TR-2400
Top of the range with Ultra wide frequency coverage and all mode reception including SSB. Easy to use direct keyboard control.
- 100kHz - 2060MHz
- 1000 memory channels (including 10 search banks)
- All mode reception (s.s.b., c.w., a.m., n.f.m., w.f.m.)
- Rotary or keypad frequency control
- User programmable step sizes (1kHz - 999kHz)
- Fast Scan Speed (20 Channels per Second)
- Priority Channel Monitoring
- Supplied with NiCads & Charger, d.c. Cigar Lead, Earpiece, Carry Strap

£369

TR-1200
A fully programmable scanning receiver, with wide coverage & a sensitive receiver. Supplied with a complete range of accessories ready to use.
- 500kHz-600MHz & 800MHz-1300MHz
- 1000 memory channels (including 10 search banks)
- Reception of a.m., f.m. & w.f.m. modes
- Rotary or keypad frequency control
- User programmable step sizes (5kHz - 999kHz)
- Fast Scan Speed (20 Channels per Second)
- Priority Channel Monitoring
- Supplied with NiCads & Charger, d.c. Cigar Lead, Earpiece, Carry Strap

£299

TR-980
A compact and pocket sized handheld offering continuous frequency coverage that's simple to programme and has a triple conversion sensitive receiver.
- 5 - 1300MHz
- 125 channel memory storage
- Reception of a.m., f.m. & w.f.m. modes
- Direct keyboard/rotary control
- Five independent search steps (5, 10, 12.5, 25, 30kHz)
- Delay/Hold Function
- Priority Channel Monitoring
- Supplied with NiCads & Charger, d.c. Cigar Lead, Earpiece, Carry Strap

Recommended!!

£249

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Good Listening
**SWM SERVICES**

**Subscriptions**

Subscriptions are available at £22 per annum to UK addresses, £25 in Europe and £27 overseas. Subscription copies are despatched by accelerated Surface Post outside Europe. Airmail rates for overseas subscriptions can be quoted on request. Joint subscriptions to both Short Wave Magazine and Practical Wireless are available at £39 (UK), £42 (Europe) and £45 (rest of world).

**Components for SWM Projects**

In general all components used in constructing SWM projects are available from a variety of component suppliers. Where special, or difficult to obtain, components are specified, a supplier will be quoted in the article. The printed circuit boards for SWM projects are available from the SWM PCB Service, Badger Boards, 87 Blackberry Lane, Four Oaks, Sutton Coldfield B74 4JF. Tel: 021-353 9326.

**Back Numbers and Binders**

Limited stocks of most issues of SWM for the past five years are available at £20.00 each including P&P to addresses at home and overseas (by surface mail).

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

Orders for back numbers, binders and items from our Book Service should be sent to: PW Publishing Ltd., FREEPOST, Post Sales Department, Arrowsmith Court, Station Approach, Broadstone BH18 8PW, with details of your credit card or a cheque or postal order payable to PW Publishing Ltd. Cheques with overseas orders must be drawn on a London Clearing Bank and in Sterling. Credit card orders (Access, Mastercard, Eurocard or Visa) are also welcome by telephone to Broadstone (0202) 659930. An answering machine will accept your order out of office hours and during busy periods in the office. You can also FAX your order, giving full details to Poole (0202) 659950.

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**editorial**

One of the most disturbing stories to come to our attention for some time concerns the idiots who have been transmitting bogus information to airline pilots as they are landing. Fortunately, no one has been killed - yet.

However, just as disturbing is the insistence of newspaper reporters to label these people as 'radio hams'. It seems that newspaper journalists believe that anyone who uses a transmitter for other than commercial reasons is a radio amateur. In the strict sense they are amateurs - after all an amateur is someone who "cultivates a study or art for the love of it, and not professionally". Mind you, I often wonder how some of the top athletes can be labelled as 'amateur' under this definition! The dictionary is even more interesting when you look up 'ham': "ham an actor who rants and overacts: an amateur, especially an amateur radio operator". This does cover anyone operating a transmitter other than for commercial gain.

What we need is either to educate newspaper journalist to only apply the description 'ham' or 'radio amateur' to those holding a current and legitimately obtained amateur callsign, or to find a better description for the 'amateur'. Being pragmatic I do not believe that the first course of action will work! That leaves the second course. I am, therefore, proposing to use the term "licensed radio amateur" to describe someone who has a legitimate amateur radio licence and callsign. This leaves the term "short wave listener" to describe anyone who 'listens' to radio transmissions for the sheer fun of it.

Enjoy this issue of your favourite magazine - may it inspire you to try 'listening' to something different.

Dick Ganderton G6VFH

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**letters**

IF YOU HAVE ANY POINTS OF VIEW THAT YOU WANT TO AIR PLEASE WRITE TO THE EDITOR. IF YOUR LETTER IS 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

We are getting used to new terminology in the field of wireless, sorry, radio. Capacitor for condenser, resistor for resistance, wound component for coil, choke, etc., are examples that come readily to mind.

Then there are antennas. This puzzles me, for from the Oxford dictionary we have the following definitions: AERIAL; antenna - like or other collecting wire in wireless telegraphy. ANTENA; sensory organ found in pairs on heads of insects and crustacea. Then from 'Wireless Constructors' Encyclopedia' edited by F. J. Camm, circa 1930, ANTENA; obsolete term for aerial, (the aerial section is far too long to quote).

Further, in 'Practical Wireless Encyclopedia' again edited by F. J. Camm, circa 1930, AERIAL; a wire or rod elevated from ground level and used to radiate or to pick up radiated signal.

The Editor's job is to fight the continuing battle against the erosion of standards in spelling, grammar, drawing style, etc. I must admit that I do not always succeed, but I do try! The written word is different to the spoken word - it is permanent, with no means of easy verification of the user's intended meaning. It must, therefore, be correct. Hence my decision not to bow to those who would have us believe that plastic is synonymous with plastics - most items made from plastics would be utterly useless if they were also plastic!

By the way, the definition given above is taken from Chambers Concise Dictionary. Chambers Concise Dictionary gives the following definition: "antenna n. a feeler or horn in insects, crustaceans, and miriapods: in wireless communication, a structure for sending out or receiving electric waves: an aerial: pl. antennae, antennas (radio)." Hence our use of antennas as the plural!

C. M. Lindarss Crewkerne Somerset

Well, here goes: "aerial" (Telecomm.) Original UK term for antenna but most technical publications refer to antenna. Reference is still made to aerial in domestic use, e.g. television aerial, car radio aerial."

Any professional publication, be it newspaper, book or magazine, needs to maintain a certain level of consistency of style. Short Wave Magazine is no different to any other magazine in this respect. The Editor's job is to fight the continuing battle against the erosion of standards in spelling, grammar, drawing style, etc. I must admit that I do not always succeed, but I do try!

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Ed.
Dear Sir

I recently bought an old Russian portable (Astrald 17) radio and wonder if any of your readers have a circuit diagram or know where I could obtain one from.

The radio did not work on a.m. but I was able to repair it by fitting a new oscillator transistor. Very unusually it has transistor holders and an AF127 (npn germanium) is a suitable replacement for the original Russian transistor.

Incidentally, it may be of interest to your readers to know that these old transistors are supplied with a fourth lead which is a shield. Often, over a period of time, the collector shorts to this shield making the set 'dead'. Cutting the shield lead makes the set spring into life!

To jog people's memories the original advert for the radio was featured in Practical Wireless, February 1974.

The set was sold by Shoptunities who, unfortunately, are no longer trading.

The set has good sensitivity and selectivity which, I suppose, is part due to the use of a three-gang tuning capacitor and therefore two r.f. circuits ahead of the oscillator/mixer stage.

The r.f. circuit boards for each waveband are mounted on a massive turret which is operated by a knob on the side of the set.

Staying with the topic of older transistorised portable radios I would like to make a point about sensitivity. I have about 20 old radios from the sixties and seventies of various makes (Hacker, Roberts, Grundig, Ferguson, Decca and Bush, etc.) and without exception they are more sensitive and quieter on m.w. and l.w.

It seems that the use of discrete components, air spaced tuning capacitors and longer ferrite rods contribute to this better sensitivity. Also the quiescent current of such sets is much lower (15-20mA) than modern sets. So, when people wax lyrical about how good modern receivers are in comparison with those of 20 years ago I can only assume that they have never had one of these older sets in operation.

If any reader has a view on this subject of sensitivity, or any old radio that they do not want, I would like to hear from them. Thanks for your help.

Chris Swayne
Bordon
Hants

We remember this set well and if memory serve me correctly it was also marketed by Dixon's in the early to mid '70s. Is there anyone who can assist with a circuit diagram for this receiver?

Dear Sir

I would first of all like to start off by saying I was most impressed with the new styling of SWM. It certainly was a pleasant shock when I flicked through it.

Getting onto the main point of this letter, I recently was in the market for a new base scanning antenna. So, the first thing I did was look at all the ads in your magazine for any suitable suppliers whom I thought might help. A few 'phone calls later revealed similar antennas with similar price tags so I decided to make a journey to one of these shops (in London, I might add).

Eventually I reached my destination, had a look around the displays and decided I needed some advice. I approached the counter and was eventually served (the shop was NOT busy). I started to speak when the person dealing with me (the manager) decided to chat to one of his colleagues about a flashly sports car parked outside. I had money in my pocket and was intending to spend it. I wasn't a happy person and decided to leave.

On my journey home, I was thinking to myself, do I portray the wrong image. I am a seventeen year old lad with a good job. I am not your average teenager who goes down the pub every night or hangs around the streets getting pneumonia. I'd much rather stay at home chasing DX.

In spite of poor service from one outlet it would seem that you did get the level of service that you or indeed any other prospective customer deserves, in the end. There is absolutely no need for the kind of situation that you describe. I hope it has not put you off the hobby. As you will see from some of the other letters this month, there are many dealers who provide an excellent service. We would be pleased to hear from anyone who would like to relate their own experiences, either good or bad.

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Dear Sir

I totally agree with J. J. Carr's comments about overload problems being annoying. I have to put up with another 'intermod hill', I am 4.5 miles due east of the BBCs Moorside Edge MW Station and I get every single conceivable combination of 908, 1089 and 1215kHz and harmonics thereof!

Readers may find it interesting to note that the ARRL Handbook For Radio Amateurs 1994 contains details of many filters in the form of look-up tables. Just select the frequency that you want and read off the required values of C and L.

J. G. Salisbury
Huddersfield

You are able to obtain the ARRL Handbook For Radio Amateurs 1994 from the SWM book service see page 87 for more useful books.

Dear Sir

Many thanks for a good magazine. I've been reading Short Wave Magazine for about seven years now and the recently changed format is very good. It was also nice to see you at the Hamfest at Wimborne on Sunday.

Whilst at the Hamfest I purchased a Trio 9R-B9D receiver which unfortunately did not come with any user or technical manuals. I would be very grateful if any of your readers could supply me with a photocopy or original of any manuals for the Trio. There are a few switches/features that I am unsure about, eg. the r.f. control has a click stop at the end of its travel, what does this do? Is there a remote socket at the back of the set. What is this for? I would be very grateful is anyone can help. I will, of course, reimburse any photocopying and postage etc. expenses.

I would also be interested to know of any radio software for a Dragon or Tandy TRS-80 computer to decode Morse, RTTY, etc.

Many thanks for your help.

Garry Rees
Caerphilly
Mid Glamorgan

Dear Sir

Having asked around the Editorial Offices there are two members of staff who once owned one of these stalwart receivers, (Kevin is one of them), however no one has kept any documentation so hopefully one of our readers will be able to help. If so please send any reply via the Editorial Offices.

Dear Sir

I can totally agree with J. J. Carr's comments about overload problems being annoying. I have to put up with another 'intermod hill', I am 4.5 miles due east of the BBCs Moorside Edge MW Station and I get every single conceivable combination of 908, 1089 and 1215kHz and harmonics thereof!

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Dear Sir

How about this! Repair job posted by me 0900 Monday, arrived back completed 0830 Wednesday! Awesome service by Nevada and Parcelforce. Not the first time Nevada have impressed me with their speed and efficiency.

Am I just unlucky? But why do most radio related items develop a fault shortly after I purchase them. Perhaps it is a judgement for once writing a letter critical of the RSGB! Fortunately no problems getting things repaired, just irritating and frustrating.

So, three cheers for Nevada!

J. Morely
Morecambe
Lancs
The AR8000 UK is the result of AOR's long term ambition to produce a new breed of radio receiver which combines full computer compatibility with advanced wide-band radio receiver technology. With the introduction of the new AR8000 UK, AOR have broken the mould of conventional radio receiver design.

At first glance the AR8000 UK in its static form may look no different to any modern hand-held scanning receiver, but the similarity ends there...just as soon as the receiver is switched on!! Initially you are greeted with the opening welcome message on the AR8000 UK multi-function liquid crystal display "WELCOME TO THE WORLD OF AR8000 RECEIVER", in a similar way to a sign on message displayed by your personal computer. This new experience immediately demonstrates to the new user and discerning radio listener that the AR8000 UK is no ordinary radio but THE NEW CONCEPT in radio design. The modern new cabinet design measures approx 152mm (H) x 69mm (W) x 40mm (D) excluding projections and weighing only 350g including NiCads (but not aerial).

The AR8000 UK is a highly sensitive handheld receiver boasting a very wide frequency coverage of 500 kHz to 1900 MHz without gaps in the range (actual acceptable frequency input from 100 kHz). Step size is programmable in multiples of 50Hz for smooth tuning. The all-mode reception provides AM, USB, LSB, CW, NFM and WFM. An independent ±2.0 kHz SSB filter is fitted as standard and the USB/LSB modes use true carrier re-insertion with correctly calibrated frequency read-out (not offset by 13 kHz). "A custom manufactured ferrite bar aerial is neatly internally installed at the top of the receiver's cabinet to enhance receive performance when listening in population centres to Medium Wave services or when commentary is provided at airshows and motor sport events.

The high visibility LCD is of a new dot matrix format comprising of four lines of display so many new facilities may be provided and displayed at the same time, these include a signal strength bar meter and a band-scope showing band occupancy. Two VFO frequencies may be displayed on the LCD simultaneously, which provides a stand-by frequency available for quick transfer. When frequencies are entered, ALPHANUMERIC comments may be stored along with frequency, mode & attenuator status simplifying the job or recalling and identifying memory channels. Password protection, computer control, data clone between sets and almost every feature you could ever wish for is provided.

Supplied with NiCads, 240V ac charger, DC lead, hand strap, belt hook & screws, 16cm semi-flexible aerial, comprehensive operating manual and quick reference guide.

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QSL Update

Following last month's d.i.y. QSL card feature I've received a letter from Bob Taylor of Stourbridge. He points out that the International Short Wave League (ISWL) offer a QSL forwarding service specially tailored to suit the needs of the listener. Not only is the joining fee of £18.00 plus £6.00 QSL supplement cheaper than the RSGB, but the price includes all postal charges. For more information you can contact the ISWL at 10 Clyde Crescent, Wharton, Winsford, Cheshire CW7 3LA.

As we've talked about QSL cards the last couple of months, I thought I'd include two of my favourite cards. I enjoy the history of radio and so the card from Adventist World Radio celebrating 70 years on the air showing the first Adventist radio station was of special interest. Also the acknowledgement from Voice of Turkey included an embroidered card including a traditional piece of Turkish work, quite what all the stitching means I'm not sure, but the colours look good!

Standard Frequency and Time Signals

Have you ever wondered what these signals are for and where to find them? If so, the latest booklet release from the ISWL will be of interest. The book is entitled Standard Frequency and Time Signal Stations of the World and covers just that.

In addition to providing a valuable time and frequency reference these stations are extremely useful in propagation work. By carefully listening for and identifying these transmissions you can quite quickly build a picture of the prevailing propagation conditions. To do this properly you ought to keep a log of these stations with a record of the signal strength and quality. By regularly monitoring a few of these stations you will find you can spot openings very quickly and then look out for those interesting DX stations.

The ISWL book covers the subject very well with a good introduction to the various time systems and modulation methods. This is followed by two frequency lists arranged in frequency and callsign mode respectively.

The final section comprises full details of each station listed in country order. The detail supplied is very comprehensive and includes full QSL details as well as the transmission timings. As usual with ISWL publications, the price is very reasonable at £2.50 or four IRCs. They are also prepared to accept stamps to the value of £2.50 as this is cheaper than a postal order. For more details or to order your copy contact the ISWL at 10 Clyde Crescent, Wharton, Winsford, Cheshire CW7 3LA.

Novice Courses

The month of September is the traditional time for enrolling in evening classes. I would be very interested in hearing from those who have signed up for a radio or electronics course, perhaps studying for the Novice Licence. It would be interesting to hear how you're progressing and whether or not you have any questions you think you should be studied in Junior Listener.

Frequency Coverage

Following my August feature Navigating the Ether, Graham O'Sullivan of Cork asks if I got my facts right with the description of the 3 to 180kHz band. His confusion arises from the fact that he can find no receiver advertised that tunes as low as 3kHz. Well, Graham is quite right to challenge the article, but it is in fact correct. He is right that there are virtually no receivers on the amateur market that will tune down to 3kHz. Most communication receivers start at around 100kHz, aligning with the start of signals that are relatively easy to resolve.

Graham also asks if it's worth considering using a scanner for h.f. reception. Whilst the inclusion of h.f. reception is a bonus, the performance rarely, if ever, matches that obtainable from a dedicated h.f. receiver. This is because the design requirements of a scanner and h.f. receiver are very different.

He also asks a couple of other questions that may well interest other readers. The first concerns the s.s.b. transmission that's to be found at around 6.605MHz. This is a Volmet transmission originating from Canada. These signals provide local weather details for airports and are used by aircraft to adjust their instruments and plan landings. On a wider note Graham asks if there's a simple b.f.o. designs that I could publish and are 1kHz tuning steps OK of s.s.b. reception? If you'd like to build your own b.f.o. I would suggest you contact the SWM offices and ask for a copy of the b.f.o. design published in Practical Wireless in September 1992. This simple design should be suitable for most short wave receivers as it formed part of the popular 'Getting Started the Practical Way' series. I think a copy of the article should set you back something like £1.50 including postage and packing.

With regard to using a receiver with 1kHz tuning steps for s.s.b., this is OK providing the b.f.o. is adjustable. If you're working with a receiver that doesn't have an adjustable b.f.o. then 100Hz steps are about the minimum for successful s.s.b. reception.

Apologies

My apologies for those who sent for the Morse abbreviations, your requests arrived right in the middle of the school holidays - not an occasion when I had a lot of time on my hands! Hopefully, I have cleared the backlog by the time you read this. If there's anything else like the Morse abbreviations or Q-codes you'd like me to mention, drop me a line and I'll see what I can do.
New to the bands, or have you been there since Marconi?

Whatever the answer, you can trust Lowe to provide you with the finest choice of equipment available today. Dozens of major manufacturers from all over the world use Lowe Electronics to distribute their products in the UK. Why? Because they know that with almost thirty years in the business we know our market inside out and we have the sales staff with the knowledge and enthusiasm to sell their products and that we have a solid reliable service department with wide experience. Quite simply, we are the best at what we do. They have exactly the same choice of dealers in the UK as you have - after all, most of them are also featured in this magazine!

Some of them even offer lower prices than we do, hardly surprising when we know few of them have a full-time engineer on the premises, or demonstration stock on the shelf for you to try before you buy and even a new, boxed unit for you to take away when you have made your choice. Few of them will be able to answer all of your questions before you buy and therefore will be unable to help you once you’ve got your new receiver or accessory in use and can’t make it work or have difficulty with some of the instructions. Before you make your next purchase, especially by mail order, have a look closely at the dealer and ask a few questions... How long has the company been in business? Do they have full time, qualified and experienced engineers on the premises backed by modern, calibrated test equipment AND a full range of factory spares on the shelf. Even if the answer is yes, ask to see it! That often produces a excuse! Will they stock all the accessories you may need to enhance your equipment to help you get the best out of it?

Many, many large, internationally famous companies choose Lowe. They already know the answer to these questions and now you do too. If we can be trusted by some of the biggest names in the business, you know that you can trust us too. After all, we have a bigger reputation than most to lose - that’s why we try harder for you!

MODEMASTER

Modemaster2 has fast become the standard software decoding package for the shortwave listener. Covering FAX, RTTY, Morse, NAVTEX and FEC, this will allow you to decode the majority of signals found on the shortwave bands today. With MODEMASTER 2 you have access to:

- Current and Forecast Weather Facsimile Maps.
- Weather Forecasts.
- Cloud Cover Pictures.
- NAVTEX and Marine Navigation Warning Broadcasts.
- News Broadcasts and Press Photographs.
- Amateur Radio Transmissions

New features in Version 2 include a new map driven front end and ability to apply false colour to fax pictures - great value at the new lower price - it's now just

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Matlock
Derbyshire DE4 5LE
Tel: 0629 580800 Fax: 0629 580020

Short Wave Magazine, October 1994
Weatherlink Version 3.0 is here!

Davis Instruments have recently released an upgrade to the weatherlink software which packs most of the features customers have been clamouring for into an exciting new version. Version 3.0 offers better bulletins, improved user interface and more plot options. More than forty other program changes to add features and streamline performance. Upgrades are available for owners of the previous version of Weatherlink for £39.95 plus £4.70 carr.

Remote Display Unit

The remote display unit uses the ‘body’ of a Weather Wizard III and allows the user to connect an extra display station to any of the Davis Instruments weather stations. You may connect up to 20 remote display units to a single master weather station. The Remote Display Unit repeats all the weather information from the ‘master’ station except humidity and barometric pressure.

Address Correction

In the review of the Dressler ARA 2000 last month the incorrect address for South Essex Communications Ltd. was given. The correct address is as follows: 292 Francis Road Leyton, London E10 6NQ.

RSGB Elect New President

It has just been announced that the 1995 RSGB president has been elected at the Council meeting of 23 July 1994. Clive Trotman GW4YKL replaces Ian Stuart GM4AUP as president. His term of office commences 1 January 1995. In the meantime he continues to represent Zone E - Wales.

Medium Wave Challenge - October 1994

A receiving contest is to be held between 0000 on 29 October and 2359 on 30 October. This is concurrent with the CQ Worldwide Challenge. The event should prove to be very interesting indeed. The Rules are as following:

- There are no time restrictions. A SWL may listen any time during the 48 hours.
- Only one station from each DXCC country can be logged on each of them main amateur bands. (No WARC bands).
- Points will be as follows: Countries in SWLs own continent score 1 point on each band. Countries outside SWLs own continent score 5 points on each band.

Final score is the total points on all bands multiplied by their total DXCC countries on all bands.

Entries must show:
- Date.
- Time (GMT).
- Callsign of station heard
- (the callsign of the station being worked is not required).
- RS of station heard at SWLs QTH
- (the minimum report will be 4x4).
- A multiplier check sheet must be included with entries.
- Computer generated logs will be accepted.
- Logs should be sent to: Bob Treacher BR3S25S, 93 Elibank Road, Eitham, London SE9 1QJ England.
- Logs must be postmarked no later than 28 November.
- Certificates will be awarded provided 20 logs are received.
- Copy of results will be sent to those enclosing either 2 IRCs or a One Dollar bill.
African Latest

Peter Shore takes a quick spin around the African radio dial for an update on developments in the region.

Deutsche Welle, which lost the use of its relay station in Rwanda earlier this year, has hired time on Channel Africa's Meyerton transmitting station. It operates from South Africa at 0200 to 0700 on 6.015, 0900 on 9.565, at 1000 on 15.41, at 1100 on 17.80, at 1200 on 21.695, at 1400 on 15.41 and at 1500 through until 2200 on 7.185MHz.

And the Voice of America has also started to hire time on the South African broadcaster's transmitters. English is carried at 1600 at weekends on 3.97MHz, and Monday to Friday at 1800 on 4.985MHz. Both transmissions are an hour long.

The Voice of Ethiopia has closed its Amharic language service, according to a number of reports. Amharic is the language spoken by a majority of people in Ethiopia. As a result, timings of some of the station's programmes have changed. Somali is on the air at 1300, Afar at 1400, Arabic at 1500, English at 1600 and French at 1700. All programmes are transmitted on 9.56 and 7.165MHz.

FEBA, the Far East Broadcasting Association, based in the Seychelles capital, Mahe, broadcasts in English to the Middle East and Africa at 0500 on Fridays on 17.75, and to Asia at 1500 Monday to Saturday on 11.87 and 9.817MHz.

Radio St. Helena Day

On Friday 14 October 1994 the tiny island of St. Helena will hold its 4th Annual Radio St. Helena Day.

The island which is Britain's most remote colony whose most celebrated resident was Napoleon Bonaparte, is just 8.5km long and 10.5km wide and situated some 1131km north west of the African coast in the South Atlantic. The island has no airstrip and is supplied every 6 weeks by a Royal Mail ship which loads canned tuna, the island's main export.

On 14 October, the 12 licensed amateurs, out of a population of 5000, will be on the air starting at 1900UTC, using the following frequencies:

21.250 to 21.300MHz
14.200 to 14.250MHz
7.070 to 7.090MHz c.w.

From 2000 Radio St. Helena, which normally only broadcasts to the island on 1548kHz, will with the help of Cable and Wireless transmit on 11.092MHz until 2300.

Competitions will be held with a write-in quiz about the island and a prize draw for anyone who sends a compact disc to the station to supplement their record library.

The Station details are:

Radio St. Helena, The Castle, Jamestown, St. Helena, South Atlantic Ocean. Tel: (from the UK) 010 290 4654.
AVON
Broadway International RC: Tuesdays, 8pm. The Fighting Cocks Public House, Henwick. All visitors are welcome. The club has a good reputation and many radio enthusiasts, whether they be hams, s.w.l.s or CBers can get together and have a good natter and do things that you do in radio clubs. PO Box 26, Bristol BS9 1LG.

GREAT LONDON
Crystal Palace & DRC: 3rd Saturdays, 7.30pm. All Saints Church, Morpeth Road, Belsfield Hill, London SE19 1OB. Before radio by G Kondal (G3JUW), with QSL card. (0181) 592 6992 or Bob on (0903) 552 7101.

Wimbledons & DARC: 2nd and last Fridays, St. Andrews Church, Herbert Road, SV41. September 30 - Siberian adventure by P Hughes G8XBC. (0114-910 2180).

HAMPSHIRE
Horndean & DARC: 1st Thursdays, 7.30pm. Horndean Community Centre, Horndean, near Waterlooville, PO Box 28, Bristol BS9 1GL.

KENT
Bromley & DARC: 3rd Tuesdays, 7.30pm. The Victory Club, Jactland Gardens, Gravesend, Kent. October 16 - ‘Radio is the easy way to get your QSL in the mail.’ (0224) 465939.

LONDON
Harrow ARC: 2nd Thursdays, 7.30pm. The Red Lion, Southwick, Trowbridge. 01225 361935

MEDFORD

MIDLANDS
Birmingham & DARC: 1st Thursdays, 7.30pm. St Andrew’s Church, Holy Trinity, Bordesley Green, Birmingham. October 5 - Monthly club meeting.

NOFOLK
Norfolk ARC: Wednesdays, 7.30pm. Formal and informal meetings at The Norman Centre, Broadford Road, Norwich. The meetings are usually held in the evening. The Norman Centre is adjacent to the Broadford Centre and is well served by public transport.

NOTTINGHAMSHIRE
Manfield ARC: 2nd Mondays, 7.30pm. The Polished Catholic Club, off Wollaton Lane, Wollaton Park, Nottingham. October 20 - Report by Ross McPhee GOQJX. (0602) 380 4680

OXFORD
Oxford & DRS: 2nd and 4th Wednesdays, 7.45pm. The Oxford North Worcestershire Group Hall, Terry Hadrian GDZJ. (0903) 552 6539.

SHROPSHIRE

SOMERSET
Yevro ARC: Thursdays, 7.30pm. The Red Cross Centre, 72 Grove Avenue, Yeovil. September 28 - Visit to local radio station. October 4 - Club meeting.

SUFFOLK

TAKELEY
Trowbridge & DARC: 3rd Wednesday, 7.30pm. Queen’s Mother House, Trowbridge. October 5 - "Best way to a present ticket to the club when setting off. The Editorial staff of your local paper would be highly impressed."

WILTSHIRE
Salisbury ARC: Wednesdays, 7.30pm. Formal and informal meetings at The Norman Centre, Broadford Road, Norwich. The meetings are usually held in the evening. The Norman Centre is adjacent to the Broadford Centre and is well served by public transport.

Yorkshire
Grassroots

rallies

[September 29-30] The 30th Harrow Amarnath Rally is being held at the Northwood Hotel Complex. The rally opens at 10.00am on Saturday and 10.30am for Sunday. There will be many exhibitors from the various sectors of electronics, covering amateur radio, computers, etc. Inquiries are welcomed for more details. Further information from Mike G7MN on (0493) 476473.

[September 29] The Three Counties Radio Rally is being held at the Three Counties Show Ground, Malvern, Worcestershire. There will be a large section of trade stands, usually Bring and Buy and possibly some lectures on amateur radio topics. There will also be on site catering facilities and other events at the show ground on the 1st day. Further details from GP(GO)(0600) 717181.

October 2: Blackwood and DARC Rally will be held at the Community Centre, Ddke, near Blackwood, South. Doors open at 10.30am. There will be traders, raffles, a Bring and Buy, etc for 1pm or 3pm. Further details from Norman G7VANW on (0495) 227550.

October 4: The Great Lamingham Amateur Radio & Electronics Rally will be held in the Community Centre, Ingleby, near Braithwaite Road, Barnsley. Doors open at 11.30am, usual Bring and Buy and probably some lectures on amateur radio topics. There will also be on site catering facilities and other events at the show ground on the 1st day. Further details from Mike G7MN on (0493) 476473.

[October 7] The All Ireland International Radio & Electronics Exhibition will take place at the GPO on Thursday, Friday & Saturday doors open 9.30am to 8pm. There will be many exhibitors from the various sectors of electronics, covering amateur radio, computers, etc. Inquiries are welcomed for more details. Further information from Mike G7MN on (0493) 476473.

[October 9] The CompuBacon Amateur Radio & Computer Rally will be held at the Metropole Hotel Complex. The rally opens at 10.00am on Saturday and 10.30am for Sunday. There will be many exhibitors from the various sectors of electronics, covering amateur radio, computers, etc. Inquiries are welcomed for more details. Further information from Mike G7MN on (0493) 476473.

October 9: The Kildermoster & District ARC Rally is being held on Tuesday at Stean Primary School, Mullion, near Hayle. Doors open at 11.00am, usual Bring and Buy and probably some lectures on amateur radio topics. There will also be on site catering facilities and other events at the show ground on the 1st day. Further details from Mike G7MN on (0493) 476473.

[October 12] The All Micro Show & Radio Rally is being held at the Ringway Hall, Staffordshire. Reporting will be on the Air from 'The Little Radio Shop' 2nd Floor, Stafford Shopping Precinct. The rally opens at 10.00am, usual Bring and Buy and probably some lectures on amateur radio topics. There will also be on site catering facilities and other events at the show ground on the 1st day. Further details from Mike G7MN on (0493) 476473.

October 12: The Barnsley & District Amateur Radio Club will be hosting its 4th Amateur Radio Rally at the Mappleton Community Centre, in Hallamshire Town, less than two miles from Junction 39. This is a new venue, all on one level with excellent disabled facilities, a licensed bar/restaurant and a secure car park. The rally will have all the usual amateur radio and computer dealers with radios, accessories, specialists groups and a Bring and Buy. For further details contact Normies G0WJE on (0114) 422 9197 or Peter GO7GIR on (0114) 610 9189 evenings.

[November 5 & 6] The Eighth North Wales Radio & Electronics Rally will be held at the Bridgend Recreation Centre. Doors open at 11.30am, usual Bring and Buy and probably some lectures on amateur radio topics. There will also be on site catering facilities and other events at the show ground on the 1st day. Further details from GP(GO)(0600) 717181.

October 2: The Great Lumley Amateur Radio & Electronics Rally will be held at the Metropole Hotel Complex. The rally opens at 10.00am on Saturday and 10.30am for Sunday. There will be many exhibitors from the various sectors of electronics, covering amateur radio, computers, etc. Inquiries are welcomed for more details. Further information from Mike G7MN on (0493) 476473.

October 5: The Great Lumley Amateur Radio & Electronics Rally will be held at the Metropole Hotel Complex. The rally opens at 10.00am on Saturday and 10.30am for Sunday. There will be many exhibitors from the various sectors of electronics, covering amateur radio, computers, etc. Inquiries are welcomed for more details. Further information from Mike G7MN on (0493) 476473.

September 17: The Great Lumley Amateur Radio & Electronics Rally will be held at the Metropole Hotel Complex. The rally opens at 10.00am on Saturday and 10.30am for Sunday. There will be many exhibitors from the various sectors of electronics, covering amateur radio, computers, etc. Inquiries are welcomed for more details. Further information from Mike G7MN on (0493) 476473.

October 5: The Specials Radio & Electronics Rally will be held at the Metrodome Complex. Further information from Mike G7MN on (0493) 476473.
new products

Miniature Packet Radio Modem for Amateur and Professional Applications

Thorcom Systems Limited of Worcester have recently introduced a new miniature packet radio modem, or TNC, to their extensive range of radio data communications products, which are designed, manufactured and supported in the UK.

Called RLC320, the tiny (63mm long, 44mm wide and 10mm high) f.f.s.k. modem can be used in a range of portable applications and is also small enough to be installed inside a number of mobile transceivers.

The RLC320 offers data transmission at 1200, 2400 and 4800 bits per second using f.f.s.k. (a type of audio shift keying) and has two serial ports (one RS232 and one at TTL/CMOS levels). The RLC320 is equipped with a modem disconnect header allowing use with other modulators, and programmable input/output lines to allow flexibility in implementing mobile data systems.

The standard firmware supplied in the modem offers AX.25 Level II, Version 2.0, KISS mode and a Text transmission protocol. Thorcom Systems offer a programming service which allows alternative firmware to be produced for its modems. Alternative firmware allows customisation for applications such as 'protocol-less' RS232 data links, Automatic Vehicle Location Systems, telemetry links, data transmission over trunked radio systems, etc.

Further information available from:

Amateur: Siskin Electronics, 2 South Street, Hythe, Southampton SO4 6EB.
Tel: (0703) 207155, Fax: (0703) 847754.
Professional/Commercial: Thorcom Systems Limited, Unit 4, 96b Blackpole Trading Estate West, Worcester WR3 8TJ.
Tel: (0905) 756700, Fax: (0905) 759777.

Automatic Distortion Meter With Level Measurement Facilities

A new two-channel automatic distortion meter incorporating level-measurement capabilities is now available from Thurlby Thander Instruments.

The new LDM178 incorporates a high-pass filter with three spot frequencies: 315Hz, 1kHz and one user-selectable optional frequency. The automatic level control is ideal for measuring distortion in tape recorders, while the use of a high-pass filter system allows accurate measurement of distortion in waveforms containing wow and flutter.

In addition to the 315Hz and 1kHz spot frequencies, the optional third frequency can be selected from 333, 400Hz or 3kHz. A built-in level meter provides simultaneous readings of output level alongside the distortion measurements.

The LDM178 also incorporates a filter terminal for monitoring harmonic components.

Thurlby Thander Instruments Ltd., 2 Glebe Road, Huntingdon, Cambs PE18 7DX.

Low Cost Quadrature Modulator

The RF2412 is a low-cost, monolithic integrated transmitter universal modulation i.e., capable of generating modulated a.m., f.m., p.m. or compound carriers in the v.h.f./u.h.f. frequency range. Modulating i.f. at around 50 to 150MHz, it offers both excellent amplitude balance and phase accuracy and features i.f. output from 200MHz to 1GHz.

The device is available from Anglia Microwaves Ltd. and has applications in digital, analogue and spread-spectrum communications systems, portable battery powered equipment and u.h.f. digital and analogue transmitters. The i.c. contains all the necessary to implement the modulation function, including differential amplifiers for base band inputs, a 90° hybrid phase splitter, limiting local oscillator amplifiers, two balanced mixers, a combining differential amplifier, a second balanced mixer and an i.f. amplifier capable of driving a 50Ω load.

With low power consumption and adjustment free operation, the RF2412 requires a single 5V power supply has a -40°C to +85°C operating temperature range. For further details contact: Anglia Microwaves Ltd., Radford Business Centre, Radford Way, Billericay, Essex CM12 0RZ, Tel: (0277) 630000.
This month sees the first of a semi-regular feature in which I will try to explain some of the issues and dilemmas which face newcomers to the hobby. In the Editorial Offices we often receive letters and queries asking for guidance and help with setting up and improving receiving station performance. In the forthcoming months I will cover the choice and use of various accessories, books and listening guides.

It is now well over 20 years since I began my first foray into listening. My first short wave receiver was a Fidelity portable used with it’s built-in telescopic whip antenna. I recall that I was able to receive many broadcast stations but it took many hours of patient dial tweaking to be able to identify which they were and therefore begin collecting those much prized QSL cards. If I recall correctly the first was Radio Netherlands followed by Radio Canada International. It wasn’t long before I realised that the reception of many more stations would require a better set-up. I searched around and discovered various publications which all seemed to suggest roughly the same thing, namely the most important component in the listening station is a good antenna. Well the situation today hasn’t changed - there is no substitute for having as much wire in the sky as possible. To achieve the best possible results from a random length wire antenna it must be matched to the receiver input terminal impedance normally 50Ω this is achieved by using an a.t.u. The way in which the impedance, is matched is by the use of an L.C. network which alters the electrical length of the antenna to create an odd number of quarter wavelengths at the frequency which you are tuning. This in turn presents the receiver with a low impedance. In other words, the antenna is tuned to be resonant at the frequency being listened to. This has the effect of increasing the signal output at that frequency and reducing out of band signals - a very useful thing indeed.

**New ATU**

A very compact and versatile a.t.u. landed on my desk last week - the new Global AT-2000 which is available from Waters and Stanton, 22 Main Road, Hockley, Essex SS5 4QS. Tel: (0702) 206835. I have been using it since it arrived, both with my EC10 and HF-150 and the results are as expected with the longest length of wire I can manage - about 15m. The unit is manufactured in Japan and is of a high quality finish. It will not look out of place in any shack. Connections for both antenna and receiver are either a pair of sprung single wire terminals or SO259 sockets, which are internally paralleled. There is also a bypass switch to enable comparison of performance with and without the unit in circuit. It is quite small - about 160x140x 60mm including knobs and connectors. Price is £99.95.

So now you’ve got an antenna that performs as well as possible and you’re able to pick up some stations that you might not have done before, the challenge of hunting more elusive signal comes to the fore. But how do you know what to listen to, where to look and what you are hearing?

Morse tutor, which arrived on my desk in the same parcel as the a.t.u. just mentioned. When connected to the audio output of your receiver will decode and display the above mentioned modes. This is by no means a new unit, in fact we reviewed it back in 1989, it is still available and it is a very useful unit - a most popular solution to data mode decoding.

The Microreader has been manufactured for the last six months by the reborn ERA, now run by Alan John Ryan, one of the ex-employees prior to the liquidation of the original company. If you have wondered how to tackle reception of RTTY, etc., or learn Morse, then you could do a lot worse than invest in the Microreader II, at £189.95 from Waters and Stanton Electronics, 22 Main Road, Hockley, Essex SS5 4QS.

**Microreader II**

There are many books which will give you guidance and I will cover some of these in future issues.

**ERA Microreader**

Poles apart from antennas, tuning units and books is the ERA Microreader MKII - a self-contained decoding unit for c.w., RTTY and Amtor combined with a Morse tutor, which arrived on my desk in the same parcel as the a.t.u. just mentioned. When connected to the audio output of your receiver will decode and display the above mentioned modes. This is by no means a new unit, in fact we reviewed it back in 1989, it is still available and it is a very useful unit - a most popular solution to data mode decoding.

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COMMUNICATIONS

14

Short Wave Magazine, October 1994
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Nicely styled but superb on performance.
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£49.95 Call us for our best price

AOR AR3030 (J)
The ultimate in desk top short wave receivers.
The review in the July Shortwave Magazine said it all!
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Sangean ATS-803A (K)
Our best selling low priced portable s.w. receiver. All modes inc. s.s.b.
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Drake R-8E (L)
The famous short wave receiver from the USA. A superb performer and the only model to include all filters fitted as standard.
£297.95 £979.95 with FREE Delivery and FREE Headphones

NEW Howes CTU-8 (M)
Ready Built Ready To Go! Antenna Tuner.
0.5 - 30MHz. Improve your short wave receiver with this little beauty.
£49.95 with FREE Delivery

MBR-8 (N)
This low priced short wave receiver is a must for the beginner. So full of facilities that we don’t have space to list them all here.
£59.95 £119.95 with FREE Delivery

Yaesu FRG-100 (O)
Superb HF Receiver comparable to others of a much higher price.
£59.95 This Month £449 Inc. a FREE PSU

ANT-60
The ideal portable companion. A pull out long wire antenna (7m long) suitable for any portable s.w. receiver.
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SAB-9 (P)
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Martin Lynch and his team at The Amateur Radio Exchange Centre in Ealing are increasingly successful in the hobby radio market, in spite of the lingering effects of the economic recession and the intense competition from other retailers.

Our substantial marketing activities, positive customer relations policy, massive purchasing power, and dependable services are seen to be in marked contrast to the old style of 'take it or leave it' attitude that so retarded the amateur radio market for a generation! Here in London, we expect a new colleague to understand this philosophy and to have the proven experience and personal capability to reflect it in his or her daily business activities!

The appointment is open to anyone who can convince us all that they will prove to be a major asset to the team on both amateur radio AND commercial sales. Thus, you will be from a similar environment, perhaps even known to one of us, and will need to 'prove your case' in order to be shortlisted.

Please write or call Martin Lynch personally and in total confidence.

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Short Wave Magazine, October 1994


In the third and final part of our series on understanding receiver specifications, Peter Buchan turns his attention to the ability of a receiver to handle a wanted signal in the presence of strong, and very strong adjacent signals.

**Fig. 1a**

Blockading Range 128dB

- IMD Dynamic Range 93dB

| A | Noise floor also Minimum Discernable Signal (MDS) -133dBm.
| B | Receiver sensitivity. 0.15µV for 10dB S+N/N ratio.
| C | -73dBm, 50µV p.d. across 50ohm receiver input. i.e. S9
| D | -40 dBm. Point where intermodulation distortion commences. (IMD) about S9+33dB
| E | -5dBm. Point where a moderate signal, S7 say, is reduced by 1dB on output meter.

**Fig. 1b**

**133dBm, followed by the sensitivity at -123dBm;**

(0.15µV for 10dB S+N/N ratio). Further to the right comes the S9 point (50µV) and then at -40dBm comes the point where, should the signal exceed -40dBm, i.m.d. will commence. The significance of this is that third order products (the result of i.m.d.), increase in amplitude three times faster than the linearly amplified signals. In other words, for a 3dB increase in a signal above -40dBm the third order products will increase by 9dB. Note that the receiver noise floor is -133dBm and the commencement of i.m.d. -40dBm Fig. 1(a). Do the subtraction

-133dBm -(-40dBm)

and you have calculated the Dynamic Range ie: 93dB.

The Dynamic Range of a receiver, by definition, is the range over which signals are amplified in a linear manner! Now 93dB for the dynamic range was arrived at by an assumption, not necessarily a correct one, when in the first article on receiver sensitivity it was assumed that the figures for sensitivity were taken with a 2.4kHz bandwidth. Now sensitivity and dynamic range go hand in hand with bandwidth. Do remember this and always enquire about the bandwidth at which sensitivity or dynamic range are stated. For example if the bandwidth in the figures discussed above had been 500Hz the noise floor would have been -138dBm and the dynamic range 98dB. (2.4kHz bandwidth is five times greater than 500Hz).

So once again, keep bandwidth in mind.

The final point on Fig. 1(a) -5dBm, shows the level of input power at which Blocking or Gain Compression occur. Here the early stages have reached saturation, they just cannot take any more input. A modest signal of say S7 would begin to fall in amplitude, a phenomena sensed by the operator. The size of signal causing this is going to be at S9 plus nearly 70dB, about 125mV, a large signal. However, about 35dB before blocking takes place, evidence of i.m.d. will have made itself felt. You will see in some receiver reviews that evidence of blocking was

---

**Theory**

**Receiver Specifications Explained 3**

Such parameters as i.m.d. (Intermodulation Distortion), third order intercept point, Dynamic Range, Blocking Dynamic Range, Reciprocal Mixing or Phase Noise, and others are to be found in many manufacturers specification sheets. What do they all mean? Let us investigate each of these parameters in turn, with a view to making an objective assessment of the information contained in a typical receiver specification.

First the i.m.d., Intermodulation Distortion is the result of early stages in a receiver commencing to amplify in a non-linear manner. That is to say, the amplified output of these stages is not a faithful replica of the input, or technically, the stages show a non-linear transfer characteristic. Design characteristics for the amateur service can be contradictory, requiring on the one hand high sensitivity but also demanding linear transfer characteristics over a wide range. However, progress has been made and there are a number of good designs available.

Consider Fig. 1(a), here the input power to a receiver, in dBm (50Ω), is shown on a horizontal axis. The figures are similar to those given in the article on receiver sensitivity. Commencing at -140dBm the first point of interest is the noise floor at -133dBm, followed by the sensitivity at -123dBm; (0.15µV for 10dB S+N/N ratio). Further to the right comes the S9 point (50µV) and then at -40dBm comes the point where, should the signal exceed -40dBm, i.m.d. will commence. The significance of this is that third order products (the result of i.m.d.), increase in amplitude three times faster than the linearly amplified signals. In other words, for a 3dB increase in a signal above -40dBm the third order products will increase by 9dB. Note that the receiver noise floor is -133dBm and the commencement of i.m.d. -40dBm Fig. 1(a). Do the subtraction

-133dBm -(-40dBm)

and you have calculated the Dynamic Range ie: 93dB.

The Dynamic Range of a receiver, by definition, is the range over which signals are amplified in a linear manner! Now 93dB for the dynamic range was arrived at by an assumption, not necessarily a correct one, when in the first article on receiver sensitivity it was assumed that the figures for sensitivity were taken with a 2.4kHz bandwidth. Now sensitivity and dynamic range go hand in hand with bandwidth. Do remember this and always enquire about the bandwidth at which sensitivity or dynamic range are stated. For example if the bandwidth in the figures discussed above had been 500Hz the noise floor would have been -138dBm and the dynamic range 98dB. (2.4kHz bandwidth is five times greater than 500Hz).

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**Fig. 1. (a) A graphical representation of the performance of a typical communications receiver. Points of interest are labelled A to E. (b).**

Showing the instrument arrangement for testing receivers for dynamic range and blocking. The combiner circuit is to be found in the ARRL Handbook 65th Ed 1988. See text.

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**Short Wave Magazine, October 1994**
These products, attenuation is the receiver is tuned to one of the two signal sources are set up at the same time allowing the two signals to be injected into two identical signal generators whose outputs are combined using a so called hybrid combiner. This allows two signals to be injected into the receiver at the same time. The combiner isolates the two signal sources, but at the same time allows the two signals to be presented to the receiver. The connection diagram is shown in Fig. 1(b) and includes an attenuator.

To measure the point where third order distortion commences the receiver is usually tuned to the mid-point of its frequency coverage, for the general coverage receiver (0.5 to 30MHz) this would be 15MHz, but 14MHz is often used to suite the amateur market. The two signal sources are set up in the 14MHz band but with output frequencies differing by 20kHz. Both signal sources are set to an output of say -10dBm. At this level third order products of the two inputs will be in evidence and the receiver is tuned to one of these products. Attenuation is now switched in until the chosen product signal level is just 3dB above the noise level. The third order i.m.d. level becomes then, -10dBm, with 6dB loss in the combiner and say 24dB of attenuation, calculates out to -10dBm -6dB -24dB = -40dBm. The figure of 6dB loss for the combiner is typical but the attenuation of 24dB was of course chosen to meet with our figure of -40dBm already shown on the power input graph Fig. 1(a), but is nevertheless a representative figure in practice. Signal sources used in these tests are very expensive. The HP8640 series of signal generator is considered a standard and the combiner would probably be a HP8721A.

The frequency of the third order products are found in the following manner. Suppose the two chosen fundamental frequencies were 14.100MHz (f1), and 14.120MHz (f2), the third order products are:

\[ F_{p1} = (2f_1-f_2) \quad \text{and} \quad F_{p2} = (2f_2-f_1) \]

Therefore, these products will be found at 14.080MHz and 14.140MHz respectively.

Now, to find the blocking or gain compression level the same two generators would be used along with the combiner. Again this would be done on the 14MHz band. First one of the generators would be set to give an input signal to the receiver of about -83dBm (about S7 on the S meter), the second generator is tuned 20kHz away from this signal ( above or below in frequency it does not matter ) and the signal input increased until the S7 signal has been reduced by 1dB, as seen on the output meter. The signal level noted on the second generator at this point becomes the blocking or gain compression level which in our case is -5dBm, about S9+6dB. If the first generator input was greater than -83dBm, say -73dBm (S9), then the blocking would take place later. That is the blocking dynamic range would be greater.

The reader will appreciate that there is a difference in the signal spacing given here and the spacing given in the manufacturers brochure. A common spacing used for determining the third order i.m.d. is quoted as 50kHz , though 20kHz is an internationally accepted figure. This is also known as the 'two tone' dynamic range by the way; probably the best way to get a feel for the figures and terms is to study carefully the reviews given in various publications. To enlarge on the third order measurements it should be realised that there are more than just the two products, and of course in real life when an antenna is connected, there are more than just two large signals present, these naturally cause more products, so with an inadequate receiver the end result is that they become so numerous that they take up the appearance of noise.

There is, or was, no better part of the spectrum to experience this effect than the 40 meter band, which includes the 7MHz amateur band. Here one would experience a cacophony of sound spread out either side of broadcast portion of the band, where only the stronger stations could be resolved. Huge signals after dark would be arriving on the antenna which the poorly designed fronts ends of the receivers where incapable of coping with. With more attention paid to front end design better results are achieved, but don't accept claims of wide dynamic range without first studying the small print, 500Hz bandwidth does nothing for s.s.b. or a.m. reception.

Turning our attention to Fig. 2 and noting that the horizontal axis is the same as Fig. 1(a), but there is now a vertical axis which represents the receiver output, in fact the figures could represent those of the output meter, as used in the earlier tests. Note that both axis are logarithmic, since both input and output are given in dB. The graphs therefore will be straight line. Commencing from around the sensitivity level of the receiver the input signal is increased giving a linear increase of output. Eventually -40dBm is reached with the input signal; now we know that signals above this point will show i.m.d. on the output. Here we start to plot the i.m.d. signals, which will also increase in a linear manner, but at three times the rate of signals below -40dBm!!

Before continuing it must be understood that the third order intercept point is purely
a 'notional point'. In practice the two graphs would not meet because saturation would have prevented either of the graphs increasing beyond a certain limit. What in fact is done is to 'extrapolate' the graphs until they meet, on paper. This meeting point then is the much quoted 'third order intercept' and is proudly offered for approval in most brochures. Values for the third order intercept range from about +5dBm to +30dBm, the higher figure generally being reflected in the outlay. A third order intercept of say +20dBm should prove satisfactory.

Looking through numerous brochures shows that Phase Noise figures are not commonly given, but nevertheless they can be important. What exactly is phase noise then? Well most of you will be familiar with the performance of modern receiving equipment with regard to long term stability, and the fact that frequencies can be tuned to within 10Hz or so, even on modestly priced models. Phase Noise is concerned with stability, but stability that is referred to as 'short term stability'. Short term stability is measured in milliseconds, not hours or days. Now all oscillators exhibit some degree of sidebands and they also wander about their nominal frequency within these sidebands. In other words they have a degree of Frequency Modulation, naturally. All oscillators including crystal oscillators, exhibit this short term instability, despite the fact that they might have a long term stability of only a few parts per million, their short term stability or phase noise performance is sometimes unacceptable.

Study for a moment Fig. 3(a), this figure represents a receiver tuned to 14.100MHz. The first intermediate frequency of the receiver is 70MHz, therefore the local oscillator will be tuned to 84.100MHz. This receiver has an oscillator with only modest side-bands, that is to say the phase noise is acceptable. A large unwanted signal appears say 5kHz up from the wanted signal on 14.100MHz. But nothing is heard of it. Now take a look at Fig. 3(b), this receiver has a noisy oscillator, the phase noise is very poor, and the unwanted signal mixes with the oscillator sidebands noise. There is a 70MHz difference between the unwanted signal and the oscillator noise, hence the 70MHz i.f. accepts the mixed products, which are simply noise, and the output becomes the wanted signal, plus the noise. Sometimes the noise output is large enough to obscure the wanted signal. This is yet another phenomena of large signal performance! So it is unfortunate if this receiver possesses first class filters. No matter how good the filters, if the interference, or unwanted signal ends up in the pass-band then there is nothing you can do about it.

For the time being the problem of phase noise affects the v.h.f. operator with closely spaced channels and extremely strong local signals, rather more than the h.f. operator. For the short wave listener however the strength of many broadcast stations probably makes the question of phase noise rather an important consideration. Phase noise is measured using statistical computer programmes in conjunction with rather expensive hardware such as the Hewlett-Packard HP 3048A. The instrument contains a reference oscillator with excellent phase noise performance, this is used as a control or standard whereby other oscillators are measured. It is interesting to note that the HP8640 standard signal generator has a relatively very poor phase noise characteristic. It would certainly not reach international agreed requirements for multi-channel equipment!

Synthesised frequency generation also shows very poor performance in general. Just a mention about phase noise units. Since they are concerned with power the dB is used but with reference to the carrier or oscillator amplitude. Therefore phase noise is referred to as so many dBc/Hz. The measurements are extended out from the carrier frequency to 100kHz. Though I have only found one brochure that quotes phase noise, and that is for a Ten Tec Model 563 OMNI-VL. They give two figures, -122dBc at 1kHz, and -138dBc at 20kHz. Now these figures mean that the phase noise is down to -122dB of the carrier amplitude 1kHz out from it, and -138dB of the carrier amplitude 20kHz out from it. So are these figures reasonable? Well quoting from Plessey Semi-conductors Radiotelecomms Handbook, Pub No P.S.2123 March 1987, page 151, “A receiver using a KVG XF9B filter with a rejection in the unwanted sideband of 80dB at 1.2kHz, would require a local oscillator with -114dBc/Hz phase noise if the filter performance was not to be degraded.” So it seems as if the Ten Tec would meet that requirement with -122dBc/Hz at 1kHz.

**Brief Look**

This, then, has been a brief look at the many facets of receiver performance characteristics. Do look at the reviews and brochures and study them, especially if the purchase of a receiver is imminent. You will learn a great deal.

---

**Fig. 3 (a):** This figure describes graphically how ordinary signal mixing behaves, with the oscillator running above the i.f. frequency of 70MHz. The 14.100MHz receiver frequency mixes with the oscillator running at 84.100MHz, a clean 70MHz signal is fed through to the i.f. amplifier, ignoring the strong unwanted signal on 14.105MHz.

(b): Here the local oscillator with -114dBc/Hz phase noise if the Ten Tec would meet that requirement with -122dBc/Hz at 1kHz.

**Fig. 3b**

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**RF Systems MT Antenna**

This month the Assistant Editor looks at a practical solution for those without the space for a large antenna system.

I recently had the opportunity to try out an RF Systems MT wideband passive magnetic transfer antenna. It is very easy to install - I fitted the review sample on the chimney next to the television antenna.

**Construction**

The antenna is a helically wound device with, according to the manufacturer's technical info, an omni-directional polar diagram. The antenna utilises magnetic balun technology to enable a match to a low impedance receiver input across the entire frequency range of the antenna.

**Installation**

It couldn't be easier to install this antenna. I used a 50mm aluminium television antenna pole located on the chimney and a standard 'U' bolt coupling. Connection to the antenna is via an S0259 socket located in the base of the assembly. To waterproof the connection there is a latex sleeve that fits over the plug and socket. A length of RG58 was all that was needed to carry the signal to my Lowe HF-150 receiver used for the test. The antenna could easily have been fitted to a self-supporting mast or a wall bracket and the maximum recommended coaxial feeder length is 50m.

**Tuning the Bands**

For test purposes I performed a back-to-back comparison of the MT antenna with a 15m end-fed wire matched with a Pi network. At almost all frequencies the end-fed produced marginally superior signal strengths but only when correctly matched. The magnetic transfer device was always better than the end-fed wire with no matching.

The low noise susceptibility was particularly impressive when compared to some vertical antennas that I have experienced in the past. Terrific when you realise that this antenna does not require any radials or ground-plane.

As the test site is located in a densely packed housing estate, with the attendant array of man-made electrical noise, listening can be very difficult at the best of times. The MT seems to take most of the contact generated noise in its stride. The manufacturers do claim that this type of antenna has a lower noise pick-up than dipoles and whips.

**Conclusions**

The Magnetic Transfer antenna is, without doubt, a good solution for those without large sites as it is a good compromise. The antenna output is reasonably flat between 1 and 20MHz while at the upper and lower ends of the frequency range there is an approximately 12dB fall off in performance.

The RF Systems MT Antenna costs £175.00. Thanks to Lowe Electronics Ltd. for the loan of the review antenna they can be contacted at Chesterfield Road, Matlock, Derbyshire DE4 5LE.

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7 MIDDLETON CLOSE, NUTHALL, NOTTINGHAM NG16 1BX
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Is the latest short wave receiver from Sony to carry the "7600" tag a revamp of an old model or a brand new set? Peter Shore has been looking at one of the first examples of the ICF-SW7600G to arrive in Britain.

Sony has used the model designation 7600 since the early 1980s for its paperback book-sized world band receivers. First there was the ICF-7600D, then the 7600DA and 7600DS (all of which were digitally-tuned models), not to mention the 7600 (which was an analogue set). Terribly confusing. Guess what? Now there is the ICF-SW7600G. I have no idea what the 'G' stands for, but I can tell you that it is a brand new set, not simply a revamp of an older receiver.

The set covers all the a.m. bands without a break from 150kHz to 29.999MHz, and also has f.m. from 76 to 108MHz. The front panel has the loudspeaker housing on the left, and the most commonly used controls to the right. The on/off switch on the top right of the panel is a push-button control, mounted in a sliding 'lock' device to prevent the receiver being accidentally switched on in travel. To the left is the 'sleep' button; press this and the set will switch itself off automatically after an hour.

Beneath the main power controls are the keypad, band controls and 4 tuning buttons. The tuning buttons are arranged in a curve, as on the ICF-SW100. The outer buttons are for fast tuning (which on a.m. means 5kHz steps) and the inner ones are for slow tuning (1kHz steps).

In the upper centre of the front panel is the liquid crystal data monitor which displays the time when the set is switched off, and the frequency in kHz on a.m. and MHz on f.m. when the radio is on, and the number of the memory position if one has been recalled. Annoyingly the time cannot be displayed together with frequency. Also on the l.c.d. is a low battery warning symbol, 'key protect' selected symbol and 'standby' indicators for the alarm functions.

On the right hand side of the set are controls for the volume, tone (two position: music or news), receive mode (a.m., synch or s.s.b.) and an s.s.b. fine tune control wheel. The left hand side has a DX/local sensitivity switch and jack plug sockets for stereo headphones and line out, external antenna and a d.c. power supply.

"I would like to have seen more memory capacity built-in to this set."

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So, what is fundamentally new in what seems like a rather conventional package? The most radical change over previous models is the inclusion of synchronous detection, now being included on a majority of Sony's digitally-tuned short wave receivers. This is a distortion-reduction system which works by generating a pure carrier frequency synchronised with the received carrier signal and then mixed with the received signal. And when there is interference from a station on an adjacent channel, the synchronous detector can be switched between the lower and upper sidebands so that the sideband with the most interference-free signal is received.
Synchronous detection really does make a difference to listening to short wave stations, and can sometimes turn an almost un-listenable signal into one which can be received in comfort. A green I.e.d above the data monitor indicates when the synchronous detector is working.

Tuning the SW7600G is easy, a.m. metre bands can be selected by holding the 'AM BAND' button and pressing one of the down or up tuning keys. The set then steps through the short wave broadcast bands and the long and medium wave bands. The lowest frequency on each band is tuned in using this feature. Frequencies can be directly entered by pressing the 'DIRECT' key, followed by the frequency in kilohertz and then 'EXE' (execute). Manual tuning uses the up and down arrows I mentioned earlier. There is automatic scanning by holding down the right-hand tuning button for a second or two. The set will stop on each received signal for around two seconds - not quite long enough I think to allow a sensible decision to be made whether to stop or continue scanning. To cease scanning you have to press a different 'stop' button.

There are memory facilities in the radio. Up to ten f.m. frequencies and a further ten across the a.m. bands can be stored, giving twenty in all. This seems a shame. I would have liked to have seen more memory capacity built-in to this set.

Those are the main features of the new ICF-SW7600G. What about its performance? Initial impressions suggest that it works well. I have only had the set for a couple of days, but I've been able to tune in to short wave stations from near and far without difficulty using just the telescopic antenna. The audio quality through the in-built speaker is fully acceptable. The radio is easy to use and should suit anyone who wants a travel portable for listening to the main broadcast stations and for doing some DXing on the move. The drawbacks seem to me to be a limited number of memories - Sony designers clearly think in a different way to those working for Grundig whose digital short wave sets are almost over endowed with memory capacity - and the fact that it is so similar in looks and model number to its predecessors, so much so that if you are upgrading from a 7600DS, you are unlikely to impress friends and neighbours as they will probably not notice that it is different!

Overall, though, another winner from Sony, offering good all round performance, the added benefits of synchronous detection, good design and build quality. At £159.99 in the UK, the ICF-SW7600G is not bad value for money.

"Synchronous detection does make a difference to listening to short wave stations."
Win a Lowe HF-225 Europa - as reviewed in the September 94 issue SWM.

Over the next four issues we will be featuring a series of qualifying puzzles for entry to our grand draw for the £700 prize of a Lowe HF-225 Europa receiver. This extremely capable radio has been kindly donated by Lowe Electronics, and could be yours. In the next four issues of SWM you find a coupon together with a question to be answered. Save each coupon until the January 95 SWM is published and then follow the instructions to be given in that issue. The draw will be held on 6 February 1995. Good luck.

Question 1:
Where is this broadcast transmitting station?

Answer 1:

A draw will be held for these radios, but only those who under normal circumstances would not be able to afford to pursue their chosen hobby of short wave listening. Perhaps you are disabled, or young with no pocket money or a pensioner with a low income. If so, please write and tell us why you think you deserve to win one of the above receivers.

Also you will need to spot the five differences between the two Grandad cartoons. Circle the 5 differences and return the cartoon to us. Together with why you believe that you deserve to win (on a separate sheet of paper).

This should be fun, Grandad's about to go into orbit.
RC818 (SSP £219.99)
Multi-band Digital Preset Stereo World Radio with Cassette Recorder
- 5 Tuning methods: direct frequency keying, auto-scan, manual scan, memory recall and rotary
- 45 memory presets
- SW metre bands from 120m to 11m
- BFO control for reception of CW and SSB
- FM stereo on headphones
- AM wide/narrow filter
- Waveband coverage: LW 150-519 kHz; MW 520-1620 kHz; SW 1.621-29.999 MHz; FM 87.5-108 MHz
- Radio standby function
- Pre-programmable radio to tape recording
- LCD display
- Signal strength and battery condition indicator
- Sleep timer
- Safety lock switches
- Adjustable RF gain

R817 (SSP £189.99)
Multi-band Digital Preset Stereo World Radio (Not shown)
Offers all the outstanding features of the RC818, minus the cassette section.

An unequalled combination of value, quality, technology and choice....in short....

ROBERTS

R809 (SSP £99.99)
Multi-band Digital Preset Stereo World Radio
The R809 has all the advanced features of the RC818 with the exception of the cassette and BFO (Beat Frequency Oscillator) but in a more compact case specially designed for the regular traveller.

R617 (SSP £129.99)
Multi-band Digital Preset Stereo World Radio
- Automatic Tuning System scans the band and puts the 9 strongest signals into memory automatically (Not on SW).
- 5 tuning methods and 45 preset stations
- Dual time clock/alarm with precise setting
- Countdown timer, stand-by function and adjustable sleep timer
- Complete with auto dual voltage ac adaptor, portable short wave aerial, stereo earphones and soft carrying pouch.

R621 (SSP £69.99)
10-Band Compact Stereo World Radio (FM/MW/SW1-8)
All the functions of a much larger model are combined in this compact radio with clock/alarm. Easy to tune with featherlight touch-band switches. LED tuning/stereo and waveband indicators. Wide SW bandspread tuning with stereo FM via ear or headphones. Complete with soft carrying pouch and stereo earpieces.

R101 (SSP £59.99)
9-Band Miniature World Radio (FM/MW/SW1-7)
Exceptional sound quality and facilities in a truly pocket-sized, ultra-light receiver. Easy to tune with featherlight touch-band switches. LED tuning/stereo and waveband indicators. Wide SW bandspread tuning with stereo FM via ear or headphones. Complete with soft carrying pouch and stereo earpieces.

For your nearest stockist contact:
ROBERTS RADIO CO. LTD
127 Molesey Avenue, West Molesey, Surrey KT8 2RI
Tel: 081 979 7474 Fax: 081 979 9995
Short Wave Magazine, October 1994
**HF225**

Probably the most cost effective receiver on the market today, our HF225 gives you the best combination of facilities, matched with performance and price.

- Excellent sensitivity
- AM bandwidths: 10, 7 & 4kHz
- SSB bandwidth: 2.2kHz
- Audio CW filter: 200Hz
- 30 memory channels
- 8Hz tuning steps

All for just £479.00

Optional enhancements:
- B225 Nicad battery pack
- D225 Whip amplifier kit
- D225 Synchronous detector
- C225 Leather carry case

**HF150M**

The world’s most popular short-wave receiver just got a younger brother! The HF150 Marine is now available! A stylish white cabinet with tropicalised PCBs make the HF150M the ideal basis for broadcast, maritime mobile and WEFAx and NAVTEX reception in the harsh environment of the high seas. Complete with mains PSU and DD lead for 12V operation, the HF150M will complement the chart table or main cabin on any boat.

Available now, just £429.00

**EUROPA**

A ‘turbocharged’ 225! The HF225 Europa is probably the best receiver to use if you are a dedicated broadcast band DXer. We’ve replaced the standard AM filters with 7, 4.5 & 3.5kHz, giving excellent selectivity for winking out those weak tropical band stations. The SSB filter stays at 2.2kHz to allow for exhalted carrier reception. We’re also fitting magnetically shielded coils and low-noise switching diodes in the bandpass filters which reduces residual noise in the receiver. The Europa model includes the KPAD1 frequency controller and the synchronous detector fitted as standard.

All for just £699.00

**SP150**

Advance Information
New module for the HF150 series receivers

The SP150 is a combined audiofilter, amplifier, and speaker combination that can be used with any shortwave receiver or transceiver. When used with the Lowe HF150, it will also provides Meter indication once the HF150 has a very minor modification.

Features:
- 10W Audio amplifier
- Low cut filter
- Variable high cut filter
- Variable notch filter
- Built-in loudspeaker
- External speaker output
- Headphone output

**PR150**

Although initially designed to compliment our own HF150 receiver, the PR150 can in fact be used with any receiver. The PR150 preselector sits ahead of your receiver and pre-selects a narrow range of frequencies from the wide range arriving from the antenna. This can help to reduce image frequencies and spurious signals in a receiver, sometimes resulting in a spectacular improvement in performance! If you’re using a scanner like the MVT7100 for short-wave reception, one of these will really make it work!

Try one out today in any of our branches.

PR150 …….. £235.00

**NEW**

What a great way to tidy up your HF150 station! Our new RK150 Stack ‘n’ Rack provides the ideal solution for storing your HF150 and accessories. Available as a two tier model for the HF150 and PR150 combination, plus you can buy an extension kit to add another layer for your NIR10, NTR1 or FL3 audio filter, or perhaps for your next accessory ...

RK150 ………… £59.95
RK150E……….. £19.95

Lowe Electronics Ltd.
Chesterfield Road, Matlock,
Derbyshire DE4 5LE
Tel 0629 580800 Fax 0629 580020

**IF YOU WOULD LIKE MORE INFORMATION ABOUT THESE AND OTHER PRODUCTS, JUST SEND US FOUR FIRST-CLASS STAMPS AND REQUEST OUR "SHORTWAVE INFORMATION PACK" WE’LL ALSO SEND YOU A FREE COPY OF OUR FAMOUS LISTENER’S GUIDE!**
SWM Book Bonanza

Here's an opportunity to buy some of those books you've needed at a bonanza price.

These are available at normal SWM price but post and packing free!

Normally £1.00 per book - UK (£1.75 overseas surface)

**World Radio TV Handbook 94**
Country-by-country listing of I.W., M.W. & S.W. broadcast and TV stations. Receiver test reports, English language broadcasts. The s.w.l.'s "bible". £15.95

**Satellite Broadcasting Guide**
Bart Kuperus
This brand new publication, written by one of the experts from the respected World Radio TV Handbook, will be a great help to everyone interested in the world of satellite radio and television. Featuring over 300 pictures and graphics. All the information you need to know about installing your own satellite system. 366 pages. £15.95

**North American Callbook 1994**
72nd Edition
Listings of US amateurs (including Hawaii). Also contains standard time chart, census of amateur licences of the world, world-wide QSL bureau, etc. Over 1400 pages. £19.50

**International Callbook 1994**
72nd Edition
The only publication listing licensed radio amateurs throughout the world. Also includes DXCC Countries list, standard time chart, beacon lists and much more. Over 1400 pages. £19.50

**Utilities Listening Package**
We are offering the two essential utility station listening guides for a special combined price of £30.00 (normally £42.00) plus carr. UK £2.00. Overseas surface £3.75.

**Guide to Utility Stations - 12th edition**
Joerg Klingensfuss
This book covers the complete short wave range from 3 to 30MHz together with the adjacent frequency bands from 0 to 150kHz and from 1.6 to 3MHz. It includes details on all types of utility stations including FAX and RTTY. There are 19549 entries in the frequency list and 3590 in the alphabetical callsign list plus press services and meteorological stations. Included are RTTY & FAX press and Meteor schedules. There are 11800 changes since the 10th edition. 534 pages.

**Air and Meteo Code Manual - 13th edition**
Joerg Klingensfuss
Detailed descriptions of the World Meteorological Organisation Global Telecommunication System operating FAX and RTTY meteo stations, and its message format with decoding examples. Also detailed description of the Aeronautical Fixed Telecommunication Network amongst others. 358 pages.

**UK scanning Directory - 4th Edition - NEW RELEASE**
This spiral bound book lists over 12000 UK spot frequencies from 25MHz to 1.213GHz. Articles on scanning in the UK. 250 pages. £17.50

If you wish to order by phone then ask for Ann at the Book Bonanza.
Short Wave vs Satellite Radio

QSB, 'long wires', DXing, short wave radios or tracking your dish around the Clarke Belt - if you are not sure which is for you then read on. R.A. Connolly G17IVX contemplates the vagaries of each and draws his own conclusions on the question.

Basiclly then the thrill and excitement we get when we first receive on short wave, Singapore BC or Radio Korea for example on our receiver using perhaps a long wire antenna some night in our shack in the UK, does not exist with satellite radio. If the radio station is broadcasting through the satellite then the audio is there, the same strength and clarity as the audio of a TV channel.

There are various types of listener which the radio station must cater for, and I list these in no particular order. Nationals who reside overseas with whom both short wave and satellite radio is a means of keeping tracks on events back home. Tourists on holiday, many of whom move around in caravans, boats and tents, etc., to whom satellite radio in its present form is of little use due to its size, so its up to the good old 'tranny' and short wave to deliver the news to them. The business person abroad who stays in hotels and wishes to keep abreast of home news or relax to programmes of his/her native tongue - satellite radio is for this type of person. Then we have the person classed as the s.w.l. (yes, that's us), who enjoy finding new stations and frequencies, listening to news and cultural broadcasts from other countries to broaden our knowledge of world affairs. Short wave radio has all of this, and more, unlike satellite radio. Satellite radio is used by broadcasters who want to, and can afford to, increase their competitiveness against other radio stations, but the important thing to remember is that they can afford to use this medium. Many of the smaller short wave broadcast stations cannot do this as suitable finance is not available. Also, it is not a cheap system for the listener to purchase, install and run (when one pays for scrambled TV programmes - as will soon be the majority). I also believe that when satellite radio becomes more popular and established, this will become another revenue source, as no doubt in

New for Old?

Satellite radio, however, is relatively new and broadcasters use audio subcarriers which are extra signals transmitted along with the video signal, a similar principle to Teletext. These subcarriers are all in the band of 5 to 8MHz in f.m. mode. Most satellite receivers now come with a tuneable subcarrier control. Many radio channels are now available on European satellites, more in N. America, and range from new stations to established broadcast stations like the BBC, Deutsche Welle and Radio Sweden to name a few.

A major problem with short wave is band overcrowding, the amount of power required for transmission and antenna sites. To this end, some broadcasters, CHUJ and Radio Havana for example, are now experimenting with single side band (s.s.b.) transmissions, thereby increasing their range while reducing transmitter power and frequency crowding. Satellite broadcasters do not suffer frequency crowding, at least as yet, but do have to pay to use the audio subcarriers. This cost could, however, possibly be less than maintaining high power transmitters and complicated antenna systems.

Not Real DX

As regards DXing, in the usual sense of the word, we are used to the varying effects of propagation and antennas. Regarding satellite DXing, well in once sense, every signal travels enormous distances from earth to the satellite and back to earth. However, in the usual sense of DX I must admit that, as I do not have a satellite system myself, I could not be sure if my thoughts on this were correct. I did, however, have some friends who had satellite systems and used them to listen to radio, so it was time to pay them a visit, put them under the spotlight and grill them 'till they were all done (recipe of the day?) or a least 'till they answered all my questions and agreed to let me play about with their satellite systems to find out their capabilities. This is called research but it seemed more like having to use torture to keep them confined to radio and get answers to my questions. After a few visits I had the answers I needed and my friends would be able to stop parking their cars a few streets away and live a life of endless darkness by keeping their blinds closed all the time, as if they were trying to avoid me - I don't know why!

It would appear from this research that DX reception on satellite radio does not exist. If an audio subcarrier is being used by a radio station, then, assuming that your decoder can select the subcarrier, the radio station is there and operates as well as a local f.m. radio station. The only possible way to DX would be to try to receive other satellites operating outside your footprint area using large, expensive motorised dishes and tune into the audio subcarriers of those satellites.

Continued on Page 34
CUSTOMISED AR3000A

As a result of popular request, we are currently developing a series of custom modifications for the AR3000A receiver. A special version of the AR3000A will soon be available carrying a selection of useful modifications "as standard". Modifications are also possible to existing AR3000A and AR3000 receivers, please phone for a list of options and costs:

- Switchable SATELLITE FAX filter
- Temperature Compensated Crystal Oscillator TCXO
- Narrow switchable AM filter
- Rear panel S-METER output drive
- Tape RELAY and VOR compatibility
- 45MHz low level I.F. output
- Others under development

SERVICE FACILITY

Of course all new equipment carries a 12 months warranty. However, we can also offer out of warranty service and repair for most AOR products and some Fair Mate and Regency models too. If you have a faulty unit laying in a draw, why not give us a call... its repair may not be as expensive as you may think !! A typical repair to an AR1000 costs about £40.00 including labour, parts, insured carriage and VAT.

We can also arrange to have the receiver collected from your doorstep.

USED EQUIPMENT

We have a constantly changing list of PRE OWNED equipment available. All equipment carries a three months warranty, in good condition and usually boxed. Carriage is £6.00 extra in UK & Eire. Examples are shown here subject to availability.

<table>
<thead>
<tr>
<th>Item Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>AOR AR1500E handheld with SSB</td>
<td>£190</td>
</tr>
<tr>
<td>AOR AR2000 handheld</td>
<td>£195</td>
</tr>
<tr>
<td>AOR AR2800 base / mobile receiver</td>
<td>£275</td>
</tr>
<tr>
<td>AOR AR2001 base / mobile receiver</td>
<td>£175</td>
</tr>
<tr>
<td>ICOM ICRI handheld receiver</td>
<td>£225</td>
</tr>
<tr>
<td>LOWE HF225 EUROPA general coverageRX with keypad &amp; whip</td>
<td>£525</td>
</tr>
<tr>
<td>JRC NRDS35 + LOWE general coverage receiver with LOWE enhancements</td>
<td>£1095</td>
</tr>
</tbody>
</table>

ACCESSORIES

Having trouble finding that AOR accessory? Printed here is an extract from our list.

Prices in pounds Sterling, prices in brackets are P&P, all prices include VAT:

<table>
<thead>
<tr>
<th>Item Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>CU8232 remote interface for AR8000</td>
<td>£80.00 (3.00)</td>
</tr>
<tr>
<td>SC8000 soft case for AR8000</td>
<td>£17.95 (1.50)</td>
</tr>
<tr>
<td>SC2000 soft case for AR2000/AR1000</td>
<td>£6.00 (1.50)</td>
</tr>
<tr>
<td>SC1500 soft case for AR1500/E/EX &amp; AR900</td>
<td>£5.50 (1.50)</td>
</tr>
<tr>
<td>DA900 wide band flexible aerial (BNC fitting)</td>
<td>£9.85 (1.50)</td>
</tr>
<tr>
<td>WA1500 short wave wire aerial (BNC fitting)</td>
<td>£5.76 (1.50)</td>
</tr>
<tr>
<td>DC2000 cigar lead for AR8000/2000/1500 etc</td>
<td>£4.00 (1.50)</td>
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<tr>
<td>DC3000DC lead for AR3000/3030/3001/2002</td>
<td>£4.00 (1.50)</td>
</tr>
<tr>
<td>CR400 tape lead for AR3000/3030</td>
<td>£13.99 (1.50)</td>
</tr>
<tr>
<td>MM1 mobile mount for AR3000/2002/2001</td>
<td>£13.99 (2.00)</td>
</tr>
<tr>
<td>ABF125 VHF airband filter (BNC fitting)</td>
<td>£24.50 (1.50)</td>
</tr>
<tr>
<td>EP2000 earphone 3.5mm for AR8000/2000</td>
<td>£1.50 (1.50)</td>
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<tr>
<td>EP1500 earphone 2.5mm for AR1500</td>
<td>£1.50 (1.50)</td>
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<tr>
<td>BP800 replacement NiCad pack for AR8000</td>
<td>£17.50 (1.50)</td>
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<tr>
<td>BP1500 replacement NiCad for AR1500/E/900</td>
<td>£16.95 (2.00)</td>
</tr>
<tr>
<td>BP1500EX NiCad for AR1500EX (3 pin)</td>
<td>£16.95 (2.00)</td>
</tr>
<tr>
<td>DC1500 dry battery case for AR1500/E</td>
<td>£2.88 (1.50)</td>
</tr>
<tr>
<td>DC1500EX dry battery case 1500EX (3 pin)</td>
<td>£2.88 (1.50)</td>
</tr>
<tr>
<td>WA7000 wide band aerial (active on SW)</td>
<td>£139.00 (free)</td>
</tr>
<tr>
<td>DA3000 16 element discone 25 - 2000 MHz</td>
<td>£79.00 (free)</td>
</tr>
</tbody>
</table>

Lots more available including operating & service manuals.

Leading brand names available

Tel: 0629 ~ 825926
Fax: 0629 ~ 825927

A retail division of AOR (UK) LTD
All trade marks acknowledged E&OE.
ICF-SW100S Kit
- Power: 2xAA size battery.
- Stereo earphones
- Shortwave
- Tone control
- Key protection
- Record out socket
- Supplied with LCD display with light function
- Dual conversion system
- 2 step programmable timer
- Sleep function
- Digital clock
- Programmable tuning: 10 memory presets, auto scan, manual tuning
- Continuous AM frequency coverage
- 4 way tuning: 10 memory presets, auto scan, manual tuning
- PLL synthesized circuitry
- FM stereo
- 32 Short Wave Magazine, October 1994

ICF-SW1600
- £149.95

ICF-SW100S Kit
- £239.95

ICF-SW30
- £89.95

ICF-SW33
- £119.95

AN-1 ANTENNA
- £54.95

ICF-SW22
- £69.95

SONY ICF-SW55 “SUPERADIO”
- World time zones
- SSB
- Full digital p/sets
- Multiband
- £249 only

SCANNERS AND TRANSCEIVERS

YUPITERU AIR-POWER AT YOUR FINGERTIPS

VT-150
- 142-170MHz
- £169.95

MVT-8000
- £349.95

ALINCO

DJ-189E
- £209.95

DJI-185E
- £214.95

DJI-184E
- £399.00

DJI-188E
- £365.00

DJI-182E
- £524.95

DR-999E Standard Dual Band - 2 $ radios
- £679.00

DR-130B
- £349.00

DX J 11 with wide band feature
- £299.95

New full range antennas,
base stations, CB mobiles, etc

ROBERTS

PHILIPS

D2345
- Portable Radio
- 140/MW/9/10/40m
- FM
- £24.95

D1675
- Compact 12 band Portable Radio
- UV/NM/EQ/12
- Large tuning control
- £24.95

All products are subject to a post & packing charge
- £49.95

For your deal call: 071-637-0353
**SPACE SPECIAL**

**While the v.h.f. and u.h.f. frequencies might be of interest to holidaymakers, the h.f. bands should be of more use to Britain-bound listeners.**

Bearing in mind propagation from the States, and that upcoming launches are likely to be around 1200UTC, the most favourable bands to listen to (for signals out of the Kennedy Space Center area) would be in the 12-21MHz areas. These have been calculated using a PC-based propagation program and, while not being conclusively, should at least give the listener the best chance of hearing anything.

It would be pointless to listen to the 2 and 3MHz signals during daylight, but there are plenty of other higher frequencies which might be useful.

Don't forget the SAREX operations on 145.550MHz either. The only scheduled operations on 145.550MHz useful.

Plenty of other higher frequencies out of the Kennedy Space Center area) would be in the 259.700MHz and 279.000MHz. The 14.295MHz WA3NAN signal out of the Goddard Space Centre in Maryland still remains very audible during missions, even on non-Sarex flights.

For up-to-date information on launch times, try watching CNN on satellite TV or try the British Interplanetary Society's Spaceplane on (0891) 881975 - the happy Hunting.

**In his article on Listening to the Shuttle (November 1993) Steve Nichols G0KYA, listed some h.f. frequencies that might carry Shuttle communications. After more research he has come up with what he believes to be the definitive list of h.f., v.h.f. and u.h.f. frequencies used for operations at Kennedy, Edwards AF and Patrick AF.**

**NASA Shuttle Radio Frequency List**

**Discovery will blast off for a nine-day mission scheduled for September 9. As we go to press, however, there is news of delay due to motor problems.**

The remaining missions for 1994 are:

<table>
<thead>
<tr>
<th>Mission</th>
<th>Start Date</th>
<th>Duration</th>
<th>Inclination</th>
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<tbody>
<tr>
<td>STS-66</td>
<td>September 9</td>
<td>10 days</td>
<td>57°</td>
</tr>
<tr>
<td>STS-64</td>
<td>September 9</td>
<td>9 days</td>
<td>57°</td>
</tr>
<tr>
<td>STS-67</td>
<td>December</td>
<td>13 days</td>
<td>26.5°</td>
</tr>
</tbody>
</table>

The three 57° inclination flights should be visible from the UK and might provide an opportunity to hear signals on the h.f. frequencies, especially if an EVA (spacewalk) is in progress, so keep an eye on 259.700MHz and 279.000MHz. The 14.295MHz WA3NAN signal out of the Goddard Space calls are at the usual premium rate. The packet radio network may also carry bulletins. Try listing 'SAREX', or 'NASA', or 'AMSAT'.

Happy Hunting.
Communications and other stuff: S-band (GHz)

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.200</td>
<td>Air-to-ground</td>
</tr>
<tr>
<td>2.2175</td>
<td>Air-to-ground secondary</td>
</tr>
<tr>
<td>2.2875</td>
<td>Air-to-ground primary digital downlink</td>
</tr>
<tr>
<td>2.0419</td>
<td>Ground-to-air</td>
</tr>
<tr>
<td>2.2014</td>
<td>Ground-to-air</td>
</tr>
<tr>
<td>1.8318</td>
<td>primary (USAF uplink, phase modulation)</td>
</tr>
<tr>
<td>1.7751</td>
<td>secondary</td>
</tr>
<tr>
<td>2.2500</td>
<td>wide band F.M. with main engine analogue telemetry during launch, or TV during orbit operations.</td>
</tr>
</tbody>
</table>

Contractors

<table>
<thead>
<tr>
<th>Company</th>
<th>Frequency (MHz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rockwell (Edwards)</td>
<td>2.9985, 3.2225, 3.475, 5.5975, 10.0106, 17.9665 (MHz, u.s.b.)</td>
</tr>
<tr>
<td>McDonnell Douglas (Edwards)</td>
<td>122.300, 123.050, 123.350, 123.525, 462.925 (MHz)</td>
</tr>
<tr>
<td>Com-Tech Associates (Kennedy)</td>
<td>123.475 (MHz)</td>
</tr>
<tr>
<td>IBM &amp; Harris Corp. (Kennedy)</td>
<td>123.300, 123.550 (MHz)</td>
</tr>
<tr>
<td>TWA (Kennedy)</td>
<td>151.955 (MHz)</td>
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<tr>
<td>TWA (Kennedy)</td>
<td>154.515 (MHz)</td>
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</table>

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.2500</td>
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<td>2.2014</td>
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<td>1.7751</td>
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Short Wave Magazine, October 1994

Room for Diversity

I would hope that the magic of short wave radio will remain with us for many years to come and that the broadcasters will see that for the listener this is the most interesting, exciting and cheapest and most portable method for the masses to receive their message. Let's hope that this becomes a case of the dog (the listeners) wagging the tail (the broadcasters) and what the listener wants in broadcasting is provided instead of the attempts of the tail wagging the dog in the form of the broadcaster saying that a certain system is the system of the future to replace all others. The broadcaster must remember that without the listener they are redundant!

Short Wave vs Satellite Radio

the future the audio subcarriers will be scrambled, like the TV channels, thus increasing the cost to the user. I am also aware that some manufacturers are experimenting with portable satellite radio receivers, but problems due to cost and limited antenna size are occurring. On the other hand a basic short wave radio can be purchased from about £20 and used anywhere in the world with ease.

Now that you have found that radio station, how are they going to keep you as a regular listener? Well, I think that good up-to-date news coverage is important, after listening to the news from several countries you can put your own interpretation on world events. Programmes on local music, culture and places of interest to the listener, as presented by Radio China International or Voice of Free China for example. Programmes on DX information and listeners letters, as for example HCB and Radio Sweden produce, are also very important and of interest to the listener, as presented by Radio Bulgaria. However, as these radio stations are not broadcasting purely for entertainment but also to influence people resident in other countries, this results in serious topics being discussed. All these ingredients mixed together in the right proportions and served correctly (recipe of the day again?) will ensure that you, the listener, will keep coming back for more.

Financial Control

You may not have realised that short wave radio is a supply and demand commodity, subject to financial budgetary control. Unfortunately, it is difficult to calculate with any form of accuracy the listener figures for any given station. Unlike domestic radio and television where a team of people ask various questions of a limited number of people and then calculate their viewing figures, with short wave radio the only information a station has to go on is the number of QSL cards received. Hence it is important to QSL with stations on a regular basis or else someone in their management could decide that your favourite programme or even station on short wave is a luxury which they can no longer afford as the QSL reports have decreased so much. Remember that on short wave we do not contribute to station running costs. With satellite radio however, the technology is available and I believe will soon be used to encrypt the radio signals and charge for the service as part of the satellite package. As a result, if a station becomes unpopular this could easily be measured and programming could be driven by financial criteria.

After much thought I have reached the conclusion that there is room for both systems, satellite having its use with the businessman and being financed as a part of a satellite package as I previously indicated, with short wave being retained, although possibly with increased use of single side band, for the general listener and programmes catered for accordingly. As I said earlier, I think that a lot of thrill is generated when you receive a distant short wave station for the first time or a distant relay of a European station, even back beams. I also believe that much of this magic remains for quite a while after the first reception of distant DX as there is always that question 'will it be there tonight again', with short wave you never know just what you will receive from day to day thus creating the intrigue. With satellite radio the magic is gone because you know that it will be there the next night. What station you receive on your satellite is as predictable as day and night. Also, as I stated earlier, many smaller or distant stations/countries may not wish to, or can afford to, use satellites outside their immediate area. I would not like to see Brian Oddy's LM&§ column becoming Long, Medium & Satellite.

Continued from Page 30

Room for Diversity

I would hope that the magic of short wave radio will remain with us for many years to come and that the broadcasters will see that for the listener this is the most interesting, exciting and cheapest and most portable method for the masses to receive their message. Let's hope that this becomes a case of the dog (the listeners) wagging the tail (the broadcasters) and what the listener wants in broadcasting is provided instead of the attempts of the tail wagging the dog in the form of the broadcaster saying that a certain system is the system of the future to replace all others. The broadcaster must remember that without the listener they are redundant!
Whatever your listening interests we are pleased to hear from you and help in any way possible. Although "Airband" is our specialist subject we are happy to discuss and advise on any particular product. We have no allegiance to any particular brand and stock receivers from all manufacturers: AOR, Bearcat, Camnis, Commtel (GRE), Fairmate, Icom, Signal, Sony, Realistic/Radio Shack (GRE), Maruhama, Trident, Uniden, Yupiteru to name a few (!) and can therefore offer un-biased and knowledgeable advice on them all.

Please feel free to call and have a chat – it would be nice to speak with you or if you would like a catalogue please send a large (A5+) SAE – Thanks.

**VHF/UHF Airband Guide**

Our current edition is dated the 29th July '94, for those not familiar with our airband guide it has complete VHF/UHF frequencies for airfields in the U.K. together with stud/channel numbers, Range, Ops, Company and Display frequencies, Squawk Codes and a considerable amount of other information. We also include the new London Air Traffic Control, Centre allocations – although what was planned and what is actually happening here seem to be two different things at the moment.

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Have you recently retired? Are you between jobs? Is your usual looking for an interesting but stimulating hobby? Perhaps you have already set up equipment at home to receive live pictures from a number of satellites. No, not satellite television - weather satellites - WXSATs. In this article I am going to look at the equipment needed for a receiving station, the hardware and software market for WXSAT users, and costs for beginners. I receive many letters from people requesting information on computers so this topic is included.

Several UK companies were invited to provide material for inclusion in this feature. Responses were disappointing! One or two did not reply; another company declined to provide a WXSAT receiver for review, and one company's product review has been 'pending' for over a year. Contrastingly, other organisations have been particularly helpful in supplying information on specific satellite systems. Their help is gratefully acknowledged. References to equipment must not be interpreted as any form of recommendation.

**WXSAT Reception**

The cost of setting up a receiving station depends on your own data requirements, the equipment you already have, and of course the depth of your wallet or purse. There are several possible routes to explore.

Do you know much about satellites? This article should provide useful background information, and there are special offers to assist you with your investigations.

You can set up a station without having to know anything about satellites, just as you can drive a car without knowing what happens under the bonnet. However, you would be missing out on a fascinating topic.

Receiving satellites is easy. Tune a conventional scanner fed by some form of external antenna - to the correct frequencies, and you will hear a WXSAT within an hour or two. To identify what you hear, you can get modern satellite tracking software at little cost, and keep it up-to-date for the cost of a stamp or two!

For quality pictures you must have a quality signal - requiring a suitable antenna and dedicated WXSAT receiver. If you want continuous pictures you must consider a METEOSAT system. Some people start with METEOSAT and then add polar reception equipment. Others do it the other way round.

Decoding the data from your receiver requires a computer or framestore. The latter is cheaper and may be adequate for your requirements. A computer is almost essential, allowing satellite tracking, pass predictions, image enhancement, animation, and conventional usage such as word processing. (Did I hear someone mention games?) We must now have a detailed look at satellites.

**Satellite Imaging**

Since the early sixties, Russia (now referred to as the Commonwealth of Independent States - CIS), America and other countries have operated a number of satellites in orbits at various heights above the earth. Many are fitted with imaging devices of different types, including conventional photography, to enable the monitoring of the environment in a number of frequency bands. To appreciate the actual types of imaging satellites, we can look at some of the official classifications. These include meteorology, climatology, remote sensing, environment, and planetary science. Satellites within each class are fitted with sensors of appropriate types. Some, for example the WXSATs, produce an image of the scene below, and immediately transmit it earthwards, where anyone with suitable equipment can receive it.

Other sensors detect radiation, such as that from ozone, and record it for later transmission to specific ground stations. Some satellites, including the WXSATs, also record sensor data. They then transmit on command, to the ground station. By this method, images of remote areas such as the polar regions, are collected.

**Weather Satellites**

The WXSATs form two principle classes - polar orbiters and geostationary, though other categories can be identified. The former includes NOAAAs (USA) and METEORs (CIS). The latter includes GOES (USA), METEOSAT (Europe), with GOMS (CIS) and FENGYUN.

Ground resolution varies widely with sensors; SPOT has a listed resolution of 10m; LANDSAT 6 includes a panchromatic scanner with sensors resolving to 15m, though its other scanners resolve to between 30 - 120m. The AVHRR (Advanced Very High Resolution Radiometer) sensors carried by NOAA WXSATs resolve details to 1.1km. Visible-light sensors on the geostationary METEOSAT series of WXSATs resolve details to 2.3km, seen in Primary Data (PD) imagery. WEFAX is derived from METEOSAT PD telemetry.

Most imaging systems process data in a unique (and therefore incompatible) manner. The frequencies used for data transmission are also considerably higher than amateur equipment can normally receive, and the data stream is normally multiplexed (sensor data is sampled during varying time periods), requiring major computing power to decode. This puts such monitoring beyond the capability of almost all amateurs. Fortunately, the field of WXSAT telemetry is completely different!
**Polar Orbiters**

This group of WXSATs (METEORs and NOAA) all have characteristic orbits with high inclination - between 92° and 100°. This results in the satellite passing near the north and south poles on each orbit - hence the term polar. There are significant differences in other aspects of their orbits.

**NOAAs**

The American WXSATs, operated by the National Oceanographic and Atmospheric Administration (NOAA), are essentially sun-synchronous. This means that they pass over any location at a similar time each day. Due to depletion of manoeuvring fuel, the orbital planes of some NOAA slowly drift.

NOAA a.p.t. (automatic picture transmission) consists of lines, each 0.5 second duration, corresponding to each sensor scan of the earth below. In effect, they produce one continuous picture strip around the globe, containing data from two channels.

It is a clever concept. Each line consists of a sequence of tones separated by picture modulation. A short pulse of 1040Hz precedes channel A (picture data); a similar (7-cycle) pulse of 832Hz precedes channel B data. Calibration sequences are also included in each line; the result is that the ear hears these individual components forming a characteristic, repetitive click-clop, the well-known sound of NOAA a.p.t.

**METEORs**

These WXSATs are in higher orbits than NOAA, adjusted so that their orbital planes drift relative to the sun. An individual METEOR therefore passes through periods of full sunlight (for the daylight part of the orbit), but a few weeks later, will be travelling close to the terminator, and therefore under conditions of low illumination. CIS satellite controllers tend to operate one of those WXSATs which are in conditions of maximum solar illumination.

Careful monitoring of METEORs, therefore allows us to 'anticipate' those which might be switched on following a period of non-use.

The official line (as published in a booklet that I obtained a few years ago) is that at any time, up to three CIS WXSATs should be operating. In recent years, my log book has recorded no more than two; spring and summer 1994 have seen only one.

METEOR a.p.t. telemetry is compatible with, but different from, that of the NOAA.

Modulation characteristics are similar, but the picture contains just one image - resulting in higher resolution. The line edges contain a set of phasing bars (alternating black-and-white), bars indicating the opening of the aperture, and a grey scale.

On those occasions when a METEOR transmits infra-red imagery, a short section of the scan line includes the bars but no grey scale. This infra-red is also inverted, that is, instead of the format used by NOAA and METEOSAT - in which warm temperatures are represented by darker shades, and cool temperatures appear whiter - METEOR i.r. shows warm seas as white and cold clouds as black. Consequently, a facility to reverse the grey scale of METEOR i.r. is a useful option!

**METEOSAT**

From geostationary orbit some 36 000km up, a constellation of WXSATs provides significant coverage of the Earth. EUMETSAT operates the METEOSAT series of which there are currently two available for European use. METEOSAT-5 and 6 are positioned on or near 0° longitude - nominally above Greenwich. METEOSAT-5 is the current WXSAT and transmits two principle data streams - WEFAX and Primary Data (PD). Reception of PD is slowly increasing as manufacturers apply advances in electronics to the production of hardware to decode the complex telemetry stream. Two years ago I purchased a PD system, and at least one other supplier (also listed under 'Sources'), has entered this market.

WEFAX transmissions from METEOSAT remain the easiest to receive - recognising minimum dish sizes (see later)! METEOSAT WEFAX is transmitted on two channels - channel A1 is 1691MHz, on which slots of four minutes duration are scheduled for the transmission of regular sequences of images, each showing fixed portions of the visible globe.

Channel A2 uses 1694.65MHz to transmit a few WEFAX formats, including sequences obtained from other geostationary WXSATs. On channel 2 you can receive whole-disc images of the earth in visible, infra-red and water vapour bands; formats from METEOSAT-3 (currently positioned over the east coast of America), and formats from the Japanese GMS WXSAT, positioned near Australia, are included in the schedule. This makes METEOSAT an almost essential WXSAT to monitor! Most A2 transmissions are of Primary Data.

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Short Wave Magazine, October 1994
Continued from Page 37

satisfactory - an adequate signal strength should be received. Under such circumstances, mount it higher but do not fit a pre-amp. Interference is amplified considerably if one is used on a roof-based antenna.

Dishes and Yagis
For METEOSAT WEFAX reception (1691-1694.5MHz) we use a dish or Yagi. These are easy to build - I built my own from conventional chicken wire with aluminium supports. It worked well and was light and portable, allowing me to scan the sky. Using this dish I located GOES-E, when it was available. Dishes must be at least 1m diameter to receive reliable WEFAX, though EUMETSAT specify a 1.8m dish for an official WEFAX (SDUS - Secondary Data User Station) system. This is to minimise co-satellite interference which occurs when tests are being performed on nearby METEOSATs. A smaller (1m) dish may give variable levels of interference and affect images during such tests. There are occasional special offers, particularly for members of associated clubs, such as the Remote Imaging Group. Dishes cost from £30-£160, depending on accessories such as cables and feeds. Yagis can be used for METEOSAT reception and blend with the environment. Many are home-built. Commercial Yagis cost around £80.

Pre-amps
For satisfactory METEOSAT reception, a good 1.691GHz pre-amp is essential, and must be attached directly to the antenna. Suitable low-noise units are available from a few suppliers - see 'Sources' list.

Receivers and Modulation
A conventional 137MHz WXSA receiver has a different specification compared with any other type. The main difference is the extra-wide i.f. (intermediate frequency) bandwidth. This is generally quoted from 35 to 50kHz, and is needed for the receiver to accommodate the complete transmitted signal spectrum.

The 137.50MHz signal is the main r.f. (radio frequency) carrier. It has been frequency modulated by a sub-carrier - a 2.4kHz tone. This, in turn, has been amplitude modulated with sensor information, such that areas of varying brightness below the WXSA produce corresponding signal peaks and troughs within the sub-carrier. Maximum modulation (corresponding to dark areas) is not zero, but normally around 5%, in order to allow hardware to stay locked on the sub-carrier.

METEOR WXSA receivers have not always used a precise 2.4kHz sub-carrier; the effect of a non-precise sub-carrier is an unsynchronised picture, unless your software synchronises on part of the line content.

In addition to the picture modulation, a superimposed Doppler shift, caused by the satellite's movement relative to your ground station, adds several more kilohertz to the r.f., requiring a final bandwidth as quoted above. This allows full reception of all information.

Consequently, although it is possible to receive and decode a.p.t. using a conventional scanner, (even with its limited bandwidth,) much of the picture information may be lost. The reduced signal content may also impede software synchronisation, resulting from the absence of synchronising tones.

Spot Frequencies
Receivers using chip synthesised frequencies, (probably the most common type), are normally well programmed, allowing the receiver to scan the complete band, and with a choice of frequency increment.

Some receivers, e.g., the Circuit unit, use crystals to generate each frequency. For this, and similar types, ensure that new crystals are obtainable if necessary. I would recommend that any receiver under consideration be fitted with 137.50, 137.62, 137.30, 137.40, and 137.55MHz crystals, from the start. Optionally, 137.80 and 137.06MHz would cover possible future use by FENGYUN, the Chinese WXSA. Receiver costs vary, from kits at around £50, to complete models near the £300 price range - see the 'Sources' list.

Paging Interference
The decision (by the DTI) to allocate frequencies close to the 137MHz band for use by powerful paging transmitters in the UK, must be a cause for wonder! The result has been serious interference to some a.p.t. frequencies, affecting reception in many areas of Britain. Before any receiver is purchased, confirm that it is 'pager-resistant' and can be returned if found to be unsatisfactory.

WEFAX/APT
All systems include hardware to decode a.p.t. and WEFAX; differences occur in convenience and user-friendliness. In previous editions of Info in Orbit I have reviewed TH2 Imaging's PC software and decoding card, PC GOES/WEFAX from Comar Electronics, and PROsat II from Timstep Weather Systems.

Image Enhancement
You will probably wish to have some basic image processing facilities available - particularly for enhancing winter visible

Meteor 3-5 image of the Mediterranean Sea during spring 1994. The phasing bars, aperture indicator and grey scale are shown.

Decoders
Whatever system you plan to use to receive WXSA telemetry, you have to decode the resulting audio output from the receiver, in order to obtain an image. There are two ways to achieve this; decoding by framestore or computer.

A full-featured framestore can display high quality images from either METEOSAT or the polar orbiters. There will be limits on certain aspects of the display; post pass image enhancement may not be catered for, and animation may only be possible with a limited number of separate images. I used a framestore for many years until circuit failure; replacement was not affordable. Framestores can still be obtained second-hand, or (rarely) as part of a complete system. If purchase is a serious consideration, you may wish to study the facilities described in this article to decide which are not essential.
pictures, where the light level is considerably reduced. There is an enormous difference between summer and winter illumination - good software allows considerable enhancement. Infra-red images usually benefit from contrast enhancement.

Colour
For impressive presentation you may want to add colour. This can significantly improve the appearance and scientific value of images, particularly infra-red. Assigning shades of red and blue to regions of extreme temperatures brings out thermal trends not easily noticed. A sequence of coloured, thermal images of north Africa (and other regions) taken every few weeks, can produce a fascinating sequence of seasonal temperature trends.

Animation
Animating METEOSAT images is a must for anyone remotely interested in weather forecasting. I use animation to identify clear spells for astronomical observing - I don't want to lug out my heavy telescope if rain is likely to arrive before midnight. METEOSAT D2 images are the answer for this decision!

Predictions
Some retailed software includes a satellite predictions section to calculate times of future passes. If this is absent, check out the 'Offers' section in this article.

Applications Software
You may use different types of satellite program on your computer - decoding, tracking, predictions, image display and enhancement, etc. With few exceptions, such programs rarely have the same demands as other software (such as word processors). The latter should be the main factor when considering a suitable specification for your requirements.

Processor Speed
This is most unlikely to be a problem if you are purchasing a new machine. The 386, 486 and Pentium processors operate at speeds far in excess of anything required by satellite decoding software. If you are looking at the second-hand computer market, avoid anything below 12MHz regardless of price.

Expansion Slots
Unless you are using the PC GOES/WEFAX or JVFAK-type of program (which require an external interface), you will need to plug a card into the computer's motherboard. This process is straightforward, but is performed more easily on a standard or half-size tower base. Micro units may have awkwardly positioned slots. Slot size should not be a factor. 16-bit expansion slots are standard, and will easily take the usual 8-bit interface card. Instructions for fitting come with the card itself.

CD-ROM Drives
Although these are not required for looking at your own pictures, you may wish to purchase one of the many CD-ROMs issued by NASA and ESA. These contain original (or processed) images, obtained from the spacecraft mentioned earlier, and containing so much data that a CD-ROM is essential for their storage. If you decide to buy a disk, check out different suppliers. NASA issues CDs at extremely low prices - some as cheaply as a few dollars. These same CDs may be re-sold elsewhere at considerably higher prices.

Kits
Both Maplin Electronics and Circit publish catalogues of their numerous kits, listing receivers and antennas, with hardware for decoding the resultant signal.
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Short Wave Magazine, October 1994
Both systems originally catered for the BBC and Amstrad computers; several years ago this was a reasonable option. In my personal view I would not recommend that the BBC route was now taken for picture display. There is no comparison between the old BBC and a modern computer with good graphics and adequate RAM.

If you are keen to build your own receiver/antenna combination, these kits have a lot to offer. I built the Cirkit receiver (with help), and then heard my first NOAA signals! This may be the cheapest route into receiver building, for those adequately experienced - it is a worthwhile project. Do bear in mind that suitable test equipment is required for component alignment - it isn’t simply a matter of soldering components to the board.

Cirkit v.h.f. WXSAT

The published specification suggests that it can be used for both polar orbiting WXSATs and with suitable additional hardware, for METEOSAT. My catalogue lists the kit price as £49.96 inc. VAT, or the completed receiver board, aligned and tested, costs £74.94 inc. VAT. Note: prices quoted here are those from a recent catalogue and may change.

Cirkit WXSAT Antenna

Cirkit market a crossed-dipole antenna, including phasing harness and mast clamp, for £199.98 inc. VAT.
Weather Satellite Signal Interface

This low-cost interface, designed by T.H. Woolner, will enable you to display high-quality weather satellite pictures on a PC for less than £10. The unit plugs into the serial port of your PC compatible computer with no need to even open its case.

How It Works

The converter (Fig. 3) was designed to fit between the Cirkit satellite receiver (in kit form Cirkit Cat. No. 40-02301) and any IBM PC with graphics support. The design principles are general so the unit will function equally well with any v.h.f. f.m. receiver suitable for satellite reception. Basically, the idea is to treat the audio tone as if it were a conventional a.m. radio carrier, rectify it, and apply the resulting varying d.c. signal to the control pin of a 566 voltage controlled oscillator chip (Fig. 2). However there are snags, as always - bandwidth and noise.

Since the carrier frequency we are converting is so low, and the detail in the picture is so fine, there is a conflict between smoothing out all the carrier ripple and losing picture definition. We must remove the ripple because the a.m. signal covers 800Hz to 4kHz, centred on 2.4kHz. The effect of 2.4kHz ripple shows as bars across the picture. Too much smoothing causes the picture to appear left to right horizontal detail, while still sharp in the vertical sense.

A simple way around this problem is to double the effective frequency by amplifying it (IC1a), inverting it (IC1b) and then rectifying the combined outputs with Tr1 and Tr2. Although the doubled frequency does not exist as a signal, any ripple remaining after filtering is at 4.8kHz, well above the expected working range of the v.c.o. The rectifying transistors, Tr1 and Tr2, operate partly as conventional amplifiers alternately for half of each cycle only. The resistor R9 sets the amount of negative feedback at this stage and so controls the voltage swing of the picture signal at pin 5 of the 566. Note that no de-coupling capacitors are allowed here as this is a fast rectifying circuit. An active bias stabiliser is needed.

This rectifier circuit also forms a handy way of producing the control pin bias voltage required by the 566 chip. This v.c.o. uses the voltage difference between its control input (pin 5) and Vcc* supply (pin 8). Thus by controlling the current in R6 by the chain R9 and transistor Tr3, the operating point of the 566 is also controlled.

Noise is ever present in radio systems. A simple parallel tuned circuit, with its Q limited to about 6 by R5, filters out white noise from the receiver, the neighbours, the atmosphere and the universe. The Q could be made higher and reject more noise, but this would make tuning critical and degrade the horizontal picture definition. A twin-T filter removes the 4.9kHz
With the radio scene changing fast in the London area, (four shops have closed in twelve months), MARTIN LYNCH goes from strength to strength. Offering you an even better deal across the range of short wave products, we have proved that SPECIALISING in RADIO together with second to none personal ‘back-up’, is the way forward. Rated ‘Number one’ by the leading manufacturers enables me to offer you the best in price and customer service - who else is expanding in a market where others are retreating? Thank you once again for your support, it encourages myself and my team to try the hardest at making you happy with your purchase and service from MARTIN LYNCH - your NUMBER ONE DEALER.

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For all customers spending over £100 on the LYNCHY STAND at the Leicester show on October 21 & 22, your entrance fee will be returned - in cash!!

REMEMBER REMEMBER the 26th of NOVEMBER
Last year was the opening of the new shop, this year we’re celebrating the first anniversary and what a day that will be! More news next month, but make a note in your diary NOW. Nearly a thousand people poured through the door and grabbed tens of thousands of pounds worth equipment at virtually trade prices. Further more, they were fed and watered for free. ARE YOU SURE YOU’RE BUSY THAT DAY? What ever you’ve got on - cancel it and come to MARTIN LYNCH. Make him sweat and give yourself a big grin - grab a bargain! More details next month.

SUMMER NEWSLETTER STILL AVAILABLE!
If you like reading my twaddle, (you’ve read this far!), then phone or write in today. Packed with new products I’m not even allowed to mention here, there’s money saving offers and clearance items or write in today. Packed with new products I’m not even allowed to mention here, there’s money saving offers and clearance items.

USED EQUIPMENT LISTS
Don’t forget MARTIN LYNCH carries the widest range of good clean USED GUARANTEED Radio Equipment. If you have a FAX machine, call us for an up-to-the-minute computer generated print-out. Part exchange against any new or used stock item, a pleasure!

MARTIN LYNCH
G4HKS
THE AMATEUR RADIO EXCHANGE CENTRE
0181-566 1120
Fax: 0181-566 1207
New After Hours Number 0973 389339

With the radio scene changing fast in the London area, (four shops have closed in twelve months), MARTIN LYNCH goes from strength to strength. Offering you an even better deal across the range of short wave products, we have proved that SPECIALISING in RADIO together with second to none personal ‘back-up’, is the way forward. Rated ‘Number one’ by the leading manufacturers enables me to offer you the best in price and customer service - who else is expanding in a market where others are retreating? Thank you once again for your support, it encourages myself and my team to try the hardest at making you happy with your purchase and service from MARTIN LYNCH - your NUMBER ONE DEALER.

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Available since the London show, the new AR3000A AIR Traffic as well as civil. Just a touch more DRAKE SW8 FINANCE, we can arrange that tool If you want ZERO that's unbeatable.

and at a price
MEMORABLE TO
who call in or phone. Stocks will be limited but I am assured of a limited quantity from June onwards. The price? I'm told around the region of £440. A deposit of only £50 will secure your £800UK and payments in the region of £33 a month are given as a reasonably accurate estimate.

MRP £449.00

MVT 7100
The new AR800 has arrived but sales of the
MVT 7110 will continue as strong as ever - especially as the price is slashed to only £399 all mode, no gaps and its available from stock.

VT 125
The no nonsense, simple to use Air Band handle. It only retails at £199.00 and it comes complete. Give yourself a birthday present. Order one today and I'll pay the delivery charge. (U.K. only mind).

VT 225
The same as its little brother, but this ones matured to enable you to listen to Military AR Traffic as well as a civil. Just a touch more green backs and I'm still throwing in FREE green backs and I'm still throwing in FREE green backs and I'm still throwing in FREE
gaps and it's available from

Now fitted with better AM filters giving extra selectivity. Deposits from as little as £50.

DRAKE RBE
The only receiver with all the major options fitted as standard. Compare the prices of accessories for the JRC NRD535 and you can see why suppliers have to discount the receiver by £300. For a maximum selling price of under £1,000, you get the following:

All filters fitted, S/F, B.O., 4kHz SY
 synchronous detector for AM fitted
 Notch and Pass band fitted
 10kHz reducta
 Keypad operation 100 memories
 much more!

KENWOOD ISD200
Built like a rock and looks fiesescantly more beautiful. The RSQ5000 is offered this month with an easy payment plan that I think you will find attractive. Deposit only £99 with 12 payments of £75 120XEQ1000, INTEREST FREE FINANCE.

LOWE HF 150
Since Lowe Production introduced their receiver range, I've been proud to sell literally hundreds of pieces and say "they're British" if you used to use an R1155, AR88D to U1, HRO or B40 many years ago and always wanted to get back into listening, then wait no longer. The HF-150 is not covered in knots and hasn't got thousands of memories but it will take you into the world of listening at a very acceptable price. £389. Thats all.

LOWE HF 225
Now in its third year, the HF 225 is a milestone to which others are compared. It can take an optional FM board. (the HF 150 cannot), covers 38kHz to 30MHz and has 30 memories. Available from stock. £479, also available on interest free finance.

OTHER LOWE PRODUCTS
ModeMaster, Data decoder software £139.95
Magnetic Rantum £39.95
WireMatch antenna system £69
HF-225 Europa £699
HF-235 Professional RX £779
PR-150 & PR-250 £235

Plus the Watkins Johnson HF1000 receiver, all their DSP Audio Filters and lots more. Support your very best BRITISH RECEIVER MANUFACTURER, buy a LOWE RECEIVER or accessory from your favourite MARTIN LYNCH STORE today!

NOISE REDUCTION FILTERS
They aren't cheap, but technology never is. If you're getting a receiver without one, then your brain is getting unnecessarily fried for no reason. Reduce the listener's noise fatigue instantly fit a DSP KA-PER DSP Multimode Filter £299.00

TimeWave DSP 6kHz Noise Filter £289.00

TimeWave DSP 59 320 filter variations £299.00

JS F11-1 Wide band noise 

JS HPF-3 As above with selectable centre frequency £279.00

JS NH 0 As above with notch filters, removing multiple hertz £399.00

ENHANCE YOUR LISTENING
Computers are playing a much bigger part in peoples lives today, both at work and in the home. There is a growing number of short wave enthusiasts using computers to enhance their listening, using computer logging and decoding. It was inevitable that the technologies of radio and computing would come together at some stage and ComFocus Corp. of America have done exactly that. SoftWave consists of a remote control built into a screened box, plus all interface card that plugs into your PC, and of course the software. You will find that to have an IBM PC type computer, and we recommend at least a 386 type with 4Mb RAM and 512 hard disc space. A math coprocessor is also desirable. You will also need DOS 5.0 and Windows 3.1 or Higher.

SR RECEIVER FUNCTIONS
© AIR Band receiver
© Communications receiver
© Wandelband receiver
© HF receiver
© VHF receiver
© Fm air receiver
© VHF car receiver
© X band receiver
© 50Hz spectrum analyser
© Frequency range: 35 to 30kHz
© Tuning resolution: Hz
© Mode: AM, AM, FM, SSB, CWS, WBS
© Sensitivity: 115db @ 8kHz in 4 days
© Dynamic range: 100dB
© 3rd Order Intermodulation: 2.5kHz @ 39, 30kHz spurious
© Gain: 15db

DATONG FL3 AUDIO FILTER
The best selling audio filter, at only £149.95, its ideal for the HF1000/225 owner.

DATONG AD270/AD370
The very best in outdoor and indoor active antennas. Supplied with mains PSU, the overall length is only 1.2 metres and covers the entire 200kHz - 30MHz band.

AD270 outdoor £79.95
AD370 indoor £99.95

ALL THIS AND SO MUCH MORE ON VIEW AT MARTIN LYNCH...THE UK'S No.1 SUPPLIER FOR DECODERS, SCANNERS & RECEIVERS. CALL IN OR PHONE TODAY.
ripple after rectification.

Transistor Tr4, biased by R12 and R13 and with R10 and R11 as load, provide a quiet, low impedance a.c. ground line. This supplies the 6V bias reference for the amplifiers and the rectifiers. Transistor Tr4 also removes the need for a second supply rail for the amplifiers, saving any power supply changes in the receiver if you want to house both of them in the same box. The power supply should be stable to avoid v.c.o. frequency variations and consequent retuning of the receiver if you are saving any power supply rail for the amplifiers, Transistor Tr4 also removes the need for a second supply rail for the amplifiers, saving any power supply changes in the receiver if you want to house both of them in the same box. The power supply should be stable to avoid v.c.o. frequency variations and consequent retuning of the receiver if you are saving any power supply rail for the amplifiers.

The inductor L1 is a Toko 10RB series component and the op-amp. is a Texas TL082 device. Any amplifier, with moderate noise and low bias current needs, will work equally well. Note that the op-amp. IC1a gets its input bias current through the inductor. The small capacitors are polyester types, except for the charging decoupler C8; this should be ceramic for high frequency performance. Use tantalum bead capacitors for supply rail decoupling. All resistors can be 0.25W carbon film, 5% types.

**Setting Up**

After assembly and a thorough check to make sure that all is well, apply the power. The current drawn should be less than 20mA. Check the voltage on the emitter of Tr3; 6V is the required value. Use a signal source of 2.4kHz and 100mV p-p (36mV r.m.s.) to simulate a satellite at nearest approach. Turn R1 up to its fullest position. Use a 'scope or an a.c. voltmeter to select the capacitor C2 that gives the highest signal voltage across L1. Look at the output pins (IC1a pin7 and IC1b pin 13) of the op-amps; they should both sit at +6V d.c. and have 5V p-p (1.8V r.m.s.) of a.c. signal. If you can use a 'scope, make sure the amplifiers do not limit. If you see signs of it, increase R3 to 220 or 270Ω to reduce the signal in both amplifiers. Limiting will degrade detail in bright parts of the received image.

Turn the signal source off and check the output pin (pin 4) of the 566 v.c.o. You should see 5V d.c. and a triangular waveform of amplitude 2.3V p-p (about 0.9V r.m.s.). Measure the frequency with a counter, or the tuning scope provided in the computer software. The frequency should vary from about 600Hz to about 4kHz or more.

Switch of the signal source off and check the voltage to ground on the emitter of Tr3 - you should see about 5.1V. Turn on the tone again and the voltage across R5 should rise to about 2.5V. Swing the rotor of R1 through its travel and watch the R6 voltage change smoothly between these two values. The circuit is now working and ready to set-up.

**Alignment**

To save waiting hours or days between satellite passes, measure the signal voltage provided by your receiver when it is delivering one very pale picture, e.g. from a night time pass. This will give the near white - typically 100mV for a recorder output. No signal (silence) to the converter is the black value. Set this white voltage on the signal source. R1 is the equivalent of the contrast on an old fashioned TV. The v.c.o. frequency is varied independently of the incoming signal by R17 - brightness on your TV. Set these controls to mid-travel.

Before you proceed any further check the voltage between the ground connection used by your computer, and the ground rail of the converter and receiver - this must be within a few tenths of a volt of zero - both a.c. and d.c. Only when you are sure no accidental application of a damaging voltage to your PC is possible, plug in your interface lead.

Start up the computer and initiate the fax program. Using the signal source, the internal software tuning scope and R1 and R17, set the white and dark levels. Use R17 to set the dark level when no signal is present (when R1 is turned right down). The prototype uses a dark frequency of 850Hz. Set the white value with R1, while the signal source is providing the equivalent of a good white signal. A good value to aim at is 3.2kHz. Go back and check R17 again, if you have to readjust it you may need to readjust R1 as well. Swing the signal source amplitude up and down between white and black levels. The tuning scope trace level on the screen should move up and down with signal amplitude.
Pictures

The system is now ready to receive its first picture. Set the software configuration to
120 l.p.m. (lines per minute), IOC 576 (Index Of Compatibility - a way of saying how wide and high a picture is). Plug in the receiver and wait for a satellite to come by. If all the setting-up was done accurately you will see a picture start to form, looking like a double strip, for a NOAA satellite. One is a visible light image of the planet, while the other shows an infra-red picture. Along the edges of the picture you will find a sequence of tone wedges or steps. These indicate how well the picture is being displayed. The steps in each wedge range from black to white, and you should see a different shade for each of the eight steps. If your computer has a SVGA display you can zoom into the fuzzy strips next to the tone wedges. These will resolve into fine lines formed by tone burst control signals sent for automatic receivers. If the picture is offset left or right do not worry - you can centre it after the satellite has passed. With experience, minor adjustments to the hardware and software controls will bring up the best contrast and definition possible from this simple system. I think you will be pleased with the result.

You will find that your NOAA and Meteor pictures are slightly curved with the hollow side to the right. The cause is the Doppler shift acting on all the picture signal components.

NOAA satellites travel at about 15km/sec, which can cause a maximum Doppler shift of about 3.1kHz at ground level. Since this species of interface and picture imaging does not offer active synchronisation, there is nothing to be done about it. You can use this effect to recognise which way up a picture was received since it will always be curved to the right when scanned from the top down. Also, when the trace is truly parallel with the screen sides, the satellite is at its nearest approach for the current pass. Many of the satellite passes approach from the south which causes the picture to appear upside down.

If you find a faint, but annoying, herringbone pattern on the picture, check the gain of IC1b. Amplifier IC1a should have a gain of 60 and IC1b should be exactly 1. The pattern is due to 2.4kHz getting through to the v.c.o. control pin, because the two signals applied to the rectifier are not quite symmetrical. Trim the gain of IC1b to achieve unity gain. Radio pagers can also cause interference.

Costs

The receiver, computer and software are not discussed here. I assume most people thinking about building an interface like this already have this equipment. The software may also be to hand. Shareware titles offer the most cost effective way of starting in this field. Most of the bits will come from the proverbial junk box. However if you do have to buy anything, the amplifier chip, v.c.o. chip and inductor should cost less than £1 each, the transistors, capacitors and pots, 30p each and all the resistors for less than £1. You may have to scrounge a small piece of prototype board. No case or connectors are needed if the converter is fitted inside the satellite receiver's box.

You Will Need

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<tr>
<th>Resistors</th>
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<td>680Ω</td>
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Miscellaneous

Prototype board 63 x 89mm
**Aerial Techniques**

RR-50 Manually Tuned Satellite Receiver

This fully manually controlled satellite receiver is ideal for the enthusiast as it has a fully variable LP control (12-20MHz) plus a secondary audio IF bandwidth control, eight front panel user controls, a signal level meter, video and audio output options, 14/18V LNB options, CAU switching, two standard 5.5/6MHz system BNGs and two individual audio subcarrier viewers when call or write for full specifications and details on the various options.

For the ultimate in versatility this is hard to beat at just £199 (+ £9 carriage).

**Complete Systems**

If you are looking for a complete enthusiast's motorised satellite system, just call or write for prices.

- A 90cm or 1.2m spun aluminium prime focus dish
- A mount
- Aluminium head/husky ground stand
- A wideband feedhorn
- A wideband electromechanical low pass Racal polariser
- A QTR (very low noise) UHF covering 10.55-11.75GHz
- A 1.2dB Superb actuator arm
- A BBC 1600 RR-50 manually tuned stereo satellite receiver complete with variable bandwidth filter
- An Antenna motor manual satellite position

All this for just £499 (with 90cm dish) or £599 (with 1.2m dish).

---

**TWO OF THE BEST**

POP ALONG TO ONE OF THE 2 RADIO HAMSTORES AND TRY THESE SUPERB HF RECEIVERS FOR YOURSELF - WE KNOW YOU'LL BE GLAD YOU MADE THE TRIp.

**IC-R71E HF RECEIVER**

ICOM's IC-R71E is a great shortwave receiver with the following features:
- All-mode and general coverage + DFM circuitry + 32 memory channels
- Notch-filter system + Passband tuning + Direct frequency entry + Optional remote-control + 3 scan functions.

---

**IC-R72E HF RECEIVER**

ICOM's compact IC-R72E has more than lived up to expectations, features include:
- Frequency range 30kHz-30MHz + USB, LSB, CW, AM and optional FM
- Direct keypad entry for improved programming versatility + 99 memory channels + 2 independent scan-edge channels + Built-in 24-hour clock and timer + Advanced DDS system + 100dB dynamic range + Level-selectable noise-blanker and much more.

---

**Specialist Televisions**

We can offer a range of television sets that are ideally suited to the DX enthusiast and we have something for every pocket.

7" Mono

This 7" portable (12V or mains) monochrome multi-standard VHF/UHF TV is perfect for use in the UK, France & Europe. It has 5.5MHz automatic sound switching plus 6.3MHz A.M. out together with control. Selection negative video switching. Both VHF and UHF have continuous v.c.a. tuning with good sensitivity and sharp selectivity and there's a 740 line input as well as the supplied v.h.f. antenna.

All this for just £133 (+ £9 carriage).

23cm (9") Colour

This 23cm (9") video set has a back marks picture tube and is perfect for multi-system reception. With coverage of 9 TV standards and 120 c.c. or 240 c.c. operation, it can be used world-wide. It covers the V.H.F. bands (bands 1, 2 & 3), U.H.F. inc. in-between and PAL system E (Europe), PAL system D (China), SECAM D/K (France), SECAM D/K (East Europe), SECAM D/K E (Germany) as well as NTSC System M, NTSC 4.43/5MHz.

It also has the usual features you would expect from a quality colour television such as:
- High Tech tuning with a discrete frequency synthesiser - direct channel selection and automatic tuning
- On-screen display with programme name, news, views of volume, colour contrast and brightness
- On-screen user menu guide (10 languages)
- Sleep timer with direct minute input via remote control

Send for our 34 Page Catalogue at £1.

---

**Two of the Best**

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**HERNE BAY:** - CHRIS - Unit 8, Herne Bay West Industrial Estate, Sea Street, Herne Bay, Kent CT6 8LD. Tel: 0227 741555. Fax: 0227 741742.

OPENING TIMES: Tuesdays to Fridays: 09:00-17:00 & Saturdays: 09:00-16:00.
Pride of place in this month's Reflections must go to the DXers who have taken advantage of the many mid-season disturbances in the 'E' region of the ionosphere and the predominantly high atmospheric pressure and hot, sticky weather, which at times upset the troposphere, to log radio and television signals way outside their normal range.

Sporadic-E

Sporadic-E openings were noted by Richard Gosnell (Swindon) on May 31 and June 1, 2, 8, 11, 15, 17-19, 22, 24, 25 & 30. On the 18th, he heard various Catholic church services from 106.8 to 107.7MHz and a baseball commentary from the US Armed Forces Radio Service on 107MHz. Richard saw a massive brass band competition on the evening of the 16th, Arthur Grainger (Carstairs Junction) logged RDS and Radiotext signals from a station called Ascolito on 97.2MHz, RAI MF3 on 95.3, 96.3 & 97.3MHz plus their sister station, RAI MF1, on 88.9MHz and RPI International on 96.6MHz.

From his home in Redditch, Richard Wood, using a Roadstar TV-400N and a loft mounted telecopic antenna, logged programmes and test-cards from Italy (RAI UNO) on June 26, July 2 & 7, Russia (with a boxed '1' on lower right of screen) on July 2 & 23, Spain (TVE1) on June 26 & July 28 and Sweden on July 2. While on holiday in Cornwall between the 9th & 22nd, he received pictures from Czechoslovakia, Italy, Norway and Sweden. Richard also reports seeing, within various programmes, the items Aitaina, Avance, MAFRA BCN, HOBOTN, NTA, SLO and Teleediciario.

Around 1800 on July 13, Richard Bell (Melton Mowbray) saw a film with SLO-1 in the top right hand corner and then caught a glimpse of a game show. During the evening of the 16th he watched the news from Italy (RAI UNO) and saw a programme with the letters HRT in the top left and another, which looked like a lottery, called MAGA LUNA. From 1757 to 2100 on the 18th Richard logged a clock caption from Norway (NRK), a film by Antenne and the news from Italy (RAI UNO) and the evening of the 16th, Divis on the 11th, Chatton on the 12th, Wrexham on the 2nd, Bilsdale on the 6th and 11th, Fig. 5, Rowridge Observatory on the 10th, Hannington and Mendip on July 1, Wrenham on the 2nd, Bilsdale on the 6th and 11th, Fig. 5. Rowidge on the 10th, Chatterton on the 12th, Pontop Pike on the 18th, Divis on the 23rd, Storerton on the 25th and RTE on the 26th.

In addition to the daily weather forecasts George Garden (Edinburgh) studies the long range weather forecasts every Sunday after the end of the farming programme primarily to see what DX may be on the way. From home on July 30 he found a strong monochrome picture, on Ch. 29, from the Bilsdale transmitter of Tyne & Wear TV. Later he took his portable gear, a log periodic beam and a JVC 610 receiver to Cairn O'Mount and from there the Bilsdale signal was in full colour. By changing the antenna polarity from horizontal to vertical he had perfect reception from the Eyemouth transmitter. By 1930, the weather all around him had become very misty with no landscapes visible in any direction.

However, he again checked around Ch. 30 and watched Superman in good colour, with Dutch sub-titles and, just before the next programme began he saw the word 'VARA'. George considered his expedition well worthwhile especially when he added a...
German station, possibly ZDF, around Ch. 35 and a strong coloured picture from the Darvel transmitter (Ayrshire) of BBC 1. TV transmitters have large and interesting looking masts as Tim Bucknell showed when he photographed the u.f. antenna at Freemote Point. Fig. 6: When I visited the Calbourne Water Mill and Rural Museum on July 17 I could see the Rowledge mast, Fig. 7, on the horizon. This museum is situated in beautiful countryside, on the main B3401 Newport to Freshwater Road and, in addition to agricultural implements, fire engines and a water mill, they have a number of early wireless sets on view. Among them is a Marconiphone portable from the 1920s, part of a crystal set with a dual crystal holder, an early radiogram and a 0.9in Bush TV receiver.

Between June 26 and July 8, Arthur Grainger found the airwaves quiet. However, on the 8th, there was a tropo-opening and he began receiving Band II stations from the Merseyside area. Among the stations he logged during the rest of the month were CFM (Cumbria & South West Scotland (96 4MHz) RDS & Radiotext), City FM (96 7MHz), Downtown Radio, FM 104 (Dublin), Key 103 (Manchester), Lincs. FM, Manx FM (RDS), Melody FM, Jazz FM (now calling J-FM), Radio Cleveland (95 0MHz), Radio Cymru (104 3MHz, RDS & Radiotext), Radio Leicester, Radio Merseyside and Radio Ulster (94 5MHz, RDS & Radiotext). At 0047 on the 17th Arthur detected Radiotext from TF/M for the first time. Previously he had only copied the station's name but the signal did not stay up long enough for him to see both the RDS and the RT. However, this time we saw it print 'TFM - ALL HITS, ALL DAY'.

Slow Scan Television

In mid-July, Robert Powell (Mablethorpe) had a good haul of slow scan television pictures in colour. He sent me a 5 1/4in floppy disk containing 20 of these images in GIF format. Robert copied a variety of captions from stations in Austria, France, Germany, Italy, Japan, Poland, Spain and Switzerland. Among the artistic backgrounds to the call signs were antennas, buildings, cartoon characters, equipment, flowers, people's faces and views.

After some late night monitoring, on 14MHz, toward the end of July when he copied slow scan pictures from N02J (New Jersey) and 4U1ITU, GMBH & GT, used a camcorder to take a picture of his station, Fig. 7 and transmit it to John Scott (Glasgow) on 144 5MHz. John found the '14MHz band good at times during the month with some fading even on strong signals. However, despite some interference he managed to log some interesting captions from stations in Poland, Fig. 8, Spain, Fig. 9, Sweden and Switzerland, Fig. 10. The interference lines can be seen across the top, centre and bottom of Figs. 8, 9 and 10 respectively.

Reports

In addition to your enjoyment in logging the DX and taking part in these various events you have placed on record the existence and the effect of these particular disturbances for the benefit of future scientific study. Now let's have a look at some possible natural causes.

The Sun

At his observatory in Bristol, Ted Waring, using a projection system, located 2 active areas (a. a.) and 12 individual spots on the sun's disc on July 2, 3 a.a. and 17 spots on the 7th, 1 a.a. and 1 spot on the 13th, 2 a.a. and 6 spots on the 20th and 1 a.a. and 4 spots on the 24th. In Selsey, Patrick Moore watched the daily progress of a sunspot group, on his projection screen, from July 6 to 11. Patrick kindly sent a drawing from his screen showing the group and other spots had crossed the central meridian by 0810 on the 9th. Fig. 4.

The Weather

"We are having hot and humid weather. There has been heavy rains all over India with flooding in Eastern and Central India," wrote Rama Roy on July 18. "The best of the weather came in the second part of July," said Arthur Grainger at the end of the month. He told me that after the 11th it was dry everyday except on the evening of Monday 25th when we had a couple of showers and heavy rain through the night. Prior to the 11th they had showers and a couple of thunder storms. "As I tap out this letter, we have thunder and lightning and I have turned off my h.f. receivers and earthed them, just in case it strikes my antennas outdoors," remarked John Scott (Glasgow) on August 3rd. A wise precaution John, I plan to talk more about the dangers of lightning in a later episode of Reflections.

In general, July was a hot and sticky month with midday temperatures often in the mid 80s Fahrenheit. During the month I recorded a mere 0.60in of rain compared to 3.17in for the same period in 1993. Half of this total, 0.40in, fell on the 4th and the rest was spread in small amounts on the 6th, 13th, 24th and 31st.

The atmospheric pressure from June 26 to July 25 was consistently high hovering between 30 0in (1015mb) and 30.2 in (1022mb). The readings on the pressure chart (Fig. 12) were taken at noon and midnight from my own barograph. His barograph readings enable us to see the pressure variations between the north and south of the UK (Page 68).

Weather Vane

While visiting the museum and gardens at Bressingham (Nr Diss, Norfolk), on July 9, I noticed a rather special weather vane, Fig. 11, adorning one of their exhibition buildings. In addition to their own passenger railway network, they have a fine collection of locos, carriages, including one of the royal coaches, fire appliances, stationary engines and a working steam roundabout.
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BBNV94 The Queens Guards on Parade 1993 The traditional ceremony of ‘Beating Retreat’ performed by the massed bands of the Household Division at Horse Guards Parade.

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**Satellite TV News**

The Latest from the Clarke Belt

**Roger Bunney, 33 Cherville Street, Romsey, Hants S051 8FB**

**When** an earlier deadline this month and holidays away from home, the column this month differs slightly from the norm.

**Bandula Gunasekera**, a reader in Sri Lanka has sent in a relatively simple direct circuit for a u.h.f. satellite receiver. Whereas most readers are familiar with European satellite operation in C Band at 11-12GHz and Ku Band at 11-12GHz, satellite TV available across India operates mainly at 4GHz though there are two channels available operating in the domestic u.h.f. band on Chs 51 and 54 - the 714-754MHz band - each operating within a 24MHz bandwidth. Downlinking from the Eran satellite group at 95°E with an i.f. strip in the main footprint of 500BW (Siberna and Northern Russia), the right-hand circular signals can be received on relatively simple helical Vagis, typically a 14-turn helix will provide noise-free reception. Across the Indian sub-continent signal levels fall off rapidly with a 33dBW contour in Tibet, 25dBW across Delhi and 15dBW in Sri Lanka.

**There are two programmes available, at 714MHz the Russian 1st Channel is downlinked, operating during the early morning and from late afternoon through the evening - and at 754MHz an Indian original service operates for several hours in the Malyalam, Telugu and Tamil languages. The cost of satellite u.h.f. TV is obviously much cheaper than a 2m dish, C Band electronics and a dedicated satellite downlink, the reception from the Eran space craft is naturally popular - cheap and simple equipment with a relatively simple antenna system.

Bandula has produced a simple u.h.f. circuit that is capable of receiving high quality signals from the Eran spacecraft. A standard u.h.f. tuning feeds into a 2-stage i.f. preamp and thence to a single i.c. containing a main i.f. amplifier, limiter, p.p.i. video demodulator, a.g.c., etc. The a.m. video output can be fed into a video monitor, v.c.r. or modulator. Audio is extracted after the video demod i.c. amplified and thence to the TBA120 C (5.65MHz ceramic filters establishing the sound sub-carrier frequency). The audio can be applied to the same equipment as the video baseband signal.

Many of this non-critical receiver have been made, it's a popular enthusiasts d.i.y. home project in Sri Lanka and with Bandula's agreement I will include his design for next month for others to build for Eran reception. At 99°E hike in the UK there is no chance of receiving the bird, the cut-off line of eight runs through Turkey and Eastern Poland. In general terms if you can see 99°E from your location then there is every chance of reception, several folk in South Africa received reasonable quality programme reception despite being completely off the side of the downlinking beam.

The receiver could have application in the UK as an i.m. video i.f. strip in a simple satellite receiver set-up - the output from a 950-1750GHz tuning head as found in a satellite receiver is either low u.h.f. around 470MHz or v.h.f. 700MHz. An appropriate u.h.f. or v.h.f. tuner will accept the i.f. out from a satellite tuning head depending on a u.h.f. or 700MHz i.f. output. Provided care is taken with the circuit then it will work at once. There is no p.p.i. layout provided! My thanks to Bandula for providing the circuit information.

In the long term, the Eran series of u.h.f. downlinking satellites will be released with the GaLS craft which operate at Ku using spot beams rather than the generalised one third of the earth's landmass as at present is covered.

**Orbital Sightings**

A shorter chronicle of things ethereal this month - holidays!

**Alan Smith** out in Thailand is still having problems with his combined C/Ku band feed coupled with the seeming lack of signals. Apstar 1 is in theory active though no Ku-banda downlinks have been seen, only weak and intermittent Thaicom Ku band signals have been received and those too fleeting for optimising feed alignment against focal point, etc. A comment from Av-Comm in NSW was that a client using a combined feed into a 4.6m dish received better Ku signals when a single Ku LNBF feed was used with a 1.6m dish!

Airstrikes on August 5 against the Bosnian Serbs flied activity once again from the former Yugoslavia, an EBU 7°E lease carried the familiar 'EBU Sarajevo' test pattern + news footage though the originating uplink couldn't be seen, normally the Sarajevo airport SN5 feed is carried on Intelsat 603 at 34°W but the bird's transponders were empty - unless of course the circuit used digital compression!

There are three dedicated German satellite operational, these are Messers DFS-1 Kopernikus, DFS-2 and DFS-3. DFS-3 at 23°E is a major carrier of German programming in Ku Band both FSS and Telecom. DFS-2 at 28°E and DFS-1 at 33°E are largely used and tried up for occasional outside broadcast and SN5 circuits within Germany. John Hockenhall (Cheeshire) has recently seen activity on DFS-1 @ 11.54GHz vertical at poor strength and DFS-2 at 11.675GHz horizontal with OB material. These satellites are largely overlooked when scanning the heavens in search of the more productive Eutelsats and Intelsats, it may be worth stopping by and checking them out!

**Memories of the EC Summit talks in Corfu.**

**John Lockyer (Wirral)** snapped this request on Intelsat K.

**Reapers**

During the recent political events in Israel and Jordan this facility company's test card popped up on Eutelsat II F3 @ 16° East.

**Clarke Belt News**

Some months ago it was reported that Iraq were planning a satellite TV service and further to this end their Diab satellite earth station has just undergone tests following heavy damage and demolition of the 9.75m dish in the Gulf War. Iraq is seeking access to an Indian Ocean Intelsat bird to resume telecomms and TV use. And Orbit International, the Middle Eastern 21 channel broadcaster has just launched their first programmes together with a sample/promo channel in the clear over Arabsat 1D. Problems of a financial nature still circulate the European based Euronews though France TV will continue to provide money in keeping the service going though are still seeking support from other state broadcasters. Both RAI and TVE are under financial/political pressure to pull out of the project. Use of the small satellite system for corporate/business communication is growing across Europe, particularly in the former Eastern Bloc. Both Hughes and Olivetti are evolving a European VSAT network using London's Masxtel as the operating hub. Meanwhile Orion Atlantic Network Services are launching their "Virtual Sky Network" (VSN) using a private satellite network basing the system on a single hop approach and not through a central hub, thus reducing costs and speeding network distribution - Orion will operate mainly in Eastern Europe. NB VSAT = Very Small Aperture Terminals. It's likely that the Spanish channels on Hispasat 39°W - TVE and Tele 1 and 3 have undergone tests during December, some 12 weeks after programme launch. The five channels will include sports, cultural and children's specialisations.
Amateur Bands Round-up

Listening to the Amateurs

Newcomers to the hobby often ask old-timers about the effect of sunspots on the bands. Let's start with a first vague generalisation, namely that the lower frequency bands open at night and are 'dead' by day, while the higher bands reverse this pattern. A second vague generalisation is that the highest frequency that can sustain traffic rises and falls roughly in accordance with the sunspot cycle. A third generalisation says that the sunspot cycle, starting from minimum, rises to a peak fairly quickly, followed by a rather slower fall back to the next minimum. A cycle takes about eleven years. At a sunspot peak we are more liable to find solar activity having upset effects on the geomagnetic field, and these effects tend to cause h doppler to become if not dead, at least comatose.

It is often said that when the higher-frequency bands are at their best at sunspot peak, the lower ones are not so good. Top Band, for example, being at best on a winter’s night at the bottom of the sunspot cycle. There is some truth in this. At any point in the sunspot cycle we look for a higher than average spot count and a low geomagnetic inclination. These factors would give us ‘good’ conditions. The latter is represented by a K index of 3 or less. The information can be obtained quickly from the DKOWC beacon on 10mHz; if you can't read Morse, record it on tape, slow the tape down and decode it letter by letter!

Finally, we must never confuse the words ‘open’ and ‘awake’. For example, if the peak propagation to some Pacific Island happens to occur at a time when that amateur is asleep in bed, then you won’t hear him, even if the band is open!

Letters

Kick-off this time with Geoff Crowley in Aberdeen, who now has his licence, but is looking-out for something with which to transmit. As he rightly says, the only home-brew designs he knows of seem to be either at h.f. or up in the GHz range. A problem, this, as my own personal inclination would be a good converter design. A tunable i.f. of 14-16MHz means you can read frequency directly from the scan receiver, and also avoids that annoying ‘birdie’ in the middle of the band that many 28-30MHz i.f. converted designs display. After that, a simple transmitter can be built either using crystals for each chosen output frequency, or maybe some variety of synthesiser.

However, Geoff's listening is still pursued, and Geoff notes on 3.8MHz 3XODE, 5ZFM, 9MBDB, 9V1XO, PY4QO, TA2DS, V8SB, ZS6IR, 5LSCU, VE1XZ, VK5AY, P2BHV and ZS6OLL, a South American net on 7MHz included LUS6F, LU7-YK, TA2DS, ZP6CC, ZP6VS, CPEPB, VE11F, VE5AUU, VE2CR, J8BBW, and a CW station at punes Aa, a mole. Up now to 14mHz where 9K2MU was noted along with assorted Europeans, and 28mHz which was only European. Southwards now, to Hastings, where John Heys comments that he hasn’t come across a W on 21MHz for weeks. On the other hand, Y1A, TTHPS, E1LEW, J8HCQ and HSO2AZ combined to relieve the pain a little. Down on 18mHz John mentions the G3SDE gang operating as J8YDE, and G3RFX operating as Z82FX. Has anyone noticed the odd signals appearing on 7, 10, 14mHz (and maybe elsewhere) that are quite unidentifiable, but then suddenly clear to give what seems to be an amateur call-sign? Seemingly there is a scrambler in circuit. Anyone out there who can give me useful reports - date, time, precise frequency, any information on the call-sign, who working, and so forth. I will pass the information on. G3OEXU at Dunnet Head finds them regularly at night at enormous signal strengths.

Lindfield in Sussex is the home of Tony Capon, who reports that he found Top Band rather quiet this time with only a couple of Gls and G3NKC noted. However, 3.5MHz saw W1XJ, K9OU, L8OU, GM2HCX, VE5UJ and an assortment of GB special-event calls. On 7MHz Tony spotted ZB5SO, GM2CWL up in Inverness, while sessions in the small hours produced AA1AS, PY7MV, JWC, VK7AZ, L32J, L2UF, RM2K, ZP6CC, UX9DR, ZL4K, W8SB and T74CQ. Looking to 14mHz we see K9GC, ZR4AF & T7X2Q, and on 18mHz P8JAD. Finally, 28mHz where Tony seems to have connected to most of the openings; by now of course these will be odd due to what is normally think of as v.h.f.-style openings.

Disaster!

Readers of the Daily Telegraph of August 9 will have been appalled by the decision of the Science Museum to close down GB2SM. Rob Mannon G3XFD as Editor of our sister-magazine Practical Wireless, has registered his protest on behalf of radio amateurs and listeners.

Back to our regulars; Luciano Marcuardt in Hereford seems to find a many of genuine long-distance openings on 28MHz, by way of ZE2Q and LG19, 21MHz with several contacts, and 9G1MR. 21MHz netted him 9K2ZC, JS2AF, ZS64F, PY0TUP, Z36U and S92YJ. Down on 14MHz and here Luciano noted Z870X, U07M and 870A receiver enter at this point. His ‘top of the Pops’ was the station signals from TransUNICOM from Napier around 0100UTC as a ‘special’ covering President Clinton’s Gulf summit meeting. At 0600 John noted SX3HY C91BX, TJ2UL, V32EF, VP3NML, T41CF, VE2AUM, J92ZZ, QG8PB, VP8LFA, J9EYVA and, of course, the usual crop of Europeans. A station from Andorra was also heard, but John found this one too weak to winkle out the full details. Oh, yes, he also logged our local club station here in Newtown!

Here and There

I hear via The DX Bulletin that NV1CC passed away in March. That will be for the foresighted future to make NY a tough spot to hear. On the other hand, North Cooks. ZK1 is likely to be activated over the Christmas and New Year period by ZL2HJ. Note these frequencies: 3.677, 7.077, 10.137, 14.177, 14.277, 18.137, 21.177, 24.937 and 28.577MHz. The dates lie between December 25 and January 28, and will be affected by the flight schedules. QSL address is: Ken Holdom ZL2HU, PO Box 56099, Tawa, Wellington, New Zealand. If this one is successful, he hopes to try for Kermadeck ZL8 activity in 1995.

South Georgia VP8 activity is planned for January 1995 by W34YN, WA4QVD and another. The intention is to set up three complete stations and beams for 28MHz and above using verticals for the lower bands. Cards will be handled by INDX, c/o John Parrott W4FRU, PO Box 5127, Suffolk, VA23435, USA. Operation will be from Grytviken.

This is one of the rarer ones, only available by way of expeditions. Another ‘down-south’ operation will be VK2DX, by Eddie de Young VK4ET from Davis Base, Antarctica, between mid-October and March next year. The cards go to Eddie’s new home address: 131 Plantain Road, Shailer Park, Queensland 4128, Australia.

Antenna Tuners

This topic came up recently in the context of the short wave listening scene. For a transmitting station, the routine is simple; tune up first into a dummy load. Transfer from dummy load to tuner, and adjust the tuner controls until you see zero return current on the s.w.r. indicator. The indication might also be corroborated by deflection of a field-strength indicator. The listener finds it less easy.

The only way, assuming you can’t find a handy amateur to tune up for you, is to tune on signals, or on the noise from a dead band. This involves careful operation of the ‘tune’ and ‘load’ controls and the band-change switch if one is fitted. Start with maximum on ‘load’ and swing ‘tune’ from limit to limit, listening carefully for a peak in the noise. Come back a little on ‘load’ and swing ‘tune’ again, repeat this for each band until you find the best settings. Be careful that you don’t miss the peak through tuning too fast! You will probably find the two controls interact to some degree too. Notice that if you have two antennas, each fed from a separate tuner, you may find that tuning one antenna changes the tuning of the other.

Once you have the best position for that band, carefully log the settings. Repeat this for each band. It’s laborious but you do not have the test gear it’s only way. Once you have the settings for each band, I suggest you tabulate them on a piece of paper and put them where they can be referred to instantly. In my own case I have settings logged for each end and the middle of 1.8, 3.5, and 28MHz bands, and the middle of the others; these are quite good enough for a listening session and I decide to transmit a quick ‘touch-up’ using the transmitter puts the exactly right.

Finale

That’s it for another month. Letters, as usual, please, to me at Box 4, Newtown, Powys SY16 1ZZ. News, views, comments are all welcome as well as lists!
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Cricket

This month's Traffic Log contains an entry for a station using the callsign 'Cricket 15', which was reported by Geoff Crowley in Aberdeen. This particular logging deserves some further expansion.

'Cricket' is a callsign being used by the UN forces involved in Bosnia. Various 'Cricket' callsigns have been heard working 'Bookshef', which is a USAF EC-130E Hercules Airborne Battle-field Command & Control Centre (ABCCC). The 'Bookshef' aircraft are co-ordinating close-air-support missions in the area; they are often heard on 11.176MHz communicating with either Brindisi, Aviano (both in Italy) or Kiseljak (near Sarajevo).

The 'Cricket' is thought to be either one of the forward-control aircraft, or an alternative callsign for the 'Bookshef' aircraft.

On h.f., these aircraft use many discrete frequencies. When they QSY from one frequency to another, they identify the new frequency by a code number prefixed with 'push' (e.g., 'Push 154' is/ was 8.083MHz). The UN forces appear to use a frequency for a few days, and then switch to another - during early June 5.742MHz was very active for a week, and nothing has been heard since.

The callsigns are quite rare, but the first step to finding them is to identify as many of the frequencies in use. Then it is easier to identify the 'push' number with the frequency. I would be interested to hear from anyone with logs of stations mentioning 'Push' numbers.

Rwanda

As I write these words in early August, the situation in the east African country of Rwanda has got about as bad as it can. The UN and many other nations are starting to assist the refugee situation in neighbouring Zaire, and a massive airlift is now underway. The USAF has started a major operation known as 'Support Hope', to move supplies from the USA and Europe into the area. Due to the limited size of the airport at Goma in Zaire, most of the flights are operating into neighbouring countries, where they are off-loaded from jet transport aircraft into smaller aircraft for airdrops over the refugee camps. The jet transports are flying into Entebbe, Uganda (ICAO-code HUEN), Mombassa (HKMO) and Nairobi, Kenya (HKNA). The USAF flights are using the format 'Reach nnnFW'.

All of the flights are relying on air-refuelling, and these flights are using callsigns with the format 'Reach nnnC'. Some of the flights require more than one tanker aircraft to refuel them, so the tanker callsigns become 'Reach nnnTA', 'nnnTB', 'nnnTC' etc. Once again, the MC-130 Hercules from RAF Alconbury are leading the air-drop flights. The aircraft were based at Entebbe during late July in a single 17 hour flight which involved two mid-air refuellings.

The French decided to act first without waiting for the UN, so their relief efforts are much further advanced. They have also sent troops into Rwanda to try to stop the war. The French operation is known as 'Operation Turquoise' and started in late June. Due to the amount of supplies and equipment that needed to be transported into the region, the French Air Force took the unusual step of chartering a number of huge Russian Antonov transport aircraft. It was quite a surprise to hear French transport flights (using callsigns in the 'CTM 9xxx' range) on 11.300MHz reporting their aircraft type as 'Antonov 124'.

Much of the air traffic is flying up and down the airways in East Africa, so there is plenty of traffic to listen on 5.658 and 11.300MHz. The French are flying the more direct route across central Africa, so they can be heard on 8.903MHz and most of the other AF-1 and AF-4 frequencies. Aircraft flying in and around Zaire can be heard on 8.913MHz.

For those who are interested, the airfield at Goma in Zaire has a single north-south runway just under 10000 feet long, and there is a volcano rising to 10000 feet high 43km north of the airfield! The airfield does have a single h.f. frequency listed, so if anyone hears any transmissions on 8.840MHz, I would be interested in hearing about them.

Ferrrels

I recently acquired a copy of the 9th edition of the best-selling Ferrrel's Confidential Frequency List. This edition weighs in at just under 400 pages, spiral-bound with a soft cover. I particularly like the spiral-bound style, as the book stays open on the desktop when you put it down. The book itself comprises over 260 pages of frequency listing (in frequency order), followed by a reverse listing in callsign order. This latter section is printed on green paper, so it is very easy to find this part of the book. There are also chapters devoted to callsign allocations, ICAO h.f. frequencies and charts for the areas covered, a NAVAREA chart, and a listing of numbers stations. The introduction to the book deserves a special mention, as it is an excellent description of exactly what constitutes a 'utility' signal.

The frequency listing itself comprises the frequency, transmission mode, callsign (where known), location, type of transmission, and finally a column for remarks. The remarks column usually identifies the type of traffic to be heard, the shift and baud rate for RTTY signals, or the IEC and speed for FAX signals.

All in all, this is an excellent book, and well worth the £17.95 cover price. It is available from the SWM Book Service which appears at the back of every issue of SWM.

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

1.876 Reykjavik Radio (TFV) Iceland working several Icelandic trawlers.
2.591 IPL/Livorno Radio broadcasting marine navigation warnings for various areas around the Italian coast.
3.178 OST/Ostdal Maritime Radio calling for the "Tom Baker"; there was no reply from the ship.
4.631 Station '41' working station 'Footot 1', requesting that they "send non-secure for 5 minutes, and then call me back".
4.739 Neatasheld asking 'U2G to 'authenticate UJS'.
5.084 'Cricket 15' reporting 'on station' at 2136 (US accent).
5.682 Station '5 Oscar November' (English accent) working station 'Footot Whisky Victor' (French Air Force, Paris), requesting the weather for airfields LFTW (Nimes) and LFMN (Nice). 50 minutes later FWV managed to come up with the information required.
5.723 Station DTR calling MKL (RAF Edinburgh) requesting a radio-check. No reply from MKL was heard.
6.8735 Italian station ICEG working station CS, which is almost certainly involved in operations in and around Bosnia.
11.176 USAF KC-135 tanker aircraft RH 83 working Ascension GHFS, reporting their eta to Ascension as 2330. RH 83 said that they were returning to Nairobi, Kenya (HKNA). The USAF operation is known), location, type of airfield at Goma in Zaire has a single north-south runway just under 10000 feet long, and there is a volcano rising to 10000 feet high 43km north of the airfield! The airfield does have a single h.f. frequency listed, so if anyone hears any transmissions on 8.840MHz, I would be interested in hearing about them.

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Swiss Radio International is undergoing major changes in its operations. In May, it launched a 24 hour-a-day French service to Europe, transmitted exclusively by satellite. News and current affairs are the main ingredient, with features and magazine-type programmes heard during off-peak hours and at weekends. The channel, on Eutelsat II-F1, also carries programmes from Radio Sulaisa Romance, the Swiss Broadcasting Corporation's national French-language channel.

On June 6, a 24-hour English service began, this time beamed from Astra. There is a half-hour of news, current affairs, correspondents' reports and press review at the top of the hour, followed by features ranging from Swiss Scene, which looks as aspects of social and political life in Switzerland, to Down To Earth examining environmental issues in the Alpine country.

Enthusiastic short wave listeners may be disappointed to learn that the weekly Swiss Short Wave Merry-go-round presented by Bob Zanotti and Bob Thomann is a casualty of the new programme line up on the satellite. The Technorama programme does, however, deal with science and technology, and will doubtless include news about developments in broadcasting.

Changes do not stop there. A German channel and an Italian channel will be launched in the Spring of next year, both carried on satellite. Meanwhile, programmes continue to be heard on short wave, both in Europe and overseas, and on a separate sub-carrier on the Teleclub transponder on Astra, and since the summer SRI has been broadcasting from Radio France International's relay in French Guyana. The frequencies are:

- 13.635MHz 0030 to 0155UTC
- 11.62MHz 0330 to 0505UTC
- 11.64MHz 0830 to 1045UTC
- 9.77MHz 2000 to 2100UTC
- 11.65MHz 2215 to 2400UTC

Neighbouring Austria has not yet joined the satellite age, relying instead on short wave to send programmes to audiences in Europe and further afield. English is on the air at:

- 0730 & 1130UTC 6.155 & 6.137MHz
- 1430UTC 6.155 & 6.137MHz
- 1830UTC 5.945 & 5.155MHz
- 2130UTC 5.945 & 5.155 & 9.86MHz

Radio Yugoslavia continues to broadcast from its transmitters in Bosnia-Hercegovina. English is on the air to Europe at:

- 1830-1900UTC 9.72 & 6.10MHz
- 2030-2100 9.62MHz
- 2100-2130 9.595 & 7.265MHz

No More Arabic

Radio Netherlands has stopped Arabic language transmissions. The final broadcast was made at the beginning of August. The frequencies that used to carry Arabic now have English, which means that at 1530 there are two additional frequencies: 13.77 & 15.56, and at 1730 English is now on additional 9.86 and 11.655MHz.

Anniversary

Radio Moscow will be celebrating its 65th anniversary on October 29. It started out back in 1929 singing the praises of communism to the few radio listeners there were then. The station has changed dramatically since the demise of the Soviet Union, and many of the station's staff have left to join the burgeoning number of independent broadcasters that have sprung up in Moscow and St Petersburg, for example. And the Dutch service, on the air for an hour a day, was down to just one staff member by the start of this summer. The station seems a shadow of its former self.

To mark its anniversary, the station is holding a special event, asking listeners to write saying when they started to listen, what made them continue to tune in and to recall any noteworthy event that might have stuck in their mind after hearing a Radio Moscow programme (the mind boggles). The station also wants to know what its listeners think of programmes on the air at the moment, and what improvements might be made. Drop a line to Radio Moscow, Moscow, Russia. -

Radio & TV Museum at Lahti, Finland is housed in the old medium wave transmitter. The Radio & TV Museum at Lahti, Finland is housed in the old medium wave transmitter. The Radio & TV Museum at Lahti, Finland is housed in the old medium wave transmitter. The Radio & TV Museum at Lahti, Finland is housed in the old medium wave transmitter. The Radio & TV Museum at Lahti, Finland is housed in the old medium wave transmitter. The Radio & TV Museum at Lahti, Finland is housed in the old medium wave transmitter. The Radio & TV Museum at Lahti, Finland is housed in the old medium wave transmitter. The Radio & TV Museum at Lahti, Finland is housed in the old medium wave transmitter. The Radio & TV Museum at Lahti, Finland is housed in the old medium wave transmitter. The Radio & TV Museum at Lahti, Finland is housed in the old medium wave transmitter. The Radio & TV Museum at Lahti, Finland is housed in the old medium wave transmitter. The Radio & TV Museum at Lahti, Finland is housed in the old medium wave transmitter. The Radio & TV Museum at Lahti, Finland is housed in the old medium wave transmitter. The Radio & TV Museum at Lahti, Finland is housed in the old medium wave transmitter. The Radio & TV Museum at Lahti, Finland is housed in the old medium wave transmitter. The Radio & TV Museum at Lahti, Finland is housed in the old medium wave transmitter. The Radio & TV Museum at Lahti, Finland is housed in the old medium wave transmitter. The Radio & TV Museum at Lahti, Finland is housed in the old medium wave transmitter. The Radio & TV Museum at Lahti, Finland is housed in the old medium wave transmitter. The Radio & TV Museum at Lahti, Finland is housed in the old medium wave transmitter. The Radio & TV Museum at Lahti, Finland is housed in the old medium wave transmitter. The Radio & TV Museum at Lahti, Finland is housed in the old medium wave transmitter. The Radio & TV Museum at Lahti, Finland is housed in the old medium wave transmitter. The Radio & TV Museum at Lahti, Finland is housed in the old medium wave transmitter. The Radio & TV Museum at Lahti, Finland is housed in the old medium wave transmitter. The Radio & TV Museum at Lahti, Finland is housed in the old medium wave transmitter. The Radio & TV Museum at Lahti, Finland is housed in the old medium wave transmitter. The Radio & TV Museum at Lahti, Finland is housed in the old medium wave transmitter. The Radio & TV Museum at Lahti, Finland is housed in the old medium wave transmitter. The Radio & TV Museum at Lahti, Finland is housed in the old medium wave transmitter. The Radio & TV Museum at Lahti, Finland is housed in the old medium wave transmitter. The Radio & TV Museum at Lahti, Finland is housed in the old medium wave transmitter. The Radio & TV Museum at Lahti, Finland is housed in the old medium wave transmitter. The Radio & TV Museum at Lahti, Finland is housed in the old medium wave

Finally

Finally this quarter, news of an unusual radio museum in the Finnish town of Lahti. An old transmitter building belonging to Yleisradio, the national broadcaster, has been filled with old radio and TV sets and other pieces of historical radio equipment. But visitors can also sample the pleasures of modern radio listening, using some of the latest radio equipment. There is the chance to compare a Luxor Ambassador receiver dating from the 1950s with a Lowe HF-150, connected to a 120 metre long wire antenna or to a half-wave dipole. The Finnish DX Association is responsible for the modern listening equipment, promoting the radio hobby to locals as well as visitors from overseas.

AFN Shrinks

In Berlin, another remnant of the Cold War has ceased to exist. American Forces Network has broadcast from transmitters in Germany some of which have been audible in the UK. As the remaining troops leave the formerly partitioned city, AFN has shut its medium wave and f.m. transmitters there. Although the station has stopped using 1.107MHz, it can continue to be heard from the Frankfurt relay on 873kHz, which now has a new 150kW transmitter. That will be on the air only until the end of 1994, though.

Off-Shore

I wonder how many of you remember Laser 558, the off-shore station from the MV Communicator that closed some years ago? The ship is being given a new lease of life, this time transmitting a legitimate station in the Netherlands. Holland FM will be moored along a dyke between Leijstad and Enkhuizen, and make use of a 23kW medium wave transmitter.

The Radio & TV Museum at Lahti, Finland is housed in the old medium wave transmitter. The amateur radio station OH3R is operated from the Museum.
## C.M. HOWES COMMUNICATIONS

### RECEIVER KITS

<table>
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<tr>
<th>Model</th>
<th>Name</th>
<th>Description</th>
<th>Price</th>
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<tbody>
<tr>
<td>MV1</td>
<td>Medium Wave &amp; 160M receiver. Excellent beginners project. Complete kit contains everything except battery and solder. Great value:</td>
<td>£29.90</td>
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<tr>
<td>TRF3</td>
<td>Shortwave Broadcast TRF receiver for AM/SSB/CW. 5.7 to 17MHz. Kit plus HA33R Hardware Pack (case, dial, knobs etc.):</td>
<td>£41.40</td>
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<tr>
<td>DCx</td>
<td>Single Band SSB/CW for 80, 40 or 20M amateur bands or 5.45MHz HF Air. Kit plus HA8OR Hardware Pack and DCS2 &quot;S Meter&quot;:</td>
<td>£57.70</td>
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<tr>
<td>DXR10</td>
<td>Three band 10,12 &amp; 15M SSB/CW amateur radio receiver kit with HA10R Hardware Pack and DCS2 &quot;S Meter&quot; kit:</td>
<td>£64.30</td>
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### The famous HOWES Active Antennas

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<tr>
<th>Model</th>
<th>Name</th>
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<tr>
<td>AA2</td>
<td>150kHz to 30MHz ACTIVE ANTENNA</td>
<td>The neat compact answer for those with limited space, holiday use, mobile operation etc. Two selectable gain settings, local or coax powering (12 to 14V). Good strong signal performance, IP3 +38dBm. Easy to build, and much liked by customers!</td>
<td>£13.90</td>
</tr>
<tr>
<td>AA4</td>
<td>ACTIVE ANTENNA FOR SCANNERS</td>
<td>Covers 25 to 1300MHz. Broad-band performance in a neat, compact package. Just over 16 inches long. Excellent performance in a small space!</td>
<td>£27.90</td>
</tr>
<tr>
<td>AB118</td>
<td>AIR-BAND ACTIVE ANTENNA</td>
<td>Optimised for long distance reception on 118 to 137MHz air-band. Tuned antenna with pre-amp &amp; band-pass filter. Hear ground stations you've never heard before!</td>
<td>£25.90</td>
</tr>
</tbody>
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### End of Summer Sale

- **Best Satellite receiver, rotary tune**
  - Very low threshold, ideal ATV or SAT scanning
  - **£39.95 incl. + £7p+p**

- **Bush/Alba rotary tune satellite receiver ideal ATV**
  - **£29.95 incl. + £7p+p**

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  - **£7.00 incl. + £7p+p**

DRS Trading are now UK Agents and service centre for Jaeger Actuators and H-H mounts.

Please call 0932 355527 for service.
A

though v.h.f. airband frequencies are not allocated twice in close geographical proximity, interference can still occur if propagation is enhanced. There aren't enough channels for each aerodrome and beacon to have its own, even in a small country like the UK. A southern aerodrome might be on the same frequency as one in Scotland. Usually, v.h.f. can only be received along a line of sight and so the geographical distance prevents mutual (co-channel) interference.

Some weather conditions cause v.h.f. signals to travel further than expected, as noted by Richard Gosnell (Swindon). One such mechanism is Sporadic E (Es) in which dense ionised patches suddenly develop in the high altitude E ionospheric layer. Without these patches, the rest of the ionosphere (in particular the F layer) is incapable of reflecting signals back to earth. Often reflected are signals in the h.f. range, but v.h.f. just drills a hole straight through and out the other side! This makes v.h.f. a good choice for communicating with spacecraft.

Despite various theories, the origin of Es is unknown; it seems to be seasonal - summer and late autumn being typical (but this is not a hard and fast rule). When it hits a patch of Es, the v.h.f. signal is reflected back to earth a great distance away from its point of origin. A characteristic of Es is the way in which it suddenly comes and goes. It isn't often that Es affects v.h.f. frequencies as high as the airband.

Some weather conditions change the refractive index of the air at low altitude and cause tropospheric duct propagation (tropo). Typical weather would be stable high pressure, perhaps when the temperature falls at night. These ducts can appear slowly and might last several hours. Both v.h.f. and higher is affected, u.h.f. television is subject to slowly and might last several hours. Both v.h.f. and higher is affected, u.h.f. television is subject to

A new trend is to run a 'pseudo' airband; in the U.S. it is known as 'Airband' but I regret to hear from Roy Dent (Harrow) that it crashed soon after in the Western Sahara (all souls saved). Hence it won't now be appearing at this year's South Farnborough. I understand that two more airframes are in store at Coventry and wonder if they'll ever be restored to flying condition.

Looking at Graham Tanner's list of LATTC frequency changes in August, R.A. Taylor (Chigwell) notes that the Hurn sector (originally 134.45 MHz) might now be on 130.05 MHz; I previously listed the new allocation as 128.625 MHz.

Let's Fly

Peter Hawkes (3km from Halpenney Green) did! In June he went to Monastir (Habib Bourguiba) in Tunisia with Airbours MD-83 and stayed at a hotel in sight of the 08 threshold. Was that planned, was there double glazing, and what did Mrs Hawkes think? Aerodrome control was on 118.3, departures contacted Tunis Air Traffic Control Centre on 132.55 or 123.9 kHz (my sources list 132.9 kHz) or occasionally Lyneham first. A new trend is to run a commentary on low-power broadcast radio. Wings Radio (1413 kHz) being the one at Fairford. Have readers encountered these elsewhere?

Information Sources

I'm often asked where frequency lists can be purchased. The answer is in the Airband Fact Sheet that you and Keith Goodchild (Airband) can get for FREE! Just send a self-addressed envelope, with enough postage for a single A4 sheet, to the Broadstone Editorial Office (not to me). This is the first thing to do before you write to me or ring up. Otherwise, if you contact me, all I can do is tell you to send off for the Factsheet!

Mike Hack will be pleased to know that TIMBA is only the new name for the Eastwood reporting point near Galwick, in the September issue I explained why the name changed. Mike also asks why British Airways keep changing their flight numbers. I should think that with so many flights to accommodate, they need to adjust the numbering system to prevent it becoming too cumbersome.

Stud numbers are a military shorthand that speed communications. The controller tells the pilot which pre-arranged Stud to switch to instead of relaying the full frequency. The decode information is restricted in the sense that it isn't published, but some specialist businesses might be able to help. Try: Intercept, 11 Newton Close, South West Denton, Newcastle Upon Tyne.

B.767-204 G-BNCW (23807) of Britannia. Seen at Luton.

Christine Mlynek.

Shape of Things to Come

As read in the national press by Brian Taylor (Woking) satellite communications are being introduced by British Airways. Unfortunately, no air-traffic control is done by satellite; pilots still scream down h.f. s.s.b. irks trying to make themselves heard while flying over remote areas. In the UK we immediately think of the north Atlantic as an h.f. area ripe for satellite communications. The majority of the airlines operating the route are based in developed countries and the controlling authorities such as Shanwick and Gander are likewise technologically advanced.

Elsewhere, it's not so simple. Remote land areas, such as Africa and India, also rely on h.f. There is less prospect of these countries being able to invest in satellite equipment. Hence an international pressure to stick to existing technology.

British Airways, meantime, seem to be doing their own thing and probably need the satellite link for relaying operational messages back to the company base and quite possibly to provide payphones for passengers.

Frequency and Operational News

Why so many v.h.f. changes (asks Brian Taylor)? Usually, it's to resolve an interference problem. As described previously, frequencies can't be re-used in close proximity so changing one can have a knock-on effect requiring extensive alterations. In our crowded airspace, proximity to the continent also needs consideration: changing a frequency on our south coast can cause a problem in northern France!
In the July GASIL, the CAA state that Cranfield’s v.d.f. is now on 118.25 instead of 124.55MHz. ATZ debits and credits: RAF Brawdy loses its, Turweston gains one.

Tim Christian (North Walsham) updates us on the Caribbean -B (CAR-B) network. Most of the flights handled are routing north or southbound. Frequencies are 17.907, 11.330, 8.846, 6.586, 5.520 & 3.455MHz. Note that allocations are not exclusive, other circuits elsewhere in the world also use some of these frequencies.

Duxford is still confusing, even to Geoff Allgood who only lives 13km from it! Displays might be on 134.85 or 132.9MHz (the latter being a new one found by Geoff). At other times, 122.075 or 128.075MHz have been used. When control is combined with nearby Fowlmere, 120.925MHz is the one.

More display frequencies, all MHz, are supplied by Roderick McKenzie (King’s Lynn). Marham: Tower 130.675, Ground 125.9. Mildenhall: 121.7 & 123.3. Rutland Water: 129.9, Cottesmore Tower 130.2. Teams: Crunchie (wing-walkers) 118.0, Falcons (parachutists) 255.1 (I also believe 255.15 has been allocated), Grasshoppers (Dutch formation helicopters) 281.8. West Raynham has closed.

Kent Air Ambulance has 132.65MHz for operational purposes; Capital Radio’s Flying Eye links to the studio on 446.3/455.075MHz f.m. (presumably full duplex). This information is from Jason Downing (Redditch).

When NATS moves its en-route airways control to the new centre at Fareham, controllers will enjoy purpose-designed lighting in their working environment. A reader from Glasgow sent me a press cutting that shows a controller inspecting the new facilities - you didn’t tell me your name, are you in fact the person in the photo?

The next deadlines (for topical information) are October 14 and November 4. Replies always appear in this column and it is regretted that no direct correspondence is possible. Genuinely urgent information/enquiries: 081-958 5113 (before 21:30 local please).
Writing this column has brought me some recognition - on which I am undeserved! It has also shown glaring anomalies in the depth of basic radio knowledge displayed by both new scanner owners, salesmen and even long established users of scanners. As a long time radio enthusiast I find this surprising. There is far more information available today than when I started out and, okay, so the sets have become more complex and maybe more user-friendly but this ignorance is pretty abysmal and a very sorry state of affairs indeed.

There are cases where this ignorance hammers us, putting us in the realms of anoraks who constantly hover on the fringe of the hobby without ever daring to fully understand it and whose actions debase an absorbing pastime. Given the unfriendly attitude to the hobby and the low esteem it is held in many quarters, we should all strive to make sure we are aware of the essentials of a) the law as it applies to us and b) the basics we need in order to enjoy the hobby.

In directing questions in this respect I always go for the start. It may be obvious to those who know the difference between v.h.f. and u.h.f. but, for a beginner, there is often no road to be taken short of going to a shop with a handful of akers and coming out with a scanner and an instruction book. Consequently, the ‘For Sale’ ads in the back of this magazine - to name one - are quite literally full of ‘Brand New, used once and still boxed’ sets looking for a new home. Likewise, the pitfalls in the wide world are many and the sharks swimming therein bite - hard!

The question I am most often asked is what scanner do I recommend? The plain simple answer to this is easy! I don’t! I have my favourites but these are based on personal preference and experience. Also, I have sets for the bands I want. Likewise, antenna choice is based on a factor of many such as the council commissurate with living on top of Holyhead Port - and exposed to the screaming barbies south-western gales come here. To illustrate this, a discosne on my roof did not last a winter. On the other hand, a vertical did. My own choice is vertical - but each to his own.

However, to the question in hand, I now direct would-be scanner owners to the excellent books written by the late Peter Rouse viz: Scanners 1, 2 & 3. There are no better reference books available on the market. Written in an easy-to-understand way, with advice based on many years experience, the books are mandatory if you wish to make a start in the hobby (see pages 87 for details I also direct them to this magazine, which remains the only one of its kind catering to the multitude of needs within the hobby. In fact, my local corner shop now stocks the magazine - Ed please note.

With regard to a particular scanner a sale is a sale is a sale. You may think you’ve got the most sensitive set on the market, but did the salesmen tell you about the existence of an extra antenna outside? That you don’t need short wave or s.s.b. if it’s just aircraft and ships or v.h.f. you want to listen to? That any external antenna will need coaxial cable and plugs? That you can’t use TV coaxial, despite the advice that it is okay? The answer to this lot is probably not. You pay your money and you take your chance. Unfortunately.

Salvation is at hand, however! Reading the back of this magazine and reading books by Peter Rouse will put you on the right track and get you organised so that your budget isn’t stretched beyond your means. Talking to the long established dealers who advertise within these pages also gets you good advice for the price of a letter or a phone call. Quite obviously they’ll wish to make a sale as well but, in the main, I have found the ones I deal with extremely good and offering sensible advice. Not so the market trader who is there one weekend and sells you what is labelled a bargain only to be strangely unavailable for refund or replacement the following week!

Beware ‘Grey imports’. What may be cheap this week may cost you dear the next - as many people will testify. The other route to take is to pay a visit to your local Amateur Radio Club - advertised in here or in your local paper under Community Notices or the like - and ask questions. What’s more, it could lead to the license in amateur operation, giving you the chance to open up a whole new world and see things from a completely different perspective including bands.

Now, onto the mail. In the July edition of SWM, A. Hill requested details of computer controlling his Realistic PRO series scanner. The response I got back on the issue was phenomenal! Apparently, such a system for control does exist and its specifications are what can only be described as state of the art. Three such systems exist namely, SCANCAT 5.0 & SCANCAT-PRO, HE-232 Scanner/computer interface and OPTO-SCAN 456 all of which, incidentally, are available by the States. The tech specs are far too complex to go into here in any depth so I’ll pass on addresses for details. Interested parties can then communicate direct.

Datametics Inc, 575 South Bayshore Dr, Suite 8A, Coconut Grove, Fl 33133, USA.

OptoElectronics, 5821 NE 14th Avenue, Fort Lauderdale, Fl 33334, USA.

Computer Aided Technologies, PO Box 18292 Shreveport, LA 71138, USA.

While, on the subject of computers, Yaesu PRO-9800 has several supporting programmes and from Bill Atkinson of Denton, Manchester, comes news that S. Collings G4S51 has a few under the generic of ‘MONITOR’. Unfortunately, Bill omits G4S51’s address - available, however, through the Call Book for those who have it. For those who haven’t then join the club!

My thanks to the following for their assistance regarding the Realistic issue: Bill Wilson, Aberdeenshire; Peter Hawkes, Wolverhampton; Mike Newell G116GQ of Kenilworth. Goes to show that there are always others willing to help, confirming that the spirit of friendship in radio is still alive.

Another address that springs to mind regarding computers and scanners is that of Bill Chater who publishes the World Scanner Report that is filled with scanner mods and additions though aimed mainly at the Realistic range. Bill also writes modifications books for scanners. He can be contacted on:

COMTronics Engineering, PO Box 252475, San Diego, CA 92196, USA.

Ian Davis of Lydd writes a general letter on SAR, which is an interest of both of us. As Deputy Group Controller of South Kent RAYNET and also a serving Officer of the Kent Constabulary, Ian’s interests are allied to his professional ones. A member of Shoreline, the RNLI Supporters’ Club, he also runs a close watch on things at Dungeness Lifeboat Station. It’s nice to know we both share parallel views on SAR, Ian, although I have recently been stood down on my lifeboat crew since contracting diabetes. My radio interests within the SAR framework, however, remain.

Jerry Hall writes to me from Northfield in Birmingham on the Sony

Short Wave Magazine, October 1994
did not discuss the topic of feeders so here goes. Whatever you use will benefit from good examination after a while. The rays of the sun beat down and eat at the covering, cracking it and allowing moisture in. If you’ve had your feeder up for a while and it is showing signs of wear I would suggest changing it. Detrimental performance is a result of water in the coaxial feeder or broken wires, check it out before blaming the set or the antenna! It also pays to have a loop-out at the feed point, to stop water running down the cable and into a few, perhaps, sensitive places. See Figs. 1 & 2 for miniature ‘U’ clamps, eyes and loop-outs.

One other area that is often ignored by listeners is mountings or lashings. I’ve attended sites of antenna crashes at friend’s QTHRs and, on examination, found that the support wires were rotten to the point of being able to be twisted and broken by hand! The too emotive sight of someone’s badly fractured antenna is always a bit of a downer, especially when you consider that attention to preserving the wires could have avoided this! If, like me, you use a corner or chimney bracket to support your antennas, then ask yourself whether you have taken the steps to protect the mounting. Did you give the bracket a thick coat of Hammerite? Have you greased the screw fasteners? Did you grease the wires? The chances are that you did not – unless you have a rigging or antenna background.

While painting the bracket and greasing the screws may be second nature to some, attention to the life-span of the support wire is often ignored. Quite simply, a liberal coating of light waterproof grease all over the wire before erection pays dividends. One hint I will give you here, do wear gloves and have a rag handy! There is nothing worse than going all the way up onto the roof, only to discover that your hands are covered in noxious, slippery grease! One other hint as well, to ensure good security when attaching the wire to the tightening slip, splice an eye into it, not as hard as it seems if you use small bulldog grips to form the eye! You can hand-splice a ‘pukka’ eye into the wire end, but why do this when ‘U’ clamps are available and save time and effort? Again, give these a liberal coating of grease. Grease has the attraction of not only delaying rust, it also makes dismantling, next time you need too, far easier!

On that note I’ll wrap it up for this month. Again may I make the request that I will only answer personal mail if it is of a serious nature! By that I mean in connection with a specific raised within the column. Same goes for ‘phone calls. I’m adjusting on a personal basis since losing my job through diabetes and plan to go on to college to re-train. This will not affect the column or my interest in scanning but it will mean time will have to be juggled. Please bear this in mind before putting pen to paper and wanting a personal reply!

Meanwhile, keep scanning and reporting anything you hear. Until next month 73s and catch you down the log.

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Short Wave Magazine, October 1994
How to use the Propagation Charts.

The charts contain three plots. The lower dashed line represents the lowest usable frequency (LUF), or ALF (Absorption Limiting Frequency). The chances of success below this frequency are very slim. The middle line indicates the optimum working frequency (OWF) with a 90% probability of success for the particular path and time. Lastly, the upper dashed line represents the maximum usable frequency (MUF) a 50% probability of success for the path and time. To make use of the charts you must select the chart most closely located to the region containing the station that you wish to hear. By selecting the time chosen for listening on the horizontal axis, the best frequencies for listening can be determined by the values of the intersections of the plots against frequency.

Good luck and happy listening.

As you have probably noticed we at SWM do our best to produce propagation charts that are visually stimulating. To achieve this end we convert the supplied raw data into the format that you see on the page and add the bounding box. Unfortunately, last month the technology 'bit back', the result being that all the charts except Australia and South America had values that were some 16% too high.

Jacques d'Avignon VE3VIA

Short Wave Magazine, October 1994
When writing this column, the only thing that I do not enjoy is having to decide each month, which pictures go back into the folder! I receive many superb prints, often several from individual sources, making life even harder! A number of pictures are realistically coloured, though all have to reproduce well in black-and-white (at least for the time being). Be assured - they are all appreciated!

Current WXSATs

No dramatic changes during summer; as at mid-August the complement of active CIS (Commonwealth of Independent States) WXSATs increased to two following the return of METEOR 2-21 using 137.400MHz. METEOR 3-5 has remained transmitting for many weeks now (in sunlight only) on 137.85MHz. Perhaps it will be switched off by September when it arrives at the terminator (night-day boundary). For a few days in mid-August, only NOAA 11 and 12 were transmitting. The other two (NOAAs 9 and 10) coincided with their prime WXSAT, so their VHF transmissions were temporarily switched off. If you are really keen to 'prove' that they are actually operating, you can often monitor their beacons - see the frequencies listed at the end of this column. These are usually left on for longer periods.

Letters and Pictures

T Lane sent in Fig. 1, an image received during April 1993 from METEOR 3-3. This shows several features that may not be obvious to beginners, or new readers unfamiliar with WXSAT monitoring. First, the picture actually photographed on the monitor, as shown here, is displaying the full width of each line scanned by the satellite, but, in order to allow display of the full pass without picture scroll, not every scanned line is shown. The advantage of this display method is that the overall image can be appreciated in real-time (as it is received). Data from the complete pass is usually stored in RAM (random access memory) if there is sufficient, or alternatively, it can be stored on the hard drive. The software allows zooming into selected regions of the image, permitting later examination of the stored picture data at full satellite resolution. The compromise is the slightly distorted aspect of the image.

Phasing bars are seen on the left side of the picture, and aperture bars on the right. The latter form a binary measure - bars can be on (representing a one), or off (representing zero). The resulting several-digit binary number represents the degree of opening of the aperture. Monitoring METEOR passes when they are near the terminator - where darkness rapidly approaches - shows the bars reach a maximum (all 1s) at this time; you then know that the WXSAT will switch off within a few seconds. If you have a visitor watching the pass with you, they become very impressed when you announce that the WXSAT is about to switch off! (I'm giving away some trade secrets here!)

The picture shows this indicator normally changes every half-minute or so. Finally, after these bars is the fixed grey scale - a set of bars graduating from white to black.

Looking at the actual detail in the picture we see how different the METEOR sensors behave, when compared with those on NOAA WXSATs. METEOR sensors were designed to respond well to clouds and snow cover, but land - such as the UK in the middle of this image - is normally not so well revealed. Using computer image-enhancement techniques, such as 'equalisation', darker greys can often be enhanced - then the true capabilities of the METEOR WXSATs can be appreciated, often surpassing the resolution of the NOAAs.

Frank Slater of Spalding still uses his YUSLMV framesstore to display WXSAT images; mine recently developed a fault. Frank sent a picture of Iceland, received with his home set-up - see Fig. 2. I am not sure which WXSAT Frank sent but I suspect that it was a METEOR.

I recently featured a short review of the popular JVFAX (BMPC) program, which decodes WXSAT signals, (as well as h.f. utility data,) when combined with an interface. A number of JVFAX users wrote to add comments. One JVFAX user is Gordon (sorry, I can't find any other details), kindly sent me copies of some historic radio 'messages'. They included the 'first direct wireless messages from Australia', dated 22 September 1918. Gordon writes that he knew one of the sons of one of the radio staff at Oxford, when they were both attending after the war. Gordon has built his own turnstile antenna to receive a.p.t. and promises some pictures of the project in due course.

Jim and Hilda Richardson of Strathkinness in Fife, carefully added artificial colour to one of their NOAA 11 images - see Fig. 3. This was taken on May 13 around 1600UTC, and has been carefully adjusted so that no colour-spill occurs over land. I wish a full-colour reproduction could do it justice! Jim and Hilda use the TH2SAT system that I reviewed some time back. They also received an image from OSCAR-21, using their AOR AR-3000 scanner on 145.987MHz.

Recording APT

A topic not recently mentioned here, concerns the recording of WXSAT audio signals. Neill Lamb of Westhill in Inverness asked for suggestions. The audio output from a WXSAT receiver normally goes straight to the computer/decoder from where the picture is decoded and produced. This signal is itself a modulated 2.4kHz (sub) carrier, and can be (stored) recorded using the simplest of tape recorders, and replayed at a later time. Such a facility can be useful for recording signals in your absence, if you do...
not wish to leave the computer running in an automatic mode. Most WXSAT receivers include a SQUELCH mode, allowing separate connection of a cable to the player. The presence of an a.p.t. signal (or interference) opens the relay, and the cassette recorder stops. If your WXSAT receiver has an 'intelligent' SQUELCH, it will only open the connection when a 5 p.t. signal is present - therefore saving tape. My own set-up does not have an intelligent SQUELCH so I sometimes find that the tape has run out following a long period of interfering signal.

The best type of cassette recorder is the cheapest you can find! You always need to reduce the signal level feeding the recorder; this is because many recorders impose signal processing before the recording takes place - this must be avoided! Reduce the input level until the reproduced signal decodes properly. Twenty minutes experimentation means safe recordings for years. As mentioned previously in this column, I still retain several first recordings of WXATS going back to early METEOS. At that time there was no software to actually reproduce them properly from tape recordings!

Space night on Bayman

Many readers watched the 25th anniversary celebrations of the Moon Landing during July, and I wrote a feature on it for our local paper. Some amateur satellite television watchers may have noticed the 'Space night' features on the German channel Bayman, which ran several hours of superb space footage all night, every night! Andrew Staddon Quick, a fellow space enthusiast also living in Plymouth, rang me to check that I was aware of these features. Bayman have shown complete range of videos, including METEOSAT and NOAA research work on the upper atmosphere, long term studies of ozone depletion, and routine WXATS archive material. I had understood that the series was expected to end on the 25th anniversary (around July 20) but it has continued, even if a little less frequently. Many of the video sequences were accompanied by music, rather than voice.

John Wills of Fordward commented on the difference between the colourful 'blueness of the oceans and the blackness of space', as seen from the manned spacecraft, shown as above; he compared this with METEOSAT images. METEOSAT sensors respond to specific sections of the spectrum, and measure albedo, not colour. Fortunately, we can generate fairly realistic images using software to add artificial colour.

Satellite Tracking Programs

There was a very good response to my recent offer to provide copies of the BRDDOG satellite tracking program. The original version requires setting a number of parameters, such as time difference from Greenwich, but I had edited these before issuing the software. Do remember to edit in your longitude and latitude - this applies to any similar program.

Most readers reported no problems using BRDDOG. I sometimes experience a crash immediately after updating the Kepler file, but this has led only to the problem 'Geoffrey Chance' of Redruth reported an instance of the program crashing at a random time after starting. He also mentions the importance of setting the local time correctly. I only use GMT (UTC) on my computer, but the program does cater for other systems - such as BST, for which you would set the parameter to -1. Another writer, Roger Eilbeck of Godalming pointed out that the data for a couple of satellites - NOAAs 9 and 10 - show the orbit number as negative and incrementing. I have checked this carefully and can confirm this is happening, but I can see no obvious explanation, and have found no information to help in this documentation. I am looking at other satellite tracking software in order to see how reliable such programs are, so that they might be distributed via 'info'.

Kepler Parameters

I continue to receive many requests for more detailed explanations of Kepler elements. A year or two back I provided some information on this topic, and distributed a Kepler elements tutorial program earlier this year. One continuing question concerns the basic format of the epoch. This is the date/time at which various parameters of the satellite's orbit were measured. It can be provided in one of a number of forms - all meaning the same thing.

1. NOAAs Epoch 94214.744242
2. Epoch 1994 2 August

Kepler elements, as issued by NASA in standard 2-line format, give the same data, but use the format shown above. If you have to do regular conversions, it is worth making up a table of day numbers, expressing the first day of each month in this form. The decimal part of the NASA format is simply the hours, minutes and seconds expressed as a decimal of a 24 hour day. Therefore 0.5 is mid-day.

Booklets from ESA

The European Space Agency regularly publishes booklets on specific and general areas of their extensive space program. These following are available free to those who are residents of the member states:

1. Microgravity News from ESA is published three times a year by the ESA Publications Division and is distributed free of charge to all readers who are interested in ESA's microgravity research programme and its evolution. It is a somewhat technical publication.

2. Reaching for the Skies is a quarterly from ESA's Directorate of Launchers. It is primarily for those readers interested in European launchers and manned space flight systems.

3. Earth Observation Quarterly EOQ is a quarterly, distributed free to readers who wish to be informed about the evolution of various elements of ESA's Earth Observation Programme. A recent edition includes pictures from ESA's ERS-1 satellite, including a general view of French Guyana. There is a fascinating article on ERS-1 SAR (synthetic aperture radar) images of oil spill surveillance of the area Torre de Hercules near the entrance to the Ria de Coruna and La Coruna harbour, Spain during December 1992, after the oil tanker Aegaean Sea polluted the region. There is an occasional supplement to EOQ called Record of Images.

There is also a CD-ROM Guide to ERS-1 available from ESA at the above address. I understand that this CD is relatively inexpensive, but full details must be obtained directly from ESA.

Preparing for the Future, a rather technical, quarterly publication on ESA's Technology Programme.

ESA Bulletin, a quarterly magazine with a less technical content than some of the previous publications. It includes updates on all ESA space projects, in both French and English.

ESA Journal, a more technical version of the ESA Bulletin.

For anyone who wants to keep totally up-to-date with ESA events and project developments, I would recommend requesting ESA to send Earth Observation Quarterly and the Bulletin. I'm afraid they have a limited appeal to most readers.

To obtain any of these publications, write to European Space Agency Publications Department at ESTC, Keplerlaan 1, 2200 AG Noordwijk, The Netherlands.

Kepler Elements

Different options are available.

1. I will send a print-out of the latest WXATS elements upon receiving an s.a.e. and separate, extra stamp. All WXATS plus MIR are included, together with transmission frequencies if operating. This data originates from NASA, and is obtained from different BBSs.

2. I already send monthly Kepler print-outs to many people. To join the list please send a 'subscription' of £1 (plus four self-addressed, stamped envelopes) for four editions.

3. I can provide disk files containing recent elements for the WXATSs, and a larger ASCII file holding elements for many satellites. This option includes a print-out from the latest edition of NASA's microgravity research programme.

4. I can provide disk files containing recent elements for the WXATSs, and a larger ASCII file holding elements for many satellites. This information includes a print-out from the latest edition of NASA's microgravity research programme.

Frequencies

NOAAs 9, 11 a.p.t. on 137.82MHz; NOAAs 10, 12 on 137.50MHz; NOAAs beacon on 136.77 & 137.77MHz and METEORS use 137.30, 137.40 & 137.85MHz.

Fig.4 Above: NOAA 11, Britain - 13 May 1994 from Jim and Hilda Richardson.

Fig.3 Left: NOAA 9, Britain on May 8 from Dr Tony Batchelor.
PROsat II is used by most leading Weather Satellite enthusiasts. Lawrence Harris, Roger Ray and Brian Dudman are just a few who have come to rely on the vastly superior features of PROsat II. Features such as 1,000 frame full screen full colour animate, 3D, direct temperature readout and Windows export make Timestep products preferred by most users. All satellites are catered for including the awkward Japanese GMS and the very infrequent Soviet Okean series. All current SVGA cards are supported. NOAA images contain full resolution visible and infrared data in a stunning 2.4Mb file!

If you really are serious about Weather Satellites, phone or write us now for a colour catalogue and find out why the world's experts including Arthur C. Clarke use and recommend our equipment.

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

A full range of separate Antennas, Preamplifiers, Cables, Receivers and accessories are held in stock.

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England
Tel: 0440 820040
Fax: 0440 820281

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A full range of separate Antennas, Preamplifiers, Cables, Receivers and accessories are held in stock.

Timestep
PO Box 2001
Newmarket
CB8 8QA
England
Tel: 0440 820040
Fax: 0440 820281
Eberhard Backeshoff has just sent me the very latest release of his excellent software package, JVFAX 7.0. One of the main changes is to distribute the program as a self-extracting archive. To install the new version all you have to do is copy the two files on the JVFAX distribution disk to the root directory of your hard disk drive and then type JVFAX 7.0. The program will then automatically unpack all the component files. This version also creates a number of sub-directories in which to file the documents, pictures, etc. You are asked to confirm the sub-directory creation, but all you need do is type Y at each prompt. Once installed, the main program lies in a sub-directory called JVFAX 7.0 with all the files linked to it and the whole package taking around 1.4MB of disk space. This means it could just about run from a high density floppy though you’d have no room to store any received pictures. This simplified installation will be a great help to new users and effectively answers a number of readers’ letters.

As well as a number of significant program changes, the on-disk documentation has also been extensively revised. The main operational manual has now been expanded to 51 pages and covers all aspects of the program’s operation. The three important files are the main manual, interface details and what’s new. All three files are in ASCII format and can be printed simply by typing COPY “FILENAME” PRN having first set your printer font to 12 characters per inch.

When you run the program for the first time you’re presented with the familiar configuration screen where you can set all the machine dependent parameters to match your computer. For new users the important point is to set the demodulator correctly. If you are using one of the simple comparator interfaces such as the one from Pervisell, you need to set the demodulator for 4 to 6 bits on comparator. The ADRQ and IRQ settings are absolutely crucial and depend on which of your computer’s serial ports you’re using. The standard setting that should work with most computers are COM1 = ACSR 03F8, IRQ 4 or COM 2 = ACSR 02F8, IRQ 3. If you find that these settings don’t work then you need to consult your computer manuals or the dealer that supplied the machine for more information.

The first time you’re presented with the main menu you need to set your printer font to 12 characters per inch, including a number of command key changes. A simple example of this is the way in which the cursor automatically steps to the next file when deleting files in the file selection menu. For those using the more complex interfaces, JVFAX can now work with TSR interface drivers. If you have Pascal programming skills you can even write your own driver using the supplied source code as a reference. Once a TSR has been enabled, JVFAX will only communicate with the interface through this driver.

There is also a new VESA 1.2 display driver for 32K and 64K colours along with the facility to store and load colour pictures as 24-bit uncompressed TIFs. You can now also directly load JPG (JPEG) picture files, which should help save some valuable disk space.

Another useful extra is the facility to save in exactly the same way from both on-screen SSTV displays. This avoids having to make the change via the main menu and is great when tuning around the bands.

The SSTV function has also been enhanced in a number of ways and now includes a spectrum analyser type tuning display. This is shown along with the received image and makes SSTV tuning very easy. The program is also set-up to evaluate the VIS codes sent in SSTV.

One particularly useful addition to the FAX mode is the inclusion of menu driven mode selection. I always found the old method of toggling through the various options very frustrating and too easy to miss the option you want. The new system displays a small menu on the receive screen where you can select the required mode using the cursor keys. I was also pleased to see the revised zoom facility that was much easier to use than JVFAX 6. The main change was to the way in which the zoom area was sized. Whereas the old version required use of the + and - keys, the new system uses SHIFT plus the cursor keys and was far more logical.

For those of you that use your computer for logging and receiver control will be pleased to hear that the new version now includes a facility to launch up to 6 of these programs from within JVFAX. Access is via an Alt F10 hot key and all parameters are maintained on return to JVFAX.

If you’re into the direct reception of satellites, JVFAX 7.0 has a number of improvements to make life easier including automatic decoding of the SDO/S digital header information from Meteosat and other geostationary satellites.

Overall then, the new version 7.0 of JVFAX looks to be a very worthwhile improvement. If you would like a copy please see my list of offers at the end of the column. Finally, I owe thanks to Eberhard for all his hard work in producing this excellent program and would like to remind him that he is always open to contributions from listeners to show your appreciation of his hard work and generosity in making this program available to all.

Koden FAX Receiver

My earlier mention of this system appears to have stirred a few memories and several readers have written with their personal recollection of this receiver.

Day Watson joined the P&O cargo ship Strathconan as sparks back in the late sixties. At this time P&O were running three of these class of ship running from London via Cape town to Hong Kong and then on to Yokohama, Shimizu, Nagoya and Osaka. The return journey was across the Pacific through the Panama canal to Rotterdam, Hamburg and finally back to London. Shortly before Day joined the Strathconan she had lost some cargo due to a run-in with a typhoon. Following this, P&O decided to fit all three ships with their own FAX receivers. This was done whilst each ship visited Yokohama on its normal tour of duty.

Day describes the Koden as a two part cube like assetry. The top unit was the recorder whilst the receiver and control electronics occupied the lower section. One of the problems with this particular unit was the need for a separate crystal pack for each frequency. For a ship like the Strathconan travelling the best part of the world you would have needed an awful lot of crystal packs. Needless to say these were not actually available. The solution was to hook up one of the ships main receivers to supplement the Koden’s built-in unit.

Although the Koden operated with approximately A4 size paper, the use of an analogue recording technique gave some very good quality images. The use of a dry recording system was particularly good as it meant the Koden was very easy to service and keep clean. All one had to do was take it up on deck and give it a good blow through!

Just to complete this piece A. White of Bournemouth is the proud owner of one of these Koden machines and has very kindly sent me some sample prints. These should be on show in the column.

Complex Modes

Whilst there is clearly a need for me to spend much time dealing with new listeners I’ve decided to increase the number of my experienced Decorder listeners. This means spending some more time...
Offenbach Interference

This station's 134.2kHz FAX transmission is one of the most popular amongst Decode readers mainly because of the excellent re-broadcast of Meteoroscope images. The only problem being the rather persistent interference from an adjacent station. The interfering station is in fact a commercial radio location system so will doubtless remain persistent.

The secret to resolving this station is to use some additional filtering. Most of us with receivers fitted with pass band tuning (PBT) should be able to reduce the interference by careful adjustment of the PBT control.

The next best solution is to use an external audio filter such as the Datong FL2/3 or one of the new DSP based units that have been reviewed in SWM over the past few months. As I currently use an FL3 here's the procedure to use to virtually eliminate the Offenbach interference.

Start by disabling the filter and adjusting the receiver for the correct point as shown by your decoder's tuning indicator. Next set your Datong filter to CW 2 and set the right-hand bandwidth control to 3. This gives a bandwidth of 1.5kHz when using CW2. Next adjust the centre frequency (middle knob) so that the interference just disappears. Don't be tempted to reduce the bandwidth or you will start to lose the fine detail of your received charts.

You also need to make sure you don't use the Datong's RTTY setting for receiving FAX pictures. If you do you'll finding ghosting around the received image caused by the increased group delay of this mode. This process should work when using JVFax or any other decoder that needs tones at around 2kHz. If you have to alter the settings, start with the centre frequency adjustment.

Using this procedure I've been able to receive very clean images from Offenbach. If you have any other tips like this then please drop me a line with the details.

Special Offers

The following special offers are available to Decode readers. Although I try to turn the orders round in a day or two, you should allow up to two weeks for delivery.

**JVFax 7.0** - FAX and SSTV transmission and reception for IBM compatible computers.

The observant amongst you will have noticed that I'm now quoting a Compuserve address along with my range of readers' services. The main benefits of this network is the provision of a very effective international messaging system. So if you have access please drop me a line with the details.

**Compuserve Access**

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Last quarter I invited your comments on Citizens Band radio, this aspect of our hobby is now regularly covered in the press, but is nonetheless a part of the SW spectrum. Reg Hudson from Bolton began using CB in 1981 but found the band full of kids playing music. Then he saw an article in Practical Wireless about 934MHz CB. He made the change and found that the “unwanted equipment” became rare.

Mr. A. Scott of Loughborough, who worked in CB, expressed concern about this decrease in CB usage and questioned whether this was due to a lack of interest in radio or not. The article goes on to say that some people have found CB to be a useful hobby and have continued to use it.

Towards the end of the 80s those who used CB for foul language, but recently this has been less of a problem. He also mentions clubs that organise CB. He also suggests that people starting out in the CB hobby would benefit from reading SWM to gain an understanding of the radio hobby in general.

Peter Barber, writing from Coventry, reflects on his experiences. Originally, his impression was that users preferred to talk on the air rather than on the telephone. One began to understand the lifestyles and personal circumstances of users, as well as being informed of local gossip and out of town happenings.

The final CB letter comes from Mr. G. Lane in Plymouth, who says, “I would love my children to be able to understand radio, under my supervision of course, but sadly the language is not for their ears”.

Pirate Radio Books

I am still receiving letters asking where more pirate radio related material may be obtained, so here is another selection. I’ve started so I’ll finish is the title of a booklet by Dave (The Fish) Turner, he skippered his Ramsagate fishing boat Fairwind, which supplied the Radio Caroline ship Roos Revenge. This activity didn’t exactly go unnoticed by the authorities who were most interested in enforcing the law relating to Marine Offences (Broadcasting). Act that forbids any kind of support to pirate radio ships. This is £5.95 including postage from Horizon Sales, 121 Monkton St, Monkton, NR Ramsgate, Kent CT1 2JQ. This price includes a donation to the MV Roos Revenge restoration fund. Horizon Sales also sell studio quality tape recordings of Radio Caroline programmes.

Another good publication is the 30th Anniversary book called Caroline The Last Of The Pirates that contains some excellent photographs. This is just £2.95 including postage within the UK, and is available from Tony Kirk, Caroline Sales, PO Box 963, London SW2 8XL.

Recently I was fortunate enough to win a copy of Keith Skues’s new book Pop Went The Pirates by way of a competition run by the British DX Club. This fabulous book with 594 pages and over 200 photographs traces unlicensed broadcasting in Europe from 1953 to the present day. The softback version is £14.99 and hardback is £24.99 plus £4.00 for packing and postage within Europe. It is available from Lamb’s Meadow Publications, Sheffield S18 5WQ.

A rather off-beat radio related newsletter that drops through my letterbox is irregular antenna regulations? I am not in favour of beams on CB but it would be nice to use a true quarter-wave vertical or a horizontal dipole, without all the fiddling at present. I have however a perfectly legal home-grown ground plane antenna stuck in a flower border giving excellent results, so there’s the chance to experiment.

The Wave, the latest issue includes pirates, cellular phones, satellite feeds, scanning and bugging devices. The whole style of this paper is a little clandestine to say the least, if this is your scene write to The Wave, 51 St Marks Road, Canvey Island, Essex.

Holidays

One tip DXers will give you is to take your radio receiver on holiday and listen from a different location.

Recently I spent a couple of weeks cruising the Caribbean aboard the Cunard Countess. (Highly recommended, but I will obviously now have to find somewhere different to go – Ed!) It was, I suppose, added attraction to be able to sit by the pool on deck wearing light-weight headphones firmly plugged into my Sangean portable receiver. As well as the very British experience of American pirates was frequently obliterated by the vessel’s own H.F. communication system, in fact the entire ship’s superstructure bristles with antennas. An interesting experience for air travellers is to use a Walkman type of radio, the kind that uses the headphone lead as an antenna. If you sit by a window (obviously essential), you can monitor local f.m. stations as you fly above. At a reasonable altitude and due to the high speed you will hear all kinds of stations without hardly touching your tuner.

More Letters

Rob O’Fokel says he has logged less pirate activity recently, he suggests this is due to a combination of difficult reception conditions coupled with less pirate activity. Sean Cooper tells me his favourite s.w. pirate station is Britain Radio International and that he enjoys the programme of the Radio Fishe. I wonder which of the regular s.w. pirates, past or present, you find the best? Send your thoughts to me, the address is at the head of this page, so that next quarter we can look at pirates, personalities and programmes. OK!

Busted!

During the afternoon of Sunday 31 July 1994, officers from the DTI’s Radio Investigation Service intercepted a 40W transmitter belonging to the s.w. station WNKR. The unmanned station had been set up in a remote location so there were no arrests, just a note left by the officials. The message claimed they had been interfering with local services, their equipment had been taken away and a further occurrence would be met by similar action.

Disc jockey and engineer Dave Martin speaking for WNKR says they hope to be back for the stations 7th birthday later this year, obviously from a different location.

105-108MHz

A decision over the use of these frequencies has at last been made, they will be used for a combination of local and community radio. There had been suggestions for it to be used for another national network, however common sense seems to have prevailed. Many of the f.m. pirates that are commonplace in our inner-city areas could well take the opportunity to become legal community stations. At present, broadcast licences are financially out of reach of small concerns wishing to become involved in radio. If this situation were remedied the incentive to run a pirate station would rapidly diminish.
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The frequency list now includes more than 20,000 entries. A new index covers 2,000 stations in country order with all frequencies for rapid access. Up-to-date schedules of weatherfax stations (the new one of Bracknell) and teletype press agencies are listed both alphabetically and chronologically. Abbreviations, addresses, call signs, codes, definitions, explanations, frequency band plans, international regulations, modulation types, NAVTEX schedules, Q and Z codes, station classes, telex codes, etc. - this reference book lists everything. Thus, it is the ideal addition to the World Radio TV Handbook for the "special" stations on SW!

Further publications available are Guide to Facsimile Stations, Air and Meteor Code Manual (13th editions) and RTTY Code Manual (12th edition). We have published our international radio books for 24 years. They are in daily use with equipment manufacturers, monitoring services, radio amateurs, SW listeners and telecom administrations worldwide. Please ask for our free catalogue, including recommendations from all over the world. For recent book reviews see e.g. the Decode sections in SW Magazine 6, 7, 8 and 10/93, and RSC\'s AECOM 6/93. All manuals are published in the handy 17 x 24 cm format, and of course in English.

Do you want to get the total information immediately? For the special price of £ 110 / DM 270 (you save £ 23 / DM 55) you will receive all our manuals and supplements (altogether more than 1800 pages)! plus our new Cassette Tape Recording of Modulation Types.

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Radio Controlled Clocks
AMDAT stocks a large number of Radio Controlled Clocks which come in all shapes and sizes. A few are mentioned here but send an SAE for a complete list.

This new model from Eurochron offers a low cost introduction to Radio Controlled clocks. It is locked to the DCF77 signal from Germany to provide absolute accuracy while displaying British or European time.

Introductory price £27.95

ADC-60 Computer Clock
The ADC-60 allows the time on any computer with a serial port to be maintained to the accuracy of MSF and DCF. The ADC-60P will receive time information from both MSF and DCF to provide highly reliable time data on the serial port as well as the integral LCD display. The ADC-60A is a lower cost version which does not include the DCF receiver or display. Send for full details of these professional units.

MultiScan comes to Britain
AMDAT is pleased to announce that we are now able to supply this superb data interface which has been taking Europe by storm. The basic unit will receive FAX SSTV in all the latest colour modes, RTTY and TORA- FEC/NAVTEX. With the addition of the TX board, full colour FAX and SSTV can be transmitted. The MultiScan interface, which is powered from 12V, is connected between the radio and the serial port of the PC. In all modes the MultiScan software gives a real time audio spectrum display which makes tuning into signals easy. In Fax mode the full screen is used to display the incoming picture while in SSTV mode two windows are used on the screen which can be configured for receive or transmit. If you want a permanent record the received images can be saved to disk as a GIF file. The multitasking software allows GIF pictures to be loaded into the window and overlaided with text ready for sending while a picture is being received off air. Units are available built or as kits. Send for full details on this amazing product today.

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When British Summer Time (BST) ends on Sunday October 23 the clocks in the UK will be put back by one hour to display Greenwich Mean Time (GMT), which, for practical purposes, is the same as Universal Co-Ordinated Time (UTC), the time system adopted by International Broadcasters and quoted in LM&S.

The return to GMT will herald the arrival of the long dark winter evenings. There are few who enjoy the outdoor life but they will be welcomed by listeners who search for the sky waves from distant long and medium wave stations after dark!

**Long Wave Reports**

Note: i.w. & m.w. frequencies in kHz; s.w. in MHz; Time in UTC (GMT). Unless stated, logs compiled in the four week period ending July 30.

During much of July the static produced by local and distant thunderstorms made searching for the band with weak signals difficult or even impossible. There was only one report of the sky waves from the 10MHz R.A. signals (453kHz) in Clarkestown, S.Ireland. The best signal from Atlantic 252 (500/100kW) at 17.250kHz due to the potent co-channel interference from Tipaza, Algeria (1500/750kW) on 17.895MHz (Eng to Africa 1600-1700) was heard at 17.995MHz by Francis Hearne in Newry. VGC-Canada (17.995MHz) at 2215 by Charles Gillmor in Aberdeen.

There were no reports of medium wave stations after dark! The best signal observed by Tom Smyth has encountered this problem in Co.Fermanagh. His only option may be to listen when Atlantic 252 is off the air for maintenance!

**Medium Wave Reports**

There were no reports of m.w. transatlantic signals reaching the UK in July. This was not unexpected, since the long hours of daylight and the 5 hour time difference between the UK and eastern N America resulted in the path over the Atlantic being in darkness for only a short period each evening.

In contrast, the sky waves from some stations in the Middle East and N.Africa were received in the UK after dark, see chart. An increase in the strength of Spectrum Radio’s signal on 558kHz has been noticed by Clive Barwood in Sincunhorpe when the change of transmitter site from Lott Road to Crystal Palace. It was logged as SINPO 22322 at 0833 by Leo Barr in Sunderland, SIO 555 at 1851 by Andrew Stokes in Leicester and 45354 at 1933 by Bill Rowley in Colchester.

A marked improvement in the audio quality from Sunlight Radio on 252kHz has been observed by David Porter in Ludlow. Whilst in Worthing, Harry Richards (Barton-on-Humber) heard BBC Radio Sussex & Surrey announce their change of name to BBC Southern Counties Radio.

**Short Wave Reports**

The decline of Solar Cycle 22 continues with sunspot counts now down in the twenties. Day to day variations in propagation have been evident in the higher frequency bands, nevertheless many interesting broadcasts have been received here.

Despite the unreliable conditions prevailing in the 25MHz (11m) band it is no longer being used by international broadcasters.

Many broadcasters are taking advantage of the propagation conditions in the 21MHz (13m) band. Although their transmissions are beamed to chosen target areas, many can be heard here. A good example is A.Russia’s Darwin broadcast to Asia on 21.725 (Eng to 0900-1100) which has often reached our shores. It was logged as 25352 at 0900 by David Edwardson in Wellsend and a potent 55545 at 1018 by Chris Shorten in Norwich.

Other broadcasters heard here in the morning were FRI via Issoudun on 21.620 (Fr to E.Africa 0700-0700) 44444 at 0815 by Bill Clark in Rotherham & (Eng to 1100-1200) 32222 at 1116 in Leicester, R.Japan via Moyobi 21.540 (Jap to E.Asia 0800-0900) 55444 at 0815 in Storrington, Slovak R in Rimaivska Sobota 21.705 (Eng to Austria 0830-0857) 33335 at 0820 by Bernard Lockley in Slirling, Monitor R.Int via WCSN, Baja 21.705 (Eng to 0830-0857) 33335 by Donald Farnsworth in Newry.

BBC on 21.455 (Eng to Africa 1400-1500) 55544 at 1400 by Ross Okeechobee 21.500 (Eng to Eu, Africa 1700-1800) 44444 at 1400 by Andrew Stokes in Leicester.

**Chart**

<table>
<thead>
<tr>
<th>Station</th>
<th>Listener</th>
<th>Country</th>
<th>Power (kW)</th>
<th>Freq kHz</th>
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<tr>
<td>131</td>
<td>Beber</td>
<td>Algeria</td>
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<td>132</td>
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<tr>
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<td>Altorf</td>
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<tr>
<td>134</td>
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<td>2000</td>
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<tr>
<td>135</td>
<td>Keltimprad</td>
<td>Tunisia</td>
<td>1000</td>
<td>A,B,D,E,F,G,H,K</td>
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<tr>
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<tr>
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<td>Centen</td>
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<td>139</td>
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<td>140</td>
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Note: Entries marked * were logged during darkness. All other entries were logged during daylight or under normal conditions.

Listeners:
- A: Geoff Crowley, Aberdeen.
- B: Martin Dale, Stockport.
- C: Simon Hestekin, E.Bristol.
- D*: Sheila Hughes, Morden.
- E: Stephen Jones, Darwen.
- F: Eddie McKeown, Newry.
- G: George Millmore, Wootton, loW.
- H*: Fred Pallant, Storrington.
- I: Brian Oddy G3FEX, Three Corners, Merryfield Way, Storrington, West Sussex RH20 4NS.
- J: Francis Hearne, Newry.
- K: Andrew Stokes, Leicester.

Long, Medium and Short Waves

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

Short Wave Magazine, October 1994
<table>
<thead>
<tr>
<th>Station/Location</th>
<th>Frequency (kHz)</th>
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<th>Listener</th>
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Note: Entries marked * were logged during darkness. All other entries were logged during daylight or at dusk/wake.
2145 by Robin Harvey in Bourne; Monitor R.int via WCSN 2200-0200 14444 at 2215 in Kilkeel.

Later, R.Pakistan, Islamabad. 11.570 (Eng, Ut to Eu 1700-1800) was 33333 at 1815 in Stalbridge; R.Kuwait via BBCptions 2100-2130 25342 at 2100 in Kingswood. 16.IV.1968.

Several others were observed to other areas. Those noted were: R.Netherlands via Bonaire 9.630 (Eng to Aust, NZ 0730-1030) SI0443 at 1030 in Newry; R.Greece 9.345 (Eng to 1900-2050) SI0443 at 2050 in Stirling, China Rnte. 9.290 (Eng to 2000-2100), heard at 2000 by Julian Wood, Office of Greece, Athens 9.395 [Various] (Eng to 2000-2050) SI0444 at 2000 in Woonkapil, VORI Tehran, Iran 9.022 (Eng 1900-2030) SI0443 at 2030 in Kilkeel.

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


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CONTRIBUTING AUTHORS INCLUDE: HILARY CLAYTONSMITH, G4JKS; ROY CLAYTON, G4SSH, CHIEF MORSE EXAMINER; RAY ECKERSLEY, G4FJT; RON BROADBENT, G3AAJ AND PETER KIRBY, G0TWW . . .

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SHORT WAVE MAGAZINE

PCB SERVICE

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Orders and remittances should be sent to; Badger Boards, 80 Clarence Road, Erdington, Birmingham B23 6AR. Tel: 021-384 2473, marking your envelope SWM PCB Service. Cheques should be crossed and made payable to Badger Boards. When ordering please state the Article Title as well as the Board Number. Please print your name and address clearly and mark for correspondence with your order.

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SHORT WAVE MAGAZINE
October 1994

82

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- SSB tuning in 10Hz steps

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The MVT-7000 from Yupiteru provides unbroken coverage throughout the spectrum. Each one is carefully tested by us and supplied with a unique power supply that will not only recharge the ni-cads, but also run the set directly from the mains. Its beautifully styled lines and superb engineering make it the best buy for the customer who wants the widest frequency range possible.

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AOR 1500EX, boxed, six months old, rarely used, with all accessories plus latest UK Scanning Directory, cost £340, accept, £200 for quick sale. Tel: Surrey 081-644 2508.

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Having updated, I have spare Roberts RC818 world receiver, Feb '93, clean, built-in cassette recorder, b.f.o., dual time ex/aerial, digital memories, mains supplies unit, scan, I.w., s.w., m.w., f.m. stereo, £60. Irish readers. J. Bonfils, 47 Forest Park, Lexlip, Co. Kildare, Ireland. Tel: 01 624 487 147.

AOR1000 1-1300MHz with s.s.b. adapter, JIM 757 pre-amp, p.s.u., diskette, NicCads, charger and scanning books, £180. Comet CD180 wide band disc antenna, 25-1300MHz, £30. Tel: Dorset (0258) 53530.

AOR2002 base scanner, £175. New V1300 SkyScan disc antenna, £30. Trio P30 power supply, £28. Maplin s.s.b. micro module, 144MHz, £16, all excellent. Ron, Gos. Tel: (0386) 641961.

AR3000 base scanner, as new condition with original packaging, comes with global AT 1000 aerial tuner, both items for, £375 o.n.o. Tel: Wokingham (0734) 891318 anytime.

Collins 390 h.f. receiver, p.s.u., speaker and 'phones, £250. ERA Microreader Mk11 Ver. 4.1, £90. Technical Software RX-8 system, £344, FAX, Packet, SSTV etc., £455. Tel: London 081-675 1708 after 6pm.

Computer Olivetti M24, 10Meg hard disk, monitor and keyboard, £100. WS2000 external modem, £70 o.n.o. Mr. Phillips, London. Tel: 01-749 6185.

Dressler ARA900 active antenna, 25-500MHz, excellent condition, £70 o.n.o. Mr. Phillips, London. Tel: 01-749 6185.


Fairmate HP200E, 1000 channel wide band programmable scanner, 500kHz to 600MHz low band, 805 to


Signal RS535 airband receiver, as new, boxed, £170. Tel: Huntingdon (0487) 832879.

Sony CRF320, 32 band receiver, international market on short wave, one owner, manual, £100 cash. Inspect and collect. Tel: Leicester (0533) 896591.

Sony ICFS700 world receiver, v.g.c., boxed with p.s.u., £90. Jonathan Fisher. Tel: 081-429 0738 answerphone.

Sony ICFS555 world receiver, 150kHz to 30MHz, f.m., a.m., s.s.b., many features with d.c. adapter, manuals, hard and soft cases, immaculate, £180. Tel: Stockport 081-645 2950 evenings only please.

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Optoelectronics model 2300 frequency counter, 1MHz to 2.4GHz, £100 o.n.o. ARA900 Dressler active antenna, 2 to 300MHz plus, £75 o.n.o. Mr. Phillips, London. Tel: 01-749 6185.

Realistic DX200 communications receiver, 150kHz to 30MHz, u.s.b., i.s.b., excellent condition and working order, ideal first receiver, £60 plus P&P. Tel: Wells (0749) 709067.

Realistic PRO2021 200ch scanner only, £100. AOR AR1000 hand-held scanner with charger and NicCads, £150. A coupler TT1000 aerial tuner, £65. A Microota 10A d.c. power supply, £20. Andy, Suffolk. Tel: (0449) 757395 occasional answerphone.

Sangean AT8580A world receiver, complete with instruction book, excellent condition, perfect radio for the beginner, £150 o.n.o. Tel: Wirral 051-334 7813.

Scanner, Tandy Realistic PRO2006, 400 channels, 25-820MHz and 1300-1500MHz, full scan and search, usual other facilities, mains operation, fully working, like new, original receipt held, £150 inclusive. Peter, Essex. Tel: (0288) 287176 answermachine.

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Telephone number, address - and send it, together with your payment for £3.00, to Trading Post, Shortwave Magazine, Arenworth Court, Station Approach, Broadheath, Dorset BR8 1PP. If due to space constraints we have not provided an order form you can use one from a previous issue. If you do wish to use the order form, you must still send the correspondence to the foot of the page, or your subscriber number, as proof of purchase of the magazine. Attachments from retailers, or for equipment which is illegal to possess, one or which cannot be licensed in the UK will not be accepted.

Short Wave Magazine, October 1994
Yaesu FRG101E h.f. transceiver with f.m., in good working condition, mic. and handbook, £225 o.n.o. or would exchange for general coverage receiver, eg. FRG7700 in similar condition. John, West Midlands. Tel: (0384) 371246.

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Yupiteru MVT7000, 8-1300MHz, new Feb '94, hardly used, soft case, still boxed, absolute bargain at £220 o.n.o. Can deliver, Midlands or meet at convenient place. Tel: Leicester (0533) 416576.

Yupiteru MVT8000 base/mobile scanner, all accessories, power supply, manual, boxed, v.g.c., £265. Datong FL3 filter, £95. Midland 77-805 Port-A-Pac CB, NiCads, charger and box, £90. Tel: Llandudno (0492) 875433 after 6pm or answerphone at other times.

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Bearcat DX1000 receiver, condition not important, will pay delivery/collecton, Mr M. McCauley, 2 Woodlands Road, Dunlaire, Ireland. Tel: Dublin 01-265 2231.

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Communication receivers, G. W. Smith, UNR50, UR-1A, Lafayette HA600, HA800, Heathkit RG1, GR64, Eddystone, all models for cash. Lepino, Surrey. Tel: (0374) 128170 or FAX: (0372) 454381.

Ex military radio, namely R1155 must be in good working order on all wave bands, power supply also required for the above receiver. Tel: Preston (0772) 320088 evenings.

Full manual for Recal RA217 in very good condition, no photocopies, write with full details of condition and price to: K. Barker, 29 St Andrews Court, Benton, Newcastle Upon Tyne NE7 7UT.

Grundig satellite world radio model 2100, mint. Grundig professional Satellite radio with stereo model 2400, mint, or Grundig Satellite radio model 1400SL, p.w.o. Hugh McCallion, No 8 Stratford Close, Co. Londonderry, N. Ireland BT51 3ES. Tel: (0265) 43783.

Pre-war or immediate post-war HMV or Marconi combined radio and TV table model wanted by enthusiast, any condition, will collect. Usher, 85 Bromham Road, Bedford MK40 4BS. Tel: (0234) 354767.

Pyo PFR8(s) good price paid for working/workable units(s), will consider anything. Will travel. Simon, Birmingham. Tel: 021-475 9315 after 7pm.

RS35 in good condition or swap for MVT8000, mint condition or will sell MVT8000 for £250. Tel/FAX: Kent (01732) 363241.

Scrapped Yaesu FRG7 for spares or frequency dial only for KCS, good price paid. Tel: Brighton (0273) 706141.

Sony CRF160 receiver, unmodified, good condition and working order, handbook. Tel: Herts 081-446 0877.

Sony CRF230, mint, alternatively not working for spares/repair. Stereo decoder module plus other accessories required. Local collection/delivery or national carrier. Full description and details to: Webb, 89 Stove Road, Bromsgrove, Worcestershire B60 3EP.

Sony CRF5080/CRF1, panasonic rf. 6000/5000/3000. Philips AL990, Braun T 1000, Nordmende Galaxy and similar, s.s.b. for Satellite 60012/100. Offer. Sabino Fina, 859K2 Attriapils (AV), Italy.

Sony radios sales literature and catalogues from the 60s, 70s and 80s original or photostats, also Grundig and Panasonic. Dave Gerrity, Cheshire. Tel: (0663) 764014 after 6pm.

VC10 v.h.f. converter for Kenwood R2000 in good condition. Tel: Gateshead 091-489 4064.

Exchange

Icom scanner ICR7000 keypad, RC12, also CLP 5130-2 dipole antenna. Wanted Icom h.f. RX RT1E or similar or w.h.v? Tel: Basingstoke (0734) 812476.
The books listed have been selected as being of special interest to our readers. They are supplied direct to your door. Some titles are overseas in origin.

TO ORDER:
PLEASE USE THE ORDER FORM ON PAGE 91 OR TELEPHONE THE CREDIT CARD HOTLINE ON (0202) 659930.

LISTENING GUIDES

AIR BAND RADIO HANDBOOK 4th Edition
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Extensively revised & updated (October 1993). 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.
190 pages £7.99

THE COMPLETE SHORT WAVE LISTENER'S HANDBOOK UK/EU EDITION
Hank Bonnett, Harry Helms & David Harly
This book is a comprehensive guide to the basics of short wave listening. Everything you need to get started as an SWL is explained in a clear and easily understood manner. Receivers, antennas, frequencies, propagation & Q-codes, etc. are all covered. 321 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., s.h. & u.w., including two special fold-out maps. Also includes a full list of British stations, a select list of European stations, transatlantic and aeronautical services. 172 pages £8.95

FLIGHT ROUTINGS 1994
Compiled by T.T. & S.J. Williams
This guide was produced with the sole aim of assisting airband listeners to quickly find details of a flight, once they have identified an aircraft's callsign. Identifies the flights of everyone interested in the world of satellite television. Organised so that the professional satellite system installer, for whom it is invaluable, but it will be appreciated by the hobbyist as well. 80 pages £30.00

INTERNATIONAL RADIO STATIONS GUIDE
Peter Pearson
This book covers the complete short wave frequency range from 3 to 30MHz together with the adjacent frequency bands from 3 to 15kHz and from 1.6 to 3MHz. It includes details on all types of utility stations including FAX and RTTY. There are over 1800 entries in the frequency list and 3910 in the alphabetical call sign list of pros services and meteorological stations. Included are RTTY & FAX press and meteorological schedules. There are 11800 changes since the 10th edition. 534 pages £20.00

HF OCEANIC AIRBAND COMMUNICATIONS
4th Edition
Bill Laver
HF aircraft channels by frequency and band, major ground radio stations, European RT networks and North Atlantic control frequencies. 37 pages £3.95

INTERNATIONAL VHF FM GUIDE
Peter Shore
As in 'Broadcast Round-up', his column in PW, Peter Shore has laid this book out in world areas, providing the listener with a reference work designed to guide around the over-much complex radio bands. There are sections covering English language transmissions, programmes for DXers and s.w.l.s. Along with sections on European medium wave and U.K. f.m. stations, 206 pages £5.95

INTERNATIONAL VHF FM GUIDE 7th Edition
Julian Baldwin G3UWK & Kris Partridge GMAU
70 pages £2.85

MONITORING THE YUGOSLAV SERVICE
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