NEW AR-3030 Communications Receiver

- SINGLE TRANSISTOR REFLEX RECEIVER
- ACORN ONE - ONE VALVE RECEIVER
- RESTORING AN R1155 part 2
- WEATHER SATELLITE PICTURES

Plus Regular Features Covering
The MVT-7100 is a new handheld sensation with the widest ever frequency coverage! It's sensitive receiver provides effortless reception of SSB and CW using true carrier injection with 50Hz resolution. It can even be hooked up for fax and data reception (with accessories).

The MVT-7100 is a complete communications package in the palm of your hand.

Accessories supplied:
- Telescopic Antenna, NiCad Batteries, Car Connector, UK Charger, Carrying Strap, Earphone, English Manual

Available from your local dealer or direct from U.K. Distributors

NEVADA COMMUNICATIONS
189 London Road, North End, Portsmouth, Hants PO2 9AE. Tel: (0705) 662145 Fax: (0705) 690626
Our cover this month shows a striking view of the new AR3030 receiver from AOR, previewed in this issue.

Photo: Craig Dyball

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

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good listening
Dear Sir

As a scanning enthusiast, I must say how much I enjoyed the November issue of SWM with its great devotion to scanning.

The What Scanner section has also inspired me to upgrade my present scanner. I will however, continue to resist the temptation of an external antenna. I would also urge other readers to resist, as a large Discone on the chimney is the perfect temptation of an external antenna. I would also urge other readers to resist.

Hiding antennas has been a problem since the early days of radio. Please let us know your solutions to this problem, we may devote a page or two to this if we get enough replies.

Andrew Provins
Berkshire

Dear Sir

In the November edition of Short Wave Magazine, 'Letters' section, you received a query from S. Malcom in Belgium regarding his apprehension in using new batteries for the computer back-up on his Sangean ATS-803A.

As an ex-ATS-803A user, I found that there were often a few quirks in the receiver when changing the AA back-up batteries. The answer to S. Malcom's problem of incorrect frequency displays, a static clock and inoperative buttons is that when he replaced his rechargeables with new Alkalines, the micro-processor failed to initialise. The solution to this problem is quite simple. Remove all batteries from the receiver and leave the battery compartment empty for at least ten minutes before inserting the new batteries. When the new batteries are inserted, the receiver should work correctly.

One other quirk I found with battery replacement was that if the external d.c. adapter is connected to the receiver without the two internal AA back-up batteries being installed the micro-processor crashes. On the occasions when this happens it is sometimes possible to tune frequencies as low as 20kHz, way below the sets standard operation of 150kHz. These low frequencies are obtained by checking the nine memories, as sometimes frequencies around 25kHz can be recalled. Once recalled, the user can tune upwards in frequency using the UP key or manual tuning knob. Should the user try to tune down in frequency from the recalled memory, the set automatically returns to 150kHz. I was able to check that the display was correct, as I was easily able to tune in the time signal station in Rugby MSF when the display reads 60kHz.

Graham Powell
South Wales
Dear Sir
I agree wholeheartedly with the comments made by S. Bates in the December issue of SWM regarding portable equipment and protective cases.

During 1992 I purchased a Kenwood TH77E dual-band hand-held transceiver. To my surprise and disappointment I found that there was NO protective case supplied with the rig despite the rig costing over £400.

I later discovered that there were two different soft cases available to suit the unit depending on which type of battery you were using to power it. To add insult to the injury, neither case would fit the rig if the other battery was being used (nancy that!). It took several telephone calls to the various dealers before I actually managed to find the correct one, in fact I think the phone calls eventually cost more than the case.

I appreciate that the equipment manufacturers have to 'make a living' and I've no doubt that the prospect of selling as many soft cases, at around £15 a time, as actual rigs is an opportunity just too good to miss for them, but surely the new owner deserves some method of protecting their new purchase provided as standard with incurring even more costs to themselves.

Perhaps a simple protective cover supplied with the rig is the answer, with a more elaborate version being available at an extra charge if required. In this way, you could choose the appropriate case to suit your needs without paying out even more money if the unit is only rarely to be used outside.

Chris Carrington
Derby

Dear Sir
With reference to the letter from Mr Furness (November SWM, page 3), Mr Furness wrote for help in getting into ham radio despite his hearing defect. Mr Furness will not be the only person with such a problem so I though this letter would be of wider benefit if I sent it to SWM as well as to Mr Furness.

My suggestion is that Mr Furness should consider data comms. So long as he can read a computer screen and use a keyboard, he can use data comms within ham radio. Data comms on h.f. offers RTTY, c.w., AMTOR and Pactor as well as packet. Whilst finding and tuning these signals, it is easier with good hearing, tuning aids such as the i.e.d. display on the Kantronics KAM TNC, (which is the TNC. I use), would be of considerable help to Mr Furness. If he is not able to take the c.w. test then packet on v.h.f., where channelised operation obviates the need for tuning would be of interest to him.

There are several multimode TNCs and software packages on the market and I am sure that suppliers such as Siskin Electronics, ICS, Lowe Electronics and Grosvenor Software would be willing to help Mr Furness, (and others in a similar plight) in his choice of equipment.

Finally, BARTG, the national data comms group, would also be willing to help get Mr Furness into ham radio.

Ian Brothwell G4EAN
Secretary, British Amateur Radio Teledata Group
56, Arnot Hill Road, Arnold, Nottingham NG5 6LQ

Dear Sir
Having read the description of your test of an AN1 Sony wide range antenna, (page 13, December issue of SWM), I purchased this item months ago for £49.95 from the same Sony agent to use mainly with my Sony SW7600 and general various radios.

I found it had no use whatsoever in my area and plugged it into the SW7600, in fact, it took away my existing signals from the built-in aerial. Having tried to obtain a transformer from Sony to cut the cost of constantly buying 6 x AA batteries, I was told that a 9V transformer for the AN1 (exclusive to Sony only) was over £72. An expensive antenna wouldn't you say?

D. A. Grant
Worcestershire

This unit requires 9V d.c. at a very low current and can easily be powered from one of the many 'universal' small power units available at a fraction of the cost. The batteries should last for many months - if yours were being flattened quickly it would indicate a fault in the unit, perhaps explaining the poor performance. I suggest you return it to you dealer for a check. - Ed

Dear Sir
I am sure that many of your readers are aware of the excellent synchronisation achieved by the BBC between a.m. transmitters sharing the same frequency allocation. During daylight hours at this location, I can receive BBC Radio 5 from their Tywyn (Wales) outlet on 990kHz with Radio Devon being clearly heard in the background. However, no annoying 'rising and falling' of volume occurs, i.e. no beat frequency whatsoever from the two stations.

Contrast this by tuning into the intervein band any evening and hear the severe beats which exists from 'Atlantic 252' and Tipaza Algeria on 252kHz. It's the same story on numerous m.w. frequency allocations.

Surely synchronisation should be achieved on an international basis? All major European and North African broadcasters on m.w. and l.w. could exactly synchronise their co-channel transmitters using a single frequency reference source, supplied to all stations by satellite.

David Baker, Eire

Dear Sir
With regards to Michael Stott's letter about whinging, why is it classed as whinging if a station has an opinion for a Morse-free test for the A licence, but not classed as whinging, if you want to take the test with Morse.

He gives the impression that Morse is the be all and end all of amateur radio. Why should Morse be forced on the amateur, who thinks of it as just a mode, which is all it means to a lot of people?

I would have thought that Michael would be pleased that not every station sends Morse, it makes more room for him.

When I send DX, I don't worry if another person cannot work the same mode as me. If you are worried about overcrowding, then let's make part of each band c.w. only. If I ever pass a Morse test, I still won't be able to construct a low powered radio, not that I wish to!

Michael would like us all to believe that Morse is a common language, therefore, if Morse is sent from Japan or Russia or from any other English speaking country, then that must mean that if he writes down every letter, then he must also be able to speak their language? or is his QSO a report or only a locator.

Every QSO that I have had in c.w. has been in English and not just a report and locator, and could have been done by phone.

Why is Michael playing with his key, when you can use a computer that will send Morse as well as receive it. Both the Army and Commercial Radio say that it is a good idea, some say it's too easy, the send is too perfect!

So, just what is the point Michael, the loss of Morse as a mode, over-crowding, or the erosion of the h.f. band? Or, is the loss of Morse to some of our fellow amateurs then end of an ego trip. Don't you think that any real problems could be worked out to the good of the hobby.

I would just like to say to Michael, that I would defend his right to use Morse or any other mode. There should be a test for the A licence, but there should also be a period of time. The test could be the Morse code alphabet, not receive or send, including, band plans, correct use of radio and a five year wait upon B to A.

If you want to use h.f. sooner, then you have to take the Morse test. This would at least give some hope to stations who cannot send Morse, due to not being able to spell or read properly, doesn't mean that they are bad radio users.

I myself just want to use my radio without interference, or interfering with other stations and I ask you to have an open mind.

K. Brown G7EXO
Hants

Letters

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K. Brown G7EXO
Hants
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 8FW. Please tell us your County and keep the details as brief as possible.

* Short Wave Magazine & Practical Wireless in attendance
Short Wave Magazine, January 1994

The interest of Basil Parylo of Bingley in short wave listening has been kindled through using his International 977R receiver. This covers several v.h.f. bands and lets him listen to his favourite air band and CB signals. With his interest awakened, Basil is now looking to buy a more sophisticated receiver for his v.h.f. listening. His problem is that, having read the What Scanner Supplement, he's doesn't understand the difference between the various modes that the scanners cover. He also asks why there's such a big price difference between models with similar facilities. I'll try and provide a simplified answer!

Let's start with the different receive modes, what they mean and where they're used. By far the most common mode used on the v.h.f. and u.h.f. bands is frequency modulation or f.m. However, there are two main variants and u.h.f. bands which are commonly abbreviated to w.f.m. or f.m. and n.b.f.m. So, why do we need different types of f.m.? The answer lies in the information being carried by the transmission. Broadcast signals such as the stereo transmissions from the BBC need to be very high quality to satisfy all the hi-fi enthusiasts. The only way to achieve this is to use a larger proportion of the radio spectrum and so the signal is called wideband. The opposite of this is narrow band f.m., which is used to handle what is known as communication quality signals. These are transmissions that are used primarily for speech such as taxis, gas, electricity, etc. These signals are commonly known as Private Mobile Radio (PMR) and appear throughout the v.h.f./u.h.f. spectrum. If you're interested in amateur radio communications, they also use n.b.f.m. extensively.

Those of you with an interest in Civil Aviation will use n.b.f.m. extensively. Communications, they also handle what is known as voice (voh) signals (a.m.) as this is the main mode used in the 108-136MHz air band.

A look through the specification of some of the more sophisticated scanners with wide frequency coverage will reveal a few modes not covered so far such as s.s.b. (single sideband), u.s.b. (upper sideband), l.s.b. (lower sideband) and c.w. (continuous wave). The sideband modes are actually variations of a.m. and are mainly used on the h.f. bands for speech communications. The last one, c.w., is perhaps the simplest system of all and is used for Morse code transmissions. Although these modes can be very interesting, they are very much in a minority on the v.h.f. and u.h.f. bands.

Now we come onto the question of why the prices of receivers with similar modes and frequency coverage vary so widely. As you can probably guess, the answer lies in the quality of the receiver. When designing a receiver to cover a very wide frequency range such as that of a modern scanner, there are a number of difficult problems to deal with. Perhaps the most significant of these is keeping out all the unwanted signals. You can visualise the problem by putting yourself in the position of someone trying to listen to a conversation on the far side of a crowded room. In order to do this, your brain has to filter out all the unwanted signals between you and the conversation in question. This is exactly what the electronics in the scanner has to do, but in this case it's radio signals that have to be sorted out. It's when operating under difficult conditions that the better quality, and inevitably more expensive, receivers come into their own. You will often find that the cheaper models suffer from all manner of false signals breaking through on top of the signals you're trying to receive.

Spanish Lessons

Back in the November issue, I replied to Russell Cox telling him where he could find better quality Spanish language transmissions. This month I received a letter from John Diggins of Matching Tye (wonderful name!) in Essex. John points out that excellent Spanish transmissions can be obtained from satellite TV. If you're worried about the price, John managed to pick-up a second-hand Amstrad SRX-200 receiver and dish for just £80.

If you're lucky enough to have a system installed and set to the popular Astra satellites, try tuning to Galavision on Channel 44 as this station transmits Spanish programmes without encryption.

Auto-Vox

Radio Research, based in Whitmore, have recently sent me details of an interesting little device that may be of particular interest to those of you with scanning receivers. How many times have you had to sit on an interesting channel for ages just waiting for it to burst into life with a few gems of information. Judging from the information supplied, Radio Research may have had the problem of someone trying to listen to a conversation on the far side of a crowded room. In order to do this, your brain has to filter out all the unwanted signals between you and the conversation in question. This is exactly what the electronics in the scanner has to do, but in this case it's radio signals that have to be sorted out. It's when operating under difficult conditions that the better quality, and inevitably more expensive, receivers come into their own. You will often find that the cheaper models suffer from all manner of false signals breaking through on top of the signals you're trying to receive.

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**news**

**BBC World Service Achieves Record Audience**

New audience figures recently published show that the BBC World Service radio programmes are now listened to by 130 million people world wide. The true size of the audience for the Service’s 39-language broadcasts could be much larger as the total excludes any estimate for countries such as China, Iran, Iraq and Vietnam. Recent increases in the size of the audience in Africa, the Middle East and parts of Asia have helped boost the total to more than twice that of the Service’s nearest rival, Voice of America.

**International Radio: Times and Frequencies**

The Red Cross Broadcasting Service, from the organisation’s headquarters in Geneva, will be on the air on Sunday 26 December, Monday 27 December and Sunday 30 January and Monday 31 January with English on Sunday at 1100 on 7.21MHz, and on Monday at 1700, also on 7.21MHz.

The English service of Radio Havana Cuba has been changed to 2100 on 15.165MHz. The broadcast lasts an hour. Spanish is on the air at 2100 for two hours on 15.195 and 11.875MHz, and on an upper sideband frequency of 13.715MHz.

Radio New Zealand, using a 100kW transmitter at Rangitaike, is on the air between 2137 and 0700 on 15.12MHz, from 0700 to 1205 on 9.70MHz 1650 to 2137 on 11.735MHz. The Radio New Zealand transmitter also carries half an hour of BBC World Service to the Pacific on 9.70MHz at 1100 UTC.

Channel Africa, broadcasting from Johannesburg to the African continent, has English at 0500 on 9.73 and 5.96MHz, 0500-0600 on 11.745 and 7.23MHz, 0600-0700 on 17.71 and 7.23MHz, 1000-1100 on 17.805MHz, 1100-1200 on 9.73MHz, 1500-1800 on 15.24 and 7.27MHz.

Radio Norway’s weekly English language programmes are beamed to European audiences on Sunday at 1000 on 21.705 and 17.84MHz, 1800 on 11.86 and 9.59MHz and at 2000 on 9.59MHz.

Australia’s newest short wave radio station - Australian Armed Forces Radio (AAAFR) - welcomes reception reports. The station broadcasts four one-hour slots daily: 23.6785MHz at 0300UTC, 20.4185MHz at 0900UTC, 12.0705MHz at 1200UTC. In addition there are broadcasts on Mondays and Fridays only on 19.0375MHz at 0300UTC, 25.3225MHz at 0900UTC and 13.5055MHz at 1400UTC. Reports are welcome and all correct ones will be verified. Send your reports to: Electronic Media Unit, Department of Defence, B1-807 Anzac Park West, Reid, A.C.T. 2601, Australia.

If you want to listen intently to the programmes of some international broadcasters, but do not want the snap, crackle and pop of short wave, then you’ll need a satellite dish pointed towards Astrea. Tune your satellite receiver to transponder 22 (MTV) and the audio subcarrier at 7.744MHz. Then you will be able to hear Radio Netherlands (0230 and 1730), Radio Australia (0800 and 1600), the Voice of Israel (1130) and Radio Finland (1500).

Also to be heard is the US public broadcaster, National Public Radio, on the air at 0600, 1900 and 2200. There is also a relay of RTE Radio 1 from Dublin at 1830.

"These new figures show that since the ending of the Cold War, demand for our services is greater than ever. We have been adapting our broadcasting to changing audience needs in a different and in some ways more uncertain world," said Bob Phillis, Managing Director World Service and BBC Deputy Director-General. "It is a major success - a great British achievement - but it will not be easy to sustain this position as the world leader in our field on a lower level of funding”.

BBC World Service, Bush House, Strand, London WC2B 4PH.

**RADIO AND TVDX NEWS**

More TV channels for Doordashan in India. - five satellite channels are now to be terrestrially transmitted following a general thumbs down and lack of system carriage by cable operators. Satellite viewers are still tuned in to the Star TV service via AsiaSat and land based transmissions should encourage viewers away from Star’s offerings. Low power transmitters will be installed in Bombay, Madras, Delhi and Calcutta, using a mix of Band 3 CHs E5.7 and u.h.f. 23. 26 and 29. Meanwhile the Russian Ekran u.h.f. satellite is now transmitting across India for about 3 hours daily in the Malayalam language.

The French have backed the start-up of the new Palestinian TV service on the West Bank at Ramallah with a grant of over £2 million. The PTA (Palestinian Television Authority) is now testing and hopefully will be in full service in January ’94. A radio service is also planned.

There are now five TV channels operating in Estonia, the latest being ‘Kanal Kaks’ which provides a general menu of entertainment interspersed with CNN news. The commercial channel intends to expand into Lithuania, Latvia and Finland. And in Russia ‘NTV’ has opened a commercial channel across Moscow concentrating initially on news and factual programming extending into general entertainment with bought-in Western programmes.

After the Russian Revolution-2 in early October, damage to the main Ostankino TV transmitter and studio centre in Moscow has been totalled to $8 million. Many communication systems and editing suites have been destroyed together with stored video tapes and films - mainly archive material.

Norway’s new 24 hour commercial radio station “P4” has gained audiences far over the anticipated numbers. Operating out of the Lillehammer and Oslo studio the system runs mainly on automation with minimal staff.

Finally in Eire the new Gaelic language channel ‘Telefis na Gaeilge’ is likely to start in 1994 with the government funding the start-up to nearly £1r15m and annual costs of similar value.

**New Edition**

A revised edition of The Interpretation of Facsimile Weather Maps and Charts is now available, at a price of £7.50 (UK post paid) from the author Philip Mitchell, 2 The Marlowes, Newbury, Berks RG14 7AW.

Tel: (0635) 48633.

**Listeners’ Group Formed**

A new group dedicated to h.f. and airband listening has been formed and will be producing newsletters, frequency lists etc. An s.a.e. to SWIG, 4 Markenfield, Swindon, Wilts SN5 8AA will bring further information.

**Last Chance for Software**

After many years, Technical Software have decided to close down the radio software side of their business in order to concentrate on other things. Sales of radio software and the associated hardware will end on 4 March, but support will continue as usual.

This will be the last chance to buy their products, so get your orders in while things are still available. There are bound to be some last-minute bargains so a phone call or s.a.e. to Technical Software, Fron, Upper Llandwrog, Caernarfon, Gwynedd LL54 7RF Tel: (0286) 881886 could be beneficial.

Short Wave Magazine, January 1994
**Major Changes at Lowe Electronics**

On 1 January 1994 the team which designs and manufactures the Lowe range of receivers and accessories will be separated from Lowe Electronic's retail operation and stand alone as an independent manufacturing company. The new company, Lowe Production Ltd., will be headed by John Wilson as Managing Director who says, "I am obviously delighted that our efforts have been so successful and I wish to thank all who supported my dreams of establishing a British manufacturing presence in the tough world of electronics". John describes himself as the "dreamer" and John Thorpe, the designer of the receivers, as the "genius" behind the organisation.

The new company will be operating from a changed location at Unit 23, Cromford Mill, Cromford, Matlock, Derbyshire DE4 3RQ Tel: (0629) 826157, where they will be happy to receive calls and visits from well wishers.

**Guide to Packet Radio**

Several years ago the British Radio Teledata Group (BARTG) published its Beginners Guide to Packet Radio in response to the growing need for a book, suitable for the newcomer, about packet. Many hundreds of copies were sold.

Time has marched on and BARTG has produced a completely new book for the newcomer to packet, The BARTG Guide to Packet Radio. The aim of the author, Ian Wade G3NRW, was to provide a friendly and clear introduction to packet. The book is now available by post from BARTG’s Publications Manager Mark Ashby G6WRB, 47 Ryton Close, Luton, Beds LU1 5SR. Tel: (0582) 36094, at a price of £1 including p&p.

**New ISWL Guide**

The Guide to English Language Shortwave Broadcasts to Europe (Winter Schedules - 1993/1994) has just been published. This 28-page booklet provides information, grouped by time period, of English language programmes including country, station names, frequencies, and programme details, e.g., news, features, sport or religious. Of special interest to listeners is the listing of DX programmes. The booklet costs £1.30 (cheque, PO, postage stamps or 2 IRCs) post paid from International Short Wave League, 10 Clyde Crescent, Wharton, Winsford, Cheshire CW7 3LA.

**Alinco Open Day**

Haydon Communications are holding an Alinco Open Day from 10am to 6pm on 29 January. Representatives from Alinco Distribution (UK) will be on hand to answer all your questions. If this isn’t enough to tempt you there will be free food and drink available as well as huge savings (more than usual they say) on equipment.

Haydon Communications, 132 High Street, Edgware, London HA8 7EL Tel/Fax: 081-951 5782

**ZD8 Callsigns**

Ascension ARC records showing callsign allocations over the years have been destroyed. Chris Salmon ZD8X has informed us that they are holding a large number of QSL cards for various ZD8 calls, mostly issued to short-term visitors of whom they have no records. If anyone has any information (no matter how old as they have recently received a batch of cards for an operation in 1964!) please contact Chris Salmon ZD8X, CSO, PO Box 2, Ascension Island, South Atlantic Ocean, Tel/Fax: (+247) 6440

**Listen With Grandad**

by Leon Balen & David Leverett

Grandad is in one of his “waste not, wan’t not” moods again....

Short Wave Magazine, January 1994
The Ultimate Receiver?

It was an honour to be chosen by Watkins-Johnson to represent them in the amateur market place in the UK. With almost thirty years in the business of selling short wave receivers and the last five of those building up an international reputation as a manufacturer in our own right, who better to provide the right kind of support and back-up that discerning hobbyists will need. Recognizing the needs of the semi-professional user, Watkins-Johnson have developed the HF1000, based on their WJ8711 model used in Government and Military establishments. Built with the same care and attention to detail as their more expensive receivers, the HF1000 is superbly engineered. They actually manufacture a lot of the hardware themselves, including the multilayer PCB, which ensures consistent quality throughout - something we ourselves understand only too well. Electrically, the HF1000 meets a very high specification, extracts of which are shown below. Operationally the HF1000 has everything the dedicated listener is ever likely to need and is made easy to operate thanks to the use of DSP technology, an uncluttered control panel and large, easy to read displays. Full details are contained in a comprehensive datasheet, which we'll be happy to provide on request.

Features:
- 5kHz to 30MHz in 1Hz steps
- High dynamic range - 110dB @ 300Hz bandwidth - +30dBm 3rd order intercept typical
- Digital filtering provides 58 IF bandwidths from 56Hz to 8.0kHz with exceptional shape factors
- AM, FM, CW, USB, LSB, and ISB
- Synchronous AM detection modes as standard
- Fast, flexible scanning with 100 memory channels
- Operator selectable RS232 or CSMA remote control
- Internal switchable pre-amplifier and attenuator

HF1000
£4995.00

Head Office, Mail Order, Service and Spares Department:
Lowe Electronics Ltd
Chesterfield Road, Matlock, Derbyshire, DE4 5LE
Tel. 0629 580800  Fax. 0629 580020  FaxInfo. 0629 580008

SEND US FOUR FIRST-CLASS STAMPS AND WE'LL SEND YOU OUR BUMPER SHORT WAVE INFORMATION PACK, TOGETHER WITH A FREE COPY OF OUR FAMOUS LISTENERS' GUIDE
LOOK AT THESE GREAT NEW PRICES!

FRG100
Yes, Yaesu's flagship receiver is down in price, making it great value for the shortwave listener! It's even better value at Lowe's this month! During January, we're including the power supply, and free copies of the Shortwave International Frequency Handbook AND the latest Passport to World Band Radio.

All for just £529.00!
Just add £10.00 for next day delivery

Our "First Eleven" of shortwave accessories!
If you've got a receiver, you need one (or more!) of these

<table>
<thead>
<tr>
<th>Accessory</th>
<th>Description</th>
<th>Price</th>
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Most branches and Head Office open Mon - Fri, 9.00am until 5.30pm and on Sat from 9.00am until 5.00pm. See you soon!
A new receiver from AOR is always viewed with great interest and the new AR3030, previewed here by Mike Richards, is bound to turn a few heads.

Those of you who visited the Short Wave Magazine/Practical Wireless stand at the Leicester Show at the end of October will no doubt have noticed the new AR3030 h.f. receiver occupying a prime position. Following the show I was given an opportunity to have a play with this brand new model for a few days. The receiver previewed here is its original styling. This appears to be a very welcome trend among receiver manufacturers. Examples of this are to be found with receivers from Lowe, Drake and now AOR. As you can see from the photographs, the result is a very functional looking receiver that cries out to be used. One particularly good feature of the layout was the provision of a front facing speaker grille. This is a feat and the sound is ducted to the front panel aperture. The audio quality from this set-up was fine for general communications use. To take full advantage of the AR3030's audio quality I would strongly recommend using a good external speaker or headphones. The usual 3.5mm speaker jack is provided on the rear panel whilst headphone reception is via the 6.3mm jack on the front panel.

New Styling

One of the first points that struck me about the AR3030 that very few other manufacturers seem to be able to manage. The front facing speaker is important because I, like many listeners, always seem to end up putting things on top of the receiver, i.e. audio filters, reference books, etc. With a top mounted internal speaker this effectively kills the sound. In the AR3030 the speaker is actually mounted well inside the case and the sound is ducted to the front panel aperture. The audio quality from this set-up was fine for general communications use. To take full advantage of the AR3030's audio quality I would strongly recommend using a good external speaker or headphones. The usual 3.5mm speaker jack is provided on the rear panel whilst headphone reception is via the 6.3mm jack on the front panel.

Wide Coverage

For those of you who haven't twigged yet, the AR3030's name is derived from its frequency coverage, which is continuous from 30kHz to 30MHz. In practice, the upper limit is 6Hz less than 30MHz - but that's hardly worth worrying about! Like most modern systems the AR3030 operated using a digital synthesiser under microprocessor control. In this particular case a direct digital synthesiser is used to give the purest signal quality. Another important aspect of the AR3030 is the very fine, 5Hz, tuning steps. This is particularly important to the utility enthusiast where accurate tuning is essential when receiving some of the more complex modes. The tuning steps can be cycled through 100Hz and 1kHz simply by pressing the kHz button on the front panel. This gave very good control when using the manual tuning knob. The current frequency was displayed using a large liquid crystal display with a resolution of 10Hz, which was great for accurate frequency setting.

Keypad frequency entry was also provided, with a few new ideas to make life easier for the operator. The first of which was the backspace key. If you make a mistake while entering a frequency you just press this key to erase the last digit. I know this sounds obvious, but with most receivers you have to abandon the entry and start again. The AR3030's system is so very much quicker. The processor logic associated with the keypad also recognises short code entries for band selection. For example to select the bottom end of the 31m broadcast band you just type 31 and press the MTR key. Although this system is to be found on many short wave receivers AOR have taken this a step further and included the amateur bands. You can, therefore, type 80 MTR and switch straight to the 3.5MHz amateur band. This facility is further expanded as you store your last used settings against the particular band. This makes the metre band selection rather more powerful than some of the more conventional implementations.

Just to complete the frequency selection options were a set of one hundred user programmable memories. In addition to storing the frequency, these memories what the manufacturers call a 'beta pre-production' unit. In effect it's the final prototype prior to starting the production run. Because of this there were a few very minor problems that AOR will be correcting for the final version.
held all the operational parameters right down to the attenuator setting. You could also set-up automatic scans of memory groups.

Perhaps the icing on the cake is the optional v.h.f. converter that extends the coverage to include 108 to 170MHz. Although only covering a portion of the v.h.f. spectrum, this is probably one of the most active sections. Included within this are the air band, marine band, amateur band and a selection of p.m.r. operators.

**All Mode**

The AR3030 is truly all mode as it includes a.m., synchronous a.m., n.b.f.m., s.s.b., u.s.b., c.w. and FAX all as standard. Each of these modes are selected using a pair of buttons of the front panel. These step the mode forwards or backwards as appropriate with a set of I.e.d. illuminating to indicate the selected mode. The provision of synchronous a.m. is becoming a feature of most of the more advanced receivers on the market. In this particular implementation the double sideband technique is used to help overcome the effects of fading on short wave signal. In use this proved to be very reliable and locked onto the required signal very quickly. There was also no need to fine tune the receiver to eliminate the I.f. beat notes that afflict some systems.

Broadcast a.m. reception was very well controlled thanks to the use of the Collins 6kHz eight resonator mechanical filter unit. This was particularly good for cutting through the bedlam on some of the busier broadcast bands. Reception of s.s.b. used a Murata ceramic filter that can be upgraded to a Collins unit as a factory-fitted option. This filter was also used to provide the narrow filter setting for a.m. reception. Those with an interest in c.w. will find the b.f.o. feature particularly interesting. This facility is enabled when c.w. is selected and gives the user the facility to alter the c.w. side tone frequency. This is particularly useful when using the optional Collins 500Hz narrow filter where you can centre the signal in the passband and alter the b.f.o. for the preferred side tone.

**Computer Control**

As with other AOR receivers, the AR3030 was capable of full computer control using a standard serial port on the rear panel. Not only could you send frequency and mode information to the receiver but you could also interrogate for a range of receive parameters. Having checked through the command set, it looks as though the AR3030 could be driven by programs designed for the AR3000 v.h.f./u.h.f. scanner with a few minor mods.

**Specification**

- **Coverage:** 20kHz to 30MHz
- **Tuning Selection:** MHz, kHz, 100Hz, 10Hz (5Hz minimum step)
- **Receive Modes:** a.m., s.a.m., u.s.b., l.s.b., c.w., FAX & n.b.f.m.
- **Frequency Stability:** 5 ppm -10 to +50°C
- **Memory Channels:** 100 (00-99)
- **Receiver sensitivity:**
  - s.s.b. 1µV 30-50kHz
  - n.b.f.m. 0.5µV 1-8-30MHz
  - a.m. 3µV 30-50kHz
  - c.w. 1.5µV 1-8-30MHz
  - s.s.b. 0.5µV 1-8-30MHz
  - FAX 0.5µV 1-8-30MHz
- **Selectivity:**
  - s.s.b. / FAX 2.4kHz -6dB
  - a.m. 6.0kHz -6dB
  - c.w. 500Hz -6dB (with optional filter)
  - f.m. 15kHz -6dB
- **Image/spurious rejection:**
  - 70dB
- **Dynamic Range:**
  - 100dB at 25kHz spacing
- **Antenna connection:**
  - l.w. - h.f. 50Ω nominal BNC
  - l.w. - h.f. 450Ω for wire terminals
  - h.f. High impedance whip on BNC (slide switch selection)
  - v.h.f. 50Ω nominal BNC for optional v.h.f. adapter installation.
- **Audio Output:**
  - 8W, 8Ω load at 10% distortion
- **Power Requirements:**
  - Internal dry batteries (8 x AA)
  - External 12V d.c. at 800mA (nominal 13.8V) negative ground

**Summary**

The new AR3030 appears to be a well thought out no nonsense receiver that is very easy to use. The functional styling makes a pleasant change and adds to the wide appeal of the receiver. I was also very pleased to see that the fully range of receive modes were included as standard. At the time of this preview I don’t have a firm price for the AR3030 but if you’re interested I’m sure AOR will be only too pleased to put you on their mailing list.

My thanks to AOR (UK) for the chance to sample this new model - I’ll look forward to a full performance review.
It's The New Classic

The AR3030 is now available from Martin Lynch, The UK's Premier Dealer.

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Restoring An R1155
Part 2

This month Chas. Miller finds the r.f. amplifier inoperative and modifies the output stage.

Modifying the Output Stage

The original output stage used the triode section of V8 to drive headphones via a small matching transformer. Because of its peculiar characteristics there is no exact equivalent to the VR101: anyone desperate might try the least unlikely candidate, which is the American 6R7G. However, when something more than headphone reception is required and a power output stage is added, the problem solves itself since the circuit modifications involved make it possible to use a conventional double-diode-triode, screen currents of only 30mA and 4mA respectively. The heater current is also modest at 0.45A, a useful point when long leads from the p.s.u. are employed and l.t. voltage drop has to be taken into account. A design feature of the 6V6GT is that the third and higher harmonic distortion is kept low by permitting the second harmonic distortion to be rather high. Reduction of the latter may be achieved by introducing negative feedback, obtained here by omitting a bypass capacitor from across the 270Ω cathode bias resistor.

The transformer in the anode for the 6V6GT grid resistor should not be exceeded.

Particular care must be taken to ensure that the cathode and grid resistors of the output valve return to h.t. and not to chassis, to prevent the anode and screen currents from flowing through the bias resistors in the h.t. circuit referred to earlier.

The output transformer (which should have a ratio of 43:1 for 3Ω speakers and 26:1 for 8Ω types) was mounted just in front of the coil box and under the tuning gang, where there is ample space available.

Fig. 2.1: R1155 modified for loudspeaker output. New components are suffixed 'A'.

as will be seen.

The removal of the d.f. section had left a blank hole next to V8 which was ideally suited to accommodating the new output valve. The valve chosen for the job was the 6V6GT, which in this application will give an output in excess of 2W with anode and of V8 was disconnected but left in situ and resistance-capacity coupling used to pass the a.f. signals on to the output valve, see Fig. 2.1. It was then possible to replace the VR101 by a DH63 which has a high-impedance triode section more suitable in this role. Note that the value of 470kΩ

A 'Monday Morning' Set?

Whilst the new wiring to V8 was being carried out something rather odd was noticed: the cathode pin of the holder was connected to chassis instead of h.t. - Further investigation produced the

Historical Radio

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interesting discovery that R26 did not go to h.t. - either, as it should have done. It is normally connected to one end of R3 - see Fig. 2.2 - by a wire on the chassis side and thus hidden from view. This wire was missing, and since it is hardly imagnable that anyone would go to the trouble deliberately to remove it, the only logical explanation is that it was omitted due to a boob at the factory. As the error would have been difficult to detect, presumably a hapless RAF mechanic had resorted to a bodge to get the set working!

**First Tests**

When the output stage had been fitted it was considered an appropriate time to carry out a test run with the aid of a power pack built especially for R1155 use. Early service manuals specify an h.t. of 200V, later increased to 220V; in practice the lower voltage is perfectly adequate and there appears to be no advantage in increasing it. The h.t. consumption with this input and using the valves mentioned is about 70mA, with the heater current just under 2.9A.

The set produced some kind of loudspeaker signals at once on the three lower frequency bands, but as they consisted of little more than interference noise, increasing at the i.f. end of the dial, it was clear that the local oscillator was not working. This proved to be due solely to dirty contacts on the band switch which were cured by being brushed over with trichlorethylene. Stations were then receivable on all bands and made the set seem almost dead on certain parts of each band. In the manual gain mode with the control advanced, performance was normal. Back in the a.v.c. mode it was noticeable that the 'magic eye' closed only on very strong stations with a very sudden jump from wide to narrow shadow, which prompted an examination of the a.g.c. circuitry. Since there was nothing visibly wrong - and the various decoupling capacitors had already been replaced - very careful voltage checks were made. Mention has already been made of the minimum bias voltages that occur on the a.g.c. feed resistors R10, R11 and R12: this also sets the delay voltage for the a.g.c. It was found that the negative voltage was completely absent, due to R3 having gone open circuit within its innocent-looking ceramic shell. Replacing this produced just over 1V negative to chassis. A further check showed that R1 had gone low, from 2kΩ to around 1kΩ and when this resistor had been replaced the a.g.c. action and sensitivity was restored to normal. This was confirmed with tests using the signal generator and then with various antennas.

**Part 3 describes the final tests and considers the mechanical aspects of the restoration, completing the job.**

The photographs for this article were supplied by Paul Aliberry.

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**Abbreviations**

A. amperes  
a.f. audio frequency  
a.g.c. automatic gain control  
a.v.c. automatic volume control  
h.t. high tension  
h.t.- high tension  
i.f. negative  
i.f. intermediate frequency  
kHz kilohertz  
kΩ kilohms  
l.f. low frequency  
l.t. low tension  
mA milliampere  
p.s.u. power supply unit  
r.f. radio frequency  
s.w. short wave  
V volt  
W watt  
Ω ohm
The AR3030 boasts a wide frequency coverage from 30kHz to 30MHz and all mode reception 'as standard': AM, S.AM (synchronous), NFM, USB, LSB, CW & FAX. The legendary high performance 6kHz *Collins 8 resonator mechanical filter is fitted as standard in order to provide the ultimate in AM selectivity. There are two other filters fitted as standard, these being 2.4kHz for SSB/FAX/CW and narrow AM/S.AM & 15kHz for NFM. Additional filter options include a *Collins 7 resonator mechanical 500Hz filter for narrow CW operation and a *Collins 8 resonator mechanical 2.4kHz filter for even better selectivity on SSB. True carrier re-insertion techniques have been employed for: SSB/CW plus a separate BFO for greater flexibility on CW.

One of the most important criteria when choosing a general coverage receiver is without doubt audio quality. With this in mind, a front mounted speaker has an obvious advantage over top or bottom mount speakers in terms of audio projection and readability (your Hi-Fi doesn’t have speakers pointing towards the ceiling or floor). Most general coverage receivers on the market today unfortunately do not have front mounted speakers due to limited space on the front panel or simple production cost cutting. The AR3030 has a 66mm 3 WATT built-in front facing speaker thanks to a clever chassis design which has succeeded in producing excellent clear audio through a deceptively small front speaker grille. High/Low audio tailoring is also selectable from a front panel key.

At one time, every general coverage receiver could be operated without referring to the handbook, such times have long gone and all modern receivers use microprocessors to drive the unit and provide facilities. The AR3030 microprocessor software has been developed with a wide variety of operators in mind.

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"Another day in the life of a radio inspector," Young Golly the trainee said.

Buccolic Kilicycle Ken observed. "It's nice to have a day in the country, get away from smog, suburban housewives eternally complaining of television interference, meet real people."

Young Golly breathed deeply, coughed. "Smells of cowshit."

"The wealth of the nation." Kilicycle Kent said.

Where was the electric fence they were seeking? It was causing radio interference. They had checked a lot of farms, climbing fences, using a small transistor radio. "It was different in the old days when we had to carry the old Type 444 interference detector receiver, weighed about 20lbs, the size of a 56lb butter box."

"Never seen a 56lb butter box," Young Golly said. "How many kilos is that?"

"Don't tune into music, listen for the electric fence."

"I hate cows."

"I should have brought a sack and got a load of cow manure for my garden. Nothing like it for strawberries."

Young Golly listened to the rasp of the interference. "We are very close."

"It could be this farm."

"You go in, I have been chased by a bull, three dogs and a ram so far today."

"It is our job to track interference to its source, and eliminate it."

The house on a knoll was new, all aluminium and ranchsliders. Back in behind a hedge of high macrocarpa trees was an old house, probably the original homestead.

At the new house was a large outboard boat in the garage, a Jaguar and a Range Rover. There was a swimming pool, a spa pool and a trampoline. Mrs Farmer was a blonde, wearing a bikini. "Wouldn't worry about radio interference with her around." Young Golly said.

The farmer declared passionately. "A sea of interference from electric fences will soon smother the entire ionosphere, making radio reception impossible." He wore a hacking jacket and brogues.

Kilocycle Ken nodded. In the background the radio receiver burped at regular two-second intervals as the snarled.

"Only if not put up correctly, bad joints mostly, but we will find it."

"Every time I pick up the telephone it beeps at me."

"Electro-magnetic coupling," Kilicycle Ken said.

"They should be banned."

"Plenty of farmers in parliament," Kilicycle Ken observed.

"I'm an old fashioned farmer, believe in wire fences, barbed wire as far as that old cow in that old house is concerned. That's where the interference is coming from."

"There's a lot of wickedness in the world," Kilicycle Ken said.

The old woman in the old homestead met them with a cradled shotgun. "What do you want?"

"We are looking for an electric fence causing radio interference."

"You'll never take me alive," Young Golly whispered.

"He sent you, didn't he."

"Have you got an electric fence?"

"Yes, around my

CONTINUES ON PAGE 21
The New Classic

AR3030 General Coverage Receiver

*Collins mechanical filter inside

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

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

Our aim here at AOR has been to produce a general coverage receiver using the *Collins 6kHz AM mechanical filter fitted as standard yet at an affordable price for most shortwave listeners around the World. We believe that only the very best receiver design deserves the *Collins mechanical filter, and feel our R&D team have succeeded with this goal. It is very easy to appreciate the true effectiveness of the *Collins AM mechanical filter on today’s crowded medium and shortwave bands especially in Europe after dark. We also believe DDS is the best method available today to produce the cleanest signals, absolutely essential for high performance receive capability especially on crowded bands containing many strong signals. There are two other filters fitted as standard, these being 2.4kHz for SSB/FAX/CW and narrow AM/SAM & 15kHz for NFM. Additional filter options include a *Collins 7 resonator mechanical 500Hz filter for narrow CW operation and a *Collins 8 resonator mechanical 2.5kHz filter for even better selectivity on SSB.

Our “Collins inside” logo and use of name has been fully approved by Collins Rockwell and we are proud of that fact. Our pride will be lifted even higher should other manufacturers be brave enough to follow our example in the near future.

The AR3030 boasts a wide frequency coverage from 30kHz to 30MHz and all mode reception “as standard”: AM, S-AM (synchronous), NFM, USB, LSB, CW & FAX. Tuning is via a silky smooth rotary tuning knob with a minimum step of 6Hz (selectable for faster / slower tuning), there are two VFOs and dial lock to prevent accidental loss of frequency while listening. We are so confident with the performance of the DDS that the same chip is planned for use in our new generation wide-band receiver which will tune in ultra smooth 1Hz increments.

The AR3030 has a number of unique facilities to offer. In particular the BFO (Beat Frequency Oscillator) is switchable on USB/LSB/CW and FAX modes. During “normal” operation the AR3030 uses true carrier re-insertion techniques for SSB reception, this ensures ease of use and good audio quality. However should adjacent interference be encountered, the BFO may be switched On so that the main rotary tuning control can be used to tune away from interference and the BFO used to recover readable audio thus provide a simple but effective manual form of passband tuning. Another useful facility is the [mtr] key. As well as being able to enter frequencies in MHz or kHz, the [mtr] key allows easy access to popular Broadcast and Amator bands. For example, to quickly access the 31m Broadcast band while in VFO mode type [3] [1] [mtr] and start listening / tuning... easy. For the 20m 14MHz example, to quickly access the 31m Broadcast band while in VFO mode type [mtr] key allows easy access to popular Broadcast and Amateur bands. For the AR3030 receiver with *Collins AM mechanical filter, includes mains power supply £699.00 inc VAT

Preliminary Price structure:

Optional *Collins 500 Hz mechanical filter £ 89.29
Optional *Collins 2.5 kHz mechanical filter £ 89.29
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CR400 tape control lead £ 13.99
LA320 active desktop loop aerial £ 119.00
VHF AM converter 108 - 139 99999 MHz £ T.B.A.
VHF NFM converter 140 - 169.99999 MHz £ T.B.A.
Control software for PC £ T.B.A.

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WORLD SATELLITE TV AND SCRAMBLING METHODS - THE TECHNICIANS' HANDBOOK - 3rd Edition
by Frank Baylin.
ISBN 0-917893-19-0
Published by Baylin Publications, Boulder, Colorado.
UK main distributor Julian Vincent Technical Books, 24 River Gardens, Purley, Reading RG6 8BX - Tel or Fax: (0734) 414468. 263 x 203mm, soft covered, 288 pages. UK price £29 including post - add 10% for European airmail and 20% for airmail Worldwide.

Another well presented and very useful from the Baylin Publications stable. Though Frank Baylin operates from Boulder, Colorado, he has for some years produced a series of satellite orientated publications that has proved extremely popular around the world.

Early satellite books from the 'States tended to concentrate on the American scene which, of course, is historically dominated by C Band satellite user. It was to that continent that the pioneer European enthusiast would look for 'his bits'. Europe exploded into satellite TV because of the relatively cheap and mass-produced technology by Amstrad and others, equipment was relatively cheap. Gradually Frank Baylin expanded his products and now any satellite publication from the 'States covers both C and Ku bands and with application for all users around the World. The Americans tend to publish technical books on a much more informal basis than the Europeans with masses of pictures and preferring to illustrate actual systems in use - and in simpler terminology than often seen in Europe. One UK exception perhaps being John Breed's Swift TV Publications.

So much for the background to the style and presentation of imported American books. This latest offering is intended for the satellite installation and repair engineer though would offer valuable help and insight to any multi-satellite enthusiast seeking knowledge of general TVRO (TV receive only) techniques. Assuming a knowledge of basic satellite launch and orbital theory, the book, after a brief background to satellite transmission, covers thoroughly each section of the typical TVRO domestic system. Passing from the dish, head electronics, cables, actuator drive and control, Baylin discusses the sections of typical receivers with expansion of each distinct section into circuit theory and practice. It's a very practical orientated approach to the subject and most folk will follow the text easily.

About 30% of the book is devoted to scrambling theory and practice - and perhaps more pertinent the devious world of descrambling and the hacker. John McCormac, the well know personality in the encryption field, has produced an enlightening and detailed section of all current scrambling types encountered and the means of decoding them. A system-by-system check is provided with background notes to the hacker and the anti-piracy techniques adopted by the broadcasters. The final section of this tome goes into fault finding in some depth with a cross reference section onto faults on specific equipment. Various addresses and appendix complete the 288 page work. There are ample illustrations and photographs throughout. I feel it important to stress that the book under review covers very adequately both C Band and Ku Band working.

My personal thoughts on this latest book from Baylin is that at £29 it represents good value, particularly if received as a present for an enthusiast, there being much valuable information and insight into your own system - or if you, the reader, is employed in the satellite installation trade then it's an essential reference work.

My thanks to Julian Vincent Technical Books for providing the review book. They also publish a catalogue, available on receipt of an s.a.e.

Roger Bunney

Book Review
Most readers have constructed a wireless set or receiver in their minds as they read the articles in Short Wave Magazine. C. M. Lindars describes a simple receiver which will tempt us to assemble the necessary parts and reach for the soldering iron.

The little receiver to be described embodies a novel feature in that reflexing and detection are done automatically. There have been circuits centred on a single transistor, but, as far as is known, none has the simplicity of this one. Tribute must be paid to the inventor, Sir Douglas Hall, who devised this unique circuit some 30 years ago. It was named the Spontaflex (Spontaneous Reflex) and often appeared in the numerous articles he wrote for the radio hobbyists over the years. Sir Douglas has kindly given his permission for this design principles to be used in the receiver described in this article.

By referring to Fig. 1, it will be seen that the signal is applied to the base of the transistor, which, being in the common collector mode, is at high impedance. It will be noted that bias for the transistor is applied to the 'earthly' end of the coil to avoid damping.

The amplified signal is produced across the diode which forms the load and is demodulated at low impedance. The demodulated signal is now amplified by the transistor, this time in the common base mode, as the signal is now amplified by the transistor, which, being in the common base mode, is at high impedance. It will be noted that bias for the transistor is applied to the 'earthly' end of the coil to avoid damping.

The complete circuit is shown in Fig. 2. As the receiver consumes only approximately 300μA, it is very economical to run and can be powered from a single PP3 battery.

The various components will now be considered.

### Tuning Circuit

The arrangement shown can be either a 'Band Set' or a main tuner and fine trim. Both arrangements obviate the need for a slow motion drive but if one is available, just the main tuning capacitor C4 is needed. Fig. 3 gives details of suitable coils. These coils will just cover from 49m to 19m, provided that a single loop tuning capacitor with a low minimum capacity is used and all stray capacitances are kept to a minimum. However, due to the effects of antenna loading and to save any disappointment, it may be better to settle for an upper limit of 25m. The coil may consist of 23 turns of 'Solid Core' wire wound on a 22mm diameter polythene tube. Alternatively, 45 turns of the same wire wound on a 13mm tube will be equally suitable; in fact, due to lead inherent capacity, it will probably enable tuning to a slightly higher frequency. This latter coil may be made on a former consisting of a few turns of thick paper wound on a 13mm diameter dowel, (remove dowel after winding).

### Antenna Connection

To obviate the need for an ancillary winding on the coil, the antenna is connected to the top of the coil via small capacitor. A choice of three is available in the circuit given. At some times in the day it will be found that about 600mm of wire connected via the 3.3pF capacitor or even no antenna at all, will give results. There is no need for an 'Earth'.

### Transistor

Here the choice has to be a compromise. An r.f. type with reasonably high gain is needed, having a suitable internal capacitance because this forms a necessary part of the circuit. The type shown in good and quite cheap. It is advised that three or four should be obtained so that the most suitable specimen can be selected.

### Diode

A germanium diode is essential and types such as the OA81 and OA91 will be highly suitable. Others may be tried, but it is advisable to keep a particular specimen once a suitable one has been found, because the diode affects the current flowing in the circuit which has to be optimised for best results.
Reaction (Regeneration) Components

Reaction is very smooth with this circuit so one has to be careful in adjusting it. On most signals, the set will 'lock on' to a signal thus giving the 'Homodyne' effect. Either a 100pF capacitor may be used or a 33pF capacitor in series with a 470Ω pot, (it may be found that a 1kΩ pot is required). The capacitor across the diode does not shunt the r.f. from the diode, but, in association with the internal capacity of the transistor, forms a Colpitts oscillator.

Output load

It is advised that a small transistor type transformer is used. The LT 44 is very suitable for use with ex-services headphones. Of these, the DLR 5 are strongly recommended. They normally pass as medium impedance headphones. The Walkman type will not be found very suitable. 400Ω headphones may be connected in circuit without a transformer, provided they are the genuine sort and not the cheap modern variety. Crystal earplugs in series may be connected across the primary of the LT 44 or better, across the primary of a 'Z changer' which has a high primary inductance. 80Ω stereo headphones may also be used by connecting to the tip and ring only - thus making them 16Ω mono headphones. These may then be connected to the secondary of the LT 44. Some results are possible if the DLR 5 headphones are connected in circuit without a transformer.

Construction

The 'chassis' consists of a base board of 10mm ply and a panel of 6mm ply glued to the base. It is advised not to use metal due to the possibility of unwanted coupling effects. 'Hand capacity' has not been a problem with the prototype, but kitchen foil may be glued to the front panel if trouble is experienced, isolating it from the tuning capacitors.

Mount the components on the tag board, the transistor last (see Fig. 4.) It is advised that a holder be used for the transistor so that several specimens may be tried as has already been suggested. Mount the remainder of the components as shown in Fig. 5.

Set the 22kΩ preset about halfway and make the remainder of the connections from tag board to panel. With a current meter in series with the + lead to the battery, switch on, set the reaction control to minimum and adjust the preset so that a total current of 300µA is flowing. Connect the antenna, advance the reaction control and tune in the stations.

Final matters

Different specimens of transistors or diodes will all require a careful setting of the current flowing. There is room for some experiment here, but the 300µA stated is generally about right. It is hoped to describe at a later date a simple amplifier to work a loud speaker with this set: also to suggest a 'variometer' tuning coil to take the place of the capacitor and coil described here.
Not all valved equipment needs to be large, or contain high voltages. Robert A. Wilson describes a neat circuit for a ‘safe’ valve circuit.

When I first became interested in radio in the mid 1950s, I was very much drawn to the physical construction of the older equipment. Everything was large and well spaced, whilst the wiring was of thick, shiny copper wire. Several months ago I decided to construct such a set for the short waves using a 955 acorn triode, a valve which had its origins over fifty years ago. Although there is nothing special about the circuit, it took more months experimenting, building and re-building, juggling of component values and layout before I got it right. The Acorn One is especially coil, the set will not be very selective, but this is far from true. I was quite surprised by the selectivity and performance when I finally got everything correct. Reaction is controlled by the potentiometer R2. I used a potentiometer rather than the usual variable capacitor in order to keep costs down. The Acorn One has three manual controls, the main tuning (C2), reaction (R2) and the antenna trimmer (C1). Each of these controls need careful adjustment for optimum performance. The coil is wound to produce an operating wavelength of about 50 - 100 metres (3 to 6MHz).

The bottom end is pointed and the top flat with a vague acorn shape. The contacts are around the central rim, three pins on one side and two on the other. The 955 is not too difficult to obtain, but prices range from about 25 pence up to £5. P M Components, Selectron House, Springhead Enterprise Park, Springhead Road, Gravesend, Kent DA11 8HD advertise these valves at a very modest cost.

Fig. 1: Circuit diagram of the Acorn One.

![Circuit diagram of the Acorn One.](image)

**Components**

Before describing the construction, a few words on each of the components is necessary.

**V1 - Acorn valve 955.** This is an attractive little valve is about the size of a pound coin. Suitable for the beginner because, although a valve set, it does not use any dangerous voltages. The theoretical diagram is shown in Fig. 1 and appears relatively simple. A casual glance might give the impression that because of lack of an antenna coupling

**Components**

The bottom end is pointed and the top flat with a vague acorn shape. The contacts are around the central rim, three pins on one side and two on the other. The 955 is not too difficult to obtain, but prices range from about 25 pence up to £5. PM Components, Selectron House, Springhead Enterprise Park, Springhead Road, Gravesend, Kent DA11 8HD advertise these valves at a very modest cost.

The holders are in the form of a ceramic ring with contacts around the edge into which the valve is pushed. They are very hard to obtain nowadays, but it is not too difficult to produce a home made one as shown in Fig. 2. Take a square or round piece of wood about 12mm thick and drill a hole in the centre (to take the pointed end of the valve). Place the valve in the hole and screw double solder tags around the rim, the inner tags pressing down on top of the valve pins. The electrical characteristics of the 955 are as follows:

- **Heater voltage 6.3V**
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- **Anode voltage 180V**

Although the anode voltage specification is 180 volts, I found that the performance was rather better with only 27 volts which, as well as being easier to obtain, is safe.

**C1 - Antenna trimming capacitor (5-22pF).** This is a small air-spaced variable capacitor once quite common in valve equipment. They are often available at low cost from firms who deal with surplus electrical components. They are also still in production and can be obtained from the big components specialists, but at a greater cost. The value is not too critical and anything up to about 50pF is satisfactory.

**C2 - Main tuning capacitor (0-160pF).** A large and more substantial capacitor. The one I used was an ex-equipment transmitter tuning capacitor which was obtained from Bull Electrical at a very low cost. As with C3 a current production one could be used, but again this is far more expensive.

**C3 - Grid capacitor (50pF).** This is a vintage baseboard.

Continued on page 28
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mounting capacitor. A modern 47pF capacitor will work just as well and it is not too difficult to make a reproduction baseboard-mounted type by concealing a modern component inside a small wooden or plastics box.

**C4 - Decoupling capacitor (5nF)**. As for C3, apart from the value of course.

**R1 - Grid leak resistor (2.2MΩ)**. I used a modern one watt resistor for this. It is supported by its own wires across solder tags projecting from the grid capacitor terminals. The one watt type was used simply because it is physically large. A smaller wattage type will work just as well.

**R2 - Reaction control (50kΩ linear potentiometer)**. A current production component.

**L1 - Grid coil**. Home-made - See text.

**L2 - Reaction coil**. Home-made - See text.

**L3 - Reaction choke**. Home-made - See text.

**Miscellaneous**

- Wooden baseboard: 280 x 150mm
- Plywood front panel: 280 x 150mm
- Aluminium sheet: 280 x 150mm
- Sheet of veneer of your choice: 280 x 150mm
- One slow motion vernier dial: Main tuning control
- Two control knobs: Reaction and antenna trimmer controls
- Piece of wood or plastics: 280 x 50mm
- Piece of plastics tube: 50mm long x 28mm diameter
- Small quantity of aluminium sheet: For brackets, see text
- Small piece of Paxolin or plastic: See text
- One standard jack socket: For Headphones
- Five rubber tap washers 25mm: See text
- Four rubber tap washers 19mm: See text
- Small quantity of testmeter lead wires: See text (Maplin Extra-Flexible Wire)
- Quantity of thick/bare copper wire: For wiring, see text
- Bobbin of 34 s.w.g. enamelled wire: See text
- Nuts & Bolts, wood screws various: General construction
- One standard jack socket: See text
- Quantity of solder tags: See text

The power supply requirements are covered in the text.

This list of components may seem quite a lot for a single valve receiver, but most of them are inexpensive. In fact, in the prototype the highest cost went to the vernier tuning dial. Everything else cost less than a pound, including the valve, which I picked up at a car boot sale for 25 pence.

In order to get good results from the receiver a pair of high impedance headphones is most suitable. Unfortunately they are neither cheap or common these days. A cheap, suitable adapter for low resistance headphones is suggested in the article.

**Headphones**. Ideally high resistance types of 2kΩ or 4kΩ impedance should be used. If you do not have them, you can make a simple matching transformer from an output transformer taken from an old radio. The low resistance windings go to the headphones and the high resistance windings to a jack socket which is plugged into the headphone jack on the set. A small 6.3 volt mains transformer could also be used in this rôle.

**Coil and Choke Construction**

First I will deal with the grid and reaction coils shown in Figs. 3a. These are both wound on a 28mm diameter plastics tube about 60mm long. This tube was the centre of a telex paper roll, but any similar tube will do. Plastics pill bottles or lengths of plastics piping from DIY stores can also be used. The 28mm diameter is not critical, but any change will affect the frequency band slightly. I made a break with tradition when choosing the type of wire with which to wind these two coils, I used insulated, standard testmeter wire, black for the grid coil and red for the reaction coil. First of all I drilled a small hole 'a' and bolted two small solder tags to the former, their tails pointed in opposite directions. To the back solder tag I soldered one end of the reaction coil and wound seven turns of wire onto the former winding the wire towards me as shown in Fig. 3a. At the seventh turn I marked where to drill the fixing hole and then unwound the coil and inserted a small nut and bolt with two more solder tags in position 'b'. I wound the coil on again, cut it off exactly the correct length and soldered it to tag 'b'. Next I drilled a hole in the former for the two tags at the start of the grid coil, 'c'. Although, in Fig. 3a, 'b' and 'c' are shown next to each other, I found it necessary in practice to have 'c' below 'b' in order to get the 2.5mm spacing between the coils. If the two
coils are too far apart, feedback or reaction will not be obtained, so this is most important. The grid coil is also seven turns wound in the same direction and terminating at ‘d’. It should be noted that the coils are wound exactly in the same manner shown and the terminals connected correctly. A reversal of either coil in the circuit would prevent reaction being obtained.

The coil is fixed down by two woodscrews driven through the ends of the former. Two nuts under the former act as spacing from the baseboard.

If you wish to receive a higher frequency band put less turns on the grid coil and for a lower frequency band more turns. The reaction coil and the spacing between them remains the same.

I wound the reaction choke on a ribbed former made up from tap washers. Four 19mm washers were glued between five 25mm washers using Superglue. This produced a former 35mm long as shown in Fig. 3b with four slots for the windings and the large washers ‘a’ on the ends. The actual winding was quite simple. Using 24 s.w.g. wire I wound 40 turns into each slot making a total of 160 turns on the choke. To get from one slot to the next I just carried the wire across the intervening washer. For a base I cut an oblong of Paxolin ‘b’ and countersunk nuts and bolts together with their solder tags ‘d’ and ‘e’ at the ends. Each end of the choke windings were then soldered to these tags. Because the baseboard of the receiver is sheathed in aluminium it was necessary to cover up the countersunk heads of the connections with another piece of Paxolin ‘c’ glued underneath. The choke itself is glued to the top of the base with epoxy resin. Two bolt heads can be seen at either end of the choke. These are merely to make it look better. They do not pass through the choke. They are sawn off bolt heads just stuck on. Two vertical fixing holes were then drilled through the base for fixing. It does not matter which way the choke is connected.

Because the three controls are mounted on the main board, there is no need to put the front panel on until the set is working.

The 280 x 50mm terminal panel was then prepared. At the left-hand side, four holes were drilled to take the four power leads, l.t.-, h.t.-, l.t.+ and h.t.+ below the l.t.+ and h.t.+ holes, two bent-over solder tags are bolted on. The power leads and the internal wiring are supported by these tags. As l.t.- and h.t.- go straight in through the holes and down to their own earthing tags on the baseboard, they have no need for supports on the terminal panel. A standard jack socket for the headphones and antenna and earth terminals (complete with solder tags on the back) are also fitted before the panel is screwed in position.

The three controls are supported by brackets clearly visible in Fig. 4. The reaction control bracket is a straightforward piece of bent aluminium. The main tuning capacitor C2 is mounted on a sub-chassis in order to have the control knob higher than the other two. It is important that the frame, which is connected to the moving vanes makes good electrical contact with the sub-chassis and the sub-chassis with the aluminium-covered baseboard.

The antenna trimmer bracket is slightly different. The angle bracket is of aluminium, and to this is bolted an insulated front section. This insulation is essential as neither side of the antenna trimmer, C1, is connected to earth and the frames of most variable capacitors are usually connected to the moving vanes.

When the three brackets are complete, the three controls are bolted in position on the baseboard. Finally, the remaining components are screwed in position. Note that
the lower glass ‘pip’ of the Acorn valve projects below the level of the holder base, so a hole must be drilled in the baseboard to accommodate this ‘pip’.

The solder tags on the screws holding the aluminium chassis down are earth points and must make good electrical contact with the aluminium covered baseboard.

All that remains is the wiring. I used heavy gauge bare copper wire for this. In order to obtain a neat appearance this wire had to be made perfectly straight. I cut several lengths about 600mm long from the spool of wire, placed one end in a vice and taking the other in a pair of heavy pliers gave a heave. This stretches the wire slightly and in doing so makes it perfectly straight. Lengths could then be cut off as required.

Figs. 4 to 6 show details of the wiring. The spacing is not very critical, as I discovered when sorting out the original design.

Many single-gang variable tuning capacitors such as C2 have four connections to the fixed vanes. These are for convenience and it is immaterial which one is used as they all go the same place in the end. I utilised the two back ones, leaving the other two unconnected.

**Suggested Wiring Sequence**

1. Centre pin of R2 down to the anode ‘a’ terminal on valve.
2. Grid pin ‘g’ on valve across to front terminal of C3.
3. Solder R1 across solder tags on C3.
4. Link heater ‘h’ and cathode ‘k’ on valve and link down to earth.
5. Terminal ‘a’ on L2 across to wire leading from centre pin of R2.
6. Terminal ‘b’ on L2 across to left hand pin on R2.
7. Terminal ‘c’ on L1 down to earth.
8. Terminal ‘d’ on L1 across to back terminal on C3.
9. Rear terminal of C3 across to fixed vanes C2.
10. Right-hand heater ‘h’ across to l.t. + tag on back panel.
11. Rear pin on phone jack to h.t. + tag on back panel.
12. Front pin on phone jack to back terminal on L3.
13. Connect front terminal L3 across to centre of wire joining terminal ‘b’ on L2 to left hand pin on R2.
15. Rear terminal of C4 across to the earth terminal on back panel.
16. Earth terminal on back panel down to earth.
17. Right-hand fixed vanes of C2 to left side of C1.
18. Right side of C1 to antenna terminal on back panel.

The wiring is now complete, but the flexible power leads must be connected through the holes on the back panel and down to the appropriate support tag.

**Power Supplies**

- **l.t. and l.t. +** Low voltage supply for valve heater. 6.3V a.c. or d.c. If a battery is used, 6V will be sufficient. A small mains transformer with a 6.3V secondary winding also provides a satisfactory supply. If this method is used be careful to insulate the 250V input terminal as this mains voltage can be lethal!

- **h.t. and h.t. +** High tension supply 27V obtained from three small PP3-type 9V batteries connected in series. The drain on the h.t. battery is only in the region of 1mA, so the set is quite economical to run.

**Testing**

Connect up the antenna and earth. I found that a wire, antenna a few metres long would work OK, but a longer one produced much better results. The earth was taken to a 300mm copper tube knocked into he ground under the window.

Plug in the headphones. Connect the l.t. supply and the valve should light up immediately. Connect the 27V h.t. supply.

With the reaction control at mid setting, move the tuning control around until you find a station. Advancing the reaction control should increase the volume and improve the selectivity until such a point is reached that the set oscillates. The reaction should then be backed off slightly. Careful adjustment of the antenna trimmer will help separate stations and increase performance. It is important to realise that all three controls should be used in conjunction with each other to get the best results. All three are very critical and the set is at its most sensitive just below the oscillation point. The strength of the signals is of a comfortable magnitude for headphones.

Listening in at various times of the day and night I have picked up broadcast stations in Europe, Russia, Spain and America. Morse and telex signals have been picked up from UK, Mediterranean, Norwegian and Spanish stations.

**Completion**

The front panel of the receiver is three-ply wood backed with an aluminium sheet. The aluminium is bolted to the plywood with countersunk screws. The front of the panel is covered in wood veneer. When drilling the holes for the control spindles it is essential that they are large enough for the spindles to pass through without touching the aluminium. The front panel is screwed on to the baseboard with countersunk wood screws. Screw the control knobs on. Finally link the aluminium backed front panel to the aluminium faced baseboard via solder tags at either side.

**Final Comments**

Despite the simplicity of the circuit, the building of a set like this gives the builder a very real sense of achievement. The physical engineering of it makes a welcome change from soldering tiny components into a small p.c.b. and the construction of major components such as the coils gives a great satisfaction. Whilst bringing back to useful life valves and components which may be more than half a century old is very commendable in itself.

There are two fairly large gaps in the physical layout. Behind the main tuning capacitor and behind the antenna trimmer. These were left on purpose for the time when I add further valve stages turning the Acorn One into an Acorn Two and finally an Acorn Three.
Although there’s nothing new under the sun

It may be only six years to the end of the century (and that gives you pause for thought), but radio waves are still propagated by the same methods as always, and the trick is to receive them with as little interference as possible. Much of the noise we hear on signals these days is picked up locally from noise radiated by the ac mains wiring of the house, and I have been doing a lot of research into how this noise can be eliminated from the aerial system.

Since I really believe that there is nothing new under the sun, I finally got down to some original work on “anti-interference aerials” carried out by KB Radio and others in the 1930’s. By developing those ideas and by application of modern materials we (that is, John Thorpe and I) have come up with a new wire aerial system for the short wave listener, which we have called the “WireMatch”. It comes as a complete ready-to-erect wire aerial, with matching transformers, coax cable, plugs and aerial wire and the only thing we couldn’t include was an earth spike, simply because if you have a dog like mine who waits by the door for the mail, you wouldn’t want him speared to the floor by a 4 foot metal rod coming through the letter box. (In other words, we can’t ship a metal rod). The results using this aerial are outstanding, because for the first time you can have total earth isolation from the ac mains supply which removes all the electrical noise normally coming in by this route.

No – I can’t show you a picture of it because there’s no excitement in a picture of a straight piece of wire, but for detailed information, just send a couple of first class stamps to me at the address below and ask for the John Wilson “WireMatch” leaflet (No. 3 in a series). However, I do have pictures of some of my other products, so take another look at the HF-150 and PR-150, two world class products from the brain of John Thorpe. Some folk say they are plain, but we put our money into performance and ease of use, not into useless “gimmicks”. The real listener will know what we have done, and it is the real listeners who are enthusing over our receivers. Take a look, take a listen and you will hear the difference.

**John Wilson**

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By the way; I am still looking for my SX-117 receiver which I traded in to Bill Lowe in 1965. If anyone out there has it, or any other SX series receivers, let me know – I have a nostalgia for this period. I’m also happy to come and talk to your club about receivers and their development over the years.

Send 4 first class stamps to cover postage and we will send your FREE copy of “The Listener’s Guide”, our ever-popular aid to LF, MF and HF listening. Ask for my leaflets (No1) “ATU or Preselector”, (No2) “What makes a Lowe receiver so good”, and the new (No3) “WireMatch Aerial” leaflet and we will include them in the pack.

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**34 SHORT WAVE MAGAZINE, JANUARY 1994**
As a young lad I was always cricket mad (and still am!) and used to follow the fortunes of my county and country. My dreams used to be of a player hitting a triple century and how he would feel after doing so; that is 300 runs in a single innings. Somehow, when I got interested in amateur radio these same cricketing thoughts transferred themselves to my new hobby. I wonder why!

As an active s.w.l. I started 'collecting' all the countries I heard on the amateur bands. Soon, I had heard 100 countries. I then dreamed of hearing 300 countries on the amateur bands just like a cricketer dreaming of scoring 300 runs! Hearing 300 countries was going to be a challenge and I knew it would take time. In fact, it took some 20 years but that was on all amateur bands.

I then set my sights on getting 300 countries on 40 metres s.s.b. I have always enjoyed the challenge of this band. Conditions can be very variable from day to day so to me this is interesting and in turn a challenge to hear those 300 countries.

I said to myself, "If the great Sir Leonard Hutton can get 300 runs from England, I can get 300 countries on 40 metres s.s.b." So the hard slog started in earnest. It must be said that it is easier to hear DX stations on 40m than it used to be. Some five years ago that was a lot of interference from broadcasting station on this band now it is mostly free of this QRM. Long may it reign!

So, what is needed to hear all these countries? Well, initially you need lots of patience! Obviously a good receiver is a must which must be selective. By that I mean some good filtering as the noise level on this band can sometimes be horrendous. Then a keen pair of ears of course! Knowledge of the band is useful as you will know when and where the DX stations operate. So, by picking the right times I gradually heard the new countries and up went my country score.

Two hundred countries was not really too difficult as I was fortunate to hear 200 countries in one year quite recently. But 300 countries was going to be much harder. Much dedication and a certain amount of luck gradually got me the countries I needed. So, by the year 1992 and after 30 years of monitoring 40 metres s.s.b., I finally made it.

I said luck sometimes comes into is and this happened when I heard country 300. I had been entertaining that evening and it was well past midnight when our last guest departed. After tidying up before bed, I decided to take one quick listen on 40m. It was about 2345UTC and someone was talking about the Bangladesh operation by the Hungarian team. That was a country I needed and it was as if by magic they appeared on the band just then. It was only a short session and they only operated for 20 minutes or so. But in that time I had them logged and that was it.

As a matter of interest I would like to know of any s.w.l. or even any amateurs who have heard/worked 300 countries or more on 40 metres s.s.b.

So what do I do now? Well, there is always 80 metres to tackle. Who knows, in a few years time we might be getting the good conditions on that band again.

Presently, I am just waiting for three more countries on 40m to get the 300 confirmed. Hopefully, that won't be too long.

I hope that these few lines have been of some interest to s.w.l.s as well as radio amateurs. For antennas I have always used wire arrangement usually of the dipole variety. My present receiver is the Kenwood R-820. Prior to that I had the all valve Trio JR310 for about 15 years and that netted me around 250 countries.

See you on 40 metres everybody!
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My life in the RTTY scene

When I was in the RAF, just after the balloons were made obsolete, I used to go into the teleprinter room to watch the antics of the great machines. I was fascinated with the mode but never thought that one day I would be able to operate my own. The machines were an outstanding example of engineering in that they seldom gave trouble in spite of their enormous complexity and they did an exceptional amount of traffic handling on account of their freedom from interception by the enemy. The W/T cabin was acting as back up in case of failure but I cannot recall if it was ever used in this mode and probably coded messages were actually telephoned as being the quickest alternative.

I duly obtained my ham ticket in '47 and spent the early years happily enough among the surplus gear and wasn't really aware of the RTTY fraternity until it started to grow and advertise in the magazines. I soon found out that there were ex-RAF teleprinters on the market, but by this time I had become a family man in a small house and a large overdraft. Time passed and the possibility of having my own machine arrived so I waded into the job of building a terminal unit - this is the thing needed to connect your teleprinter to the rig. It was a slow job in view of the other attractions which were being pursued at the time, namely s.s.b., mobile operation and v.h.f. working and... I could go on. Before I knew what had happened, amateur radio reached the point where solid state design had rendered the clattering machines of the 40s so much scrap metal. It was absolutely cataclysmic and something like telling a man who had just sunk his savings into a private aeroplane that he could fit a brand new gadget to his feet and fly to Blackpool just for a look at the 'lights'.

After due consideration (although I'd decided anyway) I acquired a new RTTY black box and was soon calling CQ in the approved band segment. I have to say that I wasn't as excited as I though I would be and think I know why. It wasn't the fact that RTTY is so prone to QRM or the fact that I'm a lousy typist, no, it's because the banging and thumping of the old machines is missing. The eerie way that they spring into life, quietly at first with a tick tick tick and then the paper roller shifts up and the callsigns start to come through. It is something like one of those elaborate train sets. You bend over the opening where the paper is starting to jerk out and you stare at the printing head hammering its message. Every now and then it halts as the operator at the other end consults his notes or whatever, then the machine sort of stands clicking its heels patiently. With a rumble, it's off again until the message is finished and you can tear it out for a close read leaving the monster to hum sinisterly to itself.

Yes, that's what's wrong with modern RTTY, it's just too quiet and it's no good saying you can add a simulated RTTY noise box because its not just the noise, its the smell of oil and paper and the sight of that great heap of working metal with its spindles, bell cranks, half shafts, ferris tangs, banjo cleats, jumper wheels, harp thrusts, etc., to all obeying your every whim.

Come to think of it, isn't this philosophy behind the chaps who are mad about Morse pump handle keys? Anyway, after a very short acquaintance I got rid without regrets and now I'm trying to figure out a way of reviving my interest in DX - perhaps with a pedal-operated generator.

John Worthington GW3COI reminisces of the days when the smell of the equipment was just as important as its performance.
During the last year or two, I have received an increasing number of pictures, submitted for inclusion in 'Info in Orbit', many being of very good quality. The column regularly includes three or four pictures taken by correspondents, which are often used to illustrate points in the text. Some are photographs of the computer screen, taken after image enhancement. Others are print-outs from either laser or dot-matrix printers.

So many pictures have been received that, after bending the Editor's arm a little, I have prepared this extra article to accompany a special batch of images. Some names here are from regular correspondents, but the absence of a name does not imply that pictures received were not considered good enough! This is just a sample of many that have been waiting for possible space in SWM! Do send in your contributions - who knows - this might happen again!

Mike Robinson of Accrington has used his RIG Proscan receiver and software to monitor the polar orbiters, and has sent some large format pictures for the column. Fig. 1 is from NOAA 12 and shows a thunderstorm over the northern Pennines. Mike comments on the occasional problems experienced when converting the highly detailed screen image to a final hard copy.

Direct reading of an image file cannot always be accomplished by editing software - for example, PROsatll files cannot be read by the Windows Paintbrush program! Fortunately there are other options. Within PROsatll one can first convert the image to PCX format; this is readable by several image processing programs.

Micheal Smith of Sherborne, uses a Martelec MSR 20 WXSAT receiver feeding a 286 PC running PROsatll under DRDOS-6. Micheal sent me a NOAA 10 image - see Fig. 2 - obtained at 0835UTC on 27 July 1993. He used the gridding facility, and points out two features: a dust storm is visible near the Sahara, but does not show up on the infra-red image, and secondly, sun glint in which the reflection of the sun, and cloud shadows can be seen around Italy, caught by the sensors.

Stephen Lowe of Billingshurst set up his WXSAT station using his Proscan receiver and MegaNOAA software. Stephen recorded this image of NOAA 13 (which has since apparently failed) on 15 August during the approach of yet another fast moving depression - see Fig. 3. This print-out, like several others shown here, was done on a laser printer in large format.

Quentin Hordle of Poole was one of the first WXSAT monitors to spot the transmissions from NOAA 13, and he is one of several people who sent me an image or two. His is rather different! Fig. 4 is a NOAA 13 picture taken on 11 August 1993, showing the east coast of America! I am fairly certain that direct pictures from NOAA 13 cannot be received in Poole whilst the WXSAT is over America, yet this image does not look like a FAX image that might have been transmitted in the h.f. band.

Mark Pepper of Camberley uses a combination of hardware - a RIG down-converter, a TH2 loop Yagi, and Timestep or JVFAX software to produce some of his METEOSAT images. By manipulating his pictures with proprietary image processing software he has enhanced his results and regularly sends me...
some extremely impressive print-outs.

**Fig. 5** is a D2 (thermal) METEOSAT-4 image, showing the Mediterranean Sea in mid-March 1993. Whether from the NOAA5s, METEORs or METEOSAT, thermal images reveal temperature profiles, normally using the format where black is warm and white is cold. CIS METEORs use the reverse format. In this picture, the darker sea is seen to be warmer than the lighter land, as one would expect at 0630UTC. Britain is seen facing an approaching weather front, a feature that typified summer 1993.

Mark also recorded the new METEOSAT GMS images that are obtained by the Japanese geostationary WXSAT GMS-4, then re-transmitted by METEOSAT-4, four times per day. Mark edited them to create a composite image - see Fig. 6 dated 16 August 1993.

GMS is positioned near Australia. These images resolve fewer details than normal METEOSAT images due to transmission time restrictions which limit the picture resolution. This composite image shows much storm activity.

**Jim and Hilda Richardson** of Fife, have been enjoying collecting images from the different WXSATs, using a loft-mounted antenna, and the PC-GOES program. From several prints I have selected a METEOR 3-4 image timed at 1140UTC on 10 February 1993 - see Fig. 7. It illustrates the different spectral sensitivities of the image sensors on-board METEOR and NOAA WXSATs. NOAA sensors show land very well, but the METEORs need image enhancement to reveal all the data that is present. When suitably enhanced, they actually show greater land detail than the NOAA5s as they only transmit one spectral band while the NOAA5s transmit two (in the a.p.t. format).

**Brian Dudman** of Harrow has been a regular contributor of pictures and monitoring notes and sent me, amongst several others, a picture from METEOR 2-19 taken at the end of winter 1991 - see Fig. 8. It shows the WXSAT descending over North Cape (top of Lapland).

**Roger Ray** of Telford has sent several batches of photographs taken with his extensive WXSAT receiving system. Selecting one or two images from a dozen impressive photographs is not easy! **Fig. 9** shows the METEOSAT-4 whole-disc visible-light image recorded on 12 April 1993. Roger has also used an image enhancing and editing program to add captions. **Fig. 10** is a NOAA 11 image from 18 July 1993, showing both Italy and Greece, with surrounding countries. It shows the amount of detail revealed by the NOAA5s - Mount Etna in Sicily being unusually clear from cloud.

This has been a small selection of many pictures received from correspondents to ‘Info in Orbit’; many more await an opportunity for publication. My thanks to all correspondents.
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When I first became interested in short wave, I was fascinated with the idea that propagation was effected by the 11-year sunspot cycle,” wrote David Edwardson (Wallsend). He wonders if sunspot activity has any influence over the earth's weather. This is a big subject David and requires a great deal of research from many sources of archive material. However, in my opinion, they do and I base this on the period from 1968 to 1984 when my solar radio telescope made daily observations of the sun. I noted many times that when there was a violent solar storm, associated with a large sunspot group, somewhere on this planet a major weather event was reported by the media. When you think about it, if some of the complex rays from a solar disturbance can upset the ionosphere and the earth's magnetic field, why can't others, perhaps still unknown, create havoc in the troposphere? Something for you to think about after your Christmas pud, p! Season's greetings to you all.

Solar

During September, Ron Livesey (Edinburgh) using a 2.5in refractor and a 4.0in projection screen found two active areas on the sun's disc on the 27th. From their respective 2.5in refractor and a 4.0in projection screen found two active areas on the sun's disc and a 4.0in projection screen found (Edinburgh) using a 2.5in refractor (Maldon), Ted Waring, Em Warwick (Plymouth) and Ford White, for their 28MHz beacon logs from which I compiled the chart seen in Fig. 3. “Signals seem to emerge from the mush and a quarter of an hour later submerge for the rest of the day,” remarked Ian. Ern told me that he found the South African beacons ZS6PW and ZS1J on 28.166MHz and 26.202MHz respectively. Ern and Henry reported strong signals from EA3JA on October 11 and 15. Judging from the chart (Fig. 3) there was a marked increase in ‘local’ beacon activity from October 7 onwards.

Magnetic

The various magnetometers used by John Fletcher (Tuffley), Tony Jackson (Birkenhead) and the German station WDR1 between 102 and 107MHz. George Garden (Edinburgh) was pleased to hear the test-transmissions from the new Classic FM transmitter in Angus, near Dundee. Although George lives beyond its predicted range, all the signal I.d.s. on his receiver were illuminated just using the set's own rod antenna. He tells me that the station is due to open on November 10. (It did - Ed.) More detailed information about the atmospheric pressure for the period September 26 to October 25 and the tropo-opening, referred to by Andrew Jackson, can be seen in my television column elsewhere in this issue.

Fig. 3: 14MHz beacon chart.

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Fig. 1: Sunspot drawing from Patrick Moore, 1305 on 7 October 1993.

Fig. 2: Sunspot drawing from Patrick Moore, 0905 on 21 October 1993.
The sad royal rehearsal was the newspaper caption for an item concerning an ITN rehearsal for the Queen Mother’s death back in the summer that I reported several columns ago, the BBC having called off their dry run for her death some weeks prior to the ITN event.

Late October a phone call from a ‘media contact’ advised that another royal obituary rehearsal was to take place on or about 7 November. The rehearsal did take place and involved satellite hook-ups, live links and interviews and was extremely realistic. An Australian VTR engineer at Sky (funtold of the rehearsal) happened across the programme, thinking the QM had, in fact, deposed the folks back home who in turn contacted the local radio station with ‘scoop news’ that it, and others, broadcast. The networks picked up the story, though I, and others, eventually found the exclusive news incorrect. By that time government switchboards were jammed with the growing population seeking more information! Sky sacked the engineer. Perhaps in future such dry runs should have a superimposed caption to make the situation clear!

Ian Woller (Lincoln) operates both C and Ku band equipment and has seen Sky News carried in its entirety (i.e. the same as Astra) on Intelsat 402, and from there it’s feed directly to the growing population seeking more information! Sky sacked the engineer. Perhaps in future such dry runs should have a superimposed caption to make the situation clear!

One such Ku band enthusiast is Andrew Sykes (Halifax) who uses a WTN news jammed summer that downlink Big Breakfast on check out daily for the Channel 4 25°E can be seen checked out this sighting and sure (4.010GHz) somehow due to a fault International bleedthrough from the Canal France Intelsat several Pace 9200 dishes needed available equipment and the large enthusiasm afternoons. Interesting that Haiti has interruptions for the Reuters and both C and Ku band equipment and engineer. Perhaps in population government news eventually checked through to the UK and picked contact with the QM had, in fact, deceased rang the across the programme, thinking the

Late October a ‘phone call from a ‘media contact’ advised that another royal obituary rehearsal was to take place on or about 7 November. The rehearsal did take place and involved satellite hook-ups, live links and interviews and was extremely realistic. An Australian VTR engineer at Sky (funtold of the rehearsal) happened across the programme, thinking the QM had, in fact, deposed the folks back home who in turn contacted the local radio station with ‘scoop news’ that it, and others, broadcast. The networks picked up the story, though I, and others, eventually found the exclusive news incorrect. By that time government switchboards were jammed with the growing population seeking more information! Sky sacked the engineer. Perhaps in future such dry runs should have a superimposed caption to make the situation clear!

One such Ku band enthusiast is Andrew Sykes (Halifax) who uses a wall mounted 800mm dish with Face 9200 IRD. Andrew reports several interesting loggings, on Intelsat 601 27°W, there is bleedthrough from the Canal France International C Band feed (4.010GHz) somehow due to a fault condition getting into the old CNNI transponder at 11.155GHz. I checked out this sighting and sure enough at the African service of CNNI can be seen, though somewhat sparkly, in locking SECAM colour. Autumn brings the leaves down to earth and at last Eutelsat I F7 25°E can be seen at my home, check out daily for the Channel 4 Big Breakfast on this break, the downlink feed to the presentation studio for inclusion into the programme make-up, the receiving dish itself can often be seen through the french windows! During the daytime, numerous horse racing circuits are carried back to the bookies channel on this bird.

Dutch reader Berry Habeckotte (Kampen) has just installed a Triax dish atop his 11m high tower giving a look angle down to the horizon East and West. A recent catch was the Albanian SS4 test card on 16.1197GHz vertical, (RTSM TV SHUQIPTR) with clock, captions suggesting RTSH possibly going onto satellite, November 14 being mentioned. Berry has heard that Astra 1A has been suffering overheating problems with certain transponders backing off, power output, MTV, Sky News, Sky One and RTL being weaker (more sparkles) than earlier.

Exotic reception by John Locker (Werrall) when on Eutelsat II F1 13°E was seen Ten-Ty Sydney Master Control advising a news feed, very unusual for an Australian signal to appear on a Pan-European beam. The Asian Broadcasting Union carries Far Eastern sourced signals during their daily news feed completion across Europe, this a second hop, the first being C Band from Asia back into Europe and then Eutelsat for domestic pan-European coverage. Origination centre for distribution is Kuala Lumpur, Malaysia, the package is preceded by the SS44 card appropriately identified.

A reader’s report says that the Irish Satanta Sports programme weekend evenings formerly on the now defunct Olympus 18°W can be found on Telecom 1C - 3°E - Sunday evenings from 1900 at 12.065GHz vertical. Nickolas Earley (Australia) has written confirming that the new Intelsat 701 is now settling down over the Pacific at 174°E to cover Pacific Basin communications. With a payload of both C and Ku band transponders Nicholas is preparing his system to receive SS (Ku) band in anticipation of more signals with a much smaller dish than is the norm for the region - any DX is on received on large C Band systems which by cost and visual impact narrows those participating to a few.

On an educational theme, Barclays Life are acting as sponsors for the ‘Jason Project’ and John sent down material relating to this expedition that may well present exciting viewing for readers. Jason is the brainchild of Dr. Robert Ballard (of Titanic and Bismarck fame) to promote more excitement and involvement in science education Robert initiated the Jason project that brings classroom into contact with the World via modern communication in exploration and involvement with nature and science, travelling to remote parts of the World.

For two weeks in early March 1994 an expedition into Central America (Belize) will satellite link back into classrooms across Europe live pictures and sound. ‘Planet Earth’ will transmit 28 February - 12 March and study the ‘health of the earth and the effect of people on the environment’. I’m hoping to confirm the satellite and frequency(ies) being used for the American-Europe feed in time to advise readers and hopefully view the proceedings. The publicly blurb confirms that live interactive broadcasts are transmitted to and from a specially prepared international network of studio locations.

The last expedition that involved satellite transmission used digital coding, hopefully the early 94 project will opt for traditional analogue to embrace more educational establishments in the expedition. If you are involved in education and require more information, write to ‘Jason Project’, Barclays Life, the Pinnacle, 8 Bedford Park, Croydon CR9 2XS

**Orbital News**

Eutelsat confirm that their ‘Hot Bird’ Plus is now going for launch during Summer 1994 and slotting at 13°E. This will offer 20 dedicated TV transponders to the existing complement of 23 transponders from messers Eutelsat II F1 and October ‘94 launching II F6. With digital compression just over the horizon the potential of many TV channels is enormous though services will undoubtedly duplicated for some years. By the time these lines are read, Eutelsat II F5 should be in orbit slotting 36°E running 15 transponders in Ku band. This will open up more potential for an improved DX window. And Eutelsat I F1, now parked at 25°E, will shortly move to either 36° or hopefully 50°E to improve European access into the Middle East and the Russians.

Hot rivalry now between newly launched satellite channel TMC - Tele Monte Carlo and the RTL network. With Canal Plus backing TMC so CLT (backers of the RTL group)has wheeled out the big guns in the battle for high viewing figures and market domination. Line up against the might of Canal Plus are the skills and experience of the RTL-TV, RTL+4, RTL-2 and 5. May the best man win...
During the Cold War, listening to the short wave broadcast bands in Europe could be hard work and at times downright unpleasant. Jamming was widespread, rendering numbers of frequencies unlistenable. Much of that jamming was directed from the Soviet Union and its satellite East European states against Radio Free Europe and Radio Liberty. RFE and RL operated from Munich, as US government stations, with the aim of providing the type of radio that it was believed people living under the hammer and sickle would want if they were free.

Until 1971, the stations were funded directly by the CIA and may have been used to try to destabilise the regimes in the former Soviet empire. Despite its quiet location in a Munich suburb, a bomb exploded in the station's car park in the 1980s, presumably planted by KGB agents. Penetration by the KGB was always a worry, fears that were confirmed when a senior member of the Russian service defected to the Soviet Union.

As the Cold War ended, the jamming stopped. This freed up hundreds of frequencies used by the two stations, and those either and Radio Free Afghanistan, which emigrated from the Munich headquarters of RFE/RL, stopped broadcasting. To save money, the Czech and Polish services will move from Munich to Prague and Warsaw respectively. Hours and staff in other services will be cut.

While the axe falls on several services, brand new services to the former Yugoslavia and Albania will be started by RFE. This seems to go against the ethos of cutting back, particularly since the engineering division of RFE/RL will be merged with the Voice of America's, and VOA already broadcasts to Serbia, Croatia and Albania.

What will happen to the frequencies that RFE/RL will undoubtedly relinquish, and to its huge transmission capability? Only time will tell, as the pattern of international broadcasting continues to change.

Radio Netherlands is going through a period of change. A review of the station's operations was undertaken and the effectiveness of its £28 million budget was examined. It seems that the report suggests that the station should concentrate more resources on serving audiences in Europe, particularly by English language broadcasts. Several languages might be cut back and the money saved ploughed into new areas of priority operation. A further study is underway, looking at possible reorganisation, and that is expected to be released in April 1994.

English language programmes at present can be heard beamed towards Europe at:

- 2030-1025 on Sundays on 5.955MHz
- 11:30-1225 on 9.65 & 5.955MHz
- 1530-1625 on Sundays on 5.955MHz.
- to Africa at 1730-1930 on 21.59,
- 21.515, 9.605 & 6.02MHz; (all from the station's relays in Bonaire and Madagascar)
- and from 1300 to 2025 on 21.59 & 17.805MHz.

Swiss Radio International has announced that it plans to devote more resources to satellite broadcasting within Europe, delivered via Astra. A new schedule will be introduced in April 1994 that will incorporate some of the changes that are being heard on the station's English service now. As well as transmissions via Astra on transponder B, English can be heard on short wave at 0500 and 0600 Monday to Friday on 6.165 & 3.985MHz; 0700 daily on 6.165 & 3.985MHz; and at 1100 on 5.935 & 6.165MHz.

Radio France International has inaugurated a new number of transmitters and a revolutionary antenna at its site at Allouis-Issodun outside Paris. RFI has worked with transmitter manufacturers Thomson-CSF to reequip the station in a revolutionary style. Instead of a central transmitter hall with several high-powered short wave transmitters, linked by lengthy feeders to the antennas, the Allouis-Issodun site is having five 500kW senders dispersed around the site. Each transmitter is built in an underground bunker, and almost immediately above is the transmitters own rotatable curtain antenna.

This concept is claimed by the manufacturers to be more ecologically sound, with less concentrated r.f. than is common with a conventional site, where all the transmitters are located in one central building. The curtain arrays can be configured in a few seconds with a different azimuth bearing and, if needed, radiation pattern.

The five transmitters will come on stream in the next twelve months or so, and then RFI will boast perhaps the most modern, and flexible, transmitter sites in the world. RFI can be heard with English to Europe at:

- 1230UTC on 21.645, 15.155, 11.67 & 7.95 MHz
- 1400UTC on 17.65 & 12.035MHz
- 1600UTC on 17.85, 17.795, 17.62, 11.975, 11.705 & 16.75MHz.

Radio Yugoslavia in Belgrade has added four new language services: Albanian, Bulgarian, Greek and Hungarian. The station already broadcasts in Arabic, English, French, German, Russian, Spanish and Serbian. Radio Budapest from Hungary has added two half-hour programmes in Ukrainian on Wednesday and Saturday, and plans to increase the broadcasts to seven days a week in the future.

Radio Ukraine International in Kiev continues to benefit from many former Soviet transmitter sites on its territory and seems to have the cash to keep the transmitters on the air. English can be heard at:


Both broadcasts last one hour.

Digital Audio Broadcasting (DAB) continues to be talked of as the radio of the future. The Finnish Broadcasting Corporation, YLE, has announced that it intends to start testing DAB in 1995. The BBC is transmitting a full service from four transmitters in the London area, operating at 225MHz. The transmitters are located at Crystal Palace - a 10kW transmitter - Alexandra Palace, Wrotham and Redhill - all 1kW. The Dutch have begun a twelve-month test in the city of Haarlem and Hilversum with 1kW and 30W respectively. DAB delivers CD quality sound to radio receivers and a comprehensive network of transmitters could be on the air across Europe by 1997.
First let me wish you all a Merry Christmas, a prosperous New Year and thank you for your letters and the support that you have given my DXTV and Propagation columns throughout the past year. Let's hope that 1994 produces a few more tropospheric openings like the ones that upset Bands III, IV and V between 25 October and 2 November.

Such events also played havoc with the IBA transmissions in Band III (175-230MHz) back in the days of 405-line television. Customers found it hard to understand why their BBC pictures, in Band III, were clear and their IBA transmissions upset by sporadic-E while the Independent network was clear.

405-Alive

Although 405-line transmissions ended in the UK in 1965, there are many collectors and vintage television enthusiasts who still keep the subject alive. Toward the end of the 1940s, I remember installing single-channel 225mm (8in) 405-line receivers and advising customers to have a 'dim' light on in the room while viewing and warning them about a variety of interferences that might spoil their evenings entertainment. Around that time, the BBC transmitted a trade test-card for about two hours in the morning, an hour's programme in the afternoon and 1.5 hours (2030-2200) each evening. A 'big' step forward came on Fridays when they began at 2000 with a 30 minute news reel. It was common to hear people saying, "Friday night is newsreel night".

I was reminded of all this when I met fellow columnist Andy Emmerson, the editor and publisher of the magazine 405 Alive that recalls the golden years of black and white television. A good number of people enjoy collecting and restoring 405 receivers and

Andy's magazine is there to assist them. At present he has around 260 international subscribers. The fee is currently £13 per annum for which four magazines are supplied during the year. Each one is A5 size and is packed tight with articles and readers' letters on all aspects of the subject. In addition, several pages are devoted to 'Market Place' where televisions and associated equipment are listed for sale or wanted.

Readers' letters are important to all concerned, because they raise common problems that can be jointly discussed and probably answered by fellow subscribers who have maintained such sets in the past.

In my view, any sort of enthusiast is wise to join a specialist group, like 405-Alive, to reap the benefit of the pooled knowledge of like-minded people. A specimen copy of the magazine (£2.50) is available from Andy, at 71 Falcutt Way, Northampton NN2 8PH.

Take Care

If any of you obtain an elderly 405-line television, please take great care, especially if you have no experience with this type of radio engineering.

Beware of high voltages and metal work. In addition, keep clear of the very high voltages around the rectifier and the valve holders, the line time-base and the extra high tension (e.h.t.) around the e.h.t. transformer and connections to the cathode ray tube. Your safety must come first, so, if you are unsure about these points do ask a qualified engineer to check it and advise you accordingly.

Before switching-on, remove the chassis from the cabinet, take great care if you handle the cathode ray tube (c.r.t.), because it may be 'soft' (air inside caused by a crack in the glass) and the glass suddenly shatter. In any case, make sure the tube is well supported while its screen is out of the cabinet frame and/or rubber mask. Check the mains lead for perished insulation, be sure that both poles on the double-pole on/off switch are working and that the polarity of the mains lead is correct. See that any internal fuses are of the recommended electrical size and type. (Some sets have anti-surge fuses). Thoroughly clean the set and the loudspeaker cone and frame-work, look for corrosion around valve pins and sockets, general purpose resistors, any mains droppers and the turret tuner capacitors.

The wiring to and from the mains dropper may be perished and cause a short circuit, especially at points where the wires pass through the chassis.

All the time a valve set is running it keeps itself dry through the internal heat generated by the valves. However, many of the 405-line receivers now reaching collectors have suffered from the damp of unsuitable storage conditions. One source of trouble, caused by damp, is the variable and preset potentiometers. These are employed for line and frame lock (hold) adjustments, picture width and height, linearity, brightness, contrast and sound volume. If the wipe on these pots cannot make good contact with the track then the associated circuit cannot be properly controlled.

Normally such controls are correctly set in about the centre of their travel. However, if the wiper is hard over one end and the circuit is still out of control, test the fixed resistors in the circuit and no doubt one or more will have gone 'high' through age. Shorted turns or open-circuit transformers and leaky 'small' capacitors can cause all sorts of problems in the time-base circuits.

Check that the c.r.t. base is making good connection and that the ion trap is in the right position. The latter is a small magnet on a fibre band secured around the neck of the tube, near its base, by a bolt. In time the heat from the tube causes the fibre to snap and the band come loose. Gravity then takes a hand, the magnet swings to the lower half of the neck and the electron beam is deflected away from the screen. The result of heat and age can cause the time-base deflector coils to stick tight around the tube neck, so do take great care if you have to adjust these to get the picture horizontal on the screen. Do not try and force anything to do with the tube in case the glass cracks. I came back to the workshop one day in the late 1950s to find bits of jagged glass stuck in the door frame, floor and ceiling following the explosion of a 9in tube!

Back to Now

Today we take for granted the strong, 625-line, colour pictures coming from a nearby u.h.f relay...
Fig. 6: SSTV from Russia.

station. Most of us have the choice of BBC 1 & 2, the IBA's CH 4 and, at least one or possibly two of the independent regional networks. Although my television pictures come from the Midhurst transmitter, I can also receive programmes from London, thus giving me the bonus of Carlton and LWT. It's no big deal, it's just modern technology, but, to the delight of DXers, we still get troubled by upsets in the troposphere.

**Band I**

Robert Connolly (Kilkeel) logged good quality colour pictures from Spain (TVE1) from 1305 to 1440 on October 15. "The program content appeared to be a news broadcast followed by 'Television Journal'," said Robert. He uses a Nikkai receiver that covers the v.h.f. Bands I & II, plus the normal u.h.f. bands. He feeds this with vertically and horizontally polarised u.h.f. arrays with a diplexed down lead. One of these is beamed southwards for RTE from Dublin and the other faces north for the BBC. The signal from Spain was most likely picked-up by the horizontal array beamng south.

Peter Barber (Coventry) received pictures from Italy (RAI Uno) around 1040 on the 18th, a 'pulsing ghost picture', at various times between 0832 and midday on the 20th. The latter sounds like 'F2' activity, Peter, and those images may have been coming from the Far East. Among the logos he saw, mainly on the 'R' channels, on the 19th were ARVD, TV at top right of the frame, a V with ORO above it, the large figures 1 and 2 and one that he cannot identify, looks like LKT, any ideas? I have reproduced these letters, from his sketch, Fig. 1, using the Windows Paintbrush program on my Packard Bell computer. Peter is equipped with Binatone Minivision and Citizen DD-T126TV receivers and feeds them with a simple dipole cut to CHs. E3R2 (55.25/23.2MHz) for Band I, a Yagi set for Ch. 8 (196.25MHz) for Band III and an 18-element, high-and

beam for Bands IV and V. He can also tune through Band I on a vintage Hallicrafters S-27 communications receiver.

In New Radnor, Simon Hamer received a test-card and Teletext from Iceland (RUV) on Ch E4 and Norway (NRK), on Chs E2 and E3 respectively, at 1230 on October 14 and pictures from Portugal (RTPI) and Spain (RTVE1 & 2) on Chs E2, E3 and 4 at 1230 on the 19th. "During the recent problems in Russia I saw some of the logos that were on both days. On 1 November, David saw RTL-T Vi on CH E24 for the first time, plus Hessen 3 and many other German stations and networks, not forgetting plenty of signals from Belgium, Denmark, France and Ireland.

Having moved to a new home in Edinburgh, George Gordon was keen to see some DX, especially on his new JVC AV 25S1EK receiver. "It is very simple to operate", said George, "as you can type in the channel No. directly". By typing in familiar numbers while looking for DX, between 26 and 30 October, he was rewarded with pictures, at varying strengths, from the BBC/BA transmitters at Angus, Biddlesden, Caldbec, Chattan, Darvel, Durns, Emley Moor, Isle of Man, Pompton Pike, Selkirk and Waltham. In his usual way, George identified the weaker signals with patience and programme guides that are among the essential tools for a u.h.f. DXer.

**SSTV**

During October, John Scott found that around 1630 was the best time to look for slow-scan television pictures in the 14MHz band. He copied a couple of interesting calling captions from UA3AJ, Figs. 5 & 6, in Russia and one from CT1AND in Portugal, Fig. 7. John caught a "stand by" caption from EA2UD, Fig. 8, in Spain and another showing a 1920s style three valve receiver, Fig. 9.
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The November issue of this column contained a photograph of an aeroplane, but without a caption, so here is the missing text: A United States Navy P-3C Orion about to depart from RAF Northolt during August 1986. This particular aircraft was operated by VP-44 Squadron, and used the sallying "LMT 441". This should make more sense when you read the item in that issue concerning US Navy aircraft scancions.

**Britannia**

In the November issue of SKIM I mentioned Britannia Airways and their new high frequencies. This prompted a very detailed and interesting letter from Malcolm W, who has first-hand experience of the frequencies - he's a pilot for Britannia Airways and regularly uses those frequencies while flying Boeing 757s and Boeing 767s.

He confirms that the three frequencies are all correct, but 11.363MHz is the one most often used. While flying, they keep one set of equipment tuned to that frequency.

On the ground at Luton, they use an ISAM h.f. transceiver connected to a rotatable 3-element beam tuned for 11.363MHz. They also have an ISAM R-71 receiver that is set up to scan the three company frequencies; this is connected to a trapped dipole. The h.f. station was introduced on 24 March 1993 (did anyone copy any transmissions on that day?), and Malcolm says that it is completely independent from Monarch Airlines.

**G'day**

During the summer, Keith Elgin and I had an interesting conversation with a crew-member of a Royal Australian Air Force (RAAF) aeroplane at one of the larger UK air-shows. He gave us details of their h.f. network, including their frequencies and locations of the ground stations.

The primary frequency is 8.976MHz, although they do also have 3.022MHz, 8.688MHz and 11.237MHz available. The ground stations are at Sydney, Perth, Townsville and Townsville; they use the prefix Air Force when talking with aircraft and other stations (e.g., Air Force Sydney). Typical aircraft scancions are 'Aives' and 'Stallion'. Keith reports that the best of these frequencies (for UK readers, at least) is 8.976MHz, which is often loud and clear for the first few hours in the morning (UTC); in one listening period he reports hearing all but one of the ground stations.

For those of you who have not yet heard signals from Australia or New Zealand yet, you can always try listening to one of the VOLMET stations. These transmit weather observations at set times throughout the day, either continuously or at certain minutes past each hour. To hear such transmissions from Australia, try listening to either 11.387 or 6.676MHz during the early morning, on the hour and on the half-hour. New Zealand appears on 13.282MHz during the early morning at 20 and 50 minutes past each hour. Although these transmissions are quite easy to hear, nothing beats the thrill of hearing signals from the other side of the world for the first time. Good luck.

**More CAP**

About a year ago, Peter Rouse gave a brief run-down of the Civil Air Patrol in the USA. Just recently, I have received a letter from Miscall Schulsinger in Ohio, USA. He has been tuning around and found a number of CAP 'nets' in the h.f. bands that he says should be audible in the UK over the winter period. The CAP National Command Net checks-in each weekday at 11am (1900UTC) on 7.635MHz, and then they meet at 11.30am (1930UTC) on 14.902MHz (note the change from 14.905). These are all u.s.b. frequencies, and the 'net' is only a few minutes long unless there is traffic to pass. Miscall says that an even easier 'net' to catch is the CAP National Chaplains Net that meets on 7.635MHz at 5pm (2200UTC) and continues on 4.582MHz at 5.15pm (2215UTC).

The above 'nets' are all national nets that cover the whole of the USA. There are also 'nets' that are used by each State. The North-Eastern Region net operates on 4.466MHz, the Mid-Eastern Net operates on 4.535MHz and the South-Eastern Net operates on 4.469MHz (once again, all u.s.b.). Miscall recommends listening on the hour and half-hour either side of midnight UTC for these.

**Letters**

Another letter from Mike Le Vesconte provides a summary of his research into 'illegal transmissions' close to agreed ICAO aeronautical frequencies. For 10 weeks during the summer, Mike noted details of signals that were within 2kHz of official stations. Nearly 850 'illegal transmissions' were heard, of which 400 were Italian, and just over 100 were either UK or Irish stations. Mike says that one group of four UK stations thought that they were operating 7kHz away from their actual frequency. Geoff Halliday writes with details of some interesting transmissions that he has been hearing on 19.600MHz i.s.b. The signals come from Qatar in the Arabian Gulf, and answer as 'Speedbird Executive Aircraft' - is this connected with British Airways (who use the sallying 'Speedbird London'?). They make contact with some aircraft, who use the scancions 'Mary 2' or 'Mary 3', and they also talk to somebody in Doha (Qatar) who uses the sallying ATAZ11. Has anyone heard anything on this frequency, or can add any more information?

Finally, what has happened to all your letters, they have almost dried-up over the past few weeks? I need your letters and logs to help me produce this column each month. Even if you are listening to transmissions that don't change much (e.g., VOLMET) I would still like to hear about them, if only to know that they are still active. Please make it your new-year's resolution to write me a letter.
Paul Essery GW3KFE, PO Box 4, Newtown, Powys SY16 1ZJ

Amateur Bands Round-up

Please, will all correspondents make sure they include their name and address, every time they write. I see so many letters that, while I might recognize the handwriting or style as that of someone who has written before, I won't be able to recall a name if the letterhead isn't signed.

Over the years I have often been asked about the effect of, for example, a severe shortening of the antenna on performance, and quite recently I thought I would point out, on the hard way! I am talking about an end-fed wire against earth, used with an antenna tuning unit.

The vertical section - some ten metres - was intact, as was the far end section, but the bit in the middle had disappeared. Thus on Top Band, instead of 3116I I suddenly came down to 1.16I.

Tuning up the a.t.u. on this abbreviated length showed that a signal that normally showed as strong 3116I on the meter had suddenly dropped to a metre S7, in each case on speech peaks. In each case the station antenna tuner was able to bring the wire to resonance, so detuning effects had been eliminated. What resulted from shortening was a drastic fall in radiated power, and the loss resistances in wire and earth were constant. Thus, by Ohm's Law, a much larger proportion of the power was being wasted!

Close a bit later on the improved situation, and the loss resistances across the loss resistance, leaving constant. Thus, by Ohm's Law, a much lower proportion to appear as across the loss resistance, leaving a much lower proportion to appear at the receiver input.

What this means to the ordinary short wave listener, who has at least one set that will work on the lower a.m. band, is that each slight improvement in his antenna will open up an improvement in their DX reports. When the conditions are less than good, it will continue to hear from shortening was a drastic fall in radiated power, and the loss resistances in wire and earth were constant. Thus, by Ohm's Law, a much larger proportion of the power was being wasted!

Mark Malone, who wants to know about the USSR, and the 0 suggests the UAO section, about: EXOA, C4OR and ZW5B. The USSR, and the 0 suggests the UAO section, about: EXOA, C4OR and ZW5B. The USSR, and the 0 suggests the UAO section, about: EXOA, C4OR and ZW5B. The USSR, and the 0 suggests the UAO section, about: EXOA, C4OR and ZW5B. The USSR, and the 0 suggests the UAO section, about: EXOA, C4OR and ZW5B. The USSR, and the 0 suggests the UAO section, about: EXOA, C4OR and ZW5B. The USSR, and the 0 suggests the UAO section, about: EXOA, C4OR and ZW5B. The USSR, and the 0 suggests the UAO section, about: EXOA, C4OR and ZW5B. The USSR, and the 0 suggests the UAO section, about: EXOA, C4OR and ZW5B. The USSR, and the 0 suggests the UAO section, about: EXOA, C4OR and ZW5B. The USSR, and the 0 suggests the UAO section, about: EXOA, C4OR and ZW5B. The USSR, and the 0 suggests the UAO section, about: EXOA, C4OR and ZW5B. The USSR, and the 0 suggests the UAO section, about: EXOA, C4OR and ZW5B. The USSR, and the 0 suggests the UAO section, about: EXOA, C4OR and ZW5B. The USSR, and the 0 suggests the UAO section, about: EXOA, C4OR and ZW5B. The USSR, and the 0 suggests the UAO section, about: EXOA, C4OR and ZW5B. The USSR, and the 0 suggests the UAO section, about: EXOA, C4OR and ZW5B. The USSR, and the 0 suggests the UAO section, about: EXOA, C4OR and ZW5B. The USSR, and the 0 suggests the UAO section, about: EXOA, C4OR and ZW5B. The USSR, and the 0 suggests the UAO section, about: EXOA, C4OR and ZW5B. The USSR, and the 0 suggests the UAO section, about: EXOA, C4OR and ZW5B. The USSR, and the 0 suggests the UAO section, about: EXOA, C4OR and ZW5B. The USSR, and the 0 suggests the UAO section, about: EXOA, C4OR and ZW5B. The USSR, and the 0 suggests the UAO section, about: EXOA, C4OR and ZW5B. The USSR, and the 0 suggests the UAO section, about: EXOA, C4OR and ZW5B. The USSR, and the 0 suggests the UAO section, about: EXOA, C4OR and ZW5B. The USSR, and the 0 suggests the UAO section, about: EXOA, C4OR and ZW5B. The USSR, and the 0 suggests the UAO section, about: EXOA, C4OR and ZW5B. The USSR, and the 0 suggests the UAO section, about: EXOA, C4OR and ZW5B. The USSR, and the 0 suggests the UAO section, about: EXOA, C4OR and ZW5B. The USSR, and the 0 suggests the UAO section, about: EXOA, C4OR and ZW5B. The USSR, and the 0 suggests the UAO section, about: EXOA, C4OR and ZW5B. The USSR, and the 0 suggests the UAO section, about: EXOA, C4OR and ZW5B. The USSR, and the 0 suggests the UAO section, about: EXOA, C4OR and ZW5B. The USSR, and the 0 suggests the UAO section, about: EXOA, C4OR and ZW5B. The USSR, and the 0 suggests the UAO section, about: EXOA, C4OR and ZW5B. The USSR, and the 0 suggests the UAO section, about: EXOA, C4OR and ZW5B. The USSR, and the 0 suggests the UAO section, about: EXOA, C4OR and ZW5B. The USSR, and the 0 suggests the UAO section, about:

Dear Editor,

I would like to call your attention to the report by Paul Essery, GW3KFE, which appeared in the September 1994 issue of Short Wave Magazine.

In his report, Paul Essery describes a situation where a vertical antenna, which was functioning adequately when tuned up in DX conditions, suddenly experienced a drastic fall in radiated power. He attributes this to the effect of shortening the antenna, which resulted in a significant loss of power being dissipated as heat in the wire and earth.

Paul also mentions the importance of considering the impact of shortening on antenna performance, especially when using antennas with tuning units. He notes that tuning up an antenna with a shortened section can significantly reduce the effective radiation, particularly when the antenna is used in DX conditions.

I would like to encourage readers to pay attention to the impact of antenna design and tuning on performance, as well as to the importance of maintaining good antenna maintenance practices. These factors can significantly affect the overall performance of an antenna system, and neglecting them can lead to unexpected performance drops.

Yours sincerely,

[Your Name]
It's that time of year again! This year's Christmas Quiz is easier than earlier ones, because so few of you entered previously.

Identify the aircraft in the photograph; that wasn't too bad, was it? Now for the tie-breaker. Pretend that you had my job for a month. How would you change this column for the better? Credit will be given for useful, practical suggestions.

The answer, the tie-break reply, and your name & address must all fit legibly on one side of a postcard or equivalent-sized stationery. My address is as follows: Air/Ground is to pass information to January. There will be a prize.

Understanding Radio-navigation Charts

In the case of airliners especially (as well as numerous other civil and military flights) it is important to understand the principles of radio navigation before an aircraft's position can be established. These operations hop from one radio beacon, or pre-defined reporting point, to the next, tracking along routes called airways. I was frequently asked about this subject at the Leicester Amateur Radio Show at the end of October. The airways structure is represented on charts, and charts of airways that are available to the public by mail order. Addresses of suppliers appear on the Airband Factsheet which you can get from the Broadstone (Amateur) office by sending a stamped, self-addressed envelope (capable of holding one A4 page). Don't forget to mark the envelope Airband Factsheet.

As an example, I refer to Aerod chart EUR/1 that, on one sheet, covers all of Ireland and Wales, and all except the south coast of England. At the edges, a little bit of Scotland and the Low Countries have crept in. When buying your charts, ask for the Aerod Legend Booklet that comes free of charge with your order and makes things clearer.

Near the south coast of Wales lies airway G1. Just like roads have numbers such as A1 or M40, so do airways (except that various letters are in use and few actually mean anything special). Heading west, G1 passes over the Brecon v.o.r. beacon. This can be tuned in on 117.45MHz in which case its Morse identification (BCN, dah-di-dit, dah-dah, dah-dit) will be heard. Also, here is a distance measuring beacon (on Channel 121) that is automatically selected by the aircraft's receivers when the v.o.r. is tuned in. The chart also shows the location of the beacon in latitude (degrees north) and longitude (degrees west).

To travel along G1, it is necessary to leave Brecon on a compass heading of 230° magnetic.

The Christmas Quiz mystery aircraft.

This is the bearing to steer assuming calm conditions. In practice the wind will blow and push the aircraft off course, but the correct track along the ground (the 290° bearing) can still be followed by adjusting the heading by reference to the beacon's signal. After flying for 28 nautical miles, a reporting point (AMMAN) is passed. There's nothing there! The reporting point (white triangle on the chart) is an imaginary location along the airway that is arrived at when the d.m.e. reads 28nm from Brecon. If previously requested to do so, the pilot makes a radio report to air traffic control stating the aircraft's position; had the triangle on the chart been coloured black then such a report would have been compulsory.

After this, a further 40nm brings us to the Stumble beacon. Airways exist between defined altitudes or flight levels. In the case of this second leg of our journey (west of AMMAN), the airway starts at FL105 and finishes at FL245 (approximately 24500ft). You could fly under the airway and not infringe controlled airspace, but not over it since all airspace above FL245 is controlled in the UK. Along the airway, the upper and lower limits are shown on top of the other with a line ruled between them (a bit like the line dividing the two numbers of a vulgar fraction). Next to these levels is often one more altitude; for the west half of our journey it's FL110. This is the lowest permitted cruising altitude, but if climbing into the airway from below then our flight would come under control as soon as it entered at the lowest level (FL105). If this stimulates you into wanting the answers to more questions about navigation then please write in!

Frequency and Operational News

The October GASIL from the CAA tells us that the a.i.s./ground experimental allocation at Oxford has now been made permanent. As a reminder, the final outcome is: a.i.s. 121.75, Ground 121.95MHz. Pilots must consult NOTAMs. This column only shows recently occurring important or permanent changes, but the lead-time in a magazine is too great to allow news to be right up to the minute.

Mike Bennett reports that all the outer markers have been withdrawn at Heathrow. He should know, he lives nearby in Datchet. The controllers know how far the aircraft is from the underground radar tells them. Also, pilots know (and can therefore work out their expected altitude) by reference to d.m.e., so this is still a precision approach. The marker gives an extra degree of confidence that the localiser is being correctly followed and that the marker is being overflown at the correct altitude. So, it seems a pity to economise by removing this inexpensive, but useful, facility. A precision approach is one in which height guidance is given by the radio aids, as distinct from a localiser on its own which provides directional guidance.

Your Aeronautical Experiences

She's done it again! Mrs. B (Isle of Man) got a look in the cockpit when flying by Britannia B.767 between Manchester and Orlando. Outbound, the BY392A was operated by G-BNY6 (c/n 24013) Selcall CH-EM, the return BY392B being on G-BOPB (c/n 24239) Selcall CJ-BF. First impression when checking in the baggage, was that every piece is now bar-coded. This reconciles bags against tickets, i.e. (hopefully) against checked-in passengers. This is a security precaution, and the logic behind it is that it is unlikely that terrorists will take their own bomb-loaded bags on a flight knowing that they are about to blow...
As I mentioned last month, AOR have been busy designing a new hand-held model that they believe will be a quantum leap ahead of the opposition. The factory in Japan has just put the finishing touches to the pre-production model of what AOR describe as a ‘wide range world band radio’ and the first indications are that it will be a world beater. AOR have spent a lot of time looking at competitors and listening to the opinions of users, and these have been considered by our Autumn 1991 ‘win an AOR 2000 competition’. Imagine all the best features of current hand-held designs, plus a lot of innovative new ones — well that’s the new hand-held.

The unit will have a frequency coverage of 100kHz to 26MHz, which has been engineered to give performance at all frequencies not just on the v.h.f. and u.h.f. bands. Special attention has also been paid to short, medium and long wave reception, with the inclusion of an internal bar antenna for the lower frequency bands, which will give excellent broadcast radio reception. You will no longer have to carry a separate transistor radio if you want to keep up to date with national news bulletins.

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True s.s.b. reception is catered for by a separate narrow filter specifically tailored for optimum performance, a true frequency readout that will take into account the frequency shifts for upper and lower sideband operation and 50kHz steps for smooth tuning across crowded short wave bands.

The case is likely to be slightly smaller and more rugged than current models, with a large specially-designed liquid crystal display offering many new functions such as a bar-graph signal strength meter. The keypad is capable of being back-lit and operations can be password protected. Construction of the circuit boards has been achieved by new techniques, with the circuit main board retaining plug-in sub-modules, which should make servicing (and possibly upgrades) that much easier to implement. New memory management features such as a memory copy and clone function should make maintenance of memory banks child’s play.

These features are just the beginning, I’m sure more information will come to light over the next couple of months before the official launch, but it’s already got me wondering what the base station model is going to be like - watch this space and start saving now!

Cellular Networks

Observant readers will have noticed a rapid growth in the number of cellular telephone base stations springs up in all manner of unlikely locations. Some sites now have three or more towers on them as rival companies compete to provide advanced personal communications networks.

All of this is not necessarily good news as the latest casualty in this battle has been the decision by Hutchison Telecom to end its ‘Rabbit’ public teletext service. This system, which allowed subscribers to use their CT2 cordless phones to make outgoing calls in public places, will be the last of the four original teletext services to be switched off.

The main reason for the decision to end the service was one of simple economics, not enough people were subscribing to make it worthwhile. Another problem was how to market the idea. The fact that users could not receive incoming calls was seen as a major drawback, causing it to be perceived as the ‘poor man’s cellphone’ - not the best advertisement for a product.

It does seem a pity that the demise of the public service may of renting an analogue cellular phone at a reduced rate, or if you are prepared to wait, you can have the option of being connected to the new Hutchison digital mobile phone network that is scheduled to come on-line next April.

Quite what will happen to the 865-868MHz band is not too clear. It will have to remain available for the 10 000 or so users of CT2 cordless phones who will still be able to use their own base stations, but it is hard to justify exclusive use of a valuable portion of radio spectrum just for that purpose. One possibility is that it could also be used for short-range radio modems, or used as an extension of the allocation for digital short range radio communications that is supposed to be taking place of 934MHz CB - but that’s another story.

Fig.1: Typical spectrum of satellite TV baseland signal.

Fig.2: Magnified portion of spectrum showing individual audio subcarriers.

also affect the future of CT2 cordless phones generally, the technology is good with digital ‘ping pong’ transmissions providing high quality, interference free, secure speech over good distances (with an external antenna). But like the Betamax/VHS video recorder battle it isn’t always the best engineered system that wins - it’s the one that people buy.

What do you do if you are a ‘Rabbit’ subscriber? Well the company intends to offer existing customers some money back for their ‘Rabbit’ phone and the option of renting an analogue cellular phone at a reduced rate, or if you are prepared to wait, you can have the option of being connected to the new Hutchison digital mobile phone network that is scheduled to come on-line next April.

A lot of you asked if it was possible to use a scanning receiver coupled to a satellite dish to achieve the same result. I must say that I don’t think that it’s quite as easy as the programme may have suggested. The way I believe the equipment was interconnected was that the dish was aligned on one of the few geostationary satellites that still carry non-digital telephone circuits and the short wave receiver was then connected to the video or base-band output of the receiver via a suitable attenuator. The individual Frequency Division Multiplex channels would then be resolved as s.s.b. signals by tuning across the frequency range 0 to 10MHz.

The problem with most domestic receive systems is the limited frequency range and short term frequency stability or phase noise of the LNB. This is the unit mounted at the focus of the dish whose main purpose is to amplify and convert the weak microwave signals from the satellite to a different frequency band at a much higher level, so that it can be used by the satellite receiver.

The LNB uses a free running oscillator usually operating at around 100kHz as part of this process. Because the oscillator is free running it can shift in frequency by anything up to 500kHz away from its design centre frequency. This doesn’t matter too much for the reception of TV signals that occupy 33MHz or so of frequency spectrum, but it does make the reception of s.s.b. signals that may only have a bandwidth of 3kHz very difficult. The satellite receiver may be able to compensate for some of this frequency jitter by use of Automatic Frequency Control but it cannot remove it completely and the residual phase noise would make any speech very difficult to resolve, rather like listening to Auroral s.s.b. on the 144MHz amateur band. This can be improved by using phase locked LNB -that is to say one that uses crystal oscillator to control the local oscillator used for frequency conversion. Such LNBs are available for professional

Scanning The Heavens

Many readers have commented on the recent television programme Dispatches in which journalist Duncan Campbell was shown sitting outside a government monitoring station with what appeared to be a domestic satellite TV system coupled up to a Lowe HF-125 short wave receiver. The purpose of this demonstration was to show just how easy it is to intercept transatlantic telephone calls made over satellite circuits.

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All of this is not necessarily good news as the latest casualty in this battle has been the decision by Hutchison Telecom to end its 'Rabbit' public teletext service. This system, which allowed subscribers to use their CT2 cordless phones to make outgoing calls in public places, will be the last of the four original teletext services to be switched off.

The main reason for the decision to end the service was one of simple economics, not enough people were subscribing to make it worthwhile. Another problem was how to market the idea. The fact that users could not receive incoming calls was seen as a major drawback, causing it to be perceived as the 'poor man's cellphone' - not the best advertisement for a product.

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applications, but tend to be expensive.

However, if you have a satellite receiver and either a scanner or short wave receiver that will allow you to receive wide-band f.m. over the range 0-10MHz you might like to try this experiment. Most satellite TV broadcasts make use of multiple subcarriers, they each provide a different language or radio services. Many of these can be resolved by use of the audio channel selection available on the satellite receiver, but a lot depends on the design. For example, I have an old Amstrad SRX-100 that does not have the facility to demodulate the 6.5MHz subcarrier used as the main mono sound channel on most transmissions.

If you want to be able to tune into other sound carriers all you have to do is to take an signal from either the main video output or, better still, if you have it, the external MAC or decoder output that does not have as much filtering applied. This can then be fed via a 60dB attenuator to reduce the level to the receiver. You can then tune across all the subcarriers that are placed higher in frequency than the video signal that ends at around 6MHz. Most of these subcarriers use about 50kHz peak deviation that is made up of 455MHz bands for similar purposes and an increasing number are now making use of the 47-48MHz band including f.a.l of Wight Radio that seems to use 48.05625MHz almost permanently as a ‘clean’ programme feed. This signal is audible for some considerable distance and gives better reception at my house than the actual medium wave broadcast transmission, as this is specially engineered to minimise reception on the mainland.

Whilst tuning around, Stephen and I also found an ITV talkback link on 455.15MHz that was being used to call out camera shots and pass instructions to the presenters during the course of the race. This can be particularly interesting if the programme is being presented live as you can watch the action on TV and listen to the directions at the same time. All of which gives a great insight into the vast amount of effort put into filming such events - especially when things don’t go quite according to plan and the running order has to be changed. Although I have commented on it before, in 1988 the DTI published a document called Study of the requirements for a radio frequency plan for services ancillary to the making of programmes, films, presentations, advertisements and other entertainment and sporting purposes. This gives a vast amount of information on the way outside broadcast communications are planned and controlled. One of the examples given was the 1984 round Britain Powerboat race that used more than 44 different communication channels. Remember that this was nearly ten years ago, these days there are many more independent production companies recording the action for satellite TV and specialist video companies - and all of them use some form of radio communications.

Many outdoor events such as agricultural shows and open days also generate a reasonable amount of radio traffic. As well as the usual short-term hire channels that tend to be used for car parking and traffic control you may also come across the some really odd signals.

Stephen was lucky enough to hear the voice of ‘Welliephant’ - the fire prevention elephant - on 457.035MHz. This was part of a local fire station open day and was used to project ‘Welliephants’ voice to young visitors.

My thanks to Stephen for his letter - it made me wonder what were the most unusual signals I’ve heard at special events. I think they must include the voices of a ‘Time Lord’, ‘Dalek’ and a promotion using a ‘Remote controlled model of a ‘Hole in the Wall Cash Machine’. Have you any amusing stories along the same lines? Thanks for all your calls and letters, as this issue marks the end of 1993, may I wish all of you a Very Happy Christmas and I hope that Santa brings you the scanner you asked for. Until next month - Good listening.
JAVIATION
THE AIRBAND SPECIALISTS

At the time of writing our combined VHF/UHF frequency guide and UHF only supplement are dated mid-December however we expect new editions to be available from late February.

IF YOU WOULD LIKE THESE LISTS IN FULL A4 FORMAT JUST LET US KNOW WHEN ORDERING.

NEW EDITION VHF/UHF LIST: £7.50 including p&p
UHF ONLY LISTING: £4.00 including p&p

From the comments we receive I would like to think that our guides are the most comprehensive and accurate listings available, if you are not familiar with them then please give them a try, we are sure you will find them both informative & interesting. They include airfield, en-route ATCC centres, Range, Ops, Display and other frequencies whilst also giving Stud/channel tie ups.

LEATHER CARRY CASES
We have real, yes real leather carry cases available for the Yupiteru VT-225, MVT-5000 and AOR/Fairmate AR1000/2000 series.
All the same price £14.99 each.
If you don’t like the smell of leather please don’t buy one as we have had one returned by the purchaser as it smelt too much like leather!!

COMPUTER SOFTWARE
We now stock a wide range of IMB PC software, mainly aviation related but other ‘games’ as well. Any radio purchase over £200 entitles you to purchase any PC software within our range for £20. Choose anything from F15 Eagle III to Sub Logics ATP or if you require something specific just ask!

Javiation, Carlton Works, Carlton Street,
BRADFORD, West Yorkshire, BD7 1DA
Telephone: 0274-732146 Facsimile: 0274-722627
Autumn has seen few changes in WXSat operations. METEOR 3-3 continued, visible-light only transmissions on 137.385MHz, and poor signals were often received from METEOR 2-21 on 137.855MHz. As each satellite approaches the terminator, we can anticipate operation of one of the other METEORs. Launches of future CIS WXSats remain scheduled. NOAA 10 is due to be launched during the next few days when its passes overlap with NOAA 12, and NOAA 9 continues to show a similar relationship with NOAA 11.

Pictures

Many good pictures have been received, I am limited to space for three or four, so unfortunately many cannot appear.

Quentin Hordle sent in a large format picture (Fig. 1) of the whole earth as seen by the Japanese WXSat GMS-4, positioned near the longitude of Australia. It is dated August 12 and is apparently a visible-light image. It may be a composite, but I am not sure of its origin because METEOSAT-4 transmits infra-red GMS-4 WEFAX images.

Quentin Finn of Dyfed sent two NOAA 13 images printed on his Cannon bubble jet printer, one of which, dated August 16, is shown in Fig. 2. Peter uses PROsat1 software.

Michael Smith of Sherborne using his 16MHz/286 computer and PROsat1 to process images received by his Martelec MSR 20. He sent a picture, Fig. 3, showing what he suspects might be a dust storm off the Sahara desert, taken last July. A later image was observed to show the same feature having drifted slightly north.

John Will of Romford sent me a picture of the Arctic Ocean region near North Cape imaged by METEOR 3-3 on 21 April 1993, together with a transparency from an old atlas covering the same region. He used this combination to identify land masses shown in the METEOR picture. Unfortunately the transparency would not reproduce properly. The right side of the picture, Fig. 4, shows the Kara Sea and Novaya Zemlya.

An Audio Compressor

Like other readers, Ray Newgea monitors regions of special interest, such as the Aral sea, and has built an audio compressor. This can enhance land surface features, particularly from METEOR satellites, which contain detail low in the grey scale (that is, they are usually very dark - but still present). Ray's compressor reduces the amplitude of peak whites (to avoid losing cloud detail) and enhances the dark greys. This is similar to the use of contrast expansion options that are usually included in WXSat image processing software.

Ray tells me his compressor has revealed just how much detail is present in METEOR images. "Europe is seen with all of its major rivers, urban areas, (quite small towns showing up if the light is right, and forests". This is my experience with the METEORs; their resolution is higher than the NOAA WXsats. (Because they transmit single images,) and enhancing the dark levels invariably reveals detail as Ray describes.

Once again Ray is kindly offering a source of additional detail - in contrast to the regular WXSat receiver. He describes his compressor as "easy to build and costs about £5 for the components. It is based around the SSMP120 chip". If any reader would like a copy of the constructional details, please send an s.a.e. May I suggest that some form of contribution to Ray's costs would be reasonable. Write to him at 31 Campbell Road, Catterham, Surrey CR3 5JP.

Cirkit WXSat RX

A fascinating letter from Andrew Blott describes his work to eliminate paging interference from his Cirkit WXSat receiver. He appears to have isolated and cured the problem for his original version, and gone some way to fixing it for Maplin receivers as well.

Andrew wrote his own software for decoding date, using variously the CBM64, an Atari, and even an Orc computer. He used a Lindenhall radiogram and says that during the early months he did not have any paging interference. When the interference started he found it difficult to obtain more than 30 seconds of date.

After examining the signal at various points in the receiver he deduced that two new filters were needed, and an adjustment to the i.f. amp to compensate for insertion loss. The result 'works like magic'. Andrew's notes may be of use to other Cirkit RX users, but it would be necessary to be familiar with the testing and adjustment of such circuits.

Michael Thomas of Peacehaven kindly wrote to pass on the telephone number of a supplier of Cirkit receiver crystals, which may be of use to those wanting to locate such crystals. Contact Danny Slab at Element Ltd, Tel: (0232) 330830 for further details.

Maplin Help?

The Science Department at Edmonton School in Enfield purchased a Maplin WXSat system last year. A letter from M. Ambridge, the science technician, asks whether any reader of Info knows of a program to manipulate, store or print the files?

More Letters

Paul Wright GW6NPC from near Chester, has recently set up a new WXSat receiving system that has allowed him to obtain pictures from all of the operating satellites, and he particularly comments on the help received from Henry Neal G3BMW, the chairman of the Remote Imaging Group. The Rig was formed a few years ago and publishes its own quarterly magazine, apart from organising national meetings for fellow enthusiasts. For more details on the group, contact Des Watson, Norton, Gore Lane, Ringmer, Nr Lewes, East Sussex BN8 5NX.

Kepler Elements

The automatic reading of Kepler elements into satellite predictions software is of interest, mainly to those newcomers who have modern computers, and can therefore download elements from a remote BBS. Roger Holtham of Eastbourne and Bruce Wise of Berkshire asked for more details on the way in which this could be done.

As mentioned recently, there are at least four British BBS carrying Kepler elements that can be downloaded, either as a file, or via terminal capture. Files may need minor editing, depending on their origin, so that any associated text is removed, leaving the elements in either NASA two-line format, or the slightly different AMSAT format.

The NASA format should be used wherever possible, because it is more compressed (and will therefore cost less in telephone time). Recent reductions in weekend telephone charges will help.

Satellite predictions software normally allows automatic reading of such files, and it is also possible to type in the data manually.

Different sources of elements may contain slightly different parameters; I am often asked about the decay figure. This is not an essential parameter (if it is required, but not quoted - use zero), so if your program (perhaps Public Domain or Shareware) does not use it, this matters little. Decay (or drag) refers to the instantaneous measurement of the rate of change of mean motion, and its value may be changed by solar radiation, or even the proximity of the moon. Because of this, I sometimes wonder whether it is best omitted.

Another common question about Kepler elements is the recommended period between updates. This depends on what predictive accuracy you want.

Elements are normally available every few days on the appropriate NASA BBS. NASA were kind enough to give me a password to access this data, and anyone else who wishes to tap into their BBS can request similar facilities. Remember the 'phone bill!

For predictive accuracy to within a few minutes, you should be able to update your Kepler files once per month. The METEORs are orbiting higher than the NOAAs, so suffer from less atmospheric drag. Consequently METEOR predictions should retain their accuracy for some weeks. The OKEAN satellites (apparently no longer operating) have much lower altitudes, so would have required updating more frequently.

The date of origin of the elements is shown in the EPOCH parameter. It is based on January 1 being day 001, and December 31 is (usually) day 365. So when you are considering updating your elements, you should aim to use
elements that are no older than perhaps one month (for the uncommon satellites), but aim for two weeks for the WXSATs. As regularly mentioned, I retain such data for the readers of Info - see end of column.

DR-DOS, MS-DOS and WINDOWS

Those many WXSAT hobbyists who run PCs will know that upgrades to the operating systems MS-DOS and DR-DOS occur regularly. A few correspondents have reported occasional problems when running Timestep's PROsat with DR-DOS version 6. Timestep state that their software is designed for Microsoft (MS) DOS, rather than either WINDOWS or DR-DOS.

I have experimented with some (other) satellite software running under Windows, and have found that some can run reasonably well, after manipulation of certain parameters. Windows consumes so much raw computing power - memory and processing time that I normally run tracking programs from DOS.

WINDOWS can be of use when wanting to be able to jump instantly from one program to another, for example from a word processor to a tracking program. Switching between programs requires about four or five times longer processing time that I normally run tracking programs from DOS.

An alternative multi-tasking program, for those wanting to have the switching facility without using WINDOWS, which is also supplied with MS-DOS, is DOS-SHELL. This also allows one to run a number of programs simultaneously, as long of course that your computer has sufficient memory. DOS-SHELL has the benefit of being straightforward, yet is, so I understand from journalists in the computer industry, little used.

Co-processors

Computers of the IBM-compatible variety (60886 and 386 versions) have a socket where a co-processor can be fitted as an option. This device performs mathematical calculations in a highly efficient manner, so, for those programs that can use it, a co-processor can speed up operations that are otherwise performed slowly by the main processor. Roger Ray noted a considerable speed improvement when using the gridding option in Timestep's PROsat software. Tracking programs may similarly work more efficiently, though the benefit may be less obvious. Not all software utilises co-processors.

Make Your Own Keplers

When a new WXSAT starts transmitting for the first time, it will be picked up by many people. The main requirement for reception is a suitable receiver - one that can tune the 137-138MHz band. The signals are powerful and even a hand-held receiver fitted with a rubber duck antenna, operated outside, will hear a signal when the satellite passes at a reasonable elevation.

We had been expecting the launch of NOAA 13 for some months, so during August I did even more monitoring than usual. Then I heard and recorded its first signals. Within a few days, I received dozens of letters requesting confirmation, and asking for Kepler elements for the new WXSAT.

Trevor Lane of Bideford told me that he had had a go at generating his own set of Kepler elements for NOAA 13 by substituting new parameters for those of other NOAA WXSATs. This method can be quite effective.

I normally receive such elements fairly quickly, but perhaps due to holidays, they didn't materialise. So I made my own! The method might be of interest, particularly for those who have the necessary software to hand. You need a tracking program, preferably one that allows you to edit the elements and produce sets of schedules. I used InstantTrack, though other software (such as TrackIt) can also do the job.

The first task is to positively identify the nature of the WXSAT - easy in this instance - it was NOAA 13. Had it been a METEOR WXSAT I would have to confirm whether it belonged to the series two or three group.

The NOAA WXSAEs have several things in common - similar inclinations, mean motions and eccentricities. NOAA 13 runs a couple of hours earlier than NOAA 11, so I started by adding a new satellite to the database, having the same elements as NOAA 11.

There may be a more efficient way to synthesise Kepler elements, but I derived the following method by trial and error, after spending some time checking out the mathematics!

The process of adjusting elements to fit the WXSAT requires that you measure the times of acquisition and loss of signal from at least a day's worth of passes, and preferably measure the passes for a couple of other days for confirmation. You also need to estimate the maximum elevation of each pass (assuming land is visible); this gives meaning to the subsequent predictions, as you gradually 'tune-in' the elements.

I set the Epoch (reference date for the simulated orbital measurements) to 1993 200.0, and entered my most recent NOAA 11 parameters. This produced a set of predictions that were not wildly out, but pass times and elevations needed adjustments. By increasing the RAAN parameter in steps of 5° and then reducing it similarly, one can adjust one of the passes to match the approximate elevation of a pass actually observed. At this point you are only concerned to match the elevation of the pass. After adjustment, the RAAN parameter can be left alone.

A similar set of trial predictions is performed on the mean anomaly parameter, and you will see that small changes to the pass times occur. Similar experiments on other parameters, like eccentricity, reveal that they have only minor effects on the final result, hence they can be left unchanged.

Your aim so far, has been to obtain a sequence of passes having matching elevations - perhaps two if not three in a row - one day's observations. Now we make the final adjustments - the Epoch!

This parameter represents the time at which the measurements were (hypothetically) made. In effect, you can change this by tiny amounts until a close match with observed pass times occurs. I increased the Epoch parameter by 0.1 of a day, and as expected, the pass times moved dramatically. By reducing it very slowly, the pass times were edged from 1258UTC back towards 1236UTC, the actual observed time of one pass.

Having synchronised calculated times to within a few minutes of the observed times, I made small changes to the RAAN to further improve the predictions. The final check was to produce predictions for the next 24 hours and to see how well they fitted!

In fact, the three calculated pass times were very close and the elevations also looked very good. These 'dummy' Kepler elements were then issued to those requesting data - together with the warning that they were unofficial! A few days later I received the official set.

You can practise this method of element generation by taking a set of NOAA elements and adjusting them to match the 'sister' satellite, for example use NOAA 10 elements to produce NOAA 12 elements (or vice versa).

Season's Greetings

This column appears just before Christmas so may I wish all SWM readers a very happy Christmas, and sincerely thank those many readers who have contributed to this column during the last twelve months.

Kepler Elements

I will send a print-out of the latest elements upon receiving an s.a.e. and extra stamp. All known weather satellites, plus MIR can be included, together with their transmission frequencies if operating. Satellites such as the amateur radio series, GLONASS, GPS and others are available in two-line format, together with a description of format conversion. For print-outs, please include at least two extra stamps towards the cost of collection. This data originates from NASA and is collected from UK BBS as well as other sources.

Frequencies

This short list includes WXSATs that are currently operating. METEOR frequencies remain subject to change. NOAA's 9 & 11 a.p.t. on 137.80MHz; NOAA's 10 & 12 on 137.50MHz; NOAA beacons on 136.77 and 137.77MHz; METEOR 2-21 on 137.85MHz & METEOR 3-3 on 137.30MHz.

Fig. 4: Picture of the Arctic Ocean sent in by John Wills.

Fig. 3: NOAA 10 on July 27 sent in by Michael Smith.
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**Short Wave Magazine, January 1994**

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As I've got so much to report on this month, I've taken the liberty of sending you copies of my conventional logs, I included a pack of work sheets. The great advantage with the work sheet is that you can see the transmission patterns of any station at a glance. So, having whetted your appetite, let's take a look at how the system operates.

Start off by checking out the sample shown in Fig. 1. The top section of the chart is used to store the basic details of the station and its transmission modes. There's also space to add some general information about the station. The heart of the system is in the matrix that follows. In the left-hand portion of the chart the frequencies and callsigns used by the stations are listed. For example, if you were creating a sheet for Offenbach Met, you would show 117.4kHz (DCF37) in the left-hand columns. The matrix to create a sheet for Offenbach Met, listed.

INTERPRETATION

There's a system in which you can see the system is very flexible and lets you gradually adapt for most types of listening activities. My thanks to Day Watson for the idea.

Weather FAX Book

Philip Mitchell of Nevbury has just sent me the latest revision of his popular FAX book. The book is titled "The Interpretation of Facsimile Weather Maps and Charts" - a bit longwinded but very descriptive! I first published the book around a year ago and it received a good reception then. Philip has written the book specifically to meet the needs of the utility listener such as myself. Although most of the information in the book can be obtained from other sources, there is no single publication that I know of that wraps everything into one publication. The other problem is that most of the other sources of information are aimed at the professional user and carry a suitably weighty price tag! Philip has managed to compress all the important information into a forty-eight-page A4 sized soft bound book. As the book is both written and published by Philip, it has a home-made feel about it, but despite this, the content is well put together.

As you can see the system is very flexible and lets you gradually build-up extensive information about a station. As shown in the example, it's well worth leaving a few blank lines between each entry to allow for seasonal or other regular schedule changes that may occur. You can also use different colours to help differentiate transmissions. The worksheet system provides a very well structured way of documenting your monitoring and can be adapted for most types of listening activities. My thanks to Day Watson for the idea.

Free FAX Software!!

Yes it's that program again! Having mentioned the latest release of JVFAX last month, I now have the author's permission to copy the program to readers. Before I go into the details of how to get your copy, I thought I ought to at least give the latest version a review.

The book tackled this complex subject in a step-by-step fashion by showing examples of charts received off-air and then guiding the reader through the interpretation. The coverage extends from surface analysis charts through to complex aeronautical charts and graphs. The final section even includes a few suggestions on equipment to use to receive FAX transmissions.

The book costs £7.50 inclusive and is available direct from Philip Mitchell at 7 The Marlows, Nevybury, Berks RG14 7AY.

The easiest way to obtain a complex interface may be to wait for the latest release from Maritec Electronics. For more details on this refer back to last month's 'Decode'. If you have facilities for home construction there are a set of GIF files supplied with the program that give full circuit diagrams for a sophisticated interface. The other alternative is to contact a few of the German companies that are listed in the Interface document that's supplied on disk with JVFAX. This gives comprehensive details of the various types of interface and lists eight German suppliers. If you opt for the simple comparator interface all you have to do is connect this to the line or external speaker jack of your receiver.

Once the program is installed and the interface decided, the next will reside at least a VGA card and this latest version provides support for most of the common SVGA systems including VESA local bus systems. This means I'm now able to run my own system with 800 x 600 resolution and 256 colours. It's also important to note that this program, like many complex utility packages, does not run under a multi-tasking environment such as Windows.

The author's recommended minimum system comprises at least a 386 computer with SVGA-256 graphics and 16Mb memory.

The next item to decide on is the interface system between the computer and the receiver. JVFAX v6.0 supports a wide range of interfaces, but perhaps the most popular is the simple comparator type that connects to the serial port. This comprises a 741 op-amp and a few components that can usually be mounted inside a standard 25-way D connector. You will find that this interface is used by many commercial FAX programs and JVFAX has been designed to make use of these. The results from this simple interface are usually good enough to satisfy most listeners, but if you want better quality you will need to look at a more complex interface unit. These more complex units give access to smoother grey scales and better processing of detailed satellite images.

Fig. 1.- A sample worksheet.

The book tackles this complex subject in a step-by-step fashion by showing examples of charts received off-air and then guiding the reader through the interpretation. The coverage extends from surface analysis charts through to complex aeronautical charts and graphs. The final section even includes a few suggestions on equipment to use to receive FAX transmissions.

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Once the program is installed and the interface decided, the next
always stores the image at the received resolution and rather than that used by the screen. You can also use the date based reception facility for fully unattended operation. Many programs in the past have suffered through poor print routines. This is certainly not the case with JVFAX as the print quality using my Cannon B-5300 with the IBM driver was very good. Although not particularly relevant to this column, JVFAX also supports FAX transmission and SSTV reception. Overall then JVFAX 6.0 is a very competent FAX package and ideal for setting up where the video mode can be set to match a variety of common video chip-sets.

Satellite Utilities

Things seem to be warming up a bit of late so I can offer some help to get you started. I realise that for many of you satellites are a completely new area, so I will be putting together a more detailed tutorial for publication later. For now I'll just offer a few suggestions for those of you fortunate enough to already have a satellite receiver system.

Let's just start with a quick run down on how satellite communications systems operate. The main advance with satellite communications came with the discovery of the geostationary orbit that occurs in what has become known as the Clarke belt after Arthur C. Clarke who predicted its existence many years ago. Once a satellite has been placed in a geostationary orbit it appears to be stationary in the sky. The great advantage with this is that the ground based transmit and receive antennas don’t have to track a moving target. You can imagine the fun and games (and expense) associated with receiving satellite TV if we all had to have tracking devices! Needless to say the Clarke Belt is very much in demand with satellite suppliers and is suffering a fair degree of congestion. The result is that maximum use is made of every satellite and they all carry a wide range of different services on their transponders.

A typical satellite transponder has a bandwidth of around 36MHz and will carry one video signal plus a number of audio channels. Many of the more popular satellites such as the Astra series carry many of these transponders. Utility or data links are also carried on these satellites in a number of different formats. One simple way is to include the data in what are known as sub-carriers along with the TV audio. These are the easiest to detect and decode as they often use similar formats to their h.f. predecessors. It’s this type of data signal that I will concentrate on. To receive these you need to connect the base-band output from your satellite receiver to the antenna input of an h.f. receiver. Unless you are very sure of what you’re doing, I would recommend that you avoid direct electrical connection of these two units. A simple way to achieve this is to wrap together the insulated centred conductors of the leads from both units. Once the link is made, try tuning between 7 and 10MHz. If you want to hear some data, set your dish to Intelsat 601 (27.5°W) and tune your satellite receiver to transponder 75B (11.562GHz vertical). Now tune your h.f. receiver to 8.217MHz U.S.B. whereupon you will hear intermittent bursts of data at around 1200 baud.

There has been a lot of activity from listeners in the USA to detect and decode these signals as they are particularly common over there. The reason for this is tied-up with the satellite band used. The early satellite TV systems used transmissions based in the C band at around 4GHz. In many parts of the world this has now been superseded by the higher frequency Ku band which operates between 10.95 and 12.75GHz. Utilities in this band seem to be somewhat less illusive than the use of complex encoding systems. At this point I need to introduce a new term that is used by the satellite world to describe what we know as utilities. This term is Single Channel Per Carrier or SCPC. Whereas conventional TV transmissions will have a number of carriers carrying different portions of the main signal e.g. video plus audio channels, SCPC transmissions have the information for a single user modulated onto one carrier. In order to make some progress and start receiving these transmission we need access to the satellite equivalent of my h.f. frequency list. These are understandably a little illusive.

However, there are various sources of information that are about to become available. One of these is Design Technology Ltd., based in Sunningdale. This company specialises in satellite communications and runs a number of information distribution systems. While most of these centre around providing information on video and radio channel occupation, they also cater for some utilities. If you have access to a FAX machine, a call to their information service on (0338) 400213 will provide an eight-page document describing how to receive utilities from satellites. As this is a premium rate line you will be charged 36p/min cheap rate and 48p/min at all other times. If you have a computer with a modem you could also try accessing Design Technology’s Datastream Network. This is available on another premium rate line (0881) 516526 and gives access to a very wide range of satellite related information. The only point to watch here is that some of the files are very large and you can very quickly run up some big phone bills. In a recent conversation with Design Technology’s Bill Smith, he reports that he will soon be publishing a listing of active SCPC channels. This should be available both through the FAX service and the Datastream network. That completes this first look at satellite utilities and, as you can see, there is a lot more information to come. If you have any further information to offer please drop me a line.

Frequency List

As usual I have compiled a brief listing of this month’s utility logs from readers. If you would like a copy of my Decode list or Day Watson’s beginners list just send these first or second class stamps to the address at the head of the column. Don’t forget to include a return address label and mark the envelope Decode, Beginners or Both.

<table>
<thead>
<tr>
<th>Frequency (MHz)</th>
<th>Mode</th>
<th>Line Speed</th>
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</tr>
</thead>
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<tr>
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<td>FAX</td>
<td>120</td>
<td>576</td>
</tr>
<tr>
<td>3.36MHz</td>
<td>FAX</td>
<td>50</td>
<td>576</td>
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<tr>
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<td>FAX</td>
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<td>576</td>
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<tr>
<td>9.35MHz</td>
<td>RTTY</td>
<td>50</td>
<td>400</td>
</tr>
<tr>
<td>10.162MHz</td>
<td>RTTY</td>
<td>50</td>
<td>400</td>
</tr>
<tr>
<td>10.298MHz</td>
<td>RTTY</td>
<td>50</td>
<td>400</td>
</tr>
<tr>
<td>10.54MHz</td>
<td>RTTY</td>
<td>50</td>
<td>400</td>
</tr>
<tr>
<td>10.54MHz</td>
<td>RTTY</td>
<td>50</td>
<td>400</td>
</tr>
<tr>
<td>11.435MHz</td>
<td>RTTY</td>
<td>50</td>
<td>400</td>
</tr>
<tr>
<td>13.51MHz</td>
<td>RTTY</td>
<td>75</td>
<td>850</td>
</tr>
<tr>
<td>13.955MHz</td>
<td>APT</td>
<td>75</td>
<td>1150</td>
</tr>
<tr>
<td>14.88MHz</td>
<td>RTTY</td>
<td>75</td>
<td>850</td>
</tr>
<tr>
<td>19.574MHz</td>
<td>TDM342</td>
<td>96</td>
<td>170</td>
</tr>
<tr>
<td>19.672MHz</td>
<td>RTTY</td>
<td>100</td>
<td>850</td>
</tr>
<tr>
<td>23.37MHz</td>
<td>RTTY</td>
<td>100</td>
<td>850</td>
</tr>
</tbody>
</table>

USN Norfolk sat pix
Kiev Met
German Met
Belgrade Press TANJUG
Tehran Press IRNA
USN Norfolk sat pix
INA Baghdad
Bangkok Met
Akkra Met
MAP Repat press
Tehran Met
Rotterdam Met
Halifax Met
Ind Red Cross
Japen Met
Brussels
Dakar Met
Addis Ababa Met
Long Medium & Short

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

Medium Wave Chart

<table>
<thead>
<tr>
<th>Station</th>
<th>Country</th>
<th>Power</th>
<th>License</th>
</tr>
</thead>
<tbody>
<tr>
<td>610</td>
<td>Brussels (BBC)</td>
<td>10</td>
<td>JP</td>
</tr>
<tr>
<td>680</td>
<td>Geneva (BBC)</td>
<td>10</td>
<td>JP</td>
</tr>
<tr>
<td>712</td>
<td>London (BBC)</td>
<td>10</td>
<td>JP</td>
</tr>
<tr>
<td>737</td>
<td>Paris (BBC)</td>
<td>10</td>
<td>JP</td>
</tr>
<tr>
<td>792</td>
<td>Rome (BBC)</td>
<td>10</td>
<td>JP</td>
</tr>
</tbody>
</table>

Note: Lw. & mw. frequencies in kHz; s.w. in MHz; time in UTC (GMT). Unless stated, logs compiled in the four week period ending October 30.

Medium Wave Reports

Whilst checking the band in Redhill, Michael Williams was drawn to a weak signal 1296 kHz. It was a sports programme broadcast by Radiotelevisione Italiana (RAI) via their 10kW outlet in Calatanissetta, Italy. At best it was S1012 at 2000UTC.

Medium Wave Reports

There was a marked improvement in m.w. transatlantic signals in October. Several stations in Canada and the USA were heard at night by listeners in the UK.

n an attempt to improve reception in selected areas, some international broadcasters may bring new s.w. transmitters into service during 1994, or make even greater use of relays. Some may opt to send their programmes to listeners via a domestic TV satellite.

Not all listeners will welcome these moves, because the thrill of receiving direct s.w. transmissions from around the world will be denied them, but new technology is bound to bring changes!

Reports on all aspects of broadcasting are always welcome for LM&S, so please keep sending them to me. Happy New Year!
Particularly good conditions were observed on October 17 by Ron Damp in E Worthing. He logged CJ1V in John's, on 930 as 10222 at 0342.

**Local Radio Chart**

<table>
<thead>
<tr>
<th>Station</th>
<th>Frequency (kHz)</th>
<th>Report</th>
<th>Listener</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECC</td>
<td>14444 at 1145 in Kilkeel</td>
<td>Takhent, Uzbekistan (2120)</td>
<td>17.790</td>
</tr>
<tr>
<td>MBC</td>
<td>14444 at 1145 in Kilkeel</td>
<td>Takhent, Uzbekistan (2120)</td>
<td>17.790</td>
</tr>
<tr>
<td>BBC</td>
<td>14444 at 1145 in Kilkeel</td>
<td>Takhent, Uzbekistan (2120)</td>
<td>17.790</td>
</tr>
</tbody>
</table>

**Short Wave Reports**

How well the 25MHz (11m) broadcasts have reached their intended target areas is unknown to me, but quite often we UK listeners have heard stations in all manner, and other countries. They come from UAE R, Abu Dhabi 25.690 (Ar to Far East 0900-1100) 33333 at 1025 by George Tebbitts, Penmeenmawr; R. Newry Int, Oslo 25.730 (Nor to 1300-1325) and 33333 at 1025 by Fred Pallant in Storrington; RFI via Issoudun 25.620 (Fr to Africa 0900-1500) 25222 at 1000 by Simon Hockenuhl in E Bristol; R. Nederland via Flevo 25.970 (Sun only, Du to Africa 1030-1120) 45223 at 1030 by Eddie McKee in Newry.

Although meant for other areas, R. Australia's 21MHz (13m) signals have reached the UK most mornings. Their Darwin signals to SE Asia on 21.525 (Eng 0100-0900) were logged as 0705 by David Edwards, Warrington; and to Asia on 21.745 (Eng 0800-1100) 33333 at 1015 by Tom Winzor in Plymouth, to S Australia on 21.565 from Carnarvon (Eng 0100-0900) 34222 at 0756 by Gerry Haynes in Bushley Heath.

Also heard here in the morning were R. Moscow Int, Russia 21.615 (Eng WS 0400-1100), R. Sheila, Hungary 25.650 (Eng to Morden; BBC via Limassol 21.470 (Eng AF to 0300-1615) SID111 at 1028 by Philip Rambaut in Nassau and field center, as 1024 by David Edwards, Warrington; and to Asia on 21.745 (Eng 0800-1100) 33333 at 1015 by Tom Winzor in Plymouth, to S Australia on 21.565 from Carnarvon (Eng 0100-0900) 34222 at 0756 by Gerry Haynes in Bushley Heath.
Short Wave Chart, January 1994

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Station</th>
<th>Country</th>
<th>Power (W)</th>
<th>Listener</th>
</tr>
</thead>
<tbody>
<tr>
<td>958 kHz</td>
<td>BBC World Service</td>
<td>Eritrea</td>
<td>500</td>
<td>Sir Fajal</td>
</tr>
<tr>
<td>962 kHz</td>
<td>BBC World Service</td>
<td>Eritrea</td>
<td>500</td>
<td>Sir Fajal</td>
</tr>
<tr>
<td>1335 kHz</td>
<td>Voice of America</td>
<td>USA</td>
<td>1000</td>
<td>J. Brown</td>
</tr>
<tr>
<td>1338 kHz</td>
<td>Voice of America</td>
<td>USA</td>
<td>1000</td>
<td>J. Brown</td>
</tr>
<tr>
<td>1513 kHz</td>
<td>BBC World Service</td>
<td>Eritrea</td>
<td>500</td>
<td>Sir Fajal</td>
</tr>
<tr>
<td>1516 kHz</td>
<td>Voice of America</td>
<td>USA</td>
<td>1000</td>
<td>J. Brown</td>
</tr>
<tr>
<td>1947 kHz</td>
<td>BBC World Service</td>
<td>Eritrea</td>
<td>500</td>
<td>Sir Fajal</td>
</tr>
<tr>
<td>1950 kHz</td>
<td>Voice of America</td>
<td>USA</td>
<td>1000</td>
<td>J. Brown</td>
</tr>
</tbody>
</table>

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

Listeners:
- A. Verba Brinley, Woodhall Spa.
- Simon Hockenhull, E. Bristol.
- C. Dews Hughes, Morden.
- D. Broderick Illman, Oxen. 
- P. Alice Marlow, Woodhall Spa.
- Edi McKeough, Newry.

Quite a number of the broadcasts in this band are meant for Europe. Those noted came from R. Nederland via Fevo 9.650 (Eng 1130-1210) SID444 at 0700 in Morden; WRFC Oksewhee 7.355 (Eng 0900-1000) SID444 at 0900 in Morden; and YO56 EK 0800-0900 at 0830 in Morden.

During their broadcast to Europe, AVR via Fort 7.230 (Eng 0700-0800) rated 43333 at 0700 in Morden; WRFC Oksewhee 7.355 (Eng 0900-1000) SID444 at 0900 in Morden; and YO56 EK 0800-0900 at 0830 in Morden.

Some of the 6MHz (49m) broadcasts to Europe come from R. Nederland via Fevo 5.955 (Eng 1130-1210) SID444 at 1130 in Morden; R. Austria Int via Magdeburg 6.115 (Eng, Fr, Sp) 0900-1000 at 0900 in Morden; R. Nederland via Fevo 9.650 (Eng 1130-1210) SID444 at 0700 in Morden; WRFC Oksewhee 7.355 (Eng 0900-1000) SID444 at 0900 in Morden; and YO56 EK 0800-0900 at 0830 in Morden.

The 13MHz (22m) broadcasts to Europe include Croatian R, Zagreb 13.640 (C, Eng) 24/25 at 24/25 in Zagreb; Czech R, Prague 13.880 (Eng 1600-1625) SID444 at 1600 in Prague; Croatian R, Zagreb 13.640 (C, Eng) 24/25 at 24/25 in Zagreb; and Czech R, Prague 13.880 (Eng 1600-1625) SID444 at 1600 in Prague.

From time to time R. New Zealand's 9MHz (31m) broadcasts to Pacific areas 9.700 kHz reached the UK, but reception was often poor. In Macclesfield they were only visible on 0900-1000 and 2000-2100. They were also received in Iceland, rating 1322 at 1032 in Hafnarfjörður. Three of R. Australia's broadcasts also reached the UK via the Pacific areas via Shepperton (Eng 0800-2130) was 3132 at 0800 in Buenos Aires; 9.510 to Asia via Carnavon (Eng 0900-1000) 24433 at 24433 in Newry; 9.700 to Asia via Shepperton 9.700 (Eng 1430-1600) 44333 at 1513 in Woodhall Spa.

Whitchurch & with other areas were HCJB Quito 9.745 (Eng to Pacific areas 0700-1130) SID444 at 0830 in Morden; R. Austria Int via Magdeburg 6.115 (Eng, Fr, Sp) 0900-1000 at 0900 in Morden; R. Nederland via Fevo 9.650 (Eng 1130-1210) SID444 at 0700 in Morden; WRFC Oksewhee 7.355 (Eng 0900-1000) SID444 at 0900 in Morden; and YO56 EK 0800-0900 at 0830 in Morden.

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**Quarley List of Equipment Used**

**November 93** #December 93 • *r. January 94*

- **Tim Allison, Middlesbrough**: Lower HF-225 • r.m.
- **Ted Barry, N. London**: JRC NR-5300 • half size GBY or V Beam 10m long.
- **Les Bart, Sunderland**: Roberts R-2018 or Sony ICF-7706 or loop or wa.
- **Richard Beattie, Easter**: TQ 720 • r.m.
- **Darren Beasley, Bridgwater**: Philips D-295 + Hexagon loop or 6.3m wire.
- **Vera Bridwell, Woodhall Spa**: Sangean ATS-203 or Sangean SW90.
- **Kenneth Buck, Edinburgh**: Lower HF-225 • a.m. loop.
- **Tim Bucknall, Compton**: Sony ICF-2001D + 1½m wire.
- **Bill Clark, Ramsey**: Sony ICF-2010 + built-in whip.
- **Robert Connelly, Kidderminster**: TQ 100 or Sangean ATS-203 + Sony AN-1 or 3m loop.
- **John Coultier, Westminster**: Yeasu FRG-7 • r.m.
- **Geoff Croyell, Iceland**: Yeasu FRG-700 + dipoles + Datong AD307.
- **Martin Davey, Stockport**: Codor CR-704A + 1½m wire.
- **Ron Darn, Worthing**: Ralex BA17 or Yeasu FRG-7 or Sangean ATS-303 • a.m. + Window or T290 dipole.
- **John Eaton, Worthing**: Lower HF-225 + DATO 127 or 23m wire.
- **David Edwardson, Wallsend**: Tribo 860 + inverted V trap dipole.
- **Ron Gate, Livingston**: Phillips D-295 + a.m. • 23m wire.
- **Peter Gordon-Smith, Kingston, Maray**: Icom R95 + dipole or dipoles.
- **Michael Griffin, Ross-on-Wye**: Lower HF-225 + 10m wire.
- **Still Griffin, E. Maisy**: Sony ICF-2001 + 3m wire.
- **Robin Harvey, Bourne**: Matsui MR-4009 • 23m wire.
- **Gerry Hayes, Burgess Hill**: Kenwood R-500 + Rhodemic or r.m.
- **Francis Heasman, N. Shrewesbury**: Eton A70 or dipole or dipoles.
- **Simon Hockenhull, E. Brighton**: HMV 1124 + 3m wire or ITT Colt or Philips D-245 + built-in whip.
- **Stephen Jones, Gorleston**: Matsui H618 − 1½m wire.
- **Peter Kay, near St. Davids**: Sony ICF-2010D.
Andy Cadier
28 Romney Avenue, Folkestone, Kent CT20 3DJ

This quarter, we are opening with reports on some of the numbers stations that have been recently monitored by the European Numbers Information Group. The stories relating to these stations together with their suspected sinister purposes of dubious intelligence gathering are covered in several books. However, with the new friendly relationship with Eastern Europe and the reduction of hostilities in the Middle East, these stations still exist. Add to this the substantial advances in professional communications, that now make the facilities on the Star Ship Enterprise almost credible, their continued use is quite amazing. The locations of these stations are not publicised, the messages are coded and several are subject to jamming, thus increasing speculation over the threat they represent.

Lincolnshire Poacher is one of the oldest stations to receive and operates on a number of frequencies, latest reports list the following times.

0700UTC on 7.867; 9.251 & 11.860MHz
1400UTC on 14.487, 15.682 & 16.084MHz
1700UTC on 11.545, 12.603 & 13.375MHz
1900UTC on 9.090, 12.605; 12.603 & 13.375MHz.

SHORT WAVE IRREGULAR BROADCASTS CHART

Atlantis A, B, D
Balkian Relay A, C, D, F
Brighton B
Carolina SW A, B, C, D, E, F
CRSM B, F
D, F
D, G
Diamond A
East Coast Commercial A, B, E, F
European Christian A, B, G
FNs Holland B
Joey Roger B, A, G, D
Level 48 A
Marbela A, B, G
Marlin A, B, D
Optimod B, D
Oceanight A, B, R, C, U, I
Ozone A, D
Pacman A
Pamela A, B, D
Pirates German B
Pineapple A
Reflections A, B, C, E, F, G
Safari A
Solo A
Subterranean Sounds A
Tonekeeper Music B
Wavesinternational B
WGAS B, A, D, G
WIXR B

B: Bob Marsh, Besleyheath, Kent.
C: Darren Tagg, Brimington, Derby.
D: David Golding, Frinton, Sunderland, Temp & Wear.
E: Graham Smith, Pershhead, Aberdeenshire.
F: Roger Lewis, Ashford, Kent.
G: Chris Harris, Kidderminster, Worcestershire.

This station was very active over the summer when changes were made to its regular schedule. Other frequencies worth trying are 5.749 and 5.889MHz, some transmissions are subject to variable jamming.

A station that commences broadcasts with a repetitive three tone signal is only heard on Sunday evenings on 5.718 or 5.617MHz and is very clear in the UK. Broadcasts consist of 5 figure groups read in German by a female.

Spanish stations are reputed to originate in Central or South America, they can be heard in Britain in the early mornings. Frequencies to try are 8.165; 8.156; 8.475; 8.486MHz at about 0600UTC. Station NNN is one of the smaller stations, transmissions commence with the letter N in Morse code repeated for five minutes followed by a message read out in German by a female group with a count down. Try 5.177 and 5.821MHz at 2000 or 2100UTC.

Grapenve

Radio Brod was off the air during July, but returned at the beginning of August, there is international confusion over the legality of this station's broadcasts. The 50kW transmissions on 720kHz, from the ex-ocean going tug Cariboo can be heard in the UK during the night when BB8 radio 4 is off air. The ship is now renamed Dracht de Parole and is anchored outside the territorial waters of former Yugoslavia, it flies the St Vincent & Grenadines flag and is financed by the EEC.

Former Radio New York International boss Al Weiner is reported to be the one behind a new station that is yet has no name! A former trawler Ross Fortune now called the Fury, has been fitted out with four short wave transmitters, 2 x 10kW and 2 x 40kW and is being backed by an American businessman. The availability of illegal equipment is pointed out by Simon Parker of Wotton-under-Edge, he says that transverters can be obtained in the UK, so can internal boards to convert your CB radio to 7MHz. Output is 12W a.m./f.m. and 15W s.s.b., leaving you to make or buy a suitable antenna.

On the subject of spy stations, John Franklin of Ripley sheds some light on the Tyrolean music station, also mentioned in October. He, while in Germany, used d.i.f. techniques to trace the broadcast to Burg in what was then the German Democratic Republic. Bavarian folk music was followed not by numbers, but by phrases in German. John also refers to the censorship page on this site by the Radio Communications Agency, in respect of reporting on the reception of pirate broadcasts. SWM's present policy is not to provide pirate 'station details', if the frequency is given the station name is excluded and vice versa.

This article should reach you just in time for me to say Happy Christmas to all SWM addicts, also mentioned in October. He, while in Germany, used d.i.f. techniques to trace the broadcast to Burg in what was then the German Democratic Republic. Bavarian folk music was followed not by numbers, but by phrases in German. John also refers to the censorship page on this site by the Radio Communications Agency, in respect of reporting on the reception of pirate broadcasts. SWM's present policy is not to provide pirate 'station details', if the frequency is given the station name is excluded and vice versa.

Pirate Memories

Two ex-pirate Radio London DJs are publishing books based on their experiences during the middle 60s. Dave Cash, now with Capital Gold, has written a fictional account of his pirate days called All Night Long. It is published by Mandarin (£4.99). Keith Skues had intended to release his Pop Went The Pirates in 1968, however as he worked for BBC Radio One and was concerned over the legality of publishing a pirate oriented book the project was put on ice. He has now dusted off the manuscript and is vigorously updating each of the 500 or so pages, including the biographies of some 200 pirate radio DJs. Publication date will be 28 March 1994. Other details will be available shortly.

Radio Chat

Harry Richards of Barton-on-Humber has written with his recollections of the early days of AFN. He listened to three transmitters Frankfurt, Munich and Stuttgart and says the Munich Night Train became a classic programme of its day. He also remembers presenter Sgt. Don Cosgrove and a show called Off The Record.

Several readers have commented on the Echo Charlie Band mentioned last quarter. So far nobody has actually found out why it's called EC, however Bob Marsh of Bexleyheath has stumbled upon a pirate packet network operating on 6.572kHz and 5.5020MHz. He says they are running at 300 baud and using AX25 format. He also supplied me with a vintage Radio Geronimo sticker, which will find a place in one of my radio scrap books. The availability of illegal equipment is pointed out by Simon Parker of Wotton-under-Edge, he says that transverters can be obtained in the UK, so can internal boards to convert your CB radio to 7MHz. Output is 12W a.m./f.m. and 15W s.s.b., leaving you to make or buy a suitable antenna.

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**DRAKE R8E Communications Receiver**

**FEATURES FITTED AS STANDARD**

* Wide frequency coverage (100KHz to 30,000KHz) plus additional VHF bands (35-55MHz and 108-174MHz) with the optional VHF converter. Multi-mode reception includes AM, FM, RTTY, CW, USB and LSB.

* Five built-in filter band widths... for reception of most signals under virtually any conditions.

* Synchronous detector... for improved quality of received AM signals, especially under severe fading conditions.

* Non-volatile memory... for information retention during power outage.

* Built-in, multi-voltage power supply... for operation in most parts of the world on nearly any type of power line voltage.

* RS232C serial interface... for remote control of receiver functions.

* Multiple scan functions... for scanning by carrier, time or seeks modes of frequency or selected memories.

* 100 channel memory capacity... for storing of frequency, band, and mode data.

* Two operating VFOs... for increased flexibility and convenience.

* Built-in pre-amp and attenuator... for improved reception of extremely weak signals, as well as very strong signals.

* Timer function... for automatic operation. Very useful for recording purposes.

* Dual time zone built-in clock.

* Built-in dual mode noise blanker... for reduced electrical interference.

* Passband offset... for the reduction of nearby interfering signals while maintaining maximum intelligibility.

* Selectable AGC... for improved reception of fading signals.

* Built-in speaker. * PLL synthesised.

* Dual antenna inputs.

* Optimum tuning step selection for each operating mode.

* Connections for an external speaker and tape recorder.

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**THE EARS HAVE IT!**

"The R8 is a highly sophisticated receiver. We'd call it professional grade, or about as close to it as receivers get these days."

Staff Review - Popular Communications

"Overall, the Drake R8 is simply the best radio we have ever tested for quality listening to programs... There's nothing like it."  
Lawrence Magne - Monitoring Times

"The R8 is like a breath of fresh air, with its ground-up engineering and up-to-date digital control from the frontpanel. I am very pleased to see a quality HF receiver of American manufacture that should successfully compete one world market."

Bill Clarke - 73 Amateur Radio Today

"The best of the best for high-quality listening to news, music and entertainment from afar. Superb for reception offaint, tough signals too."


When Drake introduced the American made R8E Worldband Communications Receiver, they knew it would be judged by some very discerning ears, experts accustomed to the finest in short-wave listening equipment from around the world.

After listening to the world on the Drake R8E loud and clear, they have delivered a decisive verdict.

They appreciated the R8E's sensitivity, clarity and simplicity so much that many of them declared the R8E simply the best of its class. High praise, indeed, from very well-travelled ears.

The Drake R8E has been designed as a "complete package" - in fact, the only peripherals you may wish to add are a VHF converter, an external speaker or computer control through the RS232 serial interface.

But why take the word of mere experts, put the Drake R8E to the test yourself. Our UK distributors, Nevada Communications, will be pleased to demonstrate the radio or direct you to your nearest Drake stockist.

We are confident that once you have listened to the Drake R8E your ears will hear of nothing else.

**PRICE..........................................................£995 including VAT**

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**R L DRAKE Co., Miamisburg, Ohio 45342, USA**

Available from selected Drake dealers throughout the UK or:

**UK Distributors:**

NEVADA COMMUNICATIONS
189 London Road, Portsmouth, PO2 9AE Order Direct Line 0705 613900
The Award Winners

HF-Europa "Best DX receiver 1992"
HF-150 "Most Innovative Receiver Design"
HF-225 "Receiver of the Year"

All across the world, users and reviewers are singing the praises of the Lowe Short Wave receivers. You can join the happy band by calling in at any of our branches to try them out. Remember - you are buying direct from the manufacturer, and not some importer.

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