FOR THE RADIO LISTENER

shortwave magazine

October 1994 £1.90 ISSN 0037 - 4261

SPACE ISSUE

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Cover Subject

To go with our space theme we have chosen this picture of Los Angeles taken from space. The picture originated from NASA and was taken from the Macintosh version of *Redshift* on CD-ROM.

pw publishing ltd.

Features

Competition
Win a Lowe Europa

Regular Columns

Special Offers

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 £2.00 each including P&P to addresses at home and overseas (by surface mail).

Binders, each taking one volume are available for £5.50 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 Dorset BH18 8PW**, with details of your credit card or a cheque or postal order payable to PW Publishing Ltd. Cheques with overseas orders must be drawn on a London Clearing Bank and in Sterling.

Credit card orders (Access, Mastercard, Eurocard or Visa) are also welcome by telephone to Broadstone (0202) 659930. An answering machine will accept your order out of office hours and during busy periods in the office. You can also FAX an order, giving full details to Poole (0202) 659950.

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 G8VFH

letters

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

The Editor reserves the right to shorten any letters for publication but will try not to alter their sense. Letters must be original and not have been submitted to any other magazines. The views expressed in letters published in this magazine are not necessarily those of *Short Wave Magazine*.

Dear Sir

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. ANTENNA; sensory organ found in pairs on heads of insects and crustacea. Then from 'Wireless Constructors' Encylopedia' edited by F. J. Camm, circa 1930, ANTENNA; 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. ANTENNA; American term for aerial.

So, we may reasonably expect a telescopic rod or other short rod to be called an antenna and a wire in an elevated position to be called an aerial. However, in car spares shops we see 'car aerials' - short rods (telescopic); in catalogues, 'TELEVISION aerials' and ferrite rod aerials.

What about getting back to basics and calling a long wire an aerial and a short rod an antenna.

C. M. Lindars
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! 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 Science and Technology 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.* ***antenn'ae, antenn'as*** *(radio)." Hence our use of antennas as the plural!*

Ed.

letters

Dear Sir
I recently bought an old Russian portable (Astrad 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 (*pnp* 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 thus 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 Shopertunities 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 Snipe
Bordon
Hants

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

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-59D 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? There is 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

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 909, 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
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 evenually 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 collagues about a flashy 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.

This isn't the first time this has happened to me. Another shop who also advertise in your mag told me that when I entered the shop, 'You will not find anything of interest here'.

Don't get me wrong, I have dealt with dealers who have treated me like royalty but, unfortunately, more times bad than good.

I'm just looking forward to the next shop I enter!?

Paul Clark
Rochford
Essex

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 excelent service. We would be pleased to hear from anyone who would like to relate their own experiences, either good or bad.

Dear Sir
How about this! Repair job posted by me 0900 Monday, arrived back completed 0830 Wednesday! Awsome 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

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AR8000UK

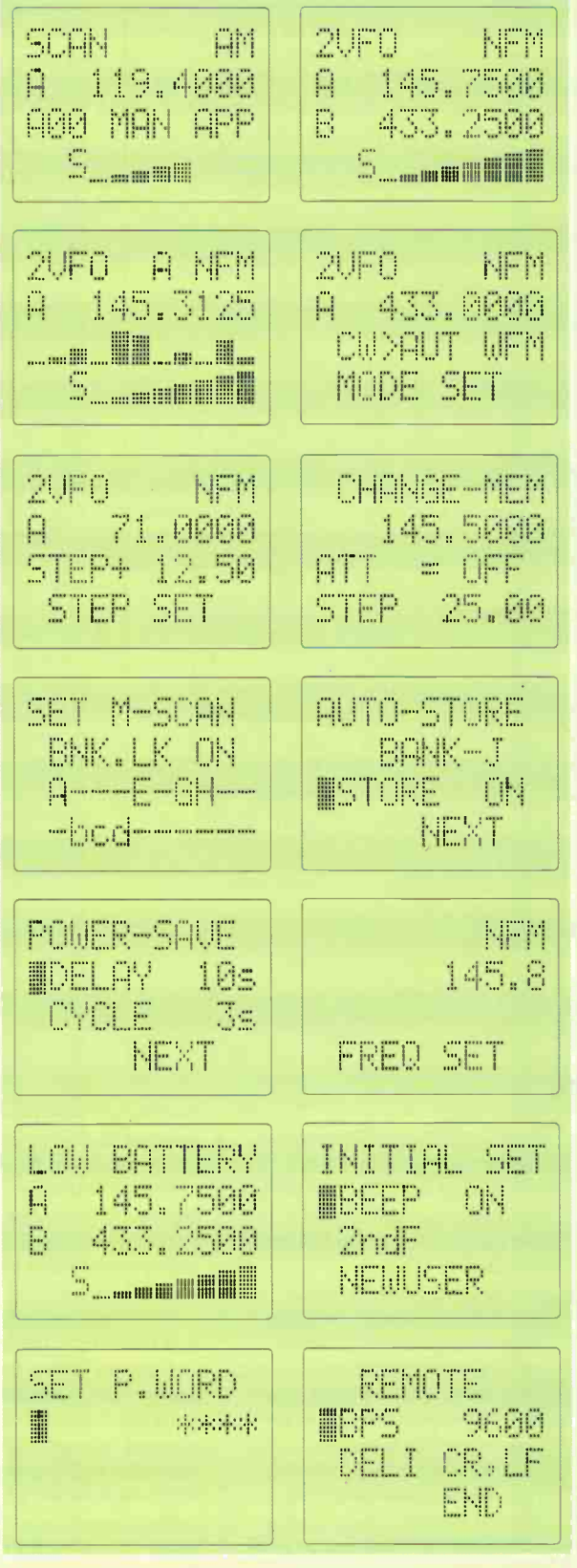
All Mode Wide Band World Band Radio Receiver

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 hand held 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 1.5 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, one providing 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.



RRP £449 inc VAT

Detailed leaflet available on request

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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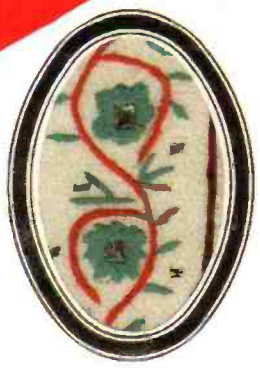
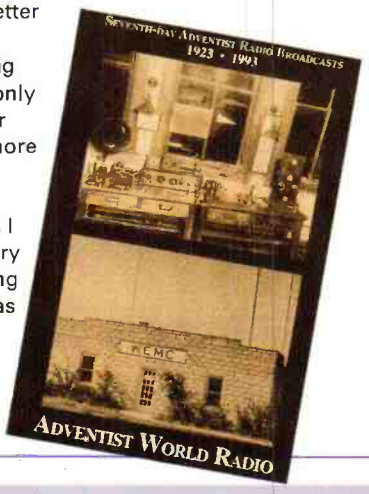
junior listener

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.

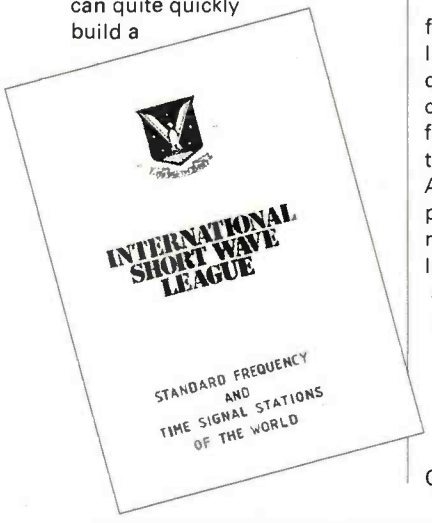
As we've talked about QSL cards the last couple of months, I thought I'd include two of my favourite cards. I enjoy the history of radio and so the card from Adventist World Radio celebrating 70 years on the air showing the first Adventist radio station was of special interest. Also the acknowledgement 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 having 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 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.

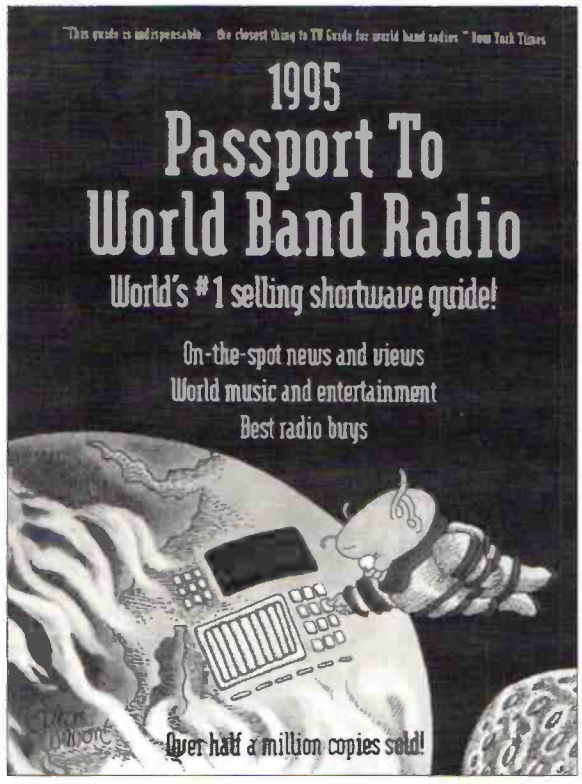
Apologies

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.

news

1995 Passport to World Band Radio

Latest edition of this invaluable guide to broadcast stations around the globe. Featuring an invaluable section on short wave receivers and how to choose them. **432 pages, £14.50. Plus £1.00 p&p.**
Available now from the SWM Book Service.



ISWL

We have just been notified by the international Short Wave League that the *Standard Frequency and Time Signal Stations of the World* has just been reprinted. It is available to ISWL members and non-members alike.

The 25 page book is filled with all the information necessary to monitor and use these fascinating stations. Chapters cover explanations of the various time systems, the transmission systems used, standard frequency and time signal stations in frequency and callsign order. The guide is available priced at £2.50 or 4IRCs post paid, from ISWL rally stands or direct from **ISWL HQ, 10 Clyde Crescent, Wharton, Winsford, Cheshire CW7 3LA.**

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.

To order or for further information contact: **ICS Electronics Ltd., Unit V, Rudford Industrial Estate, Ford, Arundel, West Sussex BN18 0BD. Tel: (0903) 731101, Fax: (0903) 731105.**

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 Suart GM4AUP as president. His term of office commences 1 January 1995. In the meantime he continues to represent Zone E - Wales.

Medium Wave Circle at Leicester

It will be possible for visitors to the show at Granby Hall to join the Medium Wave Circle on the stand which will be located in 'clubland' at the main entrance. There will be a special rate on offer to visitors to the stand for the period of the show i.e. 21 - 22 October 1994. Available will be a pack containing all the issues of the club magazine for the year to date plus a new-member's pack containing other club publications.

On the Friday evening of the show there will be a Medium Wave Circle get-together for members and other interested parties at the Grand Hotel, meeting at 1945 for 2000, anyone interested in attending this function should contact **Medium Wave Circle, 43 Atwood Drive, Bristol BS11 0SR** for further details before 15th October.

MultiScan Takes Europe by Storm

AMDAT are pleased to announce that they are now the UK importers of the superb MultiScan data interface. The MultiScan Modem transforms your IBM compatible p.c. into a professional station which enables the transmission and reception of FAX, SSTV in all the latest colour modes, and to monitor RTTY, TOR-FEC and NAVTEX. The multitasking software, which communicates via a serial port to the interface, allows creation and manipulation of the transmit screen while a picture is being received. When used with SVGA graphics 64 greyscales and 256 colours can be displayed. For more information contact: **AMDAT, 4 Northville Road, Northville, Bristol BS12 6QH.**

SWL 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 then 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.

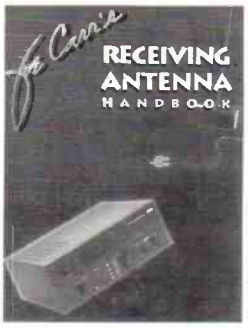
Final score is the total points on all bands multiplied by ther total DXCC countries on all bands.

- 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 BRS32525, 93 Elibank Road, Eltham, London SE9 1QJ England.
- Logs must be postmarked no later thasn 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.

Receiving Antenna Handbook

Joe Carr

Available now from the SWM Book Service.



Don't be one of those people who spend lots of money for a top of the range communications receiver and then waste its potential by using a poorly designed, inefficient antenna system. For best reception from 100kHz to 30MHz, your receiver needs an antenna that can deliver as much signal as possible. Your receiver is only as good as your antenna. This book is a complete guide to high performance receiving antennas. It is a comprehensive examination of antennas intended specifically for receiving purposes.

189 pages, £17.50. Plus £1.00 p&p.

National Transmitter News

Radio 1 FM

July 29 Bath, Avon sited at Bathampton Down, 2km east of Bath offers good stereo reception to over 85000 people in the City of Bath and the surrounding area. Frequency is 98.6MHz. The Bath f.m. station also transmits Radio 2, 3, 4, and Radio Bristol.

New BBC FM transmitters

July 29 West Kilbride, new station bringing good f.m. stereo radio reception including stereo to around 2,200 people in West Kilbride and Millport. Located 1km east of the town of West Kilbride, it entered service after a period of test transmissions which began 16 June 1994. Frequencies are, Radio 1 98.7MHz, Radio 2 89.1MHz, Radio 3 91.3MHz, Radio 4 93.5MHz, Radio Scotland 103.5MHz. This station has **vertically** polarised antennas.

July 29 Crieff, Tayside located 5km west of Crieff brings good f.m. reception including stereo to around 3,400 people in crieff, Dalginross and St. Fillans. Frequencies are, Radio 1 98.9MHz, Radio 2 89.3MHz, Radio 3 91.5MHz, Radio 4 95.3MHz, Radio Scotland 93.7MHz. This station has **vertically** polarised antennas.

Television Relay Stations:

1 August Bincombe Hill Dorset, provided jointly by the BBC and the Independent Television Commission (ITC). Located 5km north of Weymouth, it brings good television and teletext reception to about 1200 people in Thornhill and Littlemoor including the residents of Canberra Crescent, Canberra Road, Bincombe Rise and Culliford Way.

Station Details

Channels:	BBC1South West	55
	BBC2South West	62
	ITV West Country	65
	Channel 4	59
Antenna Group:	C/D	
Polarisation:	Vertical	
Effective Radiated Power:	32W (to the S & W only)	

12 July Pembroke Dock Dyfed, relay provided jointly by the BBC and the Independent Television Commission (ITC). The relay provides the possibility of improved television and teletext reception to about 560 people in Pembroke Dock, Dyfed. The relay is targeted on Pier Road, Tremeyrick Street, Arthur Street, Water Street and King William Street in the Llanion area and parts of Meyrick Street, Front Street and Sycamore Street where reception has been difficult.

Station Details

Channels:	BBC Wales on 1	58
	BBC Wales on 2	64
	HTV Wales	61
	S4C	54
Antenna Group:	C/D	
Polarisation:	Vertical	
Effective Radiated Power:	10W	

22 June Dunkeld Town Scotland, a new relay opened provided jointly by the BBC and the Independent Television Commission (ITC). The relay provides good television and teletext reception to about 250 people in the northern part of Dunkeld including the residents of Blairgowrie Road, Atholl Street and Atholl Gardens.

Station Details

Channels:	BBC 1 Scotland	33
	BBC 2 Scotland	26
	ITV Scottish	23
	Channel 4	29
Antenna Group:	A	
Polarisation:	Vertical	
Effective Radiated Power:	8W with a null to the W.	

NTL, Crawley Court,
Winchester SSO21 2QA.
Tel: (0962) 823434.

BBC Engineering Information, White City,
201 Wood Lane, London W12 7TS. Tel: 081-752 5040.

news

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 it's relay station in Rwanda earlier this year, has hired time on Channel Africa's Meyerton transmitting station. It operates from South Africa at 0300 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 3.97 MHz, and Monday to Friday at 1800 on 4.985 MHz. 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 9.81MHz

Radio St. Helena Day

On Friday 14 October 1994 the tiny island of St. Helelna 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 16.9km 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 islands 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:

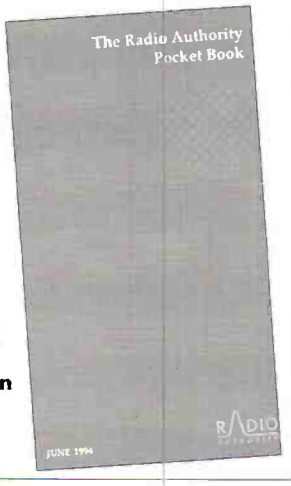
21.250 to 21.300MHz
14.200 to 14.250MHz
7.070 to 7.090MHz c.w.

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.**

Radio Authority Publishes Independent Radio Guide



The updated edition of the pocket sized guide to Independent Radio is now available. The guide features names, addresses and frequencies of all Independent Radio services in the UK.

The Guide is free and available from the **Radio Authority's Press and Information Office, Holbrook House, 14 Great Queen Street, Holborn, London WC2B 5DG.**

grassroots

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

* Short Wave Magazine & Practical Wireless in attendance

rallies

***September 20-25:** The Live '94 Consumer Electronics Show is being held at London's Earls Court One - all levels. Doors open 9.30am to 7.30pm on Tuesday, Wednesday & Sunday and on Thursday, Friday & Saturday doors open 9.30am to 8pm. There will be many exhibitors from the various sectors of electronics, covering accessories, computers, photography, security, software and much, much more. For the latest information and to pre-book tickets the hotline number is **(0891) 500103**.

September 25: The 36th Harlow Amateur Radio Rally is being staged at the usual venue of the Harlow Sports Centre, easy access of M11, Jn. 7 A414, the fully signposted route will be complemented by a talk-in on 144MHz S22 and 430MHz SU22 by G6UT, the club's own station. Doors open at 10.30am, all on site parking is free, catering and licensed bar facilities are in the complex. Further information from **Mike G7BNF** on **(0850) 487863**.

September 25: The Three Counties Rally are holding their rally at Three Counties Show Ground, Malvern, Worcestershire. There will be a large section of trade stands, usual Bring & 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 day. Further details from **G4PQZ** on **(0905) 773181**.

October 2: Blackwood and DARS Rally will be held at the Community College, Oakdale, near Blackwood, Gwent. Doors open at 10am. There will be traders, raffles, a Bring & Buy, £1 per item or job-lot. There will also be a talk-in on S22. Further details from **Norman GW0MAW** on **(0495) 227550**.

***October 2:** The Great Lumley Amateur Radio & Electronics Society will take place in the Community Centre. Doors open 10.30am for disabled visitors and 11am for others. There will be trade stands, Bring & Buy and refreshments available. Talk-in on S22. **Barry G1JDP** on **091-388 5936**.

October 7-8: The All Ireland International Radio & Hobbies Exhibition will take place at St. Patrick Hall, Cathedral Road, Armagh. **R. Ashe GI8RLE** on **(0762) 870423** or mobile **(0374) 122213**.

October 9: The Computercations 1994 Amateur Radio & Computer Rally will be held at Hillhead Campsite, Kingswear Road, Brixham, Devon. Trade stands for computer and radio, Bring & Buy, raffle and refreshments. Unlimited free parking with overnight camping available. Talk-in on S22. **Bill Trezise G6ZRM** on **(0803) 522216**.

October 9: The Kidderminster & District ARS Rally is being held at Stourport-on-Severn High School, Minster Road, Stourport-on-Severn, Worcestershire. Usual traders, Bring & Buy, refreshments and Talk-in on S22. Admission £1 per person. **Jeff G0RJP** on **(0299) 822206**.

***October 21 & 22:** Leicester ARS at Granby Halls, Leicester. Doors open at 10am each day (9.30am for disabled visitors) All the usual facilities. **Please note the date. Frank G4PDZ** on **(0533) 871086**.

***November 5 & 6:** The Eighth North Wales Radio & Electronics Show is being held at The Aberconwy Conference & The Bew Theatre, Llandudno. The show opens at 10am both days, entrance is £1.50 for adults, children under 14 free. **B. Mee GW7EXH** on **Tel/FAX: (0745) 591704**.

November 12: The All Micro Show 8, Radio Rally & Electronics Fair is being held at the Bingley Hall, Staffordshire Showground, Weston Road, Stafford (A518 Stafford-Uttoxeter Road), AA signposted from Junction 14 on the M6. Doors open at 10am to 4pm. Entrance fee is £2 for adults and children under 14 free. As usual, there will be the local charity stalls, a licensed bar from 11am, refreshments, and free parking. **(0473) 272002**.

November 13: The Barnsley & District Amateur Radio Club will be holdings its fourth Amateur Radio Rally at the Metrodome Complex in Barnsley Town Centre, less then two miles from Junction 37 M1. This is a **new** venue, all on one level with excellent disabled facilities, a licensed bar/restaurant and a separate cafeteria. The Rally will have all the usual amateur radio and computer dealers with radio clubs, specialists groups and a Bring & Buy. **Ernie G4LUE, QTHR. Tel: (0226) 716339** between 6-8pm and 6-7pm on Monday evenings.

November 13: The Midland Amateur Radio Society are holding their Radio/Computer Rally at Stockland Green Leisure Centre, Slade Road, Erdington, Birmingham. Doors open 10am, usual traders, local clubs, special interest stands, bring and sell tables, refreshments available and free car parking. Admission is £1. For further details contact **Norman G8BHE** on **021-422 9787** or **Peter G6DRN** on **021-443 1189 evenings**.

***November 20:** The Bridgend and District ARC are holding their rally at the Bridgend Recreation Centre. Doors open at 11am, 10.30am for disabled visitors. There will be a Bring & Buy, canteen and a large bar/rest room. The swimming pool is available for the family, as is the rest of the Recreation Centre. **Mike Smith** on **(0656) 722199**.

November 20: The Bishop Auckland Radio & Computer Rally will be held at the Newton Aycliffe Leisure Centre, Beveridge Arcade, Newton Aycliffe, Co. Durham DL5 4EM. Doors open 11am (10.30am for disabled visitors). **Mike Shield G0PRQ** on **(0388) 766264**.

If you're travelling a long distance to a rally, it could be worth 'phoning the contact number to check all is well, before setting off. The Editorial staff of *SWM* cannot be held responsible for information on Rallies, as this is supplied by the organisers and is published in good faith as a service to readers. If you have any queries about a particular event, please contact the organisers direct.

Editor

AVON
Bristol International RC: Tuesdays, 8pm. The Fighting Cocks Public House, Hengrove. All visitors are welcome. The club has been formed so that all 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 28, Bristol BS99 1GL.

RSGB City of Bristol Group: last Tuesdays, 7pm. New Friends Hall, Purdown, Bell Hill, Stapleton, Bristol BS16 1BG. September 27 - New members' night with wine and cheese, October 25 - AGM. Dave. (0272) 672124.

South Bristol ARC: Wednesdays. Whitchurch Folkhouse Assoc., Bridge Farm House, East Dundry Rd, Whitchurch. September 28 - Bring & Buy, October 5 - CW with club members (in house), 12th - Make your own PCs, 19th - Home construction (judging) for trophy, 26th - Simple computing programming (2nd workshop). For more information ring (0275) 834282 on a Wednesday evening.

DERBYSHIRE
Derby & DARS: Wednesdays, 7.30pm. 119 Green Lane, Derby. September 28 - Aircraft band listening, October 3 - Amateur TV group meeting, 5th - Junk sale, 12th - Visit to Trent signal box (numbers limited), 19th - Technical topics evening, 26th - The mysteries of TCP/IP - all is explained by Mike Mansfield G2SP. Mrs Hayley Winfield, 2 Hilts Cottages, Crich, Matlock, Derbyshire DE4 5DD. (0773) 856904.

DEVON
Torbay ARS: Fridays, 7.30pm. ECC Social Club, Highweek, Newton Abbot. September 23 - Monthly meeting, October 21 - Monthly meeting. Peter G4UTO. (0803) 864528.

DORSET
Dorset Police ARS: 1st and 3rd Thursday at Force HQ at 7.30pm. October 6 - Club project update, 20th - Barn dance. (0202) 229351.

DYFED
Aberystwyth & DARS: 2nd Thursdays, 8pm. Scout Hut, Plascrug Avenue, Aberystwyth. September 29 - GW0ARA on the air, October 13 - AGM, 27th - GW0ARA on the air. Katy GW0SFO. (0545) 580675.

EAST SUSSEX
Hastings Electronics & RC: 3rd Wednesdays, 7.45pm. West Hill Community Centre, Croft Road, Hastings. September 30 - Morse tuition, October 19 - Main meeting. G3YYF on (0424) 830454.

EDINBURGH
Lothians RS: 2nd & 4th Wednesdays, 7.30pm. Orwell Lodge Hotel, Polworth Terrace, Edinburgh. September 28 - Visit to the museum of communications, October 12 - Was Marconi telling lies? by Geoff Walsh GM4FH, 26th - Junk sale. GM4DIJ, QTHR on 031-337 7311.

ESSEX
Vange ARS: Thursdays 8pm, Barnstable Community Centre, Long Riding, Basildon, Essex. Sept 22 - Waves and all that by John G4XTS, October 6 - Junk sale, 13th - Spurious emissions by Robin G3JWI. 20th - Construction contest, 27th - First transmitting station by Mike G4BQF. Doris. (0268) 552606.

FIFE
Dundee ARC: Tuesdays, 7pm. College of Further Education, Graham Street, Dundee. September 27th - AGM, October 11th - Construction night, 18th - Members participation evening, 25th - Construction night. GM4FSB, 30 Albert Crescent, Newport-on-Tay, Fife DD6 8DT.

GRAMPIAN REGION
Aberdeen ARS: Fridays, 8pm. Queen Mother House, Aberdeen. September 23 - Building Competition, 30th - Talk on building competition winners presentation, October 7 - Junk sale, 14th - Talk on The Power Tower, 21st - 'Wet String' listening competition, final round. Gordon Stuart GM7PXW. (0224) 780591.

GREATER LONDON
Crystal Palace & DRC: 3rd Saturdays, 7.30pm. All Saints Church Parish Rooms, Beulah Hill, London SE19. October 15 - Before radar by B. Kendal G3GDU. Wilf G3DSC on 081-699 5732 or Bob on (0737) 552170.

Wimbledon & DARS: 2nd & last Fridays, 7.30pm. St Andrews Church Hall, Herbert Road SW19. September 30 - Siberian adventure by P. Hughes G0BXC. 081-540 2180.

HAMPSHIRE
Horndean & DARC: 1st Thursdays, 7.30pm. Horndean Community School, Barton Cross, Horndean. October 5 - AGM. S. Swain (0705) 472846.

HEREFORD & WORCESTER
Bromsgrove ARS: 2nd & 4th Tuesdays. Lickey End Social Club, Alcester Road, Burcot, Bromsgrove. September 27 - Night on the air (RTTY), October 11 - Construction/home-brew talk, 25th - Surplus sale. Barry Taylor. (0527) 542266.

HERTFORDSHIRE
Hoddesdon RC: Alternate Thursdays, 8pm. Conservative Club, Rye Road, Hoddesdon. September 31 - Learn the Morse code alphabet in under an hour by Steve White G3ZVW, October 13 - Talk by Jim Stroud, MD of Amateur Radio Insurance Services Ltd., 27th - Talk on the SS Titanic by T. M. White G0BXL. John G7OCI. (0920) 466639.

KENT
Bromley & DARS: 3rd Tuesdays, 7.30pm. The Victory Social Club, Kechill Gardens, Hayes. October 18 - Junk sale. A Messenger. 081-777 0420

Medway AR & TS: Fridays, 7.30pm. Community Hall, Catkin Close, Tunbury Avenue, Walderslade, Chatham, Kent. October 21 - Junk sale. George Packham. (0634) 685585 or Alan Stanley. (0634) 201462.

West Kent ARS: 1st and 3rd Fridays. The School Annex, Camden Road, Tunbridge Wells. October 21 - Servicing of electronic equipment by G7NOR. John Taylor G3OHV. (0892) 664960.

NORFOLK
Norfolk ARC: Wednesdays, 7.30pm. Formal and informal meetings at The Norman Centre, Bignold Road, Off Drayton Road between 'Asda' and Three Mile Cross Roundabout, Norwich. September 28 - How to generate single sideband by Mike Coan G4EOL, October 5 - Night on the air/construction QRP, Morse practice, 12th - Video of the year's events by Jack Simpson G3NJQ, 19th - Night on the air/construction QRP/Morse practice, 23rd - Used equipment sale at the Miller Hall, Norman Centre, doors open at 10.30am, sale starts 2 till 5pm, 26th - Construction contest. Mike G4EOL. (0603) 789792.

NOTTINGHAMSHIRE
Mansfield ARS: 2nd Mondays, 7.30pm. The Polish Catholic Club, off Windmill Lane, Woodhouse Road, Mansfield. October 10 - Repeaters by Mick Melbourne G0UYG. Howard G1JGY. (0623) 423697.

OXFORD
Oxford & DARS: 2nd and 4th Wednesdays, 7.45pm. The North Oxford Grove House Club. Terry Hastings G0CFN. (0865) 863526.

SHROPSHIRE
Salop ARS: Thursdays, 8pm. Oak Hotel, Shrewsbury. Aug 25 - Telford Rally Group meeting. Sept 22 - British Vintage Wireless Society by Pat Leggatt, 29th - A presentation by the Wartime Recovery Group, October 6 - AGM, 13th - 23cm - the easy way by Terry G8DIQ and John G4EAB. Sheila Blumfield G0SST. (0743) 361935.

SOMERSET
Yeovil ARC: Thursdays, 7.30pm. The Red Cross Centre, 72 Grove Avenue, Yeovil. Sept 22 - Satellite TVDXing by G4JBH, 29th - Club station on the air and committee meeting, October 6 - Using your GDO by G3ICO, 13th - Club project, the 'Coker' receiver by G3PCJ, 20th - The mystery of valve equipment by G7LNJ, 27th - Club station on the air and committee meeting. Cedric White, QTHR. (0258) 473845.

SUFFOLK
Haverhill & DRC: 2nd Mondays, 7.30pm. Samuel Ward Upper School, Chalkstone Way, Haverhill. October 10 - WW2 radio at Duxford. Rob Proctor G4PZW. (0440) 704637.

Sudbury & DRA: 1st & 3rd Tuesdays, Wells Hall, Old School, Great Cornard, Five Bells Public House, Bures Road, Great Cornard. October 4 - Talk on electrical safety and regulations by Frank G1MYD & Tony G8LTY, 18th - Natter & Noggin night. Tony Harman G8LTY. (0787) 313212

WARWICKSHIRE
Mid Warwickshire ARS: 2nd & 4th Tuesdays, 8pm. St. Johns HQ, Warwick Div., 61 Emscote Road, Warwick. September 27 - RSGB videos, October 11 - Open evening, 25th - Home-brew. Don on (0926) 424465.

Stratford-upon-Avon & DRS: 2nd & 4th Mondays, 7.30pm. Home Guard Club, Main Street, Tiddington, Stratford-upon-Avon. September 26 - Top Band d.f. construction by Geoff Foster G8UKT, October 10 - Inside your PC by Martin Rhodes G3XZO, 24th - QRP by Norman Field G4LQF. Mr A Beasley G0CXJ. (0608) 682495.

WEST MIDLANDS
Sandwell ARC: The Broadway, Warley. RAE class on Monday nights, Morse class on Wednesday nights and RAE Novice class on Thursday nights. Three operating shacks, h.f./v.h.f./u.h.f., Phone, c.w., RTTY, AMTOR, Packet, all bands. Talks, outings, contest and demonstrations. For further information please ring 021-552 4619/021-552 4902.

South Birmingham RS: West Heath Community Association, Hamstead House, Fairfax Road, West Heath, Birmingham. October 5 - Monthly club meeting. Don Keeling. 021-458 1603.

West Bromwich Central Radio Club: Sundays, 7.30pm (talks begin at 8pm). The Sandwell Hotel (upstairs function room), High Street, West Bromwich. October 2 - Harry Harrison of The Black Country Bugle visiting the club for a chat, 16th - Talk on UF Band III by Geoff Wainhouse, Castle Electronics. Ian Leitch. 021-561 2884 (home) or (0902) 353522 ext. 2093 (office).

WILTSHIRE
Salisbury Radio & Electronic Society: Tuesdays, 7.30pm. 3rd Salisbury Sea Scout Hut, St Marks Avenue, Salisbury. September 27 - Quiz planning for the interclub quiz, October 4 - Interclub quiz at Andover club, 11th - QRP by Ken Whillock of the G QRP club, 15/16th - Jamboree on the air weekend, 18th - JOTA de-brief/QSL writing - what we could have done better, 25th - Project evening, constructing a Magloop antenna. J David Kennedy. (0722) 330971.

Trowbridge & DARC: 3rd Wednesday, 8pm. The Southwick Village Hall, Southwick, Trowbridge. October 5 - The British Red Cross by Mrs Avril Taylor-Webb, 19th - Natter night. Ian G0GRI. (0225) 864698.

new products

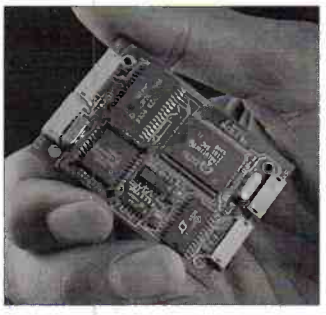
Miniature Packet Radio Modem for Amateur and Professional Applications

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) 755777

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.

Hand-Held Multimeter With Large LCD Display

Thurlby Thander Instruments has released the TM360, a new low-cost, easy to operate hand-held multimeter which features a large, highly legible display with a 19mm (0.75in) character height.

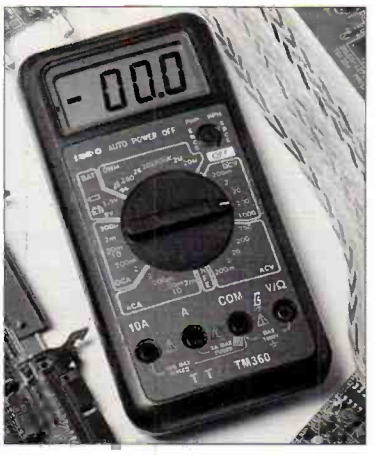
The TM360 uses a single rotary knob for function and range selection. Functions include a.c. and d.c. voltage from 0.1mV to 1000V a.c. and d.c. current from 0.1µA to 10A, resistance from 0.1Ω to 20MΩ, continuity, diode test, battery test and transistor h_{FE} test. The basic d.c. accuracy is 0.5%.

The multimeter operates from two AA size batteries, which can provide many hundreds of hours of use. An automatic power-off function saves power if the meter is left switched on

Lowe Announce New Scanning Receiver

New to the UK the Maruhama RT618 hand-held scanning receiver is now available from Lowe Electronics. This all mode receiver has a continuous coverage from 0.5 -1300MHz. The compact receiver provides 800 programmable memory channels, 20 pre-programmed scan bands, 10 user programmable bands are also available. Lock out is available for 500 spot frequencies. Display is a backlit l.c.d. Lowe advise us that they are the factory appointed distributor for the UK. For more information contact:
Lowe Electronics Ltd., Chesterfield Road, Matlock,
Derbyshire DE4 5LE.
Tel: (0629) 580800.
Fax: (0629) 580020.

See review next month! - Ed.



when not is use.

The TM360 is highly robust and is supplied complete with a protective rubber buffer, which makes it almost completely drop-proof when in use. Extensive safety features are incorporated, including an audible warning if a test lead is plugged into the wrong socket for the function selected.

The TM360 is very competitively priced at £39.95 (plus VAT).
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.c., 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 r.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 r.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 0BZ.
Tel: (0277) 630000.

Siskin Breed New CAT

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NEW FEATURE

accessories corner

Kevin Nice reports on various station accessories to make your listening just that bit easier.

This months 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.

The AT2000 a.t.u.

It is now well over 20 years since I began my first foray in to 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?

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.

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. Tel: (0702) 206835.**

Well, that's it for this month. I'll cover some more areas that cause consternation and confusion next time. Meanwhile if you have any specific queries please write to me.

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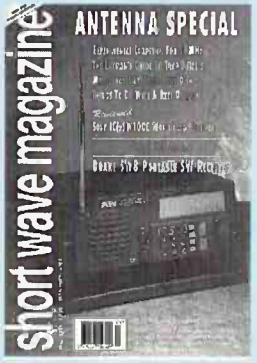

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Receiver Specifications Explained 3

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.

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 acessment 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

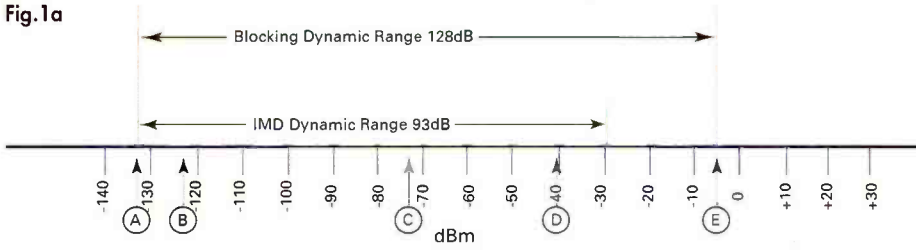
-133dBm -(-40dBm)

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). 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

Fig.1a



(A) Noise floor also Minimum Discernable Signal. (MDS) -133dBm.

(B) Receiver sensitivity. 0.15µV for 10dB S+N/N ratio.

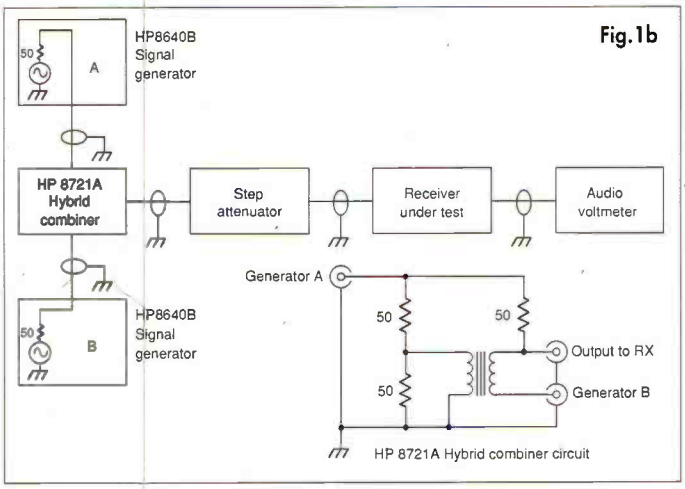
(C) -73dBm. 50µV p.d. across 50Ω receiver input. i.e. S9

(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. 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.

Fig.1b



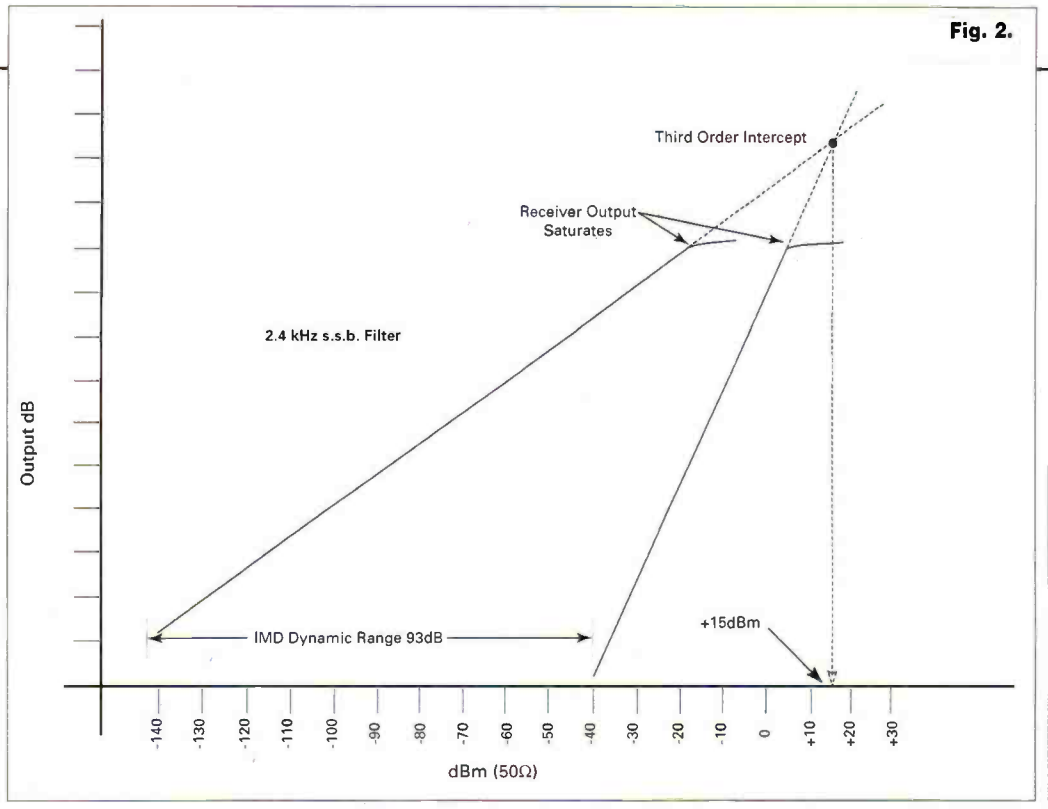


Fig. 2. Using the same horizontal scale as for Fig. 1 (a), a graph is constructed showing how the receiver output increases with input. At -40dBm the i.m.d. commences, and at this point a graph, rising at three times the rate of the output graph, indicates the rapid build up of third order products. Also shown is the third order intercept point at +15dBm which is obtained by extrapolation.

preceded by reciprocal mixing or phase noise, and therefore blocking range was not measured. This problem of phase noise will be looked at a little later.

So how are these figures determined? The sensitivity and noise floor figures were obtained in a manner described in the first article. i.m.d. and blocking range figures are obtained using 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 give 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:

$F_{p1} = (2_{f1-f2})$ and $F_{p2} = (2_{f2-f1})$

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+68dB. 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 effect 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 milli-seconds, 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 sideband 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.

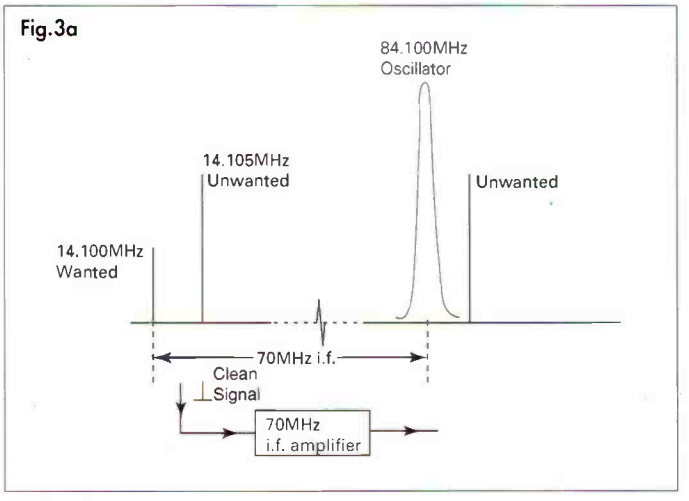
For the time being the problem of phase noise affects the v.h.f. operator with closely spaced channels and extremely strong local signals, rather more than the h.f. operator. For the short wave listener however the strength of many broadcast stations probably makes the question of phase noise rather 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.

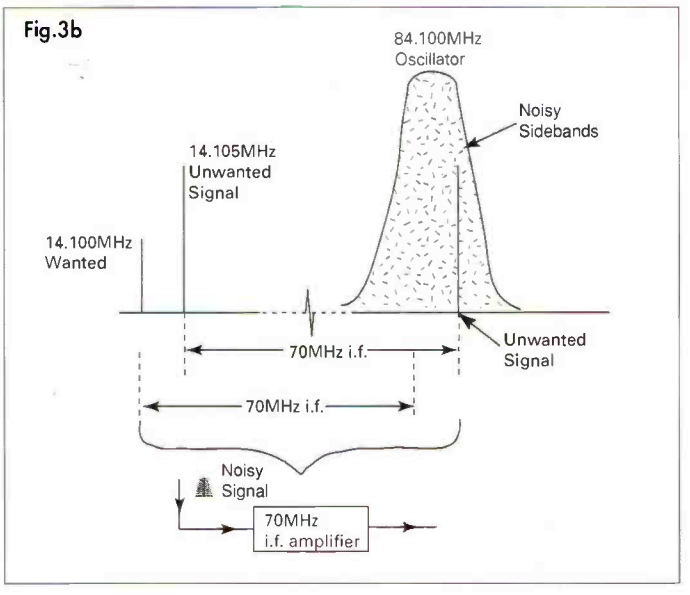
Just a mention about phase noise units. Since they are concerned with power the dB is used but with reference to the carrier or oscillator amplitude. Therefore phase noise is referred to as so many dBc/Hz. The measurements are extended out from the carrier frequency to 100kHz , s.s.b. Look under 'Phase Noise', though I have only found one brochure that quotes phase noise, and that is for a Ten Tec Model 563 OMNI-VI. 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 oscillator is very noisy and, despite the fact that the unwanted signal is 5kHz away, the strong unwanted signal mixes with the oscillator sideband, which results in a noisy signal being presented to the i.f. amp.





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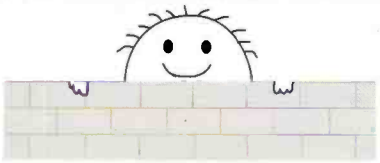

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RF Systems MT Antenna

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.

The transfer of signals from the antenna to the receiver is performed by a magnetic field. This means that there is no direct connection between the antenna and the receiver. In fact the helical element is directly connected to earth. This results in any static charge due to, say, thunderstorms being leaked away to earth.

The MT antenna is encased in a white u.v. stabilised weather-proof plastics pipe, not unlike the ARA-2000 active antenna reviewed last month. The pipe is 32mm in diameter and is just over 2m in length. It can be painted to create a very unobtrusive appearance. The base is constructed from a stainless steel sleeve and this is the mounting point for 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 SO259 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. Tel: (0629) 580800.** ■

Sony ICF-SW7600G

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.

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

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.

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 l.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. ■

Specifications

Coverage:	76 - 108MHz v.h.f.-f.m. 150kHz - 29.999MHz a.m.
Size:	191.2 x 118 x 32.3mm (w/h/d)
Weight:	615g with batteries
Batteries:	4 x AA size cells
Estimated battery life:	between 20 and 33 hours with alkaline cells
Audio output:	400mW
Price:	£159.99

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COMPETITIONS

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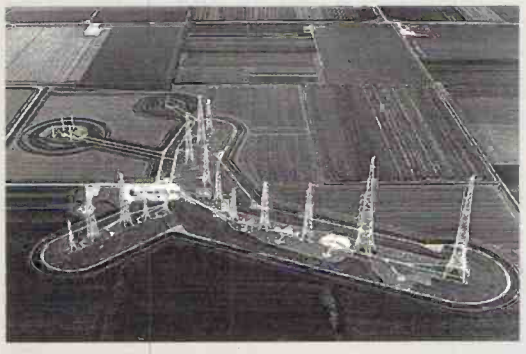

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Also you will need to spot the five differences between the two Grandad cartoons. Circle the 5 differences and return the cartoon to us. Together with why you believe that you deserve to win (on a separate sheet of paper).

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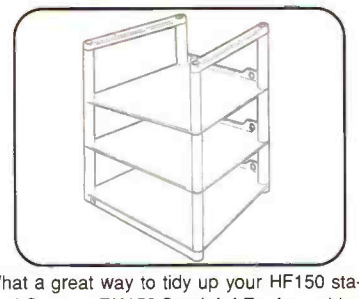

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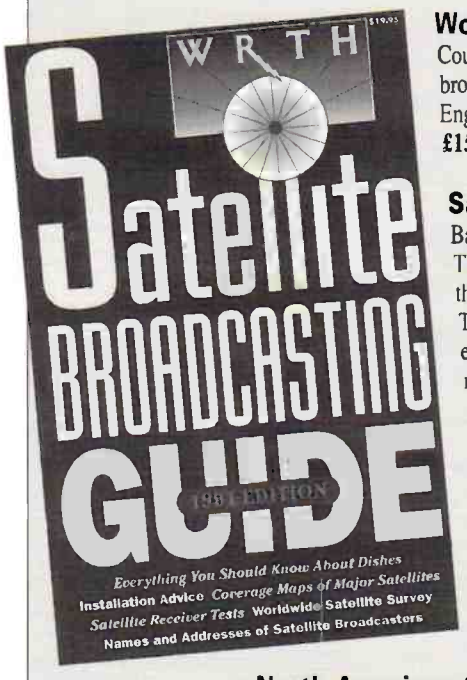

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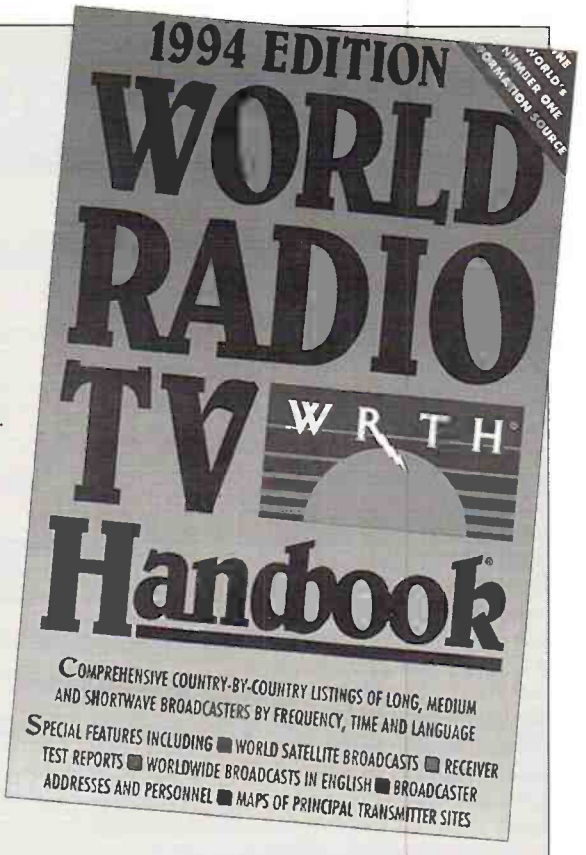

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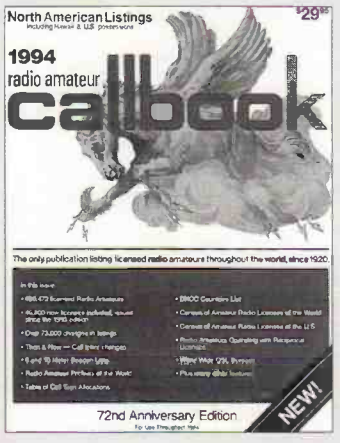

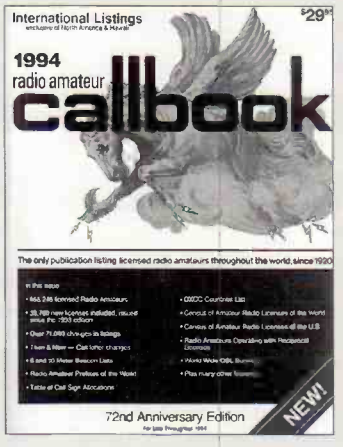

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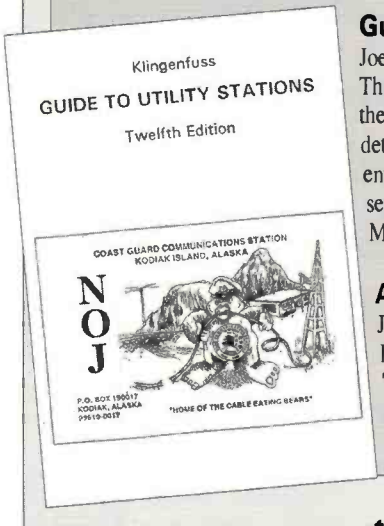

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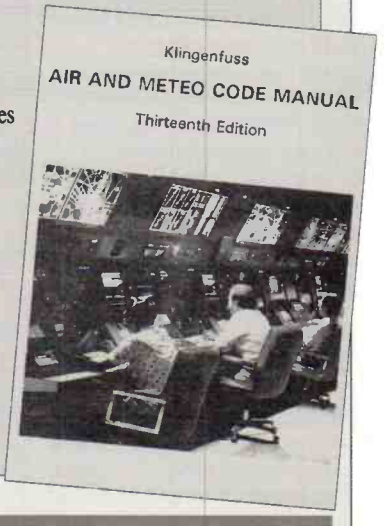

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Short Wave vs Satellite Radio

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 GI7IVX contemplates the vagaries of each and draws his own conclusions on the question.

A recent letter to me from Brian Oddy, who compiles the LM&S section of this magazine, mentioned the thrills of receiving a direct short wave transmission from a distant station compared to the receiving of a broadcast which has been relayed by satellite. This got the few remaining cells of grey matter working overtime resulting in this article where I look at the thrills and otherwise of short wave and satellite radio and give my own ideas as to what the broadcasters should be trying to do in the future. I do not intend this to be a highly technical article, so if you, the reader, think that I have over simplified some technical details I apologise in advance, but please bear in mind that some readers are novice and/or junior, perhaps without your technical background.

I think that it is probably best to have a brief look at both mediums, short wave and satellite, to establish what the broadcast station is attempting to do via each medium; listener types; and to finally what I think broadcasters should be aiming to do in the coming years.

Short wave radio, as we all know, began a considerable number of years ago in a time when space exploration and communication had not even reached the 'Dan Dare' type fiction stage, and radios had those funny glass lights in them called valves. Its purpose was to send news and views, etc. round the world utilising the propagation characteristics of the different bands to achieve this. Subsequently, some broadcasters were to use relay sites to increase world coverage, as stations, frequencies and bands used, grew in number and strength.

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, HCJB 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.

Basically 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

Continued on Page 34

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NASA Shuttle Radio Frequency List

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 AFB and Patrick AFB.

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 conclusive, 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 mission which will be audible in the UK is STS-64, when *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:

STS-66	September	10 days	57° inclination
STS-64	September	9 days	57° inclination
STS-67	December	13 days	28.5° inclination

The three 57° inclination flights should be visible from the UK and might provide an opportunity to hear signals on the u.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 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 Spaceline on (0891) 881975 - the calls are at the usual premium rate.

The packet radio network may also carry bulletins. Try listing '>SAREX', or '>NASA', or '>AMSAT'.

Happy Hunting.

NASA Malabar/Palm Bay, FL Nets (in MHz, u.s.b. commonly)

Solid booster rocket recovery	2.622 primary, 2.764, 3.187, 4.510, 7.765, 11.407, 11.621
NASA tracking vessels	5.180, 5.187
ETR range control	2.678
ETR primary night channel	5.190
ETR secondary night channel	5.810
ETR primary day channel	10.780
ETR secondary day channel	20.390
Launch support ships	5.680, 11.104, 11.252, 18.009, 19.303
Launch support aircraft	5.350, 7.676, 9.022, 9.043, 9.132, 13.227, 13.878
Cape Radio/Leader	4.856
Cape Radio/Coast Guard Ships	4.992
Cape Radio/Launch support A/C	7.461
Cape Radio	6.896, 6.837, 11.414, 11.548, 19.640, 23.413
S&R Coast Guard primary	3.024
S&R Primary recovery zone	4.376
S&R Primary Atlantic	6.720
S&R comm with Bahamas	7.412
Backup mission audio	2.664
Navy harbour control	2.716.
Launch tracking net	7.525, 20.186
Space missile tactical net	10.305
OCC Shuttle mission audio	20.198
NASA CB radio channel 9	27.065 a.m.
Data buoys	2.405
Data channels	7.919, 7.985, 13.237, 13.495
Malabar-Ascencion Island MUX	10.310, 13.600, 20.192
Ascencion Island-Malabar MUX	14.937, 19.966, 22.755
USAF/NASA communications	4.510, 4.760, 4.855, 4.992, 5.350, 5.810, 6.727, 6.740, 8.993, 9.315, 9.974, 10.780, 11.104, 11.414, 11.548, 14.615, 19.303, 19.984, 20.191, 20.475

Edwards AFB: (frequencies in MHz)

116.400	ATIS
120.700	control tower
121.800	ground control
126.100	approach control
127.800	approach control
133.650	approach/departure control
138.450	commandpost
149.925	security
162.6125	NASA ops
164.100	NASA
173.5875	fire
236.600	control tower
269.900	ATIS
290.300	departure control
318.100	tower
348.700	approach control
372.200	dispatchers
390.100	ground control

Kennedy Space Center Operations (MHz)
2.182, 3.023

Shuttle frequencies: (MHz)

296.800	primary, air-to-ground or orbiter-to-suit
259.700	air-to-ground or suit-to-orbiter
279.000	suit-to-orbiter or suit-to-suit

International emergency air frequencies (MHz)
121.500
243.000

Kennedy: (MHz)

117.8 00	Shuttle control
121.750	ground control
126.300	ground control
126.650	weather
142.500	cranes
143.040	cranes
148.455	NASA booster recovery
148.485	launch countdown/status
148.500	Search and Rescue ships
149.100	Search and Rescue ships
149.175	Shuttle crawler
162.000	Search and Rescue ships
162.0125	NASA vessels
162.6125	NASA ops
163.4625	security
163.4875	security
163.5125	security
163.5625	fire - primary
164.000	radiation checks
164.800	Search and Rescue aircraft
165.1875	check points
170.150	base operations
170.175	transportation
170.350	public relations
170.400	General Services Administration
171.150	maintenance/fuel
171.2625	camera tracking
173.175	security - gates
173.4375	medics
173.5625	fire/rescue
173.6625	safety units
173.6875	security - vans
173.7875	fire - secondary
284.000	ground control

Communications and other stuff: S-band (GHz)

2.20.0	Air-to-ground
2.2175	Air-to-ground secondary
2.2875	Air-to-ground primary digital downlink
2.0419	Ground-to-air
2.2014	Ground-to-air
1.8318	primary (USAF uplink, phase modulation)
1.7751	secondary
2.2500	wide band f.m. with main engine analogue telemetry during launch, or TV during orbit operations.

Contractors

Rockwell (Edwards)
2.9955, 3.2825, 3.475, 5.5975, 10.0105, 17.9665 (MHz, u.s.b.)
122.800, 123.050, 123.350, 123.525, 462.925 (MHz)

Rockwell (Edwards/Kennedy)
123.475 (MHz)

McDonnell Douglas (Edwards)
123.300, 123.550 (MHz)

Com-Tech Associates (Kennedy)
151.955 (MHz)

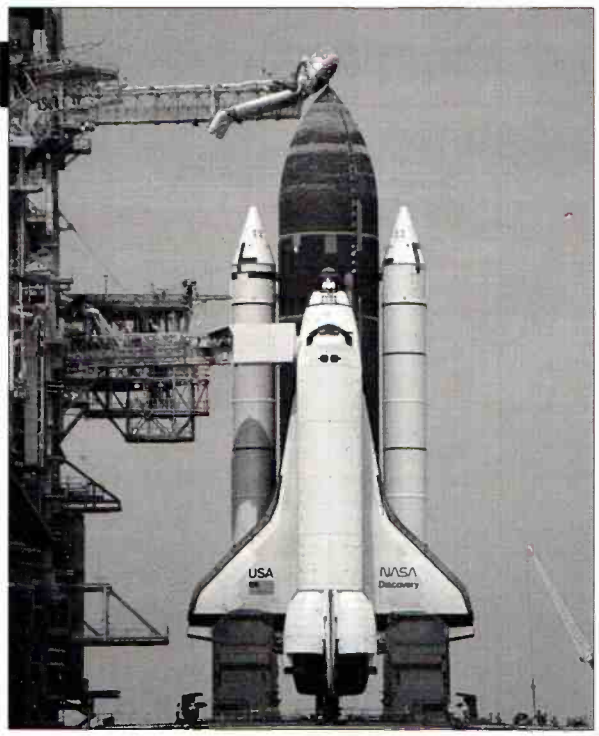
IBM & Harris Corp. (Kennedy)
152.480 (MHz)

TWA (Kennedy)
154.515 (MHz)

Kennedy Space Center Ground Support (MHz)
148.480, 149.170, 162.610, 163.460, 163.480, 163.510, 163.560, 165.190, 170,150, 170.170, 170.350, 171.150, 171.260, 173.560, 173.680

Patrick AFB: (MHz)

118.400	approach/departure control
121.700	ground control
125.100	approach control
126.200	control tower
128.800	dispatchers
138.300	command post
273.500	ATIS
335.800	ground control
340.900	approach/departure control
344.600	weather
348.400	control tower
358.300	approach control
372.200	dispatchers



Short Wave vs Satellite Radio

Continued from Page 30

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 HCJB and Radio Sweden produce, are also very important ingredients. Awards for QSL reports are useful for holding onto listeners as for example the bronze, silver and gold diplomas issued 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 be 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&S column becoming Long, Medium & Satellite.

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! ■

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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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Weather Satellite Special

Our Info in Orbit columnist Lawrence Harris explains what's needed for Weather Satellite reception and examines some dedicated receivers and other essential parts of a receiving station.

Have you recently retired? Are you between jobs (!) and looking for an unusually interesting but stimulating hobby? Have those hours spent at the 'local' left you wondering whether there was something more worthwhile on which to spend your time? Perhaps you have already picked up signals in the 137MHz band on your scanner and wondered about their origin?

A growing number of people have 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.

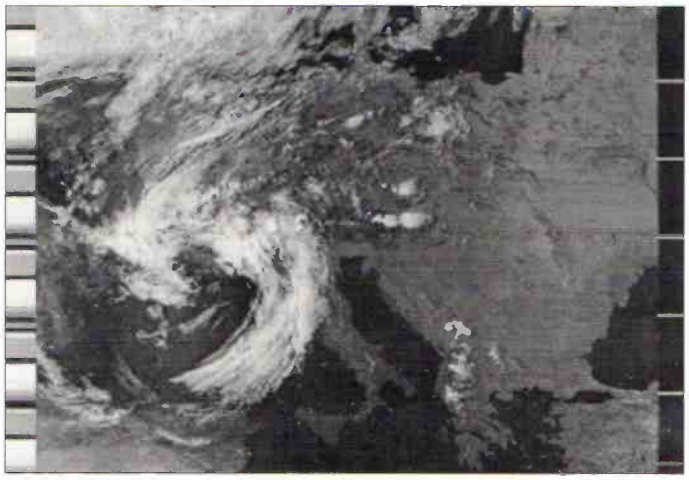
You can set up a station without having to know anything about satellites, just as you can drive a car without knowing what happens under the bonnet. However, you would be missing out on a fascinating topic.

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.



Europe in July. This picture was received from the American weather satellite NOAA 12 in early July. The left hand of this visible-light image shows the tones and calibration levels, the right hand side shows the minute markers.

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.

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 2.5km, 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!

Weather Satellites

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

(China) planned for the future. Forming a further group amongst the polar orbiters are oceanographic satellites such as OKEAN, operated by the CIS, though these are rarely heard.

Polar Orbiters

This group of WXSATs (METEORs and NOAAs) all have characteristic orbits with high inclination - between 82° 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 NOAAs 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 clip-clop, the well-known sound of NOAA a.p.t.

METEORs

These WXSATs are in higher orbits than NOAAs, 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.

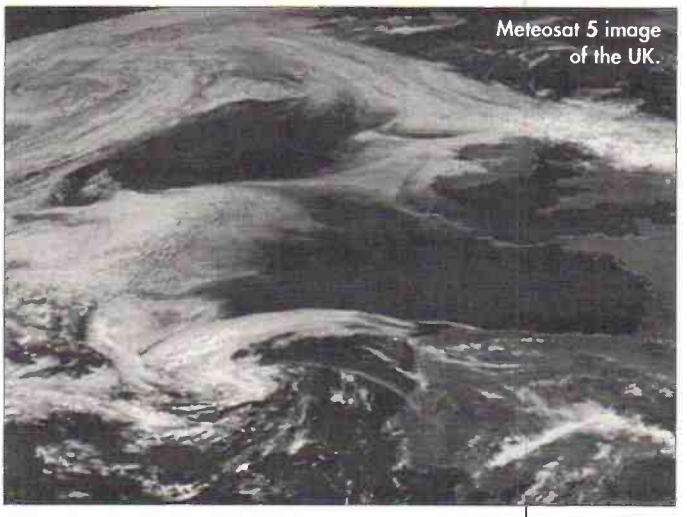
The official line (as published in a booklet that I obtained a few years ago) is that at any time, up to three CIS WXSATs should be operating. In recent years, my log book has recorded no more than two; spring and summer 1994 have seen only one.

METEOR a.p.t. telemetry is compatible with, but different from, that of the NOAAs. 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 35 800km 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. METEOSATs 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



Meteosat 5 image of the UK.

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 1694.5MHz 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.

WXSAT Antennas

Frequencies used for a.p.t. and WEFAX reception require different antenna types. Suitable antennas to receive v.h.f., include discones, dipoles and Yagis, and for 1691MHz, a dish or Yagi.

Each can receive WXSAT signals but they do not all respond in an acceptable manner. People merely wishing to monitor signals from polar orbiters can tune to the appropriate frequencies, and a WXSAT will eventually be heard. It's signal may fluctuate wildly, but this is to be expected.

Polar WXSATs are spin-stabilised - all (OK, except one) in the same direction! So if you use a discone, or other nominal antenna, you will hear a variable signal. Should you try decoding the resulting data stream from such a non-optimised antenna, you would find it difficult to achieve consistent signal strength. Fades and noise would affect the data.

The recommended antenna for v.h.f. WXSAT use is the fixed, roof-mounted, crossed dipole, phased for right-circularly polarised signals. You may know that the amateur radio satellite UoSAT-2 uses left-circular polarisation on 145.825MHz. For test purposes you can use such an antenna - if you reverse its phasing harness; the frequency difference does not significantly affect reception. For routine satellite monitoring, I use a loft-mounted discone, feeding a general purpose scanner. This is unsuitable for picture production though!

You can expect to pay between £20-£60 for a crossed-dipole antenna, depending on the total package - cable and connectors etc. A nominal impedance of 50Ω is normally used for antenna and cable.

VHF Pre-amp?

If you test your v.h.f. WXSAT antenna at ground level, you may well find that reception is

Continued on Page 41

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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 (1691.0/1694.5MHz) 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.

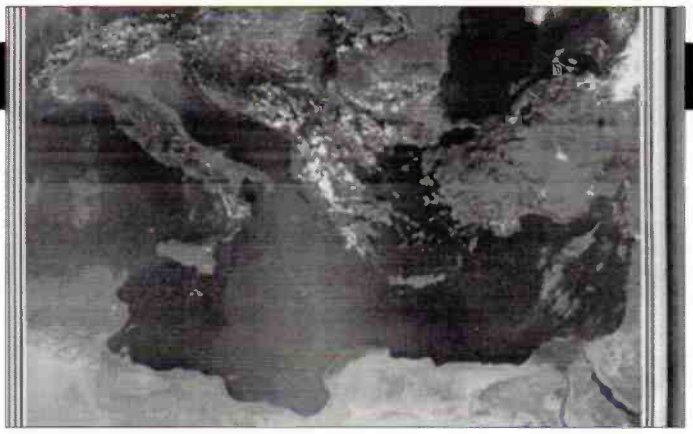
Dishes cost from £30-£160, depending on accessories such as cables and feeds. Yagis can be used for METEOSAT reception and blend with the environment. Many are home-built. Commercial Yagis cost around £80.

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 WXSAT 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.



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

The 137.50MHz signal is the main r.f. (radio frequency) carrier. It has been frequency modulated by a second (sub-) carrier - a 2.4kHz tone. This, in turn, has been amplitude modulated with sensor information, such that areas of varying brightness below the WXSAT 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 WXSATs have not always used a precise 2.4kHz sub-carrier; the effect of a non-precise sub-carrier is an un-synchronised 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 Cirkit 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 should be fitted with 137.50, 137.62, 137.30, 137.40, and 137.85MHz crystals, from the start. Optionally, 137.80 and 137.06MHz would cover possible future use by FENGYUN, the Chinese WXSAT. 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.

METEOSAT RXs

Because of improved specification hardware, it is possible to amplify the 1.691GHz band r.f. signal at the dish/Yagi head, and take it through several metres of cable indoors. This then feeds a 1.691GHz switchable receiver. I use this type, but successfully operated a conventional down-converting system for years.

Down-Converters

For METEOSAT reception, an alternative option is available. Instead of feeding the 1691MHz signal directly to a separate, dedicated receiver, a down-converter can be used to convert the output from the METEOSAT pre-amp to 137.50MHz. Except for a lack of Doppler shift, this signal is similarly modulated to that from the polar orbiters, so can feed a standard 137MHz band WXSAT receiver. Martelec currently supply a converter for about £200.

Decoders

Whatever system you plan to use to receive WXSAT 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.

Decoding by Computer

Computers are used by many hobbyists for WXSAT and other types of decoding. A number of suppliers - see 'Sources' - sell interfaces which fit into an expansion slot inside your computer. Prices and specifications vary, so it is important to decide your own requirements before purchasing any particular unit.

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 Timestep Weather Systems.

Image Enhancement

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

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 mid-night. 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.

The 'Sources' list includes companies which supply cards and part/complete systems. Prices range from £100 upwards. Whichever card you decide to buy, you need a suitable computer. The following topics are summarised and may help those considering purchasing a new or second-hand machine.

Computer Specifications

The most common enquiry that I receive concerns the minimum specification that a computer must have, in order to be suitable for decoding and presenting WXSAT pictures. Fortunately the news is good and getting better!

When the personal computer (the IBM PC) was first introduced, its capabilities were somewhat limited. The main processing chip ran at a few MHz, hard disks were not standard, and the monitor was usually a CGA (colour graphics adapter) having low resolution. During the last few years, progress has been rapid. More (RAM) memory is now supplied as standard, and hard disks have grown in capacity while dropping in price. For the beginner wanting to know whether a machine is suitable for WXSAT decoding, here are a few items to check.

Labrador is shown in this Meteor 3-5 image from spring 1994. Meteor polar orbits have higher orbits, allowing monitor to 'see' further.

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.

RAM

The computer's internal memory defines how much information it can hold. Today's sophisticated operating systems can perform feats previously not possible. DOS 6.2 (and Windows) allows multi-tasking - the facility to run more than one program at a time. Dosshell (a program in the DOS 6.2 suite, and some earlier versions) performs this, and provides easy switching between programs.

Multi-tasking is only possible when sufficient RAM is installed. I have 4Mb fitted; many new machines have 8Mb as standard. Windows applications software invariably require a minimum of 4Mb. Don't accept less.

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 JVFAX-type of program (which require an external interface), you will need to plug a card into the computer's motherboard. This process is straight-forward, 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.

Monitor Quality

Although VGA (video graphics array) is good, it was superseded by the SVGA (super VGA) monitor. These can display up to 1024x768 picture elements (pixels), provided the video card inside the computer can store the information. Consequently, you must check that the monitor and computer are jointly able to meet your specification! It is not unknown for a video card to have insufficient memory to provide the quoted resolution. Look for a 1Mb card; there are many good ones - the ET4000 seems better than most.

Hard Drive

These consist of layers of magnetic storage media, surrounded by a protective metal casing. They have increased in capacity as production quality has improved. 80Mb is now considered the minimum capacity. In the late 80s, my '286' computer came fitted with a 40Mb drive. I now use DOS 6.2 with Doublespace on this drive and have not had any problems while using routine satellite decoding and predictions programs. Doublespace seems unacceptably slow when running Windows applications on a 286 (which is not a recommended configuration anyway).

If you wish to store a number of weather pictures, you may need increased hard disk capacity. A typical image requires between 500Kb and 1Mb. Later you may wish to install large capacity programs so I would recommend no less than 80Mb. Access times are often quoted in the 15 to 25ms (millisecond) range. Where possible, go for the faster drive, particularly if you anticipate upgrading to Primary Data in the future.

CD-ROM Drives

Although these are not required for looking at your own pictures, you may want to purchase one of the many CD-ROMs issued by NASA and ESA. These contain original (or processed) images, obtained from those 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.

The readers themselves now retail at lower prices than even a year ago. A good one, internal or external, can be obtained within a budget of £200.

Kits

Both Maplin Electronics and Cirkit publish catalogues of their numerous kits, listing receivers and antennas, with hardware for decoding the resultant signal.

WARNING!

Your scanner is only as good as your antenna

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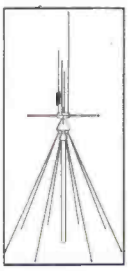

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Shop: SRP Radio Centre, 1686 Bristol Road South, Rednall, Birmingham B45 9TZ. Tel: 021 460 1581

Kits

Cirkit, Park Lane, Broxbourne, Hertfordshire EN10 7NQ; Tel: Sales (0992) 448899; Enquiries (0992) 441306.

Maplin Electronics, PO Box 3, Rayleigh, Essex SS6 8LR, Tel: Sales (0702) 554161; Enquiries (0702) 552911.

General Hardware/Software (alphabetically)

Comar Electronics, Unit 3, Medina Court, Arctic Road, Cowes, Isle of Wight PO31 7XD; Tel (0983) 282400. Suppliers of PC GOES/WEFAX system.
Martelec Communication Systems, The Acorns, Wyck Lane, East Worldham, Alton, Hants GU34 3AW; Tel (0420) 82752. Supply a range of hardware including METEOSAT and polar orbiter equipment, and have recently entered the h.r.p.t. and PDUS market. Also supply for Commodore Amiga.
Spacetech Space Science Resources, 21 West Wool, Portland, Dorset DT5 2EA; Tel (0305) 822753. Comprehensive range of hardware and software, mainly dedicated to schools. Specialist for Acorn systems. Large collection of CD-ROMs.
TH2 Imaging, 34 Princes Gardens, Margate, Kent, CT9 3AR; Tel (0843) 223831. Interface card and software for PC clones; s.h.f. yagis.
Timestep, PO Box 2001, Newmarket, CB8 8XB; Tel (0440) 820040. Comprehensive range of a.p.t/WEFAX hardware and software, including PDUS and h.r.p.t. systems.

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 £19.98 inc. VAT.

Maplin MAPSAT Sytem

Unlike the Cirkit receiver this unit does not require a change of crystals for frequency selection. It also features both tuning and signal strength meters. The receiver board is ready built, tested and pre-aligned thus making construction very easy. The kit is available at £93.94 inc. VAT

Maplin WXSAT Antenna

A crossed dipole antenna kit to compliment the Maplin receiver, at £19.33 inc. VAT.

Software

In my monthly *Info in Orbit* column, I occasionally describe some of the satellite-type software that I receive by mail and BBS. Several of these programs are very good and I have made a selection available to readers. Some programs are Public Domain, others are Shareware or Freeware. Those wishing to continue to use Shareware programs should register the software at nominal cost.

For those who did not see the original items, I am summarising those programs newcomers might wish to obtain, together with a new offer.

Kepler Elements

Many people are interested in the technical terms used to describe satellite orbits, so a year or two back, I ran a sequence of explanatory paragraphs on the topic. A program written by Major Tom Riggs, of the US Airforce Academy's Astronautics Department, provides graphical illustrations of these parameters. It comes in two parts - one is the tutorial section, the other allows experimental parameters to be tested.

You can illustrate how Shuttle flights having low orbital inclinations cannot be directly monitored from the UK, whereas those with inclinations above about 50° pass over Britain. The program shows the relationship between orbital height and period in an easily understood graphical manner.

Satellite Tracking

The August edition of 'Info in Orbit' included my offer to supply the Birddog program. This is one of a number of tracking programs for the simultaneous monitoring of several satellites e.g., six WXSATs and MIR. It allows printouts of satellite prediction times for future orbits. Like similar programs, you need to update the Kepler elements file every few weeks, and sources of this data (obtainable at minimal cost) are listed each month in 'Info in Orbit'.

Readers have pointed out other good tracking programs to me; I am looking at these and will report in future editions of my column.

JVFAX

I reviewed the use of this shareware program for WXSAT picture decoding in the May edition of 'Info in Orbit'. It decodes polar orbiter a.p.t. telemetry and that from METEOSAT, and contains comprehensive features, even allowing animation sequences to be generated from METEOSAT WEFAX images. There is also a colour option.

A hardware device is required to provide the interface between your WXSAT receiver and computer. This can be bought from various sources, or you can build your own, using the design in this issue. For those wanting the cheapest possible route into WXSAT picture decoding, this has to be the answer.

Display software

For those who want to know what picture quality can be expected using the type of equipment described in this article, I have assembled a collection of typical images on disk. You require an IBM-clone computer to display them. Images from NOAA, METEOR, METEOSAT, OKEAN and possibly FENGYUN (if space permits) will be included. I can even provide a suitable display program if required. All of these images were obtained at my own station.

To receive a copy of any of these programs/files, please send me a pre-paid (self-addressed) package with IBM-formatted disk(s) and 50p per selection (maximum £1.50 for all) towards the cost of software/data collection etc.

Finally

This article has featured a.p.t. and WEFAX, while mentioning PDUS from which WEFAX originates. Some readers may know that EUMETSAT, the operators of METEOSAT, have published plans for the encryption of most METEOSAT PDUS data from September 1995. Almost all METEOSAT primary data images will be included, except those transmitted at six-hourly intervals. Applications for licenses to obtain suitable decoders need now be sent to EUMETSAT - I have forwarded mine. The complete cost has not been specified at the time of writing, but the necessary decoding unit may cost around £500 on a once-off basis, plus a moderate annual charge.

WEFAX users will not be affected by this change in the former policy of free access. However, during the early years of the next century, a new system of METEOSAT WEFAX transmissions will be implemented, requiring new hardware. This change is several years away so I do not personally feel that readers should be over concerned about buying 'redundant' equipment. Television sets have a similar situation!

Buying a complete WXSAT system may not leave much change from £1000 so many hobbyists purchase hardware over a period of time. Entering the field requires little more than a scanner, with software to help identify the satellites. For £1 or so you can test your level of interest. **Be warned - it can be addictive!** ■

My thanks to Matra Marconi Space UK, of Portsmouth, for providing me with information on a number of scientific satellites, and the American National Aeronautics and Space Administration for recent information on NOAA and GOES WXSATs.

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.

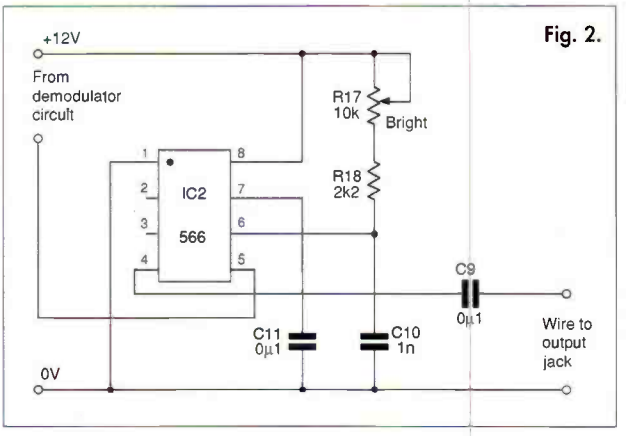

Fig. 2.

Many short wave radio utility listeners use one of the many low-cost radio fax decoding software packages available for IBM compatible personal computers. Programs such as PC HFFAX, PC Weather Fax, JVFax, FAX40, PC GOES and SkyView Fax and others offer a low-cost introduction to facsimile reception and decoding. The non-shareware programs come with a special lead which incorporates a simple limiting amplifier built into the 25-pin plug **(Fig.1).** This lead serves as the only hardware interface between the radio and the computer. The amplifier takes power from spare logic lines in the serial port of the IBM PC. Such systems avoid expensive terminal equipment, are very simple and cheap, as well being capable of amazingly good results. They will produce excellent high resolution grey-scale pictures from the many weather and press bureaux around the world.

All these packages do, however, require an audio, frequency-varying, signal to work on. They operate by measuring the period of the received audio signal. On short wave this tone is normally produced by the receiver's b.f.o. beating with the frequency modulated carrier of the incoming signal. The computer uses the measured period to calculate the pixel brightness about to be printed on the screen. The process repeats for each pixel along the line, and line by line, until the image is completed.

Such systems cannot measure the amplitude of the incoming signal. The amplifier built into the computer lead is intended to minimise amplitude variations. Weather satellite v.h.f. radio signals are frequency modulated with an audible 2.4kHz tone. This audio tone (or sub-carrier) is amplitude modulated with the picture data. Its pitch is constant - except for a small Doppler error due to the orbital motion of the spacecraft. It seems unfortunate that this excellent PC imaging system, so attractive to the amateur, cannot be used to decode the amplitude modulated tone signals produced by the NOAA, Meteor and Meteosat weather satellites. Here is a simple converter to do the translation required by the computer. The cost can be less than £10, plus a few hours assembly and testing.

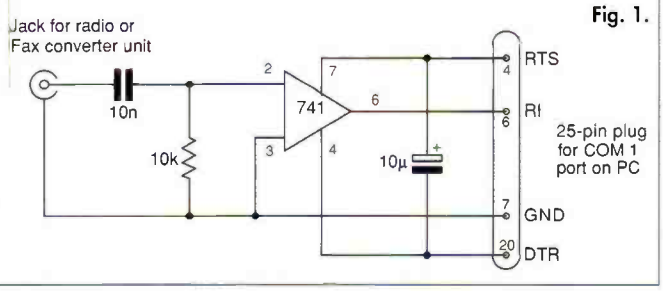

Fig. 1.

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 V_{CC}+ 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 R3, 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 4.8kHz

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The new AR800 has arrived but sales of the MVT7100 will continue as strong as ever - especially as the price is slashed to only £369! All mode, no gaps and it's available from stock.

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AOR3030

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FRG100

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DRAKE R8E

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LOWE HF225

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HF-235 Professional RX.....£1116
PR-150 a must for the HF150 .....£235

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ENHANCE YOUR LISTENING

Computers are playing a much bigger part in peoples lives today, both at work and in the home. There are 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 receiver built into a screened box, plus an interface card that plugs into your PC, and of course the software. You will need to have an IBM PC type computer, and we recommend at least a 386 type with 4Mb RAM and 6Mb hard disk space. A maths coprocessor is also desirable. You will also need DOS 5.0 and Windows 3.1 or higher.

SIX RECEIVER FUNCTIONS
- O AM DX receiver
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- O Worldband receiver
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- O Time sync receiver
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- O Tuning resolution: 1Hz
- O Modes: AM, AM-sync, WFM, NFM, CW, USB, LSB
- O Selectivity: 11kHz to 49Hz in 49 steps
- O Dynamic range: 97dB
- O 3rd Order Intercept Point: 2.5dBm (HF, 20 kHz spacing) and 5.5dBm (VHF, 20kHz spacing)

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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 decoding software.

The v.c.o. is entirely conventional and the centre frequency is set by R17. The triangle wave output option is used to provide a clean, simple output signal to feed into the limiter in the computer lead. The 566 square wave option does not have the amplitude required for a valid COM port logic signal and so cannot be connected directly to the computer. Square wave audio signals also radiate harmonics well into the v.h.f., and could get into the receiver.

Construction

There are no really spiky problems to allow for in laying out the circuit. Don't forget that C1 is in the signal path from the receiver, so keep it close to the input pins. It is advisable to keep the amplifier chip, Tr1 and Tr2 close together, with C5 attending not too far away. There are ±6V a.c. signals at up to 5mA in these transistors, so good decoupling is sensible. The prototype was built on a piece of prototype board, 63 x 89mm with room to spare. Leave one or two spare positions next to C2 so that you can tune L1 and C2 by selecting and combining capacitors to make up the exact amount needed.

Components

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 C6; 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 1) 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 again and check the voltage to ground on the emitter of Tr3 - you should see about 5.1V. Check the voltage across R5 - you should see 0.9V. 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 value - typically 100mV for a recorder outlet. No signal (silence) to the converter is the black value. Set this white value 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.

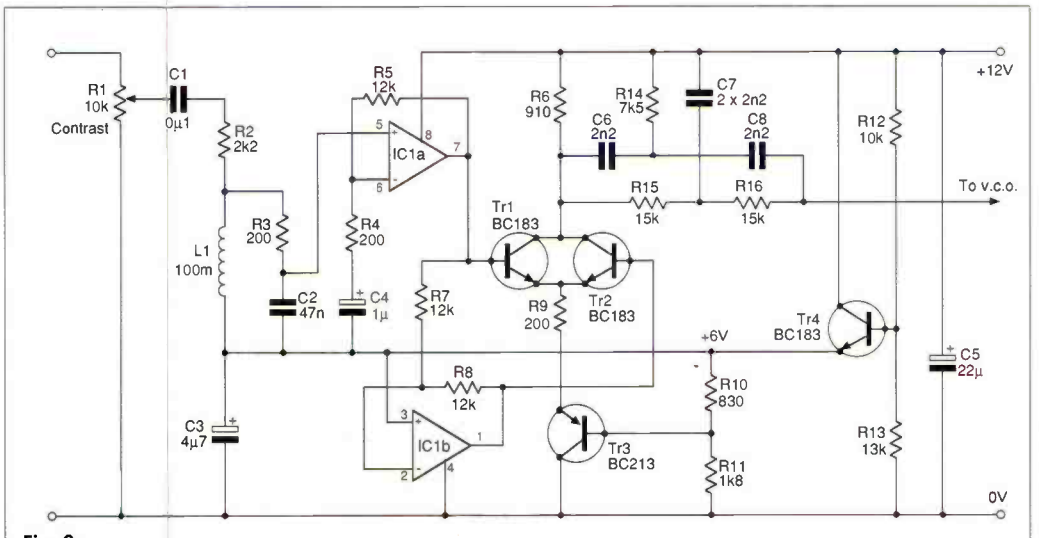
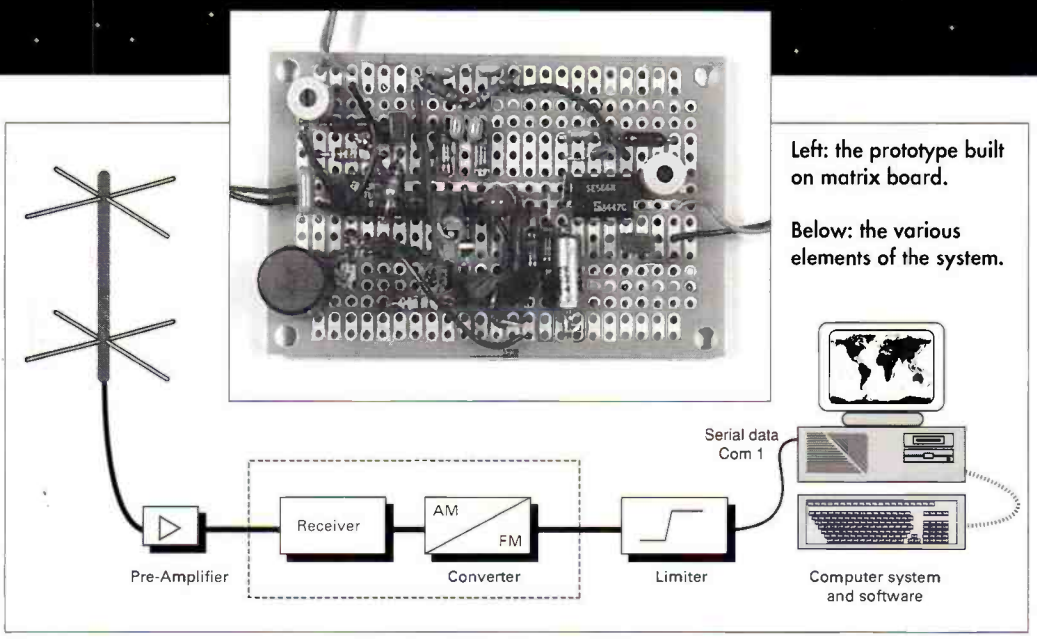


Fig. 3.



Left: the prototype built on matrix board.

Below: the various elements of the system.

Pictures

The system is now ready to receive its first picture. Set the software configuration to 120l.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

Resistors

0.25W Carbon film 5%

200Ω	3	R3, 4, 9
680Ω	1	R10
910Ω	1	R6
1.8kΩ	1	R11
2.2kΩ	2	R2, 18
5kΩ	1	R14
10kΩ	1	R12
12kΩ	3	R5, 7, 8
13kΩ	1	R13
15kΩ	2	R15, 16

Potentiometerss

10kΩ	2	R1, 17

Capacitors

Polyester

1nF	1	C10
2.2nF	3	C7a, 7b, 8
47nF	1	C2
0.1µF	3	C1, 9, 11

Ceramic

2.2nF	1	C6

Tantalum Bead 16V (min)

1µF	1	C4
4.7µF	1	C3
22µF	1	C6

Semiconductors

Transistors

BC183	3	Tr1,2,4
BC213	1	Tr3

Integrated circuits

NE566	1	IC2
TL082	1	IC1

Inductors

100mH	1	L1 (see text)

Miscellaneous

Prototype board 63 x 89mm

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

Reflections

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 Ch. R2 (59.25MHz), carrying the logo 'PPJ', on July 2. He also watched pictures from Slovenia on the 18th with the 'SLO1' logo. Between 1800 and 1900 on the 16th, **Arthur Grainger** (Carstairs Junction) logged RDS and Radiotext signals from a station

Fig.1: Russia (CIS).

Fig.2: SE Asian TV.

Fig.3: Russia (CIS).

called Ascolto on 97.2MHz, RAI MF3 on 95.3, 96.3 & 97.3MHz plus their sister station, RAI MF1, on 88.9MHz and RFI International on 96.6MHz.

From his home in Redditch, **Richard Wood**, using a Roadstar TV-400N and a loft mounted telescopic 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 & 29, 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 idents Aitaina, Avance, HOBOCTN, NTA, SLO and Telediario.

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 Poland (TVP1).

During the morning of the 21st, **Tim Bucknall** (Congleton) received pictures from Finland (YLE) on Ch. E3 (55.25MHz), Norway (NRK) on Chs. E2 (48.25MHz) & E3 and Sweden (KANAL1) on Ch. E4 (62.25MHz).

"There have been some good 'lifts' about and on July 19 the signals were very strong," wrote **John Woodcock** (Basingstoke) on the 30th. He logged idents from Norway (Gamlem), Italy (RAI UNO) and 'SLO1' on the 5th, 17th & 19th respectively, cycling from Poland (TVP1) on the 19th, pictures from Norway (NRK) and Sweden (Kanal1 Sverige) on the 19th and films from Spain (TVE1) on the 3rd, 6th & 14th.

Sporadic-E events in Band I were noted by **Lt. Col. Rana Roy** (Meerut, India) on June 2, 4, 7-9, 14, 15, 18, 19, 21, 22-27, July 9 10, 12 & 16. Although he received pictures from Dubai TV, on Ch. E2, on June 4, 19, 27 & July 12 and South East Asian TV on June 21, the majority of his DX came from Russia's Commonwealth Of Independent States on Chs. R1 (49.75MHz) and R2. The strength of a CIS signal that he received at

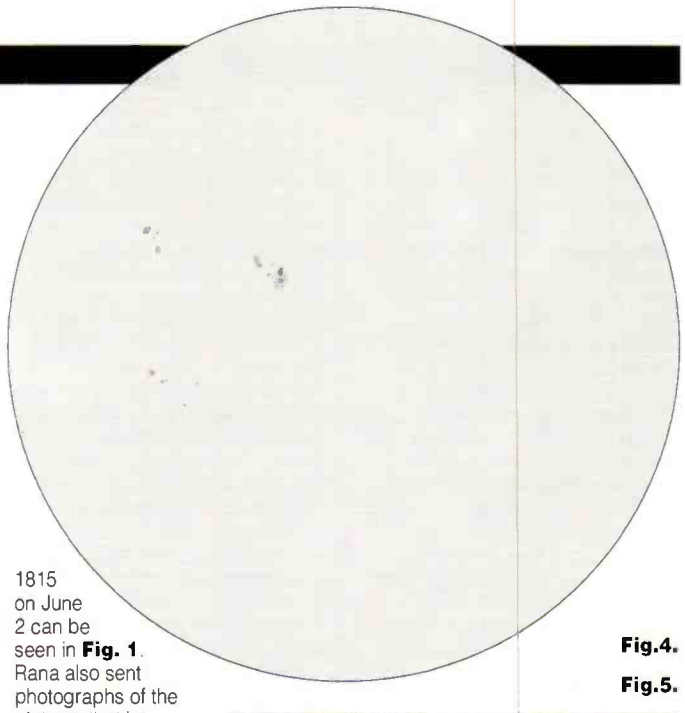
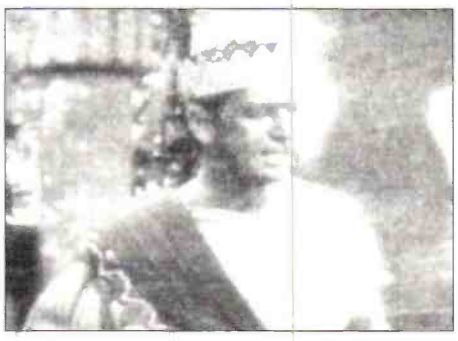


Fig.4.

Fig.5.



1815 on June 2 can be seen in **Fig. 1**. Rana also sent photographs of the pictures that he watched from SE. Asian TV at 1728 on May 21, **Fig. 2** and from the CIS at 1820 on the 22nd, **Fig. 3**. He also saw a CIS digital clock showing 0540 at 0710, his time, on June 8, the logo NTA on the bottom right of the screen at 1140 on the 14th and very clear pictures, with a boxed 'B' in the bottom right, at 1630 on July 16. One of those busy days for Rana was July 12 when his log shows the following

"*0930 - R1 - CIS: At 0937 very clear pics. At 0940 a programme presenter/news reader with ID on left side (AX6OP). AT 1650 on E2 Dubai TV with an English programme. At 1654 following seen on the bottom of the screen moving from right to left, "EDTV ON GALAXY SEVEN TRANSPONDER 17.*" Pics faded away at 1730.

Tropospheric

On June 27, **Richard Gosnell** identified a "superb trop-duct open to the Netherlands and Ireland". He received good u.h.f. colour pictures in Swindon from the Mount Leinster transmitter and found the 144MHz band 'very lively' toward Holland.

As usual, Tim Bucknall kept his eye on the u.h.f. bands and logged pictures from Wenvoe on June 30, Hannington and Mendip on July 1, Wrexham on the 2nd, Bilsdale on the 6th and 11th, **Fig. 5**, Rowridge on the 10th, Chatton on the 12th, Pontop Pike on the 16th, Divis on the 23rd, Storeton 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

Fig.6.

Tees TV. Later he took his portable gear, a log periodic beam and a JVC 610 receiver, to Cairn O' Mounth 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 Bucknall showed when he photographed the u.h.f. antenna at Fremont Point, **Fig. 6**. When I visited the Calbourne Water Mill and Rural Museum on July 17 I could see the Rowridge 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 for the first time. 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 TFM 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 he 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 3.5in 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 callsigns 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, GM8HGT, 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 France, 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 Rana 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 0.80in 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 30.2in (1022mb).

The readings on the pressure chart (Fig.12) were taken at noon and midnight from my own barograph. His barometer readings enable to mine which enables 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 of 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.

Fig.7.

Fig.8.

Fig.9.

Fig.10.

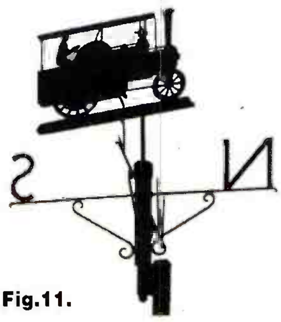
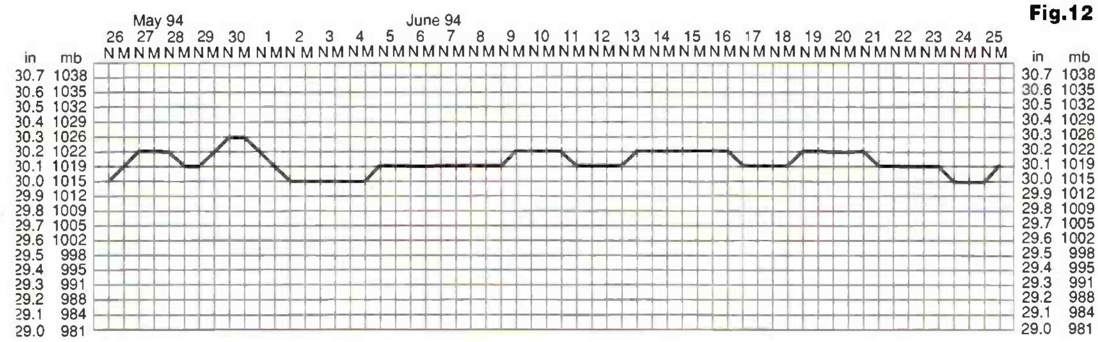


Fig.11.

Fig.12



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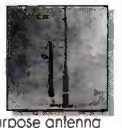

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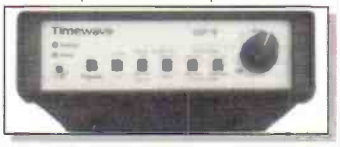

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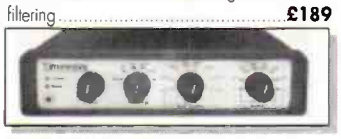

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Satellite TV News

The Latest from the Clarke Belt

With 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 circuit for a u.h.f. satellite receiver. Whereas most readers are familiar with European satellite operation in C Band at 4GHz 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 Ekran satellite group at 99°E with an e.i.r.p. in the main footprint of +50dBW (Siberia and Northern Russia), the right-hand circular signals can be received on relatively simple helical Yagis, 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 originated service operates for several hours in the Malayalam, 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 receiver - reception from the Ekran 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 resolving high quality signals from the Ekran spacecraft. A standard u.h.f. tuner feeds into a 2-stage i.f. pre-amp and thence to a single i.c. containing a main i.f. amplifier, limiting, p.l.l. video demodulator, a.g.c., etc. The a.m. video out 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 IC, 6.5MHz 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 the circuit detail next month for others to build for Ekran reception. At 99°E here in the UK there is no chance of receiving the bird, the cut-off line of sight 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 f.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. 70MHz. 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 70MHz i.f. out. Provided care is taken with the circuit then it will work at once. There is no p.c.b. layout provided! My thanks to Bandula for providing the circuit information.

In the long term, the Ekran series of u.h.f. downlinking satellites will be replaced 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 band 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 LNB feed was used with a 1.6m dish!

Airstrikes on August 5 against the Bosnian Serbs lifted 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 SNG 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 satellites 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 under used and fired up for occasional outside broadcast and SNG circuits within Germany. **John Hockenhall** (Cheshire) has recently seen activity on DFS-1 @ 11.549GHz 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!

Though most UK outside broadcast programming is carried via Eutelsat capacity, occasionally the BT! transponder on Intelsat 601 at 27°W is used, Sky Sports horse racing, Sky cricket and LWT athletics have been seen the past few weeks on 11.135GHz horizontal.

Despite the lazy days of the UK summer, the satellite belt is alive, well and still very active.

Clarke Belt News

Some months ago it was reported that Iraq were planning a satellite TV service and further to this end their Djail 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 sampler/promo channel in the clear over Arabsat 1D.

Problems of a financial nature still circulate Lyons 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 Maxat as the operating hub centre. 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 30°W - TVE, Canal +, Antena 3 and Tele 5 will encrypt during December, some 12 weeks after programme launch. The five channels will include sports, cultural and children's specialisations.

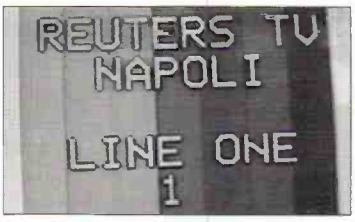
During the recent political events in Israel and Jordan this facility company's test card popped up on Eutelsat II F3 @ 16° East.

Memories of the EC Summit talks in Corfu.

A rare catch seen on Eutelsat II F1 @ 13° East.

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

During a feed for GMTV on 13° East, our Wirral observer saw this message during an Irish member interview.



Aidan Murphy in County Meath noted using his 900mm dish during the G7 Summit Talks in Naples, Westbound to the 'States on Intelsat K.

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

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 upsetting effects on the geomagnetic field, and these effects tend to cause h.f. bands to become if not dead, at least comatose. All is not lost, though, because on occasion they also result in either radio or visual aurora.

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 figure to give us 'good' conditions. The latter is represented by a K index of 3 at most. The information can be obtained quickly from the DK0WCY 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 is 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. My own personal inclination would be a good converter design. A tuneable i.f. of 14-16MHz means you can read frequency directly from the main 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 3.5MHz 3X0DEX, 5Z4FM, 9M8DB, 9V1XQ, PY4OY, TA2DS, V85PB, ZS6IR, LU5FAU, VE1ZZ, VK6AY, P29VH and ZS6OUL; a South American net on 7MHz included LU5HF, LU7HYK, TA2DS, ZP6CC, ZP6VS, CP6RP, VE1LFR, VE2AUU, VE2QR, J88BW, and an A6ATN that puzzles me a mite. Up now to 14MHz where 9K2MU was noted along with assorted Europeans, and 28MHz where it was only Europe.

Southwards now, to Hastings, where **John Heys** comments that he hasn't come across a W on 21MHz for weeks. On the other hand, YI1AA, TT8PS, ET3YU, AP2MMN and HS0ZAZ combined to relieve the pain a little. Down on 18MHz John mentions the G3SED gang operating as JY8ED, and G3RFX operating as ZB2FX.

Has anyone noticed the odd signals appearing on 7, 10, 14MHz (and maybe elsewhere) that are quite undecodable, but then suddenly clear to give what seems to be an amateur callsign? Seemingly there is a scrambler in circuit. Anyone out there who can give me useful reports - date, time, precise frequency, any information on the callsign, who working, and so forth, and I will pass the information on. **GM0EXN** up 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 GIs and G3NKC noted. However, 3.5MHz saw W1AW, K2OU, LU5DJ, GD2HCX, VE3YJ and an assortment of GB special-event calls. On 7MHz Tony spotted ZB2SO, GM2CWL up in Inverness, while sessions in the small hours resulted in AA1AS, PY7MTV, JW0C, VK7AZ, ZL2JR, LU2FM, RK9XWH, ZP6CC, UX0RR, ZL4KF, W5RB and TT4CF. Looking to 14MHz we see 9K2CC, ZC4RAF & 7X2JF, and on 18MHz PJ8AD. Finally, 28MHz where Tony seems to have connected to most of the openings; by now of course these will be occurring due to what we 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 Mannion 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 Marcquardt** in Hereford seems to have managed to find a couple of genuine long-distance openings on 28MHz, by way of D2EGH and 9G1MR. 21MHz netted him 9K2ZC, J5/SM5FJY, W8AH, ZS94F, PY0TUP, Z32BU and S92YL. Down on to 14MHz and here Luciano netted 7X5VBK, ZB2AZ, KH6FKG, C6AGR, VP8GAV, ZS94A, 9K2YA, C31HK, FY5FJ, G3UXO/MM on the *QE2*, HZ1AB, VY2RO, 5N8NDP, D44AB, PJ2MI, 3Z0EMC, BV2VA and 1A0KM. A final turn downwards in frequency to 7MHz located TI4CF, 4Z5AW, T94MV and VK4MZ.

John Collins from South Birmingham and his Eddystone 870A receiver enter at this point. His 'Top of the Pops' was the station signing II8GULF from Naples, heard around 0100UTC as a 'special' covering President Clinton's Gulf summit meeting. At 0600 John noted XK3YH C91BX, TU2JL, VP2EY, VP8HAL, TI4CF, VE2AUU/M, 9K2ZZ, XQ8PV, VP8LFA, JY9EVA 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 YN1CC passed away in March. That will for the foreseeable future make YN 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 ZL2HU. 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 17 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 Kermadec ZL8 activity in 1995.

South Georgia VP8 activity is planned for January 1995 by WA3YVN, WA4QVD and another. The intention is to set up three complete stations and beams for 7-28MHz plus verticals for the lower bands. Cards will be handled by INDXA, c/o John Parrott W4FRU, PO Box 5127, Suffork, 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 VK0DX, by Eddie deYoung VK4EET 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 **only** 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 one.

Once you have the best position for that band, carefully log the settings. Repeat this for each band. It's a laborious business but if you don't have the test gear it's the 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 if I decide to transmit a quick 'touch-up' using the transmitter puts me 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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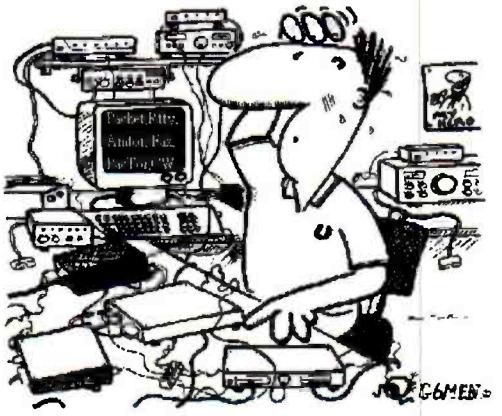

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SSB Utility Listening

HF Sideband

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 'Bookshelf', which is a USAF EC-130E Hercules Airborne Battle-field Command & Control Centre (ABCCC). The 'Bookshelf' 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 callsign 'Cricket' is thought to be either one of the forward-control aircraft, or an alternative callsign for the 'Bookshelf' 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.

Tie-ups for these frequencies 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 a series of callsigns for the flights; the callsign format is "Reach nnnRW". Many of the flights are relying on air-refuelling, and these flights are using callsigns with the format "Reach nnnT". 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 flew direct from Alconbury to 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 to 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 AFI-2 and AFI-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.

Ferrells

I recently acquired a copy of the 9th edition of the best-selling *Ferrell'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 IOC 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 (TFA) Iceland working several Icelandic trawlers.
2.591	IPL/Livorno Radio broadcasting marine navigation warnings for various areas around the Italian coast.
3.178	OST/Ostend Maritime Radio calling for the "Tom Baker"; there was no reply from the ship.
4.631	Station '41' working station 'Foxtrot 1', requesting that they "send non-secure for 5 minutes, and then call me back".
4.739	Neatishead 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 'Foxtrot 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 D7R 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 Rhet 83 working Ascension GHFS, reporting their eta to Ascension as 2330. Rhet 83 said that they were returning to 10.780 to continue working with Cape Radio.
	SAM 27000 working Ascension, requesting a discrete frequency away from 13MHz (where they were working with Andrews VIP at the time). Ascension says to QSY to 14.615MHz (see below).
12.277	Spar 84 working Ascension GHFS after QSY'ing here from 11.176MHz.
13.104	WOO/Ocean Gate Radio, New Jersey broadcasting a weather-report for the Atlantic Ocean.
14.295	W3NAN re-broadcasting the launch of Space Shuttle mission STS-65.
14.615	SAM 27000 working Ascension, for a phone-patch to STATE OPS in Washington. Once through, they ask for a phone-patch to flight ops in Shannon, Eire, but get connected to a fax machine!

Peter Shore, c/o SWM Editorial Offices, Broadstone

Bandscan

Europe

Swiss Radio International is undergoing major changes in its operations. In May, it launched a 24 hour-a-day French service for European audiences 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 Suisse Romande, 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* that 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 station. 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 0315UTC
11.62MHz	0330 to 0530UTC
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 & 13.73MHz
1430UTC	6.155 & 9.87 & 13.73MHz
1830UTC	5.945 & 6.155MHz
2130UTC	5.945, 6.155 & 9.88MHz.

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, - mentioning *Short Wave Magazine* of course!

Radioropa Info

Tune to the long wave frequency of 261kHz expecting to hear Russian on Radio Volga, the former Soviet troops station in eastern Germany, and you'll find nothing but German. Radioropa Info, based in the small western German town of Daun, managed to hire time on the transmitter back in 1993. Now it has the frequency entirely to itself from opening at 0400 through to close at 2100UTC. The station is also carried on Astra's 11.475GHz transponder in stereo on the audio sub-carriers at 7.74 and 7.92MHz. Radioropa Info takes some of its news from the BBC's German Service in Bush House.

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.

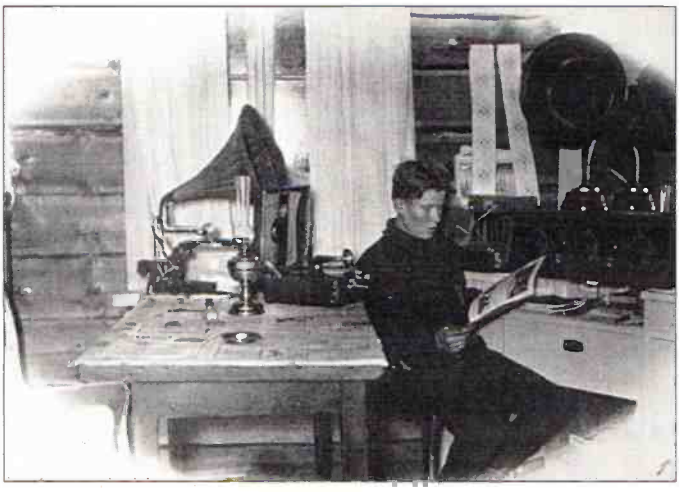
Off-Shore

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 Lelystad and Enkhuizen, and make use of a 23kW medium wave transmitter.

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.

The Radio & TV Museum at Lahti, Finland is housed in the old Lahti radio station. The amateur radio station OH3R is operated from the Museum.



Godfrey Manning G4GLM, c/o The Godfrey Manning Aircraft Museum, 63 The Drive Edgwae, Middlesex HA8 8PS

Airband

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

Christine Mlynek.

Although 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 skyward v.h.f. 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 is not often that Es affects 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 interference and high power Band II broadcasters can be received over great distances. The v.h.f. and u.h.f. airbands can certainly be affected by tropo.

Follow-Ups

In July the question was: "Can Hawks refuel in the air?" and I answered "No." Now I can change the answer to "Not yet" because British Aerospace Military Aircraft (Warton) have sent information on air-to-air refuelling trials conducted with a Hawk 200 earlier this year. The refuelling probe's tip is just in front of the cockpit glazing. Participating in ground and air trials were Hawk ZH778 and VC-10 Tanker ZA149. Air trials out of Boscombe Down involved flying a triangle between the north coast of Cornwall, the south coast of Wales and the Scillies (this does not correspond with a known air-to-air refuelling area).

British Aerospace always makes me think of Hatfield, now closed (as previously reported by me). **Gene Reed WB7NGI** (Las Vegas, USA) asks if The Comet pub (immediately south-east of the aerodrome) is still open; last time I drove past, a few months ago, it indeed was. To clear up any confusion, the Comet in this case is the Racer variety, G-ACSS, and a model of it stands proudly in front of the building on a high pole. Closure of the airfield is nothing to be proud of, though.

South Africa's Shackleton made a 'guest appearance' in the August '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 SBAC 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 LATCC frequency changes in August, **R.A. Taylor** (Chigwell) notes that the Hurn sector (originally 134.45) might now be on 120.025; I previously listed the new allocation as 128.625MHz.

Let's Fly

Peter Hawkes (3km from Halfpenny Green) did! In June he went to Monastir (Habib Bourguiba) in Tunisia by Airtours 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 Area Control Centre on 132.55 or 123.9MHz (my sources list 129.3) after following the SID. Approach aids were the Monastir v.o.r. and i.l.s.

Watching the flying during the International Air Tattoo at Fairford was **Richard Gosnell**. Apparently there is a 'park and view' facility abeam the 27 threshold but, for no apparent reason, spectators were moved on from here at certain times during the show. Does anyone know why? One point I always seem to need to make: remember that there are others watching too, and their hobby isn't necessarily the same as yours. If you listen to any radio, do it through an ear piece. If you need to climb a stepladder to improve your photography, place yourself behind the main crowd. Avoid leaving your car's tailgate open if it could obstruct the view. Airshows attract large crowds but there should be room for us all. Annoying behaviour gets noticed by the officials - good conduct doesn't!

Arrivals at Fairford usually contacted Brize (127.25 or 132.9MHz) or occasionally Lyneham first. A new trend is to run a commentary on low-power broadcast radio, Wings Radio (1.413MHz) 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 Factsheet that you and **Keith Goodchild** (Aldbury) 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 Gatwick; 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 reciting the full frequency. The decode information is restricted in the sense that it isn't published, but some specialist sources might be able to help. Try: Intercept, 11 Newton Close, South West Denton, Newcastle Upon Tyne NE15 7QP. Also: Signet, 19 Crescent Road, Hunstanton, Norfolk PE36 5BU. A stamped/addressed envelope is necessary if you want a reply.

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. links 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!

Piper PA-22 Tri-Pacer at the PFA Rally, Wroughton. *Christine Mlynek.*

Abbreviations

ATZ	Aerodrome Traffic Zone
CAA	Civil Aviation Authority
f.m.	frequency modulation
GASIL	General Aviation Safety Information Leaflet
h.f.	high frequency
i.l.s.	instrument landing system
km	kilometres
LATCC	London Area & Terminal Control Centre
MD-	McDonnell-Douglas
MHz	megahertz
NATS	National Air Traffic Services
SBAC	Society of British Aerospace Companies
SID	Standard Instrument Departure
s.s.b.	single sideband
u.h.f.	ultra high frequency
v.d.f.	v.h.f. direction finder
v.h.f.	very high frequency
v.o.r.	very high frequency omni-directional radio range

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). ■

John Griffiths, 9 Rhos-y-Gaer Avenue, Holyhead, Gwynedd LL65 2BE

Scanning

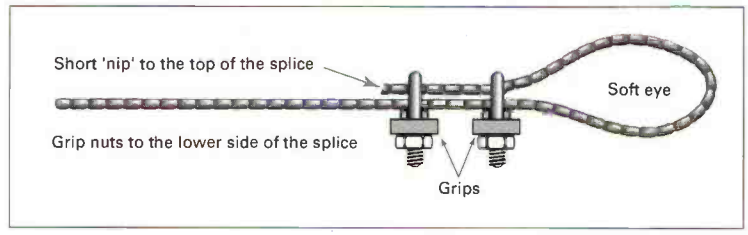


Fig.1.

Writing this column has brought me some recognition - on which I am undecided! 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 committing themselves fully 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 akkers 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 meteorological conditions commensurate with living on top of Holyhead Port - and exposed to the screaming banshee south-westerly gales we get here. To illustrate this, a discone 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 salesman tell you about the benefits of an extra antenna outside? That you don't need short wave or s.s.b. if it's just aircraft and ships on 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 this magazine and the books by Peter Rouse will put you on the right trail 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 indeed.

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; HB-232 Scanner/computer interface and OPTO-SCAN 456 all of which, incidentally, are available via 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.

Datametrics 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.

Also, while on the subject of control the Yaesu FRG-9600 has several supporting programmes and from **Bill Atkinson** of Denton, Manchester, comes news that S. Collings G4SGI has a few under the generic of 'MONITOR'. Unfortunately, Bill omits G4SGI'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**, Aberdeen: **Peter Hawkes**, Wolverhampton: **Mike Newell G1HGD** 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 Cheek 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:

COMMtronics Engineering, PO Box 262478, 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 keeps 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 Captain 5500M I asked for information on. It seems the set is well loved and has been kept, beating many others hands down on such things as audio reproduction and design. As Jerry points out, the Sony's vertical - as opposed to horizontal - design is both unique and functional. I side with Jerry in saying that the set is built well and to last, unlike many sets nowadays that have a so obvious built-in obsolescence factor.

Waters and Stanton were good enough to send me this year's catalogue inside of which are many goodies - just the thing to read before Christmas! I am glad to see, however, that Waters and Stanton do something I don't think any other retailer does, and that is to include a personal potted biography of the company as well as a short lesson in how to make up plugs. If, like me, you have two left hands and can never remember just how a BNC is supposed to be made up then the advice is easy: Get the catalogue!

Information here on a query raised by a reader in the Republic of Ireland should now have been successfully sorted. My thanks to the reader who sent it in for onpass to the party concerned and his wishes to remain anonymous will be adhered to. I will honour any calls for anonymity of source regarding specific frequencies or lists of frequencies and will also ensure that confidentiality is sacrosanct. If you do want to share something then please bear this in mind.

RAF Valley '94 Airshow was seen from my dormer window looking directly down the main runway, give or take the odd house or two. Frequencies this year were 121.200 and 121.300 - Tower and Ground respectively. I managed to hear more than I saw but the displays that I did manage to catch were spectacular. The Soviet Mi-24 Hind D pair and the Sukhoi Su27s were, by far the best of the day - out posing the BAe Hawks - and giving rise to the question: Is Soviet hardware really as under-tech as it is often made out to be here in the West? After the stall slips of the Su27s I am not so sure! That was damned good stuff! Again, the spots used by the airfield were in the civvy portion of airband and must have caused some consternation to people with scanners who presumed they'd be in the military segment! If you're new to scanners and going to displays do bear that in mind! It saves a whole lot of trouble!

Following on from last months examination of external antennas and their maintenance and care. I

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.

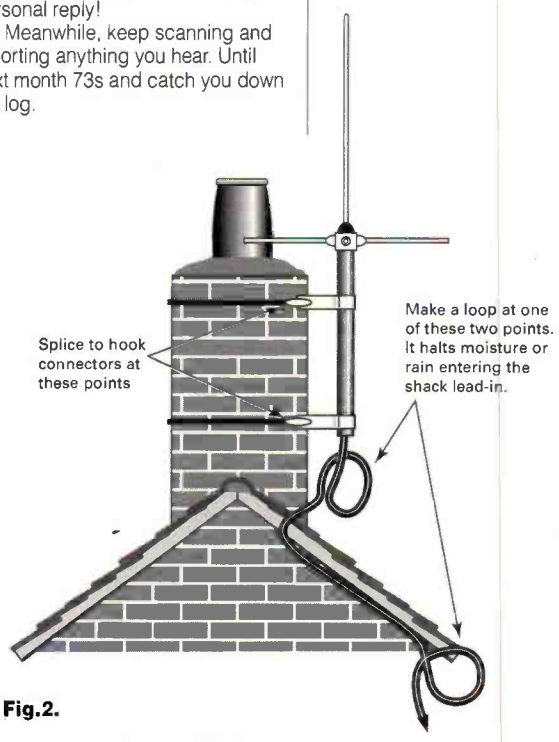
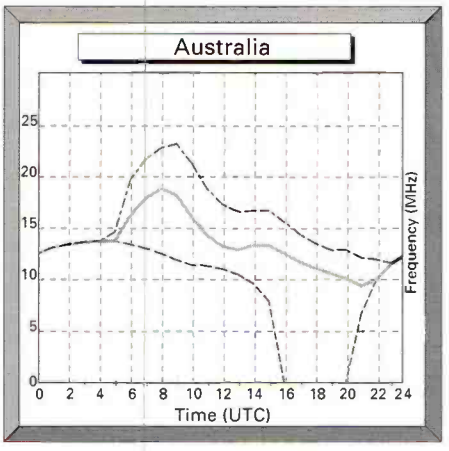
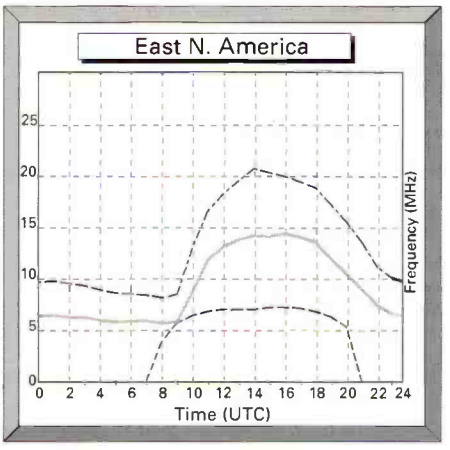


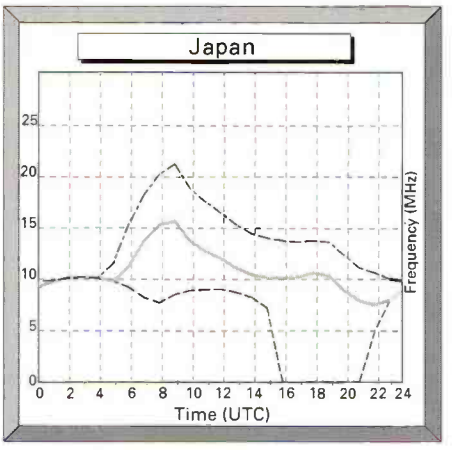
Fig.2.

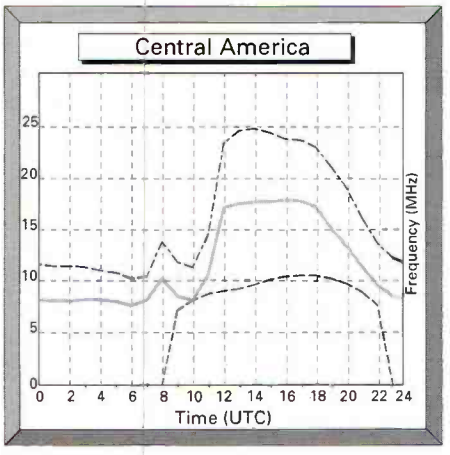
Jacques d'Avignon VE3VIA

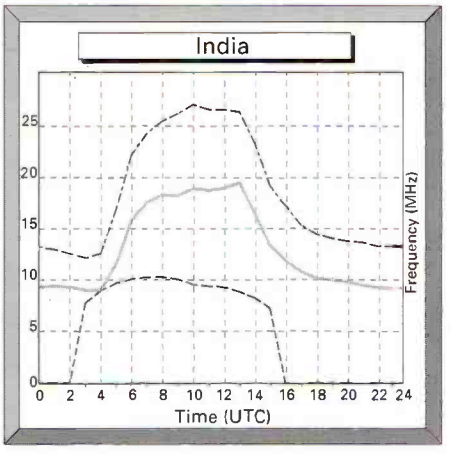
World Propagation Forecasts October

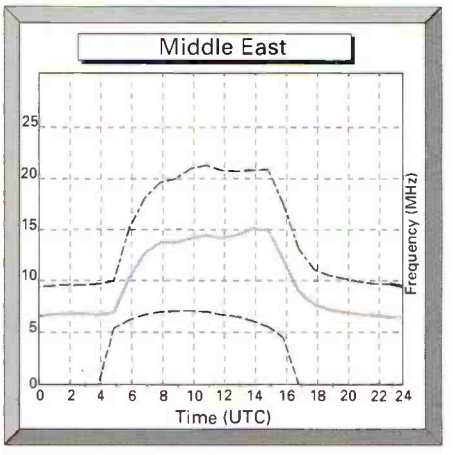


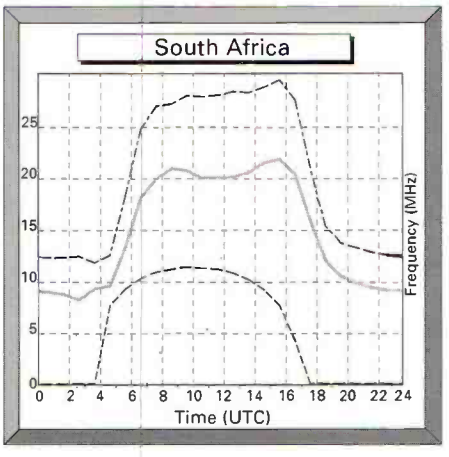


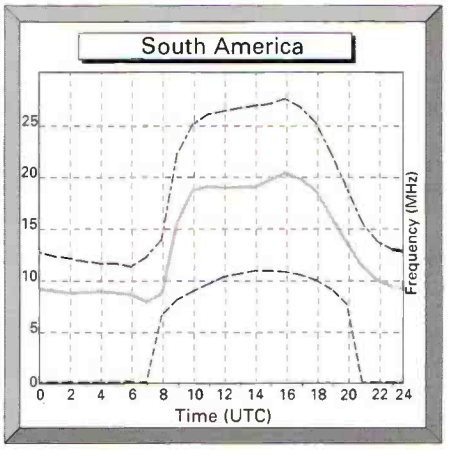


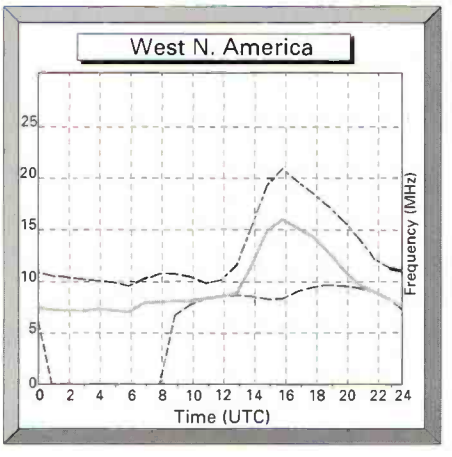












How to use the Propagation Charts.

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.

Lawrence Harris, 5 Burnham Park Road, Peverell, Plymouth, Devon PL3 5QB

Info In Orbit

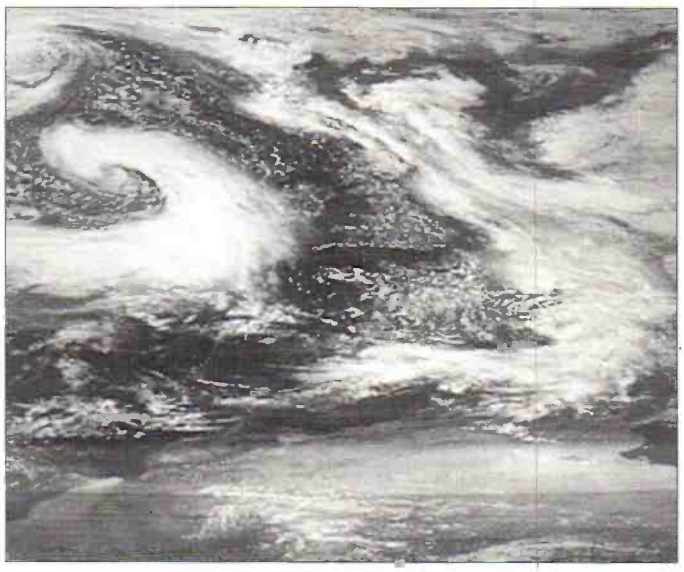


Fig. 1: METEOR 3-3 April 1993 from T Lane.

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 137.40MHz. 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 NOAAs 11 and 12 were transmitting. The other two (NOAAs 9 and 10) coincided with their prime WXSAT, so their v.h.f. 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.

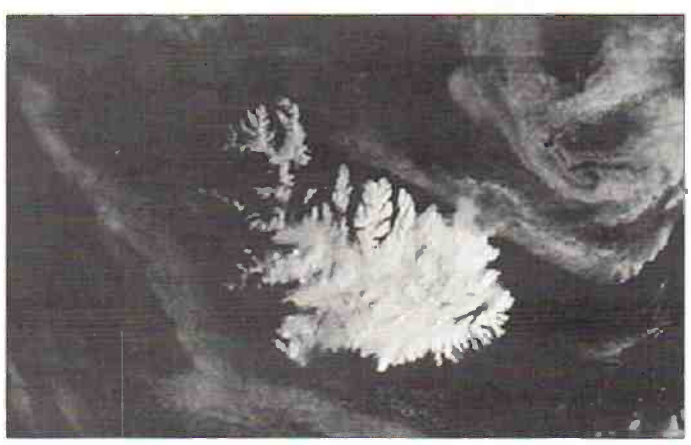


Fig. 2: Iceland - a METEOR picture from Frank Slater.

Frank Slater of Spalding still uses his YU3UMV framestore 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 used but I suspect that it was a METEOR.

I recently featured a short review of the popular JVFAX (IBM PC) 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 **Lester Jones** of West Kirby, who uses a Pervisell interface and says that it works well.

Jim Healey of Plymouth sent some pictures taken using his WXSAT equipment. Jim has a polar orbiter system and wonders about the cost of adding hardware to receive METEOSAT. I have written about this in the Special edition; essentially, one needs to add a suitable antenna/pre-amp, and either a down-converter or dedicated METEOSAT receiver. Suitable dishes/Yagi cost between £30 and £180; a good pre-amp is pricey, but you may get moderately satisfactory results without one, at least for a time! Down-converters cost around £180, and can be used to change the 1691MHz METEOSAT signal from the antenna, down to 137.50MHz which then feeds your conventional WXSAT receiver. This avoids the necessity to purchase a dedicated METEOSAT receiver, which is quite expensive. Curiously, Jim also sent me a METEOSAT picture!

Dr Tony Batchelor is the managing director of a Falmouth company and sent me some laser print-outs from his PC GOES/WEFAX WXSAT system. He acquired his images at 1280x800 pixels resolution, converted them to GIF format, cropped them using the GWS (Graphics WorkShop) package, finally printing them. The result is **Fig. 3**- a NOAA 9 picture from early May.

Australian correspondent **Gordon** (sorry, I can't find any other details), kindly sent me some 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. 4**. 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

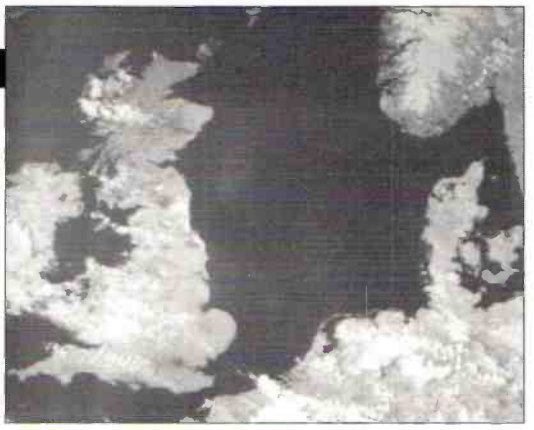


Fig.4 (Above): NOAA 11, Britain - 13 May 1994 from Jim and Hilda Richardson.

Fig.3 (Left): NOAA 9, Britain on May 8 from Dr Tony Batchelor.

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 starts. If your WXSAT receiver has an 'intelligent' SQUELCH, it will only open the connection when an a.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 WXSATs going back to early METEORs. At that time there was no software to actually reproduce them properly from tape recordings!

Spacenight on Bayern

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 astute satellite television watchers may have noticed the 'Spacenight' features on the German channel Bayern, 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. Bayern have shown a complete range of videos, including METEOSAT and NOAA research work on the upper atmosphere, long term studies of ozone depletion, and routine WXSAT 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 Romford commented on the difference between the colourful 'blueness of the oceans and the blackness of space', as seen from the manned spacecraft, shown as described 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 BIRDDOG 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 BIRDDOG. I sometimes experience a crash immediately after updating the Kepler file, but that has been the only 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 not found any reference to it in the 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. NOAA-9 Epoch 94214.744242.
2. Epoch 1994 2 August.

Kepler elements, as issued by NASA in standard 2-line form, give the same data, but use the format shown in line 1. Some programs require data to be input in the form of a date, as in line 2. Data are easily converted - remember that the '214' (following the year 94) is just the day number of the year. January 1 is day 001, December 31 is day 365 (or 366), so day 214 is August 2, as given in line 2. 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. The following are available free to those who are residents of the member states:

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.

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 spaceflight systems.

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 *Aegean 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 PD 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*. The others may have a limited appeal to most readers.

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

Kepler Elements

Different options are available.

1: I will send a print-out of the latest WXSAT elements upon receiving an s.a.e. and separate, extra stamp. All WXSATs 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 WXSATs, and a larger ASCII file holding elements for many satellites. This option includes a print-out identifying NASA catalogue numbers (for the WXSATs, Amateur Radio satellites, and others of general interest), in both launch and object format - ideal for computer data retrieval. This is constantly being improved and notes are provided. Please enclose cash, a cheque, or PO for £2 with your PC-formatted disk and s.a.e. Further suggestions for improvement will be welcomed.

Frequencies

NOAAs 9, 11 a.p.t. on 137.62MHz; NOAAs 10, 12 on 137.50MHz; NOAA beacons on 136.77 & 137.77MHz and METEORs use 137.30, 137.40 & 137.85MHz.

Mike Richards G4WNC, PO Box 1863, Ringwood, Hants BH24 3XD. Compuserve: 100411,3444

Decode

All the Data Modes

Eberhard Backeshoff has just sent me the very latest release of his excellent software package, JVFAX. 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 JVFAX70. 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 JVFAX70 with all the others 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 dependant 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 8 bits on comparator. The ADDR and IRQ settings are absolutely crucial and depend on which of your computer's serial ports you're using. The standard settings that should work with most computers are COM1 = ADDR 03F8, IRQ 4 or COM 2 = ADDR 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.

JVFAX 7.0 has a number of improvements designed to make the program much easier to use, 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 (JFIF) picture files, which should help save some valuable disk space.

Another useful extra is the facility to switch directly between SSTV and FAX reception. This avoids having to make the change via the main menu and is great when tuning around the bands.

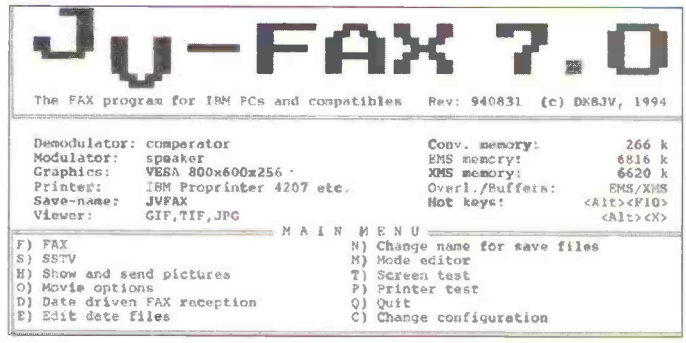
The SSTV function has also been enhanced in a number of ways and now includes a spectrum analyser type tuning display. This is shown along with the received image and makes SSTV tuning very easy. The program is also set-up to evaluate the VIS codes sent in SSTV.

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 all 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 nine 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 fully automatic decoding of the SDUS 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 you 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.

WXFAX Update

Some months back I reviewed the Jan Nieuwenhuis WXFAX utility for PCs and compatibles. This interesting program provides a database of all the currently active l.f. and h.f. FAX stations. The information contained in the database is very comprehensive and includes station name, location, callsign, frequency and QSL address. This is supplemented, where available, with transmission times, schedules, transmitter power, speed and IOC. As you can see, the database is likely to be very useful for all FAX enthusiasts.

Jan has just written to me announcing the release of version 2.0. This new version has been enhanced in a number of areas and now includes a colour display instead of the earlier black and white. He has also added a record counter to the main display to help with the identification and location of station details. The print menu has also been changed to give the option to print transmission info in addition to weather map identification.

Finally, a general information section has been added to the main menu to give help about FAX transmissions, technical specifications, decoding software and a simple FAX decoding system.

If you already have an earlier version of the WXFAX you can upgrade for 10 Dutch Guilders providing you return your original disk. For new users the price is a very reasonable 20 Dutch Guilders (around £7.50). Once you've registered you will be informed of latest developments one year after purchase and will be able to upgrade for just 10 Guilders. If you would like to take Jan up on his offer the address to write to is: Jan Nieuwenhuis (JNi), Vloedlyn 12, NL-1791 HH Den Burg (Texel), The Netherlands.

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 this 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 assembly. 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 clear. All one had to do was take it up on deck and give it a good blow through!

Just to complete this piece **A. M. 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 my support for the experienced Decode listener. This means spending some more time

dealing with what has become known as the complex modes. This generic term really means everything except basic RTTY, c.w., SITOR/AMTOR and Packet. A look through the specification of any of the top range decoders will soon give you an idea of just how many of these modes are available. The important point to note about these modes is that the fun is in finding and identifying the stations rather than decoding the transmitted data. With so many modes sounding very similar you have to use a combination of your decoder's analysis tools and your own experience. It's rather like a complex detective game but can be very absorbing. It's also a great way to learn how communications protocols work.

To get the ball rolling I've added a new COMPLEX frequency list to my range of readers' services. The list has been compiled from readers reports but I could do with your help to develop it further. First of all I would like to receive more logs. Ideally these should be on disk in Dbase format, but I can accept text files or simple paper lists. Secondly I would like to hear what you would like to see as regards a format for the list. As a starter I've used my standard format, e.g. frequency, mode, speed, shift, callsign, time, notes. However, I expect the notes field to be far more important with this list as it will contain important details to help identify the transmission. One of the other differences with the complex list is that there will be lots of gaps in the station information. Once the list has been published the object is to use the expertise of readers to fill in the gaps and gradually refine the list. If you have any logs or comments to make please send them to the address at the head of the column.

Compuserve Access

The observant amongst you will have noticed that I'm now quoting a Compuserve address along with my postal address. Compuserve is a US based network operator that supplies an extensive information network for those with computers and suitable terminals. One of 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 message. If you don't have access but do have a computer and modem, Compuserve have sent me special registration details that can be used by *SWM* readers. All you have to do is dial up Compuserve's London node on 071-490 8881 and answer the prompts as follows: Incidentally this node can handle all modem speeds from 300 to 14400 bits per second.

Set your comms software to use 7 bits, one stop bit and even parity (7-1-E), dial the London node number and input the information shown in bold below following each prompt:

HOST NAME:CIS[CR]
USER ID:177000,5606[CR]
PASSWORD:EXPLORE/WORLD[CR]
AGREEMENT
NUMBER:???????????[CR]
SERIAL NUMBER:93006[CR]

Should you encounter any problems just call Compuserve's Freephone support line on (0800) 289458.

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 Meteosat 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. Those of you 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 loose the fine detail of your received charts.

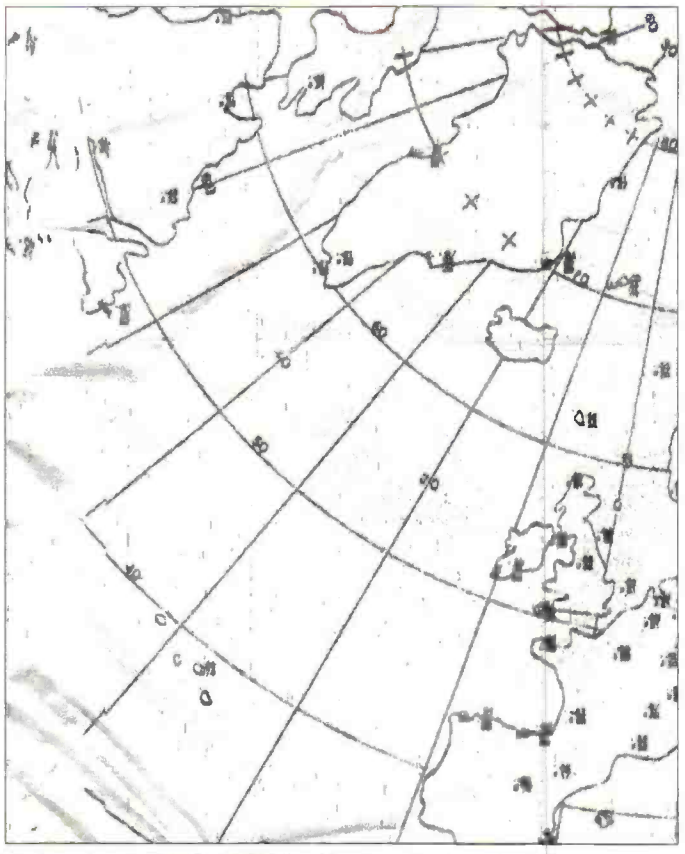
You also need to make sure you don't use the Datong's RTTY setting for receiving FAX pictures. If you do you'll finding ghosting around the received image caused by the increased group delay of this mode. This process should work when using JVFAX or any other decoder that needs tones at around 2kHz.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

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



Picture from a Koden FAX receiver. The original is on electrosensitive paper and is, therefore, grey on silver.

HAMCOMM 3.0 - RTTY and c.w. transceive facilities for IBM compatibles.

Day Watson Beginners List - Chronological frequency listing of reliable signals for new listeners.

Decode List - Straightforward frequency list from Decode readers.

Complex Modes List - Advanced frequency listing for experienced listeners.

FactPack 1 Interference - Help for solving interference problems.

FactPack 2 Decoding Accessories - How to use and choose your decoding accessories.

To receive any of these offers just send a self addressed sticky label plus 50p per item or £1.50 for 4, £2.00 for 5, £2.50 for 6 or £3.00 for all seven items. If you're ordering JVFAX or HAMCOMM you will also need to send a blank formatted 720Kb disk for each program or just one 1.4Mb disk.

Frequency List

Now for this month's selection of frequencies supplied by Decode readers.

Freq (MHz)	Mode	Speed	Shift	Call	Time	Notes
0.1342	FAX	120	576	DCF54	0459	Offenbach Met
2.374	FAX	120	576	GYA	1753	Northwood
3.8855	FAX	120	576	DDH3	1904	Hamburg Met
4.292	CW			IAR24	1904	Rome Weather
6.3185	ARQ	100	170	OXZ	2005	Lyngby Radio
6.348	CW			HWN	1936	Paris-Houilles
6.348	RTTY	75	400	HWN	1600	French Navy
6.379	CW			4XZ	1924	Haifa Naval
6.9185	FAX	120	576	ECA7	1750	Madrid Met
7.67	FAX	120	576	RCC76	1755	Moscow Met
8.083	FAX	60	576	RIJ75	1530	Tashkent Met
8.42	FEC	100	170	FFT	1900	Saint Lys
11.039	RTTY	50	400	DDH9	0742	Hamburg
11.062	RTTY	50	400	LZU2	1610	Sofia Met
12.2125	RTTY	50	400	Y2O3	1630	Belgrade press
14.452	RTTY	50	400	HMP	1438	Pyongyang
14.497	RTTY	50	400	CSY	1517	Santa Maria
14.7601	RTTY	50	400	CNM61	1232	Rabat press

Andy Cadier, 28 Romney Avenue, Folkestone, Kent CT20 3QJ

Off The Record

Last quarter I invited your comments on Citizens Band radio, this aspect of our hobby is not regularly covered in *SWM*, but is nonetheless a part of the SW spectrum. **Reg Hudson** from Bletchley 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 finds these frequencies a dream to use.

Mr A. Scott of Loughborough says at his location CB suffered badly from foul language, but recently this has been less of a problem. He continues to say, "I myself have all the CB frequencies and find 934 and 27MHz the greatest thing since sliced bread. This wonderful little box can give great pleasure to all if used properly". He also suggests that persons starting out in the CB hobby would benefit from reading *SWM* to give them a wider understanding of the radio hobby in general.

Peter Barber, writing from Coventry relates his experiences, "Originally my 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 of being informed of local gossip and out of town happenings. Towards the end of the 80s those whom I call the undesirables became CBers, obscene language, jumping on occupied channels, insults, and dead keyers have ruined the pleasures of CB". An airmail letter from **Bruce Balog** from Stamford, CT. in the USA says that, "Many a Radio Amateur has been born from CB, as well as careers in electronics and other off-shoots". He also mentions clubs that organise emergency contact with the police and ambulance services.

From Somerset a breaker with the handle 'Thunderbolt' writes. "I obtained my Class A amateur licence in 1954 and went into CB about 8 years ago when I was given some old unwanted equipment. I have never regretted taking out a CB licence. Forget the moronic element who are determined to spoil anything that takes the fancy of their tiny minds. Forget too the male drivers of large vehicles who spatter their talk with a procreative word five times a sentence!

You are then left with a hard core of people who have a genuine interest in radio and use that medium to experiment and to talk to each other. Some years ago the Radio Society of Great Britain seemed very anti-CB and banned from their publication *Radcom* any articles or advertising about that mode, thereby distancing amateurs from astonishing sources of cheap hardware. They also missed an opportunity to trawl the ranks of CB operators and computer buffs, who would have been quite an asset to the amateur radio field. With CB, 4W is a lot of fun, it reminds me of 160 metres in the 50s when we worked with simple gear. But why, oh why do the powers that be persist with ludicrous 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 half-wave dipole, without all the fiddling at present. I have however a perfectly legal home-brew ground plane antenna stuck in a flower border giving excellent results, so there is the chance to experiment.

The final CB letter comes from **Mr G. Lane** in Plymouth who says, "I would love my children to be able to use my 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 Ramsgate fishing boat *Fairwind*, which supplied the Radio Caroline ship *Ross Revenge*. This activity didn't exactly go unnoticed by the authorities who were most intent 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 CT12 4JQ. This price includes a donation to the MV *Ross 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 SW20 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 the 1930's 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 Lambs' Meadow Publications, Sheffield S18 5WQ.

A rather off-beat radio related newsletter that drops through my letterbox at irregular intervals is called *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.

Short Wave Pirates Chart

	Monitors
Reflections Europe	A,B,C,D,E,F
Radio Nord	A
Star Club Radio	A,F
Ozone	A,B,D.E
Lightning	A
WGAS	B,D,E,F FRS
Holland	A,D,F
Emerald	A,D
Orion	B
Jolly Roger	A,B,D,E,F
Lazer Hot Hits	A,D,F
Britain	A,D
Radio Mike	A
XTC	B,D
Piranha	A,C
East Coast Commercial	A,C,D,E,F
Good Music Radio	B,D,E
Safari	A
Geronimo	E
Caroline SW (Possibly ceased?)	A,B,C,D,E
Marabu	E
Angel (Relay via WNKR)	A,B,D,E,F
WNKR (Raided 31/7/94)	D,E
Brigitte	A
Radio Dublin	A,B,E
Europe	A
Level 48	A
Starshine	A
Subterranean Sounds	A,B,F
Livewire	A,E,F
Southern Music	A
Barones MW	E

A: Free Radio Monitoring, Halesowen, W. Midlands.
B: Bob Marsh, Bexleyheath, Kent.
C: Sean Cooper, Wells-next-the-Sea, Norfolk.
D: David Williams, Southampton, Hampshire.
E: Rab O'Fokel, Sunderland, Tyne & Wear.
F: Ian Turner, Deal, Kent.

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, an added attraction to be able to sit by the pool on deck wearing light-weight headphones firmly plugged into my Sangean portable receiver. Alas my reception of American pirates was frequently obliterated by the vessel's own h.f. radio communications system, in fact the entire ship's superstructure bristles with antennas.

Another 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 *Radio File*. 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 confiscated 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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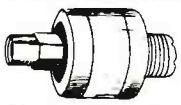

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By Brian Oddy G3FEX, Three Corners, Merryfield Way, Storrington, West Sussex RH20 4NS

LM&S

Long, Medium and Short Waves

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. They may not suit those 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: l.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 the band for weak signals difficult or even impossible. There was only one report of the sky waves from the 10kW RAI outlet in Caltanissetta, Italy on 189kHz being received here - it came from **Fred Pallant** in Storrington, who picked them up after dark.

Some listeners are unable to hear Tipaza, Algeria (1500/750kW) on 252kHz due to the potent co-channel signal from Atlantic 252 (500/100kW) in Clarkestown, S.Ireland. The best approach would seem to be to listen after dark and to use a directional antenna to 'null-out' Atlantic 252. In Wootton, IoW, **George Millmore** has found the directivity of the ferrite rod antenna in his Sangean ATS-803A portable quite adequate for this purpose, but the depth of the null could well be insufficient in locations where their signal is very strong. **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 night.

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 Scunthorpe since their change of transmitter site from Lots Road to Crystal Palace. It was logged as SINPO 22332 at 0833 by **Leo Barr** in Sunderland, SIO 555 at 1851 by **Andrew Stokes** in Leicester and 45354 at 1853 by **Bill Rowley** in Colchester.

A marked improvement in the audio quality from Sunshine Radio on 855kHz 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.

Owing to 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 R.Australia's Darwin broadcast to Asia on 21.725 (Eng 0900-1100) that has often reached our shores. It was logged as 25532 at 0900 by **David Edwardson** in Wallsend and a potent 55545 at 1018 by **Chris Shorten** in Norwich.

Other broadcasters heard here in the morning were RFI via Issoudun on 21.620 (Fr to E.Africa 0700?-1700?) 44444 at 0800 by **Geoff Crowley** in Aberdeen; R.Pakistan, Islamabad 21.520 (Eng to Eu 0800-0845) SIO444 at 0805 by **Bill Clark** in Rotherham & (Eng to Eu 1100-1120) 32232 at 1116 in Leicester; R.Japan via Moyabi 21.640 (Jap to Eu, M.East 0800-0900) 35444 at 0815 in Storrington; Slovak R.Int via Rimavska Sobota 21.705 (Eng to Aust 0830-0857) 33333 at 0855 by **Bernard Curtis** in Stalbridge; UAER, Abu Dhabi 21.735 (Ar to Eu 0900-1358) SIO455 at 0900 by **Kenneth Buck** in Edinburgh & Dubai 21.605 (Eng to Eu 1030-1055) 35333 at 1045 by **Simon Hockenhull** in E.Bristol.

After mid-day they were R.Portugal Int via Sines 21.515 (Eng to M.East, India? 1430-1500) 35343 at 1430 by **Eddie McKeown** in Newry; BBC via Limassol 21.470 (Eng to E.Africa 0430-1615) 45534 at 1459 by **Ron Damp** in E.Worthing, & via Ascension Is 21.660 (Eng to Africa 0730-1745) 45544 at 1650 by **John Eaton** in Woking; WYFR via Okeechobee 21.500 (Eng to Eu, Africa 1700?-1900) 25332 at 1800 by **Eric Shaw** in Chester & 21.525 (Eng to Eu, Africa 2000-2200) 25222 at 2020 by **Darren Beasley** in Bridgwater; R.Nederlands via Bonaire 21.590 (Eng to Africa 1730-1925) 24333 at 1815 by **Rhoderick Illman** in Oxted; HCJB Quito 21.455 (Eng, u.s.b. + p.c.) 25434 at 2140 by **Michael Griffin** in Ross-on-Wye; VOFC Taiwan via Okeechobee 21.720 (Eng to Eu, Africa 2200-2300) 44444 at 2240 by **Robert Connolly** in Kilkeel.

R.Australia has also been reaching the UK in the **17MHz (16m)** band. Their Darwin transmission to S.Asia 17.880 (Eng 0600?-0900) was 34333 at 0817 in Woking. Much later, 17.860 to Pacific areas (Eng ?-0600) was 24343 at 2245 in Ross-on-Wye.

Also logged in the morning were R.Pakistan, Islamabad 17.900 (Eng to Eu 0800-0845) noted as 43333 at 0816 in Sunderland & (Eng to Eu 1100-1120) 45444 at 1114 in Bridgwater; RTVM Tanger, Morocco 17.595 (Eng to M.East, N.Africa 1400-1500) 55544 at 1400 by **Ross Lockley** in Stirling; Monitor R.Int via KHBI Saipan17.555 (Eng to E.Asia 0900-1000) 23222 at 0920 in Kilkeel; Channel Africa, Johannesburg 17.810 (Eng to E.Africa 1000-1100) 32442 at 1005 in Chester; R.Moscow Int 17.560 (Eng WS 1000-1300) 33233 at 1039 in Leicester; SRI via Sottens? 17.515 (Eng, Fr, Ger, It to Far East, SE.Asia 1100-1300) SIO444 at 1128 by **Philip Rambaut** in Macclesfield.

In the afternoon the Voice of Greece, Athens 17.520 (Gr, Eng to N.Am 1300-1350) was 44444 at 1343 in Newry; RCI via Sackville 17.820 (Eng [CBC progs] to USA, Caribbean 1200-1300 Mon-Fri, 1300-1600 Sun) SIO344 at 1355 in Edinburgh; RFI via Moyabi 17.560 (Eng to M.East 1400-1500) 43333 at 1415 by **Sheila Hughes** in Morden & via Allouis? 17.620 (Eng to Africa 1600-1700) SIO322 at 1600 in Co.Fermanagh; Africa No.1, Gabon 17.630 (Fr, Eng to W.Africa 0700-1600) 34433 at 1459 in E.Worthing; WEWN, Birmingham 18.930 (Sp to S.Am 1400-2100) 22233 at 1529 by **Martin Dale** in Stockport & 17.510 (Eng to Eu? 1500-1600) 55555 at 1530 in Norwich.

Later, Monitor R.Int via WCSN 17.510 (Eng to Africa 1800?-2000) 43333 at 1815 in Stalbridge; VOA via Tangier 17.895 (Eng to Africa 1600-1900) 34444 at 1818 in Oxted & via Tinang 17.820 (Eng to E.Asia 2200-0100) SIO333 at 2215 by **Francis Hearne** in N.Bristol; HCJB Quito 17.790 (Eng to Eu 1900-2000) SIO444 at 1950 in Rotherham & 17.490 (Jap 2200-2230 u.s.b.+ p.c.) 45544 at 2234 in Aberdeen; R.Nederlands via Bonaire 17.605 (Eng to W.Africa 1930-2025) 33333 at 2025 by **Peter Pollard** in Rugby; RCI via Sackville 17.875 (Eng to Eu 2030-2130) 34333 at 2045 in E.Bristol; R.Havana Cuba 17.760 (Eng to Eu 2100-2200) 33333 at 2130 by **Clare Pinder** while in Appleby; VOFC Taiwan via WYFR 17.750 (Eng to Eu, Africa 2200-2300) 53434 at 2220 by **George Tebbitts** in Penmaenmawr.

Broadcasts from many areas may also be heard in the **15MHz (19m)** band! During the morning the BBC via Ascension Is 15.400 (Eng to W/C.Africa 0730-1130) was 32223 at 0900 in Stalbridge;

Long Wave Chart

Freq kHz	Station	Country	Power (kW)	Listener
153	Bechar	Algeria	1000	J,K*
153	Donebach	Germany	500	A,B,C,E*,F*,G,H,I*,K
153	Brasov	Romania	1200	F*
162	Allouis	France	2000	A,B,D*,F*,G,H,I*,J,K
171	Nador Medi-1	Morocco	2000	H*
171	Kaliningrad	Russia	1000	A,B,C,D*,E*,G*,H,I*
177	Oranienburg	Germany	750	A,B,C,D*,F*,G*,H*,I*,K
183	Saarlouis	Germany	2000	A,B,D,E*,G*,H,I*,J,K
189	Caltanissetta	Italy	10	H*
198	Warsaw 3	Poland	200	C*,E*
198	Burghead BBC	UK	50	A
198	Droitwich BBC	UK	500	B,D,E*,F*,G,I*,J,K
198	St.Petersburg	Russia	150	F*
207	Munich	Germany	500	A,C*,D*,E*,F*,G*,H,I*,K
207	Reykjavik	Iceland	100	A,E*
207	Azilal	Morocco	800	H*
216	Roumoules RMC	S.France	1400	A,D,F*,G,H,I*,J,K
216	Oslo	Norway	200	D*,H*
225	Raszyn Resv	Poland	?	A,C,D*,F*,G*,H*,I*,K
234	Beidweiler	Luxembourg	2000	A,B,D,F*,G*,H,I*,J,K
243	Kalundborg	Denmark	300	A,B,C,E*,F*,G,H,I*,K
252	Tipaza	Algeria	1500	A*,D*,G*,H*,I*,K*
252	Atlantic 252	S.Ireland	500	A,B,D*,E*,F,G,H,I*,J,K
261	Burg	Germany	200	A,G*,H,K
261	Taldom Moscow	Russia	2000	H*,I*,K
270	Topolna	Slovak Rep	1500	A*,F*,G,H*,K*
279	Minsk	Belarus	500	A*,F*,H*,K*

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

Listeners:
A: Geoff Crowley, Aberdeen.
B: Martin Dale, Stockport.
C: Simon Hockenhull, E.Bristol.
D: Sheila Hughes, Morden.
E: Stephen Jones, Oswestry.
F: Eddie McKeown, Newry.
G: George Millmore, Wootton, IoW.
H: Fred Pallant, Storrington.
I: Harry Richards, Worthing.
J: Tom Smyth, Co.Fermanagh.
K: Andrew Stokes, Leicester.

Medium Wave Chart

Freq (kHz)	Station	Country	Power (kW)	Listener
531	Ain Belda	Algeria	600	D*,I*,M*,S*
531	Torshavn	Faroe Is.	100	B
531	Leipzig	Germany	100	I*,L*,M*,R*,S*
531	RNE5 via ?	Spain	?	L*,M*
540	Wavre	Belgium	150/50	C*,L*,M,S
540	Solt	Hungary	2000	R*,S
549	Les Trembles	Algeria	600	L*,M*
549	Thurmau (DLF)	Germany	200	C*,L*,M*,S
558	Espoo	Finland	100	M*
558	Rostock(NDR)	Germany	20	L*
558	Tirgu Jiu	Romania	200	M*
558	RNE5 via ?	Spain	?	L*
567	Berlin	Germany	100	L*
567	Tullamore(RTE1)	Ireland (S)	500	B,C,F,H,K*,M, Q,R,S
576	Muhlacker(SDR)	Germany	500	L*,M*,S*
576	Riga	Latvia	500	M*
576	Barcelona(RNE5)	Spain	50	L*,M*
585	Orf Wien	Austria	600	M*
585	Paris(FIP)	France	8	M
585	Madrid(RNE1)	Spain	200	C*,L*,M*
585	Gafsa	Tunisia	350	F*
585	Dumfries(BBCScot)	UK	2	B,R*
594	Frankfurt(HR)	Germany	1000/400	L*,M*,R*,S*
594	Muge	Portugal	100	L*,M*
603	Lyon	France	300	L*
603	Sevilla(RNE5)	Spain	50	M*
603	Newcastle(BBC)	UK	2	B,K*
612	Athlone(RTE2)	Ireland (S)	100	C,F*,H,M*,R,S*
621	Wavre	Belgium	80	B,L*,M,S
621	Barcelona(OCR)	Spain	50	M*
630	Vigra	Norway	100	B,L*,M*,S*
630	Tunis-Djedeida	Tunisia	600	F*,L*
639	Praha(Liblice)	Czech	1500	C,L*,M*,S
639	RNE1 via ?	Spain	?	L*,M*
648	RNE1 via ?	Spain	10	R
648	Orfordness(BBC)	UK	500	M,Q,S
657	Neubrandenburg(NDR)	Germany	250	L*,R*
657	Madrid(RNE5)	Spain	20	L*,M*,S*
657	Wrexham(BBCWales)	UK	2	L*,S
666	Bodensees'dr(SWF)	Germany	300/180	L*,M*
666	R.Vilnius	Lithuania	500	L*
666	Lisboa	Portugal	135	L*,M*
675	Marseille	France	600	M*
675	Lopic(R10 Gold)	Holland	120	A,B,C*,H,I,L*, M,Q,S
684	Sevilla(RNE1)	Spain	500	L*,M*,S*
684	Avala(Beograd-1)	Yugoslavia	2000	M*
693	Burghead(BBC5)	UK	50	B
693	Droitwich(BBC5)	UK	150	C,F*,M,Q,R
702	Flensburg(NDR)	Germany	5	K*,L*,M*,R*
702	Monte Carlo	Monaco	300	M*
702	Zamora(RNE1)	Spain	10	L*,M*,S*
711	Rennes 1	France	300	H,L*,M
711	Laayoune	Morocco	600	M*
711	Murcia(COPE)	Spain	5	L*
720	Langenberg	Germany	200	L*
720	Lisnagarvey(BBC4)	Ireland (N)	10	F*,M*,S
720	Norte	Portugal	100	L*,M*
720	Lots Rd,Ldn(BBC4)	UK	0.5	B,M,Q,R
729	Cork(RTE1)	Ireland (S)	10	L*,M*,R
729	RNE1 via ?	Spain	?	B*,L*,M*,S*
738	Paris	France	4	M
738	Poznan	Poland	300	L*,M*
738	Barcelona(RNE1)	Spain	500	L*,M*
747	Flevo(Hilv2)	Holland	400	B,C*,H,I,L*,M, Q,R*,S
756	Braunschweig(DLF)	Germany	800/200	C*,F*,L*,M*,S*
756	Lugoj	Romania	400	M*
756	Redruth(BBC)	UK	2	M,R*
765	Sottens	Switzerland	500	C*,L*,M*
774	Enniskillen(BBC)	Ireland (N)	1	L*
774	RNE1 via ?	Spain	?	L*,M*,R*
783	Burg	Germany	1000	I*,L*,M*,S*
783	Miramar(R.Porto)	Portugal	100	L*
792	Limoges	France	300	F*,M*
792	Lingen(NOR)	Germany	5	L*,M*
792	Sevilla(SER)	Spain	20	L*,M*
801	Munchen-Ismaning	Germany	300	K*,L*,S*
801	RNE1 via ?	Spain	?	K*,L*,M*
810	Voru	Estonia	5	M*
810	Madrid(SER)	Spain	20	D*,M*
810	Burghead(BBCScot)	UK	100	B
810	Westerglen(BBCScot)	UK	100	C*,H*,M*,N,R,S*
819	Toulouse	France	50	M*
819	Warsaw	Poland	300	M*
828	Hannover(NDR)	Germany	100/5	L*,S*
837	Nancy	France	200	F*,J,L*,R*
837	COPE via ?	Spain	?	M*
846	Rome	Italy	540	L*,M*
855	Berlin	Germany	100	L*,S*
855	RNE1 via ?	Spain	?	C*,L*,M*,S*
864	Paris	France	300	L*,M
864	Socuellamos(RNE1)	Spain	2	M*
873	Frankfurt(AFN)	Germany	150	C*,F*,L*,M*,S*
873	Zaragoza(SER)	Spain	20	D*,L*,M*
873	Enniskillen(R.UI)	UK	1	L*,N
882	COPE via ?	Spain	?	L*,M*
882	Washford(BBCWales)	UK	100	F*,M,Q,R,S*
891	Algiers	Algeria	600/300	C*,D*,I*,J,L*,M*
891	Huisberg	Netherlands	20	L*,S*
900	Milan	Italy	600	L*,M*
900	COPE via ?	Spain	?	M*
909	B'mans Pk(BBC5)	UK	140	F*,M,Q,S*
909	M'side Edge(BBC5)	UK	200	C,R
909	Westerglen(BBC5)	UK	50	B
918	Plesivec(Sloven'nR)	Yugoslavia	600/100	M*,S*
918	Madrid(R.Int)	Spain	20	L*,M*
927	Wolvertem	Belgium	300	B,L*,M
936	Bremen	Germany	100	L*,M*,S*
936	Venezia	Italy	20	M*,S*
945	Toulouse	France	300	L*,M*,S*
954	Madrid(CI)	Spain	20	C*,L*,M*
963	Pori	Finland	600	C*,I*,L*,M*,S*
963	Paris	France	8	M*
972	Hamburg(NDR)	Germany	300	C*,L*,S*
972	RNE1 via ?	Spain	?	M*
981	Alger	Algeria	600/300	I*,L*,M*,S*
981	Megara	Greece	200	D*
990	Berlin	Germany	300	S*
990	R.Bilbao(SER)	Spain	10	L*,M*
990	Redmoss(BBC)	UK	1	B,F*,L*,R
999	Madrid(COPE)	Spain	50	L*
1008	Flevo(Hilv-5)	Holland	400	B,L*,M,S
1017	Rheinsender(SWF)	Germany	600	C*,L*,M*,S*
1017	RNE5 via ?	Spain	?	L*,M*
1026	Graz-Dobl	Austria	100	L*
1035	Lisbon(Prog3)	Portugal	120	L*
1044	Dresden	Germany	250	H,L*
1044	S.Sebastian(SER)	Spain	10	L*,M*,S*
1053	Iasi	Romania	1000	H
1053	Zarogoza(COPE)	Spain	10	B*,L*
1062	Kalundborg	Denmark	250	B,F*,H,L*,M*,S
1071	Brest	France	20	L*,M
1071	Lille	France	40	H,J,S*
1071	Bilbao(EI)	Spain	5	B*,L*,M*
1080	Katowice	Poland	1500	F*,H,L*,M*
1080	SER via ?	Spain	?	L*,M*
1089	Durres	Albania	150	H
1089	Weimar	Germany	20	H
1089	Krasnodar	Russia	300	L*
1098	Nitra(Jarok)	Slovakia	1500	H,L*,M*,S*
1098	RNE5 via ?	Spain	?	L*
1107	AFN via ?	Germany	10	I*,L*
1107	RNE5 via ?	Spain	?	I*,L*,M*
1116	Bari	Italy	150	L*
1125	La Louviere	Belgium	20	L*
1125	Deanovec	Croatia	100	M*
1125	RNE5 via ?	Spain	?	M*,S*
1134	Zadar(Croatian R)	Yugoslavia	600/1200	L*,M*
1134	COPE via ?	Spain	2	L*,M*,S*
1143	Stuttgart(AFN)	Germany	10	F*,L*
1143	Messina	Italy	6	L*
1143	COPE via ?	Spain	2	L*,M*
1152	RNE5 via ?	Spain	10	L*
1161	Strasbourg(Flnt)	France	200	C*,L*,S*
1179	SER via ?	Spain	?	M*
1179	Santiago(SER)	Spain	10	L*
1179	Solvesborg	Sweden	600	B,C*,F*,H*,L*, M*,S*
1188	Kuurne	Belgium	5	L*,M
1188	Szolnok	Hungary	135	L*
1197	Munich(VOA)	Germany	300	L*
1197	Virgin via ?	UK	?	M,Q,R*,S
1206	Wroclaw	Poland	200	L*,M*
1215	Virgin via ?	UK	?	B,C,F*,M,P,Q,R,S
1224	Vidin	Bulgaria	500	L*,M*,S*
1224	Virgin via ?	UK	?	B
1233	Liege	Belgium	5	M*
1233	Nitra	Slovakia	40	L*
1233	Virgin via ?	UK	?	Q,R*,S
1242	Marseille	France	150	L*
1242	Virgin via ?	UK	?	F*,S
1251	Marcali	Hungary	500	L*,S*
1251	Huisberg	Netherlands	10	L*
1260	SER via ?	Spain	?	L*
1260	Guildford (V)	UK	?	J,M
1269	Neumunster(DLF)	Germany	600	B,C*,F*,J,L*, M*,S*
1278	Dublin/Cork(RTE2)	Ireland (S)	10	J,M*,R,S
1287	RFE via ?	Czech Rep.	400	L*,M*,S
1296	Valencia(COPE)	Spain	10	L*,M*,S*
1296	Orfordness(BBC)	UK	500	M*
1305	Rzeszow	Poland	100	L*,M*
1314	Kvitsoy	Norway	1200	B,C*,F*,L*, M*,R*,S
1323	Wachenbrunn(RMWS)	Germany	1000/150	L*,S*
1332	Rome	Italy	300	J*,L*,M*
1341	Lakihegy	Hungary	300	L*
1341	Lisnagarvey(BBC)	Ireland (N)	100	F*,G*,H*,I*, M*,R,S
1350	Nancy/Nice	France	100	J*,L*,M*,R*,S*
1359	Melilla	Morocco	5	L*,M*
1359	Arganda (RNE-FS)	Spain	600	B*,L*,R*,S*
1368	Foxdale(Manx R)	I.D.M.	20	C*,E*,F*,I*, M*,R*
1377	Lille	France	300	J*,M,S
1386	Bolshakovo	Russia	2500	F*,H*,I*,L*,M*
1395	Lushnje(Tirana)	Albania	1000	L*,M*,S*
1404	Brest	France	20	J*,L*,M,S*
1413	RNE5 via ?	Spain	?	L*,M*
1413	Pristina	Yugoslavia	1000	R*
1422	Heusweiler(SR)	Germany	1200/600	C*,F*,L*,M*, R*,S*
1431	Nikolayev	Ukraine	400	L*
1440	Marnach(RTL)	Lux'bourg	1200	F*,L*,M,P,Q,S
1440	Damman	S. Arabia	1600	D*,L*
1449	Berlin	Germany	5	L*
1449	Redmoss(BBC)	UK	2	S*
1458	Lushnje(Tirana)	Albania	500	S*
1467	Monte Carlo(TWR)	Monaco	1000/400	C*,L*,M*,S*
1476	Wien-Bisamberg	Austria	600	L*,M*
1485	SER via ?	Spain	?	M*,S*
1494	Clermont-Ferrand	France	20	L*
1494	St.Petersburg	Russia	1000	I*,L*
1503	Stargard	Poland	300	M*
1512	Wolvertem	Belgium	600	C*,F*,I*,J,L*, M*,D*,S*
1521	Kosice(Cizatice)	Slovakia	600	L*,M*,S*
1530	Vatican R	Italy	150/450	D*,F*,L*,M*,S*
1539	Mainflingen(DLF)	Germany	700	C*,L*,M*,S*
1557	Nice	France	300	L*
1566	Sfax	Tunisia	1200	B*
1575	Genova	Italy	50	L*
1575	SER via ?	Spain	5	M*,S*
1602	SER via ?	Spain	?	M*,S*
1602	Vitoria(EI)	Spain	10	M*

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

Listeners:
A: Clive Barwood, Dolgellau and Porthmadog.
B: Geoff Crowley, Aberdeen.
C: Martin Dale, Stockport.
D: John Eaton, Woking.
E: Arthur Grainger, Carstairs Junction.
F: Alec Griffiths, Inverness.
G: Francis Hearne, N.Bristol.
H: Simon Hockenhull, E.Bristol.
I: Sheila Hughes, Morden.
J: Rhoderick Illman, Oxted.
K: Stephen Jones, Oswestry.
L: Eddie McKeown, Newry.
M: George Millmore, Wootton IoW.
N: John Parry, Northwich.
O: Clare Pinder, Appleby.
P: Harry Richards, Worthing.
Q: Bill Rowley, Colchester.
R: Tom Smyth, Co.Fermanagh
S: Andrew Stokes, Leicester.

R.Australia via Carnarvon 15.170 (Eng, Chin, Cant to China, Korea 0900-1400) 32222 at 0909 in Newry & via ? 15.565 (Eng to Asia 1100-1300) 44444 at 1110 in Morden; Monitor R.Int via ? 15.665 (Eng to Eu?) 54444 at 0950 in Penmaenmawr; R.Norway Int, Oslo 15.165 (Norw to S.Am 1100-1130) SIO555 at 1100 in Macclesfield;.

After mid-day RCI via Sackville 15.315 (Eng to Eu 1330-1400, Mon-Sat) was 34432 at 1350 in Chester; R.Japan via Moyabi 15.355 (Eng to S.Africa 1500-1600) 23432 at 1530 in Bridgwater; World Voice of Adventism via WCSN 15.665 (Eng to Eu 1500-1700) 35553 at 1555 in Wallsend; LJB Sabrata, Libya 15.415 (Ger, Ro, Hung, Pol, Bul, Cz, Slo 1600-1715) 3334 at 1601 in Stockport; China R,Int via Russia 15.540 (Ar to M.East 1600-1655) 33433 at 1620 in Leicester; Africa No.1, Gabon 15.475 (Fr to W.Africa 1600-1900) 44444 at 1704 in Woking.

During the evening VOA via Morocco 15.205 (Eng to Eu, M.East, N.Africa 1500-2200) was 34232 at 1730 in Sunderland; Voice of Vietnam, Hanoi 15.010 (Eng, Fr, Sp to Eu 1800-2130) SIO212 at 1800 in Co.Fermanagh; R.Vlaanderen Int, Belgium 15.550 (Eng to Africa 1800-1830) 54444 at 1817 in Norwich; Israel R, Jerusalem 15.640 (Eng to ? 1900-1930) 55555 at 1900 in Appleby; RNB Brazil 15.265 (Eng, Ger to Eu 1800-2020) SIO444 at 1905 in Edinburgh; WWCR Nashville 15.685 (Eng to Eu 1000-2100?) 44444 at 1943 in Oxted; HCJB Quito 15.270 (Eng to Eu 1900-2000) SIO433 at 1946 in Rotherham; WEWN Birmingham 15.695 (Eng, Fr, It, Serb to Eu 1800-2200) 44444 at 2015 in Rugby; RCI via Sackville 15.325 (Eng to Eu 2030-2130) 33343 at 2038 in E.Worthing; BBC via Ascension Is 15.400 (Eng to Africa 1500-2300) 35333 at 2050 in E.Bristol.

Later, R.Korea, Seoul 15.575 (Eng to Eu 2100-2200) 44444 at 2140 in Ross-on-Wye; DW via Julich? 15.135 (Eng to Africa? 2100-2150) SIO444 at 2145 in N.Bristol; WYFR via Okeechobee 15.566 (Eng to Eu, Africa 2100-2200) 54444 at

Local Radio Chart

Freq (kHz)	Station	ILR BBC	e.m.r.p (kW)	Listener
558	Spectrum R	I	7.50	A,B,C,O,R,T,U
585	R.Solway	B	2.00	P,S,T
603	Cheltenham (CD603)	I	?	C,H*,K,N*,O,T,U
603	Invicta SG (Coast)	I	0.10	O,Q,R,U
630	R.Bedfordshire (3CR)	B	0.20	C,K,L,O,P,Q,R,T,U
630	R.Cornwall	B	2.00	C,O,U
657	R.Clwyd	B	2.00	A,C,E,O,P,U
657	R.Cornwall	B	0.50	H*,O
666	DevonAir R	I	0.34	C,H&,K,O,S,U
666	R.York	B	0.80	P,T,U
729	BBC Essex	B	0.20	C,O,Q,R,T,U
738	Hereford/Worcester	B	0.037	C,K,L,O,S*,T,U
756	R.Maldwyn	I	0.63	K,O,U
765	BBC Essex	B	0.50	C,H*,O,Q,R,T,U
774	R.Kent	B	0.70	C,H*,O,Q,R,U
774	R.Leeds	B	0.50	E
774	Gloucester (3CSG)	I	0.14	C,O,T
792	Chiltern (S.Gold)	I	0.27	C,O,R,T,U
801	R.Devon & Dorset	B	2.00	C,K,M,O,U
828	Chiltern (S.Gold)	I	0.20	C,R,T,U
828	R.Aire (Magic828)	I	0.12	E
828	2CR (Cl.Gold)	I	0.27	C,O,Q,U
837	R.Cumbria/Furness	B	1.50	H*
837	R.Leicester	B	0.45	C,E,M,O,R,T,U
855	R.Devon & Dorset	B	1.00	C,O
855	R.Lancashire	B	1.50	E,H*
855	R.Norfolk	B	1.50	Q,U
855	Sunshine R	I	0.15	K,U
873	R.Norfolk	B	0.30	M,O,Q,U
936	Brunel R (Cl.Gold)	I	0.18	C,I*,O,U
945	R.Trent (Gem AM)	I	0.20	C,E,H*,J,M,R,T*,U
954	DevonAir (Cl.Gld)	I	0.32	C,O,U
954	R.Wyvern (WYVN)	I	0.16	U
990	WABC (Nice & Easy)	I	0.09	U
990	R.Devon & Dorset	B	1.00	C,K,L,O,U
999	R.Solent	B	1.00	C,M,O,Q,U
999	R.Trent (Gem AM)	I	0.25	J,R,U
999	Red Rose (Gold)	I	0.80	H*
1017	Beacon R (WABC)	I	0.70	C,E,O,T,U
1026	Downtown R	I	1.70	S
1026	R.Cambridgeshire	B	0.50	L,R,T,U
1026	R.Jersey	B	1.00	C,L,O,Q,U
1035	Country 1035	I	?	G,Q,R,U
1035	R.Sheffield	B	1.00	E,T
1035	West Sound R	I	0.32	D
1107	Moray Firth R	I	1.50	D,H*
1116	R.Derby	B	1.20	C,E,H*,L,R,T,U
1116	R.Guernsey	B	0.50	C,L,O,Q,U
1152	BRMB (Xtra-AM)	I	3.00	C,T
1152	LBC (L.Talkback R)	I	23.50	O,Q,U
1152	Piccadilly R (Gold)	I	1.50	E,H*
1152	R.Broadland	I	0.83	R,U
1152	R.Clyde (Clyde 2)	I	3.06	H*
1161	Brunel R (Cl.Gold)	I	0.16	C,O,U
1161	R.Bedfordshire (3CR)	B	0.10	R,T,U
1161	Southern Counties R	B	1.00	O,U
1161	R.Tay	I	1.40	D,H*
1161	Humberside (Gt.Yks)	I	0.35	H*
1170	H. Wycombe 1170AM	I	?	U
1170	Portsmouth (SCR)	I	0.12	O,U
1170	R.Orwell (SGR)	I	0.28	R
1170	Signal R (S.Gold)	I	0.20	E,T
1170	Swansea Sound	I	0.58	C,L*
1242	Invicta Snd (Coast)	I	0.32	O,Q,U
1242	Isle of Wight R	I	0.50	C,K,O,Q,U
1251	Saxon R (SGR)	I	0.76	F,R,U
1260	Brunel R (Cl.Gold)	I	1.60	C,O
1260	Sunrise R	I	0.29	H*,T,U
1278	Bradford (Gt.Yks)	I	0.43	E
1305	Barnsley (Gt.Yks)	I	0.15	E,H*
1305	Red Dragon (Touch)	I	0.20	C,O,U
1323	R.Bristol (Som.Snd)	B	0.63	C,U
1323	Brighton (SCR)	I	0.50	M,O,Q,R,U
1332	Hereward R (WGMS)	I	0.60	T,U
1332	Wiltshire Sound	B	0.30	C,G,O,U
1359	Essex R (BreezeAM)	I	0.28	H*,R,U
1359	Mercia Snd (Xtra-AM)	I	0.27	T
1359	Red Dragon (Touch)	I	0.20	C,I
1359	R.Solent	B	0.85	O
1368	R.Lincolnshire	B	2.00	T,U
1368	Southern Counties R	B	0.50	L*,O,Q,U
1368	Wiltshire Sound	B	0.10	C,O
1413	Sunrise R	I	0.125	O,Q,U
1431	Essex R (BreezeAM)	I	0.35	H*,O,R,S,U
1431	R 210 (Cl.Gold)	I	0.14	C,H*,L*,O,U
1449	R.Peterboro/Cambs	B	0.15	O,R,T,U
1458	Fortune	I	5.00	E,P
1458	R.Devon & Dorset	B	2.00	C,O,U
1458	Radio WM	B	5.00	C,J,T
1458	Sunrise R	I	50.00	C,O,Q,R,U
1476	Guildford (M.Xtra)	I	0.50	H*,O,R,U
1485	R.Humberside	B	1.00	A,R
1485	R.Merseyside	B	1.20	E,H*
1485	Southern Counties R	B	1.00	C,O,Q,R,T,U
1503	R.Stoke-on-Trent	B	1.00	C,E,F,H*,J,L*,O*,R,T,U
1521	Reigate (M.Xtra)	I	0.64	O,Q,R,U
1530	Huddersfld (Gt.Yks)	I	0.74	E,H*,S*
1530	R.Essex	B	0.15	C,F,O,R,U
1530	R.Wyvern (WYVN)	I	0.52	C,F,O,T,U
1548	Capital R (Cap G)	I	97.50	O,Q,R,S,U
1548	R.Bristol	B	5.00	C,O
1548	Liverpool (City G)	I	4.40	E,H*
1548	R.Forth (Max AM)	I	2.20	A,H*
1557	Chiltern R (Gold)	I	0.76	C,H*,T*
1557	Southampton (SCR)	I	0.50	C,O,Q,U
1557	Tendring (Mellow)	I	?	M,R,U
1584	Kettering (KCBC)	I	0.04	R,S*,U
1584	R.Nottingham	B	1.00	J,O,Q,T*,U
1584	R.Shropshire	B	0.50	C,O,R
1584	R.Tay	I	0.21	D
1602	R.Kent	B	0.25	F,O,P,R,T,U

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

Listeners:
A: Leo Barr, Sunderland.
B: Clive Barwood, Scunthorpe.
C: Darren Beasley, Bridgwater.
D: Geoff Crowley, Aberdeen.
E: Martin Dale, Stockport.
F: Ron Damp, Worthing.
G: John Eaton, Woking.
H: Arthur Grainger, Carstairs Junction.
I: Francis Hearne, N.Bristol.
J: Francis Hearne, Derby.
K: Simon Hockenhull, E.Bristol.
L: Sheila Hughes, Morden.
M: Rhoderick Illman, Oxted.
N: Stephen Jones, Oswestry.
O: George Millmore, Wootton, IoW.
P: John Parry, Northwich.
Q: Harry Richards, Worthing.
R: Bill Rowley, Colchester.
S: Tom Smyth, Co.Fermanagh.
T: Andrew Stokes, Leicester.
U: John Wells, East Grinstead.

2145 by **Robin Harvey** in Bourne; Monitor R.Int via WSHB 15.665 (Eng to Europe 1900-2200) 45444 at 2148 in Aberdeen; WRNO New Orleans 15.420 (Eng to E.USA, Eu 1600?-2300) 33323 at 2159 by **Vera Brindley** in Woodhall Spa; WINB Red Lion 15.715 (Eng to Africa, Eu 1600-0000) 14321 at 2220 in Stirling; KTBN Salt Lake City 15.590 (Eng to N.Am 1500-0100) 22332 at 2250 in Kilkeel.

The **13MHz (22m)** band is now used by many broadcasters. Those noted in the daytime were R.Kuwait via Kabd 13.670 (Eng to Eu) 32332 at 0955 in Bridgwater; R.Australia via Darwin on 13.605 (Eng, Chin to Asia 0900-1355) 43333 at 1105 in Norwich; Croatian R, Zargreb 13.830 (Cr, Eng to Eu 24hrs) 44444 at 1340 in Oxted; AWR via Slovakia 13.595 (Eng to S.Asia 1400-1500) SIO455 at 1405 in Edinburgh; R.Prague, Czech Rep 13.580 (Eng to Eu 1500-1527) SIO221 at 1500 in Co.Fermanagh; SRI via Sottens? 13.635 (Eng, Fr, It, Ger to SE/S.Asia 1300-1700) 55555 at 1525 in Bourne; R.Pyongyang, Korea 13.785 (Eng to Eu, M.East, Africa 1500-1550) 35443 at 1545 in Woking; UAER, Dubai 13.675 (Eng to Eu 1600-1640) 35553 at 1636 in Wallsend; AWR (KSDA) Guam 13.720 (Eng 1700-1900, Sat/Sun only) 24112 at 1700 in Newry.

During the evening DW via Julich? 13.790 (Eng to W.Africa 1900-1950) was 34333 at 1939 in Leicester; Monitor R.Int via WCSN Boston 13.770 (Eng to Africa 2000-2057, Eng to Eu 2100-2157) 25342 at 2000 in Chester & via WSHB Cypress Creek 13.770 (Eng to Africa 2200-0000) 43333 at 2300 in Stalbridge; RCI via Sackville 13.650 (Eng to Eu 2030-2130) 45444 at 2050 in E.Bristol; WHRI South Bend 13.760 (Eng to E.USA, Eu 1700-0000) 34332 at 2120 in Ross-on-Wye; WWCR Nashville 13.845 (Eng to E.USA 1200-0200) SIO333 at 2152 in Rotherham; UAER, Abu Dhabi 13.605 (Eng to USA 2200-0000) 44444 at 2315 in Kilkeel.

Good reception from many areas has been noted in the **11MHz (25m)** band. Before noon, the BBC via Skelton 12.095 (Eng to Eu, N/W.Africa 0400-2215) was 45444 at 0541 in Woking; HCJB Quito 11.835 (Eng to Eu 0700-0830) SIO444 at 0826 in Rotherham; Vatican R, Italy 11.740 (News in It, Fr, Eng to Eu 1000-1030) 44444 at 1000 in Morden; R.Finland via Pori 11.755 (Eng, Fin, Sw, Fr, Ger, Russ to Eu 0530-2125) SIO555 at 1030 in Macclesfield.

After mid-day, R.Romania Int, Bucharest 11.940 (Eng to Eu 1300-1400) was 45333 at 1330 in Chester; Voice of the Mediterranean, Malta 11.925 (Eng, Ar to N.Africa 1400-1600) SIO555 at 1400 in Edinburgh; R.Australia via Shepparton 11.695 (Eng to Pacific areas 1430-2055) 33333 at 1544 in E.Worthing & via Carnarvon 11.660 (Eng, Chin to S.Asia 1430-1800) 43443 at 1615 in Aberdeen; R.Algiers Int via Bouchaoui 11.715 (Ar, Eng to M.East, Europe 1500-2100) 53433 at 1615 in Stirling; RFI via Moyabi 11.705 (Eng to W.Africa 1600-1700) 53434 at 1627 in Penmaenmawr; ERA Thessaloniki, Greece 11.595 (Gr to Eu 0900?-2255) 44444 at 1646 in Leicester; China R.Int, Beijing 11.575 (Eng to E/S.Africa 1600-1755?) SIO222 at 1700 in Co.Fermanagh.

Later, R.Pakistan, Islamabad 11.570 (Eng, Ur to Eu 1700-1855) was 43333 at 1815 in Stalbridge; R.Kuwait via Kabd 11.990 (Eng to Eu 1800-2100) 54554 at 1820 in Bridgwater; R.Romania Int, Bucharest 11.940 (Eng to Eu 1900-1957) 44444 at 1900 in Appleby; R.Bulgaria, Sofia 11.720 (Eng to W.Eu 1900-2000) 33433 at 1946 in Oxted; R.Damascus, Syria 12.085 (Eng to Eu 2005-2105) 45444 at 2006 in Woodhall Spa; R.Japan via Moyabi 11.925 (Eng to Eu.2100-2155) 53343 at 2102 in Norwich; AIR via Bangalore 11.620 (Eng, Hi to Eu 1745-2230) 44444 at 2139 in Newry; Voice of Turkey, Ankara 11.710 (Eng to USA? 2200-2300) 33333 at 2200 in Rugby; RAI Rome 11.800 (It, Eng to N.Am 2230-0120) 34443 at 2305 in Kilkeel; R.Moscow, Russia 12.050 (Eng WS) SIO444 at 2315 in N.Bristol; Voice of Greece, Athens 11.645 (Eng to USA 0000-0350) 55545 at 0137 in Ross-on-Wye.

Quite a few of the **9MHz (31m)** broadcasts are beamed to Europe. They include R.Mediterranee Int via Nardor, Morocco 9.575 (Fr, Ar 0500-0100) SIO443 at 0546 in Woking; R.Jordan via Al Karanah 9.560 (Ar, Eng 1500-1730) SIO222 at 1600 in Co.Fermanagh; VOA via Gloria 9.760 (Eng 1700-2100, also to N.Africa, M.East) 44444 at 1730 in Morden; R.Portugal via Sines? 9.815 (Eng 1900-1930 Mon-Fri) 54434 at 1910 in Ross-on-Wye; R.Pyongyang, N.Korea 9.345 (Eng 2000-2050) 35433 at 2000 in Stirling; China R.Int, Beijing 9.920 (Eng 2000-2155), heard at 2000 by Julian Wood in Elgin; Voice of Greece, Athens 9.395 (Various [Eng 2007] 2000-2050) 44444 at 2001 in Woodhall Spa; VOIRI Tehran, Iran 9.022 (Eng 1930-2030) 32232 at 2011 in E.Worthing; R.Cairo via Abis 9.900 (Eng 2115-2245?) SIO433 at 2137 in Rotherham; R.Bulgaria, Sofia 9.700 (Eng 2100-2200) SIO444 at 2145 in N.Bristol.

Those noted to other areas were R.Nederlands via Bonaire 9.630 (Eng to Aust, NZ 0730-0830) 33333 at 0730 in Appleby; also 9.720 (Eng to Aust, NZ 0730-1025) SIO222 at 0836 in Macclesfield; HCJB Quito 9.745 (Eng to S.Pacific 0715-1125) 43333 at 0845 in Stalbridge; BBC via Kranji 9.740 (Eng to S/S.E.Asia 0900-1830) 43343 at 1538 in Leicester & via Skelton 9.915 (Eng to S.Am 2200-0330) 32222 at 2208 in Bourne; R.Australia via Carnarvon 9.770 (Eng to Asia 1430-1630) 43333 at 1608 in Norwich; TWR Manzini, Swaziland 9.500 (Eng to E.Africa 1800-1845) 11331 at 1800 in Chester; AIR via Delhi? 9.910 (Eng to Pacific areas 2045-2230) 33333 at 2202 in Newry;

Quarterly List of Equipment Used

LM&S for $August, #September, *October'94.

$ Tim Allison, Middlesborough: Lowe HF-225 + r.w.
$# Leo Barr, Sunderland: Roberts RC-818 + Sooper Loop or r.w. in loft.
* Clive Barwood, Scunthorpe: Sony ICF-5900W or Sharp car radio.
$# Charles Beanland, Gibralter: Sangean ATS-803 + a.t.u. + 6m wire or Howes AA2.
$# Darren Beasley, Bridgwater: Yaesu FRG-100 or Philips D-2935 + Hex loop or a.t.u. + 15m wire.
$# Clive Boutell, Dovercourt: Trio R-600 + a.t.u. + half size 5RV or loop.
$# Vera Brindley, Woodhall Spa: Sangean ATS-803A; Saisho 3000; Sangean SW60 + r.w.
$# Kenneth Buck, Edinburgh: Lowe HF-225 + r.w. In loft or l.w. screened loop or s.w. loop.
$ Tim Bucknall, Congleton: Roberts 808, Sony ICF-2001D + AN-1.
# Scott Caldwell, Warrington: Sony ICF-2001 + 60m wire or Toshiba RT-SX1 + loop.
$* Bill Clark, Rotherham: Sony ICF-2001D + built-in whip or r.w.
$ Kimberley Clift, Northampton: Aiwa portable + built-in whip.
$# Robert Connolly, Kilkeel: Trio R-1000 or Sangean ATS-803A + 30m wire or Sony AN-1.
Sean Cooper, Wells-next-the-Sea: Morpy Richards R191, Pioneer F-656 + loop or 20m wire.
$# Geoff Crowley, Aberdeen: Yaesu FRG-100 + a.t.u. + 1/2 size 5RV.
$# Bernard Curtis, Stalbridge: Tatung TMR-7602 or Ford car radio.
$* Martin Dale, Stockport: Codar CR-70A + Howes a.t.u. + 23m wire or CapCo loop.
#* Ron Damp, Worthing: Racal RA17, Yaesu FRG-7, Sangean ATS-803A + Hex loop or a.t.u. + Windom.
Wilfried Derynck; Ichtegem: Yaesu FRG-100 + Mag Balun + 15m wire.
$# John Eaton, Woking: Lowe HF-225 + Datong AD-270 or 23m wire; Sony SRF M-43.
$# David Edwardson, Wallsend: Trio R-600 + inverted V trap dipole.
$# P.Gordon Smith, Kingston, Moray: Icom R72 + a.t.u. + dipole or Rhombic or 25m Vert dipole or helical dipole.
* Arthur Grainger, Carstairs Junction: Pioneer F-502RDS tuner + loop.
$# Michael Griffin, Ross-on-Wye: Lowe HF-225 + 10m wire.
Bill Griffith, W.London: JRC NRD-535 + 25m wire.
$* Alec Griffiths, Inverness: Steepletone or Vega + r.w. or dipole.
$ Robin Harvey, Bourne: Matsui MR-4099 + s.w. loop.
$# Gerry Haynes, Bushey Heath: Kenwood R-5000, Yeasu FRG-7700 + a.t.u. + r.w. or Mag Balun + 40m wire.
$# Francis Hearne, N.Bristol: Sharp WQT370 or Sharp GFA3 + r.w.
$# Simon Hockenhull, E.Bristol: Roberts R-817, ITT Colt or HMV 1124 + r.w.
$# Sheila Hughes, Morden: Sony ICF-7600DS + loop; Panasonic DR48 + 15m wire.
$# Rhoderick Illman, Oxted: Kenwood R-5000 + AN-1 or Mag Balun + 19m wire or Sony ICF-7600DS + whip.
$* Steven Jones, Oswestry: Matsui Hi-fi.
$ Ronald Kilgore, Co.Londonderry: Drake R-8E + Mag Balun + 20m wire.
# Tony King, Swindon: Panasonic DR-49 + indoor mag-mount CB antenna.
$# Ross Lockley, Stirling: Realistic DX-300 + 50m dipole or Global AT-1000.
Paul Logan, Lisnaskea: Silver XF-900 + loop, Yaesu FRG-8800 + r.w.
$# Eddie McKeown, Co.Down: Tatung TMR-7602.
$ Mary McPhillips, Co.Monaghan: Grundig Satellit 700 + loop or r.w.
$# George Millmore, Wootton, IoW: Sangean ATS-803A + loop or Racal RA-17L + v.l.f. converter + loop.
$ Sid Morris, Rowley Regis: Lowe HF-225 or Kenwood R-5000 + 11m wire. Nevada MS-1000 + whip or Sangean ATS-803A.
$# Fred Pallant, Storrington: Trio R-2000 + r.w. in loft.
* John Parry, Northwich: Realistic DX-400 + 33m wire.
$ Roy Patrick, Derby: Lowe HF-125 + 22m wire or inverted V.
$# Clair Pinder, Appleby: JRC NRD-525 + Yaesu FRT-7700 + 16m wire.
$# Peter Pollard, Rugby: Sony ICF-2001D + AN-1.
$# Martin Price, Shrewsbury: Lowe HF-150 + AD-270 or r.w. or Matsui MR-4099.
$ Aleksandar Radulovic, Southampton: Grundig Yacht Boy 206.
$# Philip Rambaut, Macclesfield: Int.Marine Radio R.700M + r.w.
$# Harry Richards, Barton-on-Humber: Grundig Satellit 700 + AD270 or r.w.
* Harry Richards, Worthing: Grundig Yacht Boy or Matsui MR-4099.
# Alan Roberts, Quebec, Canada: Lowe HF-225 + 31m, 19m or 11m dipole, or 11m vertical dipole or r.w. Panasonic RF-B40 + whip.
$* Bill Rowley, Colchester: Selena B210.
$# John Sadler, Bishops Stortford: DX-400 or Omega 4020 or Acadamy 12 + a.t.u. + s.w. loop.
$# Eric Shaw, Chester: Lowe HF-225 + 7m wire.
$# Chris Shorten, Norwich: Matsui MR-4099 + 10m wire.
$# Tom Smyth, Co.Fermanagh: Sangean ATS-803A or Morphy Richards R-191 or Vega Selena B210 + whip.
$# Andrew Stokes, Leicester: Lowe HF-150 + 15m wire or Sony ICF-780L or Sanyo W10.
$ Darran Taplin, Brenchley: Yaesu FRG-7700 + FRT-7700 + 35m wire.
$ George Tebbitts, Penmaenmawr: Blaupunkt Stereo Radiogramme c1968.
$# Phil Townsend, London: Lowe HF-225 + loop or a.t.u. + r.w.
$# John Wells, E.Grinstead: RCA AR-88D + Loop, also l.w. converter.
$# Julian Wood, Elgin: Kenwood R-2000 + Yaesu FRT-7700 a.t.u. + 5m wire or Philips D-2935 + built-in whip.

Tropical Bands Chart

Freq (MHz)	Station	Country	UTC	DXer
2.310	ABC Alice Springs	Australia	2032	G,K
2.325	ABC Tennant Creek	Australia	2044	G,K
2.350	Sariwon/Hwanghae	Korea	2330	L
2.485	ABC Katherine	Australia	1937	G
3.200	TWR Ndebele	Swaziland	1920	G
3.220	R.HCJB Quito	Ecuador	0330	E,J
3.220	R.Togo, Lome	Togo	2059	B,G,K
3.232	RRI Bukittinggi	Indonesia	0035	B
3.240	TWR Shona	Swaziland	2145	C,G
3.245	R.Clube Varginha	Brazil	2345	B
3.255	BBC via Maseru	Lesotho	2045	G,K,L
3.270	SWABC 1, Namibia	SW.Africa	2058	B,C,G,K
3.280	R.Beira	Moz'bique	1945	G
3.290	SWABC 2, Namibia	SW.Africa	2340	B,G
3.300	R.Cultural	Guatemala	0125	B,J
3.310	Channel Africa	S.Africa	1935	G
3.316	SLBS Goderich	Sierra Leone	2138	C,F,J,K,L
3.325	FRCN Lagos	Nigeria	2250	B,J
3.335	CBS Taipei	Taiwan	2047	G,K
3.338	R.Maputo	Moz'bique	1936	G
3.355	AIR Kurseong	India	1732	G
3.356	R.Botswana	Gabarone	2105	B,G,J,K
3.359	RTV Malagasy	M'gascar	1842	G
3.365	GBC R-2	Ghana	2048	A,B,C,H, J,K,L
3.365	AIR Delhi	India	1829	G
3.370	R.Beira	Moz'bique	1959	G
3.377	R.Nacional, Mulenvos	Angola	1936	G
3.380	R.Malawi	Malawi	2048	G,K
3.870	Voz de la Esparanza	Peru	0122	E
3.915	BBC Kranji	Singapore	2205	C,E,G,H,J
3.934	RRI Semarang	Indonesia	2209	C
3.945	Vatican Radio	Italy	2239	E,J
3.955	BBC Skelton	England	0449	J
3.955	R.Budapest	Hungary	2100	I,J,M,N
3.965	RFI Paris	France	2255	B,C,I,J
3.980	VOA Munich	Germany	2355	B,I,J
3.985	China R via SRI	Switzerland	2105	C,J
3.985	SRI Beromunster	Switzerland	0600	I
3.995	DW via Julich	Germany	0050	B,J
4.003	RRI Padang	Indonesia	2300	B
4.470	R.Movima	Bolivia	2350	B
4.650	R.Santa Ana	Bolivia	2345	B
4.735	Xinjiang, Urumqi	China	0030	B
4.755	R.Educ CP Grande	Brazil	2355	B
4.760	Yunnan PBS,Kunming	China	2215	E
4.760	AIR Port Blair	India	1724	G
4.760	ELWA Monrovia	Liberia	2043	G,J,K
4.760	TWR	Swaziland	2152	C
4.765	R.Integracao	Brazil	0100	B
4.765	Brazzaville	PR.Congo	2043	B,C,E,J,K
4.770	FRCN Kaduna	Nigeria	2046	B,C,D,I,J,K
4.777	R.Gabon, Libreville	Gabon	2140	C,J
4.783	RTM Bamako	Mali	2226	B,C,E
4.785	Ecos del Combeima	Colombia	0105	B
4.790	Azad Kashmir R.	Pakistan	1717	G
4.790	R.Atlantida	Peru	2345	B
4.790	TWR Manzini	Swaziland	1811	E,G
4.800	AIR Hyderabad	India	0030	B,G
4.800	LNBS Lesotho	Maseru	2042	C,G,J,K
4.805	R.Nac.Amazonas	Brazil	0030	B
4.810	R.San Martin Tara	Peru	0130	B,E
4.810	SABC Meyerton	S.Africa	2113	C,G,J
4.815	R.diff TV Burkina	Ouagadougou	2310	B,C
4.820	E.Prov.Huila	Angola	2155	C
4.820	La Voz Evangelica	Honduras	0005	B
4.825	R.Cancao Nova	Brazil	2250	E,J
4.830	R.Botswana, Gaborone	Botswana	2048	C,G,J,K
4.830	R.Tachira	Venezuela	0025	B,J
4.835	R.Tezulutlan, Coban	Guatemala	0110	B
4.835	RTM Bamako	Mali	2042	B,C,J,K,L
4.840	AIR Bombay	India	1648	G
4.840	R.Valera, Trujillo	Venezuela	0115	B
4.845	R.Fides, La Paz	Bolivia	0005	B
4.845	ORTM Nouakchott	Mauritania	2042	B,C,I,J,K
4.850	R.Yaounde	Cameroon	2115	B,C,J
4.860	AIR Kingsway(Feeder)	India	1913	G
4.865	PBS Lanzhou	China	2207	E
4.865	L.V. del Cinaruco	Colombia	0045	B
4.870	R.Cotonou	Benin	2041	C,J,K
4.880	R.Nac.Espejo, Quito	Ecuador	0035	B
4.885	R.Difusora Acreana	Brazil	2330	B
4.885	KBC East Sce Nairobi	Kenya	2040	F,G,J,K
4.890	RFI Paris	via Gabon	0358	J
4.895	Voz del Rio Arauca	Colombia	2315	B
4.895	Pakistan BC	Pakistan	1636	G
4.905	R.Relogio, Rio	Brazil	2320	B
4.905	R.Nat.N'djamena	Chad	2050	C,I,J,K
4.910	AIR Jaipur	India	1651	G
4.910	R.Zambia, Lusaka	Zambia	2048	C,G
4.915	GBC-1, Accra	Ghana	2040	A,B,C,E,F, H,I,J,K
4.915	KBC Cent Sce Nairobi	Kenya	1950	K
4.920	AIR Madras	India	1716	G
4.925	R.Difusora, Taubate	Brazil	2320	B
4.935	KBC Gen Sce Nairobi	Kenya	1938	J,K
4.940	R.Abidjan	Ivory Coast	2315	B
4.950	R.Nacional, Mulenvos	Angola	1938	G
4.950	R.Madre de Dios	Peru	2320	B
4.960	AIR Delhi	India	0040	B
4.965	R.Alvorada	Brazil	0005	B
4.970	R.Rumbos, Caracas	Venezuela	0030	B
4.975	R.Uganda, Kampala	Uganda	2039	J,K
4.980	Ecos del Torbes	Venezuela	2325	B,F,J
4.985	R.Brazil Central	Brazil	2240	E
4.990	AIR Ext.Service	India	0011	J
4.990	FRCN Lagos	Nigeria	2037	C,E,J,K
5.005	R.Libertad, La Paz	Bolivia	0005	B,E
5.005	R.Nacional, Bata	Eq.Guinea	1903	G
5.005	R.Nepal, Kathmandu	Nepal	1655	G
5.010	R.Garoua	Cameroon	2147	C,J,K
5.010	AIR Thiru'puram	India	0120	B
5.015	R.Brazil Tropical	Brazil	0005	B
5.020	ORTN Niamey	Niger	2048	G,K
5.025	R.Rebelde, Habana	Cuba	0040	B
5.035	R.Aparecida	Brazil	2335	I
5.035	R.Bengui	C.Africa	2049	B,C,E,I,J,K
5.040	Voz del Upano, Macas	Ecuador	0045	B,J
5.045	R.Cultura do Para	Brazil	0140	B
5.047	R.Togo, Lome	Togo	2049	B,C,E,I,J,K
5.050	R.Tanzania	Tanzania	2050	F,G,K
5.055	R.Difusora, Caceres	Brazil	0125	B
5.055	RFO Cayenne (Matoury)	F. Guiana	2335	B,E,J
5.075	Caracol Bogata	Colombia	2355	A,B,E,J
5.083	R.Mundo, Cusco	Peru	0010	B

DXers:
A: Leo Barr, Sunderland.
B: Robert Connolly, Kilkeel.
C: Geoff Crowley, Aberdeen.
D: Ron Damp, Worthing.
E: John Eaton, Woking.
F: David Edwardson, Wallsend.
G: P.Gordon Smith, Kingston, Moray.
H: Simon Hockenhull, E.Bristol.
I: Sheila Hughes, Morden.
J: Eddie McKeown, Newry.
K: Fred Pallant, Storrington.
L: Peter Pollard, Rugby.
M: Chris Shorten, Norwich.
N: Tom Smyth, Co.Fermanagh.

Voice of Turkey, Ankara 9.445 (Eng to USA 2200-2250) 55555 at 2204 in Bridgwater; UAER, Abu Dhabi 9.770 (Eng to NW.USA 2200-0000) SIO455 at 2205 in Edinburgh; RCI via Sackville 9.755 (Eng [CBC progs] to USA 2200-0000 Mon-Fri, 2300-0000 Sat/Sun) 43443 at 2320 in Kilkeel.

Some of the broadcasts in the congested **7MHz (41m)** band originate from distant places. Among those noted were the Voice of Nigeria, Ikorodu 7.255 (Eng to W.Africa 0455-0700) 34233 at 0600 in Newry; WEWN Birmingham 7.425 (Eng to N.Am 0600-0800) 25333 at 0737 in Aberdeen; R.Nederlands via Talata Volon 7.120 (Eng to S/E/W.Africa 1730-1925) 43443 at 1753 in E.Worthing; R.Australia via Carnarvon 7.260 (Eng to S.Asia 1430-2100) 35454 at 1510 in Wallsend and SIO333 at 1945 in Edinburgh; VOA via Selebi-Phikwe 7.415 (Eng to Africa 1900-2200) 53444 at 1920 in Chester; Voice of Turkey, Ankara 7.185 (Eng to M.East 2200-2300) 32333 at 2204 in Woodhall Spa; WJCR Upton 7.490 (Eng to E.USA 2100-1000) 32222 at 2300 in Stalbridge; WRNO New Orleans 7.355 (Eng to E.USA 2300-0300) 32332 at 0030 in Kilkeel.

Programmes for European listeners were noted from R.Japan via Skelton 7.230 (Jap, Eng 0400-0800) 55555 at 0700 in Appleby; TWR Monte Carlo, Monaco 7.385 (Eng 0640-0820) SIO444 at 0742 in Rotherham; AWR via Slovakia 7.180 (Eng 0830-0930) 44333 at 0830 in Morden; Sudwestfunk via Rohrdorf 7.265 (Ger 24hrs) 45554 at 1421 in Woking; R.Prague, Czech Rep 7.345 (Eng 1500-1527) 44444 at 1507 in Oxted & (Eng 2000-2027) 55555 at 2022 in Leicester; Polish R, Warsaw 7.285 (Eng 1500-1555) SIO323 at 1500 in Co.Fermanagh & (Eng 1930-2025) 53553 at 1945 in Bridgwater; Slovak R.Int via Velke Kostolany 7.345 (Eng 1830-1900) 53332 at 1835 in Ross-on-Wye; R.Budapest, Hungary 7.220 (Eng 2100-2200?) 54444 at 2100 in Norwich; AIR via Aligarh? 7.412 (Hi, Eng 1745-2230) 33323 at 2130 in Sunderland.

Many of the **6MHz (49m)** broadcasts are also intended for listeners in Europe. Among those noted were R.Austria Int, via Moosbrunn 6.155 (Ger, Eng, Fr, Sp 0400-2300) SIO332 at 0745 in N.Bristol; R.Vlaanderen Int, Belgium 6.035 (Eng 0900-0930) 33333 at 0900 in Morden & 5.910 (Eng 1800-1830) 42322 at 1805 in Bridgwater; R.Nederlands via Flevo 5.955 (Eng 0830-1030) 55555 at 1020 in Aberdeen; RFI via Allouis 6.175 (Eng 1600-1700) 45444 at 1608 in Leicester; R.Prague, Czech Rep 5.930 (Eng 1700-1727) SIO444 at 1700 in Co.Fermanagh; R.Sweden via Horby? 6.065 (Eng 1715-1745) in Barton-on-Humber & via Karlsborg? 6.065 (Eng 2130-2200) 43434 at 2145 in Rugby; R.Estonia 5.925 (Eng 1900-1930, Mon/Thurs only) 31431 at 1900 in Stirling; R.Pyongyang, Korea 6.576 (Eng 2000-2050, also to M.East, Africa) 25331 at 2010 in Chester; RCI via Skelton (Eng 2030-2130) 33333 at 2055 in E.Bristol; R.Japan via Skelton 6.125 (Eng 2300-0000) 55555 at 2300 in Appleby.

Whilst beaming to other areas WWCR Nashville, 5.935 (Eng to USA 0200-1200) was 22222 at 0600 in Sunderland; R.New Zealand Int 6.100 (Eng to Pacific areas 0758-1206) SIO222 at 0815 in Rotherham; R.Australia via Carnarvon 6.080 (Eng to S.Asia 1430-2100) 53343 at 1815 in Norwich; BBC via Antigua 5.975 (Eng to C/S.Am 2000-0430) 43443 at 2325 in Kilkeel; R.Nederlands via Bonaire 6.165 (Eng to N.Am 2330-0125) 44333 at 2330 in Stalbridge.

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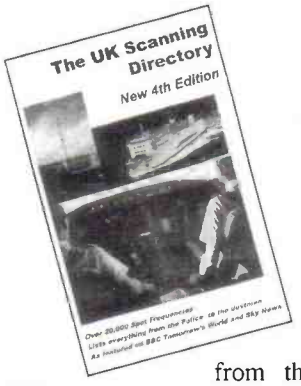

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Icom R71E receiver with PBT notch, FL33 filter, little used due to proximity of XYLs television set. Bankers order or cash. Preferably buyer views and collects, £500. Mr Cropper, Merseyside. Tel: 051-648 1860.

JRC NRD535 receiver, mint condition, complete with optional JRC CFL251, 2.4kHz s.s.b., Xtal filter, boxed with manual, £850. Buyer to inspect and collect. G3NGC, Cheltenham. Tel: (0242) 519281 anytime.

Kenwood R1000 receiver with manual, £225. Datong FL3 filter, £100. ERA Microreader Ver. 4.1, £90. Codar PR40 pre-selector, £55. All good condition, cash only. Mr Hughes, Gwynedd. Tel: (0492) 875433.

Kenwood R1000 receiver, good condition, manual, d.c. conversion kit, HS-5 headphones, £125. Datong AD270 active antenna, £15. Mizuho antenna coupler KX-2, £15. SEM v.h.f. converter, £10. Buyer collects. Harry Thomson, Merseyside. Tel: (0744) 25526.

Kenwood R2000 communications receiver with v.h.f. converter (boxed), £295. ERA Microreader and tape, £60. AT1000 a.t.u., £40. All carefully used and in unmarked condition (reason for sale, buying transceiver etc.). Gordon Foote G7NCR, Bristol. Tel: (0272) 374155 anytime.

Kenwood R600 h.f. receiver, a.m., s.s.b., plus own added n.b.f.m. demod, original box and manual, £150. Tel: Southampton (0703) 267685.

Lowe HF-225 magnetic long wire balun, headphones and manual, 12 months old, in excellent condition, £400. Tel: Surrey (0276) 682244 after 6pm and weekends.

Lowe HF-225 receiver with a.m./f.m. detector and keypad options. Boxed with manual, purchase of new receiver induces reluctant sale, v.g.c., £350 o.n.o. Tel: Shetland (0950) 60150.

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NRD535, CFL243W, CMF78, Lowe mods, Mordant-Short speaker and multiscan control s/w and null modem, £900 (£1937 new). ICS FAX1 and printer cable, £180. Microreader MkII Ver. 4.1, £90. RS232 display unit, £90. All boxed, manuals, excellent condition. Alan, Harwich. Tel: (0255) 503176 after 6pm.

Optoelectronics model 2300 frequency counter, 1MHz to 2.4GHz, £100 o.n.o. ARA900 Dressler active antenna, 20 to 900MHz plus, £75 o.n.o. Mr Phillips, London. Tel: 081-749 6185.

Realistic DX200 communications receiver, 150kHz to 30MHz, u.s.b., l.s.b., excellent condition and working order, ideal first receiver, £60 plus P&P. Tel: Wells (0749) 870062.

Realistic PRO2021 200ch. scanner only, £100. AOR AR1000 hand-held scanner with charger and NiCads, £150. A coupler AT1000 aerial tuner, £65. A Microset 10A d.c. power supply, £20. Andy, Suffolk. Tel: (0449) 775395 occassional answerphone.

Sangean ATS803A world receiver, complete with instruction book, excellent condition, perfect radio for the beginner, £100 o.v.n.o. Tel: Wirral 051-334 7813.

Scanner, Tandy Realistic PRO2006, 400 channels, 25-520MHz and 760-1300MHz, full scan and search, usual other facilities, mains operation, fully working, like new, original receipt held, £150 inclusive. Peter, Essex. Tel: (0268) 287176 answermachine.

SEM QRM eliminator, as new, £50. DeeComm a.t.u., £20. Super scaf digital filter, £45. Drake SW8 receiver, mint, £375. Wanted Collins 4515-1. Tel: Lancs (0772) 704009 after 6pm.

Signal R535 airband receiver, as new, boxed, £170. Tel: Huntingdon (0487) 823879.

Sony CRF320, 32 band receiver, intermittant fault on short wave, one owner, manual, £100 cash. Inspect and collect. Tel: Leicester (0533) 896391.

Sony ICF7600 world receiver, v.g.c., boxed with p.s.u., £90. Jonathan Fisher. Tel: 081-429 0738 answerphone.

Sony ICFSW55 world receiver, 150kHz to 30MHz, f.m., a.m., s.s.b., many features with a.c. adapter, manuals, hard and soft cases, immaculate, £180. Tel: Stockport 061-442 2950 evenings only please.

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SRX30, £20. KW2000 needs slight attention, £25. G3YQV, QTHR. Tel: Glos (0453) 764966.

Steepletone MBR7 receiver, l.w./m.w./s.w. bands plus v.h.f. air and marine bands, one year old, rarely used, boxed, excellent condition, £50 including postage. Tel: London 081-675 1708 after 6pm.

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VHF f.m. marine hand-held transceiver, 6/1W, as new, in box and cost £200, sale at £160 o.n.o. Tel: Exeter (0392) 421769 weekdays after 6.30pm, weekends after 8.30pm. Answerphone if not in.

Watkins-Johnson, Rycom, Collins R-391URR, BRT400, BC342, RA17, CR100/8, Eddystone, DX360, Daiwa 144-146MHz, 156-162MHz, Sharp multiband BFO, d.f., HRO, German h.f. and v.l.f., Hamgear a.t.u.,

Nem's-Clarks, discone, AVO sig. gen., CR bridge, multimeter, wavemeter, VVM, frequency meter TS323 URR. Tel: Wigan (0942) 55948.

Wavecom 4010 all mode receiver, £500. CWR 685E, £300. CD660, £125. Microdot, £125. DX200 receiver, £55. DX302, £80. FRG7, £100. Tel: Peterborough (0733) 268400.

Yaesu FRG7 communications receiver, good condition with manual, £110 including postage. ERA Microreader V 4.1, good condition, £95 including postage. Peter, Dover. Tel: (0304) 368684 after 6.30pm or weekends.

Yaesu FRG7, 0.5 to 30MHz, digital read-out, a.t.u., mint, £180 o.n.o. or exchange for hand-held scanner or exchange Yaesu a.t.u. Realistic 2006 400ch., 25-1300 for AOR3000/3000A. Yaesu has o riginal manuals. Tel: Chesterfield (0246) 559794, prefer after 5pm.

Yaesu FRG8800 communications receiver, internal v.h.f. converter, 150 to 30.000kHz v.h.f., 118 to 174MHz. Yaesu FRT7700 antenna tuner, very little use, as new, £460. Tel: Southampton (0703) 403328.

Yaesu FRG8800 communications scanning receiver with FRT7700 antenna tuner and FRV7700 v.h.f. tuner, boxed, mint condition with manual, £400. Tel/FAX: Bristol (0272) 827263.

Yaesu FRG9600 coverage to 950MHz, as new with AKD h.f. converter for coverage 100kHz to 60MHz, £250. Also AEA PK232 decoder, excellent condition, £120. All items with manuals, cables etc. Richard, Oxon. Tel: (0993) 779723.

Yaesu FT101E 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.

Yupiteru 7100, boxed, complete with accessories, mains adapter, used only a few times so as new, £300. Tel: Cardiff (0222) 734190.

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Ex military radio, namely R1155 most be in good working order on all wave bands, power supply also required for the above receiver. Tel: Preston (0772) 322088 evenings.

Full manual for Racal 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 satellit world radio model 2100, mint. Grundig professional Satellit radio with stereo model 2400, mint, or Grundig Satellit radio model 1400SL p.w.o. Hugh McCallion, No 8 Strathard Close, Coleraine, Co. Londonderry, N. Ireland BT51 3ES. Tel: (0265) 43793.

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Pye PF8(s) good price paid for working/workable unit(s), but will consider anything. Will travel. Simon, Birmingham. Tel: 021-475 9315 after 7pm.

R535 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 KC/S, good price paid. Tel: Brighton (0273) 706141.

Sony CRF160 receiver, unmodified, good condition and good working order, handbook. Tel: Herts 081-449 0877.

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Sony CRF5080/CRF1, panasonic r.f. 8000/5000/3000. Philips AL990, Braun T 1000, Nordmende Galaxy and similar, s.s.b. for Satellit 6001/2100. Offer. Sabino Fina, 830K2 Atripalda (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 091-469 4064.

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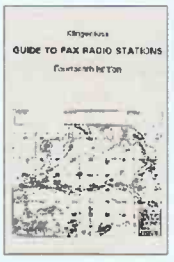

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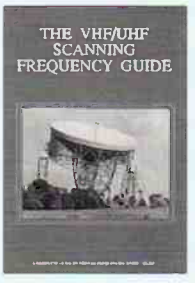

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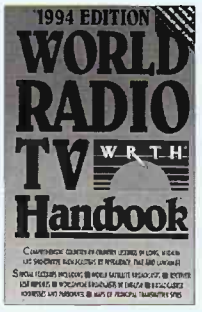

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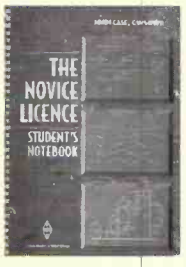

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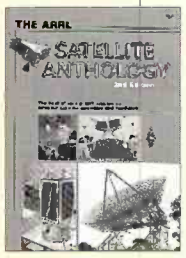

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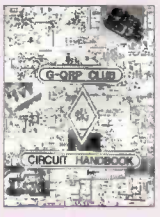

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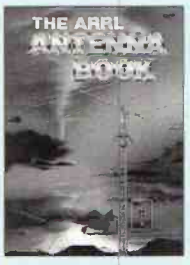

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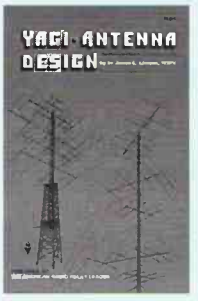

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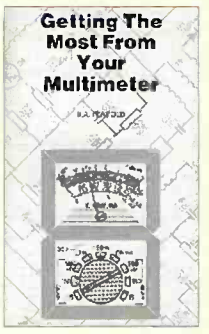

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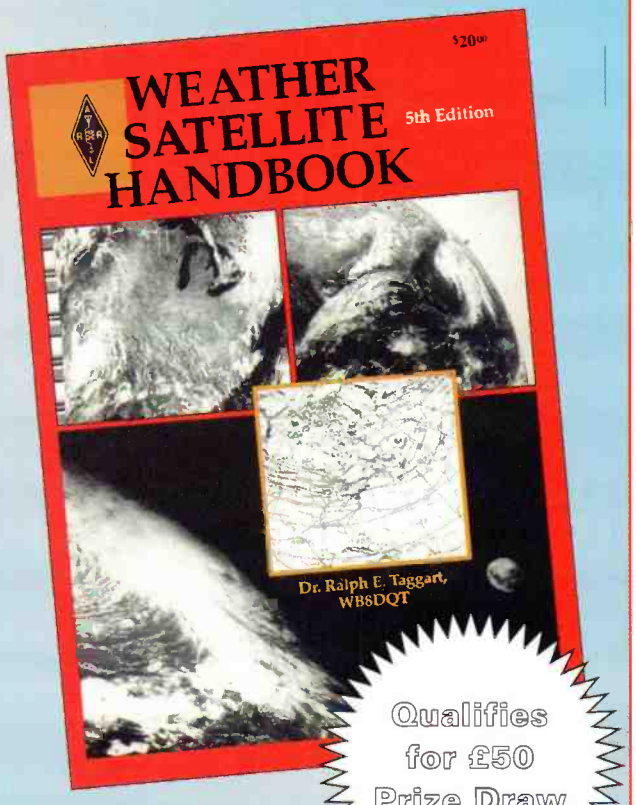

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