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Cover: Our cover this month shows a 'screen-grab' from the Spacetech software reviewed on page 18. If you look closely, you might see our old offices on the Quay at Poole, as the satellite picture shows a detailed view of Poole harbour!
Letters

SWM Services

Subscriptions

Subscriptions are available at £21 per annum to UK addresses, £23 in Europe and £25 overseas. Subscription copies are dispatched by accelerated Surface Post outside Europe. Airmail rates for overseas subscriptions can be quoted on request. Joint subscriptions to both Short Wave Magazine and Practical Wireless are available at £36 (UK) £39 (Europe) and £41 (rest of world).

Components for SWM Projects

In general all components used in constructing SWM projects are available from a variety of component suppliers. Where special, or difficult to obtain, components are specified, a supplier will be quoted in the article.

The printed circuit boards for SWM projects are available from the SWM PCB Service, Badger Boards, 87 Blackberry Lane, Four Oaks, Sutton Coldfield B74 4JF. Tel: 021-353 9326.

Back Numbers and Binders

Limited stocks of most issues of SWM for the past five years are available at £2.00 each including P&P to addresses at home and overseas (by surface mail).

Binders, each taking one volume are available for £5.50 plus £1 P&P for one binder, £2 P&P for two or more, UK or overseas. Please state the year and volume number for which the binder is required. Prices include VAT where appropriate.

Orders for back numbers, binders and items from our Book Service should be sent to: PW Publishing Ltd., FREEPOST, Post Sales Department, Arrowsmith Court, Station Approach, Broadstone Dorset BH18 8PW, with details of your credit card or a cheque or postal order payable to PW Publishing Ltd. Cheques with overseas orders must be drawn on a London Clearing Bank and in Sterling.

Credit card orders (Access, Mastercard, Eurocard or Visa) are also welcomed by telephone to Broadstone (0203) 659950. An answering machine will accept your order out of office hours and during busy periods in the office. You can also FAX an order, giving full details to Poole (0203) 659950.

Faulty Batteries

Dear Sir

Other readers of your excellent magazine may be interested in a problem that arose with my Matsui MR-4099. The solution would, I think, also apply to the basic Sangeele ATS-803A.

The problem arose when the set failed to switch on when the power button was depressed. In my set up, the receiver operates from an external mains supply but the internal batteries are left in place.

Checking the other functions the clock and the display light still operated although I thought the clock display was a little dim. I therefore concluded that the switch was the problem and began to dismantle the set to get at it! After removing one circuit board, it was evident that life was going to be difficult, and feeling pretty depressed about the whole problem, I suddenly noted the instruction of the back of the set, "If this product malfunctions, try new batteries'.

Could it be, I thought, the two small AA type batteries for compact back-up that were causing the problem. It seemed to me unlikely since the set would not turn on. However, I checked them and they were a little flat.

A visit to the local store for two new batteries restored the Matsui to life — so the moral really is: if this product fails to function, try new batteries!

K Milne

Hants

Electric Earth Storm

Dear Sir

While I was researching, I came across a news item in the Daily Mirror, 2 November 1903, regarding what must be one of the first reports of sun spots giving a bit of trouble, and confusing everyone. I will repeat it a word for word, as printed in the Daily Mirror.

Electric Earth Storm - Telegraphic Communication Strangely Broken.

An electric earth-storm was the curious phenomena that puzzled telegraphists and interrupted the wires on Saturday. The electric disturbance was confined entirely to the earth, and interfered considerably with the working of all the land lines and cables. Only four or five words a minute could be sent by the American cables at certain times during the day, and communications with the Continent was much interrupted.

France was isolated during part of Saturday in regards to telegraphic communication with the rest of Europe and with the United States. The disturbance (Reuter states) is attributed to seismic movement and atmospheric phenomena, as to the nature of which nothing definite has been ascertained. This is the first time that such a thing has occurred since the introduction of telegraphy.

Telegraphic communication was suddenly restored at sunset, but at half past five was again interrupted, this interruption being officially attributed to magnetic phenomena of terrestrial origin. The telegraphic service (says Reuter) had to be carried on by post. Internal communication in France was not interrupted.

It is interesting to note that a new cluster of sun-spots, measuring about 77,000 miles in length has been observed. The association between sun-spots and electrical, as distinct from atmospheric, storms thus receives a further proof.

That's it word for word. The front page carried a little snippet "News at a Glance", and included, "An electric disturbance, felt only beneath the surface, seriously interrupted telegraphic communications between England, France and America."

E. Dunlop

Scotland

Missed Point

Dear Sir

I feel that Mr Richards missed my point in his reply to my letter in the May issue of SWM, which is that I am at a loss to understand why anyone would pay out a large amount of cash for equipment, and then to re-sell it quite soon after, at presumably not a profit, but a loss.

H. F. Buggins

Oxon

No Code Licence

Dear Sir

Having read many letters and articles on the subject of the proposed 'No Code Licence', there has been, it seems, no mention of the one big advantage that c.w. has over all other modes of transmission. That is the ability to communicate with anyone in the world, regardless of language, by means of the Q Code.

By this means a QSO can be held with another amateur in the world. Admittedly it is rather basic and limited in what can be said, but its scope could be radically improved by an extension of this, the Q Code, to further embrace radio amateur needs.

Peter Fairingston G3PLJ

Weston-super-Mare

Dear Sir

Please find enclosed a report in today's Times newspaper (26 June 1993), which may be of interest to your readers - 'Radip ham clogged the air with silly voices'. In view of the Morse debate, it would be interesting to know whether this idiot held a Class A or B licence.

D.W. Dunstan

London

Ed: According to the DTI, Mr Robert Hitchcock, the radio amateur concerned in the report, was found guilty on five of the ten charges, ordered to pay a £3500 fine and £6000 prosecution costs, his equipment was also forfeited. It was a case of using amateur radio outside the terms of his licence.

Peter Fairingston G3PLJ

Weston-super-Mare

Ed: Mr Robert Hitchcock, the radio amateur concerned in the report, was found guilty on five of the ten charges, ordered to pay a £3500 fine and £6000 prosecution costs, his equipment was also forfeited. It was a case of using amateur radio outside the terms of his licence.
**Microwave Cookery**

**Dear Sir**

On the subject of microwave cookery (Letters, June SWM, Nick Day, Cheltenham), I tried both Yagi and log-periodic types, and can report in cutting my fingers, although I did achieve a somewhat misshapen dish.

After this, I went back to the beginning, and cut out a Hertz resonator, which is simply a ring with a spark gap.

I made a stack of such rings, with a pork sausage up the middle, standing on a beefburger as a ground-plane. Unfortunately, the experiment came to an abrupt ending when the sausage exploded violently. Possibly the s.w.r. was all wrong. Anyone wishing to repeat this experiment should first notify the police, fire brigade, ambulance and where applicable, air-sea rescue!

H. S. Stevens

**Buckinghamshire**

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**Transatlantic DX**

**Dear Sir**

If you were a m.w. or v.h.f./f.m. DXer and you heard stations identifying themselves on m.w. as WABC, WGMS or KCBC then you could be excused for imagining that you had heard some exotic transatlantic DX.

On the v.h.f./f.m. band should you hear the identifying call letters such as KFM, WNK, CVS or CNFM then again you could be led to believe that some form of propagation anomaly was being allotted to Canadian and US stations, there may actually be a WABC or WNK or any of the others which is legally entitled to use those call letters.

If a G3XXX went on the air calling himself openly W3XXX then retribution would be swift. Why then are these licensed British stations allowed to identify themselves with these pseudo call letters? It all started in the mid-80s when the pirate KFM came on the air, the others have merely copied KFM. Why does the British licensing authority condone this misuses of identifying call letters?

I am listening to KLFM and have heard the ID used three times in an hour long programme, earlier I heard KCBC on m.w. identify twice within minutes, surely this is illegal?

W. E. Moore

**West Yorks**

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**RF Radiation**

**Dear Sir**

George Millmore raises an interesting point in his letter (SWM July) on the subject of radiation.

The safety standard in the UK has, for many years, given the maximum safe exposure as 10mW/sq cm. The former Soviet Union, not noted for being kind to its citizens, used the much lower figure of 100µW/sq cm.

We can easily calculate the power density of a transmitter at any distance if we assume the power is uniformly radiated over a sphere with that distance as its radius.

Power density = Power in µW/4π r² (cm²)

For a 1MW transmitter at 1km distance, this gives a figure of about 8µW/sq cm. It can be argued that power is not uniformly radiated, but this is cancelled by the power of 1MW being the effective radiated power (e.r.p.), i.e., the power in the beam.

We can see that since the power density is inversely proportional to the square of the distance, we can regard the power received from the transmitters more than say 10km away as being negligible, so George need not worry.

We get the same answer for an amateur transmitter using 100W and 10m from his antenna, but this is 'real power' not e.r.p. so he should be careful not to sit in the beam of a high gain antenna.

Hand-held transmitters are a different story. A SW transmitter at 20cm from the head gives about 1mW/sq cm, which is to high, at least for anything other than occasional use.

J. H. C. Wells

**East Grinstead**

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**Valve Construction**

**Dear Sir**

Your recent publication of the three valve regenerative receiver article happened to coincide with my acquisition of a pair of high-impedance headphones, an item that I had been looking for, on and off, since the publication of the SWM-50 receiver in March 1987. Although I could not track down any Acorn valves locally, I did manage to source a DL92 and set about building a SWM-50, as much out of interest as anything else, never having worked with valves before.

The construction went according to plan and I was soon twiddling knobs hoping to hear at least something, but all was not well. Even with a pre-amplifier in circuit, only a very few weak broadcast stations could be resolved, certainly no s.s.b. or c.w. on 3.5MHz, the valve just didn't seem to want to go into oscillation, or anything near it. The original article suggested that the tapping point on the coil may need to be adjusted, so several metres of wire and a few coil formers later I had some improvement, but the cathode had been tapped so far down the coil that it was virtually direct to earth, indeed connecting the cathode directly to earth and ignoring the coil tapping completely gave the best volume in the headphones, but of course, no feedback meant no regeneration so selectivity was wanting to say the least and s.s.b. and c.w. were out of the question.

I have since replaced every component in the circuit, including buying a new valve (shock, horror!), but still cannot get any improvement. Did I miss an error or update to this article or am I just expecting too much out of this little set?

I noticed the three valve receiver used a very similar detection circuit so I can reasonably assume that it will work given the right conditions. I do not want to give up on this idea, running a valve on a PP3 has a certain attraction, but I would appreciate a few pointers as to where I might have gone wrong.

My headphones are Brown Type F which I have rewired in series, this gave a significant improvement over the original parallel wiring but still no regeneration. The only reservation I have is the RFC. 100 turns over a 1 watt resistor is fine, but is the physical size of the resistor important, I guess it might be, how big is a one watt resistor, also is the value important, will a 100Ω item be OK or does it need to be of the order of several kΩ? These questions may seem trivial to the old-timers who have come up with these things but to me, and I suggest many like me, they are a mystery.

C. R Eve

**Jersey**

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**Japanese Test Station**

**Dear Sir**

I recently brought a Realistic DX-434, that has proved to be quite good and efficient.

I have received many stations such as Radio Australia, Israel, Saudi Arabia and many others. The one that particularly interested me was a test station from Japan, the address is as follows, or rather what I thought to be said at the time as the presenter spoke poor English, but better than my Japanese.

Radio OLMSIKO, Shirkio, Hitoana, Shzoka, Japan Zip code 418-01.

I would be interested to hear from any other s.w. listener who may have heard this station and could confirm the address. The station broadcast on 21.56MHz at 04.56UTC, date 1 June 1993.

C. Prior

**South Yorkshire**

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**Letters**
**AVON**

RSGB City of Bristol Group: last Mondays, 7pm. The Small Lecture Theatre, Queens Building, University of Bristol. Aug 23 - Your ideas are Needed! Dave Bailey G4NKT. (0272) 672124.


**BERKSHIRE**


**CHESHIRE**


**DERBYSHIRE**

Derby & DARS: Wednesdays, 7.30pm. 119 Green Lane, Derby. Aug 4 - Rally Preparation Evening, 11th - Satellite Television by GSUGF, 18th - Visit to Carsington Reservoir: Mrs Hayley Winfield, 2 Hils Cottages, Crich, Matlock, Derbyshire DE4 5DD. (0773) 859904.

**DORSET**


**EAST SUSSEX**

Southdown ARC: 8:00pm Chasely Home for Disabled Ex-Servicemen, Southcill, Bolsover Road, Eastbourne, East Sussex. Aug 2 - Radio in Air Traffic Control by G6HKR, Jan G4KNL. (0232) 412699.

**ESSEX**


**GREATERNORTH**

Edgware & DRS: Thursdays, 8pm. Wasing Community Centre, 145 Orange Hill Road, Burnt Oak. Aug 26 - SSE Field Day Briefing by G41UZ. Rod Bishop 081-204 1868.

**Lancashire**

Rochdale & DARS: Mondays, 8pm. Cemetery Hotel, Bury Road, Rochdale. August 16 - 5 Million Volts, Aftermath by GOGNR. Dave. (0706) 32502.

**NOTTINGHAMSHIRE**

Manfield ARS: 2nd Mondays, 7.30pm. The Polish Catholic Club, off Windmill Lane, Woodhouse Road, Manfield. August 9 - Foxhunt at the BBQ. Mary GDNZ. (0623) 75258.

**OXFORD**

Oxford & DARS: 2nd & 4th Wednesdays, 4.5pm. Littlemore Hospital Social Club, Terry Hasting. (0865) 803526.

**SUFFOLK**

Sudbury & DARC: 1st Tuesdays, 8pm. The Five Bells Inn, Great Cornard, Sudbury. August 3 - The Grid Dip Oscillator Explained by BBLT. Colin. (0767) 77004.

**WARWICKSHIRE**

Mid Warwickshire ARS: 2nd & 4th Tuesdays. Aug 24 - Fox Hunt 7pm start horizontal 1.m on 145.350. Don Darke. (0628) 424465.

**WEST MIDLANDS**

South Birmingham RS: West Heath Community Association, Hamstead House, Fairfax Road, West Heath. August 4 - MAXPAK Demo by GDIK1. 021-4743784.

**WILTSHIRE**

Trowbridge & DARC: 3rd Wednesdays. The Southwark Village Hall, Southwick, Trowbridge. August 4 - Family Picnic, 18th - Natter Nite. Ian GGGRI. (0225) 864698.

**SOUTH YORKSHIRE**

Eve of Evesham: August 8 - The Annual Treasure Hunt meet at Evesham Post Office 2.30pm. Alasdair Lindsay G4NRO.
Sunshine 855

Dave Potter G4OVX has written in with a very interesting insight into the equipment used at Sunshine 855's station. Their transmitter site is located 6km south-west of Ludlow and comprises an omni-directional vertical antenna system. This uses a 48 metre mast with the uninsulated part of the upper stays providing top loading. A good ground plane is provided by an earth mat of some 120 wires radiating from the antenna base and buried 400mm below ground. In the transmitter hut are two RCA 250 watt transmitters that are set to give an output of 400 watts to the antenna. The 855kHz signal is provided by a pair of drive units where the frequency is kept within 0.25Hz.

Modulation is controlled using an Orban Optimod 9100 audio Processing unit to ensure that the signal bandwidth stays within the license requirements. The programme signal is fed from the studio to the transmitter using a BT private circuit. At the Waterside studio Technics CD players, grams and cassette players are used along with a Tascam reel-to-reel tape deck and Aircom mixing deck to control the programme content. All the station adverts and jingles are held on disk using a Digital Commercial System.

VHF Antennas

This month's postbag revealed an interesting new booklet that's available from Maxview Ltd of King's Lynn. The booklet provides simple guidance for the installation of a wide range of v.h.f./u.h.f. broadcast antenna systems. I found it very informative with lots of clear diagrams illustrating a very informative with lots of antenna systems. I found it of v.h.f./u.h.f. broadcast installations there was lots of information on distribution systems. The descriptions were very detailed and covered the combining of v.h.f. and u.h.f. antenna feeds into one cable. What is perhaps most remarkable about the booklet was that it's free! For more information contact Maxview Ltd, Common Lane, Setchley, Kings Lynn, Norfolk PE33 0AT. Tel: (0553) 810376.

Medium Wave News

Those of you who'd like more information on medium wave DXing may be interested in joining the Medium Wave Circle. As the name implies the club provides specialist news and information for the medium wave listener. I've just received a copy of the May/June Newsletter and it's packed with useful information and reception reports. If you'd like more information you can write to the Secretary, Harold Embelton, 137a Hampton Road, Southport PR8 5DY.

QSL Addresses

A few interesting DX stations have written in giving QSL addresses you might find useful. The first is the Pakistan Broadcasting Corporation based in Islamabad. If you're interested in listening, they transmit English programmes to Europe on 17.9 and 21.52MHz between 1300 and 1600UTC. If you can only listen in the evenings, there's an alternative broadcast at 2200 on 11.57 and 15.55MHz. The QSL address for the station is Pakistan Broadcasting Corporation, Headquarters, Broadcasting House, Constitution Ave, Islamabad, Pakistan.

Another interesting station is Channel Africa based in Johannesburg. The frequencies and times to watch are 11.745 and 17.71MHz between 0400 and 0700UTC. You may also catch them on 5.96 or 17.71MHz between 1600 and 1800UTC. To QSL write to Channel Africa, PO Box 91313, Auckland Park 2006, Johannesburg, RSA.

Free Holidays!

Have you ever fancied a holiday in Cuba? If so, you might like to enter the Radio Habana Cuba International contest. All you have to do is write for an entry form and then choose one of their tourist resorts and explain why you like it. Sounds so simple it must be worth a try. The four winners will be given a one week all expenses paid trip to Cuba. Apparently, all entrants will receive a present, so you really can't lose! The address is Radio Habana Cuba, A Voice of Friendship Heard Around the World, PO Box 6240, Havana, Cuba.

Mark Jones of Godalming writes with a problem that troubles many broadcast listeners. He wants to know how to receive a weak station that's being swamped by a stronger local station. In his particular case he enjoys listening to the AFN networks from Germany.

Whilst he has great success at home, he is about to move out to France. There the reception conditions are very different with the AFN stations being swamped by Italian stations. Mark asks if a more expensive receiver would help overcome the problem. Although a better receiver may help a little, the best solution is likely to be a combination of things. By far the most important is to select the best frequency for the station you want to receive. This is where you can make good use of a frequency guide such as the World Radio and TV Handbook.

A check through my reference show that AFN main transmissions are on 873 and 1107kHz. The lists also shows that FORMA transmits on 1107kHz. I suspect it is this latter station that's causing Mark's problems. The solution may be simply retuning to 873kHz when in France. If the problem still persists the best course of action is to use the directional properties of the ferrite rod antenna that's used in most receivers. You will often find that by rotating the receiver you will find a position where the difference between the wanted and unwanted is greatest. Alternatively you could use one of the external loop antennas that are available from several suppliers.
**RAE Courses**
The City of Westminster College (formerly Paddington College) will be running a RAE course. Starting in September, it will run until May 1994 and Class A and B Licences will be catered for. An Advanced Morse course is also hoped to be run, taking in candidates up to 22-25 w.p.m. with an insight into professional & marine procedures, etc.

For enrolment details contact Ann James, Science & Technology Department, City of Westminster College, 25 Paddington Green, London. Tel: 071-723 8826.

Brighton College of Technology are to begin running RAE courses from 13 September. The courses will run on two evenings. Mondays from 6 to 8.30pm covering theory and Wednesdays for Morse and Practical Project Building.

For details of enrolment fees, etc., contact T. F. Strickland G4EOA on (0273) 667788 ext. 433 or 730.

Southdown ARS will again be running weekly evening classes to introduce newcomers to amateur radio and to assist in the preparation for the RAE. The classes start on Friday 1 October 1993, 7.45pm and run until May 1994, at the Lagoon Leisure Centre, Vicarage Lane, Hailsham.

The first part of the course, leading up to Christmas will feature various aspects of amateur radio as well as an introduction to basic electronics and radio theory. As from 7 January 1994 the classes will follow a 17 week course in to prepare for the May examinations.

For more details contact John Vaughan G3DQY. Tel: (0323) 485704 or Vic Robins GOTHX. Tel: (0323) 846774.

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**Kenwood TR-751 Stolen**
On Tuesday 22 June a Kenwood TR-751 was stolen from Amateur Radio Communications Ltd in Merseyside. The rig is minus the box, lead and microphone.

If anyone is offered a Kenwood TR-571 serial no. 4090041 they would please contact Amateur Radio Communications Ltd., 36 Bridge Street, Newton-Le-Willows, Merseyside WA12 9BA. Tel: (0925) 229881 immediately.

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**Increased Demand**
Holdings Amateur Electronics of Blackburn have recently reported that the escalating prices caused by the Pound's 25% fall against the Yen has created an increased demand for repairs on second-hand equipment.

Harry Leeming G3LLL has therefore advised SWM that as from August, Holdings Amateur Electronics will close for one extra day a week. The new opening hours are as follows: Tuesday, Wednesday, Friday and Saturday 9.30 am - 12pm & 1.30 - 5pm.

Further details from Anglia Microwaves Ltd. on (0277) 630000.

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**Directly Heated Crystal Oscillator**
The Piezo Crystal Company has recently introduced the Directly Heated Crystal Oscillator (DHXO).

This patented technology bridges the gap between TCXOs and ovenised oscillators and is available from Anglia Microwaves Ltd. Using an SC cut crystal with a 'heater' deposited on the crystal blank, more rapid warm-up can be achieved, with lower d.c. power consumption compared with a conventional ovenised crystal oscillator. The SC cut crystal also provides improved ageing, phase noise and vibrational sensitivity.

The DHXO has a frequency range of 7-20 MHz and has a stability over temperature of 2 x 10^-7 over -20 to +70°C. Ageing is 1 x 10^-7 per year and d.c. power input is less than 1W at +12V d.c. Allen Variance is offered at 1 x 10^-11 per second and s.s.b. phase noise is -153dBc/Hz at 10kHz.

With a volume of one cubic inch the DHXO is useful for portable applications where size, power consumption and performance are important.

Further details from Anglia Microwaves Ltd. on (0277) 630000.

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**ISWL Awards**
The International Short Wave League is one of the few organisations to offer awards to listeners as well as licensed amateurs and is one of the only organisations to offer awards to broadcast band listeners.

There are nine awards on offer ranging from the Century Club Award, which is given for verified contact/reception of 100 countries as defined on the ISWL Country List, through to the Short Wave Broadcast Bands DX Award that is for broadcast band listeners only.

Full details of all the awards, rules and prices can be obtained from Herbert Yeldham G6XOU, ISWL Awards & Contests Manager, Deal Hall Farm, Burnham Marshes, Burnham-on-Crouch, Essex CM06NQ.

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**Commtel Scanners**
Nevada Communications of Portsmouth have introduced a new range of Commtel scanners to their range.

Commtel scanners are made by one of Japan's largest manufacturers, who have been building high quality products for many years. Nevada have tested the first samples and say they can thoroughly recommend this new range of reliable and easy to use scanners.

For more information contact Nevada Communications, 189 London Road, North End, Portsmouth PO2 9AE. Tel: (0706) 698113.
**International Air Tattoo**

The Royal Air Force Benevolent Fund will be holding their International Air Tattoo '93 (IAT '93) at RAF Fairford, Gloucestershire during the weekend of July 24-25.

This year there will be a record 14 national display teams in action including the RAF's inimitable Red Arrows Aerobatic display team, the Royal Jordanian Falcons as well as a display team from the Czech Republic, the Army Air Corps Eagles and the Dutch Air Force Grasshopper helicopter team. Star of the show should be the Russian TU-95 Bear Bomber - visiting the UK for the first time by invitation!

Tickets for the IAT '93 are available from branches of the Alliance & Leicester Building Society, B&Q Superstores and selected Tourist Board Offices or direct from the IAT booking office on (0891) 122997 (calls cost 36p per minutes cheap rate, 48p per minute at other times, 10p of which will be donated to the RAF Benevolent Fund).

Further details on IAT '93 can be obtained from the IAT Hotline. Tel: (0891) 122999 (charges as above).

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**SMC Aquires Jaybeam**

Jaybeam are one of the best known and longest surviving names in the amateur radio antenna business. Due to their success in the professional side of their business and stretched manufacturing capacity, it was decided that the amateur antenna production should be sold.

South Midlands Communications Ltd. who already have a large manufacturing facility, supplying structures and antennas for the furniture trade, felt that it would be the ideal choice. Under the banner J B Antennas, SMC will continue to provide the same high level of technical, spares and sales support.

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**Cirkit Catalogue**

Cirkit have recently published their Summer 1993 Electronic Constructors' Catalogue. This 224-page edition includes 25 product sections and over 4000 product lines as well as new products, scanning receivers and accessories in 25 product sections and over 4000 product lines as well as new products, scanning receivers and accessories. Plenty of new components are available from most larger stores.

**Adventist World Radio**

During the last few months Adventist World Radio have had difficulties in transmissions to north west Europe. The antenna system has been replaced and reception of the UK is once again very satisfactory.

Transmission details are: Sundays 0930UTC on 7.230MHz. On the last Sunday of each month the programme relates to m.w. and technical news and the Sundays inbetween are devoted to s.w. nets.

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**How Small Can We Go?**

The National Museum of Science & Industry, London currently have an exhibition running until 26 September 1993 on the beginnings of nanotechnology and the benefits of extreme miniaturisation.

How Small Can We Go? is the sixth in the Science Box series sponsored by Nuclear Electric Plc, and explores nanotechnology or the technology of atom sized dimensions.

Visitors to the exhibition can see US engineer William McLellan's rotating electric motor measuring 0.4mm cube, as assembled in 1959. Also on display is a model McLellan's rotating electric motor measuring 0.4mm cube, as assembled in 1959. Also on display is a model.

For further details of How Small Can We Go? contact the Science Museum, Exhibition Road, London SW7 2DD. Tel: 071-938 8080/8088.

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**Radio &TVDX News**

Digital Audio Broadcasting (DAB) has been given the thumbs down in Germany! The project started last year has been scrapped due to a shortage of funding at the ARD and the nearest commencement date has been put back to 1997. ARD are pushing to run a future DAB network that will add considerably to the costs whereas the network is currently operated by the DBP broadcasters need only lease transmitting equipment. The ARD also are unhappy about the cost of moving 300 fill-in Ch. E12 relay stations to u.h.f. to obtain the Band III DAB spectrum.

There may be a new terrestrial MMDS service opening in New Zealand's main cities soon operated by Cellular-Vision NZ (Auckland) and offering up to 60 channels.

The Berlin 'Inforadio 101' has closed with nearly DM8 million losses after nearly 18 months on air but only securing and 8% market share in Berlin City. And the Swiss TV station 'TELL-TV' may be closing prior to its opening! Money has run out and the 24 staff have not received their salaries for months.

A new commercial TV station 'Tele-2' opened in Lithuania during April but funds are drying up due to the region's high inflation levels. The channel that replaced the Moscow 3rd channel for the region is popular since many American/European programmes are screened and dubbed in Russian. And a name change for Kanali 29 in Athens, Greece which will become 'SuperStar TV' September 1st and radiate more popular entertainment shows. The need for change is that the present heavily charged political programming is only drawing 1-2% of the viewers and the station operates in the red.

'TV-6' is 'Moscow Independent Broadcasting Corporation' (MiBC) and transmits via MMDS across the capital under the callsign 'TV-6 MOSCOW'. Currently transmitting 1500-2000 hours expansion will take them to a 20 hour format and in 1994 should hit round the clock operation. Currently running 100 watts e.r.p., transmissions will increase to 1kW e.r.p. Programmes consist of a mix from many European satellite programmes.

Another mix of satellite programming will be transmitted by the Icelandic STDD-2 service which has just applied for a licence for microwave transmissions to cover the capital Reykjavik initially with expansion to other towns if successful later.

RTL is new aired in Berlin on Ch. E41 and E56. Between 1830-1845 a local news programme is aired called 'TV AngermundelLokaL' but on the Channel E41 only.

Finally, a new TV station in Rotterdam called 'TV Gold Holland' will open this coming Autumn. Originally intended to offer a service for cable systems only, provision has been made for a u.h.f. transmitter to be placed on the new p.t.t. tower at Walhaven in the harbour area, channel as yet unknown. The 180m high tower will allow reception over the whole province. Initially the service will be on-air for a few hours weekly.

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**Search for peak radio frequency**

This is the second of a new 20 part series on how to find the peak frequency for your receiver. We are basing it on the experience of a seasoned radio amateur, Martin Green. Martin will show you how to...
RECEIVING YOU LOUD AND CLEAR!
WORLD CLASS RECEIVERS
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Short Wave Magazine, August 1993
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Universal M-400

Following Universal's success in the USA, Mike Richards takes a look at the Universal M-400 Decoder.

The Universal M-400 is a very neat, stand-alone decoder designed to handle a range of popular data signals. The modes included are RTTY, ASCIL, SITOR A and B, FEC-A, SWED-ARQ, FAX, ACARS, POCSAG, GOLAY plus a number of tone decoding systems. This is an unusual mix of modes and I'll take a closer look at the type of information that can be decoded later. As you can see from the photographs, the M-400 was very smartly presented with an angled front panel to aid viewing. The controls have been kept to minimum and all are mounted on the front panel.

Setting-up

As with most stand-alone or self-contained decoders the external connections requirements were very simple. The M-400 needed an external d.c. power supply that could deliver between 11 & 16V at 200mA. The connection was made using a standard coaxial power socket. The easiest way to meet this requirement is with one of the simple plug mounted supplies that seem to be so readily available. The relatively low power consumption even makes portable/mobile operation a possibility.

Connection to the receiver can be made in one of two ways. The simplest method, for most operators, is to use the receiver's external speaker socket. The only problem with this system is that inserting a plug into the receiver's socket usually disables the internal speaker. The Universal team have thought of this and provided a separate 'speaker out' jack for the connection of an external speaker. There's also some rather crafty switching associated with the tone detection modes that I'll cover later.

An alternative to using the external speaker jack is to use a low level audio output from the receiver. The M-400 features a separate 3.5mm jack for this connection. This was well thought out, as the speaker jacks were automatically isolated when the low level jack was in use. This minimised the risk of damage should both inputs be in use at the same time.

The only other connection to be made was the printer. This was met via a 25-way D connector that aligned with the standard used for IBM compatible printer to PC leads. This should make it easy to link-up to any printer with a Centronics interface. Although having the ability to printout is very useful, it's not essential for most of the modes. The only exception is FAX reception where the output is only displayed on the printer. Incidentally the M-400's software could support any Epson compatible 8- or 24-pin printer.

Internal Display

One of the important features of the M-400 is the built-in display unit. This comes with a two line liquid crystal unit mounted on the front panel. Each of the lines was able to display twenty characters using a five by seven dot matrix pattern. Although there was no backlight facility, the display contrast was very good. Rather than acting as a simple display of the decoded output, the M-400 has a number of interesting features. The basic display mode is called 'STRING' and simply shows the text as it's received. The text is displayed left to right on the bottom row first that then scrolls up to the top row. A problem with this type of display can be the break-up of words as they reach the end of a line. The M-400 tackles this in software by returning you to the default display mode. An important point with this display mode was that the decoder continues receiving information while you're reviewing the text buffer. This means you can freely check received text without losing any new information.

An alternative display method called BURST was provided for dealing with signals that send data in bursts. This is designed specifically for use with the POCSAG/GOLAY pager systems. In these modes the ACARS aviation system. All these modes send their data in high speed bursts that would be hopeless with the direct display mode. In the BURST mode, the M-400 displays the data one line at a time with a user programmable delay between each line. The delay can be set to any value between 0 and 19.5 seconds in 0.5 second intervals. In practice, I found that around two seconds was optimum. As with the direct mode, you could use the manual scrolling system to review any received information.

The final display mode was designed specifically for handling the tone decoding systems. In these modes the only information transmitted is a tone pattern. The M-400 simply displays the...
frequency of the received tones - I’ll cover the relevance of this later.

**RTTY Reception**

Let’s start with what is probably the most popular of the h.f. utility modes. Selection of the receive mode is done using the UP and DOWN buttons on the front panel. Pressing FUNCTION takes you to the mode menu and you then scroll through the various options. A second press of FUNCTION takes you to the set-up screen for the selected mode.

With RTTY you could select shifts of 170, 425 or 850Hz and speeds of 45, 50, 57, 75 and 100 baud. This is a good range of options that enables reception of most of the popular h.f. RTTY modes. If you need to receive an unusual shift you could manually set the shift for any value between 100 and 1000Hz in 5Hz steps. Once you have selected the appropriate speed and shift, you can set about tuning-in the required signal.

The M-400 features a simple two I.e.d. tuning indicator for RTTY signals. To use this, you tune across the signal until both I.e.d.s flash with approximately equal brightness. Personally, I find this type of indicator very easy to use - this may be because my first decoder used this system! Once tuned-in the M-400 locked on to the signal very quickly and proved to be a very good decoder. For handling inverted signals you can toggle between normal and reverse polarity by pressing the SENSE button.

There is also a gain control on the front panel that’s used to adjust the signal level so that the LEVEL I.e.d. lights. One of the advantages of this level control is that it can be used to eliminate the reception of garbage when tuning around or between overs. The M-400 also appeared to need a lot of signal to drive it. A few measurements showed that it required around 150mV to light the LEVEL I.e.d.

For the review I used the M-400 with a Lowe HF-150 and my old Icom IC-720A. The performance with both receivers was very good. Because the M-400 uses an active filter detection system, it was very good at handling weak and fading stations. I tried it with a number of difficult reception conditions and it fared very well. Despite its good decoding system, the results could be improved still further by the addition of an external audio filter or by better filtering in the receiver. Closely associated with RTTY is the ASCII mode that’s provided on the M-400. This was able to receive at 75, 110 and 150 baud using the same range of shifts as RTTY. Although it’s a useful addition, the only station regularly sending ASCII is the ARRL amateur news station W1AW. (Another connection to the Radio Society of Great Britain - 3CW.)

**AUTOR Reception**

What’s this I hear you ask? It is Universal’s term for the M-400’s mode that provides automatic selection and decoding of SITOR A and B signals. The parameters of this mode were fixed with synchronised extremely quickly. In my tests this synchronisation period was always less than two seconds. I found the decoding algorithm to be very effective as there was very little garbage filtering through to the screen. The display operated in STRING mode and presented the message in bursts of three characters. I found this particular display mode very easy to read. If you missed a point of interest, you could use the manual scrolling to look back through the received text.

**Advanced Modes**

In addition to the basic modes described so far, the M-400 was able to resolve SWED-ARG and FEC-A signals. These two modes are far less common than RTTY, but can usually be found in most frequency lists.

SWED-ARG is a mode used primarily by the Swedish diplomatic service and is to be found scattered throughout the h.f. bands. The code used is complex and employs the International Telegraph Alphabet No 3 with an added parity bit. There is also a variable block length that can be 3, 9 or 22 characters long. The M-400 can handle all the block lengths, so is able to receive all versions of this mode. Due to the complex nature of the signal it can take a while for the decoder to synchronise.

It’s probably worth mentioning the DATA I.e.d. at this point. This is a very useful feature that is used to indicate that the decoding logic has synchronised and is processing data. It’s with the more complex modes such as SWED-ARQ that this really comes into its own. Without it you are never quite what’s going on. The second complex mode, FEC-A, is a broadcast mode that’s used by some of the European press and diplomatic agencies. It uses a complex variant of the ITA 2 and, again, includes parity checking.

As the system uses full interleaving, it can take a while for the M-400 to synchronise and start producing text. Despite the fine performance, it’s important to appreciate that there’s very little plain English text around with either of these complex modes.

**FAX**

The M-400 featured a limited facility FAX mode that supported the reception of charts with a drum speed of 120 r.p.m. and an IOC of 576. As the majority of h.f. charts follow this format this limitation was not a particular problem. Because the FAX charts cannot be viewed on the built-in I.e.d. unit, a standard computer printer is required to display the received image.
I must admit this mode caused me a few problems when I first tried it out. The difficulties centre around the lack of any tuning display for this mode. You therefore have to use trial and error to select the optimum tuning point. On the bright side, the 'sound' of a correctly tuned signal can soon be learnt and, once mastered, the M-400 is easy to use.

To help make life easy for the FAX operator, the M-400 supported automatic reception and could recognise the standard start and stop tones. Other features provided were a manual start and phasing adjustment. The phasing adjustment moved the image 0.5in to the left for every press of the DOWN button. This was useful for correcting images that had been started manually.

**Pager Modes**

Now this was a bit different - a decoder for the v.h.f. monitor. Have you ever wondered just what goes out over the various pager networks - well the M-400 will tell you the answer. The two modes that support pager decoding are POCSAG and GOLAY. As these two systems directly modulate the carrier with a digital signal they have a significant low frequency component.

This type of signal often suffers distortion within the receiver due to the i.f. roll-off in the audio stages. The M-400 manual was very helpful giving a number of suggestions to improve reception. During the review, I found I was able to successfully decode pager signals using a Netset PRO-46 scanner. However, to be successful, you do need a good strong, clean signal. Both the pager modes employed the BURST display mode to give a more readable display. As with the other modes, you were able to scroll through the display at any point. The display format for these pager modes were very well thought out with each line containing the pager type and message.

**Aviation Data**

Airband enthusiasts may well be interested to hear the M-400 is able to decode the Aircraft Communication Addressing and Reporting System (ACARS).

This is a Packet like data mode that's used to handle routine data reports from aircraft. The very short duration of the transmissions means they can be very difficult to find unless you live near a major airport. As with the other v.h.f. modes the BURST display mode is used to make the data easily readable. However, as the data is simply blocks of alpha-numeric characters you will have to employ another level of decoding before the data becomes meaningful.

**Tone Decoding System**

Yet another interesting development is the inclusion of a range of tone detection systems. The modes supported are CTCSS, DCS and DTMF. These systems are used extensively on radio links with shared usage. Each of the users is assigned a particular tone sequence that is programmed into the receiver. Once this has been activated, the receiver will only respond to transmissions that use the pre-arranged tones.

The M-400 has a special mode for handling CTCSS and DCS systems. In its analysis mode it will display the CTCSS or DCS code for any transmission it receives. Having identified a tone sequence, you can then program this into the M-400 and use it to control the path between the speaker in and out jacks. In this way you can be very selective in your monitoring! This mode suffers similar problems to the pager mode, e.g. distortion of the data signals due to poor receiver i.f. response. If you're really keen to use these modes you will probably have to get your scanner modified to give an output direct from the detector.

**Printer Control**

I mentioned earlier that the printer was an option on all modes except FAX so I thought an explanation might be helpful. Although the manual only gives limited guidance, I found that you could successfully control the printer operation by taking it on and off line. This meant the printer could be left connected without consuming vast quantities of paper. It's also worth noting that the printer operated from the decoder output and not from the display buffer. I rather think it would be an improvement to run it from the buffer as you could then review and print interesting messages.

**Summary**

The M-400 is certainly a neat and interesting decoder. It was good to see such a wide range of modes included, but I was surprised to see Morse left out. The decoding performance was very good on all modes except FAX. If FAX is not your main interest then I would thoroughly recommend this as a very competent decoder. The Universal M-400 costs £379.95 and is available from Martin Lynch, 286 Northfield Avenue, Ealing, London W5 4UB. Tel: 081-566 1120.

**My Thanks to Martin for the loan of the review model.**
When you're satisfied... We're delighted!

Ref: WYTBK Front-end modification Kit.

Just to confirm my recent comments to you by telephone in regard to the above kit. I found the performance of the YAESU FT-786R to be very much improved following the modification; the receiver performance is now superb, as you know. I did the modification myself and because of this, although I am not without experience, I was pleasantly surprised to find that the rig still worked!

Many thanks for an excellent modification.

Yours sincerely,

[Signature]

DEAR MR. LYNCH,

Just writing to thank you for the excellent front-end modifications you supplied - exactly as promised. I am currently in the process of changing my rig and was very glad to take advantage of your offer.

Many thanks for all your help and advice.

Yours sincerely,

[Signature]

DEAR SIR,

Please find enclosed a reply to your recent letter. The feedback I received from you was most positive and has given me confidence to proceed with the modifications.

Yours sincerely,

[Signature]

DEAR MR. LYNCH,

I am delighted with the service and expertise provided. The rig arrived safely - well packed - ( I am impressed. Thanks for your help.

Yours sincerely,

[Signature]

DEAR MR. LYNCH,

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Yours sincerely,

[Signature]

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Mystery Man of the BBC

Eric Westman unravels who the mysterious broadcaster was in the early days of the BBC.

As they 'tickled' the galena in their crystal receivers or adjusted the reaction of their primitive valve radios, listeners to the British Broadcasting Company's National programme one winter evening received a pleasant surprise. For, instead of the stodgy talk they had been expecting, their earphones and horn loudspeakers gave forth with the cultured tones of an unknown gentleman recounting a fascinating story. The huge audience was delighted, for nothing of the kind had come over the air before. During the next few days, people on buses, in the streets and pubs discussed excitedly this new departure on the part of the BBC, eager for it be repeated and to know more about the innovator. Hundreds of letters swamped the BBC asking for details of the wonderful raconteur and demanding that he should broadcast more of his weird tales in his inimical manner.

So began, on Saturday 31 January 1924, a mystery that intrigued the radio listeners of Britain during more than a decade and a half. For despite urgent entreaties, the BBC would give no information upon this teller of bizarre tales beyond his pseudonym of A J Alan. Speculation about his identity was rife. Was he an aristocrat, a famous stage performer appearing incognito, or even a member of royalty? It would give no information or even a member of royalty? It would give no information as to whether Alan was a person in disguise, but merely a devotes as A J Alan's letting was honored by court, castle and cotter's ben. As telling was honored by court, castle and cotter's ben. As 4th quarter of an hour. Countless thousands of curious devotees at last learned the truth: 'A J Alan' was a civil servant.

Born in 1884, Captain Leslie Harrison Lambert had served in the Royal Navy and now worked for Navy Intelligence at the Admiralty. He took up his mystery side-line after he had heard a wireless talk by Sir William Bull, who was lamenting the demise of the ancient art of story-telling. Fired with an urge to remedy this latter-day deficiency, Lambert approached Rex Palmer, the first London Station Director of 2LO, who gave him an audition. Palmer engaged him straight away. As one of the conditions of his engagement, Lambert insisted that his identity should never be revealed, and the BBC entered into the spirit of the matter by maintaining an atmosphere of mystery around their popular performer, whom they presented as A J Alan. To further increase his mystique, Alan limited his broadcasts to five every year, all eagerly anticipated.

Alan's eccentricity extended to the studio. He always arrived attired in correct civil service garb, carrying a rolled umbrella and a dispatch case. Perching himself on a high stool close to the microphone, he would open his dispatch case and take out a candle and a box of matches. Placing the candle upright on a convenient ledge, he would light it as a precaution should the lights fail. Alan must have a sight, for on the occasion they did fail, but, thanks to his emergency lighting arrangement, he did not even falter in his recital. Having performed his ritual with the candle, Alan dived into his dispatch case and withdrew his script, which had previously been pasted onto sheets of cardboard and now assembled in a pile on his knees. This was a precaution against the rustling of paper, which would sound in early loudspeakers like waves breaking on the shore. Alan's script would be marked at intervals with directions such as 'cough here', 'pause', 'sigh', etc. The recounting of the story that seemed so informal to the listener was, in reality, carefully contrived. Alan would never smoke or drink, and the manner of telling his story was meticulously rehearsed.

Each of his broadcasts began with the introductory words "Good evening everyone" which became his catch phrase, eagerly awaited by his adoring listeners. Through earphone and speaker trumpet flowed his light, almost surprised tones, to thrill his unseen audience with yet another of his strange tales. All of his stories, right from the first, 'An Adventure in Jermyn Street', had a weird, almost ghosty quality that reflected his own ghost-like character.

Four years after he began his radio story-telling, a collection of Alan's stories were published in 1928, with the not surprising title of Good Evening Everyone. It carried an enthusiastic foreword by J C Reith, the Director General of the BBC. Reith wrote, An old-time story-teller has found his way into the twentieth century from the days before the invention of printing, when the art of story-telling was honoured by court, and speaker trumpet flowed his light, almost surprised tones, to thrill his unseen audience with printing became established, the art gradually died out, and several centuries had to pass before Broadcasting afforded the long-delayed opportunity for a revival. It was no exaggeration to say that A J Alan had been a pioneer. His 'Good evening everyone' had always been the precursor to an amusing and intriguing quarter of an hour. Countless listeners enjoyed his genial cynisms, his gentle satire, his ridiculous but convincing yarns of burglary and adventure - all told in such a blasé manner.

Alan broadcast not only for the BBC but later from Radio Luxembourg in a 15 minute series called 'Story Telling' that began on the 9 July 1939. The German occupation of the Duchy of Luxembourg during the Second World War put a sudden end to the series, and the arch-raconteur's last broadcast was made in March 1940.

His death in 1941 at last allowed his true identity to be revealed. There was among his devotees a general feeling of let-down that A J Alan was not, after all, some important person in disguise, but merely a civil servant with a remarkable aptitude for telling his own stories.

So ended a phenomenon that had delighted and mystified the wireless listeners of Britain for more than sixteen years. And despite the disappointment of A J Alan's many fans on learning he was a nonentity, he was in popular estimation truly a King of Story Tellers.
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Short Wave Magazine, August 1993

5
International Marconi Day

Vic Scambell G3FWE took part in the International Marconi Day celebrations on the Isle of Wight.

This year’s Marconi Day, 24 April 1993, was expanded in presentation as a build-up for the anniversary of ‘D’ Day in June 94. Therefore, as a step in this direction, one of the old underground ammunition tunnels was cleared of many years debris - less the wartime barbed wire, closing off an interconnecting tunnel and the whole complex of six tunnels complete with 1945 style military kitchen.

Unfortunately, these are not open to the public and are in need of much attention. However, the tunnel chosen has been allocated to the Communications & Electronics Museum Trust (CEM) for storing various electronic artifacts of yester-year. Therefore, it was decided to make restoration of approximately a third of the storage tunnel into a wartime display of military communications and to activate a c.w. station from the tunnel in support of the s.s.b. station in the museum lodge, using the call sign GBOIMD.

The work proved to be somewhat laborious beginning in January 1993 and taking up to the first week in April to complete. The major part being undertaken by G3FWE and G3KPO - Douglas finding it difficult as he was recovering from a hernia operation. This layout is available to the public on a now permanent basis during the summer months at the Wireless Museum, Puckpool Park, near Ryde, Isle of Wight.

Viewing a 1943 night-sight, can be seen, left to right, Lord Mottistone, Wing Commander Alec Gilding G3KSH, G3FWE, Lady Mottistone and Dr Graham Winholt.

The work proved to be somewhat laborious beginning in January 1993 and taking up to the first week in April to complete. The major part being undertaken by G3FWE and G3KPO - Douglas finding it difficult as he was recovering from a hernia operation. This layout is available to the public on a now permanent basis during the summer months at the Wireless Museum, Puckpool Park, near Ryde, Isle of Wight.

of Wight. Probably, the hardest part was moving some heavy artifacts into position although several members of the public were coerced into assisting with this!! The antennas were fed through ventilator shafts in the ceiling, the internal ventilator system for explosives!

Posters were forthcoming from the Imperial War Museum and most amazingly, from people’s lofts and cupboards. Also, I must not forget the Royal Navy Amateur Radio Society and the Royal Air Force Amateur Radio Society, both contributing their flags for flying from the mast-head above the tunnel. Both groups took an active part supplying operators for the event, G3JFF, G3UK, G3WAO, G3KHS all operating c.w. as a wartime station underground would have done.

The weather proved, as usual, most peculiar - heavy rain the day prior to the event, keeping fine for the event, then chucking it down afterwards! The RSGB stand was well attended, installed in an adjacent tunnel with the wine and light refreshment! The St John’s Ambulance Brigade attracted some recruits and the Isle of Wight Radio Society operating from the Lodge had a good attendance and also took the opportunity to introduce a group of Novice operators to the intricacies of the Public Event Stations on the v.h.f. and u.h.f. bands.

The day’s event went well and was visited by many dignitaries including Lord and Lady Mottistone (Governor of the Isle of Wight) as well as Medina Borough Council Mayor, Barry Wade. The event drew a considerable number of visitors, many reminiscing on the artifacts of wartime memories and the earlier pre-war items in the Lodge. Some 600 stations were contacted in all continents. It may be of interest to note that the CEM Trust has another museum at Arreton Manor on the Isle of Wight and is co-ordinating a display of Radar at Bletchley Park.

A vote of thanks is given to all who participated and assisted with the presentations.

Marie Astrid Plant, aged just 8 years old, practising her wireless telephony!

Part of the display in the ammunition tunnel.
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PDSview & The Weather

Graham Woolf takes a look at two programs available from Spacetech Weather Systems

Image Processing

The image is loaded initially into the primary band along with the current palette and it is on this image that the processing techniques are applied. The results can be transferred to one of three secondary bands consisting of the red, green and blue components of the primary and menu options allow the transfer of images between these bands. Some of these processes are destructive, however, and if not required it is necessary to reload the image.

The processing options within the package are quite substantial. Arithmetic and binary operations can be applied to alter the values of individual pixel elements, geometric operations can resize, move, rotate and reflect an image. Convolution matrices can be applied that can be user defined such as sharpening or softening an image or applying edge enhancement. All these are shown in a preview window so the effects can be observed before being applied to the whole image.

It is not possible to go through all the facilities available in this package in the space available but they provide a comprehensive range of powerful tools for the processing of any image.

By far the most stunning aspect of PDSview is the ability to produce multi-spectral images, especially those received from the other Spacetech application, Weather Desk. This is achieved by saving the infra-red and visible images added together and placed in the green band, when all these secondary bands are added together, a breathtaking 16-bit multi-spectral image is produced which really has to be seen to be appreciated.

It is also possible to save the actions carried out on an image to a command file. This is very useful if the same type of image and the same operations are carried out as by running the file the processes are applied automatically.

PDSview can also be used to produce a sequence of images that can then be loaded into PDSMovies and played as a moving sequence. This small application allows you to start, stop and reverse direction and the speed of animation. It will also accept sequences created in the Weather Desk.

Conclusion

I have really only scratched the surface of the capabilities of PDSview and it takes some time to realise just what the package can do. It will help to read one of the many books on image processing, although Spacetech have produced a couple of small tutorials to get you started. The application itself is superb and together with the processing power of the Archimedes provides a powerful tool for image manipulation.

Weather Desk

Weather Desk is an application also running on the Acorn Risc OS series of computers enabling anybody with the requisite hardware to receive and display images from the many meteorological satellites in orbit.

It requires a minimum of 2Mb of memory and will benefit from having a fast hard disc to replay animation sequences and a multi-scan monitor to view images in high resolution. An expansion card with the necessary decoding hardware is also required. The most outstanding feature of
Desk

The software is the fact that in conjunction with the multi-tasking operating system it allows you to have up to six animation windows open at once. This means that, for example, you can collect sequences of images from say, the D2, C2, C2D, CTOT, DTOT and Admin slots at the same time as well as enabling you to use your computer for other things.

The main features of the package are automatic scheduled collection to disc, user defined timetable, background collection of images and unlimited frames.

Collecting Meteosat Images

In order to collect a particular sequence it is first necessary to create a task. This is achieved by first loading the application along with the required engineering file. This file holds all the parameters required for satellite reception such as the carrier frequency and picture format for WEFAX images. The application installs itself on the Archimedes icon bar and displays a small dish with the system time shown underneath. The computers clock must be set to GMT to receive the correct Meteosat images that can also be achieved automatically by using the satellite signal. The schedule is then selected from the menu and the required slot is highlighted. The Meteosat timetable is kept in text format so that any changes made by ESA can easily be incorporated. The highlighted slot is then collected in the framestore and the resultant image is copied to the reference window that can display the image at full, half or quarter size.

At this stage various facilities are available to enhance the image. First the whole frame can be collected or a particular area can be outlined by the reference window and magnified as required. A coloured backdrop can also be used to give colour to the land and sea areas. Certain backdrops are provide by Spacetech and it is possible to trace your own. A number of image processing techniques can also be applied such as median filtering to remove the outlines of the land masses, a 3D projection to give the clouds that lumpy look much loved by the TV weather forecasters and Floyd-Steinberg dithering to improve the perceived number of grey levels.

A palette can also be associated with a task, for example, to spread the available grey levels over the range of the image. The required number of frames can also be specified and can be as many, or as few, as you wish. If a hard disk is used then the limit is the capacity of the disc.

As is usual once the specified number of images has been collected the oldest image is discarded. At this stage the task is complete and can be saved. As I mentioned earlier, it is possible to have up to six animated tasks running at once. Once the tasks are running, a control window can be opened that gives access to various parameters that can be applied to the animation - such as the number of frames in the sequence, the first and last frame and the speed of the animation, which (if the sequence is stored on a hard or floppy disk) depends on disk access time.

An engineering window is also available that shows the calibration data that can be changed either manually or automatically at the start of an image. A small window shows an oscilloscope display of the received image.

Collecting an Image From Polar Orbiting Satellites

This is again a question of creating a task by loading up the appropriate engineering file. Default files exist for most of the current polar orbiters. It is also possible to collect either infra red or visible images or both side by side from the NOAA satellites. This is important because using PDS View, the image processing package I described earlier, it is possible to create superb multi-spectral colour images (that can be viewed in 16-bit colour with the appropriate hardware) by combining the visible and infra red images.

The size of the image buffer has been collected the oldest image is discarded. At this stage the task is complete and can be saved. As I mentioned earlier, it is possible to have up to six animated tasks running at once. Once the tasks are running, a control window can be opened that gives access to various parameters that can be applied to the animation - such as the number of frames in the sequence, the first and last frame and the speed of the animation, which (if the sequence is stored on a hard or floppy disk) depends on disk access time.

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Collecting an Image From Polar Orbiting Satellites

This is again a question of creating a task by loading up the appropriate engineering

Summary

The ability to be able to have up to six different collection tasks active at once with all images collected in the background has meant that even while producing this review using my computer, image collection has carried on. This is just one of the many advanced features available form this superb package and has transformed the collection of satellite images.

Prices

PDSview software £99.50
NASA CD sampler (two CD Disks with assorted images from Voyager, NOAA, Landsat, Viking, Seasat) £40
NASA Voyager database (12 CD disks with 26000 images from Voyager)
Also Landsat and SPOT panchromatic and multiplexed data available on CD. Prices on application.

Two disk demo for PDSview and Weather Desk £5.00

Weather Desk

Software £99.50
Podule (includes Weather Desk) £329.50
Meteosat Station, (complete system) £1199.00
GMS Station (for Australia,NZ) £1699.00
NOAA upgrade for Meteosat and GMS £495.00

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My thanks to Spacetech Space Science Resources, 21 West Wools, Portland, Dorset DT5 2EA. Tel: (0306) 822753 for all their help in preparing these reviews.
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Short Wave Magazine, August 1993
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As many SWM readers are aware, we are the UK’s largest distributor of Scanning Receivers - supplying many of the dealers who advertise in this magazine. As a result, over a period of time, we receive in our bulk shipments from Japan and elsewhere product with marks or slight damage to the outer cover sleeve or carton. For this month we can offer a limited quantity of these secondhand receivers, BRAND NEW WITH 1 YEAR GUARANTEE, but with slightly damaged or missing outer packaging sleeve, box etc.

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Short Wave Magazine, August 1993 21
"I am delighted to be able to start this occasional series with news of a small technological miracle of electronics which I have in fact invented myself. It's called the "Squadger" and it started life as a project for Practical Wireless but ran into difficulties on two counts. First I felt the financial rewards were not really justified for such a marvelous piece of equipment and secondly there was great difficulty in finding a name for it as all the obscure names of west country places and rivers that I liked had already been used by the editor for previous projects.

I am now delighted though to tell you dear reader, that the manufacturing rights for the Squadger have been bought-up by a major manufacturer. But what, I hear you say is a Squadger?

Put simply, it is the logical development of the familiar metal detector or 'treasure tracer'... you know the kind of thing, it looks like a dinner plate on the end of half a broomstick which is attached to a human who appears to be using a primitive form of Sony Walkman. But whilst the metal detector has both limited range and scope (in terms of what it can find), the Squadger can be programmed to find almost anything.

No matter how many DIN plugs, PL259s, ballpoint pens and paper clips you buy, you never can find one when you want one. I can tell you now that they are all piled up in a massive hole in the ground in the West Riding of Yorkshire and the prototype Squadger found them in no time at all. Soon you will be able to buy a Squadger. At this very moment the first ones are coming off a production line on a small trading estate near Cambridge. It consists of a small black box made of matt black plastics and has a full QWERTY keyboard with pushbuttons made from squidgy rubber that feels like cuttlefish skin. The price will be £99.95 (not including batteries) and delivery will no doubt be much longer than 30 days."

This was the start of a series of 'occasional barefaced lies about products and developments' that came from the prolific pen - or rather the wordprocessor - of a very special person. It was published in our sister magazine Practical Wireless in December 1988 and was written by Peter Rouse GU1DKD. Peter was a dedicated radio amateur with a fantastic sense of humour. He had the rare ability to explain in simple, readable terms the technicalities of radio, or, as in this instance, to make his readers laugh while getting to the point. This gift he put to good use, writing several books and many technical features on one of his favourite subjects - radio.

Short Wave Magazine readers will remember Peter best for his very popular monthly column "SSB Utility Listening". This was Peter's own idea stemming from his interest in this particular facet of the hobby. The way in which the column developed was almost entirely due to his enthusiasm and boundless energy. Even during his recent illness he could still dream up fresh ideas for future use in the magazine.

Peter was well-known in the Channel Islands as a television presenter for Channel Television. In fact he was so well known on Guernsey that when I asked in St Peter Port which bus would get me to St Andrews Parish Church for two o'clock, the bus inspector knew that I was attending Peter's funeral. The funeral itself, although tinged with sorrow, was not a sombre affair - just as Peter himself would have wished. He leaves behind Val and children James, Abbi and Arron.

Short Wave Magazine will miss the humour and wisdom of Peter's writing.

Dick Ganderton G8VFH
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**Project**

**Do-it-yourself Chart Recorder**  Part 3  Richard Noble deals with the electronic control system of the chart recorder

The electronic system can be split into two basic items, the motor servo drive and the multi-trace multiplexer.

Dealing first with the servo drive, the principle is essentially simple. The slider potentiometer is connected across a fixed voltage so that when the slider contact is moved, the potentiometer gives an output proportional to its position. The voltage is subtracted from the incoming input voltage and the difference is amplified by an operational amplifier and two output power transistors.

If the two voltages are equal and the difference is zero, then the amplifier output will be zero and will start to drive the motor. Provided the motor is connected the right way round it will drive the slider towards a voltage match again and when a match is achieved, will stop. In this way, the potentiometer slider position (and, of course, the pen position) follows the input voltage.

Unfortunately, this simple idea sounds very convincing but does not actually work! The reason is that it is a dynamic feedback system that has friction and inertia in the loop, causing phase shifts that usually send it into oscillation as the motor overshoots, reverses, overshoots again the other way and so on ad infinitum.

There is, however, a solution in this case - velocity feedback. When the motor overshoots it is hit with a reverse voltage, not proportional to its tiny overshoot, but proportional to its speed. This brings it to a halt in short order. It is also easy to do, as all it needs is a capacitor across the amplifier input resistor. This acts like a short to rapidly changing voltages, momentarily increasing the amplifier gain.

The other factor that affects this kind of oscillation is the total gain of the feedback loop. Ideally, we want as much gain as possible, but no continuous oscillation. A small amount of damped oscillation is acceptable, however, and the gain to achieve this can be controlled by the variable resistor just ahead of the transistor drivers.

An additional amplifier is added ahead of the system to increase the instrument sensitivity and this is all that is required to make a single channel chart recorder. The pen follows the incoming voltage and if it is on the paper, draws the required picture.

**Trace Multiplexer**

A multi-trace chart recorder would be much more useful in many applications and since this is a very slow recorder there is plenty of time to do all manner of things between making marks on the paper. In particular, we can make marks somewhere else without any noticeable loss of continuity. The technique is to keep the pen off the paper until we want to make a mark, use a switch to select one of a number of possible inputs, let the pen settle in position, drop it, pick it up and then repeat the process for the next input.

When input from all channels has been collected, the system stops and waits for a while to give the paper roll a chance to settle in position, drop it, pick it up and then repeat the process for the next input. When input from all channels has been collected, the system stops and waits for a while to enable the paper roll a chance to move on a little before starting the whole process again.

The electronics to do this consist of a timer that issues a pulse at intervals, an oscillator triggered by this pulse to issue somewhat faster pulses to a counter, and a decoder to provide a switching voltage level on separate output lines for each state of the counter. When the last count level is reached, its output is fed back to the front end to switch the oscillator off. Each count state gives out a signal which is used to operate something, such as select the required channel, switch on the motor amplifier, lift the pen, etc. Each output can be fed to several places to make things happen simultaneously such as connecting the motor and selecting a channel. Where the same event is required at several different times the various counter states are combined in a gate used to control that event.

**Circuit Operation**

The circuit diagram is shown in Figs. 3.1 & 3.2. The two channels have gain controls feeding into two LM324 operational amplifiers IC1a & b, each with its own zero offset control to separate the traces vertically. The outputs are selected by analogue switches into a third LM324 IC1c acting as the comparator for incoming signals and
The next output on pin 7 switches channel 2 on and as above also removes the motor drive amplifier short, the pen settling in the new channel 2 position, after it has been lifted as the solenoid releases. The next count on pin 10 again operates the solenoid dropping the pen on to the paper once more, but in a different place. The counter steps once more to give an output on pin 1 and since this pin is connected to the reset pin it immediately resets the counter to its zero state which does nothing. Pin 1 is also connected to the reset pin of the first 4013 bistable IC4a, which also resets, shutting off the clock pulses and terminating the recording cycle.

The system then goes into a rest period until the long time interval 556 timer IC3 emits another pulse, starting the entire process off again. During this rest period, however, the quartz clock will continue ticking, although the output is terminated after each count. The system thus repeats the recording cycle ad infinitum.

The power requirements are ±5V at about 1A and can be provided by a simple conventional power supply using 7805 and 7905 regulators provided by a simple transformer.

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Bearcat has been a respected name in the field of scanners for many years and are probably one of the best selling ranges of scanners in the USA. The scanners themselves are made by Uniden in the Philippines, and their scanners are also made for Tandy (Radio Shack in the USA). Short Wave Magazine have had a Uniden Bearcat UBC-200XLT on loan and Graham Tanner has been trying it out.

UBC-200XLT Scanner

The radio is a hand-held unit with a slim liquid crystal display at the top of the front panel, a keypad beneath it and a small speaker just beneath that. The battery-pack slides onto the bottom of the unit, similar to most 144 and 430MHz band hand-helds. The battery pack is shaped so that it can only be fitted in one way.

The top panel contains two rotary controls, a BNC antenna connector and an earphone socket covered by a small plastics shield. The two rotary controls are a combined volume and on/off switch, and a squelch control. Unusually, the controls operate in different directions; the squelch control works anti-clockwise, and the on-off/volume control works clockwise.

The earphone socket is an unusual (for a scanner, at least) 2.5mm socket, but a simple 2.5mm-3.5mm adapter socket soon made the socket compatible with the rest of my equipment. Inserting the supplied earphone into the socket silences the audio from the speaker, so you can listen to the radio without disturbing others. The earphone socket has a small plastics plug that is used to prevent the ingress of moisture or dust.

The rear of the battery pack contains a socket where 12V d.c. can be connected to recharge the battery. There is also a small i.e.d. that lights-up when the battery is being recharged. You do not need to have the battery pack connected to the radio to recharge it, so you can always buy a second battery pack and then use one and recharge the other.

The battery pack supplied with the radio contains six ‘AA size’ rechargeable batteries, which provides 7.2V at 600mAh; the manual states that this should last for about 5 hours before a recharge is required. When the battery charge runs low, a small BATT indicator blinks on the i.c.d., and after 10 minutes of this, the scanner automatically switches itself off.

The scanner itself does not have a belt clip, but the protective 'leather-look' case does; this means that you have to use the case if you want to attach it to your belt. The clip itself is actually a loop on the rear of the case, so you cannot clip the unit to the top of a pocket.

Like many scanners available today, this radio is designed for the American market, so it has pre-programmed the 7 frequencies used by weather alert broadcasts in the USA (162.400-162.550MHz narrow f.m.). Also, the radio automatically selects the correct mode (either a.m. or f.m.) depending on the entered frequency, but this is based upon the US band-plan. In most places, this coincides with the UK band-plan, but there are a few places where this may cause problems.

The step sizes are also preset for the American band-plan, so some bands use 5kHz/10kHz spacing instead of 12.5kHz/25kHz spacing (i.e., the 144 and 430MHz amateur bands). In these bands, if you try to enter a frequency that is not an exact multiple of 5kHz it will register as the next exact multiple down. I tried to enter 145.8125MHz, and the scanner displayed (and tuned to) 145.810MHz.

For convenience, the key pad contains a LOCK key that disables the rest of the keypad; this will prevent stray pressings of the other keys from altering the set-up of the scanner. The LOCK button itself is surrounded by a raised edge that prevents accidental pressing of the key.

Easy to Program

The UBC-200XLT is one of the easiest radios to program that I have ever used. To put a frequency into any memory channel, all you have to do is press the keys to indicate which memory channel you want to use, then press the memory key to enter the channel, and finally press the the keypad to indicate the frequency you want to enter. The scanner will then automatically store the frequency in the designated channel, and after a short while, it will automatically scan through the frequencies that you have programmed into the memory channels.

Short Wave Magazine, August 1993
wish to fill, then press the numbered keys for the frequency, followed by the enter ('E') key. This will overwrite anything that is already in the memory channel. As an example, to place 118.7MHz into memory channel 01, you would press 1, MAN, 118.7 and E. Notice that you do not need to enter leading zeros for the memory channel, or trailing zeros for the frequency. There is no need (and no way) to specify a mode for a frequency, as it is automatically determined by the radio from the chosen frequency.

One extremely interesting and useful facility is the ability of the radio to search for duplicate frequencies already stored in memory. When you press the enter key to store a frequency, the radio does a quick (i.e., less than 1 second!) check of all the memory channels to see if the new frequency already exists, the I.c.d. shows the channel number (e.g. Ch. 27). To store the new frequency a second time, just press the enter key again. Of course, if the new frequency does not already exist, it will be stored first time around. With scanners having more and more memory channels, I found this feature most useful on numerous occasions.

**Scanning**

Once you have filled all your memory channels, with all those frequencies that you wish to listen to, you will want to scan them to see what's happening. The UBC-200XLT has 10 banks of 20 channels each, and you can scan through any or all of them. The scan sequence is always in ascending channel-number order, but you can rapidly swap in and out various banks of memory channels to suit your scanning needs. You press the red SCAN button to start scanning, and the orange MANUAL button to stop scanning; the MANUAL button also allows you to step through the memory channels one at a time.

Across the top of the I.c.d. are the numbers "1" to "10", which represent the 10 memory banks. When scanning, a small bar appears beneath the numbers to indicate which banks are included in the scan. All filled channels within the bank are scanned, unless they have been locked-out of the scan. What I found very useful was the ability to add or remove different search banks from the scan while the scan is in progress. To do this you merely press the numbered button that corresponds to the bank that you wish to add (or remove) from the scan. So that you do not miss a reply to a signal, you can program a 2-second delay into each memory channel, and when the carrier drops on a frequency the scanner waits before continuing with the scan.

You can also set up a priority frequency. Within any bank of 20 channels; the frequency that is in the first channel of the bank (i.e., 1, 21, 41, etc.) is the priority channel, which is sampled every 2 seconds by pressing the PRIORITY button. When scanning through memory channels, the scanner will scan 15 channels per second; this seemed quite ideal, as I have seen scanners with faster scan speeds completely miss out on active frequencies.

There will always be times during scanning when you wish to skip over stored frequencies without having to delete them from memory, and re-add them later. The UBC-200XLT has a handy 'lock-out' feature that allows you to mark a memory channel to be skipped during scanning. A locked-out channel displays a small 'L/O' beneath the memory channel number on the display, but the only way that you get to see this is if you manually step through the memory channels using the MANUAL key.

**Searching**

The UBC-200XLT has only one search range, but the upper and lower limits are very easy to change (so long as both are within the frequency ranges covered by the radio). Before starting the search, you have to program both upper and lower limits of the search range - the are no initial limits preset. You can enter search limits that are either side of the gaps in coverage (I tried with 511MHz and 807MHz), but when you try to search that range, the display shows Error. You cannot enter search limits that are not within the scanners receive limits; I tried with 170MHz (in range) and 180MHz (out of range), but as soon as I tried to set the upper limit the display showed Error. Pressing the SEARCH key will start searching though any preset frequency range; you can only select "upwards" through the range, but the
radio does scan through 25 steps per second. The scanner will automatically select the correct mode for the search, and it will also change mode (from a.m. to f.m., or vice versa) as required.

To stop SEARCHing, you can press the 'V' or 'A' keys; pressing either of these keys again will stop the scanner. Pressing the SEARCH button again will start the search from the displayed frequency. When searching, once an active frequency is found, the search stops and display shows the frequency. Once the carrier has dropped, the search will automatically restart. So that you do not miss any reply to the original signal, you can set a delay so that the scanner pauses (for about 2 seconds) before the search restarts. The display shows a small DLY when this is set.

Audio

The audio from the scanner is from either an in-built speaker, or via a 2.5mm jack on the top panel. The audio from the speaker is quite good considering its small size, and it was only when I used the scanner in a noisy car that I had any problems with distortion because the volume was set too high.

The squelch cut-off works very well, and there is not trace of 'hiss' at the cut-off point. Apart from the relatively non-standard sized jack, the audio from the ear-phone was just as good as the speaker, and when 'Walk-man' type headphones were used the audio quality was excellent.

The Manual

The manual that is supplied with the radio covers all the major functions, but is quite poor in comparison to the manuals supplied with other radios. The manual is in the form of a fold-out sheet printed on both sides. Just like a road-map, once you have opened the manual, it is always difficult to re-fold it!

Within the manual itself, several items of important information are buried in the middle of lengthy pieces of text. Maybe this is to make sure that you read all the instructions before you start to program your radio, but it makes it very difficult to find some of the programming instructions when you need them again. The 'pages' of the manual are not numbered, and there is no index, so you have to re-read the whole of the manual again when looking for something specific.

Mods

During the review period I came across some general notes pertaining to the Tandy/Radio Shack version of this radio on a computer bulletin board.

The notes gave details of how to reset all the memory channels to '000.000', and also how to improve the audio from the ear-phone socket. I tried some of these to see how compatible the two models were. Pressing buttons 2, 9 and MAN together and switching the scanner on will reset all the memory channels to 000.00 very handy at times! Furthermore, pressing buttons 2, 9 and SCAN together while switching the radio on will fill (or overwrite) the first 20 memory channels with a series of 'test' frequencies. I tried this, but I didn't change any of the values as I didn't know what the result would be.

Earphone

I also didn't attempt to improve the ear-phone audio, as it involved physical modification of the scanner. The fact that the modifications work on the Uniden Bearcat UBC-200XLT is further proof that the two units are essentially the same radio, but with minor differences in the ranges covered.

Conclusion

The Uniden UBC-200XLT is a very good radio for somebody who is new to scanning. Although it does not cover as much of the frequency spectrum as other scanners, it is very easy to use and program, and offers an almost ideal breakdown of memory channels; it is also very competitively priced. The few items that I was not so pleased with are all things that can be overcome quite easily.

The scanner itself looks quite large and bulky in its protective case, but it looks very slim and smart without the case. The review model was kindly loaned by President Electronics Europe, and is available through their UK distributor, Nevada Communications, 189 London Road, Portsmouth PO2 9AE. Tel: (0705) 662145 and costs £249.95.

Listen With Grandad

by Leon Balen and David Leverett

Grandad could have bought them for 50p each if he hadn't shown so much interest!

Short Wave Magazine, August 1993
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- New marine listings

Editorial and review

This new title will be published in early April and replaces the eighth edition of the “Short Wave Listener’s Confidential Frequency List”. We have added missing data and have been missing! Money back if returned in 10 days.

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<td>£779.00</td>
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<td>£569.00</td>
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<td>£329.00</td>
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The standard long range radio equipment fitted in Royal Air Force aircraft during WWII was the transmitter type T1154 and its associated receiver type R1155. This equipment entered service in 1941 and some 80,000 examples were produced during the war years, with some variants remaining in service until the 1960s. S. Pope tells us more about these sets.

Wireless Telegraphy
Set Type T1154/R1155

The RAF's general purpose aircraft radios at the start of the war were the transmitter type T1083 and receiver type R1082. These radios were unreliable and difficult to operate, for example, changes of frequency required the wireless operator to change over coils in both the transmitter and receiver as well as retuning the transmitter to the new frequency. These difficulties in operation were blamed for the loss of a number of bomber aircraft in bad weather during the early war years.

In 1937 the Marconi company had begun design work on their AD67/AD77 'all wave' transmitter and receiver radios. This equipment gave an 80W output over frequency ranges of 200-500kHz and 2.35-16.7MHz. The RAF became interested in the Marconi equipment as a replacement for the T1083/R1082 radios. A number of modifications were requested including pre-selection of frequency and direction finding (d.f.) facilities with visual indications. By the end of April 1940, design and layout of the new equipment, by now designated T1154/R1155, was complete. Production started in August, but output was slow and the first examples did not reach the RAF until the end of 1940.

As well as manufacturing the equipment, Marconi were also responsible for their installation into RAF aircraft. Fitting parties consisting of Marconi engineers were sent out to RAF stations where they carried out installation and checking of the T1154 and R1155 radios. Trial installations were made in all types of RAF bomber aircraft. These, however, showed that the electrical supply in these aircraft was insufficient. As a temporary measure, an additional accumulator was fitted to provide the extra power, later on extra engine driven generators were fitted. By 1942 when the RAF's own Maintenance Units were able to take over the task the Marconi teams had fitted out over 2000 aircraft.

Operational Use

Designed primarily for aircraft, the T1154/R1155 equipment provided Wireless Telegraphy (W/T) and Radio Telephony (R/T) communication in air to ground and air to air modes. Thirteen variants of the basic transmitter design and ten variants of the basic receiver design were produced (Table 1) and apart from their

Fig. 1: Typical installation (Crown Copyright/RAF diagram).
use in aircraft they were also to be found in ground stations, vehicles and RAF air rescue launches. In bomber aircraft, the equipment was used by the wireless operator to obtain position and weather reports, as well as relaying strike reports from the target area. Position reports were plotted using the R1155 and its associated direction finding (d.f.) loop antenna to receive bearing signals from radio beacons. Bearings obtained by these methods were, however, not always reliable due to the effects of jamming and 'Meaconing'.

Master Bomber

Another role for the equipment in Bomber Command was to control the progress of a bomber raid. One aircraft in the formation called the 'Master Bomber' was detailed to assess the target marking and bombing results during the course of the raid. This control aircraft used its T1154 transmitter to issue instructions to other aircraft via their R1155 receivers. Communication was by R/T on a frequency of 7000kHz over a range of 40km. However, the use of the equipment in this role was not successful and the Master Bomber technique did not become widespread until the introduction of very high frequency (v.h.f.) R/T equipment in 1943. Some RAF aircraft also used the T1154/R1155 set in a Radio Counter Measure (RCM) role. These aircraft were fitted with a microphone in one of their engine nacelles. Noise picked up by the microphone was transmitted by the T1154 and used to jam the R/T communications between German ground controllers and their night fighters.

Table 1

<table>
<thead>
<tr>
<th>Type</th>
<th>Sec/Ref</th>
<th>Features</th>
<th>Fitted to</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1154</td>
<td>100/97</td>
<td>m.c.w., c.w., R/T multi click stop</td>
<td>Handley Page Halifax only</td>
</tr>
<tr>
<td>T1154A</td>
<td>100/99</td>
<td>m.c.w., c.w., R/T multi click stop</td>
<td>Coastal Command aircraft</td>
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<tr>
<td>T1154B</td>
<td>100/106</td>
<td>m.c.w., c.w., R/T multi click stop</td>
<td>Mobile Ground stations used with receiver Type R1188</td>
</tr>
<tr>
<td>T1154C</td>
<td>100/108</td>
<td>m.c.w., c.w., R/T multi click stop</td>
<td>Coastal Command aircraft</td>
</tr>
<tr>
<td>T1154D</td>
<td>100/730</td>
<td>m.c.w., c.w., R/T multi click stop</td>
<td>Short Sunderland</td>
</tr>
<tr>
<td>T1154E</td>
<td>100/731</td>
<td>m.c.w., c.w., R/T multi click stop</td>
<td></td>
</tr>
<tr>
<td>T1154F</td>
<td>100/893</td>
<td>m.c.w., c.w., R/T multi click stop</td>
<td></td>
</tr>
<tr>
<td>T1154G</td>
<td></td>
<td>Did not enter production</td>
<td></td>
</tr>
<tr>
<td>T1154H</td>
<td>100/1180</td>
<td>m.c.w., c.w., R/T uni click stop</td>
<td>Handley Page Halifax</td>
</tr>
<tr>
<td>T1154I</td>
<td></td>
<td></td>
<td>Short Sunderland</td>
</tr>
<tr>
<td>T1154J</td>
<td>100/1229</td>
<td>m.c.w., c.w., R/T multi click stop</td>
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<tr>
<td>T1154K</td>
<td>100/1330</td>
<td>m.c.w., c.w., R/T multi click stop</td>
<td></td>
</tr>
<tr>
<td>T1154L</td>
<td>100/1455</td>
<td>Steel case version of T1154F</td>
<td>Marine craft, Training aircraft</td>
</tr>
<tr>
<td>T1154M</td>
<td>100/1587</td>
<td>m.c.w., c.w., R/T as T1154K with uni click stop</td>
<td>General</td>
</tr>
<tr>
<td>T1154N</td>
<td>100/1588</td>
<td>m.c.w., c.w., R/T steel case version of T1154B</td>
<td>Marine craft</td>
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<tr>
<td>R1155</td>
<td>100/96</td>
<td>Aluminium case</td>
<td>Handley Page Halifax</td>
</tr>
<tr>
<td>R1155A</td>
<td>100/820</td>
<td>Filters to prevent m.f. interference</td>
<td>Handley Page Halifax</td>
</tr>
<tr>
<td>R1155B</td>
<td>100/1304</td>
<td>Aluminium case h.f. choke to prevent radar interference</td>
<td></td>
</tr>
<tr>
<td>R1155C</td>
<td>100/1105</td>
<td>Aluminium case Modified for h.f. d.f.</td>
<td></td>
</tr>
<tr>
<td>R1155D</td>
<td>100/1331</td>
<td>Steel case</td>
<td>Marine craft</td>
</tr>
<tr>
<td>R1155E</td>
<td>100/1332</td>
<td>Steel case Filters to prevent m.f. interference</td>
<td></td>
</tr>
<tr>
<td>R1155F</td>
<td>100/1333</td>
<td>Aluminium case h.f. choke to prevent radar interference</td>
<td>All bombers except Handley Page Halifax</td>
</tr>
<tr>
<td>R1155G</td>
<td></td>
<td>These variants did not enter production</td>
<td></td>
</tr>
<tr>
<td>R1155H</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R1155J</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R1155K</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R1155L</td>
<td>100/1477</td>
<td>Aluminium case As R1155B or F but frequency range altered</td>
<td>General</td>
</tr>
<tr>
<td>R1155M</td>
<td>100/1597</td>
<td>Aluminium case filters to prevent m.f. interference</td>
<td>Ground Schools only</td>
</tr>
<tr>
<td>R1155N</td>
<td>100/1667</td>
<td>Steel case As R1155B or F but frequency range altered</td>
<td>General use except bombers Marine craft</td>
</tr>
</tbody>
</table>

Fig. 2: Simplified circuit diagram T1154 (Crown Copyright/RAF diagram).
Installation

In a typical aircraft installation (Fig. 1), the transmitter was the focal point and was usually mounted either on top of, or to one side of, the receiver. Power was obtained from the aircraft’s electrical supply of 12 or 24V through two rotary transformers. One of these power supplies, a Type 35, provided 1200V h.t. for the transmitter, whilst the other, a Type 33, provided 217V h.t. and 7V l.t. for the receiver and 6.3V l.t. for the transmitter.

Routing of the transmitted output to the appropriate antenna was via an Antenna Selector Switch Type J. Five positions were available, allowing for:
- signals to be routed with h.f. through a fixed antenna and m.f. through a trailing antenna
- or h.f. through the trailing - m.f. through the fixed - d.f., where the fixed antenna was used for reception together with the d.f. loop and earth where all antennas were connected to earth.

Transmitter Circuit

The T1154 transmitter provided c.w., m.c.w. and R/T facilities on frequency ranges of 200 to 500kHz (m.f.), 3 to 5.5MHz (h.f.) and 5.5 to 10MHz (l.f.). The transmitter circuit (Fig. 2), consisted of a master oscillator stage driving two pentode power amplifier valves in parallel, control being provided through the transmitter master switch. The master oscillator used a VT105 valve connected as a series fed Hartley oscillator. The two directly heated power amplifiers used VT104 pentodes and were shunt fed through a choke on both m.f. and h.f. ranges. On m.c.w. another VT105 valve provided side-tone and modulation of the transmitted output during R/T operation. When transmitting voice, use could be made of either carbon or electromagnetic microphones.

Transmitter Operation

In operation, the h.f. and m.f. ranges were selected via the antenna switch Type J. The transmitter master switch was then set to STB B1, starting up the i.f. power unit providing power to the transmitter and receiver valves. After a few seconds the master switch was then set to TUNE causing the h.f. power unit to start up. The master oscillator condenser for the frequency range selected was then adjusted by back tuning to the receiver. The Morse key was depressed and the condenser rotated until the magic eye tuning indicator on the receiver closed. With the master oscillator stage set up the power amplifier stage was tuned until a dip was obtained on the antenna feed meter. Frequency selection was made easy by the use of a unique click stop mechanism on the transmitters. Set up by wireless mechanics on the ground prior to flight it locked the frequency controls enabling the operator to select frequencies with ease. Two types were fitted, a multi click system where all chosen frequencies were selected in turn as the tuning dial was rotated, and a uni click type where only one click stop was in use at any one time on any range. These click stop facilities were only available on the h.f. ranges, the m.f. ranges were set by the operator once in flight.

Receiver Circuit

The R1195 receiver consisted of a ten-valve superheterodyne (Fig. 3) operating on frequency ranges of 75 to 500kHz, 600 to 1500kHz and 3 to 18.5MHz. Facilities were also provided on the first two ranges for direction finding using a visual indicator. A five-position master switch gave the following functions - Omni providing normal communications functions, AVC providing automatic volume control, Balance where the visual indicator was balanced during d.f. functions, Visual where the visual indicator was switched into circuit and where bearings were taken aurally from radio beacons and sense circuitry was used to determine signal direction.

The r.f. amplifier stage consisted of a VR100 pentode valve whose variable μ characteristic allowed its gain to be controlled by varying the grid bias. Frequency changing from the r.f. signal down to i.f. was carried out by a VR99 triode hexode valve. The i.f. stage included two stages of amplification and operated at 500kHz. Both manual and automatic volume control were available. Detection was by means of a VR101 double diode triode valves, the triode section of which acted as the output stage.

Direction finding was available both aurally and visually. The aural method used a Type 3 loop antenna which was adjusted for a minimum signal. The visual system used a ‘switched heart’ circuits. Here a push-pull oscillator was used to switch the fixed antenna in such a way that the voltages were applied alternatively in phase and anti-phase with the instantaneous voltage due to the loop. At the same time, the oscillator switched the rectified output of the detector stage to two pairs of moving coils operating the visual indicator needles. To allow the receiver to be used with a variety of d.f. loops a number of impedance matching units were produced. Workshop testing of the receiver was carried out using a Test Set Type 65.

Fig. 3: Receiver schematic diagram (Crown Copyright/RAF diagram).
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PHONE FOR DETAILS

Short Wave Magazine, August 1993
It was the sun glinting amongst the junk that first caught my attention. There is seldom anything that shines in the bric-a-brac in the second-hand furniture shop, around which I periodically browse. I moved a couple of broken chairs and a flowered teapot with a chipped spout to find the sun shining on two large aluminium slow-motion dial - obviously a radio set of some sort. It was in a wooden box - "cabinet" would be too grand a name - and had an ebonite panel with three controls and an assortment of terminals and switches. I lifted the lid to find inside a short wave receiver of early 'thirties vintage, obviously home-made but, nevertheless, well constructed.

A popular medium and long wave set of the same era was the Cossor Melody Maker (a straight 3-valver) and this s.w. receiver had obviously been constructed along the same physical and electrical lines. A typical i.f. (audio) stage made four valves in all: r.f. amplifier, reacting detector, RC coupled audio amplifier and a transformer coupled output stage. There was of course no loudspeaker - this was normally a separate item in those far-off days. The main parts of the set were all there and undamaged except for two missing valves and no coils, although there were coil holders for plug-in coils. How could I resist such a relic from the days when I was an avid short wave listener?

**Triumphant**

Some hard bargaining followed when I tried not to appear too keen to buy it, but eventually honour appeared satisfied on both sides and I bore the set triumphantly homeward.

The first step - after the inevitable celebratory cup of tea - was to remove the set from its box and take stock. Construction was conventional for those days - an ebonite panel supporting the controls and a wooden baseboard onto which the components were mounted. The main parts of the set were all there and undamaged except for two missing valves and no coils, although there were coil holders for plug-in coils. How could I resist such a relic from the days when I was an avid short wave listener?

The Strip-Down and Re-Build

Following this appraisal I decided to completely re-build the set in its original form, using the original components as far as possible. As there was no chance of obtaining or making coils to fit the coil holders, the only solution here would be to make both coils and new holders to my own pattern. Accordingly a sketch was made of the layout and then everything was removed from panel and baseboard. The foil covering these was quite tatty so it was replaced with aluminium "kitchen foil". All the components were taken to pieces, cleaned and replaced in their original position, using the original square-section wire wherever possible.

The only duff components were the "mainsbridge condensers" and these posed a bit of a problem. Construction was a roll of foil and waxed paper placed inside a metal can fitted with terminals. The can was sealed by soldering so it was not very difficult to open, but inside it was found that the "works" were embedded in pitch. Attempts to chip this out were futile, so both capacitors were rolled up in a sheet of "kitchen foil", placed on a baking tray and put in the oven at "Gas Mark 8" for half an hour. (I reasoned that since that was the correct setting for "oven crispy fish" it was probably the correct setting for "mainsbridge condensers"!)

An aromatic scent of roadworks filled the house in due course, and when taken from the oven and the foil opened I found all the pitch in a little pool and the condenser roll quite easy to remove. It was replaced in each instance by a 1µF polyester capacitor, the case was then resoldered, a touch of paint added and, lo and behold, two 100 per cent serviceable '1930 mainsbridge condensers' circa 1987!

It is many a year since I wound short wave coils. However, I had some 37.5mm diameter plastics waste pipe handy, and a reference to Newnes Wireless Constructor's Encyclopaedia by F.J. Camm gave me something to start with. Soon memories came flooding back and before long three pairs of coils were made covering 2 to 15MHz (if they had been originals I would have said 150 to 20MHz). I was fortunate in still having some 2V valves among my bits and pieces and as luck would have it, a friend of mine had just sent me some more he had found at a rally - among which was a FM2DX, the ideal detector for a short wave set.

I had to knock up a small power supply. It proved quite difficult to obtain an h.t. transformer with around 120V output, but one was eventually found. The 2 volts for the valve filaments was easy to provide as I had a couple of small sealed lead-acid cells. Although these are only 2.5Ah, they were quite adequate for testing the receiver.

**Results**

Apart from some slight adjustments to the coils to ensure that there was just a small overlap between the different ranges, everything worked first time. There will be many readers who have never handled a straight set with 'reaction' and it may come as a surprise to learn that in a strict signal/noise ratio test the old receiver came out slightly better than my FT - 757! To obtain results like this, the reaction control must be handled most carefully otherwise performance is very poor indeed, a receiver of this type has very little selectivity, unless the detector is just on the point of oscillation. Therefore, the set performs quite well for c.w., but is not so good on a.m. It can be used to receive s.s.b. if the reaction control is advanced just sufficiently to make the detector oscillate, thus providing a b.f.o. Powerful signals will, however, pull the oscillation into lock with the incoming signal, thus losing the b.f.o. effect, so to be quite honest, the receiver is really only good for c.w. on the amateur bands or for s.w. broadcast stations.

I found one unexpected snag: when receiving c.w. - the best note kept changing frequency in a random manner. Eventually this was traced to an uninstalled h.t. supply. The set would have originally been powered by h.t. batteries, so the problem would not have arisen. After I stabilised the 60V to the detector everything was fine. Even though there is an r.f. stage to isolate the detector from the antenna, the isolation is not all that good and in very windy weather the swaying of the long wire antenna will cause a c.w. note to waver gently up and down!

**The DX Four**

I christened the receiver the DX-Four - all sets had names in the 'thirties. It is good fun to operate when the bands are quiet but not much use on 7MHz in the evening! It has, nonetheless, a character lacking in my Japanese black box, however good that may be. Also it needs to be "operated" and not just have its dial spun, with all the chips doing the hard work. I have to do that and there is much satisfaction in so doing. When I worked my first 'W' using the DX-Four as a receiver, I felt that something worthwhile had been achieved - just like 55 years ago.
Dial Search is an easy-to-use book for the long, medium and short wave listener. It contains information on British radio stations and the main European ones too. There are hints on how to make the most of your portable, programme notes, details of broadcasts in English and some popular station addresses. The first of the Dial Search maps included in the book fold-out to show where the European broadcast stations are located, e.g. Brookmans Park, Lopik and Allouis - to mention just three. The second fold-out map details where the UK transmitters are situated.

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The AR88 is a classic among the older receivers and holds an honoured place in the history of radio. It was first produced in 1940 by RCA in the United States. Exactly what niche in the market place the designer had intended it to fill, I am not sure, but as events turned out most of RCA production ended up being shipped to Europe as part of the United States war effort. By the mid 1950s when I came into amateur radio many of these receivers had appeared in the UK surplus market, and were retailing at £40 - £100, (4 - 10 weeks wages in those days!).

Is it any good? Can a 50-year-old receiver possibly be of use in today's crowded radio conditions? The answer is a very firm yes. A good AR88 will still perform very well and whilst it was never intended to receive s.s.b., the simplest of modifications will enable it to give a very acceptable performance in this mode, in fact, without any modifications it is not that bad.

The Versions

Basically, there were two versions produced. The AR88D covering 550kHz - 30MHz and the AR88 LF covering 73 and 1.5 - 30.5MHz. For amateur use, the 'D' is preferred in that it is a little more selective and has a better band spread. The 'LF', however, does have a little better image rejection as the i.f. amplifier is tuned to 735kHz instead of 455kHz as used in the 'D'. By and large, the difference between the versions are quite small and so given the choice of two units, go for the one in the best condition every time. that is unless you have some particular requirement for either medium or long wave coverage.

Service Rebuilds

The original RCA AR88 has a black crackle front panel, the control at the top left on the front panel being 'HF TONE'. Many units have, however, been re-built in REME workshops and these can be identified externally as having a grey front panel and usually the h.f. tone control is re-wired and marked 'IF GAIN'. Internally, the original cotton/rubber covered wires will have been replaced by plastics wiring, and many resistors and capacitors swapped. If the job has been done properly, these REME re-builds can be the best buys, as breakdown of the insulation of the original wiring looms is by no means unusual dependant upon conditions of storage over the last 40 odd years.

Construction & Circuit

The manual for the AR88D is fairly freely available, ask around at your local club or at a Rally and you will almost certainly get one. Failing that, try one of the suppliers listed at the end of this article. A full circuit diagram of the LF version is available from the SWM Editorial Offices by sending in an s.a.e. marked AR88, along with diagrams of the rear panel and a copy of the top chassis layout.

The receiver, of course, uses valves, the all metal types used in the 1940s, the latest thing in reliability and ruggedness. Two r.f. amplifier valves, type 6SG7M, are used along with three tuned circuits before the mixer to give good gain and signal-to-noise ratio. All the coils, capacitors and switches used in the tuned circuits are of high quality resulting in good Q and hence satisfactory image rejection.

The mixer stage uses a 6SA7M frequency changer valve. (In domestic sets of this era, the same type of valve would have been used as a combined mixer and local oscillator - hence the term frequency changer). To help oscillator stability, a separate 6J5 local oscillator is used in

Or how to get a top class, general coverage communications receiver for around £30-£50 says Harry Leeming G3LLL

Short Wave Magazine, August 1993

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the AR88.

After the mixer comes three i.f. stages, the first incorporating a variable bandwidth crystal filter. Two stages of i.f. amplification would have given more than enough gain, having three enables the valves to be 'throttled back' and also gives more control of selectivity, in addition to the crystal filter, by variable coupling in the transformers.

Two double diode valves come next, one is used in the automatic gain control and detector circuits, the other acts as a series impulse noise limiter. The noise limiter is very effective during a.m. reception, but is not so hot on s.s.b. or c.w., at least it does stop you having your ears blasted out when wearing head-phones.

Beat frequency oscillation is provided by the circuit around the second 6J5 triode and once again this is pretty conventional.

The a.f. stages come next, first the 6SJ7 voltage amplifier and then a 6V6 power amplifier. The AR88D uses a 6K6 power amplifier valve that is slightly different in characteristics to the 6V6 but has the same pin connections. In practice, swapping one for the other does not seem to make much difference. The output transformer and headphone wiring differ between various models and some of the REME re-builds. On some sets the 2.5Ω speaker terminals on the rear go dead when headphones are plugged in, on others they do not. The simplest way out of this predicament is to plug a higher impedance (8-15Ω) speaker into the front headphones socket so that it can be plugged out when the headphones are plugged in.

Whatever is fitted make sure that it is correctly set before you plug it in! A full wave valve rectifier is used, and the voltage to the oscillator stages is stabilised by a VR150 regulator tube. For the benefit of those bought up on transistors, this is a valve equivalent of a Zener diode and uses identical circuit arrangement. High tension smoothing is by L50 and L49 in conjunction with C96, C97 and C98. The negative bias for most of the valves and for the r.f. gain control circuit is developed across R43, R44 and R45 in the negative return of the mains transformer.

Second-hand Sets

What should you look for when purchasing a second-hand AR88? If possible see if the receiver is in some kind of working order before parting with your money, how good, of course, depends on the price asked. Do be certain that the major irreplaceable parts are OK. Take a good look, and have a smell! around the power supply for signs of obvious burning and check the tuning mechanism and wave change switch.

Whilst most small components will be replaceable by standard radio and TV bits and pieces, a burnt out mains transformer, wrecked waveband switch or faulty tuning mechanism will be somewhat of a disaster. Do check that the tuning drive has negligible backlash on it, as backlash is a common fault with old equipment and difficult to cure.

**Repairing, Overhauling and Modifying**

Safety first. The voltages and power levels used in the AR88 are lethal, so do not treat it as a transistor radio! It is particularly dangerous due to its weight, if you are gripping it hard, trying to turning it over with both hands and come into contact with a high voltage you will not be able to get loose! Ideally, you should keep one hand in your pocket and stand on a dry insulated surface when doing any work with the receiver live, but, at the very least make it an absolute rule that you will never grip the receiver tightly with both hands when it is plugged into the mains supply whether it is switched on or not. (Competition in the magazine industry for circulation is just too fierce to lose readers that way!)

Over the years, all sorts of modifications have been suggested for the AR88. My feeling being that most are complicated and unnecessary. The simple modifications suggested here alter the bias performance more in the direction of long distance communication.

1. **For better a.f. gain and more communications like this.** Remove resistor R54 from the negative feed loop around the output stage and reduce the a.f. coupling capacitor/capacitors that run from Pin 8 of V10 to Pin 5 of V11 to 1nF each.

2. **For better s.s.b. reception.** Increase the oscillator injection, but first have a look under the set and make sure someone has not already done this. Originally, the b.f.o. injection was taken from the 6J5 b.f.o. valve by soldering a wire on to either Pin 6 or Pin 4. These were unused spare pins and hence only stray capacity coupling was used.

The modification consists of soldering two 1.5m lengths of stiff insulating wire, one to Pin 3 and the other, either to Pin 6 or to Pin 4 depending upon which is used. The two lengths of wire are then either twisted together or even just brought near to each other until sufficient b.f.o. injection is obtained. You can either decide this by trial and error on s.s.b. reception or go through the following procedure.

Switch the set to 'Phone' 'AVC' and measure the rectified carrier voltage when a fairly strong broadcast station is tuned in at maximum r.f. gain. The easiest point to measure this voltage at, is the 'hot' end of the noise limiter control. After removing the antenna, switch to BFO AVC and adjust the capacitor formed by the two wires until the voltage is about the same as that produced by the strong station. In it's original form, the manual position on the function switch does not completely kill the a.v.c. line. When using a higher level of oscillator injection it is advisable that it should, and this can be achieved by short circuiting R42 mounted on the back of the a.v.c. switch. If this simple modification is not carried out, a.v.c. action will
reduce the gain even when switched to the manual position as the b.f.o. will register as a strong signal. The only other modification worth carrying out is to fit a tuning meter. This will not work on s.a.b. as the set does not have a product detector, but it may be of some use. If you wish to do this, wire a 1mA meter into the cathode of the first i.f. valve. The standard meter will read backwards way, so if this worries you, mount the meter upside down.

It is suggested that you do not try overhauling the receiver until it is in some kind of working order or otherwise if you make a mistake, you will end up in total confusion.

Common Problems

The set is dead. The presence of h.t. can be ascertained by looking at the VR-150-30, the voltage regulator valve. This will glow like a neon lamp of all is OK in this department, check the rectifier valve. If there is any trouble here, do not be tempted to replace the rectifier valve by silicone diodes unless you fit surge resistors, a suitable modern replacement for the 5Y3 being a GZ32. If the set does not seem to be switching on at all and the pilot lamps are not alight, check the contacts of the mains on/off switch as these do frequently give trouble. If the switch is faulty, it is probably best to short circuit it and either pull out the mains plug when you want to switch off, or fit a separate toggle switch.

If there is low volume or distortion, then common troubles here are high valve or open circuit resistors R40 and R41 or leaky capacitor C118/C122.

If the frequency drifts and jumps, a dirty band change switch is the most common trouble here. Remove the lids from the coil pack underneath the chassis and clean the switch with a propriety non-lubricated cleaning fluid rotating the switch quickly as this is applied. After you have done this, apply a very slight amount of cleaning fluid with lubricant. Note that loads of lubricant all over the place will not help stability at all and may result in a breakdown of some insulation.

If you have low gain, check the voltages on all the valves. Low voltages are usually caused by resistors having gone high or decoupling capacitors that have gone leaky. A valve can, of course, also be faulty, but this will usually be indicated by higher than normal anode or screen voltages.

Unwanted gain or oscillation in the i.f. stages. Faulty by-pass capacitors or excessive gain are usually the cause of unwanted oscillation. Check that R20 is in the cathode circuit of the first i.f. amplifier valve and that it has not had a capacitor wired across it or been short circuit for more gain. Note that both Pins 3 and 5 are wired to the cathode and so both these should be checked. Some sets also have similar 150Ω resistor wired in the cathode lead of the second i.f. amplifier valve to reduce gain. If the gain is too high, you can fit this resistor, or conversely, if it is too low you can short circuit it or wire a 10nF capacitor in parallel.

Oscillation in r.f. and antenna stages. There is a lot of r.f. gain in the AR88 and it is stable only by virtue of good layout and adequate screening and decoupling. A set in good working order will not oscillate at any frequency on any band, even with the metal can that covers the valves and tuning gang removed, and will be reasonably docile with the bottom covers of the coil pack removed as well.

There is, however, a lot of gain around and especially at the higher frequency end of the receiver's coverage, everything must be correct if oscillation is not to occur especially if the gain is peaked up during alignment. The common causes of trouble, are faulty by-pass capacitors and poor earth connections. The main tuning capacitor is earthed in many places via spring contacts on its mounting. If the set is oscillating and this oscillation comes and goes as the tuning capacitor mounting is rocked, it is almost certain that the grime and oxidization of ages on these contacts is causing trouble. The easiest way out of the problem is to use a 100W soldering iron and solder about a dozen lengths of flexible braid between the capacitor and the chassis at various points all around. This modification will usually completely tame the receiver and also help to stabilise the frequency of the local oscillator. If you end up with a receiver with bad backlash in the tuning gear box, all might not be lost if you have plenty of patience and some mechanical dexterity. Look at it carefully and you will see that the large cogs consist of two discs of teeth mounted next to each other with a small window cut through both discs. Into this window a small coil spring should be set so as to pressurise the teeth in opposite directions. You will find that backlash is caused by either this spring having gone missing or that the teeth have jumped one notch and are no longer under spring tension. Fit the spring or retention the cogs by moving the two discs one jump in opposite directions and you have cured your backlash. It is difficult, but possible.

Overhauling the AR88

As most AR88s are now well over 40 years old, they are usually full of capacitors that have developed leaks and resistors that are high in value. Once you have the set is reasonable working order, it is well worth while gradually working your way through stage by stage replacing all suspect components. It is suggested that you only replace the resistors and capacitors around one valve stage at a time, testing the receiver as you go along. You should notice a gradual improvement of performance, but at least, doing things this way will give you a fighting chance of retracing your steps should you make a mistake and put the receiver out of action.

The r.f. mixer and oscillator stages are contained in the large screened box underneath the chassis, the lid of which is held on by dozens of nuts and screws that must be removed to get to the works. Feast your eyes on the quality of construction first and then down to work.

The small value capacitors used in the tuned circuits and attached to the coils are almost certainly OK, so leave well alone here. The rest of the capacitors and resistors should be replaced, as by Murphy's Law, otherwise the one you have not swopped will be the one which gives trouble. The h.t. decoupling capacitors that have values of either 0.006 or 0.0047 can be replaced by 10nF 500V disc ceramics. Note that when you switch on, the high tension voltage surges to just over 500V and hence you must not use low voltage components.

Try and avoid moving the leads or fitting components.
very close to the windings of the coils, also make sure that you do not accidentally fit a 10μF in place of one of the oscillator coils padding capacitors or you will throw the alignment widely out.

Whilst you have the coil pack apart, check the input wiring to the antenna socket. Originally, a balanced or unbalanced input could be selected by fitting or refitting the link on TB1. Quite often this arrangement will have been altered and the coil permanently earthed to the coaxial socket, it does not really matter as long as you know what is happening.

As in most superhets, the majority of the AR88s gain and selectivity is in the i.f. stages, and once again age will have taken its toll.

Quite a few of the anode, screen, and general h.t. decoupling capacitors are in blocks with three 0.1μF or three 0.25μF being in one can. If possible check all the block capacitors on a 500V insulation tester and reject any that read less than about 20MΩ. The blocks can, of course, be replaced by three separate capacitors, but for neatness, it is worth retaining the old units if they are OK. All separate decoupling capacitors, particularly any on the a.v.c. line, should be swapped regardless as should also be the resistors. Out of interest check these components once you have removed them and you will find many were out of specification. Note once again, that any new capacitors fitted must be at least 500V working.

There is not much point in swapping the wire wound resistors and large 4μF capacitors in the power supply if they are OK. Otherwise, test the block capacitors and swap all the resistors and decoupling capacitors regardless. Ensure that you replace the capacitors from the anode of the 6JS7 valve to the grid of the power amplifier h.t.

Clean all switches with a non-lubricated cleaning fluid and then give them a final clean with a very small amount of lubricated cleaner. All variable capacitors should have their wiping contacts cleaned similarly, but be extra careful only to introduce the slightest amount of lubricant or particularly in the oscillator stage you will create a drift problem. Volume, noise limiter and other carbon controls should be cleaned with a lubricated cleaner, or a mixture of 50/50 3-in-1 oil and paraffin works wonders.

**Alignment**

Correct alignment is crucial as a total of around 20 tuned circuits all have to be spot on before the receiver will give its full performance. Whilst the adjustments are time consuming, at least in the AR88 pulling and interaction between adjustments is minimised due to the efficient screening and lay-out.

Ideally, according to the RCA manual a wobulator and an oscilloscope should be used during alignment. This might be desirable if it is required to set up the wide band selectivity position for high quality broadcast reception, but for communications used it can be dispensed with.

First check that the crystal filter is working correctly. Connect a high impedance d.c. meter set to about 10V f.s.d. (full scale deflection) to the hot end of the noise limiter, and with a short length of antenna wire, tune in a weak and steady broadcast station with the receiver set to 'Phone', 'Man' and 'Selectivity 2'. If the station is too strong at full r.f. gain either shorten the antenna wire or tune off the ANT. ADJ. knob until the meter reading falls to below half of the maximum possible reading. Note the reading on the meter as you tune either side of the station to get some idea of the selectivity, and then try switching to the alternative selectivity positions.

If all reads reasonably well, you are ready to align the i.f. amplifier. First, carefully tune the AR88 into a steady fairly weak broadcast station or signal generator with the selectivity set to position 3, manual gain control being selected. Peak the tuning, using a meter connected to the hot end of the noise blanker, the signal must be fairly weak so that only a small reading is obtained even at maximum r.f. gain.

To do this, remove the local oscillator valve V3, 6S5, and set the receiver to about 550kHz. Inject either 735 or 455kHz as applicable from an accurate signal generator at the antenna socket and tune the generator either side of the frequency for maximum reading. You will have to use a fairly high level signal from the generator as the trap will try and reject it. Check that the reading peaks up on selectivity 2 at 735 or 455kHz. If it does not, adjust 1st, 2nd, 3rd and 4th i.f. transformers until it does. If in doubt, check your generator with a frequency counter. Finally, switch to selectivity 3 and tuning the generator 1kHz or so either side of the correct frequency, peak L34 and the generator for maximum. At all times, keep the generator output as low as possible to keep the meter reading below half the maximum possible reading.

If the crystal filter still does not work and yet the receiver i.f.s are aligned to the correct frequency, check the wiring around the filter and see that C75 is about half capacity and that its blades have not been bent and short circuited. The crystal will seldom be faulty, although it has been known. If you become certain that the crystal is at fault, very carefully remove it complete with holder and dismantle it on a soft clean surface. If the quartz element is not damaged or cracked, it can usually be restored to life if it is washed in soap and washed in clean water and left to dry before r.f. assembly. Note that the crystal element is very easily chipped when it will become useless, so wash it in a plastics bowl and do not drop it on a hard surface. Try and not get any grease from your fingers on the quartz element, and make sure that the plates are clean and shiny when you re-assemble them. The quartz element should be loose between the plates, so whatever you do, do not over-tighten the assembly and crack the crystal.

Once things are working reasonably well, you are ready to align the i.f. amplifier. First, carefully tune the AR88 into a steady fairly weak broadcast station or signal generator with the selectivity set to position 3, manual gain control being selected. Peak the tuning, using a meter connected to the hot end of the noise blanker, the signal must be fairly weak so that only a small reading is obtained even at maximum r.f. gain.

Ensure that C75 is at half capacity and peak the top and bottom cores in the 1st, 2nd, 3rd and 4th i.f. transformer reducing the output of the signal generator or off tuning the ANT ADJ. trimmer to keep the reading of the meter from saturating. The last transformer tuning will be somewhat flat but all the
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Short Wave Magazine, August 1993
Radio Communication Products from AOR

**AR1500EX** - One of many receivers & products produced by AOR. The very compact AR1500EX hand-held wide range receiver offers all mode reception including SSB as standard. Newly designed printed circuit boards have been incorporated to ensure this new version offers the very best performance. Frequency range is 500 kHz - 1300 MHz without gaps, all mode reception AM, FM(N), FM(W) & SSB (USB, LSB & CW - with BFO). The AR1500EX offers full coverage of the VHF, UHF and Shortwave Airbands plus Broadcast, Amateur band, Utility services etc. Many accessories included: Nicad pack, Charger, Dry battery case, DC lead, Soft case, Belt hook, DA900 VHF-UHF aerial, SW-between, Earphone, Comprehensive Operating manual. **Suggested Retail Price of £249.00 inc VAT.** (UK Carriage free)

**AR2000** - this popular receiver continues and remains a firm favourite with listeners and enthusiasts. Features include coverage from 500 kHz - 1300 MHz and reception of AM, FM(N) & FM(W). Many accessories supplied as standard including Charger, Nicads etc. **Suggested Retail Price £269.00 inc VAT.** (UK Carriage free)

**New ABF~125 VHF Air Band Filter for better strong signal performance...**

The ABF125 is a receive bandpass filter especially designed to improve the strong signal handling characteristics of receivers for VHF commercial Airband listening. The ABF125 is suitable for connection to most airband and wide range receivers on the market, it is not designed just for AOR branded products. The addition of this filter to the aerial signal path will provide additional selectivity which will enable the receiver's circuitry to cope much more easily with strong interfering signals such as Band-2 Stereo or Shortwave broadcast transmissions which can manifest in many ways such as 'hissing', mixing of many signals together, music breakthrough and desensitisation of the receiver.

The ABF125 will provide useful additional selectivity (in many situations) to any receiver's 'front end' by reducing the multitude of unwanted strong signals from reaching and saturating the receiver's first mixer stage... this results in less interference and improved reception.

Of course 'stub filters' can provide a degree of rejection to unwanted signals but tend to be bulky being suitable for base station applications and usually have to be hand-made. The ABF125 on the other hand is ready made and very compact measuring only 73.5mm and weighing a mere 52g yet offers excellent performance and for connection directly under the whip aerial of a hand-held receiver. A BNC socket (female) is fitted to the top of the ABF125 and a BNC plug (male) to the other making connection to an aerial easy and straight forward.

The ABF125 is not an amplifier so will not 'boost' signals, however the additional selectivity offered can significantly improve reception in many situations by removing unwanted strong signals which may overload the receiver and reduce it's effectiveness. When any connection is fitted to the aerial signal path some reduction of signal is resulted (attenuation) however the ABF125 in band attenuation level is very small due to the excellent in band V.S.W.R. of 2:1 resulting in a loss of only about 4dB.

Note: Remember to remove the ABF125 from the aerial when monitoring V.H.F Airband or signal strength will be dramatically reduced.

**Suggested Retail Price £24.50 inc VAT.** (UK Carriage £1.50)

**AR3000A** (base-mobile receiver) your listening horizons are truly extended providing receiving coverage from 100 kHz all the way up to 2036 MHz without any gaps in the range. The AR3000A offers the widest coverage on the market today with a high level of performance and versatility from low wave through shortwave, VHF and right up to the upper limits of UHF and SHF. Not only will the AR3000A cover this extremely wide range it will allow listening on any mode: NFM, WFM, AM, USB, LSB AND CW. The AR3000A also features an RS232C port for computer control. **Suggested Retail Price £949.00 including VAT.** (UK Carriage free)

**AR2800 Hand-held receiver 500 kHz - 1300 MHz**

- **AR2000** - compact all mode hand-held receiver. Coverage is from 100 kHz - 2036 MHz without gaps. Includes internal NiCad battery. **Retail Price £250.00**

- **AR1500e** - enhanced model. **Retail Price £299.00**

**ACEPAC3A** is a powerful program for the IBM PC (and 100% compatible) computer, which allows you to control an AOR scanning receiver using a serial port (RS-232 interface) of the computer. Many facilities are offered to provide you with a high performance radio monitoring system. It is possible to switch instantaneously between the two VFOs with a single key press. A fixed VFO offset may be entered into the system and the VFOs locked together using the "tracking" facility so that an offset is maintained while tuning across the receiver's spectrum. The three thousand mode sensitive memory channels are provided in each memory file, each with dual VFOs and a 50 character comment. A selection of these memories is displayed on the screen so that you may review memory contents easily. The display of memories may be paged up or down so that it is possible to check on the contents of the entire bank of 3000 channels from the VDU. You may expand the memories by creating new memory files, each with 3000 channels as above. There is no limit to the number of files you can create, unless you run out of disk space. A comprehensive range of scanning facilities is provided with the software. It is possible to scan memories, free scan or perform band limited scans. A descriptive 5 page booklet is available to request. The software is priced at **£75.00 plus £2.00 P&P.** AORSC is supplied on both 3.5 & 5.25 inch media for installation onto a hard drive. A DEMO disk (without RS232 support) is available on a 3.5 inch disk for installation onto a hard drive. Price is **£5.00**

ACEPAC3A is also available for the AR3000A & AR3000 receivers. Installation is recommended on a hard drive but can be run from 3.5 or 5.25 inch floppy's depending on machine compatibility. Features are similar to AORSC but ACEPAC3A has a more versatile spectrum graph display. A descriptive leaflet is available to request. **Suggested Retail Price £139.00 plus £2.00 P&P.**

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At the higher frequencies you will have difficulty deciding with 100kHz point which is correct. I tuned to 28MHz or 28.1MHz? To decide this, set the signal generator at a much lower frequency where its scale is reasonably accurate by listening at say 3.5MHz to the calibrator and tuning the generator to zero beat. The generator will then be very accurately set at 3.5MHz and will produce accurate harmonics every 3.5MHz throughout the range of the receiver.

Having established an accurate standard, follow the manual and set the oscillator coil near the l.f. end of each range until the best compromise of accuracy of frequency readout right across the dial is obtained. A crystal calibrator is very handy when doing this as you can select 1MHz or 100kHz pips depending upon the frequency range and quickly see any fall off in accuracy as you spin the dial across its range. If your AR88 does not have the correct trimmer tools clipped under the lid, do not despair. Use a pair of pliers to slightly loosen the nuts at the base of the trimmer rods and pull the rods up and down with the pliers to align, use a small screw driver to trim the coil cores.

If it is found impossible to get good tracking on the highest frequency range (particularly important on the AR88LF as this range covers 21 and 26MHz+1) slightly ease, do not bend, the blades of the smallest section of the oscillator ganged tuning capacitor until the calibration is correct. I must emphasise that only an imperceptable movement of the blades is required, a noticeable bend will throw the tuning widely out on all ranges. Be certain on highest frequency ranges that you have the oscillator circuit set to the correct frequency and not at the image. If in doubt, set your signal generator at this image frequency very much weaker than at the correct point. If you should have aligned the oscillator wrongly the image will appear with the receiver tuned 900 or 1470kHz higher in frequency.

Peaking Up The Front End

Once again, using the signal generator, the coils should be trimmed at the low frequency end of each range and the trimmer capacitors at the h.f. end. Once the circuits are reasonably aligned, plugging in an antenna and peaking for maximum noise when not used into a station is very effective and simple. Ensure that the antenna coil is set so that the ANT/ADJ trimmer on the front panel will peak throughout the range. If you prefer to trim on a meter rather than by ear, use this connected to the hot end of the noise limiter control as suggested under the i.f. alignment. Alignment is always a matter of compromise especially with an older receiver, so finally you will have to adjust the calibration and the peaking adjustments for the best compromise over the range, or if desirable, for the best results on the amateur bands, practise makes perfect.

Anything Else!

The main remaining cause of reduced gain and selectivity in the AR88 is a fall off of Q in the i.f. transformers due to age. I have a friend who removed his transformers one at a time, boiled the coils in paraffin wax, replaced the fixed tuning capacitors, re-assembled an realigned. It certainly improved his AR88 but whether or not the danger of completely writing off the coils outweighs the possible gain depends on how brave you are - I have never tried it myself.

In conclusion, can I please point out, that this article is based on past experience of 'labours of love'. I make my living servicing and selling modern amateur radio gear, overhauling AR88s on a commercial basis would be totally uneconomical as at normal workshop rates the cost would be a few hundred pounds!

Further reading

SWM October ’65, November ’65 - 'Servicing the AR88' G3LLL.
O

viousl no one can be sure, but there is evidence again this time that the ‘active’ sun put some ‘life’ into the 28MHz band in the middle of May. First consider the number of sunspots in Fig. 1 and compare the time of these with the sudden increase in beacon signals shown on the chart in Fig. 3. Also, check the Band 1 (48-856MHz) section of my television column, elsewhere in this issue and you will see that a fair amount of short-duration, Sporadic-E type openings, were reported by the TVDXers around the same time. However, Sporadic-E openings are normally very positive and last for several hours, so, I wonder, did some other form of ionospheric disturbance take place more in keeping with the influence sunspots?

Solar

Prior to this, in April, an average of four active areas were located on the sun’s disc by Ron Livesey (Edinburgh) with his 2.5in refractor telescope and a 4.0in projection screen on days 1, 2, 3, 4, 5 & 20.

In Sevenoaks, Cmdr Henry Hatfield, using his spectrohelioscope, located 3 sunspot groups, 13 filaments and 3 small flares at 1415 on the 21st. 3grps and a small ribbon flare on the 22nd; 2grps and 12fs at 1602 on the 28th and 1grp with 18fs, 13fs and 11fs, around 1115; on the 27th. 28th and 29th respectively. April ended with two double spots and 9fs and a burst of solar radio noise at 1020, on 136MHz, respectively. April ended with two 2grps and 12fs at 1602 on the 28th and 29th respectively.

In Scotland, Wallace Shackleton (Kinross) monitors the solar data transmitted by the German beacon DKOWCY on 10.144MHz, Aurora Warnbake, ueber Kappeln, D-2341 Scheggerott, Germany.

Magnetic

Strong magnetic disturbances were reported on April 4 & 5 by John Fletcher (Tuffley) using a twin Hall effect magnetometer, Tony Hopwood (suspended magnet), Karl Lewis (Saltsath) (fluxgate), Ron Livesey (suspended magnet), David Pettitt (Carlisle) (fluxgate) and Tom Rackham (Goostrey) (suspended magnet). Between them they also detected disturbed conditions almost daily throughout the month except for days 7, 19, 23, 26, 28 & 29.

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Scarborough's only 4 star hotel - the Holbeck Hall Hotel - is no more. Guests awoke on Friday June 4 to find that the gardens formerly reaching, together with South Cliff, some 800 yards to the cliffs had, overnight, subsided into muddy chaos and destruction. Over the next few days the hotel - watched by locals and the world's media - slowly collapsed, piece by piece, over the cliff edge and towards the sea. Television was well represented at the event with ITV's SNG-1 UKI 7" news gathering satellite truck sending up pictures to be down-linked by Eutelsat II F1 at 12.56GHz horizontal. Numerous reports both live and recorded for various networks were sent back to respective base via the 12.5°E bird.

More serious was the collision at sea near Ostend on June 3 when the British Trent, a tanker carrying petroleum, collided with another vessel. The resulting explosion and fire caused loss of life - the sea ablaze at the floating petrol. Belgium's VTM SNG unit no.1 was rapidly deployed to Ostend and fed news items on the 16°E bird for much of the day and evening. VTM is the only European broadcaster to employ her own fleet of four SNG trucks and using a full-time transponder lease over Eutelsat II F3.

Over the last few years the TV outside broadcast world has been revolutionised with the employment of satellite linking rather than the former conventional terrestrial linking. In the earlier days the remote outside broadcast site would have its own microwave linking unit that would transmit the signal - often at 7GHz - to the nearest high point and hence a further hop to the next distant high point until the transmitter or network insertion point could be reached. A remote site would employ an engineer and rigger with receiver and transmit dishes, a generator and local catering.

Unless the insertion point can be reached with perhaps just a single or two hops, it is more cost effective these days to employ SIS or another satellite company to uplink the programme output onto satellite and down to the network base.

With falling prices of technology returning from two weeks in Spain and comments of his amazement at seeing the larger yachts in the local marina sporting satellite dishes, several moorings having permanent fixtures made to the mast system itself. And in an Iberian theme, John has noticed Capital Radio using a 11.617GHz vertical transponder on Eutelsat II F1 - 13°E - for a temporary link from a yacht at Majorca. Audio is carried at 6.8MHz, the video displaying a black/white pattern.

John Locker and others received the mystery 'TV Houston' and NASA TV signal feeds mentioned in last month's column that featured various shots of the Space Shuttle Columbus D2 mission and of the German involvement with that particular mission.

The mystery of the satellite downlink has now been confirmed as being Intelsat 504 at 31.4°W. This satellite was moved some months ago from a parking orbit at 40.5°W and has remained dormant since setting at the new 31.4°W slot. At the end of the Columbus mission, May, activity ceased from the 504 bird and has remained dead ever since. For future Shuttle missions there is every chance that the same satellite will be used for TV linking, check out 11.135GHz vertical at 31.4°W! The satellite is incidentally in an inclined orbit environment and any signals received will vary over a period of hours assuming that you, the enthusiast, is using a standard polar mount that tracks the Clarke Belt. An inclined orbit craft is not maintained in a stabilised position but tends to form its own 'mini-orbit' around the nominated orbital slot, this in the interests of fuel saving. A ground based satellite dish will need to track in azimuth and elevation to maintain optimum quality. A standard domestic installation will not feature such refined features whereas an industrial system will incorporate inclined orbit tracking as a matter of course.

Orbital News

The end of the Europesat project has been heralded with the pulling out of the Deutches Bundespost Telekom closely followed by the Swiss and German counterparts. Reasons are a lack of interest by programme providers now that Astra is well entrenched as a hot broadcasting spot in the sky for Germany and Telecom 2B for the French. Europesat would have provided 14 DBS level transponders from 19°W, replacing the ageing TV Sat and TDF birds.

Another DBS platform satellite -

Hispasat at 31°W - is to have three of its channels sold off to the highest bidder during the Summer for programme opening this Autumn. Hispasat has carried out digital TV tests in the FSS band using a digital compressed downlink with similar material sent via conventional PAL analogue.

Meanwhile Eutelsat is planning a new TV service for those programme makers unable to take up transponder full-time leases. Likely to be called Rainbow it will offer access TV for the smaller broadcasters such as TV Galicia and tend to reflect the nature and 'flavour' of the area of the broadcaster to help tourism and possibly local industry. The service is to be carried on the future Eutelsat II F5 bird and will open in Spring 1994. In early May Eutelsat agreed to accept the Czech Republic as a member, the Slovak Republic joined last January.

There's a lot happening in furthest Asia. Germany has now signed a 5-year lease to take a transponder over AsiaSat 2 due for launching early 1995 to carry the Deutsche Welle service, possibly by that time into a 24 hour format. The new satellite, a GE 700 will carry a 32 transponder payload.
As far as I know, there is no positive connection between sunspot activity and those sudden outbreaks of Sporadic-E. However, let's begin this time by referring to my 'Propagation' column elsewhere in this issue. The idea is to compare the large number of spots on May 10 [Fig. 1], with the considerable increase in 28MHz beacon signals, shown on the chart [Fig. 3], between the 8th and 18th. Judging by the position of those spots on the sun's disc, some of them were there while the 28MHz band was active. As far as the UK is concerned, the first 11 beacons on the chart are 'locals' therefore, at this time of year, their signals should have been enhanced by Sporadic-E.

I think that this was present at the time because, as you will soon read in this column, there were a number of short DX openings in Band I. In view of this, I wonder, have we seen a connection this time, was it a coincidence that conditions were generally quiet until those spots appeared, or was there some other form of ionospheric disturbance, caused by the sun, that influenced the paths of signals in these two bands? Whichever, readers enjoyed the DXTV that came with it.

Band I

During the opening on May 12, John Woodcock (Basingstoke) received unidentified pictures around 1100 and, later, at 1400 and 1600, he watched Italy’s RAI showing the Italian Open Tennis Tournament from Rome.

Bob Brooks (Great Sutton) also found Sporadic-E predominant on the 12th, when he saw one of their films at 0915, plus tennis, their clock logo and another programme between 1400 and 1815. In addition he logged a newscaster, Fig. 1, and a news-reporter, Fig. 2, from Hungary (MTV), cookery from Spain (TVE), an announcer with the caption 'Bayern Studio' from Germany and a pop concert from an unidentified source. Then came news and sport from Russia, with the familiar Cyrillic titles HOBOTN and CNOPT respectively, on Ch. R2 (59.25MHz) at midday on the 15th. Although Bob caught Spain again on 15th (TVE), and the 26th (NOXEMA), the signals during the events on the 14th, 15th, 21st and 24th came mainly from the North. Spread among those 'northern' days he received test-cards from Iceland (RUV Island), Norway (NRK), the Norwegian region of Hemnes and Steigen and Sweden (SVT Kanal 1).

In Melton Mowbray, Richard Bell, using a Pye 99 receiver with a Labgear pre-amplifier, watched a quiz show from Spain (TVE1) called El Precio Justo on May 29. "The signal first came in about 1910 and lasted for about 30 minutes," he said. Richard also noted further short-lived openings on the 30th, when he logged a signal, with a large ‘1’ in a square at the bottom right-hand corner, possibly from Czechoslovakia at 1125, various adverts from Italy (RAI Uno) at 1255, a programme menu from Norway (NRK), for about 5 minutes, at 1305 and a volley ball match between Russia and Germany from an unidentified station, for 10 minutes, at 1820.

Simon Hamer (New Radnor) received pictures from Czechoslovakia (CST), Germany (ARD1), Russia (RTSS) and Yugoslavia (JRT/RTB1 & JRT/MTV) on the 12th, Norway on the 14th, Austria (ORF1), Denmark (DR), Czechoslovakia, Hungary (MTV), Portugal (RTP), Spain (TVE1) and Sweden (SVT1) on the 27th, Norway, Russia and Sweden, each on several channels in Band I, on the 30th and Denmark and Russia on the 31st.

Around 1600 on the 30th, David Glenday (Arbroath) watched a programme from Poland (TVP1) and some classical music, with the on-screen logo 'TK' from Russia (CT1 or TSS1 ?) on Chs. R1 (49.75MHz) and R2.

Satellite TV

On 20 November 1992, Lt. Col. Rana Roy (Meerut, India) saw a Russian TV news, Fig. 3, via satellite, from an unidentified source, from an unknown origin. Rana told me that both the sound and pictures were very clear. In December 1992, Peter de Jong (Leiden, Holland) received good colour test-cards from Croatia, Fig. 4, Germany, Fig. 5 and Tunisia, Fig. 6, via Eutelsat II.

Weather

On the subject of weather instruments, I saw a compact Stevenson Screen, Fig. 7, while visiting a college garden in Sussex. These louvered boxes are used to house and protect various weather recording instruments. The front section is hinged to enable quick access for taking the readings once or twice a day depending on the observational programme in hand. I asked a supplier for details of a smaller, wall mounting, screen that I examined, along with a range of barographs on a stand at the Chelsea Flower Show on May 28. I hope to tell you more about these next time.
The variations in atmospheric pressure for the period April 26 to May 25, shown on the chart in Fig. 13, were recorded at dawn and midnight by the barograph installed at my home in Sussex. I recorded 1.9in of rain in May, with amounts of more than 0.25in falling on days 17, 20, 21, 27 & 30. This compares with only 0.3in for the same period last year.

From the East, David Ashley (Norwich) reported, "Typical May weather, wet one half the month, dry the other half. Temperatures have averaged the low mid-sixties".

Tropospheric

Although his local atmospheric pressure was low at 996mb (29.4in), David Ashley received good signals from Denmark, Germany and Holland, in the u.h.f. band, on May 12. "This I believe was due to a very strong warm front over the North Sea, between Denmark and Norway/Sweden," wrote David.

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David Ashley's local loops were added. He also added Germany's ARD1, SAT1 and ZDF, Denmark on TV2, and when strong on his local BBC2 on Ch. 55, he logged as

"every time a warm front turns up in Norway/Sweden," wrote David and Simon.

Strong warm front over the North Sea, in the u.h.f. band, on May 93.

David Ashley received good signals from Belgium (BRT1) on May 7th, and when he logged

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Text Books

Those of you wishing to know more about a recently manufactured receiver, may find its circuit in a book called Television Servicing 1989-90 sub-headed 'Circuit Diagrams', published by U-VIEW, (ISBN 09513897 1 8). A similar book, printed in 1992, with the same title but covering 1991-92 has the ISBN code 0 9513897 7 7. I saw these in the reference section of Chichester Library and was impressed by the clarity of the print and the graphics in such detailed circuits. These are large books, bound in a hard red cover, measuring approximately 300 x 200mm. The thickness of the inner leaves is about 35mm in book 1 and 45mm in book 2. Each one is plainly indexed with more than 40 manufacturers' names.

For more information and the price I suggest you contact your own public library or write to the publishers at 29 Warnsworth Road, Doncaster DN4 0RP. A free catalogue is available from Axdon Books, 32 Atholl Street, Perth, Scotland PH1 5NP, in reply to an A5 s.a.e. There are four titles on Satellite TV, one about European TV pictures and a variety of others about getting the best from the short wave bands.

SSTV

"Slow scan from the Russian stations come alive in the early evenings, just for a short time", wrote John Scott (Glasgow) at the end of May. However, during the month, John copied some interesting CQ captions, on the 14MHz band around 14.230MHz, from stations in Italy, Fig. 8 and Russia, Figs. 9 and 10 and a couple of eye-catching, end of QSO captions, from Italy, Fig. 11 and Scotland, Fig. 12. Note the horizontal bars of interference on Figs. 9 and 10 which spoils the reception of good quality pictures.

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transmitter site by now and should be operated only from Cahuata on the Atlantic coast, a facility once used by Radio Impacto. The Alajuela transmitter on 11.870 MHz will be moved to Guatemala to enhance the AWR facility there. At present, Radio Reloj is not using its 6.006MHz frequency but 4.832MHz continues in operation.

El Salvador - Both of the former FMLN clandestine stations are not licensed broadcasters. Both are currently off short wave, but plan to return. Radio Venceremos can be reached at Apartado Postal 05-258, San Salvador and Radio Farabundo Marti at Apartado Postal 3080, San Salvador. The government's Radio Nacional continues is long absence from short wave.

Guatemala - Look for 5GN4A/Radio Cultural to reappear in the 31m band after an absence there of many years. The station was in the process of installing a new transmitter for its medium wave broadcasts and intends to modify the old a.m. transmitter for use somewhere in the 31m range. The station used 9.760MHz many years ago.

Nicaragua - Another former clandestine, Radio Mukst, has now made two reappearances as a legitimate short wave station. It is currently being heard on 5.770MHz. The sign-off time varies widely, ranging from as early as 2200 to as late as past 0200UTC.

Argentina - Radio Malague, in the city of the same name, is active again on 6.165MHz, after a considerable silent period. The station uses a 500W transmitter and is scheduled from 1000 to 0400UTC.

Bolivia - Frequently well heard is Radio Metropolitana, La Paz, on slightly variable 6.195MHz. Sign-off varies between 0800 and 0930UTC and uses the slogan "La radio popular, mas popular." Much of the programming is in an indigenous Indian language, rather than Spanish.

Radio San Jose, San Jose de Chiquitos has resumed broadcasts on its old 5.58MHz frequency, running to sign-off around 0200UTC.

Another new station is RadioFusuras on 6.012MHz (listed for 6.120MHz) and using 5kW.

Brazil - Watch 1.704MHz (variable) for Radio Transamérica, Santa Maria, sometimes programming past its listed 2200UTC closing time.

A new Brazilian station is Radio Eldorado FM on 6.180MHz (variable).

Radio Cultural in Guatemala is planning a return to the 31m band, where it has been silent for many years.

Surinam - Seldom heard Radio Aponte is being heard on 4.919MHz (variable) around 0400, although suffering QRM from the Peruvian Radio Ancash until the latter signs off at 0430. Aponte formerly was being heard on 4.919MHz (variable) around 0400, although suffering QRM from the Peruvian Radio Ancash until the latter signs off at 0430UTC. Aponte formerly operated on 5.059MHz (variable).

Uruguay - Radio Monte Carlo, Montevideo, is sometimes heard on 11.755MHz around 2200 or later, in Spanish.

Special Events This Fall

If you are planning a trip to the United States sometime this year, October is a great time to do it, as there are two major events for radio listening hobbyists on the calendar that month.

On the weekend of October 1 the US magazine Popular Communications hosting its first World-wide SVL Conference, in Virginia Beach, Virginia and held in conjunction with the 18th annual Virginia Beach Hamfest and Computer Fair. The Conference will feature several international short wave broadcasters, speakers on everything from antennas to QSLs to tuning in RTTY. For more information contact Harold Ort, Popular Communications, 76 North Broadway, Hicksville, NY 11801, USA.

Two weeks later, on the weekend of October 15, the fourth annual Monitoring Times convention will take place at the Atlanta (Georgia) Airport Hilton. This three-day affair will feature numerous talks on everything from beginner's forums to military and satellite monitoring, digital communications and more. Additional information can be had by writing to Monitoring Times, PO Box 98, Brassington, NC 28602, USA. Please include an International Reply Coupon to cover return postage costs. I will be pleased to meet you at either, or both, of these special radio events.

Short Wave Magazine, August 1993 53
As mentioned last month, this is Graham Tanner compiling the column once again. All your letters have been passed on to me; I will try to cover as many of your questions and comments as I can in this column over the next few months. As mentioned elsewhere in this issue, Peter Rouse died during late June, and I am now in the 'hot seat' permanently.

Bosnia

For the past two years, the situation in the former Yugoslavia has varied between peace and civil war. The UN have a large number of personnel on the ground engaged in peace-keeping duties, and several nations are heavily involved in keeping the warring factions 'on the ground' by preventing their aircraft flying. Since the start of this year, the UN has been co-ordinating food-drops to besieged towns and cities. The food-drop flights are an extension to the 'Provide Promise' mission that was originally used to fly food and medicine into Sarajevo. The flights operate from Frankfurt in Germany, using mainly USAF C-130 Hercules transport aircraft, aided by both German and French C-160 Transall aircraft. Because of the possibility of hostile attack, the drops take place from above 10,000 feet (3000m), and occur at night or during the late evening. Much of the above is controlled and co-ordinated using H.F., and since the majority of the flying is done by the US forces, the USAF GWIF frequencies are where any activity is likely to occur. One callsign that 'appears' on an almost nightly basis is 'Bama 15'; several of us have mentioned this callsign, but nobody has discovered what it is yet. 'Bama 15' is the callsign used by an RC-135 aircraft operating from RAF Mildenhall, to act as a radio-relay aircraft and also to monitor any radio transmissions from the ground during the food-drop flight. 'Bama 15' has been heard regularly on 6.748, 11.176 and 15.615MHz, during the evening passing Operations Normal reports to 'Banter Control'.

On this page is a photograph of the RC-135 that flew as 'Bama 15' during early May; notice the extended nose and the modifications to the fuselage just forward of the wings - these are all packed with sensitive electronics. Notice also the extra antennas along the cabin roof and the antennas along the wings. The aircraft's h.f. long-wire antenna runs from the tail-fin (above the black vertical bar) to the top of the forward fuselage; also, notice the SATCOM antenna on the fuselage roof just forward of the tail-fin.

Encrypted

Strangely, the callsign 'Bama 15' has been the only callsign used for this flight since the first mission on February 15 this year. 'Bama 15' makes regular calls on h.f. to report its progress over Europe, but most of the traffic is passed as encrypted 3-letter groups. 'Banter Control' is the code name assigned to the SAC Command Post at RAF Mildenhall, where the flight departs from. The aircraft themselves are operated by the 55th Wing based at Offutt AFB in the USA, but there are always a few of them based in Europe, primarily at RAF Mildenhall and at Souda Bay on Crete.

Just In Case

The RC-135 and C-130s are not the only things flying during the air-drops. There are numerous combat aircraft airborne 'just in case', including several aircraft operating from US aircraft carriers in the Adriatic and Mediterranean seas (currently, CVN-71 - USS Theodore Roosevelt). The combat aircraft from these are usually controlled by an E-2C Hawkeye from the same aircraft carrier; these are sometimes heard on h.f. using callsigns with numbers in the low 600s (e.g., 'Navy AJ 601'). They also use the usual US Navy tactical h.f. frequencies, but they tend to use coded 'tri-graph' callsigns making positive identification difficult. The combat aircraft operate under the title of 'Dany Flight' (preventing the Yugoslav Air Force from flying) but they are ready to defend the transport aircraft if necessary. The aircraft performing the food-drop flights use normal 'UN' callsigns, just like those flights that are flying into Sarajevo. The 'UN' callsign allows the aircraft to overfly Austria and/or Switzerland.

Path-Finder

The flight of C-130s (usually 6 in total, with some C-160 Transalls) are accompanied by a 'special forces' MC-130 Hercules detached from RAF Alconbury to Frankfurt. This acts as a 'path-finder', to check out the route to be flown and searching for any potential problem areas on the ground. There is also some evidence that US special-forces troops are 'on the ground' in the drop zones to ensure that the air-drops land safely. In future months, I hope to be giving more information about these aircraft, including their callsigns and some of their 'discrete' frequencies (needless to say, I would welcome any additional information on this).

Next Month

There are going to be some changes in the next few years in the equipment used by the UK Search and Rescue organisations. Next month, I intend to give a rundown of these changes, and this presents an ideal opportunity for some more photographs. On the subject of photographs, I am always pleased to receive suitable photographs for publication within this column in SWM. Ideally, they should be topical, and with a suitable caption (I'm quite good with aircraft, but antenna masts all look alike to me!). Photographs should be sent direct to me with a stamped s.a.e. for their return. I look forward to receiving all your letters; I'm more than happy to write about 'military' stuff each month, so if you want to see more about marine h.f., or airline operations on h.f., or 'spy' numbers stations, then write and tell me.
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Short Wave Magazine, August 1993

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The first letter this time is from Sias Pretorius, who lives in Brakpan, Transvaal, South Africa. Sias uses a Kenwood R800, plus converters for 220, 430 & 1296MHz; a modified Blaupunkt stereo radio giving 1105 to 135MHz; and an International VHF220. Antennas include a 40m loop system for HF, verticals for the various VHF bands, and a Yagi loop design covering 1980MHz for satellite WEFAX.

Over the past few months Sias has put some 580 different stations into his computer logging system; VE3ZTT, VK6UJ, SPAIAD (all 14MHz), JL1HOU & UH8EA (17MHz), G3XVR & F8RLN on 28MHz, U2CLBF & D2UFU (24MHz), plus Z2 & A22 stations many times. Incidentally, Sias notes that RSA has new bulletins on Sundays between 0830 & 1000SST, in English for 2178MHz & 2908MHz lower sideband, relayed on 14-282 & 14-292, again on lower sideband.

Mark Malone lives in Great Horwood and uses an AR 1500 ham radio kit and a random wire antenna; this has netted him many of his friends in France, Germany, and much of the Middle East.

Iceland is our next stop, where Geoff Crowley lives in Hafnarfjordur. At this time of year Geoff says, they are into 24-hour daylight and a modified Blaupunkt stereo radio converting for 220, 430 & 1296MHz; Sias uses a Kenwood R600, plus a modified Blaupunkt stereo radio converting for 220, 430 & 1296MHz; Sias uses a Kenwood R600, plus a random hand-held scanner and a random wire antenna; this has netted him 1691MHz 0830 & 21350 and 28.350MHz; c.w. addicts might find it worth a look.

On 14MHz from around 0400UTC with zilch! Geoff says, they are into 24-hour daylight and a modified Blaupunkt stereo radio converting for 220, 430 & 1296MHz; Sias uses a Kenwood R600, plus a random wire antenna; this has netted him 1691MHz 0830 & 21350 and 28.350MHz; c.w. addicts might find it worth a look.

On Top Band Gerald Bramwell in Swinton stuck with c.w. to leg G3TKF & F6CNN; on 80m the same mode yielded Q3HLM, with RTTY giving GW3LYF, G3XKF, G4ZOP, PI4AA & lower sideband a couple of SM, G & GM, PT7LB, 9M6/G4SMC, KP2/K7ZD2ZLKF, VKs, ZLs, 9Y1XQ, TL8NB, SM0S, ZP5FT & EABAE. 7MHz showed with HB9AE, H6FM & ZA1C/12. RTTY gave OH2G1, and sideband GB6ISZGN (Commemorative station for S617 Son, the 'Dambusters'), other GBs, LS6G & lesser mortals in Europe, plus YV5JF, RHSE/JU2XKH, US7J, CE2CC, PT5SK, PY1NEZ, LZ3LA, RT9CIY, ULOA, YV1FYJ, 3X0HLU & VK6ACY.

The 14MHz list is quite enormous, with TA3TA on c.w. all continents save Oceanic, on RTTY, and some 150 non-European signals on sideband; of these perhaps the pick of the crop included 7Zs, BT2000BJ, A71BH, 5X1DX, VKs, KP2N, JAs, 9Ys, SB6AA, ZS6AKT, PG1BG, CO20M, OD5PL, VX3NLF and a whole raft of assorted WS and lesser folk. Now on to 18MHz for JAs, WS, PJ2MN, TA2Z, 4X4s, 7X2NV, JB9UX, JG8IR, V0JST, JAs, V47VC, A92BE, V01XC, HK6HEU, SJ7OX, QV2AQ, CN05C, VU1AK, 3X0HLU and another large raft of smaller fry. For 21MHz another long list with ETOEA on c.w. as pick of the crop. Otherwise it was ZS1ER, 9K2ZZ, CH2AQ, VEs, ET3SO, SJ2CV, OD2EZ, ZK1DL, JH1AM, 9M6/G4SMC, 3X0HLU and a whole raft of assorted WS and lesser folk. For 21MHz another long list with ETOEA on c.w. as pick of the crop. Otherwise it was ZS1ER, 9K2ZZ, CH2AQ, VEs, ET3SO, SJ2CV, OD2EZ, ZK1DL, JH1AM, 9M6/G4SMC, 3X0HLU and a whole raft of assorted WS and lesser folk.

Comming Up

This section, as always, courtesy of RSGB's DX MAG, The DX Bulletin, California, K1AF's Contest Calendar, and what you tell me in your letters. It would be interesting to know if there are any short DX Bulletin readers who know what you're up to each month!
There are far too many displays, fly-ins and other events to list here so I suggest that readers obtain a specialist publication that contains a complete diary for the season. Available from newswagents, Airshow '93 is a special publication from FlyPast magazine and costs £2.50.

During August, the ever-popular Red Arrows are expected to appear at: Donington on the 1st; Land's End & St. Mawgan on the 4th; Bournemouth & Swanage on the 5th; Eastbourne on the 6th; Cromer & Great Yarmouth on the 9th; Torbay on the 20th; Alconbury on the 21st; Alconbury & Leicester on the 22nd; Caxton on the 26th; Daglish & Weston-super-Mare on the 27th; Carlisle & Plymouth on the 28th; Carlisle, Plymouth & Wroughton on the 29th Plymouth and Wroughton on the 30th. Before setting out to a show, remember that appearances are subject to last-minute change or cancellation. The Reds Hotline (0881) 864424 might have more recent news, but I'm not sure of the call charges.

Mildenhall Report

One of the largest displays takes place now at the start of the season, at Mildenhall, near Cambridge, for one of the show days at the end of May. This display is usually noted for its striking display of "new metal" USAF transports and has included B-52 bombers. A specially early start enabled us to arrive before the traffic jams built up and we were then able to tour the huge static park exhibition. Some of the items found here are to be seen in the accompanying photos that Chris took.

Unfortunately, there were several disappointments. All the static aircraft were roped off and hence inaccessible to close inspection. This is in contrast to other events. At Brize Norton last year we joined the queue for a good look around the inside of a KC-135 tanker and when the rain came it could shelter variously in the voluminous cargo hold of a Galaxy or in the comfort of a VC-10.

Beyond the organisers' control was, of course, the weather. Now, for such pleasant conditions, with a little high cloud and plenty of sun, it was a surprise that flying had to be reduced. The wind prevented the sun from feeling too hot, but there lay the problem. That refreshing breeze was gusting up to nearly 30kts and was coming from nearly the wind direction - direct to the runway heading! A call over the public address summoned a meeting of all display pilots and soon after we were informed of the bad news: the display would be curtailed.

The day was saved by the various helicopter teams who, although having to lessen their formations to increase safety margins, bravely worked to hold the crowd's attention. The flying was also kept further from the crowd line than usual since the wind could have blown the aircraft towards us. Also able to perform, despite the crosswind, were the light, powerful fighters although none of the more susceptible heavy stuff or historical items were able to fly. In fact, the programme didn't have as many heavy items scheduled as had been seen in the past.

We were warned not to drop any litter as the wind could have blown this straight into the hungry intake of a jet engine. The cordon in the car park was not just a metal fence, it was also covered in orange plastic mesh to prevent stray items blowing towards the aircraft and causing Foreign Object Damage (the litter itself being known as 'FOD' for this reason). The orange mesh is called 'FOD fencing'. I'm sure that 'Airband' readers know just how important it is not to drop anything when visiting an airfield.

Lucky, things didn't get much worse although the nearby passage of a thundery squall made conditions unpleasant for a short while. When clouds covered the sun, the wind even felt decidedly cool! After such a long day, we were glad of the remainder of the remaining public holiday to rest.

You Fly!

Congratulations to Vincent Dagostino (Edinburgh) who went solo in early June. As is customary on these occasions, a single circuit was flown. That 'great sense of achievement' is certainly justified, Vincent! I expect that there's plenty more training ahead of you now, so as to consolidate your skills. But remember: you now have the confidence of knowing that you can do it!

As is becoming more common these days, Vincent has done some flying (supervised) by reference to a V.O.R beacon that was of particular help when the weather became too poor for visual flight. Of course, it's important to know your instruments, but I hope I don't sound old-fashioned when I say that there's a case for not doing too much instrument flying too soon.

Remember, the basic licence only permits visual flight - instrument ratings have to be added later. When flying by instruments, there is a tendency to pay less attention to visual features. This brings the danger of the late sighting of conflicting traffic and also missing the fact that restricted airspace, such as an aerodrome, is being overflown. Take care too when close to a beacon as aircraft will be homing in on this navigational point from all directions! Lastly, Vincent, be careful not to fly into weather conditions for which you have not yet gained the experience. This is one of the commonest causes of serious accidents in light aircraft: take your time to become proficient, and enjoy your flying!

News from Abroad

First stop takes us to the Republic of South Africa where J.B. Chamen watches aircraft while sitting by the pool! Thanks for the stamps - a mint set commemorating the development of South African aviation. As Mr. Chamen points out, the DC-3 is not depicted. He calls it 'The work horse of Africa' to which I would add that it was at one time the work-horse of just about everywhere else in the world, too! Even the Russians had their own licence-built variant. The airframe is of course strong enough to remain in service today, half a century later.

To those of us not accustomed to pre-war airliners, it is hard to believe that the Douglas Sleeper Transport offered the height of speed and luxury when it first went into service. These aircraft were even tolerant of a crosswind, were the light, powerful fighters although none of the more susceptible heavy stuff or historical items were able to fly. In fact, the programme didn't have as many heavy items scheduled as had been seen in the past.

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Short Wave Magazine, August 1993
With the holiday season approaching, several readers have asked me about using scanners abroad. This is a bit of a difficult question as many countries do not have clearly defined laws relating to radio monitoring, especially scanning.

In some ways it's similar to the situation in the UK where scanning is tolerated, but you could find yourself in trouble if you happen to be listening to the wrong thing, in the wrong place, at the wrong time. This can be made worse in foreign countries because of additional factors such as language difficulties, local bye-laws and on rare occasions corrupt officials wishing to subsidise their pay. As a general guide I would say don't risk taking your scanner abroad unless you are aware of the current situation in the country you are intending to visit. This can change, politics, unrest in neighbouring areas, crack-downs on crime or smuggling can all influence how strongly the law is enforced, even within the EEC.

One other aspect, often forgotten in haste, is to get away from it all, is that you may not be able to make sense of anything you hear because it's not spoken in English! Even though you may frequently hear Band E whilst you are travelling, most radio communications tend to be in the native language. Very often this has a strong regional accent that can defeat even fairly accomplished linguists. When there are large numbers of immigrant workers other languages can be used, for example many New York taxi drivers are Hispanic.

If you decide to take your scanner with you make sure it is insured and take the original sales receipt. It may be necessary to prove ownership of the receiver and show where and how long ago it was purchased. You may need to do this in order to satisfy a customs officer that the duty has been paid, that the item is for your personal use and that you are not intending to import or export it for resale.

Whilst travelling it may be necessary to disable the receiver by removing the batteries, particularly if it is packed in your suitcase rather than in your hand luggage. I would suggest carrying a scanner in your hand luggage with the batteries removed whilst you are actually travelling or passing through customs and immigration. It is more than likely that you will be asked to demonstrate the operation of the receiver at some point during your journey, so make sure the batteries are close at hand and that you only have amateur or broadcast frequencies programmed in.

If your scanner can receive the short wave bands, fill the memories with stations such as the BBC World Service, many officials assume it is just a short wave receiver, which arouses much less interest. Frequently it is only necessary to switch the receiver on so that the display operates and open the squelch so that it makes a noise to satisfy most officials. Once you reach your holiday destination don't forget that at some point you will almost certainly need to recharge your scanner's batteries, so take adaptors and check on the mains voltage before you plug in. Most bathroom shaver sockets have a standard 240V 2-pin outlet and are capable of running a NiCad battery charger, although they may not be able to provide enough current to run the receiver directly.

Some form of simple external antenna may also help if you find yourself inside a steel frame building, you can usually prop it up next to the window or on the balcony if you have one. Don't leave your scanner lying around your room if you go out, put it out of sight in a suitcase. Be careful if you decide to use it in public, once again try not to have it on open display. It is a good idea to use an earphone to keep the content of transmissions private and to avoid disturbing other people.

In Flight

If you are flying it is very tempting to use your scanner during the flight. This may or may not be allowed by the airline so it is always a good idea to check beforehand on company policy. If your given permission please consider other passengers and use an earphone.

Some airlines do not permit the operation of any electronic equipment onboard aircraft. This ban can include lap-top computers, broadcast radios, cellular phones, hand-held computer games and dictating machines. The usual reason given for banning these items is that they could cause interference to aircraft communication or navigation equipment. This is debatable, several people have commented that it may just be to reduce the potential for nuisance to other passengers. However, at least one American airline is very concerned about the level of 'hash' radiating from lap-top computers used by businessmen during flights. On one popular transatlantic business route up to 80% of the passengers were found to be using lap-tops at some stage during the journey. In order to prolong the battery life some users constantly monitor practically the whole journey in the toilet with the power supply plugged into the shaver socket. In one instance a passenger had run a mains lead from the toilet to his seat. The airline is now considering providing power sockets for business travellers.

In the case of cellular phones, using one from several thousand feet can cause unexpected problems for the network operators. This is because the cellular base station frequencies are reused on a geographical basis, which is planned so that normally only one base station operating on a particular frequency is within range of the phone at any one time. Because of the height of the aircraft several base stations can be within range causing the network to become confused about which cell it thinks the phone is operating in, as well as this happening the airborne phone can also block out other calls using the same frequencies in other cells.

The ban on dictation machines may seem odd, but it is because they use a bias oscillator operating at around 25-150kHz to erase previous recordings on the tape. These frequencies are close to those used by I.F. navigation beacons and the fear is that serious bearing errors could be displayed on the aircraft instruments. This is likely to become less of a problem as more aircraft change over to satellite navigation systems.

Why not drop me a line about your scanning experiences whilst on holiday?

Scanning Transceivers

Although I don't normally mention amateur radio equipment in this column, the distinction between the features found on some of the most recent designs and those normally only found on scanners is becoming less obvious.

I recently had a chance to try a Kenwood TH-78E dual-band handheld transceiver. This is designed to operate on the 144-146 and 430-440MHz amateur bands using...
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Short Wave Magazine, August 1993
n.b.f.m. with an output power of about 1.5W. The interesting part is that the receiver can be made to operate over the range 91-136, 136-174, 174-290, 400-800 MHz, with a.m. reception automatically selected over the range 91-135MHz.

If this wasn't enough there are actually two separate receivers built into the unit so it is possible to continuously monitor two separate channels, scan different frequency bands or banks of memories at the same time. This is very handy if for example you want to identify frequency pairings. Just set one half of the receiver to the broadcast station frequency and use the other half to search for the mobile. Other options include a sub-audible tone decoder which only opens the squelch if a transmission with the correct tone is received. One controller can be used for this purpose.

This receiver is as useful as many newly licensed radio systems use this system as standard. If you are a licensed amateur some of the other features such as the duplex transceive facility and message paging system may be of interest.

Kenwood are not the only company with dual-band handsets. Of course, Icom are just starting to advertise a 3-band hand-held - the IC-Delta 1. This covers the 144, 432 and 1200MHz amateur bands and you can select other companies to follow suit. I don't really want to go into much more detail about these particular handsets, but it may not be long before some of the features, particularly the dual receiver function, become standard in new models of scanning receiver.

AOR Spectrum Display

A new feature that may appear in a spectrum analyser facility rather like the Standard AX700. This would give an instant visual display of signals occurring within a large range of frequencies, which is useful if you want to spot strong local signals quickly. ACE Communications in America is offering a conversion for the AR-2800 which covers the 1980s, 2002, and 2800 with a perfect look at future versions for the AR-1000 and 3000 series.

The modification involves adding an additional BNC and 9-way D-type connector to the rear panel of the receiver, which is then connected to a separate unit called the SV150. This converts the receiver output into a spectrum display that can be seen on an externally connected oscilloscope screen. There are one or two drawbacks with this modification. The first is that the receiver only has to be fairly extensively modified and the second is that you need an oscilloscope to display the end result.

As with most of simple spectrum displays you have got to be able to display the end result. In fact with so many signals using frequencies (e.g. 131.725MHz) and channels do carry data as well as speech (e.g. on 131.725MHz).

The aircraft sends information such as weight of off-wheel (i.e. time of takeoff) which is user friendly. The route is sometimes checked from an up-to-date network and passing out the case via the ventilation grill in the base of the cabinet. He has used some very thin cables for this purpose of the type normally used in a recording player for generating an output from the pin and the plastic connector shell. The outer of the screened cable is connected to the chassis of the receiver by trapping it between the chassis and an additional piece of test equipment.

Frequency and Operational News

Each month, the GASIL from the CAA lists a content of frequency changes. I report only those appearing for the first time and that are likely to have permanent or other important consequences. The GASIL lists each change in three successive issues. The message for pilots and others who are responsible for flight planning is that your information will be checked from an up-to-date source. The lead time in preparing a magazine means that up-to-the-minute currency is not possible.

The GILS lists the following.

Frequency changes from Dunford: 122.55 is replaced by 125.875 (Lower Airspace Radar Service, v.h.f. Direction Finder and Approach); 119.325 is replaced by 122.550MHz (Radar). At Gatwick the Lower Airspace Radar Service has been withdrawn, but I suggest that pilots could instead use the Farnborough 125.25MHz (AGS). The coverage has been extended to compensate for the loss of Gatwick as listed above.

Also mentioned are two airspace changes: loss of ATZ and Military ATZ at Wattham which will affect all be temporary. At Southend, the Control Zone has been replaced by a smaller area.

Finally from the CAA, the Leuchars n.d.b. (LU, 417kHz) has been withdrawn; see AIC 70/1993. Although it hasn't reached the list in GASIL yet, I. Kirby (Edgeware) reckons that 135.125 replaces 120.4MHz at Heathrow. Could it be a temporary alternative frequency?

The next deadline for submitting correspondence is August 6. Replies always appear in this column and it is regretted that no direct correspondence is possible. All letters to "Airband," c/o The Godfrey Manning Aircraft Museum, 63 The Drive, Edgeware, Middlesex HA8 8PS. Genuinely urgent information enquiries: 081-958 5113.
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DXR10 10,12 & 15M three band amateur radio SSB/CW receiver complete kit with HA10R Hardware Pack and DCS2 "S Meter": £58.30

The above items are also available with assembled PCB modules, and as basic electronics kits without the hardware.

ACCESSORIES

<table>
<thead>
<tr>
<th>Kit</th>
<th>Assembled PCB</th>
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<tr>
<td>AP3</td>
<td>£16.80 £24.90</td>
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<tr>
<td>DFD4</td>
<td>£49.90 £69.90</td>
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<tr>
<td>CTU30</td>
<td>£39.90 £46.90</td>
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<tr>
<td>CV100</td>
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<td>ST2</td>
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<tr>
<td>XM1</td>
<td>£16.90 £22.90</td>
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73 from Dave G4KQH, Technical Manager.

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Short Wave Magazine, August 1993
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Enables all weather satellite signals to be displayed on any FAX system. Plugs into RX-8 system direct. £59 or £39 if ordered with RX-8.

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Every possible feature and performance to receive FAX, HF & VHF PACKET, COLOUR SSTV, RTTY, CW, AMTOR, UoSAT and ASCII on any BBC computer. Reviews Oct. 89 Ham Radio Today and July 91 Rad Comm. Complete system of EPROM, interface, instructions, leads and demo cassette £259.

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Performance, features and ease of use make this still a best seller. Needs TIF1 interface. BBC, C64/66 tape £25, disk £27. VIC20 tape £25. SPECTRUM tape £40, + 3 disk £42 inc adaptor board (needs TIF1 also) or software-only version £25. TIF1 INTERFACE has 4-pole filtering and computer noise isolation for excellent HF and VHF performance. Kit £30, ready-made, boxed with all connections £40. Available only with software.

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**SHORT WAVE MAGAZINE**

August 1993

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**GOOD NEWS!**

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73 s Elaine

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**SHORT WAVE MAGAZINE**

August 1993
It is pleasing to see the mail for this column steadily growing. I receive many requests for Kepler elements, but even more request general information and tell me of a new interest in the hobby of WXSAT monitoring. Some readers are going along the computer route; others are simply listening without decoding the pictures. A few are using tape recorders for future production. Watch this column for some special offers of useful software!

Current WXSATs

During May and June the WXSAT scene has remained steady, with no significant surprises. My log book noted that the CIS satellite METEOR 3-3 ended its time-space transmissions of infra-red images in late May. It has remained on 137.85MHz for a long time, though I expect that within a few days of writing this, it will not be transmitting. It is near the terminator (the night/day boundary) where illumination from the sun reaches it at a shallow angle. The history of CIS WX SATS suggests that at that stage in the ever-changing orbits of the METEORS, it will be switched off for a few weeks. Without the infra-red transmissions, METEOR 3-3 remained silent while crossing the dark UK during the evening, but as it approached the sunlit north polar regions, it was activated and came on. This is currently providing dramatic low-light level cloud illumination images near Greenland. Similarly, METEOR 3-4 has been transmitting visible pictures on 137.30MHz, but during its night it has transmitted blank images.

I am still awaiting the first beeps from NOAA 13, unless I missed them! NOAA 9 ended its hibernation on May 25 as published in the TUBUS bulletins. These dates are broadcast on h.f. as well as on BBS. People who have recently started decoding these pictures may find several unexpected features in the summer images. Many show a strong reflection from the sun as the satellite passes over the seas, particularly the North Sea during summer. Strong cyclonic dust storms may sometimes be seen over North Africa. If you have recently set up a METEOSAT system you will find the ‘animate’ section interesting. On many days you may see cloud systems going in opposite directions, quite close together. The different types of weather seen in different areas of the planet will keep you out of the pub most evenings!

NOAA 13

Geoffrey Falworth of Penwortham reports that the NOAA 13 (launch date is still uncertain (as of early June) because of successful operations with NOAA 9 through 12. He also informs me that the US Air Force has announced that some facilities at RAF Upper Heyford are being used for picture production. Watch this column for some special offers of useful software!

METEORS

During May and June the WXSATS transmissions of infra-red images in late May. It has remained on 137.85MHz for a long time, though I expect that within a few days of writing this, it will not be transmitting. It is near the terminator (the night/day boundary) where illumination from the sun reaches it at a shallow angle. The history of CIS WX SATS suggests that at that stage in the ever-changing orbits of the METEORS, it will be switched off for a few weeks.

NEW regular WEFA images from the geostationary GMS satellite will be transmitted on channel two, providing four different views around the western Pacific Ocean. All WEFA (not WEFA!!) formats will end from August 1, and the AVHR format will be removed in September. Higher resolution LXI (Primary Data) images are going to be disseminated every hour in due course. If you can’t receive METEOSAT data this is the time!

METEOR Orbits

It is very helpful to have a satellite tracking program when studying the behaviour of the CIS satellites. Look at their Kepler elements - the list of mathematical parameters that describe the orbit of a satellite - to spot a few guide-lines. Their Mean Motion weather satellite orbit is always around 14, so they cover 14 orbits of the earth each day. Work out the exact time taken for one orbit (the orbital period), and you may notice that each day they pass over a few minutes earlier than the previous day. The exact amount varies a little between satellites. They all have an orbital inclination of around 82°. Because this is not far off 90°, it means that every pass takes them close to the poles, hence the general term polar satellites.

Comparison with the American NOAA WX SATS that have similar inclinations (about 98°) and the benefit of having satellites in such orbits, passing over every part of the earth during a 24 hour period, is clear. They have on-board tape recorders to record selected regions of the earth, as well as other types of instrumentation.

METEOSAT 4

EUMETSAT has just announced the launch of a new satellite - a new terminal coming into operation on July 8, with further changes on August 1 and September 1. In my view, they are most welcome additions!

New regular WEFA images from the geostationary GMS satellite will be transmitted on channel two, providing four different sectors around the western Pacific Ocean. All WEFA (not WEFA!!) formats will end from August 1, and the AVHR format will be removed in September. Higher resolution LXI (Primary Data) images are going to be disseminated every hour in due course. If you can’t receive METEOSAT data this is the time!

Radio Sweden

George Wood has a radio programme called MediaScan/Sweden Calling DXers, on Radio Sweden and kindly sent me a letter, together with a magazine called The DXers Guide to the Galaxy, which he edits for that station. He comments that he enjoys this column and hopes to monitor WX SATS from his new home. He has a motorised 1.2m TVRO satellite dish and wonders whether the addition of a suitable LNB (low noise block) might enable him to receive METEOSAT. I believe that this should work in principle, but systems are normally bought complete; it is possible to buy or hire a feed for 1.7GHz (the METEOSAT f1 frequency), but the rest of the hardware would still need to be acquired. If anyone would like a free copy of the magazine mentioned (it’s very good!), write to Radio Sweden at S-105 10 Stockholm, Sweden.

A picture from Mike Robinson of Accrington (see Fig. 3) illustrates a phenomenon that I often see on WX SATS images. Notice how cloud seems to remain inside land boundaries. It covers both Britain and Europe, right up to the

Lawrence Harris
5 Burnham Park Road, Peverell, Plymouth, Devon PL3 5GB
coastlines, but leaves large areas of the sea under clear skies. Mike is using a PROscan receiver, together with PROsatll software, and after adjusting his antenna, is now receiving noise-free pictures from NOAA and METEOR WXSATs. He added a grid before photographing the screen.

Mike also comments on the amount of disk space required when you want to save several images. He has used a Backup program to save images on floppy disks; this allows an image to be split over one or more disks.

**File Compression**

There are other solutions to this problem of data storage, e.g., file compression. Programs are available that analyse the content of a file and reduce it by applying mathematical techniques. Many pictures contain areas having similar content e.g., large areas of dark sea or white cloud. When such a file is compressed it may then occupy some 50% or even less space. Some of my astronomical images (CCD based) contain one planet or even just a few stars, in an otherwise black sky, and these frequently compress down to some 3% of their original size! You can expect many 512kB WXSAT files to compress down to around 300kB.

**Auto Saving of Images**

My own WXSAT receiver is a Dartcom-based home-wired unit that automatically scans the available channels and saves the received pictures. My program is set-up to capture the image and store it. Viv has tested his program on both 286 and 486 computers, even while running file compression software and finds that it runs well. His system uses a small program to check the opening of the squelch relay on the receiver. The program starts the main (polar orbiter) computer running in the correct mode. Pictures from signals lasting more than three minutes are stored automatically. Dave Rogers has also been running a program and comments very favourably. For full details, please send an s.a.e. to Viv at 11 Priory Green, Highbworth, Swindon, Wilts.

**New Products**

I have just received a copy of **TRACKII**, an upgraded version of the satellite tracking programs from Timestop Weather Systems. In addition to the facilities provided with the version that I reviewed last time, it allows the setting up of satellite groups. All four NOAA and two WXSATS (plus any saved as group 1 and instantly called for display by pressing the selected function key. Other combinations can also be defined - I would rebroadcast all WXSATS or one group for the unused METEOR WXSATS so that when you hear unidentified signals you can select that group for checking. Further useful features include: resident commands that convert the screen image to formats for reading by other programs; GIF, SFC and PCX conversions are available. The program runs on a 286 PC or better, and a co-processor is recommended but is not essential. For full details, ring Timestop on 0440 620 820.

Following a number of requests for information, such as that from J Bloomfield of Ipswich, I have written to WXSAT equipment suppliers to identify those products for computers such as the Amiga and other non-PC computers. Mr Bloomfield has an Amiga 500+ and wants to know where he can obtain decoding programs. I am happy to pass on any information that readers or vendors can supply.

**Beginners' Section**

Last month I had a look at the way the American NOAA and Russian METEOR WXSATs actually modulate their data - the picture information. Since then, various manufacturers of co-operation have ensured that anyone who can decode pictures from one WXSAT can also decode them from the others - perhaps unique in broadcasting history? This month let's look at the METEOSAT format in a little more detail.

The geostationary WXSATs transmit a compatible signal - using the same modulation methods as the polar orbiters - called WEFAX (weather facsimile). This ensures that the same type of equipment can be used to decode all images.

To receive the signal you need an antenna suitable for 1.7GHz. The precise frequencies used by METEOSAT, for our purposes, are 1861 and 1694.5MHz. They are called channels A1 and A2 by EUMETSAT, which is the organisation responsible for controlling the satellites. The many frequencies transmitted by WEFAX are not referred to here. Antennas used most commonly in this band include dishes and Yagis. For WEFAX use, a '1m dish will suffice, but a good parabolic dish greatly improve signal reception. The 1681MHz signal is essentially a carrier and can be either converted down to the more conventional 137MHz band for picture decoding, or a 1681MHz dedicated receiver can be used. I have both types, and currently use a direct receiver without down-conversion. The satellite transmits virtually continuously on 1661MHz, so detecting the carrier is not normally a problem. METEOSAT is around 6° longitude, so pointing your antenna due south at an elevation of about 35° (60° minus your latitude) should enable you to hear the carrier. You will quickly hear the different types (tones) of signal being transmitted. The format (content) of each picture line differs from NOAA and METEOR images though there are similarities. The line rate (number of scan lines per second) is four. Pictures are individual frames taking 3 minutes and 33 seconds to transmit, so METEOSAT is based on four-minute slots, with the odd 27 seconds being used for DCP data - which does sound strange!

The start tone for every image consists of a three second burst of 300Hz signal. This is used to trigger computer programs and framesters for picture synchronisation. There are then five seconds of phasing signal, essentially white with a black border. The picture itself lasts for 200 seconds (and therefore 800 lines) and includes a digital header for computer decoding, and a display header within the picture, together with a white border. The end of the frame is marked by a stop signal consisting of a five second tone burst of 450Hz. Images are of three types - visible (indicated as V on the header), infra-red (shown as IR), and water vapour (WV). Each is a portion of the original higher resolution whole disc image that is obtained approximately every thirty minutes by the spacecraft. Decoding systems that produce pictures from the original data, are called Primary Data User Stations (PDUS) and I expect to produce a review of the first commercially available unit, of which I took delivery some months ago, as quickly as possible.

There can be some confusion over the amount of detail that one may expect to see from METEOSAT images. The raw PDUS data contains the highest resolution imagery available, and at the satellite point, this is approximately 2.5km for the visible light images. METEOSAT 4 is positioned over the Ivory Coast having moved north, towards the Mediterranean Sea countries, the resolution drops off considerably, and by the time we see Britain, the resolution is down to that of the polar orbiters' a.p.t. images.

PDUS infra-red and water vapour images have resolutions of about 5km at the sub-satellite point. WEFAX pictures have lower resolution, but as the pictures published in this column show, there still remains much to see. I find the images extremely helpful when planning an evening with my telescope, not to mention a day out! A few animated images of D2 - the infra-red format which includes Britain - tells me where all the clouds are, and where they are going.

**BARAS News**

During the last month or two a new edition of the Journal of the British Amateur Radio Astronomy Society has been prepared. It should be with members by the time that this appears. For membership details write to secretary Joe Pritchard of 27 Walkley Crescent Road, Walkley, Sheffield S8 5BA.

**Kepler Elements**

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

**Frequencies**

NOAAs 9, 11 on 137.62MHz, NOAA3 10, 12 on 137.50MHz, METEOR 3-4 or 3-5 on 137.30MHz, METEOR 3-3 on 137.85MHz.

Fig. 2: Eastern coast near Canada from Laurence Patton.
Fig. 3: Gridded image of the UK from Mike Robinson.
PROsat II is used by most leading Weather Satellite enthusiasts. Lawrence Harris, Roger Ray and Brian Dudman are just a few who have come to rely on the vastly superior features of PROsat II. Features such as 1,000 frame full screen full colour animate, 3D, direct temperature readout and Windows export make Timestep products preferred by most users. All satellites are catered for including the awkward Japanese GMS and the very infrequent Soviet Okean series. All current SVGA cards are supported. NOAA images contain full resolution visible and infrared data in a stunning 2.4Mb file!

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

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Tel: 0440 820040 Fax: 0440 820281

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

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Keith Mayhew of Mansfield has recently bought one of the new ERA Synoptic decoders and wants some advice. The problem he has is that the decoder pumps out data so fast that he keeps running out of paper. Ideally, he would like to be able to view the received data and select batches for printing. It sounds to me as though he could do with a good comms program. Most of these have the facility to save data to file and view/edit that data. Not having used a BBC B for a while, I'm a little out of touch with the available software. If you have any bright ideas to help Keith, please write and let me know.

Geoff Crowley of Iceland reports great success using a computer-based propagation predictor. This enables him to optimise his listening time and seek out the best DX. The program in use is called Mapper 86 v7.1 and is available from the Public Domain Software Library, Winscombe House, Beacon Road, Clevedon, Somerset T随时 available online.

Robert Hall from Capetown S.A. is a regular contributor to 'Decode' and has just sent me detailed schedules and frequency allocations for Capetown Radio. Although Robert doesn't give the station address, the 1993 Klingenfuss Guide to Utility Stations lists it as: Capetown Radio ZSC, Control Officer, Private Bag X01, MILNERTON 7435, Republic of South Africa.

Radio Telax frequencies - SITOR Mode A (ZSC Service 4331)

These frequencies are also used for broadcasting navigation, weather and traffic information as follows:

**Navigation warnings:** 0615, 0900 & 1200UTC 1200UTC

**Weather forecasts:** 0930 & 1200UTC

**Traffic lists:** Even hours - 15 mins, e.g. 1015, 1215, etc.

Robert has also received some hot news regarding the commencement of NAVTEX transmissions on 518kHz using SITOR B. Apparently, the test transmissions will start on Friday July 9 at 0700UTC and will continue on the following Fridays. However, with a range of around 850km it's unlikely to be heard in the UK.

**Beyond The Broadcast Bands**

A new book, published by Richard Wilmot of Technical Software, **Beyond The Broadcast Bands** is aimed at the utility listener in AS format with one hundred and forty four pages. The first few chapters cover many of the equipment basics with some advice on buying new and second-hand equipment. Before moving into a more detailed look at data modes, the author explains some of the basics of data signals. The main core of the book covers many of the more popular modes with sections on Morse, RTTY, ASCII, SITOR, Packet, SSTV, weather satellites, and NBTV. There was also another short chapter that gave a brief overview of some of the complex modes. One intriguing chapter was titled 'Publications' and seemed to be having a snipe at reviewers - me included. I don't want any valuable column space going into detail! The final few chapters provided some useful help for those with decoding and interference problems. The only odd point about the book was that the author seemed to make a point of not making the connection between himself and his decoding software business Technical Software. **Beyond The Broadcast Bands** costs £12.95 and is available from Richard Wilmot, Fron, Upper Llanddwrog, Caernarfon.

**Amiga Software Help**

Following last month's plea for help, I've received a rapid response from a number of readers. Colin Seear of Havant and David Aldred of Eye both recommend the Amiga Amateur Radio User Group. As their name suggests, they provide support for a wide range of radio applications using the Amiga range of computers.

**Sample MetFAX chart.**

Although the accent is very much on amateur radio, there is plenty to interest the short wave listener. The user group was started back in 1988, so they have built-up lots of experience and contacts. To keep their members up-to-date with the latest news they publish a regular newsletter called Amigain Airways. The samples supplied by David Aldred were very well produced, extremely informative and well worth getting on the mailing list. Like many other user groups, the newsletter is distributed around three to four times a year to all those who have submitted s.a.e.s to the distribution manager. One of the most remarkable points about this particular user group is that it's completely free. That explains why you have to send in pre-paid envelopes for the newsletter.

In addition to communicating through the newsletter, they also use public domain disks and packet radio bulletins. There's even an amateur radio s.s.b. net at 1300hrs local time on Sundays using a frequency around 7.090MHz. A look through their list of public domain software shows that they have around thirty to forty disks available. If the titles are anything to go by, they all look to be extremely useful. If I've whetted your appetite and you'd like to join up, then the man to contact is Bob Wellbeloved (G3LMH) and his address is: 8 Orchard Close, South Wiston, Winchester S021 3EY. Don't forget to include a s.a.e. with your enquiry.

**African Meteo Stations**

Now that there are a number of decoding systems available for SYNOP RTTY signals, I thought it might be useful to print details of some of the remote stations. This was prompted by Robert Hall sending details of some of the African stations. In addition to the transmission details, Robert has included the station's location.

**Location**

<table>
<thead>
<tr>
<th>Station Index</th>
<th>Name</th>
<th>Frequency</th>
<th>Speed</th>
<th>Shift</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dakar 14°34′N</td>
<td>17°29′W</td>
<td>19.7456</td>
<td>50</td>
<td>730</td>
</tr>
<tr>
<td>Nairobi 1° 17′S</td>
<td>36° 48′E</td>
<td>17.442/13.727</td>
<td>100</td>
<td>850</td>
</tr>
<tr>
<td>Pretoria 25° 44′S</td>
<td>28° 12′E</td>
<td>18.242/13.542</td>
<td>75</td>
<td>425</td>
</tr>
<tr>
<td>Cairo 30° 1′N</td>
<td>31° 14′E</td>
<td>18.254/16.108</td>
<td>75</td>
<td>850</td>
</tr>
<tr>
<td>Jeddah 21° 29′N</td>
<td>39° 10′E</td>
<td>22.37/17.59</td>
<td>100</td>
<td>850</td>
</tr>
</tbody>
</table>

The station index and location indicator for these stations is:

**Name**

<table>
<thead>
<tr>
<th>Station Location</th>
<th>Name</th>
<th>Index Location</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dakar 14°34′N</td>
<td>17°29′W</td>
<td>19.7456</td>
<td>50</td>
</tr>
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</tr>
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<tr>
<td>Jeddah 21° 29′N</td>
<td>39° 10′E</td>
<td>22.37/17.59</td>
<td>100</td>
</tr>
</tbody>
</table>

One important point about Nairobi is that it has now been designated a regional weather centre and is linked to the main weather centres at Offenbach and Bracknell. If you would like to decode SYNOP signals, you can either do this manually or automatically. For the manual system you will need a reference book such as the Klingenfuss Air and Meteo Code Manual. The automatic systems are based around computer decoding of the received signal. The two main contenders in this market are ICS Electronics with their SYNOP package for IBM compatibles and ERA with their stand-alone system.
The development of JVFAX is version 5.1.

Once I've checked it out I'll print more details.

After the crash was serious, as he had to use FDISK to correct the hard disk. The crash was serious, as he had to use FDISK to correct the hard disk.

The JVFAX program for IBM PCs has been received by many users. The program has also been used with the Archimedes computer using another software package available from Elektor.

Having recently mentioned this FAX program for IBM PCs, I've received many letters from readers. One from Allan Grant gives a tip to increase the display speed. Instead of saving the images to a conventional disk file, set-up a RAM disk. Because RAM is so much faster than disk access, the image can be viewed and edited much quicker. Although the tip was aimed at the JVFAX program, it's likely to work with many other systems.

Martin Gerrard of Broughton reports one or two problems when running JVFAX on older computers. Martin and a colleague tried to run JVFAX on Amstrad 1512 and Olivetti PCs/65 computers with DRDOS 6.0336-400-400-400-420-421-422-423-424-428-429

Marine.

JVFAX

I have to thank my wife, Elaine, for providing this one in the Daily Telegraph on June 5. This is an interesting novel new service that's been made available by the Met. Office in Bracknell. The service has been designed to make weather FAX charts available to the masses. The only requirement is that you need to have access to a standard office FAX machine. You then simply dial the appropriate MetFAX number and press start on the FAX machine. The only disadvantage is that the service uses premium rate numbers, so the charges are 36p per minute, other time charges are 46p per minute at all other times (inc. VAT). However, with most of the charges only taking around 3 minutes to receive, £1.44 is not too unreasonable. So what can you get? To give you an idea of the standard MetFAX service here are the phone numbers for the various charts:

FAX chart received by Allan Grant using JVFAX.

Northwood FAX Update

Allan Grant of Crowmarsh Gifford has just received the latest schedule from this popular FAX source. He also received a message announcing the end of the recent satellite imagery trial. This contained an interesting note that their current equipment does not support grey scales. However, they are seeking replacement equipment. So that you have the complete picture, here's the current schedule as of May 29.

0300 Schedule

0320 002 Surface Analysis

0400 18Z Sig Su Wind and WX Prog.

0440 Satellite Pictures

0540 002 Selected Upper Air Ascents

0600 Repeat of 0320

0620 NAC TAFS

0730 Repeat 0400

0750 Combined 0 and 2°C 12Z Anal

0825 Gale Summary

0950 002 Surface Analysis

1040 Satellite Pictures

1130 Gale Summary

Weather Reports

Guide to Plotted Chart

Guide to Satellite Pictures

Index

Elettra Avenue, Waterlooville, Hants

0336-400-480

11.476

11.476

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11.476
### Medium Wave Chart

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Station</th>
<th>Country</th>
<th>Power</th>
<th>Listener</th>
</tr>
</thead>
<tbody>
<tr>
<td>530 kHz</td>
<td>Berlin</td>
<td>Germany</td>
<td>2 kW</td>
<td>R</td>
</tr>
<tr>
<td>555 kHz</td>
<td>K-Bay</td>
<td>Germany</td>
<td>20 kW</td>
<td>Listener</td>
</tr>
<tr>
<td>590 kHz</td>
<td>Moscow</td>
<td>Russia</td>
<td>500 kW</td>
<td>Listener</td>
</tr>
<tr>
<td>630 kHz</td>
<td>Paris</td>
<td>France</td>
<td>100 kW</td>
<td>Listener</td>
</tr>
<tr>
<td>690 kHz</td>
<td>Tokyo</td>
<td>Japan</td>
<td>200 kW</td>
<td>Listener</td>
</tr>
<tr>
<td>750 kHz</td>
<td>Rome</td>
<td>Italy</td>
<td>100 kW</td>
<td>Listener</td>
</tr>
<tr>
<td>810 kHz</td>
<td>Madrid</td>
<td>Spain</td>
<td>500 kW</td>
<td>Listener</td>
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<tr>
<td>875 kHz</td>
<td>Copenhagen</td>
<td>Denmark</td>
<td>100 kW</td>
<td>Listener</td>
</tr>
<tr>
<td>930 kHz</td>
<td>Mexico</td>
<td>Mexico</td>
<td>200 kW</td>
<td>Listener</td>
</tr>
</tbody>
</table>

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

### Long Wave Reports

To allow for seasonal changes in propagation some international broadcasters made further changes to their short wave schedules in May. They are reflected in some of the reports here.

#### Long Wave Reports

Note: l.w. & m.w. frequencies in kHz; s.w. in MHz; Time in UTC (i.e. GMT). Unless stated, all logs compiled in the four week period ending May 28.

Few listeners in Finland have been using the l.w. service from Lahti on 252kHz, so the Finnish Broadcasting Company suspended transmissions at 1200 on May 31. The service commenced in 1928. New transmitting equipment was installed in the early 1950 s, but the original 150m towers were retained.

Repotting from Iceland, Geoff Crowley (Hafnarfjordur) says, "long wave is now just about dead. His log was compiled at the beginning of May. They now have 24 hour light conditions, after sunset it is like an overcast day!

#### Medium Wave Reports

Whilst searching for transatlantic signals on May 1, Ted Barry (N.London) heard the broadcasts from CJYJ in St. John's, Nfld. Although the signal peaked SINPO 33333 no others were heard until 0202, when he heard a news report from WNEW in New York on 1130, rated 2232. At 0215 he tuned to the Caribbean Beacon, Anguilla on 1610, which was 2231.2. Before closing he logged VOIC in St. John's on 590 as 2232 at 0246.

Prior to the start of Virgin Radio's broadcasts on 1215, DXers often logged transatlantic signals on 1210 & 1220kHz. Ted Barry says there is no chance of hearing them now owing to the sideband splatter from Virgin's Brookmans Park outlet (125kW) on 1215. Tim Bucknell has similar problems in Congleton, he is equidistant from Moorside Edge (250kW) and Droitwich (125kW) and both radiate Virgin 1215.

Some of the signals from N.Africa and the Middle East also reached the UK after dark. George Millmore (Woodton) found conditions to be above average for the time of year. After dark, he logged Algeria - Les Treguils 549 (SINPO323), Alger 881 (SIO323) & Alger 881 (SIO444). Morocco - Sidi Bennour 546 (SIO223), Oujda 534 (SIO223) & Sbsah-Aouin 1044 (SIO333). Tunisia - Tunis-Djedda 630 (SIO444). Many Spanish stations were audible, but he added Bilbao 756 (EI), Malaga 882 (COPE) and Lugo 1088 (RE-5) to his list.

The complexities of the Spanish broadcast network have been attracting RoyMerrall in Dunstable. He received some detailed information from SER in Madrid. It revealed...
that they have no outlets on 827 or 336kHz - the latter being a group frequency for RNE-5, their McKeown in Newry, Co.Down.

Short Wave Reports

Favourable conditions their signal on 25.750 (Eng 0800-0855) was 35233 at 0807 by Eddie that they have no outlets on 927 or 936kHz - the latter being a group frequency for RNE-5, their McKeown in Newry, Co.Down.

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The 17MHz Band

Some of the 17MHz (16m) signals in come from R.Australia via Darwin 16.795 (Eng to S-Africa 0700-0900) SI0333 at 0800 in Macquariefield; SRI via Schwarzenburg 17.670 (Eng to Aust, NZ, S-Pacific 0900-0930) 4313 at 0900 in Newry; KKB, N. Marianas Is 17.555 (Eng to NE Asia 0800-1155) 44444 at 0953 in St. Andrews; RTV Tunisia via Stax 17.500 (Ar [Home Service] 0700-1800) SI0114 at 1005 in Winchester; Israel, R. Jerusalem 17.545 (Eng, Fr., Heb to USA, W.Eu 1800-2130) SI0333 at 1015 in Sheffield; R.Bulgaria, Sofia 17.830 (Eng to Us 1000-1200) SI0114 at 1043 in Bushby Heath & 5555 at 1042 in Hafnarfjordur; DW/Via Julich 17.860 (Eng to W.Africa 1100-1300) 3222 at 1100 by Sheila Hughes in Morden; Pakistan, Islamabad 17.600 (Eng to Us 1100-1200) 3242 at 1112 in Bagasing; R.Moscow Int 17.765 (WS10444 at 0700-1800) SI0114 at 1200 in Co.Fermanagh.

After mid-day, R.romania Int, Bucharest 17.950 (Eng to USA 1300-1500) was 33233 at 2115 in Barton-on-Wye; HCJB Quito 17.495 (u.s.b. + p.c.) 17.595 (Fr, Eng to N.Africa, 1600) SI0444 at 1005 in Winchester; ORT N Tunisia via Eu, M.East, Africa 2100-2200) 42323 at 1620 in Kilkeel. After dark, RCI via Sackville 17.820 (Eng to USA), S10444 at 1230 in Winchester; to USA 2200-0000) SI0555 at 2201 in Winchester; VOA via Selebi-Phikwe 15.445 (Eng to W.Africa 1600-1800) SI0343 at 1705 in Rowley Regis, via Timang 15.295 (Eng to Asia, M.East 1900-2000) SI0222 at 2305 by Julian Wood in Elgin & 15.160 (Eng to E.Africa 1400-1500) 44333 at 1425 in Co.Fermanagh & via Botswana 15.495 (Eng to Africa 1900-2200) 34533 at 2030 in Northwich; KTBN, Santa Ana, 15.590 (Eng to USA 1600-0200) 31333 at 1820 in Woodhall Spa; Vaticn City, Italia, 15.190 (Eng, Fr to W.Africa 2000-2100) S10555 at 2201 in Co.Fermanagh & via Ascension Is 15.400 (Eng to Africa 1500-2315) 44334 at 2303 by Robin Harvey in Bourne; UAE R, Abu Dhabi 15.305/15.315 (Eng to USA 2200-0000) SI0333 at 2302 in Edinburgh; Air via ? 15.245 (Eng to Aust, NZ 2045-2200) S10422 at 2030 in Redhill.

The 15MHz Band

Throughout the day the 15MHz (19m) band carries many signals in a variety of languages. Some for European listeners were noted from WWCR, Nashville 15.685 (Eng 1000-0000, also to USA), S10444 at 1230 in Winchester; Voice of Turkey, Ankara 15.325 (Tur 1000-1700) SI0333 at 1900 by John D’Holloran in Harrogate; WCSN, Scotts Corner 15.665 (Eng 1400-1655) 25544 at 1525 in Chester; AWI Russia 15.125 (Eng 1600-1800) 34333 at 1500 in Newry; Voice of Vietnam, Hano, 15.010 (Eng 1800-1830) 55545 at 1810 in Norwich; UAE R Dubai 15.435 (Eng 1330-1400) 43333 at 1330 in Rugby; R.Pakistan, Islamabad 15.550 (Eng 1700-) SI0114 at 1700 in Sheffield; RNS Brasilia, Brazil, 15.265 (Eng, Ger 2000-2130) 4313 at 2130 in Bridgwater; Israel, R. Jerusalem 15.640 (Eng 1900-1930) SI0444 at 1910 in Rotherham; WBW, Red Lion 15.295 (Eng 1800-2100, also to n.Africa) 13333 at 2030 in Worthing; also 15.185 (Eng 2100-2245) SI0444 at 2100 in Ross-on-Wye; also 15.145 (Eng 2247-2347) 43443 at 2250 in Kilkeel.

Quite a number to other areas were also logged here: R.Australia via Shepparton 15.240 (Eng to Pacific areas 0030-0830) SI021 at 0825 in Macquariefield & 15.320 (Eng to S.Africa 2200-0730) 24532 at 0232 in Wallisand; R.Finland via Por 15.400 (Fin, Eng to USA, 1100-1400) 34333 at 1100 in Morden; LibS, Sabrata, Libya 15.415 [Ar Home Service] 1315-1745) 45444 at 1330 in Woking; KTVF Agana, Guam 15.610 (Eng to India, S.Africa 1500-1700) 34533 at 1500 in Stirling; via Ascension 17.880 (Eng to Africa 1400-1700, 1745-2030) 24322 at 1527 in Oxford; Voice of Greece, Athens 17.525 (Gr, Eng, Sw to USA, Sweden 1500-1500) 44444 at 1525 in Brescia; RTM via Tangiers 17.595 (Eng, Fr to N.Africa, M.East 1400-1700) 54554 at 1620 in Bridgwater; Channel Africa 17.710 (Eng to Africa 1600-1800) 54444 at 1645 in Newry.

In the evening, WCCN, Scotts Corner 17.510 (Eng to Us 1800-2200) was SI0444 at 1810 in Rotherham; R.Algeria Int, via Bouchaoui 17.745 (Eng, E/C Africa 1900-2000) SI0343 at 1900 by Michael Griffin in Ross-on-Wye; HC/J Bu Quito 17.450 (s.u.b. + p.c.) SI1222 at 1928 by Michael Williams in Redhill; also 17.790 (Eng to Eu 1900-2000) SI0444 at 1900 in Edinburgh; R.Netherlands via Bonar 17.605 (Eng to W.Africa 1900-2035) SI0435 at 2005 in Rowley Regis; VOA via Bethany 17.800 (Eng to Africa 1900-2000) 34533 at 2030 in Northwich; KTBN, Santa Ana, 15.590 (Eng to USA 1600-0200) 31333 at 1820 in Woodhall Spa; Vaticn City, Italia, 15.190 (Eng, Fr to W.Africa 2000-2100) S10555 at 2201 in Co.Fermanagh & via Ascension Is 15.400 (Eng to Africa 1500-2315) 44334 at 2303 by Robin Harvey in Bourne; UAE R, Abu Dhabi 15.305/15.315 (Eng to USA 2200-0000) SI0333 at 2302 in Edinburgh; Air via ? 15.245 (Eng to Aust, NZ 2045-2200) S10442 at 2030 in Redhill.

The 13MHz Band

Although R.Australia’s 13MHz (22m) signals have reached the UK,
reception has deteriorated. Until recently, 13.755 from Carolinav (Eng to Asia 1430-1600) often rated 44444, but now 33333 noted at 1456 in Woodhall Spa is now typical. Whilst in Litchboro, Greece Zacharias Lianas (Thessaloniki) logged it as 22222 at 1610. Their transmission to SE-Asia via Darwin 13.665 (Chin, Eng 1000-1450) peaked 43333 at 1300 in Kilkeel.

Some of the signals to Europe in this band stem from WYFR via Okeechobee 13.665 (Eng 0500-0800, also to Africa) 54444 at 0645 in Bushley Heath and 34343 at 0641 in Hafnarfjordur; R.Austria Int via Moolabrum 13.730 (Ger, Eng, Fr Sp 0600-190055544 at 0700 in Northwich; UAE.R.Dubai 13.675 (Ar, Eng 0615-2100) SI0333 at 1330 in Edinburgh; R.Pyongyang, Korea 13.785 (Eng 1500-1555, also to M.East Africa) 33433 at 1536 in St Andrews; R.Prague, Czech Rep. 13.600 (Eng 1700-1727) 31555 at 1710 in Macclesfield; R.Bulgaria via Plovdiv 13.670 (Eng 1730-1930) 54444 at 1730 in Basingstoke; R.Hungary, South East Budapest 13.760 (Eng 1700-0007) SI0333 at 1755 in Winchester, R.Kuwait via Kbd 13.630 (Eng 1800-2100) SI0444 at 2030 in Sheffield, WWVCR, Nashville 13.845 (Eng 1200-0100) 55555 at 2100 by Martin Dale at his listening post in Stockport.

The 7MHz Band

In the 7MHz (41m) band broadcasts in the UK has often been disappearing. Under favourable conditions their 100kW signal on 3.700 (Eng to Pacific areas 0700-1200) was 32332 at 0840 in Bridgwater. Also noted were R.Australia via Caravon 9.645 (Eng to Asia 2100-2300) 33333 at 2115 in Worthing; AIR via Delhi 9.910 (Eng to Africa, 2045-2230) 43333 at 2220 in Kilkeel.

Broadcasts to Europe abound in this band. Among those noted were R.British Columbia 5.5555 at 0740 in Woking; R.Nederlands via Talata Volon 7.120 (Eng to Africa 1730-1930) 55554 at 1740 in Redhill. The reception of R.New Zealand’s 9MHz (31m) broadcasts in the UK has often been disappearing. Under favourable conditions their 100kW signal on 9.700 (Eng to Pacific areas 0700-1200) was rated S10444 in Kilkeel.

The 11MHz Band

In the 11MHz (25m) band Vatican R, Italy 11.625 (Port, Fr, Eng to VI Africa 0500-0700) was SI0444 at 0630 by Francis Heanne in N.Bristol, Voice of Israel, Jerusalem 9.388 (Heb 0400-2300, also to USA) 23552 at 0500 in Northwich; VOIRI Tehran 9.022 (Eng 2130-2200) 45544 at 2108 in Newry; R.Vilnius, Lithuania 9.710 (Eng 0700-0745) 35544 at 0730 in Chester; VOA via Skelton 9.410 (Eng 0300-2125) 55545 at 1825 in Worthing.

Some of the many 41m signals to Europe came from R.Prague, Czech Rep. 13.345 (Eng 0600-0630) SI0444 at 0600 in A.Bristol; WYFR via Okeechobee 7.355 (Eng600-900, also to Africa) SI0544 at 0638 in Bushley Heath and 55544 at 0642 in Kilkeel; R.Japan via Skelton 7.230 (Jap, Eng 0700-0830) 35543 at 0750 in Walsall; AIRF, Fori, Italy 7.250 (Eng, Fr, Sp, Eng, 0900-1330) 34443 at 0940 in Morden; Polish R, Warsaw 7.285 (Eng 1500-1555) 54444 at 1510 in Norwich; Vatican R, Italy 7.250 (Eng 1900-2100) 54544 at 2005 in Bourne; R.Australia via Carnavon 7.260 (Eng to Africa 1800-2100) 43232 at 1813 in Co.London; R.Australia via Skelton 9.645 (Eng to Asia 1730-1930) 55554 at 1740 in Redhill. Good reception of R.Australia’s 6MHz (49m) broadcast to Asia has been noted in the UK. At 1855 their transmission via Carnavon on 6.000 (Eng 1800-2100) was rated SI0444 in Bushley Heath.

Station Addresses

RTL 45 Boulevard Pierre Frieden, L-1543 Luxembourg.
ILR Radio Clyde, Clydebank Business Park, Clydebank, Glasgow G61 2RX.
Radio Anhanguera, CP13, 70010 Goiania, Brazil.
Radio of the United Arab Emirates, PO Box 63, Abu Dhabi, UAE.
Radio Globo, Rua do Russel 434, 2220 Rio de Janeiro, Brazil.
Radio Vision (YVKG), Final Ave, La Salle Colinas de los Caobos, Caracas, Venezuela.
It is easily forgotten that newcomers have to start somewhere and finding out isn't always simple. A lot of what seems obvious to us old hands wasn't so obvious when we started, so I welcome questions from readers, even 'dumb questions'!

Not that the following is a particularly dumb question. Nick GODFL asks if a coaxial relay is the only way to use between transmit and receive at 24cm. The answer is no, but I suspect the question is not as simple as it seems, so let's look at what is involved here.

Ideally we want to save money, antenna weight and wind capture area. So a single antenna - and a single coaxial feed to a mast-head - for transmitting and receiving sound like the best idea and indeed this was how it was once done. At mast-head, a relay system was used to by-pass the mast-head pre-amplifier during transmit. But in retrospect it wasn't such a good idea.

Gainiax is Best

From a transmitting point of view our prime aim is to minimise feeder loss so the maximum transmitter power to reach the antenna. Ideally, we would put the transmitter at mast-head but this introduces many complications. It is possible but not very practical. Instead we go for really low-loss 50Ω coaxial feeder at least half an inch in diameter. Take your choice from H100, that white stuff from Japan that's far more flexible than H100 and takes normal N-type connectors, Heliax or ideally that superbly engineered system don't exhibit these faults but the kind of resources available to most amateurs don't allow superb engineering.

If you're keeping up with me, you'll probably have realised this implies a dedicated feeder and antenna for transmitting. That's right! Who said ATV was cheap, anyway? Actually, the alternative of a shared antenna for transmitting and receiving would require the use of a fabulously expensive change-over relay at mast-head and specialist switching to ensure it switches momentarily before the transmitter is keyed.

Two Taboos

Here are two 'no-nos': r.f. switching of change-over relays is absolutely forbidden and so is feeding d.c. power up the centre conductor of the coaxial cable, even though there are commercial products that employ both of these and it's not professional to ruin your equipment deliberately.

Feeding d.c. up the coaxial cable is unwise too, because it leads to electrolytic action at mast-head. At the upper end of the feeder you will almost certainly have a junction of two dissimilar metals (e.g. the centre conductor of the feeder and the pin of the connector used). You will also have some residual dampness however well you try to exclude moisture and bingo, corrosion sets in just where you don't want it, in the feed-line path. Feel free to ignore this but don't call me a liar, I've seen this too many times in real life. If you haven't, you've been very lucky!

So, we are resigned to separate transmit and receive antennas. Good! That means we can optimise the receive side. That means a mast-head pre-amplifier probably and, in that case, a separate power conductor. Simple bell wire taped alongside the coaxial cable is adequate and you can use the shielding of the coaxial cable as your return conductor. With a mast-head pre-amp you can also economise on the coaxial feeder and satellite television cable would be adequate for the down-lead.

Simple Switchery

Back in the shack you can take the receive coaxial cable straight to the receive side of your system and hey presto, not a relay in sight. The only switchery then is at d.c. level, keying up the transmitter when you are sending pictures. It is optional whether you leave the receive side powered during transmit, although people who work mainly through repeaters say it is advantageous to have 'look through' on transmit and see your own pictures coming back (assuming your transmitter isn't de-sensitised). There is another major objection to the use of mast-head relays for by-passing the receive side of things. If you are using high power (and I used to use 150W from two 2C39s, which is not uncommon), you need to be sure the contacts of the relay are rated to carry this kind of power. Many cheaper relays cannot handle this much. Even more important, what is the isolation? We are talking about r.f., not d.c., and although the contacts may be connecting to one port, this doesn't mean no power will appear at all on the other one. Some coaxial relays have poor isolation at higher frequencies and will allow your sensitive GaAs f.e.t. pre-amp transistors to be well and truly fried alive. Well, alive the first time only, then permanently dead...

So what started out as a simple question ended up in a complex answer. In short, the voice of experience says avoid relays at all costs at 24cm. Any more questions on ATV technology? I'll try and answer them here, but personal answers are not possible (except...

Andy Emmerson's column appears on a quarterly basis.

In the intervening two issues this page will be taken up by Brian Oddy's 'Long Wave Maritime Beacons' column followed by Andy Cadier's 'Off the Record' column.
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