to hear the received signal. For this reason an additional 3.5mm socket is provided on the interface box so that an external speaker or headphones may be attached.

**RTTY**

The interface may also be used, with reasonable success, to decode RTTY signals. In this case you will have to tune the interface (as before) to match either the 'Mark' or 'Space' tones you are receiving and match this with the configuration of the RTTY computer program. Purpose built RTTY terminal-units have two separate tone gates one for each of the 'Mark' and 'Space' audio frequencies. When correctly adjusted the received RTTY signal should be decoded and displayed as was the cw.

Naturally the success you have will depend on the decoding program you are using. Good c.w. is decoded and displayed with few if any errors. Morse, being sent automatically or from a keyboard is a pleasure to watch, hand-sent Morse is another thing though most good c.w.-decoding programs have self-adjusting timing/tracking routines within them so you shouldn't have to worry about setting received speeds etc. The upper speed limit when receiving c.w. is about 120 w.p.m. this is dependant on the switching speed of the relay. For RTTY use this means you will be able to receive 45.5, 50 and 75 baud signals. The bits and pieces you need should cost you around a tenner - less if you've got a good 'junk-box' in your shack. More, if you decide to put it into a proper case. But a suitable and very appropriate box is one of those flip-top clear plastics types that hold ten 3.5in computer disks, these can be unclipped into three pieces, if you are careful, for ease of drilling holes, etc. They are quite sturdy when re-assembled and as an added bonus are usually provided free when you buy new disks. (You can buy them 'empty' for around £1.50)

Apart from a plug and connecting lead to your receiver's external loudspeaker socket and the same for the port on your computer, there is nothing else to buy. You can build it in an evening... Go on - give it a try!

---

**You Will Need**

**Resistors**
- Carbon Film (1/3W)
  - 1kΩ 2 R2, 4
  - 4.7kΩ 1 R3
  - 47kΩ 1 R1

**Potentiometers**
- Linear
  - 4.7kΩ 1 R5

**Capacitors**
- Polyester
  - 0.1μF 4 C1, 4, 5, 6
  - 0.22μF 1 C8

- Ceramic disc
  - 0.1μF 1 C3 (see text)

- Electrolytic
  - 1μF 1 C7
  - 100μF 1 C2

**Semiconductors**
- Diodes
  - 1N914 2 D1, 2
  - i.e.d. 1 D3

- Transistors
  - BC477 1 Tr1

- Integrated circuits
  - NE567 1 IC1

**Miscellaneous**
- Relay s.p.d.i.l. 500Ω coil; Jack sockets 3.5mm (3); Mini. toggle switch, s.p.s.t.; Printed circuit board (see text); Plastics case (see text); Knob; Battery connector PP3 type.

Short Wave Magazine, April 1994
When the AR3030 was first placed onto the drawing board about 15 months ago, the R&D team at AOR had the dream of producing a high quality DDS (Direct Digital Synthesizer) receiver with excellent filtering characteristics offered by the legendary *Collins mechanical filters. This dream has now come true, a feat rarely achieved by any manufacturer whether large or small. As a shortwave listener you too can enjoy the experience of this very special marriage of high technology and classical styling.

Most receivers employ ceramic filters, such filters offer good performance and reasonable cost. However the “best” kind of filter is the mechanical resonator filter, pioneered and still manufactured by the *Collins Division of Rockwell International. In contrast to ceramic filters, *Collins mechanical I.F. filters are more expensive and rarely used in any but the very top of the range and professional equipment.

Our aim here at AOR has been to produce a general coverage receiver using the *Collins 6kHz AM mechanical filter fitted as standard yet at an affordable price for most shortwave listeners around the World. We believe that only the very best receiver design deserves the *Collins mechanical filter, and feel our R&D team have succeeded with this goal. It is very easy to appreciate the true effectiveness of the *Collins AM mechanical filter on todays’ crowded medium and shortwave bands especially in Europe after dark.

We also believe DDS is the best method available today to produce the cleanest signals, absolutely essential for high performance receive capability especially on crowded bands containing many strong signals. There are two other filters fitted as standard, these being 2.4kHz for SSB/FAX/CW and narrow AM/S.AM & 15kHz for NFM. Additional filter options include a *Collins 7 resonator mechanical 500Hz filter for narrow CW operation and a *Collins 8 resonator mechanical 2.5kHz filter for even better selectivity on SSB.

Our “Collins inside” logo and use of name has been fully approved by Collins Rockwell and we are proud of that fact. Our pride will be lifted even higher should other manufacturers be brave enough to follow our example in the near future. The AR3030 boasts a wide frequency coverage from 30kHz to 30MHz and all mode reception “as standard”: AM, S.AM (synchronous), NFM, USB, LSB, CW & FAX with a minimum tuning step of 5Hz. Frequency stability and alignment is excellent featuring a temperature compensated crystal oscillator (TCXO) fitted as standard.

The AR3030 has a number of unique facilities to offer. In particular the BFO (Beat Frequency Oscillator) is switchable on USB/LSB/CW and FAX modes. During "normal" operation the AR3030 uses true carrier re-insertion techniques for SSB reception, this ensures ease of use and good audio quality. However should adjacent interference be encountered, the BFO may be switched On so that the main rotary tuning control can be used to tune away from interference and the BFO used to recover readable audio thus provide a simple but effective manual form of passband tuning.

Operation is from a nominal 13.8V DC input or from internally fitted dry batteries for short duration use to provide greatest flexibility while operating from a fixed or portable location. Two optional internally fitted VHF converters are also planned.

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AOR (UK) Ltd.
Adam Bede High Tech Centre, Derby Road, Wirksworth, Derbys. DE4 4BG. Tel: 0629 - 825926 Fax: 0629 - 825927

Please phone or send a large S.A.E. (36p) for full details. Fast mail order available for direct orders.

* Collins is a trade name of Rockwell International
Of all the utility or data modes, facsimile or FAX is the one you can most easily impress your family and friends with. It is also one of the least understood. Mike Richards explains how the system works and the type of equipment needed to receive FAX pictures at home.

Early Beginnings

Like many areas of modern technology, the basic principles of a working system have been known for some considerable time. In the case of FAX systems, the first record came with a British patent that was registered back in 1843 by the Scottish inventor and clock maker Alexander Bain. Since that time there have been an amazing range of developments by most of the main communications manufacturers. Perhaps the most unusual was a system produced by the WideCom Corporation of Ontario. They introduced a special wide-bodied FAX machine that could handle a document 0.6m wide by 61m long! The latest office FAX machines have now reached exceptional speed and quality standards such that they can transmit a page of A4 high quality text in a couple of seconds using BT's ISDN network.

Basic Principles

At the heart of every FAX system is a basic operating principle that has changed very little over the years. The easiest way to explain this is to consider a very simple FAX system and see the role of each component. I've illustrated the main elements in Fig. 1 so you will need to refer to that diagram.

Most FAX systems start with a revolving drum around which is wrapped the document to be sent. Running alongside this drum is a motorised stylus that's used to scan the document. The stylus can take many forms, but is essentially a light sensitive unit that can detect the differing shades of the document to be transmitted. For simple text documents of weather charts, this detector just has to be able to successfully detect black or white. When sending photographs, the detector has to be able to accurately interpret the varying shades of grey. The output from the stylus can take many forms, but is essentially an electrical signal of which the extremes represent black and white respectively. This signal is fed to the transmitter and broadcast using one of the standard systems that I'll cover later.

At the far end, the FAX receiver is identical to the transmitter, except that, the stylus has to be able to mark the sheet of blank paper that's wrapped around the drum. I know this all sounds very straightforward, but it's at this point we hit our first problem. If we are to receive a faithful reproduction of the original image, the receiver's drum speed and stylus must move at exactly the same rate as the transmitter.

We also need to think about what would happen if the sheet of paper at the receive end was smaller (or larger) than the transmitter. What is needed is a way of specifying the speed of the drum and the speed of the stylus. The drum speed is easy as we simple quote the speed in revolutions per minute r.p.m. The difficult bit is defining the stylus speed so that you can receive the image perfectly proportioned on any size sheet of paper.

Index of Co-operation

The answer is to use what has become known as the index of co-operation (IOC). The name is very appropriate as it describes the way in which the stylus movement must co-operate with the line length to reproduce a perfect replica of the original. This index is calculated as the length of each scanned line multiplied by the number of line per unit length divided by π.

The formula for this is:

\[ \text{IOC} = \frac{L}{\text{D}/\pi} \]

Where \( L \) is the scanning line length or drum circumference. \( D \) is the scan density or lines per unit length.

To better illustrate this, let's try a practical example. If we assume we are sending an A4 document that fits exactly around the circumference of the drum the length of each scanned line will be 210mm (width of A4 paper). Now let's assume the drum revolves twice every second, which is 120 r.p.m. Next we need to know how many times the drum will turn as the stylus moves over the entire document. As I know the answer I'm trying to get, I've decided that the drum...
will have turned through 2554 revolutions. We also know that a sheet of A4 paper is 297mm long, so we can now calculate the number of revolutions or scanning lines per millimetre. This calculation is simply the number of revs (2554) divided by the length of the paper (297mm) i.e. 2554/297 = 8.6 lines/mm

To turn this into an IOC we divide the number of lines per millimetre by \( \pi \) (8.6/\( \pi \) = 2.74) and multiply the result by the length of each line (210mm).

The result being an IOC of 2.74 x 210 = 575.4. If you've already tried FAX reception you will recognise that this is very close to the most common IOC standard of 576.

Just to complete the picture, let's use the knowledge gained so far to work out the parameters of a FAX unit that will receive an image from our A4 FAX mechanism but print it on A5 210mm (long) x 148mm (wide). The drum speed of our smaller machine needs to stay at 120 r.p.m. but we need to use the IOC to work out the number of line per millimetre that the stylus must travel.

In this case we need to rearrange the formula so we can calculate the scan density. The new formula becomes: IOC/L x \( \pi \). The final calculation then becomes 575.4/148 x 3.142 = 12.2 lines per millimetre. This is a logical result, as you would expect the stylus to move slower to cover an A5 sheet in the same time as the original took to cover an A4 sheet. If you're not too hot on maths, you don’t have to worry about all this to receive FAX images as this is all taken care of in the decoding system. In practice, all you have to do is choose between the two standard IOCs of 288 or 576.

**Transmission Systems**

Now we have our raw FAX signal from the stylus, we need to consider how we could apply this to a radio transmitter to build a useful communications system. For an h.f. or l.f. transmitter the answer is remarkably simple as we can use the same technology as that used for RTTY i.e. frequency shift keying (f.s.k.) or frequency modulation (f.m.).

In basic terms, this is where the carrier frequency of the transmitter changes in synchronisation with the FAX or RTTY signal. In our case, the amount of change or shift is restricted to a relatively small 1 400Hz on h.f. and 1 150Hz on l.f. Receiving this type of transmission is also very straightforward using a standard s.s.b. communications receiver. This shift is reproduced through the audio stages of the receiver as an audio tone that varies by the full 1400 or 1150Hz. It is this audio signal that's passed to the decoding system and used to produce the received FAX image.

The standards used for satellite FAX images is much the same as h.f., the prime difference being the modulation system. The use of simple f.s.k. is not possible because of an phenomena known as the Doppler effect. This effects the frequency of signals emanating or bouncing off a moving object (speed traps rely on this effect!). When trying to receive FAX images from a fast moving satellite the signal will suffer severe frequency changes as the satellite moves overhead and so changes from approaching the listener to rapidly receding. These frequency changes would cause havoc with the FAX image. The answer lies in a change to amplitude modulation (a.m.). In this system the amplitude of an audio tone is changed in synchronisation with the changing FAX image.

**Automatic Reception**

If you've ever tried h.f. FAX reception, you will know that a typical weather chart can take up to 15 minutes to send.

From a commercial viewpoint, it's clearly not viable to have a radio operator standing by to monitor the reception of every image. What's needed is an automatic reception system that can identify the type of image being sent and synchronise the start and finish of that image. The system devised for this is known fairly obviously as Automatic Picture Transmission or APT. The key elements of this systems are a start tone, phasing signal and stop tone.

The start tone tells the receiving system the IOC to use and the current standards are 300Hz for IOC 576 and 675Hz for an IOC of 288. The 30 second phasing signal that follows consists of a full white signal interrupted at a specific rate by a black pulse. The interruption rate indicates the drum speed of the transmitter as follows: 1Hz = 60r.p.m., 1.5Hz = 90r.p.m., 2Hz = 120r.p.m. and 4Hz = 240r.p.m. The final element is the 450Hz stop tone that puts the FAX receiver back into standby mode. Providing the receive station has a suitably stable receiver, the APT system enables completely automatic reception over long periods of time.

**Practical Systems**

If you've followed me this far you're probably wondering how you can adapt your system to be able to tap into the fascinating world of FAX reception. Fortunately this is remarkably easy to do thanks to a wide interest in FAX over a number of years. The first decision to be made is whether you want to get involved in using a computer for your decoding.

If you do, you will find that there are decoding systems available for many of the more popular computers. You do need to be careful that the resolution given by the package is up to the standard you require. I would recommend that you either see the package working before you buy or...
Operationally the HF1000 has everything the dedicated listener is ever likely to need and is made easy to operate thanks to the use of DSP technology, an uncluttered control panel and large, easy to read displays. Full details are contained in a comprehensive datasheet and user review, which we'll be happy to provide on request.

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- Fine tuning to 1Hz resolution

Short Wave Magazine, April 1994
Almost 16000 customers tell me we're getting it right. Not only offering a "super deal", but after-care in the unlikely event of something going wrong. The continuing silly prices offered by various so-called competitors may attract your eye - we all like a bargain, but can you really afford to buy that new rig from someone who just cannot afford to plough profit back into long-term customer care and a highly developed personal service! If you think you can take that risk, then do so, in the mean time we will carry on offering the "BEST PACKAGE DEAL" and our renowned "price promise". Speak to any of my sales team, (including me), and ask our advice on what we would recommend for your individual requirements. You'll be surprised at the response, you won't be sold anything until we're confident you've made the right choice and will be happy with your purchase, (if you're not, we will gladly change it). Then...we'll quote you the best price!

73 Martin G4HKS

---

**SCANNERS**

**AR-1500EX**
Now in the "EX" guise, the little AOR has proved to be the number one best seller for many stores. Complete with Flexi antenna, carry case, dry cell case and NiCads, Charger, even a Shortwave Antenna, the AR-1500EX is the obvious choice. 
Deposit from only £39.00. Phone for today's best price!

**MVT-7100**
The alternative to the AR-1500EX, if you don't mind the extra for a carry case, Flexi Antenna etc., then this is the one for you. Give me £49.00 now, then nothing for six months! Beats three cheques any day!

**Icom ICR-1E**
Still the smallest pocket scanner. If covert operation is the name of the game, then consider the IRE. Available at a very special price. Price: Unbeatable!

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If you require constant receive from 25MHz to 2GHz, then it's going to cost you lotsa wonga. But the IC-7100 with or without our H.F. coverage is special and so is our offer. 
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For the serious Airband enthusiast. Leaves the "wide band" scanner brigade standing. Dedicated to Air only, this one really works!
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As per the VT-125 but with Military Air as well. Our best selling Airband scanner of 1993
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**RECEIVERS**

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New high quality wideband scanning antenna.

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Complete with stainless steel “N” type connector, mounting pole, clamps, 8-ele with vertical whip.

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Scanmaster Double Discone
100-1300MHz giving outstanding performance. Nearly 2.5dB gain over standard discone.

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£235.00

Datong FL3
With the collection of Audio & Digital Filters that seem to be swamping the market, there is always one that stands out during demonstration in our showroom - the proven Datong FL3. Like the antennas, the FL3 was originally manufactured for professional use. Fortunately, the price is so low that it becomes its competitors and the performance is truly untouchable. Whether your Shortwave receiver is blessed with notch and width controls or not, (Lowe HF150/225 owners please note), try the FL3 from Datong. You’ll wonder why you didn’t buy one earlier!

£149.95

MyDEL TPA Tunable PreAmp Antenna
Housed in one neat unit, the MyDEL TPA is the latest innovation from the USA. Ever wished you could increase the input signal just a little bit when the going gets tough? MyDEL brought to you! And for the first time, the TPA offers an effective ATU for short random wires together with a preamp, and as an alternative a telescopic whip for the occasional indoor short wave listening. Powered by one 9V P93 type battery, it could be the answer to your tuner problems! Ideal for listeners who have limited space and only have limited space.

£69.95 incl. VAT. (9V battery not supplied)

MyDEL ATU-1
A more conventional approach to resonating that length of wire or centre fed dipole for an antenna system is the MyDEL ATU-1. Built in the U.K. to our own specification, the ATU is housed in a strong metal case and employs two good quality tuning capacitors with a tapped coil in the standard “PI” configuration. Almost identical to a similar Japanese model costing nearly 40% more, isn’t it time you bought British?

£59.95 incl. VAT and patch lead to your radio.

Attention all Yupiteru MVT7100 & 7000 owners!
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Wide band scanner antenna
Ideal as a direct replacement to the telescopic antenna often supplied with the Yupiteru models, the NEW MyDEL SCAN-2513 flex antenna covers 25-1300MHz. It’s a far more convenient than the standard unit and a lot safer! Will suit any hand held scanners.

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MVT 7100
NFM / WFM / AM / LSB / USB • 530 kHz - 1650 MHz • 1000 memory channels • 500 search pass frequencies • 10 search bands • 30 channels per sec. scan speed • 12v d.c. or 4 x AA power supply • Back-lit t.c.d. & buttons
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Short Wave Magazine, April 1994
at least ask for sight of some sample images. If you don’t have a local supplier you can visit, a trip to a radio rally is a good way to see and compare a number of different systems.

Generally the best results will be obtained from the more modern computer systems such as the IBM PC or Amiga. This improved performance is due to the superior graphics handling capabilities of modern computers. A look through the adverts in SWM will reveal a number of advertisers that can supply FAX systems. If you have an IBM PC or compatible you could take up my offer to supply a copy of JVFAK. This is an excellent decoding package that makes an ideal way to try out FAX reception (see my ‘Decode’ column for details).

If you want to keep away from using computers for FAX decoding, you will need to look out for a standalone FAX unit. There are several on the market and again the adverts in SWM should point you in the right direction. You will also find that most of the stand-alone units use a standard computer printer to show the received image. Whilst this usually provides a good quality image, you can use up a lot of paper whilst searching for a suitable signal.

My personal preference lies with the computer based systems as they enable extensive storage capacity and received images can be tidied-up after reception.

In addition to a good quality decoding system, you also need a decent receiver. The main qualities are fine tuning steps and good long term stability. This latter feature is especially important if you want to make the best of unattended automatic reception. When receiving h.f. FAX signals with a shift of 1400Hz you may be able to use a receiver with 100Hz tuning steps, this is certainly not true when receiving the popular German weather stations on i.f. The 1150Hz shift means that you really need 10 or 15Hz steps to receive good quality re-transmitted weather photographs from METEOSAT.

Reception Problems

Because FAX is so different from the other utility modes there are some new problems you may have to tackle. The most common is that of multi-path reception of h.f. signals. A big word, but it just means that the signal arrives via more than one route. The effect on the received image is very similar to the ghosting that can sometimes occur on domestic televisions. Because the signal arrives via more than one path, the transmission distance and therefore transmission time is different. The end result varies depending on the severity of the multi-path signals.

In a mild case there may be just a second image displaced to the right of the original. In severe cases the image looks as though the ink has been badly smeared. One of the benefits of the long transmission times of a FAX image is that shorts bursts of interference generally have very little effect on the final image.

Those of you using computer based systems may find that the received image is skewed. This skewing is caused by errors in the computer’s internal clock. Most computer decoding systems are able to correct this very easily and you should refer to the operating manual for more detail. One tip I can offer is to use the Rugby MSF standard frequency transmission on 60kHz to help align your computer. To use this, you just set your decoder to a drum speed of 120 r.p.m. and tune to 60kHz. When properly tuned you should see a black stripe down one side of the screen with pulses leading out to the right. All you have to do is adjust the internal clock setting so that the black line remains parallel with the side of the screen.

I hope you have enjoyed this brief look at FAX, if you have any comments or questions, please drop me a line via the ‘Decode’ column.

Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>a.m.</td>
<td>amplitude modulation</td>
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<td>APT</td>
<td>Automatic Picture Transmission</td>
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<td>BT</td>
<td>British Telecomm</td>
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<tr>
<td>f.m.</td>
<td>frequency modulation</td>
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<td>f.s.k.</td>
<td>frequency shift keying</td>
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<td>FAX</td>
<td>facsimile</td>
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<td>h.f.</td>
<td>high frequency</td>
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<td>Hz</td>
<td>hertz</td>
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<td>IOC</td>
<td>Index Of Co-operation</td>
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<tr>
<td>ISDN</td>
<td>Integrated Services Digital Network</td>
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<td>kHz</td>
<td>kilohertz</td>
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<td>l.f.</td>
<td>low frequency</td>
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<td>m</td>
<td>metres</td>
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<td>mm</td>
<td>millimetres</td>
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<td>r.p.m.</td>
<td>revolutions per minute</td>
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<td>RTTY</td>
<td>Radio TeleType</td>
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For the best in Shortwave
Look to Lowe Production

Spring is Sprung, The Grass is Riz
I wonder where my aerial is?

Probably lying on the ground

after the storms of the winter have passed by, and yes, I know it’s a terrible rhyme, but out there
our “WireMatch” aerials are being erected outside many a listener’s home, and the letters are
coming in to say how pleased people are with the performance of the system, and how effective it
is in providing a low noise source for the cherished receiver inside.

More bunkum has been written and propagated (sorry, the pun disease is rampant in Spring)
about aerials than almost any other subject under the sun, and more folk have parted with more
money on useless bits of fibreglass and aluminium than one could possibly imagine. As they
used to say in the early days of wireless: -

‘The number of stations you can hear will have a direct relationship to the amount of wire you see when
you look out of the window’, and it is still true that a good straight wire outside the house will give
you the best results. Verticals? I’m not too keen because they often pick up more noise than
signal. Active aerials? Only if you are compelled to use them by lack of space: The G5RV? Fine
aerial if you are a radio amateur, but has no advantage over a random lump of wire for general
listening. (and incidentally I too worked for the Marconi Company at the same time as Louis
Varney, G5RV, and have great admiration for his work.)

If you are a keen listener to a wide range of frequencies,
you cannot get a better aerial system than the “WireMatch”.

If you want low noise performance
you cannot get a better aerial system
than the “WireMatch”.

If you want a simple to erect,
conspicuous wire aerial,
you cannot get a better aerial system
than the “WireMatch”.

If you want to know more about the
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Tel: 0629 826287 Fax: 0629 826263
Today's allocations in the radio spectrum seem most confusing. Tony Hopwood puts forward some suggestions for sorting out the chaos.

It was an advert in SWM that made me think about writing this article. A hand-held receiver with continuous frequency coverage from 100kHz to 1.2GHz. How sensible, how logical! Why should we put up with anything less? Thanks to the microchip, the days of fixed wavebands ruled by combinations of mechanical C and R are gone for good.

It's going to be tough to break the tuning habits of sixty years. All those ancient Broadcast Conventions going back to the days when the wireless warmed the living room and high frequency meant over three megacycles, sorry, megahertz! Thanks to those Conventions, ancient Broadcast and modern, we have been conditioned to believing that the radio spectrum is jammed solid with transmitters duelling for the last kilohertz.

We were told that this was why the dear old 'Beeb' was evicted from its 200kHz slot, which it had kept warm since 1928, to make space for one or two extra long wave channels, then Radios Two and Three were banished from the medium wave and so on.

All unnecessary, Today's use of the radio spectrum is a bit like someone saying you may be able to see all the colours of the rainbow, but the only ones of any use are the green and blue, the others are out of order!

It's time to slaughter a few holy cows!

First for the chop is f.m. radio, especially the stereo variety.

What's wrong with f.m.?

It's supposed to be better than a.m. because there is less interference from static and it can offer a wider audio bandwidth than a.m.

Hang on! For a start, what's static?

Static is interference, short for static electricity. It was a big problem in the sparks era of radio when very long waves were used with enormous antennas. In the 20s and 30s it became the popular name for the mains borne fizzes and crackles from tramcars, motors and switches and, very occasionally, lightning.

Static

These days there is very little static because things are better suppressed and signals are stronger. But anyway, as the frequency goes up, what static there is, virtually disappears. To emphasise the point, I have a wide band a.m. receiver that gives continuous coverage from 35 - 250MHz, and I can confirm that nearby lightening hardly registers above 50MHz.

And as for the audio bandwidth argument, that's a waste of airwaves - a.m. wins hands down. If you take the BBC standard f.m. signals channel, it has a deviation of ±275kHz for full modulation. The ratio is one station per 100kHz. That's the entire a.m. long wave band for two and a half stations.

How does it work out if you put out a high fidelity a.m. stereo signal on v.h.f.? Say two adjacent channels, each amplitude modulated to 20kHz for left and right. If you allow 10kHz sound channel separation, you are still only going to need about 50kHz per station and much less if you start doing clever things with the sidebands or go digital. That means at least twice as many hi-fi disco rap channels between 88 and 108MHz!

How would wide band a.m. sound on v.h.f.? It was tried before the war when BBC TV radiated signals on Band 1 from Alexandra Palace. The trade press reckoned that a.m. TV sound was so good that many late 30s domestic radios sprouted an ultra short wave band so you could listen to TV sound and test card music on the ten shilling wireless licence!

So far we have doubled the number of channels in the 88-108MHz band where else can we find more spare ether? Try looking at the gaps on your radio dial. My 10-valve RDF (1950) has a good domestic radio frequency coverage: Long Wave 160 - 400kHz; spare 400 - 650kHz (at 9kHz channel that's another 27 channels!); Medium Wave 650kHz - 1.5MHz - jammed solid.

Not so the wide open spaces from 1.5 to 6MHz. Yes, I do know that there are some stations and amateur bands out there, but you will find most of that great chunk of ether is empty - if you've actually got a set that can tune it!

For a start, why not allocate 1.5 to 3MHz for a.m. local and community radio of less than 1kW e.r.p.? That would ease the medium wave logjam and better still revise the use of portable radios with internal ferrite rod antennas rather than the lethal f.m. kebabs that nobody except the Beeb loves.

Round numbers suggest there could be another 160 channels between 1.5 and 3MHz, say 100 more if we leave space for h.f. amateurs and maritime users.

The same goes for the spectrum from 3 to 6MHz. Not much there either until you crash into the 49 metre band ant-heap. Say another 200 spare channels if power is limited to 20kW.

The next bit, from 6 to 30MHz is well used and because you can get a long way on little power if conditions are right - so best left alone!

Above 30MHz it's back to wide open spaces, so how about some of the new a.m. stereo rigs to compete with Band 1 TV signals and existing East European users like that well known hot music station Gdansk?

There's no reason why some of the spectrum from 30MHz to the existing 88 - 108MHz f.m. band shouldn't be allocated for broadcasting with parts re-zoned to protect Emergency Services and Air Traffic Control from adjacent channel splatter. There are enough spare channels rules licensed amateurs more channels as well.

Above 108MHz, there's certainly some tidying up needed. Here in the West Midlands, we have numerous licensed packet stations interfering with emergency services and aircraft. Why not ghetto the pulse code and RTTY traffic into an exclusive sector to clear a space for satellite weather signal downlinks, radio astronomy and other less pushy radio services?

Reorganising the radio spectrum is not going to happen overnight because there are international broadcast conventions involved and getting them changed will make the Maastricht negotiations look easy.

The important thing is that technology can now free radio from its ancient bands, but nothing will happen until radiophiles realise that pollution of some parts of the ether by congestion is every bit as antisocial as light pollution or acid rain.
ICS SYNOP III DATA PLOTTING SOFTWARE

Have you ever wanted to generate your own custom weather charts? If so this latest version of the powerful ICS SYNOP, reviewed here by Mike Richards, could be just what you’re looking for.

Whilst most utility software is used to decode a variety of transmission systems into a string of received text, this program for the IBM PC or compatible takes decoding to another level.

Those who have ventured into RTTY reception on the h.f. bands will no doubt have encountered the coded weather transmissions that comprise a seemingly endless stream of five digit number groups. One of the most popular European transmissions being Bracknell Met on 4.489MHz. These transmissions have been developed over a long period of time to provide a detailed weather map rather like those used by the TV weather people. Having whetted your appetite, let’s take a closer look at how ICS SYNOP III performs.

New Features

For those of you that already have an earlier version of SYNOP there are a number of interesting changes built-in to version III. Perhaps one of the most powerful is the ability to create customised maps. With this facility you can enter the latitude and longitude for the bottom left-hand corner of the screen and then adjust its height in whole degrees of latitude. Once the map has been defined you can name and save it for use with any of the data capture and display functions. There are an infinite range of uses for these maps.

Just to complete the picture, this new version includes the facility to plot isolines for both pressure and temperature. The computations for this are quite complex and took a few seconds to complete even on my 33MHz, 486 computer. The instructions warn that the calculations in 16 colours. SYNOP supports a number of standard printers including Epson 8- and 24-pin plus Hewlett Packard LaserJet, DeskJet and PaintJet systems.

Despite this good cover, I was surprised to find that an IBM Proprinter driver was not included as this ranks with Epson as one of the most popular emulations. However, the omission was not serious, as you could export all the screen images in the popular PCX format for printing via other graphics packages.

Connection to your h.f. receiver is done using a special DSD-3 demodulator that plugs into a spare serial port on your computer. This can be either COM1 or COM2 so you can still use other serial devices.

In addition to providing some demodulation electronics, the decoder also contained a hardware copy protection device. This prevented the software running properly if the demodulator was not in place. One rather odd point about this set-up was the inclusion of a LOCK l.e.d. and SHIFT slider switch on the demodulator. Whilst this was very neatly done, it’s not very practical when you consider that most computer serial ports are tucked away at the back of the cabinet! In my case the problem was easily overcome as I use a four way switch box connected to my spare serial port plus a short length of ribbon cable to act as a gender changer. Using this system I was able to make the decoder easily accessible by resting it on top of the switch box.

The SYNOP software was supplied on a 3.5in disk with a simple batch file to handle installation to the target disk drive. Once installed, the program occupied 1.12Mb of disk space.

Good Manual

As synoptic weather reports are something of a black art to many utility listeners, a good manual is essential if the newcomer is to get the best from the software. The
receive this station you need to set the bandwidth slider on the DSD-3 interface to WIDE. To get accurate results you also need to ensure the signal is properly tuned in.

With the SYNOP III package the correct tuning point is indicated by the LOCK I.e.d. on the interface or the illumination of a square block in the bottom right hand corner of the screen. In practice this proved to be a fairly crude tuning indicator and I found the best technique was to swing the receiver right through the band where the indicator lit and then back track to find the mid-point.

With the tuning point set you can move to the RTTY option using the neat drop down menu system. From this menu you can view the decoded RTTY live and set the appropriate baud rate. You can also disable the RTTY decoder to allow an existing RTTY decoder to feed SYNOP III. A typical example of this is if you already have a PK-232 or similar decoder, you can connect the ASCII output direct to the computer's COM 1 or COM 2 port and use the information to feed the SYNOP III program.

**Automatic Reception**

A particularly powerful facility is the AUTODUMP option. This provides means you can leave your receiver tuned to a Synoptic station for long periods of time without having to manually save the buffer every three hours. You can also review and print the RTTY buffer to examine the raw data in more detail.

With the receive function set-up and capturing data you can choose to plot the data as it arrives. To do this you first have to select the map you want to use. SYNOP III comes with a good selection of maps covering the North Atlantic and Europe. You can also choose to present the data in list form, which can be by country, station or aircraft. Next you have the option of choosing the features that you want displayed on the selected map. This determines which of the components of the SYNOP weather reports are displayed on the map. The range of available features is extremely good, covering from a straightforward pictorial map with cloud pictures, through to a plot of all data.

For those new to weather monitoring, the pictorial option gives a very easy to use display. I've included a sample to give you a better idea. However, my image does not do SYNOP III justice as the on-screen display makes very good use of colour to show the differing weather conditions.

If you want to review previously captured data you just have to change the data source from Live to File. Personally, I found the live display quite fascinating as new reports popped-up onto the display.

**Display Options**

Once your display of data is complete you have a number of options available to preserve the image. The simplest of these is to just hit the Print Screen key, which will give you a printout on your printer. Alternatively, by pressing Control-X, the image is saved in the popular PCX graphic file format. The great advantage of this is that files in this format can be edited and printed using a wide range of commercial graphics programs. You can also take advantage of SYNOP III's slide show system to automatically display a number of previously stored PCX files. This is a very effective way to illustrate changes in weather systems.

**Summary**

Of all the weather related decoding systems around SYNOP III stands out as being the most powerful in terms of clarity of display. The wide choice in display formats means that it has strong appeal to both newcomers and the more experienced listener. SYNOP III currently costs £149.95 and is available from ICS Electronics Ltd., Unit V, Rudford Industrial Estate, Ford, Arundel, West Sussex BN18 0BD. Tel: (0903) 731101. My thanks to ICS for the loan of the review model.
ICS was the first company into amateur radio data transmission in the UK and we are now UK main distributors for AEA, manufacturers of the world's finest range of multimode data controllers. Additional AEA and ICS products are also available. Free colour brochure on any product upon request.

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Antennas and Accessories

[Table of antennas and accessories with prices]

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73 from Dave G4KQH, Technical Manager.
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This has been a most "tiresome" period, activity has been very sparse," wrote Ern Warwick (Plymouth) at the end of January. Ern summed up the general feeling among the 28MHz beacon watchers.

At opposite ends of the UK, Ian McDermid (Comrie) and Cmdr Henry Hatfield (Severnside) found only the occasional beacon signal, but this is not unusual during the low part of the sunspot cycle. "The m.u.f. (maximum usable frequency) rarely above 23MHz up here", remarked Ian on his log covering the period shown in Fig. 3. Nevertheless, the consistent monitoring of the 28MHz beacon signals is important because it tells us, at what time and in which direction a path was open through the upper regions of the ionosphere. Such information can then be compared with any auroral, magnetic and solar activity that occurred around the same time.

Good Reading

Most of the post-war, co-ordinated observational work, by members of the amateur radio fraternity, dates back to the International Geophysical Year (IGY - 1 July 1957 to 31 December 1958). Although much more can be said about this work, there are two books that you may find of great help. One, published by Hodder & Stoughton in the 1960s, is Assault on the Unknown by Walter Sullivan and the other, published by the RSGB in 1991, is Radio Auroras by Charlie Newton. ISBN 1-872309-03-8.

Solar

During December, Ron Livesey (Edinburgh), using a 2.5in refractor telescope and a 4.0in projection screen, located one active area on the sun's disc on most days, two on the 2nd and 4th and three on the 30th. From his observatory in Selsey, Patrick Moore kindly sent drawings of the groups of sunspots that he projected at 1150 on January 1, Fig. 1 and at 1130 on the 25th, Fig. 2.

Auroral

The auroral co-ordinator for the British Astronomical Association, Ron Livesey, received reports of auroral "glow" for the overnight period on December 9/10, 17/18 & 29/30. "arc" on 78M, "rayed arc" or "band" on 78, "active" on 253, 76 & 21/22 and "corona" on 7/8 from observers in North America, Canada and Scotland. In Portland, Ford White heard the German beacon DKO WCY on 10.144MHz transmitting a weak auroral warning at 0000 on January 9 and Ern Warwick tells me that this beacon sends solar data once every five minutes.

Magnetic

The various types of magnetometer used by John Fletcher (Tuffley), Andy Hollis (Winsford), Tony Hopwood (Upton-on-Severn), Karl Lewis (Salts), Ron Livesey, David Pettitt (Carlisle) and Tom Rackham (Goostrey) between them, recorded strong disturbances to the earth's magnetic field on December 1-3, 7, 8, 16, 19, 21, 23, 24 & 31.

Propagation Beacons

First, my thanks are due to Gordon Foote (Bristol), Cmdr Henry Hatfield, Ian McDermid, Ted Owen (Maldon), Andy Hollis (Winsford), Tony Hopwood (Upton-on-Severn), Karl Lewis (Salts), Ern Warwick and Ford White. For their 28MHz beacon reports from which I compiled the chart in Fig. 3. Ern, Ford and Ted added the South African beacon 2S1J to our list this time and Ford logged 2B8J and WU2X on the days indicated in Fig. 3. Gordon has the opinion that the Cyprus beacon, 5B4CY continues to keep things "afloat" and adds that CH910 was very loud and clear on [January] 24th and 25th. Both Em and Ford reported very strong signals from EA3JA at 1735 on the 12th and Ford found the same for OH9TEN at 1205 on the 23rd. This sounds like a touch of winter Sporadic-E. At present, Gordon is using an active Diamond antenna on the apex of his roof and plans to erect a long-wire in due course.

Tropospheric

The variations in atmospheric pressure for the period December 25 to January 25 are shown in my "Television" column elsewhere in this issue. The table below shows the beacon signals on 91.75MHz (Ch. R4) and 99.75MHz (Ch. R5) and the 'buzz' of the 'RS' vision pulses on 93.25MHz.

It's amazing how strong these signals can be and their reception means that an extensive Sporadic-E is in progress. Then is the time to check the strength of the signals from the 28MHz propagation beacons in Germany (CGFAAB, DFOTHD, DKO WCY, DLOGI), Italy (IY4M) and Spain (EA3JA).

Band II

At any time when you suspect that conditions are right for Sporadic-E, especially in June and July, then carefully tune through Band II, on a good domestic portable with its own rod antenna and listen for a number of French, Italian and/or Spanish stations at both ends of the band. Also check for Eastern European or Russian television sound on 91.75MHz (Ch. R4) and 99.75MHz (Ch. R5) and the "buzz" of the "RS" vision pulses on 93.25MHz.

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

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**Fig. 1.**

**Fig. 2.**

**Fig. 3.** 28MHz beacon chart.
The Latest from the Clarke Belt

It's always good to hear from readers and John Hockenhull (Cheshire) has written to expand on photographs in the January '94 column. (T.H.) Arthur C. Clarke shown in Fig. 4 was a live feed from his home in Sri Lanka to Hastings, UK in celebration of the 60th anniversary of the British Interplanetary Society - apparently Arthur was secretary of the society in 1945 when he published his thoughts on satellite communication. The hook-up was sponsored by BT, Intelsat and Eutelsat and took place on 17 October 1993 from 1230-1300BST.

John details the signal path - the uplink out of Sri Lanka was organised by the SRLC onto Intelsat 604 at 57°W in C Band. Downloading of the feed was at BT Maldesey, UK and then up again onto Eutelsat I F5 at 21°E. In Hastings, a 2.4m transportable link dish was in use. The Fig. 3 Sports 21 appeared on Eutelsat II F1 and is usually seen on France Telecom transponders. John says that this card is usually followed with Spanish language feeds such as Spain's TV3, Canal Sur, etc.

And to another John - John Locker in the Wirral. After the delayed launch of Ariane V63 from Kourou January 20, the flight finally lifted off on January 24. John monitored Eutelsat I F5 at 21°E as that carried the whole event with an English sound track, most others watch an Eastbound feed from Intelsat K 21°W that only had a Turkish language commentary. On board the rocket were two important satellites carrying considerable Ku band transponder loading, Eutelsat I F5 destined for 36°E to expand the Eutelsat Network into Central Russia, and the Turkish Turksat 1.

The whole launch was to be a PR fanfare for Ariane but as the rocket lifted off and into flight John noticed a change in the faces of the controllers. Though the upbeat commentary continued, at about nine minutes into the mission the launch track on monitor screens showed a dip and at 210km height Kourou lost acquisition of the launcher. Though problems were obvious the commentary still maintained 'everything is progressing normally' - eventually, of course, Charles Bigot, chairman of Arianespace spoke to the press and announced the loss of the rocket and load. For Turksat 1, the delay in an orbiting bird is temporary since Turksat 2 is on stream to launch later this year, Eutelsat however has a major problem since the lost will set back their expansion programme considerably. Their series II F6 will, of course, launch on schedule (subject to Arianspace rocket and load. For Turksat 1A satellite, another Intelsat at 50°W but research has now proven that Intelsat 513 at 53°W does have Telecom band transponders together with Intelsat 515 (18°W) - 514 failed on launch. The two active birds have three Telecom transponders at 12.54, 12.63 and 12.71GHz all vertical. Later series 6 Intelsats do not carry Telecom band transponders.

UK company Starbucks was very active on Eut. I F3 at 16°E with their UK164 unit. With Serbia very active on Eut. II F3 at 16°E using PAL telecom band transponders. The livestock auctions are still being carried well worth checking out as it's a part of the loot from a Russian hijack attempt that failed. Seen via Gorizont at 14°W out of Moscow.

Orbital News

RTL-TV is changing to Smartcrypt encryption (Schlumberger) - another cut and rotate system but requiring two cards, one with the access code and the other with the algorithm coding. Cost is estimated at £100 with a three-year 'free' access to RTL-TV programmes.

Red Hot Television, the well known, though intermittently seen, English language porn channel has dropped plans for a 'Gay' segment, though at the time of writing the station is off the air once more. Rumours suggest that it may return one February this time beamed up from Zagreb.

Fig. 3: And a Happy New Year to you too!
will start this month's Bandscan here in Britain where, since the
beginning of February, the BBC has been using the popular Astra
satellite to carry all five domestic national radio channels, Radios 1,
2, 3, 4 and the revamped Radio 5 Live (what a ridicilous name for a
radio station - as one columnist wrote, it could hardly be Radio 5
(Dad)).
The classical music station Radio 3 has gone on to
transponder 34, UK Living TV, in stereo on the audio sub-carriers at 7.74
and 7.925MHz, and Radio 1 has moved to this transponder where it is also in stereo on the
audio sub-carriers at 7.38 and 7.56MHz. Radio 2 is available on satellites for the first time, but in
mono, on transponder 23, UK Gold TV, with the audio at 7.74MHz.
Radio 4 is also on UK Gold at 7.56MHz and Radio 5 Live is at 7.56MHz. BBC World Service
continues on UK Gold at 7.38MHz.
Whether the availability of Radio 1 on satellite will stem the flow of
listeners away from the station following the shake up of schedules in
the autumn is debatable. Maybe people on the Spanish Costas will be
included in the audience figures in future.

With the release of the f.m. band between 104 and 108MHz to
broadcasting in 1996, the UK's Radio Authority is now advertising
for applicants to run three national commercial stations. It is likely
that Richard Branson will want to try and secure one of the channels to
move Virgin 1215 AM to the higher quality f.m. band and increase the
station's audience share. Satellite owners can find the Virgin radio
station on the Sky News TV channel on Astra and the audio sub-carriers at 7.38 and 7.56MHz.
Digital Audio Broadcasting - or DAB - is likely to go in to service in
a number of European countries next summer including Britain,
France, the Netherlands and parts of Scandinavia. Already receptive
manufacturers are being wooed by broadcasters to ensure that sets
are available, at least for cars initially, when services go live. 'I'll
bring you news of developments in this exciting area as they occur.
The BBC World Service is currently going through a period of
reorganisation on so-called regional lines. It seems that the
BBC has divided the world into six separate regions, and will be
tailoring programmes and schedules specifically for those areas.
Will this mean the end of a

Global World Service broadcasting in
English when you knew that wherever you happened to be on
the planet, Dave Lee Travis would pop out from your radio set with A
Jolly Good Show each Saturday at 0815 UTC?
The Europe Scene
Over The Channel in France, Radio France International is working on plans to develop a separate French
service for Europe, during the peak evening listening hours. This will be
on the air for up to five hours every day, in addition to the 24 hour-a-
day French channel beamed world-wide.
Radio Netherlands is another station affected, or about to be
affected, by a major reorganisation. It has been rumoured - although I
have to say that I have been unable to get reliable confirmation - that even the English service has been
under threat. A report on the

station's future has been prepared and new senior management are
working out the best way to take the broadcaster through into the
next century. There is likely to be

more emphasis on both Europe and the parts of developing world that
have the largest audiences at present. Full details will be known during the Spring, details that you
will find covered extensively in the pages of Short Wave Magazine.
In the meantime, tune in to the

Hilversum based station in English at 1100UTC each day on the
relatively reliable 49m band channel of 5.955MHz.
Radio Vlaanderen International in

Brussels is now on Astra. You
can tune in to the FilmNet TV on Astra 1C at 10.92075GHz and the
audio sub-carrier at 7.38MHz.
Unheard since late last summer has been Estonian Radio. In early
February, though, the station

appeared back on its old channel of 5.925MHz, with English at
2000UTC for half an hour, followed by Finnish and Swedish. There is
also a half hour broadcast at 1800
UTC in Finnish, German and

English.
Fellow Baltic state Lithuania
seems to have settled, for the time being at least, on a schedule that
includes English to Europe at 2000 on 9.71MHz, as well as 9.40MHz in
lower side band, and

2230 on 9.71MHz. On
Sunday and Monday, listeners in North America can tune to 7.15MHz at
0000 for a half-hour programme but Tuesday to Saturday there is just a
direct minute English news bulletin at this time, followed by 25 minutes of

Lithuanian. The 7MHz

transmission is beamed from a site in Russia.
New Services
A new broadcaster in central Europe started transmissions over the Italian Radio
Relay Service, IRRS, based in

Milan. Short Wave Radio
Switzerland will have two hour-long programmes each month at
1300UTC on the second and fourth
Saturday on the regular IRRS
frequency of 7.125MHz. The Swiss
station is a project of a group of

enthusiastic DXers who got together last year to found a non-
profit making association. The

programmes appear to be of the

type more usually heard on the 48m

"pirate" band on Sunday mornings,
with the Voice of Basel one of the

identifications being used.
It seems that by hiring time on
IRRS, the Swiss DXers are

circumventing the usual restrictions placed on small groups who want
access to the airwaves. The owners of IRRS, Milan based Nexus- IBA,
say they, "do not endorse the principle or right of free-radio
producers to air via unregulated, unlicensed media, but intends to
offer IRRS as a legal media and an excellent arena to be heard and
judged for the value of their productions". In other words, I

suppose, they don't really care. I

wonder what other organisations whose programmes are aired on
IRRS, including the United Nations, feel?
Radio Free Europe has started
broadcasting a Balkan service in

Serbo-Croatian to the former

Yugoslavia. This is in addition to the

service provided to the region by

the Voice of America. The new

programme stream began at the
end of January, and eight staff, all

veteran journalists from Serbia,

Croatia and Bosnia, are putting

together two hours of broadcasts
every day. Tune in at 1800 and

2200 on 5 985, 7 115, 7 145, 9 685,
11 815 and 15 37MHz. RFE's new

Balkan service is budgeted to cost
US$1.2 million each year, out of a
current total budget for both RFE
and Radio Liberty of US$208
million. That will fall to an estimated
$75 million by October next year.
At the beginning of the year, a
new station was formed in Germany - DeutschlandRadio. It was formed
from three existing stations: DS-
Kultur, a former East German
station, RIAS Berlin (Radio in the
American Sector) and part of

Deutschlandfunk's operations. DLF
now calls itself the news station of

DeutschlandRadio. You can tune to
the new station on the short wave
frequency of 6.005MHz or on long
wave on 177kHz.
Vatican Radio is moving to new
delivery methods, concentrating
resources on satellite delivery while
closing down medium wave outlets.
The transmitters in the Vatican City
on 527 and 1611kHz have been
dismantled, although it is thought that
1611kHz will be used in the
future when a new transmitter and
antenna are installed at the Santa
Maria di Galeria transmitting site.
The transmitter will beam towards the
Balkans and the Middle East.
That is all I have room for this
counter. Do drop me a line if you
learn anything interesting about the
European broadcast scene, or want
me to investigate something. All
letters gratefully received at the
SWM Editorial Offices in

Broadstone. Until the July edition,
good listening!
B y the time you read this, we should be seeing the first signs of the 1994 Sporadic-E season, a period when Band I (45 to 68MHz) is an attractive area for both the new and experienced DXer.

Briefly, a Sporadic-E opening, caused by sudden changes in the 'E' region of the ionosphere, may last a few minutes or several hours. Such an event can deflect radio and television signals, between about 20 and 200MHz, over 1600km. This means that under extreme conditions, extraordinary DXing is possible in the 20, 50, 70 and 144MHz amateur bands, the broadcast bands between 68 and 106MHz and most television channels in Bands I and III.

The most vulnerable frequencies to be affected, by even a mild disturbance, are around 50MHz where signals from Russia to Scandinavia are 'bounced' into most parts of the UK. For example, 625-line television transmitters in Czechoslovakia, Hungary and Russia use Chs. R1 and R2, Fig. 1, and such countries as Norway, Portugal and Spain are among those using Chs. E2, E3 and E4. This alone shows that Band I can be a TVDXer's heaven, especially during the peak months of June and July when 12 and 18 hour openings are possible. The upper and lower frequencies shown in Fig. 1 are for the vision and sound channels respectively. Signals at the beginning and shortly before the end of an opening are often subject to deep and sharp fading and this means from just above the receiver noise to ear-blasting.

If a disturbance creates a northerly path, with a modest dipole antenna you can expect to receive pictures from a variety of Norwegian regions, identified on their test-cards that usually carry some form of identity at the top such as ARD (Germany), BRT (Belgium), DR (Denmark) Canalis-France, JRT (Yugoslavia), NED-1 (Holland), RAI (Italy), RTP (Portugal), RUV (Iceland), TVE (Spain), TVP (Poland), TW (Romania) and YLE Finland.

Vision Pulses

Obviously, it's not practical to watch a screen full of receiver noise for long periods. However, there is another way that permits you to do other things while waiting for a Sporadic-E to develop. If you have a scanner, or a communications receiver, that covers the 50MHz region then set it to 48.25MHz and/or 49.75MHz and leave it running with the 'hiss' of the receiver noise just audible. At the first hint of a disturbance, random bursts of television synchronising pulses (a fluctuating 'buzzing') should be heard. When these get stronger and more prolonged, switch on the TV and see what's about.

During the 1978 'season', my sync-pulse monitor (a Hallcrafters 'S36'), had been emitting background noise, on Ch. R1, for most of the day, then suddenly, just before 1900BST, the room was filled with a deafening 'buzz' of sync. On went the TV and there was a clock, Fig. 2, on the screen with CCCP behind the upper centre of the hands. It was showing 0550, three hours ahead of GMT. This was followed at 2100 with their news-caption, Fig. 3, from the (then) USSR (now CIS). The event lasted for about 30 minutes, during which time I watched the bulk of their news. The pictures were rock solid because it was the only path open and no other stations using Ch. R1 appeared. Don't forget to set your scanner, or communications receiver, to one of the sound channels. For instance, it's possible to watch a programme on say Ch. E2 (48.25MHz) and hear the sound on another set tuned to 53.75MHz.

Satellite TV

In January, John Scott (Glasgow) received test-cards from Germany and Poland Fig. 4 and a weather report from the Middle East Broadcasting Centre (MBC), Fig. 5, via satellite. In Holland, Peter de Jong (Leiden) produced photographs from his archives of a German test-card, Fig. 6 and a programme caption from Turkey, Fig. 7, that he received, via Eutelsat II, F1 and F4 respectively, around the 21 December 1992. Peter tells me that 'Yerli Dizi' on Fig. 7 means 'Local Series'.

Weather

"Very wet and stormy winter," wrote Simon Hamer early in February. How right you are Simon, in addition to the heavy rain falls toward the end of 1993, I recorded a further 6.33in of rain in January with more than 0.5in falling on days 2, 4-6, 10, 12 & 15 with lesser amounts on the 3rd, 9th, 11th, 13th, 15th, 23rd, 24th & 26-29th. However, this lot is only 0.73in up on the same period in 1993. Early morning frosts were seen on days 1, 8 & 16, light snow fell on the 6th & 17th and my relative humidity dial was over 80% on days 10, 12 & 22-24. The variations in atmospheric pressure were also marked.

Fig. 1.

<table>
<thead>
<tr>
<th>Channel</th>
<th>Frequency</th>
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<tr>
<td>Ch. E2</td>
<td>48.75</td>
<td>Ch. E2</td>
<td>49.75</td>
<td>Ch. 1a</td>
<td>53.75</td>
<td>Ch. E3</td>
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<td>Czech</td>
<td>Hungary</td>
<td>Poland</td>
<td>Russia</td>
<td>Belgium</td>
<td>Denmark</td>
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<tr>
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<td>Norway</td>
<td>Portugal</td>
<td>Spain</td>
<td>Switzerland</td>
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<td>53.75</td>
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<td>56.25</td>
<td>59.25</td>
<td>60.75</td>
<td>65.75</td>
<td>67.75</td>
<td></td>
</tr>
</tbody>
</table>

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.
DXTV continued

pressure from December 26 to January 25, shown in Fig. 13, were taken at noon and midnight from my own barograph.

Tropospheric

"What an obstinate start to the New Year," remarked Simon Hamer with his January log. The only stations that he found 'viewable' were Germany's MDR-1 on Ch. E6 in the v.h.f. Band III and a few in the u.h.f. band from Belgium, Denmark (TV2), Eire (RTE), France, Germany (ZDF) and Holland. Simon pointed out in his letter that DXTV is a hobby and requires patience.

SSTV

Referring to the slow-scan television spot 14.230MHz, John Scott (Glasgow) told me that, "the European stations come on mostly at regular times and again give many hours of enjoyable receiving." In January, John received captions from England, Finland Fig. 8, Germany Fig. 9, Spain, Sweden, Fig.10 - showing the operator with his gear - and one similar from a station in Switzerland.

"The advances in the computer related equipment is moving at a fast rate, regarding even the SSTV side of things, now I have found that colour pictures can be viewed using the computer and an audio interface," said John. He recently changed his computer base-unit to an Intertan DT-Fig. 13.

He has a new Trident 1Mb RAM, 256 colours, graphics card via which he now displays full colour, high resolution, slow-scan pictures.

Photo CD

Last month I raised the subject of keeping DXTV photographs on a compact disc. These, like any other 35mm negative that is processed this way, can be reproduced, via a Kodak Photo CD player, on your TV screen or via a compatible CD-ROM drive fitted to your computer. The Panasonic 562 unit fitted in the 'spare' 5.25in drive bay on my Packard Bell can be seen in Fig. 11. The CD tray is motorised and opens by a touch of the 'eject' button, seen on the right of the unit in Fig. 11. After the disc is laid in the tray another touch opens the motor takes it back in.

I agree with John, computer related equipment is moving at a very fast rate, you only have to look at any of the multitude of computer magazines to see that this is true. Most have a free 3.5in disc of software attached to the cover and, at present, PC Home, has a CD-ROM issue. No doubt, others will follow. One of their CDs is shown on my open drive-tray in Fig. 12.

Kodak Leaflets

I obtained two Kodak leaflets: both called Your Photos On TV. One, A4 size, describes their three players, PCD 265, 565 and 5865 and the other, much smaller, explains the procedure, in simple terms, to transfer your negatives to Photo CD. The resolution available with Kodak Photo CD technology far exceeds the capabilities of current TVs, so the picture will only get better as televisions continue to improve," says Kodak.

I saw one of their PCDs working through a TV and the pictures and the cropping, turning and zooming facilities on the player were very impressive. Obviously there is much more on this subject so, before you purchase either the computer or direct-to-TV system, talk to a good computer and/or Kodak dealer and do let me know how you get on.
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- Various auto functions
- Dimensions: 425W x 92H x 315Dmm

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HF Sideband

Following my appeal for more letters and logs, I am pleased to say that I have been snowed under with correspondence. Thank you to everyone who wrote. Your questions will be answered over the next few issues. I hope that I can count on your letters in the coming months. Your logs have also allowed me to continue with the Traffic Log.

**ATC**

The Air Training Corps (ATC) is a national voluntary organisation aimed at encouraging a practical interest in aviation, adventure and sport. The UK is divided into Regions, each of which is responsible for a number of Wings. Each Wing covers a number of Counties, and are responsible for the ATC Squadrons and ATC Flights within those counties. There are nearly 1,000 ATC Squadrons, and about 100 ATC Flights. ATC cadets can take part in a vast selection of activities, including radio. Many ATC units have converted p.m.r. equipment used for v.h.f., but a number have the ability to use h.f. s.s.b. equipment. The radios are used to train cadets in radio-procedure, and they are also used for communication with other ATC units. The best time to hear these stations is during weekday evenings after 7 pm or at weekends.

A number of frequencies have been identified, as a result of patient monitoring. Each frequency is assigned a channel number, which comprises a letter/number combination.

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Letter/Number Combination</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>4.610MHz</td>
</tr>
<tr>
<td>A2</td>
<td>5.770MHz</td>
</tr>
<tr>
<td>A3</td>
<td>7.740MHz</td>
</tr>
<tr>
<td>A4</td>
<td>8.750MHz</td>
</tr>
<tr>
<td>A5</td>
<td>9.650MHz</td>
</tr>
<tr>
<td>A6</td>
<td>11.176MHz</td>
</tr>
</tbody>
</table>

Callsigns used by the ATC are all five characters long and start with ‘M’, and consist of three letters followed by two numbers. As an example, the callsign ‘MVR2’ was used at the 1992 Royal Tournament in London, but other callsigns have been heard in the ‘M-1’...‘M-99’...‘MIX’...‘MIX’ ranges. Finding out exactly which ATC units use which callsign is almost impossible; I do not know of any publicly available listing of callsigns - but maybe somebody can help?

There is a similar organisation based upon the Royal Navy, known as the Sea Cadet Corps (SCC). I have been told that they also make use of h.f. s.s.b., but I have been unable to find any of their frequencies - does anyone know of any?

Your Letters

**Phillip Murphy** from Eire listens regularly to the African ATC frequencies, including Anglers on 8.940MHz and Brazzaville on 8.930MHz. He says that the controllers and aircraft pass position reports on 'sectors', not geographical co-ordinates; he wants to know if there is any way of finding where each 'sector' is located. Unfortunately, Phillip did not list any of the 'sectors' in his letter, but I believe that the 'sectors' are actually VOR, DME or NDB locations, just like those in the UK and the rest of Europe. The only suggestion that I have for finding out exactly where these are located is to try to get hold of some old aircraft navigation charts for the area concerned. These may be available from British Airways, the 'Airband' column mentions the address quite often, so check your local issues.

**Roderick McKenzie** from Anglia mentions the usual 'mystery' station that many people still manage to mis-identify. This concerns the female voice on 6.745MHz that reads coded messages, and the unconfirmed HM Customs & Excise frequency of 6.746MHz. The two are not connected. The female voice is almost certainly associated with MOSSAD (the Israeli secret service), it has been 'Id'd to Israeli, while the slightly higher frequency has been regularly reported (but never confirmed) as the UK C&E. On the subject of the MOSSAD frequency, it operates at 45 minutes past each hour during the day, each transmission lasts for five minutes, and usually consists of the sequence 'C...I...O...L...V...B...L...' continually repeated. The number that follows the letters is thought to signify whether the message is a real message or a dummy message.

**Lee Williams** asks about a flight that he heard on 11.176MHz. 'Barrel 25' was heard receiving weather details for 'L. I.R.P.', and wants to know some more about what he heard. Well Lee, what you heard was a small part of a standard arrival message passed by a USAF aircraft; similar transmissions occur hundreds of times each day, mainly by military aircraft. The first part is where the aircraft tells its destination airfield, and advises them of their arrival time and cargo or passenger load. The second part is where the aircraft talks with a Meteorological Office ('Metro') to find out the weather at their destination; for this, the Met Office need to know the destination and time; the time is always given as a Zulu time (UTC), and the destination is given as a four-letter code. A full list of these four-letter airfield codes can be found in the Klingenfuss Air & Metro Codes Manual. In the example mentioned above, 'LIRP' is the airport at Pisa in Italy.

**Traffic Log** (frequency in MHz, all u.s.b. unless indicated)

1.906 Marseille Radio calling ship Lago IV.
2.596 Douglas Lighthouse calling to Liverpool Coast guard, with the lifefloat passing their ETA for Douglas Harbour. Liverpool Coast guard referred to this as a 'new' frequency.
2.700 Cyprus Radio long-distance maritime service. Transmitting on 2.700MHz and listening on 2.182 & 0.479MHz.
2.702 GT working Coastal Control. GT said they were c/s BBG -which is HMS Edinburgh (D97).
4.645 VOLMET broadcast by TALLINN INFORMATION in English, at 0532Z.
4.713 Possible UN Yugoslav blockade traffic. American stations 6H6, 7OE, 7L6, 3RD & 2BE. British stations MS, 4UC, WSH & ESY, and Spanish/Italian stations 36A & 8YF. Aircraft mentioned were 1V1G, Talon 410 & Talon 711.
4.755 RAF Notholt/Adlu working stations 4IV, 4DF & FQH, passing coded messages.
4.777 RN Clyde Ops calling Navy 803 (750 Sqn Jetstream a/c). Clyde Ops reported that a dead bird was found on the runway after they take-off, and '03 should 'proceed with caution'.
4.785 Firestation Protection vessel GUY1/HMS Orkney (P299) requesting a radio-check with RN Clyde Ops, but got no reply.
5.180 Cape Radio working DoD Cape, Cape Town. King 01/02/03, USS McKinney (FFG-63) and CGC Legare (WMEC-912) preparing for the launch of Space Shuttle mission STS-61 in early December. The launch was delayed for 24 hours due to bad weather.
24 hours later: DoD Cape talking to King 01 about imminent Space Shuttle launch. Cape asked '01 in the event of a catastrophic breakdown of the vehicle, which direction do you intend to flee towards?'. '01 said they would head 180 degrees. Just to prove that you can hear 'NASA' stuff on h.f.
5.538 Gulf Air flight ops talking to an unidentified aircraft.
5.610 An Air New Zealand flight working Portishead, with a phone patch to their company ops in Auckland. The aircraft was one hour out of Gatwick, going to Los Angeles, and reported trouble with three engines. The aircraft, a Boeing 747, returned to Gatwick.
5.616 Air Force 1 working Shanwick, returning to the USA after visiting Europe. Position 49°N 15°W at 18.57 at FL 280, 48°N 20°W at 19.22 and 46°N 30°W next; Selcal check on AE-MP.
5.629 RAF Renwick Adlu working stations FOM, 4IV, 4DF & FQH, passing coded messages.
5.720 Broadway 20 working RIM. A new frequency for 'Grove Control', or have they moved from 6.719?
6.179 RAF Neatishead ADPU working stations 4IV, 4DF & FQH, passing coded messages.
6.284 Marseilles Radio calling ship Lago IV.
6.427 RAF Blackpool talking to King 01 about imminent Space Shuttle launch. King 01/02/03, USS McKinney (FFG-63) and CGC Legare (WMEC-912) preparing for the launch of Space Shuttle mission STS-61 in early December. The launch was delayed for 24 hours due to bad weather.
6.769 Coastal Control working stations 4IV, 4DF & FQH, passing coded messages.
7.152 RAF Northolt ADPU working stations 4II, 4DF, FQH, passing coded messages.
7.284 Guindy/hms Orkney (P299) requesting a radio-check with RN Clyde Ops, but got no reply.
7.360 Gulf Air flight ops talking to an unidentified aircraft.
7.423 Ocean Air Radio working DoD Cape, Cape Town. King 01/02/03, USS McKinney (FFG-63) and CGC Legare (WMEC-912) preparing for the launch of Space Shuttle mission STS-61 in early December. The launch was delayed for 24 hours due to bad weather.
7.497 Fishery Protection vessel GUY1/HMS Orkney (P299) requesting a radio-check with RN Clyde Ops, but got no reply.
7.693 Coastal Control working stations 4IV, 4DF & FQH, passing coded messages.
8.240 Broadway 20 working RIM. A new frequency for 'Grove Control', or have they moved from 6.719?
8.745 German Air Force 6DI requesting weather for EDCG (Eggebek, N. Germany).
8.748 RAF Northolt ADPU working stations 4IV, 4DF & FQH, passing coded messages.
9.508 Marseilles Radio calling ship Lago IV.
9.721 Coastal Control working stations 4IV, 4DF & FQH, passing coded messages.
9.900 RN Clyde Ops calling Navy 803 (750 Sqn Jetstream a/c). Clyde Ops reported that a dead bird was found on the runway after they take-off, and '03 should 'proceed with caution'.
24 hours later: DoD Cape talking to King 01 about imminent Space Shuttle launch. Cape asked '01 in the event of a catastrophic breakdown of the vehicle, which direction do you intend to flee towards?'. '01 said they would head 180 degrees. Just to prove that you can hear 'NASA' stuff on h.f.
9.920 Coastal Control working stations 4IV, 4DF & FQH, passing coded messages.
10.176 RAF Renwick ADPU working stations 4IV, 4DF & FQH, passing coded messages.
10.192 RAF Northolt ADPU working stations 4IV, 4DF & FQH, passing coded messages.
11.176 MacDill and Offutt GHF's making 'Mystery frequency calls for "Ace 01. "Ace 01" was the delivery flight of the first of the USAF's new B-2A bomber from California to Missouri.
11.377 Sydney VOLMET reporting heavy smoke and flames during the bush-fires in early January.
12.199 WDG/Miami Radio talking to Dallas/Lauderdon, Florida with weather forecasts and navigation warnings for the Caribbean.
13.231 Italian radio ham I5Q1YL well out of band! Probably thought he was on 14.091.
13.980 (It's b.) 'Amiri 3 calling A7A211, reporting departure from Heathrow at 1405Z, estimating Doha, Qatar at 2025Z.
23.035 Airforce 1, SAM 2800 and various other SAM aircraft, en-route from Moscow to Geneva.
Short Wave Magazine, April 1994

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Listening to the Amateurs

This time we start by trying to resolve the confusion in some readers’ minds as to the relationship between an attenuator and an antenna tuning unit.

Any a.t.u. is essentially in the form of a tuned circuit, to transform whatever odd impedance the station antenna might offer it, into 50Ω pure resistive, in listening terms, to squeeze that bit of wide cvr of signals! The tuned circuit aspect has the effect of reducing to some extent the amplitude of off-frequency signals the antenna picks up but which upset our operation. In a practical case a good a.t.u. will make hearable signals that previously were too weak to overcome the receiver’s inherent noise in a perfect receiver we wouldn’t need an attenuator. At no receiver is immune to the effects of big signals spaced more or less away from the weaker one we want. Both the a.t.u. and the input to the receiver are low-Q circuits, simply because they have our 50Ω to damp them. Hence they are very broadband. Now, imagine a very big signal, several klicks away from ours, and big enough to drive the first mixer (usually) out of its normal operating conditions. The mixer is now totally non-linear, so every signal on the mixer input beats every other signal, there are now the ‘suff’ tacked on to the front. Our 50Ω circuits, simply because they have a 20dB attenuator (or even r.f. gain control) comes into play. An attenuator is essentially not frequency conscious, a 20Ω attenuator between the antenna terminals knocks everything down by 20dB. Hence if we gradually increase the attenuation we will eventually reduce the biggest unwanted signal to the point where it stops causing overload. Suddenly, the overload noise vanishes, and signals can be heard. It’s a compromise, obviously if your man is say 10Ω above the noise of the receiver in the absence of overload, and you need 20Ω to stop the mixer overload, hard luck, you’ve lost him anyway! On the other hand, lots of others will have picked up out of the noise, so on balance you win.

In an ideal world, we would have a perfect receiver of zero noise and immune to overload, coupled to a perfect antenna which would only respond to whatever signal you want to hear. With a practical receiver and practical antenna, both a.t.u. and attenuator are needed in order to get the best from the receiver. It follows that, given only that the receiver is not out of kilter, to put a pre-amplifier between a.t.u. and receiver can only reduce the ability of the receiver to resist mixer overload, by exactly the gain of the pre-amp. If the receiver is out of kilter - mend it. End of sermon!

Letters

Welcome back Philip Ford, from Gloucester after an eight-year lay-off. In those distant days Philip used to chase the prefixes, and he has replies, when the rules were drawn up, such a call would have been W6Y3IV/SVP, but the fashion has changed and many such calls now have the suffix tocked on to the front. Our station is still W9YY operating portable in Greece. The modern way is probably best insular as you know straight away where the station is located. Philip doesn’t say what went wrong in the air, but he still sticks to his old FR103 receiver.

A first letter comes in from F. Lennon of Hyde, Cheshire, who has a Low-F150 coupled either to a GSRV in the loft and about ten metres of wire outside but lower than the GSRV. Behind the receiver there is a Datong filter. On Top Band, one evening around 21.00, he noted W2POZ, while on 3.5MHz we see KO1P and W2CHQ as early as around 22.00, UTC of course plus C9LU, for Andorra, V01PQ, E87X, KO1MUP, KO4KS, SB4OBA, N8ATQ, K1JJ, VO1MZ, and WOLVI in New Hampshire. Up to 7MHz where HV3SV was logged, and on 1.7MHz one morning for ZL2JZ, and WK7AZ in Hobart. 18.5MHz saw KO4AI and WQ6CR while 21MHz yielded WP2EY and W5QWV. Finally, a lightning storm round 28MHz gave ZC4ML, and WP4WJ for Puerto Rico, plus 1m. from 9H4AC and EABu/3JOS, both by slope-detection. What, you may ask, is the blazes is slope detection? Well now, if your 1m. has a suitable characteristic, a narrow-band fm. signal, such as we amateurs use, can be resolved in the receiver’s a.m. mode by careful tuning. The receiver i.f. has turned the f.m. into a.m. Obviously, not all receivers are equally good at this, nor all f.m. sets rigid for a particular receiver, but the recovered audio is usually good enough on a clear channel. Back in the old days of 405-line Band 1 TV, narrow-band f.m. was a possible way to use ‘phone in TV hours; the amount of deviation used would be adjusted when the guy at the other end told you what receiver he had - so much for an HRO, so much for an AR8BD and so on.

Logging Program

Matt Spencer of Redhill, it will be recalled, asked about this one here comes at least one answer.

Keith Goodchild, who lives in the Tring area, mentions that he got an ‘AM1940 SW LOG’ program from Venus Electronics Shareware. Keith says he finds this program easy to work and easy to run.

Next we have Mark Borthwick from Hackow in the Scottish Borders. Mark says he now has a Top-R-1000, with which he heard, on 21MHz W1-2-3-4-5-9, YV5GZ, 7X2WAK, PY2H, PTY7, Z22UE, T2ODC, EQ0X, SN7W1F, SU5A/VK, A43LY, ZB2JO, 7X2VZK, SV1BRL/P8, on IOTA EU 52, and a Portuguese special in CQ7G/MO, on 170MHz W1H, and W4 plus WB2CO/V/M in the Mediterranean. V01N3 V01A, and VO1X0, 9X9DK, 425QG, 0052Z, CO2QG, 7Z2AB and VK6QPH. Down on Twenty, Mark noted W2YT1, K3BEG, KH4NW, BW4W1K, K9PPY, VZ2QO, 4X6ES, CUZYA, and EA6AGM. At 7.7MHz the score was CX2TL, LU1FCJ, 3K2MU, and FOR7 XF, leaving us to note thirty-six metre catches by way of K1CFY, AK1N, WB1J, W2BEB, W3KOD, W5FMW, NB9QB, W4QDB, K9BEEV, W9TQ, W9MMC, VE1VZ, VE2VZ, VE21K, VE3KLX, EA6WX, 5V6RS, and JA5KMM.

Another new reporter is Steven Sawyer from Ashington in Northumberland, who has built an MFJ-100 kit receiver up and hooked it to a random wire antenna. On 3.5MHz he logged TS4ON KAPJU, PHQVRI, TS3M, HB9AVW, and PM90, while on 4.7MHz there were a string of Fs plus ER2OZ and GU4W. On 14MHz the receiver had to cope with LA1CI working GA47Y, a few doors away, 9A1NOE, ZA1B, P4C3QJ, 4N7DW, ESXW, LZ1KQZ, 5BBES for a school club station, and F5JOE/E1R1W for 21MHz there were TA1BY, W1JL, and LZ9RR. Finally, some specials and club stations: GB3HVS for Hartlepool Venture Scouts, and GB4CST for Oxford Scouts. GB0TGW was the Astrology station Camhouse, and GB5E5 was the Scottish Expedition Group on the Isle of Mull. GB5SR was for 25 years of Schlun 195, and GW0WRS for William Roberts School, while GB4KSE was part of a King Edwards School. There is always a bumper list from Gerald Bramwell of Swinton: not only is he keen enough to put the hours in, but he lists also on c.w. and RTTY. On Top Band c.w. W4MAYA was logged, along with sideband from GHC7P, VE12Z, K1PE, and AFASHA. 3.5MHz yielded the r.t. of US3KLW and UX0K, but c.w. was not used. Sideband showed W1-3-4-0, VE1-2-9.

IOTA Contest

The 24 hours, noon UTC to noon, July 30-31, are slated for the IOTA Contest. There is an s.w.l. section. Separate logs for each band, marked date, time, call of station heard, RST/serial number/IOTA reference sent, call of station being worked, multiplier claimed and QSO points claimed. Under ‘callsign being worked’ there must be at least two other callsigns before a call re-appears. Add the usual summary sheet and signed declaration. IOTA means ‘Islands On the Air’, so stations in places having an IOTA reference will use that (mainland G/W/G/M is EU005, mainland G1EL is EU015), while others will send a serial number. Each hearing of an IOTA island counts 15 points, others five points, own country or IOTA reference two points. The multiplier is the total of different IOTA references for each band on c.w., plus the same for sideband, so the total score is QSO points times multiplier points for each band added together. Entries, and check logs, to S. Knowles, G3UHY, 77Bensham Mans Road, Thornton Heath, Surrey CR7 7AF, postmarked before August 26.
Alphanumeric Display

The most noticeable feature of the new model is the large alphanumeric dot matrix display. This indicates the status of the twin v.f.o's that can be configured as primary and secondary receive frequencies as well as other information relating to operation such as mode and signal strength. In addition, comments can be added to memory contents if the unit has been programmed externally (more on this later). The memory and search groups are arranged in 20 blocks of 50 giving 1000 channels that can be whisked through at speeds of up to 30 steps per second. Various modes can be selected including delay, audio, free, signal level or manual search/scan. Auto memory store during a search is also available to help you find those elusive signals as well as a novel 'Bandscope' function that produces a simple spectrum type display of band occupancy on the L.C.D. screen.

Serial Data Port

Memory information is stored in EEPROM, which should mean that the contents will remain intact even if the batteries are left discharged for a long period. Additionally, the ability to add password protection will also help to prevent anyone else from examining or changing them.

If you want to exchange information with another AR-8000 owner, you can connect them together and 'clone' the contents from one to the other. This also offers the facility for computer control, although a small interface is required if you want to use your PC's RS232 comms port to upload and download memory contents.

The receiver comes supplied with NiCad batteries and a mains charger as well as a wideband helical whip antenna. This is required on most frequencies but an additional internal ferrite rod antenna gives exceptional performance on the long and medium wavebands. Short wave reception of s.s.b. amateur and utility stations is also enhanced by the inclusion of a good quality 2.4kHz i.f. filter and the availability of 50Hz tuning steps.

By now you must be thinking Great but how much does it cost? Well AOR are keen to beat the price of their main competitors, so if you are thinking of buying a new model why not ask AOR for more information.

Shine A Light

Whilst we are on the subject of AOR products if you own an AR-3000 and run Windows on your PC then a new software package should be of interest to you.

Called 'AOR Searchlight' the new program has been written by Simon Collings and is a logical development of 'AORSC' that was also produced using the same design. This may not always be 100% accurate as the software. The minimum requirement is a 25MHz 386 machine with at least 4Mb of memory, a mouse, a free serial port, Windows 3.1 software and 2Mb of empty hard disk space.

If you want to use the audio recording function, and I think you will, you also need a multimedia compatible sound card such as Creative Labs 'Sound Blaster' and a lot of free disk space. This is because even at the lowest sampling rate each second of recording time uses up 8Kb of memory.

For further information on 'AOR Searchlight' or the new AR-8000 new hand-held receiver contact:- AOR (UK) Ltd, Adam Bede High Tech Centre, Derby Road, Wirksworth, Derbyshire DE4 4BG or Tel: (0629) 825926.

Rubber Ducks

I had an intriguing letter from Peter Lepino of Surrey who has been interested in radio for a number of years. During that period he has collected a number of helically wound antennas or "Rubber Ducks" as they are commonly nickname. He wonders if there is an easy way of determining their operating frequencies.

Providing the construction of the antenna follows standard design techniques it should be possible to calculate the operating frequency from parameters such as the length and diameter of the coiled element, the total number of turns and the spacing between them.

This was detailed in an article written by Dr D.A. Tong (of Datalog fame) in the July 1974 issue of the RSGB magazine Radio Communication. The article is titled 'The Normal Mode helical antenna' and contains design formulae and practical examples of helical antenna based on calculated values.

However, it does take a fair amount of effort to work back through the examples before you can determine the operating frequency of an existing design. This may not always be 100% accurate as the
construction of the antenna and the type of material it is made from can alter the design frequency slightly.

Measured Values
Some time ago I acquired a box of helical antennas that were marked as operating at around 70MHz. Fortunately, I had access to some professional impedance measuring equipment and so was able to perform some experiments with them. I set up one of the antennas to operate over a small ground plane made from a sheet of aluminium and connected the test gear to it. I then shortened the antenna a few turns at a time and made a note of the change in resonant frequency. The next step was to plot the results onto some graph paper, which luckily I had access to some graph paper, which luckily gave a smooth curve indicating that the values I had obtained were fairly consistent. By examining the graph I can now tell how many turns are needed if I want to modify one of the antennas to operate on a different frequency.

Most commercial helical antennas tend to be constructed in the same way utilising similar materials. Usually this is a copper-plated steel spring with fairly widely spaced turns attached to some form of coaxial connector and covered in heat shrink sleeving. If this is the case, the graph will probably give a good indication of the operating frequency - but beware. A lot of the helical antennas supplied with Japanese equipment tend to use much more tightly spaced turns in order to make the antenna more flexible and this can change the results slightly.

My advice would be to use the graph as a rough guide and try to compare the performance of the antenna with that of a known one at frequencies above and below those obtained from the graph. This should give you an indication of the true centre frequency. If you intend to use it for transmit as well as receive, a v.s.w.r. bridge will give you a more accurate result. Try transmitting on different frequencies to see if the antenna is of the correct length or if it needs adjusting slightly. The graph will help you judge how many turns need adding or removing to alter the resonant frequency. I hope this answers the question Peter and thank you for your letter.

Satellite Reception
A few readers have replied to my request for information on the subject of telephone links via geostationary communication satellites. As I originally thought, it would seem that many of these circuits now use digital techniques such as Time Division Multiple Access to convey speech information. This type of transmission cannot be demodulated by the method I described in the January column. However, after looking through some of the publications you suggested to me, there may be the possibility of Frequency Division Multiple Access transmissions being carried on satellites located at 21.5 and 34° West. These signals should be in the frequency band of 10.950 to 11.7GHz that is within the tuning range of most domestic satellite receive systems. Unfortunately at my location the western segment of the geostationary arc is obscured by nearby houses, so I haven't been able to confirm the presence of any likely transmissions - but I would be pleased to hear from anyone who has.

Until next month - Good Listening.

Graph showing Turns vs Frequency for typical helical antennas.
Jetstream 41 (41010) G-WAWR of Manx (Chescliffe Bridge)

Frequency and Operational News

Let's look at what's new in the January GASIL, from the CAA. At Cardiff, Radar 120.05 is replaced by 124.1; at Luton, Radar 127.3 is replaced by 126.75; and at Norwich, Radar 118.475 is replaced by 128.325MHz. Pilots: you do remember to check all this in your NOTAMs, don't you? No direct access to NOTAMs could try asking nicely at their local flying club.

Sumburgh once had its own a.l.i.s. (125.85) but this has now ceased. The same information can be heard, though, over the SUM v.o.r. on 117.35MHz. Some readers query the Alderney beacon frequencies, and some manufacturers presume to offer Airband receivers that omit the beacon segment (108-117.95MHz). Now you know one reason why beacons really do matter!

A new a.l.i.s. is reported on 128.235MHz at East Midlands by George Nichols (Bristol) expects this to change again to 120.6MHz.

A familiar sight in the south-east is G-HEMS. To an injured victim, this medical evacuation helicopter from the London Hospital is a welcome sight! Calling 'Mike Sierra' unless actually on task, in which case it calls 'Medevac,' the originally white Dauphin was resprayed fluorescent red/orange. This faded rapidly and was replaced by fluorescent yellow. Ron Galliers (Islington) asks if Depcom, 122.95MHz, is available nationally for these operations (e.g. air-to-air or talk-back to the hospital). The official answer (see March 'Airband') is NO! Definite restrictions have been placed on this frequency to prevent interference and air-to-air is forbidden. Ron: you ask about a London frequency but I'm not sure if you mean Heathrow or Airways, could you write back and confirm?
to the advice on some flight safety cards. I suggested that plug-type emergency exit hatches should be thrown clear through their aperture. Many airlines ask you to leave the hatch on the seat in the aircraft. The thinking behind this is that, when left on the seat, the hatch will impede egress and even cause injury. However, you need to be careful when throwing the hatch outwards, especially over the wing. Other passengers might be in your firing line, particularly if they've just popped out of the other, adjacent, over-wing exit. There's no hard and fast rule. Only you can judge correctly if you're the one on the spot at the time. Anyway, it's soon time to book those summer hols so let's be prepared but fly off to the sun knowing how unlikely an untoward incident really is.

The next three deadlines (for topical information) are April 15, May 13 and June 17. Replies always appear in this column and it is regretted that no direct correspondence is possible. All letters to 'Airband,' c/o The Godfrey Manning Aircraft Museum, 63 The Drive, Edgware, Middlesex HA8 8PS. Genuinely urgent information/enquiries: 081-958 5113 (before 21:30 local please).

Follow-Up

In February, I gave hints as to what you use as a passenger can do if involved in an emergency. Contrary
Decode
All the Data Modes

As promised last month, I’m including a wide selection of readers stations as a way of helping newcomers see the type of equipment currently in use. Let’s start with Steve Walker of Aylesbury who’s sent me a very full description not only of his current set-up but also most of his previous gear as well.

His serious listening began with a Yaesu FRG-7700 receiver and a Tonom-550 decoder. Although this got him started, he soon became frustrated with the decoder and started to look for something a little more sophisticated. After some detailed research he settled on an Info Tech M-6000, which was the predecessor of the Universal M-8000 system I reviewed last year. Next change was to upgrade the receiver to a new Icom IC-R71E, which worked very well in combination with the M-6000. With this very competent station Steve was still finding modes that were outside the decoding capabilities of the M-6000.

A search around the adverts at the time showed the Hoka Code-3 to be the next move. This also linked well with his desire to get himself a computer to help with his logging. By now, Steve was well and truly hooked with a Datong FL-3 audio filter. Alex Tulloch of Edinburgh is just getting started and has recently been to a copy of JVFAX. His station comprises a Lowe HF-225 receiver combined with a Datong FL-3 audio filter. The antenna is about 11m of wire and a ‘home-made' balun. Alex reports that the FL-3 ‘doesn’t do much' but I think he must be doing something wrong as the FL-3 is a very effective filter and is especially useful for utility work.

The trick is perhaps in the way it's set up. The best mode to use is CW(2) where the middle knob sets the centre of the pass band and the right-hand knob adjusts the bandwidth. To tune a utility signal, you start with the right-hand knob fully clockwise to give the widest bandwidth. Once you’ve found the correct tuning point according to your decoding system, you then slowly turn the right-hand knob to give the lowest error rate. One of the most common problems with new users is setting the bandwidth too narrow.

P.G. Tinkler of Nottingham has based his decoding around an IBM compatible PC using a 386 processor. The current software comprises the ICS FAX III and SYNOP III (see review in this issue) plus a recently received version of JVFAX. The receiver is a trusty Icom IC-R70 which is fed by both an active antenna and a long wire.

Laurence Jamieson from Shetland is an experienced listener who has comparatively recently become interested in utility monitoring. His favourite antenna is a random length wire fed to the receiver via a magnetic longwire balun. The receiver is the Lowe HF-225 with a Datong FL-2 adjustable audio filter. For decoding he uses a Noss 386DX 33MHz PC running PC JVFAX, JVFAX-5.2 and Hoka Code 3 v.14. The set-up works very well and Laurence has been regularly receiving TOPS T1 transmissions on 18.495MHz.

Les Crossan is a regular contributor to the column and takes great pride in customising received FAX charts. He does this by saving the FAX charts in GIF or PCX file format and then processing them using standard graphics packages such as CorelDraw.

One recent image had been enhanced to full colour and was really very impressive - perhaps it'll make the front cover one day! Les manages to achieve these excellent results using fairly modest receiving equipment. The receiver is a Sangean ATS-803A that is fed by a 10m long wire and a.t.u. The decoder is the Lowe Modemaster which runs on his 486DX3 PC with 64mb RAM and Super VGA. Les did suffer a few problems with interference, but has found a neat, but perhaps unconventional, way to cure this. He cut the lead between the receiver and decoder, left the screen disconnected and inserted a low value resistor in the centre conductor.

Moving away from IBM PC based systems for a while, Derek Brooks of Bridgnorth has been listening for around thirty-five years and is currently using the Technical Software RX4 plus Commodore C644 computer. The receiver is a Yaesu FRG-8800 and is fed with a Datong active antenna.

Malcolm Jennings of Stoke-on-Trent has a Tatung-7602 working with an old Codemaster RTTY/c.w decoder. This has provided good service over the years but he is now hoping to upgrade to a PC based system using JVFAX.

Whilst my mailbox seems to be dominated by readers using PC based decoding systems, I know there are many of you using self-contained compact units such as the excellent Microreader from ERA or the Easy Reader from Momentum. There are also some excellent sophisticated decoders such as the Wavecom 4010/4100 series and the Universal M-8000. Just to provide some balance, here’s how about writing with details of your non-PC systems explaining the pros and cons.

Satellite Utilities

I’m still gathering data on this aspect of the hobby but Peter Thompson of Crewe has written with a few snippets. Peter uses a satellite receive system much like my own from Aerial Techniques in Parkstone (look for their ad in SWM) which comprises a 900mm steerable dish, LNB and polariser plus the Echostar SR-50 receiver and an Alba powerliner. Whilst searching around the satellites Peter has found the following potential utilities: Eutelsat II F1 13 E (10,387MHz vert) Superchannel 7.75MHz fast but weak data signal Eutelsat II F1 13 E (11,163MHz vert) Worldnet 8MHz Morse code from US Information Agency? Eutelsat II F2 10 E (11,149MHz horiz) TVE International 7.93MHz fast weak data Inmarsat K 21 5.9W (11,532MHz vert) TV feed -7.43MHz what soundeds like fast Morse Code.

For any of you who’d like to try this but missed my earlier write-up, here’s a quick resume of how to link your satellite receiver to your h.f. receiver.

You need to locate the Baseband output on the rear of the satellite receiver. This can then be connected to the antenna socket of your receiver, preferably via a 10-20dbr attenuator to prevent overload from strong signals. Once the connection is made, you just tune across the various satellite transponders using your satellite receiver and then use your h.f. receiver to tune between about 5MHz and 8MHz to search for utilities. If you only have a fixed dish set to the popular Astra satellite you probably won’t find any utilities. For best results you really need to be able to steer your dish to the satellites that are used to carry international feeds. As soon as I’ve acquired sufficient data, I’ll be putting together a full feature on how to receive and decode these signals.
1965 RTTY with a Creed 7B.

Experts Needed!

I know I spend a lot of time dealing with the basics of decoding, but now there's a chance for the experts to do some investigative work. Dr Martin Th A. van Duinen of Holland has a very advanced decoding system with a Hoke Code-30 and the latest Wavecom 4100. These decoders being driven by the impressive IC-9000 receiver. Whilst tuning around recently he came across an unusual multi-frequency signal on 12,101 and 14.397MHz at around 0950UTC. The format appears to be 1 x 10 + 2 x 11 tones. Can anyone out there provide any further details? Just to help with the analysis, I've included a spectrum analysis print from the Wavecom 4100.

Black Holes!

Robert Hall of Capetown, South Africa asks just what are all those indecipherable RTTY like signals that are found throughout the marine bands. I'm sure we all have been bugged by these signals at some time or other and I think we just sound like a standard RTTY signal.

If you're lucky enough to own a decoder with speed and shift analysis you will usually find these signals give a reading of 75 baud and 650Hz shift. As you can imagine, I've received many queries over the years and the answer given by those who should know is that these are NATO signals using a pseudo random code. The problem with this type of signal is that even if you are correctly tuned and decoding perfectly you will still only receive garbage because of the encryption! I'm afraid you just have to accept that they cannot be received.

Pioneering RTTY

As I spend most of my time trying to get my hands on the latest equipment for review, I thought it might make a change to take a look back at the good old days. This idea was prompted by a letter from Guy Dannen of Portsmouth who wrote with details of his early days of listening.

Although he now runs a sophisticated all mode station using Code-3 and a Yaesu FRG-100 receiver, things were quite different back in the early sixties. Guy started listening to RTTY in 1962 when some ex-government equipment came up for sale. To build a station you had to have a stable receiver some form of printer and a terminal unit. This terminal unit was required to convert the audio signal from the receiver in to ±80V to drive the printer magnet.

The terminal unit in Guy's case was an ex-GPO Creed 3X and his first printer was an ex-GPO Creed 3X. This printer produced the characters on tape using an ink roller. As time went by, Guy was able to upgrade to the popular Creed 7B teleprinter which gave a more conventional page of text on a continuous roll of paper. Although the Creeds were wonderful mechanical devices, they did make an awful lot of noise and the carriage return could move a table across the floor! To illustrate the type of station used in the sixties, Guy has sent me a couple of photos of his 1965 set-up.

The 19in rack houses from top to bottom: Heathkit monitor scope, AR-600 + receiver, AP66862 terminal unit, 80/0-80V p.s.u. for the printer and tuning scope. The table on the right carries two Creed 7B teleprinters. The second photograph shows the radio equipment in use at the time which was: KW Vanguard 3.5MHz to 26MHz a.m. and c.w. transmitter. Hallcrafters SX110 receiver and KW-160 10w a.m. transmitter for 1.8-2.0MHz. Just to complete the picture, I've also included sample prints from the Creed 3x tape printer and the 7B teleprinter.

Special Offers

I can offer a number of services that are designed to make life easier for the utility listener.

Perhaps one of the most popular is JVFAX v6.0. This software package for IBM PCs and compatibles gives access to the world of FAX and SSTV for very little outlay. For your copy, just send me a blank, formatted 3.5in disk (720Kb or 1.44Mb) sticky return address label and three first class stamps. Next in line comes the Day Watson Beginners frequency list that has just been updated to version 1.94. I can also offer the latest Decode list of stations reported by regular readers. For either of these list just send three first or second class stamps and a sticky return address label to the address at the head of the column. I'm currently working on a series of fact sheets, so watch this space for more information.

If you recently sent for a copy of JVFAX and haven't had a reply, please contact me again. We've got a few left over disk after bashing through the lastest batch (about 40 copies of the program). This reminds me if you could possibly put your name and address on the disk - a sticky label is ideal - it will prevent this happening again. Mind you, one lost disk in over 450 copies isn't that bad.

Frequency List

Now for this month's selection of frequencies as supplied by Decode readers. As the reports have been logged within the past few months they should be receivable by most. The only point to watch is that you should listen at the times specified. This is because many stations, especially press broadcasts operate to a strict schedule. The list is totally dependant on contributions from readers, so please keep those letters coming. If you can supply the information in the same order as my e.g. freq, mode, speed, shift, etc. it makes life easier for me. Don't worry if your loggings don't contain any exotic stations - it's repeatability that's really needed.

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I t seems that everyone is wanting to learn about Kepler elements! Within one day of publication of the January SWM, disks started to arrive with requests for copies of the Kepler teaching program that I offered in that edition. Within five days I received forty requests, with more in each post. I hope that everyone has enjoyed running it - I know I did. This month we have a unique opportunity to inform NOAA about what we want from their WXSATS! Read on.

Current WXSATS

The new CIS WXSAT METEOR 3-6 spent the first few days of its life in an off-on state. Following the launch around 0025UTC on January 25, METEOR 3-6 came over my horizon at 1134UTC on the eastern side, transmitting good quality infra-red - typical reversed-grey-scale video, on 137.30MHz. It remained operational for at least 24 hours, but then apparently ceased transmissions. After a day's absence, I started to receive queries about a new signal, and fled METEOR 3-6 was again transmitting, but in sunlight only - so no overnight infra-red. After further spells of on-off operations, I failed to pick up any more signals until February 16. Its transmissions then showed an apparent fault with the infra-red - occasional missing sync bars.

I have seen variable early-orbit behaviour with previous CIS launches, but I had expected 3-6 to continue transmissions, noting that it was in full sunlight, so unlikely to suffer from power constraints. In addition, there was only one other METEOR operating - METEOR 2-21 on 137.695MHz; so the Commonwealth of Independent States is running low on active WXSATS.

In early February, the signal from NOAA 9 was sounding distinctly different. Noise levels in the channels were affecting the data, so controllers de-activate the infra-red channel and switched on the cooler's heater. This vapourises (or outgasses) impurities. The process is continued for about nine days.

During outgassing, only one visible image is transmitted. The other frame is blank so the p.a.t. audio has a distinctly "hollow" tone, normally associated with images of evening landscapes.

METEOSAT-4

Severe image corruption of METEOSAT-4 data occurred around February 4 so the controllers made an immediate swap of all operations to METEOSAT-5. Because of manoeuvring, METEOSAT-5 was then at 2°W so administration messages warned of the possible need to adjust dishes temporarily while the satellite was moved eastwards. The impact on WEFAX users was minimal.

This new situation may affect plans to replace METEOSAT-3, currently part of the American WXSAT system, pending launch of the next GOES.

Pictures

Some of the pictures that I receive have been enhanced with artificial colour, and, in my view, are stunning! SWM is not yet able to print such pictures in their original colour, but I am including them where it is likely that they will reproduce well in black-and-white.

Roger Ray of Telford sent me a selection of which I have chosen a METEOSAT 4 whole-disc visible light image - see Fig. 1. Roger has used some software called Joinpix that allows adjacent METEOSAT images to be stitched together.

Brian Dudman sent a whole-disc METEOSAT 3 image, taken with his PDUS system - see Fig. 2. The large-scale storm activity near the west coast of America can be seen.

Hilda and Jim Richardson of Fife used their 386SX for WXSAT operations and have sent me a selection of prints. Fig. 3 is a METEOR 3-4 image that illustrates the manner in which CIS WXSATS show greater sensitivity to snow and cloud spectral ranges than the NOAAS. With so much of Russia in northerly latitudes this seems to be a reasonable choice. The manner in which clouds stay within the area of the Gulf of Bothnia is seen in other regions - perhaps meteorologists can explain this effect?

Les Sherlock of Bridgnorth sent Fig. 4 - a NOAA evening picture taken using the JVFAX program. I hope to include notes on the WXSAT use of JVFAX version 6.0 next month.

Non-IBM Computers

I get regular requests from correspondents wanting information on software for Commodore, BBC, Mac and other computers. One letter came from a reader in Solihull who has an Amiga 1200 being used to run an old satellite tracking program called SatTrack. He asks whether anyone knows of more recent Public Domain or Shareware programs for this machine? If anyone knows of WXSAT software for non-IBM computers I will be happy to pass on details.

For anyone contemplating purchasing a new computer for WXSAT operations, I would always recommend giving serious consideration to IBM-compatible computers. It is not a matter of these being (or not being) the best, because of the enormous range of software that is available.

Other Satellites

From my log of satellites heard near the 137MHz band, X3 (PROSPERO) remains active on 137.56MHz; the MIR cosmonauts are heard regularly on their voice communications frequency of 143.625MHz; MAGION 3 sometimes interferes with NOAAs 10 and 12 because it also uses 137.50MHz - though fortunately its orbit is so different that such interference is rare. TEMISAT transmits a powerful but intermittent signal on 137.72MHz.

Digital APT - the Future

I have received more than one call from concerned users and potential users of p.a.t. transmissions from the polar orbiters. They have heard that digital transmissions are around the corner and wonder whether expensive equipment is about to be rendered obsolete. In a word - no.

Proposals for the change-over from analogue (p.a.t.) to digital transmissions are currently being planned. The lifetime of electronic equipment, receiver components and computer parts is normally several years, so I personally would not be concerned about upgrading hardware for some years yet.

The new digital service will be called Low Resolution Picture Transmission (l.r.p.t.), and there will be a period of overlap between the digital and analogue service. The change could be implemented earlier on the new European satellites. The transmissions will provide more information to users than the a.p.t. images currently received.

It is important to realise that despite the enormous strides made in electronic engineering, the a.p.t. format used by WXSATS has not materially changed since its inception over 30 years ago!

The National Oceanographic and Atmospheric Administration (NOAA) is now embarking on a process of consultation with a.p.t. users to identify those aspects of imagery which users wish to maintain. This is an exceptional opportunity in which readers of this column can participate. I am therefore summa-
rising a fairly lengthy document to enable readers to take part.

An Important Opportunity

You are invited to rate, on a scale of one to five, the importance that you attach to each of the following:

1: How important is it to obtain higher resolution (1-3km) images with constant resolution across the scan?
2: How important is it to obtain more channels in the l.r.p.t. data stream?
3: How important is it to obtain an increased number of channels and data resolution by implementing a data compression scheme?
4: How important is it to have coverage below 25° elevation with acceptable signal-to-noise ratios, using non-steerable antennas?
5: How important is it to have data from other instruments? NOAA request that the above five items are ranked in importance.
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Short Wave Magazine, April 1994 59
e.g., perhaps you grade item four as five, down to perhaps item three ranking as one.

To help with an appreciation of the significance of these questions, I am including some edited notes provided by NOAA.

**Question 1**
The current resolution (the smallest distinguishable part) of a p.t. images is 4km at nadir and grows to approximately 6.5km toward the limb (at the extreme scan angles).

**Question 2**
The number of different channels transmitted in the i.r.p.t. data stream will have a significant impact on the design of the transmission scheme. Current a.p.t. can transmit only two channels. Some examples of the types of products produced from each of the seven imagery channels are:
- Channel 1 (0.6μm): clouds/aerosol/surface, vegetation index
- Channel 2 (0.8μm): clouds/aerosol/surface, vegetation index
- Channel 3 (1.5μm): clouds/aerosol/snow/ice properties, vegetation stress
- Channel 4 (3.7μm): surface temp, cloud properties, fire detection
- Channel 5 (8.5μm): surface temp, daynight clouds, water vapour
- Channel 6 (11μm): surface temp, daynight clouds, water vapour
- Channel 7 (12μm): surface temp, daynight clouds, water vapour

The more channels transmitted, the greater the bandwidth required, and schemes such as data compression must be utilised.

**Question 3**
As I have discussed previously in this column, current a.p.t. imagery is a reduced resolution subset of the scene provided by the satellite’s Advanced Very High Resolution Radiometer (AVHRR). The AVHRR has an Instantaneous Geometric Field of View (IGFOV) of 1.3 milliradians (0.074°), which provides a basic resolution of 1.1km directly below the satellite.

Because of the earth’s curvature and the greater slant distance, the AVHRR’s field-of-view increases considerably near the earth’s edge. At a point 1400km from the satellite’s ground track, the field-of-view has enlarged to an ellipse 2.3km by 3.9km. For a p.t., every third scan of the AVHRR is used to produce an along-track resolution (line-to-line) of approximately 3.3km. In the cross-track direction (left-to-right) some AVHRR picture elements are averaged over the scan to produce a roughly constant resolution across the picture. The a.p.t. resolution in the cross-track direction varies between 3.6 (below the satellite) to about 6km (at the extreme left and right sides).

**Higher Resolution - Higher Cost**

For i.r.p.t. it is possible to consider transmitting more picture elements, thus providing a greater resolution, so enabling the user to discern smaller features. Unfortunately, the amount of data to be transmitted increases with the square of the resolution; for example, a 2km resolution picture would require approximately 2.72 times more picture elements than the current 3.3km resolution scene.

Because the frequencies available for transmitting from the satellite are limited, this increased amount of data would necessitate that fewer spectral bands from the AVHRR could be transmitted at the same time.

As noted above, near the limb of the earth (left and right edges of the scan) the basic resolution of the AVHRR is limited, so that a significantly higher resolution could not actually be obtained over the entire area scanned. At least for the areas near the satellite’s ground track, higher or lower resolutions than the 2 or 3.3km values mentioned above are possible.

Data compression techniques can increase the effective data volume dramatically (from 3 to 10 times) but will add slightly to the complexity of the receive system, (and therefore its cost,) and could add some noise to the individual picture elements. This additional noise could affect numerical uses for the data, but not pictorial (visual) applications.

**Instrumentation**

In addition, NOAA are providing us with an opportunity to give preferences for instrumentation data for possible inclusion in the i.r.p.t. data stream!

**Question 5**
Which of the following instrument data would you prefer to have included, if they could be transmitted in the i.r.p.t. data stream?

<table>
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<th>SEM</th>
<th>LEFI</th>
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**Background Information**

In addition to the AVHRR imager data that will be provided in the i.r.p.t. downlink, data from all or some of the following instruments may be included in the data transmission:

**Advanced Microwave Sounding Unit (AMSU-A)**
The AMSU-A is a 15-channel, total power microwave radiometer that measures scene radiances to permit the calculation of the vertical temperature profile from the earth’s surface, to about 1 millibar pressure altitude.

**Microwave Humidity Sounder (MHS)**
The MHS is a 5-channel, total power microwave radiometer that measures scene radiances to permit, in conjunction with the AMSU-A data, calculation of atmospheric humidity profiles.

**High Resolution Infrared Sounder (HIRS/3)**
The HIRS/3 is a scanning instrument used to measure radiant energy emitted by the atmosphere in 19 infra-red spectrum channels. A 20th channel measures solar irradiance. The data acquired allows a profile of the earth’s atmosphere to be generated to an attitude of about 40km.

**Solar Backscatter Ultraviolet Radiometer (SBUV)**
The SBUV, a nadir viewing instrument, measures the spectral radiance of the ultraviolet radiation backscattered from the earth, and the direct solar spectral radiance at 12 discrete wavelength bands. This provides measurement, on a global scale, of total ozone concentrations and the vertical distribution of ozone in the earth’s atmosphere.

**Local Ozone Mapping System (TOMS)**
The TOMS, a scanning instrument, measures the earth albedo, i.e. the ratio of the ultraviolet radiation backscattered from the earth, to the direct solar spectral radiance, at six discrete wavelength bands. The instrument provides a two-dimensional map of the global total ozone distribution.

**Space Environment Monitor (SEM)**
The SEM is a multi-channel, charged particle spectrometer. It provides measurements indicative of the population of the earth’s radiation belts, and of particle precipitation phenomena resulting from solar activity.

**Frequencies**

NOAAs 9, 11 a.p.t. on 137.62MHz;
NOAAs 10, 12 on 137.50MHz;
METEOR 2-21 on 137.85MHz;
METEOR 3-5 or 3-6 on 137.30MHz and FENIGYN 1-3 monitors 137.06 & 137.90MHz.

**Summary**

NOAA point out that inclusion of these instruments’ data will affect the implementation of the imager data transmission. Information from users will assist in performing trade-off analyses to determine which instruments are included in the i.r.p.t. downlink, and to lessen the impact on the imager data transmission.

Send your ratings to:
Mary Hughes, APT/HRPT Coordinator,
NOAA/NESDIS/DCDS, E/SP21, NOAA Science Center, 5200 Auth Road, Room 806, Camp Springs, MD 20746, USA

The most economical method to use is probably an Aerogramme.

**Kepler Elements**

I will send a print-out of the latest elements upon receiving an s.a.e. and extra stamp. All known satellites plus MIR can be included, together with their transmission frequencies if operating. This data originates from NASA.

I also maintain a massive database containing Kepler elements for over 200 satellites, not all being operational. A disk copy of this file is available by sending a cheque/postal order for £3, plus a disk with a self-addressed, stamped envelope. The costs of obtaining this data are not minimal; this is offered as a service to the readership of this column. On occasions many years ago, I was desperate to obtain Kepler elements when trying to pinpoint comets heard in the various bands.
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**Long, Medium, and Short Waves**

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

**Medium Wave Reports**

An impressive list of m.w. transatlantic DX was compiled during January by Paul Logan in Lisnaskea, Co.Fermanagh. Most were logged with his trusty Silver 1560 portable and a 1.5m square loop but he also used a new Yeasu FRG-8800 receiver plus r.w. antenna. Reception was potentiometrically challenging.

Four stations in the USA and two in Canada were logged by Ted Barry on January 11. He used a large fixed loop (nw/se) ahead of his NRD-535 receiver. CVO in St.John's on 900 kHz was heard on January 15.

Good signals from CYG on 930 kHz were also heard on January 16 by Ron Damp in E.Worthing. They rated 33/33 at 0318. Later, John Hesse on Botton 15222 at 0213.

Frequent better conditions were noticed by Simon Hockenhull in E.Bristol. He rated 55/55 in Newry; BBC via Ascension Is 225 at 0950; BBC via Ascension Is 225 at 0950.

At 1520 by Phil Townsend in E.London; R.Portugal Int via Sines (Du 1030-1125, Sun only) 35333 at 1540 in Chester; BSKSA Riyadh Arabia 21.605 (ind to SE Asia 1000-1200) 44444 at 1130 by Roy Merrill in Lancashire.

**Short Wave Reports**

Effects of solar flares resulted in a number of sudden ionospheric disturbances (s.i.d.) in January. Most lasted only a short while, but a prolonged fade-out occurred on January 29.

Four broadcasters are still using the 25MHz (11m) band to reach Africa. Reception may be adequate in many areas, but there were no reports confirming this. At times they were heard in the UK via backscatter and other modes.

B: David Bissell, Dovercourt.
C: Clive Boutell, Dovercourt.
D: Ted Bardy, N.London.
E: John Eaton, Woking.
F: John Galliers, Islington.
G: Ron Galliers, Islington.
H: John Galliers, Islington.
I: Harry Richards in Brighton-on-Humber.
J: Bernard Curtis in Stalbridge.
K: Bernard Curtis in Stalbridge.
L: Ted Bardy, N.London.
M: B: Clive Boutell, Dovercourt.
N: Tim Bucknall, Congleton.
O: Harry Richards in Brighton-on-Humber.
P: John Eaton, Woking.
Q: John Eaton, Woking.
R: John Eaton, Woking.
S: Bernard Curtis in Stalbridge.
T: Bernard Curtis in Stalbridge.
U: Bernard Curtis in Stalbridge.
V: Bernard Curtis in Stalbridge.
W: Bernard Curtis in Stalbridge.
X: Bernard Curtis in Stalbridge.
Y: Bernard Curtis in Stalbridge.
Z: Bernard Curtis in Stalbridge.

**February 2000 Short Wave Programmes**

In the morning the BBC via Limassol 15.575 (Eng M.E. 1100-1130) was 35333 at 1540 in Chester; HCJB Quito 17.790 (Eng to E.Africa 1100-1130) 44444 at 1700 by John Eaton in Woodhall Spa.

Good reception from many areas was noticed in the 15.5MHz (19m) band. R.Australia via Carnavon on 14.555 (Eng, Chin, Cant to China, Komi 0900-1400) was a potent 44444 at 0925 in Kabul! Their signal to S.Africa on 15.640 (Eng to Africa 1100-1130) was 35333 at 1430 in Westleigh.

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### Short Wave Chart

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<tr>
<th>Freq (kHz)</th>
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**Note:** Entries marked * were broadcast during darkness. All other entries were broadcast during daylight or at dusk.
Hello, this quarter we are taking a look at Restricted Service Broadcasting Licences, known as RSLs. These are available from the Radiocommunications Agency for periods of up to 28 days, usually to cover special occasions or events. The maximum r.e.p. is 25W on v.h.f. or 1W on medium wave. The licence, copyright and phonographic performance fees can amount to almost £2000. Also transmission facilities, station premises and studio equipment will need to be obtained. There are a number of recognised companies that can hire you virtually everything you need, which of course can add substantially to the overheads. Having got the gear, you need at least one qualified and capable person to install the equipment and operate the station. Whatever kind of programming you choose, programme presentation has to be as good as, and hopefully different to, competing stations. Advertisers will only be attracted to a station that has a confident and reliable sound and a professional business attitude. A programme manager and a band of proficient presenters, together with a news and public relations team will probably be required. Plus a commercial production department to organise the making of advertisements to clients specifications. Last, but not least, a business manager to organise initial funding, to establish an advertising sales team and to be responsible for insurance, safety and security. Using voluntary staff many RSL stations are able to cover their costs and show a reasonable profit.

Shepway Sound

Last December saw me reviving my DJ talents as a presenter with a local RSL Shepway Sound, who broadcast from a studio in Folkestone’s town centre. This was a part of the local Christmas Festival to promote shopping and entertainment facilities during the run-up to Christmas. The station played a carefully planned wide range of pop music from the 50s to the present charts. The satellite-delivered Network News was provided on the hour followed by a local weather bulletin. Local traffic and travel, including reports from our own harbour were provided at quarter past and quarter to each hour. At the half-hour, live music from both the Folkestone Herald newspaper and the radio station’s own staff was a splendid example of successful cooperation in this field. Then followed an inshore waters forecast for the benefit of ferry passengers and our local fishing fleet.

The audio output from the studio was fed to the transmitter site by a u.h.f. radio link. The receiver for this, together with the rented 25W transmitter and diesel generator, was located in an old WWII gun emplacement high above the town on the South Downs. An omnidirectional vertically-mounted antenna at this vantage point produced a first class signal in the target area plus reasonable reception in most of south-east Kent. The reaction from both listeners and local business people has been most positive, many asking, “When are you coming back?”

Mystery and intrigue appear to surround two American radio ships the MV Sarah and the MV Fury, the forrmer was used by the pirate station RNI (Radio New York international). Broadcasts started on 23 July 1987 but within days the Federal Communications Commission had issued a Warning Citation and after this was ignored, raided the ship on July 28. Further transmissions were made on 14 October 1988, after the ships registration details had been changed.

Just three days later programmes finally stopped following a visit from the US Coast Guard in possession of an FCC Restraining Order. At this point it had been intended to register the ship with the Principality of Sealand, this self-made state is really an old wartime sea fort off Harwich in England, known as Roughts Tower. It is not recognised as a country and from 1 October 1987 became within the new extended territorial jurisdiction of the UK and therefore was not in a position to register international shipping.

The key figure behind Radio New York International was Allan Weiner who has been involved in the construction an offshore short wave station for an American religious organisation. He and Brother R. Stair of Overcomer Ministries at Waverboro, South Carolina, were equipping a former trawler the MV Fury with four short wave broadcasting transmitters. All the radio equipment that had been aboard the Sarah was transferred to the Fury, except for the top section of the radio mast, which was damaged while being moved. The Sarah, whose registered name is Lichfield, I was then sold to MGM Pictures for $20,000 for a spectacular role in a film with the working title Blown Away, that reflected the planned fate of the vessel. The superstructure was to have been reconstructed in timber with the big bang taking place on 21 August 1993. The scorched remains of the vessel were bought for $16,000 by a salvage company.

On 19 January 1994 US federal agents raided the MV Fury while anchored in the Wando River, near Charleston, South Carolina. This followed an investigation by two field operations officials from the enforcement division of the FCC who claimed they had detected radio signals coming from the ship. A warrant was issued by a district judge for the seizure of all radio equipment aboard.

Using a hired barge with a crane the US Marshall’s Service, the FCC and the Coast Guard took almost two days to remove the transmitters, reportedly valued at $500,000. The owners of the equipment have a month to file a claim or it will be forfeited to the US Government. The Assistant US Attorney handling the case said, “It was the governments intention to seize the property and not pursue legal charges against anyone.”

The MV Peace that broadcast the programmes The Voice of Peace to Israel, ceased broadcasting on 1 October 1993. The station’s owner Abie Nathan was unable to find sufficient financial backing for his shipboard peace museum. The former Dutch coaster, originally named Rolf and launched in 1940, was scuttled on 29 November 1993 some 15km off the coast of Israel. Previously Abie had referred to the possibility of him sinking or setting fire to the vessel as some sort of symbolic gesture. He had spent many years attempting to bridge the gap between the Israeli and Palestinian people and the PLO, and was once imprisoned for allegedly talking to the ‘enemy.’

Radio Caroline

Radio Caroline hopes to be on air over Easter to celebrate their 30th anniversary. They intend to use a medium wave RSL, however, with the usual 1W allocation they may have difficulty reaching any centre of population distant to the ships remote anchorage. The Department of Transport will not allow the vessel to move until it is completely seaworthy. At present the rudder will not operate! In exceptional circumstances, the Radiocommunications Agency are able to issue licences for higher power, or for the use of a larger antenna than normally specified.

Collectors Corner

Kevin Reeks is a collector of old broadcasting equipment, particularly from the 1960s and 70s, if you have something suitable Kevin can be contacted at 67 Lancaster Drive, Hyde, Greater Manchester SK12 6HP.

Jenny Knight of Horizon Sales are looking for early Radio Caroline recordings. Of particular interest are broadcasts from the MV Frederica or the MV Amigo from 1964 to 1968. Their address is 121 Monkton Street, Monkton, Ramsgate, Kent CT11 2AQ.

Bookworms will be pleased to know that Pop Went the Pirates by Keith Skues is available from the publishers Black Bear Press, King Hedges Road, Cambridge CB4 2PG. There are 594 pages of text, 230 illustrations and biographies of some 200 pirate radio personalities, including a priceless picture of myself! The soft-back version is £14.99 plus postage, in case-bound hardback it’s £24.99.

Sunday Morning Pirates


Darren Taplin of Brenchley in Kent using his Yaesu FR-7700 tells us he has received many of the above plus Pandora, Amsterdam, Citadel, Lowland, and Xenon Transmitting Company. Bob Marsh of Bexleyheath, also in Kent, uses a JRC NRD-525 to log lots of stations including Live Wire, Caroline, Waves, Merlin, Stella, FRS Holland and Radio Galaxy.

Finally David Williams of Southampton adds Reflex, Britain, Overflow and Transatlantic. I am happy to supply a complete list of pirate station activity based on our contributors’ logs. My address is at the head of this page, please include 2 first class stamps to cover materials and return postage.
SATELLITE TV SPECIALISTS

- Actuator 1 and Horizont-Horizontal Mounts
- Ultra Wide Build 2 and Low Mass 1 Dishes
- Fully Quality Motorized Systems and Components: Aluminum High Quality Dishes, up to 1.5m

Below is a list of our Mail Order price offers to readers of SHORTWAVE magazine, please call us if you do not see what you want.

- Horizons 1 and 2 Dishes
  - $205 each
  - $370 each
- Horizons 1 and 2 Dishes plus Equipment
  - $350 each
  - $550 each
- Horizons 1 and 2 Dishes plus Equipment and Antennas
  - $550 each
  - $800 each

SATELLITE TV SPECIALISTS

We are always ready to serve a large stock of high-quality dishes and receiving packages at the lowest possible prices, ideal for TV enthusiasts. Discounts on large purchases are available. All prices include VAT. Please add $7.50 p&p per order, and allow 14-21 days delivery. Items will be receipted with you within 28 days. Technical enquiries welcome.

GAREX ELECTRONICS

All major brands available, with the all-important service back-up from the Company who pioneered the UK scanner market.

"SCANMASTER" Scanners for TV Signal Amplifiers
- For Reflection (R) and Transmission (T) Mounts on IGR9007L100 or YAESSU FR95600: built-in software expands the scanner to over 700 memories with automatic tuning and logging of a vast store of scenes. Operates with a terminal or any compatible terminal mode.

$153.25

WIDEBAND SCANNER AERIALS

"REVCONE" premium quality British VHF/UHF Discoscope 16 element for all-round reception.

$46.95

- Includes N-type connector for high gain performance $39.95. New "REVCONE PLUS" with improved low frequency coverage $49.95. "REVCONE EXTRA" ready-to-go package: discoscope, 10cm coax-tiled PL259, mast clamps, BNC plug $49.95. "RADAC" nest of dipoles, imitated groundplanes, receives 25-1300MHz, with 10m co-ax, mastclamps, BNC plug £38.95. Or N-type connector for improved UHF coverage, S0239 connector £35.50. Or N-type connector for improved UHF coverage, S0239 connector £38.95. Or N-type connector for improved UHF coverage, S0239 connector £49.95.

"SCANMASTER" Scanner Aerial Unobtrusive vertical whip design, with small roll-up into a small bundle for ease of transport, hang from any convenient point, requires 12v DC at 30mA, N connectors £49.80. GA-4MS, as above, but PL/S0 connectors £35.95.

$28.95

WIDEBAND SCANNER AMPLIFIERS

GA-4 SERIES 20MHz 1.3GHz precision stripline construction for exceptional stability. 13dB gain at 1GHz with filter to reduce HF breakthrough problems.

4MHz Inline Masthead Amplifier COMPLETE with stripline DC supply splitter unit, requires 12v DC at 36mA, N connectors $49.90. GA-4MS, as above, but PL/SO connectors $49.90. "Local Loop" versions, with die-cast box enclosures for 230v AC power operation GA-4B (BNC sockets): $35.75. GA-4S (S0239): $35.75. GA-4N (N sockets): $39.95. Mains adaptors included. Test equipment only £42.95.

"SCANMASTER" Aerial Aeronautical inobtrusive vertical whip design, with small groundplanes, receives 25-1300MHz, with 10m co-ax, mastclamps, BNC plug $34.95. Mobile version on mag-mount or hatch-mount (stereo which) $29.95.

$45.95

SCANMASTER FILTER Aerial

A specially designed tunable filter to be fitted in line with the aerial feeder, reduces strong signal breakthrough over the range 85-1750MHz, BNC connectors with high Pass Filter to reduce MW/SW breakthrough $24.90. PORTABLE SCANMASTER AERIAL lightweight design using ribbon cable elements rolled into a small bundle for ease of transport, can be from any convenient point, ideal for travelling, with 4cm co-ax & BNC plug $15.95. WFP AIRBAND "AERAMP" 110 kHz to 137MHz, BNC plug, ready for use in die-cast box, BNC connectors requires 9-15V DC $28.95.

Write, phone or fax for lists. Regular lines, components and bargains for callers.

Short Wave Magazine, April 1994
SWM APRIL 94 TP

For Sale

AOR1500EX wide-range receiver a.m., f.m.(n), f.m.(w), and s.a., s.s. wire, NiCad, mains adapter, aerial, ear phone, cigar lighter, plug and manual, v.g.c., £200 o.n.o. Craig, London. Tel: 071-702 4569 evenings.

Audio filter ERA BP34 s.s.b. a.m., c.w., RTTY, excellent performance, boxed with lead, mint condition, £60. Send registered or collect. Tel: London 071-1000 1540 anytime.

Black Jaguar 200 MkII hand-held scanner, v.f.u., f.h.f. 26-30, 60-88, 115-178, 210-260, 410-520, 16 memories, delay, look-out, priority, charger with instructions and boxed, less than three years old, £80. Tel: Somerset (0935) 728888.

Black Jaguar M-3, frequencies 26-30, 60-88, 115-178, 210-260, 410-520 boxed with all accessories including three antennas, excellent condition, £95. Tel: Essex 0865 502240.

D-100 (De-luxa version) DXTV converter, £50. Lieb magnet v.h.f. to u.h.f. up-converter, £30. P&P extra. 2 Craven Grove, Irvine KA11 1RY. Tel: (0294) 221842.


Eddystone EC11 MkII with mains and battery power packs, mint condition. Tel: Wynyeed (0369) 744024.

ERa Micro-reader MkII 4.1, £90. LCD ERA display, £90. FAX1 decoder RTTY, FAX to printer, £100. FAXII decoder and computer system, RTTY, Navtex, FAX. Everything works, £50, all with operating instructions. A. Bell, Kent. Tel: (0369) 571113.

Icom IC-R7000 scanner, boxed with manual 25-2000MHz, v.g.c. buyer collects, £550. Tel: (0478) 723204.

Icom IC-R701, mint condition, boxed, antenna and cox available, cost, £1400, for sale at £800. Tel: Nr. Coventry (0686) 533274.

Icom R71E receiver with p.p.-amp and passband tuning, excellent condition, complete with box and instructions, £550. Tel: Cambridge (0223) 586513 after 6pm.

ICS FAX1 weather map decoder with all cables and manual, excellent condition, £185. Universal M400 decoder as new with manual, £310. G3KZU, Oxford. Tel: (0869) 630000.

JRC h.f. receiver NRD-53SD, £950, mint, boxed with manuals etc., Builtin CLF-243 BWC, CMF 76 ECSS and CFL 232 f.i.f. JRC S3703 headsets, £30. JRC scanner NVA 2151, £100, new AEA decoder PK232 MBX and PC program, £25. Doreen, Kent. Tel: (071-967) 1240.

JRC NRD-525G extra filters fitted, one year old, very little used, boxed and as new, £550, carrycase extra. Mr M. Wyn, 28 Court Place Gardens, Iffley, Oxford OX4 4EW. Tel: (0865) 770398.

JRC NRD-535 h.f. communications receiver, in excellent condition, boxed with all instructions and manual. NVA-319 external matching speaker with filters, also JRC communication headphones, open to offers. Steve, Northumberland (0570) 510855 after 6pm.

Kenwood R-1000 in new condition with manual and f.m. board (not fitted), £240. Codemaster CWR-610E RTTY/Sp.c decoder, good condition, £60. BBC-B computer in v.g.c., £75. Tel: Warrington (0450) 370897.

Lowen HF-225 receiver, long wire, balun active antenna, power supply and keypad, £375 o.n.o. Tel: Warwick (0296) 401399.

Realistic PRO-2021 scanner, 200 channels/programmable a.m. & f.m., v.h.f. 66-88, 106-138, 138-174MHz, u.h.f. 380-512MHz, £110. Tel: Somerset (0460) 240837.

Saisho twin speaker radio cassette, good condition, £10. Sanyo Walkman-type tape recorder with earphones, not boxed, good condition, £20, carrycase extra. Mr. Wyn, 28 Court Place Gardens, Iffley, Oxford. Tel: (0865) 770398.

Save £10001 NRD-335 with pbs and eccs worth, £1650; £586PC, v.g.c. etc., NRD software, CODES; and DX1 antenna. Ultimate computerised shortwave utility station, offers around, £170 excellent condition. Tel: Essex (0702) 475980 after 8pm.

Scannaster 2 scanner controller with connectors for AR3000, £125 or consider p/x with large IED hard drive for P/K, Oxford. Tel: (0782) 330613.

Silent Key Sale: Receivers: Lowe 0-30MHz, £150, Roberts Radio, £45, a.t.u., £15, BRT 400 RX, HRO, Drake & Watkins, and Johnson, Rycom (v.f.) APR-4Y. Cased Speakers For Edystone, AR88, Realistic. Decoders (various) Microrocoder, Microwave Modules. Marconi B628/CR100, 17 Set, Various Spy transmitter receivers and books. Tel: Lancs (0493) 554948.

Sony 2001D in perfect condition with all accessories including mains supply, boxed, batteries included, £130, carrycase extra. Mr M. Wyn, 28 Court Place Gardens, Iffley, Oxford OX4 4EW. Tel: (0865) 770398.

Sony ICF PR080 plus frequency converter, manual and soft case, £150. Wanted Signal R59 airband RX. Martin, Devon. Tel: (0837) 87438 evenings.

Sony ICF-SW7 short wave and f.m. stereo portable receiver, as new, mint condition, boxed, £225 o.n.o. Bearcat BC-2000 XLT hand-held scanner, excellent condition, £100. Tel: Herts (0592) 792543.

Sony SW77 superb, as new, used approx six hours only. Boxed with all accessories, bargain at, £275, John, Romford. Tel: (0708) 742662.

Sony SW77 worldband receiver with f.m. stereo, mint condition, as new, £225. Uniden Bearcat 2000XLT scanner, excellent condition, £100. Tel: Herts (0592) 792543.

Trio R2000 digital communications receiver, 150KHz to 30MHz all-mode. VC10 v.h.f. being fitted, 116-174MHz, excellent condition with manual but no box, £425 o.n.o. Tel: Plymouth (0572) 351063.

Yaesu FRG7700 receiver, v.g.c., boxed and FRA-7700 pre-amp, £275 o.n.o. Niboral BC-2000 XLT, new and includes case, manual and soft case, £250, any condition, £200. Tel: Ipswich (0414) 659405.

Yesus FRG7700 receiver, v.g.c., boxed and FRA-7700 pre-amp, £275 o.n.o. Niboral BC-2000 XLT, new and includes case, manual and soft case, £250, any condition, £200.Tel: Ipswich (0414) 659405.

Yupiteru MV7600 for PRO2005 or 2006, in mint condition. Tel: Sheffield (0742) 351005 anytime.

Wanted

Buy/copy of handbook for Panasonic RB48 com rec, all costs refunded. Tel: West Glamorgan (0792) 896902.

Edystone receivers models EB35, EB36, EB37, EC10, EC10 MkII, 960, 368, 385X, EY11, 885, 899, pillow speaker etc, £10. Each offered for scrap sets, please telephone anytime! Peter Lepino, Surrey. Tel: (0372) 121870, FAX: (0372) 454381.

Good condition, second-hand radio scanners, any make and I will arrange carriage. Tel: Isle of Man (0624) 625039 answerphone.

Lowe HF-15 with or without associated equipment, must be in good condition, also Amstrad laptop 386/466 with colour screen. Tel: Plymouth (0572) 872174 most times.

SSB unit for Grundig Satellit 6000. Tel: Mersedge (051-649 3031.

Top prices paid for your German gear of WWII vintage. Lookin for similar 2m, transmitters, accessories. Lissok, Rm. M. Poedsd 9. B-1160 Brussels, Belgium. Tel: 010-322 673711.


Please use an order form from a previous issue as there was no room to squeeze it in this month. You must still send the corner flash from this page. Ed.
LISTENING GUIDES

AIR BAND RADIO HANDBOOK 4th Edition David J. Smith Extensively revised & updated (October 1992) Air band radio listening enables you to listen-in on the conversations between aircraft and those on the ground who control them, and is an increasingly popular and fascinating hobby. A new chapter on military air band has been added. The author, an air traffic controller, explains more about this listening hobby. 130 pages £7.99

THE COMPLETE SHORT WAVE LISTENER'S HANDBOOK 3rd Edition Hank Bennet, Harry Helms & David Hardy This book is a comprehensive guide to the basics of short-wave listening. Everything you need to get started as an s.w.l. is explained in a clear and easily understood manner. Receivers, antennas, frequencies, propagation, G-codes, etc. are all covered. 296 pages £17.95

DIAL SEARCH 1992/94 George Wilcox The listener's check list and guide to European radio broadcasting. Covers m.w., l.w., v.h.f. & s.w., including two special fold-out maps. Also includes a full list of British stations, a select list of European stations, broadcasts in English and 'Making the Most of Your Portable'. 46 pages £4.25

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ASK Electronics .20
Aviation Hobby Centre .55, 74
Axdon Books .67
Chevet Books .61
Cirkit .47
CM Leisure .50
Colorom .76
Comar Electronics .76
Datong .47
DG Antill .76
DRS Trading .67
Ergymen .76
Flightdeck .59
Garex Electronics .67
Grosvener Software .55
Haydon Communications .14
Holdings .75
Hawes, CM .40
Icom .50
ICS Electronics .40
Interproducts .41
J & K Enterprises .55
J & P Electronics .50
Javitation .75
Jaycee .75
Jaylee Electronics .48
JW Staton .75
Klingenfuss .74
Lee Electronics .48
Link Electronics .59
Lowe Electronics .8, 9, 31, 67.
Lowe Electronics .50
Lowe Production .36
Martin Lynch .32,33
Mauritron .74
Momentum Communications .59
Nebraska Communications .Cover
Pervisell Ltd .61
PhotoAiva Press .55
Priory Software .75
Quantek Electronics .74
Radio Research .50
Rapid Results College .48
Simon Collings .50
Skyview Systems .53
SMC Ltd .13
Solid State Electronics .41
SRP Trading .34
Suredata .50
The Flying Shop .59
Timetrol .1
Trac Satellite Systems .75
Waters & Stanton .24,35
Welland Communications .53

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