

FOR THE
RADIO LISTENER

shortwave magazine

August 1993 £1.90 ISSN 0037 - 4261

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from Spacetech

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AN AR-88**

**THE HISTORY OF THE RAF
T1154 & R1155 SETS**

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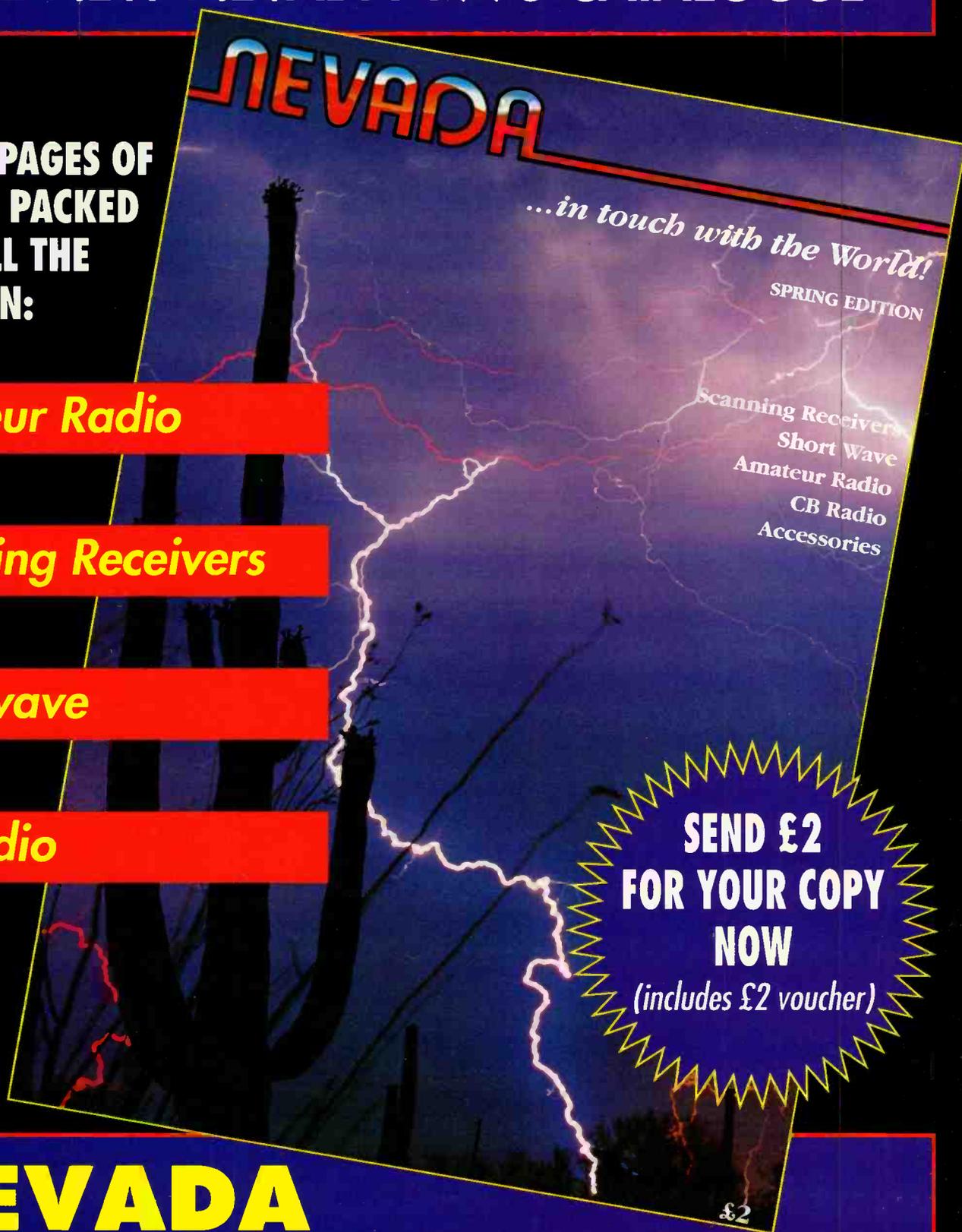
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short wave magazine

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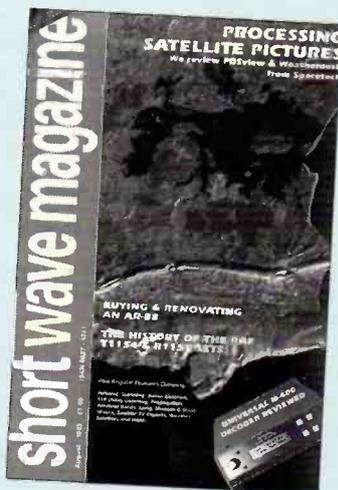
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Cover:

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!



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

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BOOK OFFER
AUGUST 1993

good listening

Letters

SWM SERVICES

Subscriptions

Subscriptions are available at £21 per annum to UK addresses, £23 in Europe and £25 overseas. Subscription copies are despatched by accelerated Surface Post outside Europe. Airmail rates for overseas subscriptions can be quoted on request. Joint subscriptions to both *Short Wave Magazine* and *Practical Wireless* are available at £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 welcome by telephone to Broadstone (0202) 659930. An answering machine will accept your order out of office hours and during busy periods in the office. You can also FAX an order, giving full details to Poole (0202) 659950.

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**

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 Sangean 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'.

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 Fairington 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 - 'Radio 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.

Could it be, I thought, the two small AA type batteries for computer 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**

letters

Microwave Cookery

Dear Sir

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

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

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, CWR or CNFM then again you could be led to believe that some form of propagation anomaly was producing transatlantic v.h.f. DX.

The prefix letters C, W and K are internationally recognised as being allotted to Canadian and US stations, there may actually be a WABC or a 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

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.

$$\text{Power density} = \text{Power in } \mu\text{W}/(4\pi r(\text{cm})^2)$$

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 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 5W transmitter at 20cm from the head gives about 1mW/sq cm, which is too high, at least for anything other than occasional use.

J.H.C. Wells
East Grinstead

Short Wave Magazine, August 1993

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

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, Shirakio, 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

grassroots

Club Secretaries:

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

rallies

***August 8:** Flight Refuelling ARS Hamfest will take place at the Flight Refuelling Sports ground, Merley, Wimborne. The event will run from 10am to 5pm and will include the usual mix of traders, Bring & Buy, craft exhibitors, car boot sale and field events. Overnight camping facilities available for the 7th. Talk-in on S22. **Richard Hogan G4VCC. Tel: (0202) 691021.**

August 22: The West Manchester Radio Club Red Rose Rally will be held at the Bolton Sports & Exhibition Centre, Silverwell Street, Bolton. All the usual trade stands, societies, Bring & Buy, etc. All at pavement level with facilities for the disabled. Refreshments/meals available all day as well as a bat. Doors open at 10.30am for the disabled, 11pm for the general public. Admission £1, children free. **Dave. Tel: (0204) 24104.**

August 29: The Galashiels Club are holding their open day at the Focus Centre, Livingstone Place, Galashiels. All the usual activities will be there - Bring & Buy, traders, club stands, raffle and refreshments. **GMOAMB. Tel: (0835) 22686.**

August 29: The 2nd Gloucester Radio Rally & Car Boot Sale will be held at Naas Lane, Quedgley, Gloucester. Talk-in on S22. Bring & Buy run by Stroud Radio Club. **Mike. Tel: (0452) 503786.**

August 30: The Huntingdonshire ARS Annual Bank Holiday Monday Rally will be at St Germain Street, Huntingdon. All pitches and car parking on hard standing. Admission £1 per person, car parking free. Hot & cold refreshments available. Starts 10am. **David Leech. Tel: (0480) 431333.**

September 5: The Telford Rally will be held at the Telford Exhibition Centre, Telford. **Bob G7BWQ. Tel: (0952) 770922.**

***September 5:** The Bristol Radio Rally will be held in The Great Train Shed, Temple Meads Railway Station, Bristol. **Muriel Baker G4YZR. Tel: (0275) 834282.**

September 5: The Vange ARS Annual Rally will be held at The Laindon Community Centre, Laindon High Road/Aston Road, Laindon, Basildon. Doors open from 10.30am. Admission 75p. There will be trade stands, a Bring & Buy, raffle, refreshments, good car parking, talk-in on S22. **Mike Musgrove G4NVT. Tel: (0268) 543025.**

If you're travelling long distances to rallies, it could be worth phoning the contact number before setting off to check all is well.

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.**

South Bristol ARC: Wednesdays. Whitchurch Folkhouse Assoc, Bridge Farm House, East Dundry Rd, Whitchurch. Aug 4 - 70cm Activity Evening and Committee Meeting, 11th - Computer Shareware Evening, 18th - Soldering Iron Competition, 25th - Magazine Exchange. For more information ring 0275832222 on a Wednesday evening.

BERKSHIRE

Maidenhead & DARC: 1st Thursday & 3rd Tuesday, 7.45pm. The Red Cross Hall, The Crescent, Maidenhead. Aug 1 - McMichael Rally, 5th - Barbecue at Max G7DXC QTH. **Neil G0SVN. (0628) 25952.**

CHESHIRE

Stockport RS: 34 Ladythorn Road, Bramhall, Stockport, Cheshire. Aug 11 - What Your Mother Never Told You About Multi-track Recording by Howard Gregory, 25th - Non-packet Data Systems by Bill Green. J. France 061-439 4952.

DERBYSHIRE

Derby & DARS. Wednesdays, 7.30pm. 119 Green Lane, Derby. Aug 4 - Rally Preparation Evening, 11th - Satellite Television by G8JGF, 18th - Visit to Carsington Reservoir. Mrs Hayley Winfield, 2 Hilts Cottages, Crich, Matlock, Derbyshire DE4 5DD. (0773) 856904.

DORSET

Dorset Police ARS: 1st Thursdays & 3rd Tuesdays at Head Quarters, in the Bar & Social Club. August 5 & 17 - Evening on the Air. PC915 Richard Newton. (0202) 229351 or PC828 Bob Knight. (0202) 552099 ext 2031.

EAST SUSSEX

Southdown ARS: 8.00pm Chasely Home for Disabled Ex-Servicemen, Southcliff, Bolsover Road, Eastbourne, East Sussex. August 2 - Radio in Air Traffic Control by G6HXR. **Jan G4XNL. (0323) 412699.**

ESSEX

Vange ARS: Thursdays 8pm,

Barnstable Community Centre, Long Riding, Basildon, Essex. August 5 - Junk Sale, 12th - Round Table Discussion on c.w., 19th - Loading & Setting-up of the FT-101 by G3ASH, 26th - Rally Update. **Doris. (0268) 552606.**

GREATER LONDON

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

Wimbledon & DARS: 2nd & last Fridays, 7.30pm. St Andrews Church Hall, Herbert Road, SW19. Aug 13 & 27 - No meeting. **Chris Frost. 081-397 0427.**

HAMPSHIRE

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

HEREFORD & WORCESTER

Bromsgrove ARS: 2nd & 4th Tuesdays. Lickey End Social Club, Alcester Road, Burcot, Bromsgrove. Aug 10 - Safety in the Shack, 24th - Night on the Air (HF). **Barry Taylor. (0527) 542266.**

Bromsgrove & DARC: Fridays. Avoncroft Arts Centre, South Bromsgrove, Worcester or Waseney Country Park, Gannow Green Lane, Rubery. **Joe Poole. (0562) 710010.**

HERTFORDSHIRE

Dacorum AR & TS: 1st (informal) & 3rd (formal) Tuesdays, 8pm. The Heath Park, Cotterells, Hemel Hempstead. August 17 - WAB by G40BE. **Dennis Boast. 8 Juniper Green, Warners End, Hemel Hempstead HP1 2NQ.**

HUMBERSIDE

Wirral & DARC: Aug 4 - D & W The Twelfth Man, Greasby, 18th - D & W The Anchor, Irby, 25th - Annual BBQ at Heswall Shore 8pm. **Paul 051-648 5892.**

KENT

Bromley & DARS: 3rd Tuesdays, 7.30pm. The Victory Social Club, Kechill Gardens, Hayes. Aug 17 - BBQ/Calibration/Operating Evening. **A.G. Messenger. 081-777 0420.**

LANCASHIRE

Rochdale & DARS: Mondays, 8pm. Cemetery Hotel, Bury Road, Rochdale. August 16 - 5 Million Volts, Aftermath by G0GNR. **Dave. (0706) 32502.**

NOTTINGHAMSHIRE

Mansfield ARS: 2nd Mondays, 7.30pm. The Polish Catholic Club, off Windmill Lane, Woodhouse Road, Mansfield. August 9 - Foxhunt at the BBQ. **Mary G0NZA. (0623) 755288.**

South Notts ARC: Fridays, 7pm. Highbank Community Centre or Fairham Community College, Farnborough Road, Clifton Estate, Nottingham. August 1 - Club Field Day and BBQ Day 2, 6th - Mobile HF Antennas & Mobile FSTV by G0LCU. **Julie Brown G0SOU. (0602) 211069.**

OXFORD

Oxford & DARS: 2nd & 4th Wednesdays, 4.5pm. Littlemore Hospital Social Club. **Terry Hastings. (0865) 863526.**

SUFFOLK

Sudbury & DARC: 1st Tuesdays, 8pm. The Five Bells Inn, Great Cornard, Sudbury. August 3 - The Grid Dip Oscillator Explained by G8LTY. **Colin. (0787) 77004.**

WARWICKSHIRE

Mid Warwickshire ARS: 2nd & 4th Tuesdays. Aug 24 - Fox Hunt 7pm start horizontal f.m. on 145.350. **Don Darkes. (0926) 424465.**

WEST MIDLANDS

South Birmingham RS: West Heath Community Association, Hamstead House, Fairfax Road, West Heath. August 4 - MAXPAK Demo by G1DKI. **021-4743784.**

WILTSHIRE

Trowbridge & DARC: 3rd Wednesday. The Southwick Village Hall, Southwick, Trowbridge. August 4 - Family Picnic, 18th - Natter Nite. **Ian G0GRI. (0225) 864698.**

SOUTH YORKSHIRE

Vale of Evesham: August 8 - The Annual Treasure Hunt meet at Evesham Post Office 2.30pm. **Alasdair Lindsay G4NRD.**

Jon Jones
PO Box 59
Fishponds
Bristol BS16 4LH

junior listener

SUNSHINE 855 AM

Sunshine 855

Dave Porter G4OYX 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 wide range of systems. In addition to covering antenna 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 Emblem, 137a Hampton Road, Southport PR8 5DY.**

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 Roma 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 next 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.

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 9.65, 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.

CERTIFICADO POR DIEZ REPORTES QUE
LO HACEN MIEMBRO DEL CLUB "DX"



RADIO HABANA CUBA
OTORGA ESTE
CERTIFICADO

Al oyente:
por haber enviado los diez reportes de audición que lo hacen
miembro del Club "DX" de esta emisora radial cubana.
de RADIO HABANA CUBA,
Ciudad de La Habana, de 19

Free Holidays!

Have you ever fancied a holiday in Cuba? If so, you might like to enter the Radio Havana 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 Havana Cuba, A Voice of Friendship Heard Around the World, PO Box 6240, Havana, Cuba.**

news

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 22-25w.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 G0THX. Tel: (0323) 846774.**

Kenwood TR-751 Stolen

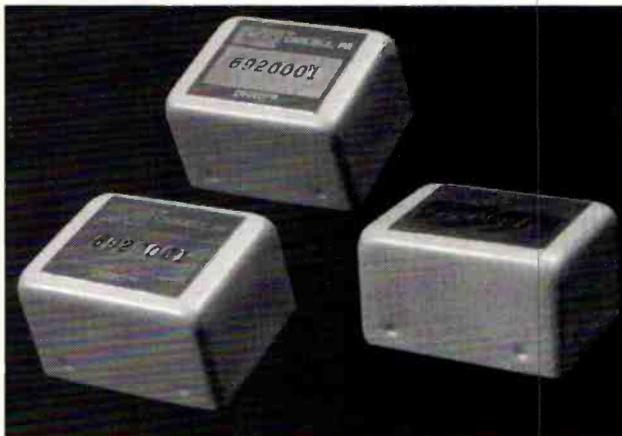
On Tuesday 22 June a Kenwood TR-751 was stolen from Amateur Radio Communications Ltd in Merseyside. The rig is minus the box, lead and microphone.

If anyone is offered a Kenwood TR-751 serial no. 40900041 would they please contact **Amateur Radio Communications Ltd., 38 Bridge Street, Newton-Le-Willows, Merseyside WA12 9BA. Tel: (0925) 229881** immediately.

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.



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 7-20MHz and has a stability over temperature of 2×10^{-7} over -20 to +70°C. Ageing is 1×10^{-7} per year and d.c. power input is less than 1W at +12V d.c. Allen Variance is offered at 1×10^{-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.**

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 CM08NQ.**

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: (0705) 698113.**



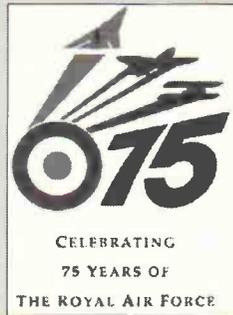
International Air Tattoo

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 Grasshoppers helicopter teams. 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).**



SMC Acquires 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 were felt to 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.

In the future SMC plan to progressively improve the designs and expect to manufacture the antenna under the auspices of BS5750 part 1, to ensure consistent design and manufacturing quality.

South Midlands Communications Ltd., SM House, School Close, Chandlers Ford Industrial Estate, Eastleigh, Hampshire SO5 3BY. Tel: (0703) 255111.

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 plenty of new components are included

The catalogue costs £1.90 and is available from most larger newsagents or direct from **Cirkit Distribution Ltd., Park Lane, Broxbourne, Herts EN10 7NQ. Tel: (0992) 441306.**

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 in the UK is once again very satisfactory.

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

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 Toyota car which is 4.8mm long, complete with hub caps and number plates, which contains a working electric motor. The highlight of this exhibition is the opportunity to see the TopMetrix Atomic Force Microscope (AFM) in action, which can produce a three dimensional picture of a surface.

For further details of 'How Small Can We Go?' contact the **Science Museum, Exhibition Road, London SW7 2DD. Tel: 071-938 8080/8008.**

Radio & TVDX News

Digital Audio Broadcasting (DAB) has been given the thumbs down in Germany! The projected 1995 start 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 if privately 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 50 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.

A new commercial TV station 'Tele-3' 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 1 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 call sign '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 STOD-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 now aired in Berlin on Ch. E41 and E56. Between 1830-1845 a local news programme is aired called 'TV AngermundeLokal' but on the Channel E41 outlet only.

Finally, a new TV station in Rotterdam called 'TV Zuid-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. 30kW e.r.p. transmitter atop the new p.t.t. tower at Waalhaven 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.

HOW small CAN WE GO?

This design was etched on a piece of graphene by a probe which is only one atom wide. Each line is 1000 times smaller than the width of a human hair.

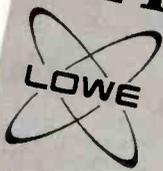
EVENTS

SCIENCE MUSEUM

29 JUNE to 26 SEPTEMBER 1993

Monday to Saturday 10.00 - 18.00
Sunday 11.00 - 18.00

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JRC NRD535

Probably the finest receiver available to the short-wave listener (without the financial clout of a small government!) We also stock the full range of accessories, ready for instant fitting. For the listening purist, we also offer our unique IF filter/audio upgrade. Lowe Multiscan compatible.

From £1395.00

STILL AVAILABLE - Our famous free Listeners Guide. Pick up one at any branch or send us four first class stamps to receive your free copy, together with our latest Shortwave newsletter and price list.



KENWOOD R5000

Kenwood's only receiver now but still holding its own with the competition. Always in stock and again we hold the full range of accessories and are the only company to give a full TWO-YEAR WARRANTY. Lowe Multiscan compatible

From £999.95

Finance available through Lombard Tricity Creditcharge or personal loans. Written details available on request. Ask about our own lay-away scheme.



ICOM R72E

Icom's excellent mid-price receiver. Ideal for listeners needing "modern" facilities like scanning, loads of memories and a clock. Now with battery backup. Lowe Multiscan compatible.

From £859.00

Need our second hand list? Try our new fax service! Dial 0628 580008 from your fax machine and follow the voice instructions. Service available 24 hours, 7 days so even when we're not here we will be! Watch this service grow as we learn!



YAESU FRG100

It set the world alight when launched but where are they? Join our waiting list now!! Yaesu's new compact receiver is the latest in a long and successful line. It has one or two excellent features but they're not immediately obvious. We know what they are though so pop into your local branch for the secret.

From £599.00

BRANCHES AT

BOURNEMOUTH - 0202 577760

BRISTOL - 0272 315263

CAMBRIDGE - 0223 311230

CUMBERNAULD - 0236 721004

LONDON - HEATHROW - 0753 545255

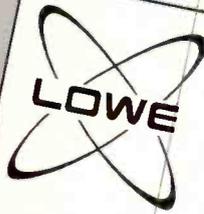
LEEDS - 0532 452657

MAIDSTONE - 0622 692773

NEWCASTLE - 0661 860418

NEW BRANCH - PLYMOUTH - 0752 607284

Short Wave Magazine, August 1993



LOWE ELECTRONICS

ICOM R7100E

The ultimate scanner! W-i-d-e coverage from 25 MHz to 20000 MHz. (We don't do free HF upgrades - after all if it's free, it can't really be worth much!) Every conceivable permutation of scanning and searching included and if that's not enough it's also Lowe Multiscan compatible.

From £1395.00



Need a short-wave antenna? You'll find the biggest and best range of active and passive antenna systems at every branch of Lowe Electronics. If it's worth having, we've got it in stock.

AOR AR3000A

Still one of our more popular scanners. Easy computer control with our Multiscan program from 100kHz to 2036 MHz, it's a true multiband and with all-mode reception and 400 memories is a highly versatile receiver. Try one today at any of our branches.

From £939.00



We still do our free Airbands guide. Send us four first class stamps and we'll send you a free copy together with a bumper information pack of the latest scanners, antennas and accessories.

VT 225

Full coverage of both civil and military bands make this a firm favourite with our airband fans. True portability, 100 memories, scanning and searching plus keypad entry make this one of the most easily usable scanners. In stock always!

From £269.00

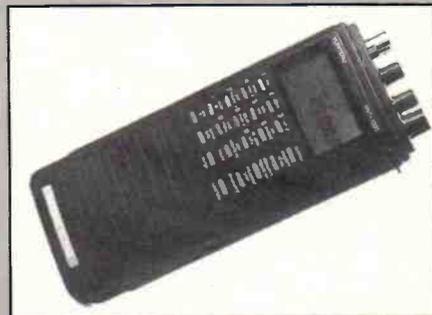


Got a discone? Want something better? What about a super new scanner antenna with real gain, just where you want it? Ask about the Butternut SC3000. You can buy it now at Lowe Electronics.

MVT7000

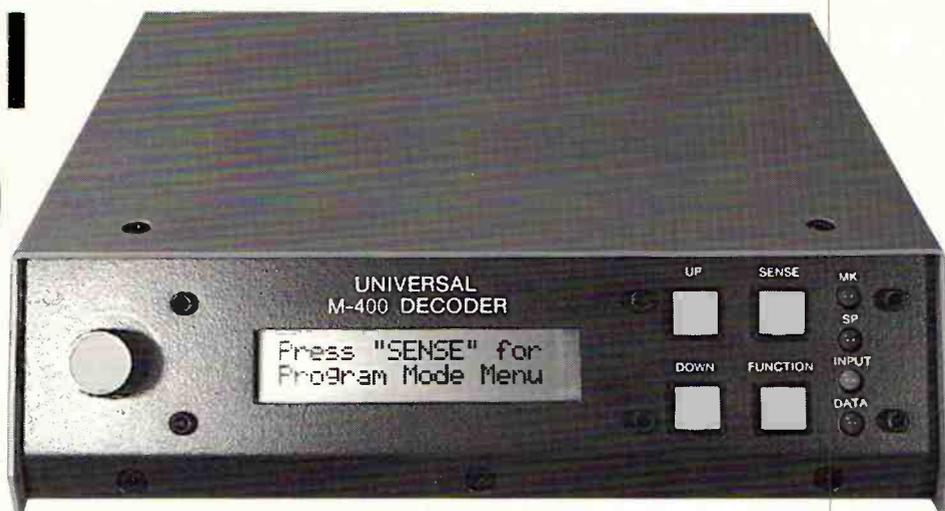
The world's best selling wideband scanner. Okay so it's not the cheapest scanner in the world but it is the easiest to use, the best quality of construction, and we've found it to be the most reliable of all the scanners we've ever sold. That's got to be worth that little bit extra!

From £369.00



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, ASCII, 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 comprised 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 moving any part completed words to the next line down. This effectively overcomes the problem and makes the display system very readable. This STRING display mode was the default mode for most of the M-400's decoding options.

An added bonus with the M-400's display is the provision of manual scrolling. This was activated at any time by pressing either of the buttons marked UP or DOWN. With this system you can look through up to 4000 characters of previously received text. This was a

real boon and made the M-400 a pleasure to use. Once you had finished reviewing the text, pressing UP and DOWN together returned 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 modes and 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.

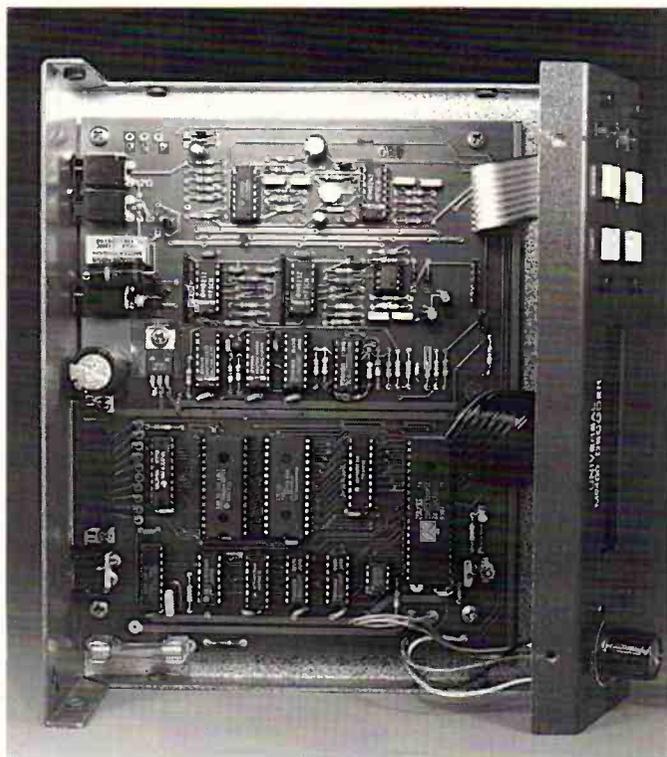
The M-400 features a simple two l.e.d. tuning indicator for RTTY signals. To use this, you tune across the signal until both l.e.d.s flash with approximately equal brightness. Personally, I find this type of indicator very easy to use - this may be because my first decoder used this system! Once tuned-in 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 l.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 l.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

170Hz shift and a speed of 100 baud, which aligns with the commercial standards used for these modes. Tuning was done in the same way as for RTTY reception i.e. setting-up for even flickering between the two tuning l.e.d.s.

Once a station had been tuned-in, the M-400



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.

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-ARQ and FEC-A signals. These two modes are far less common than

RTTY, but can usually be found in most frequency lists.

SWED-ARQ 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 l.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 in to 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 l.c.d. unit, a standard computer printer is required to display the received image.

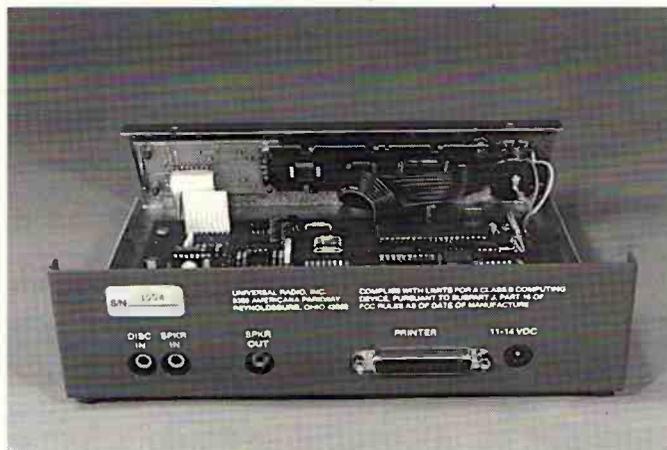
I must admit this mode caused me a few problems when I first tried it out. The difficulties centre around the lack of any tuning display for this mode. You therefore have to use trial and error to select the optimum tuning point. On the bright side, the 'sound' of a correctly tuned signal can soon be 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 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 l.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 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 l.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.

Specifications

Modes & Codes

Baudot	45, 50, 57, 75 & 100 Baud
ASCII	75, 110 & 150 baud
SITOR A & B	Automatically selected
FEC-A	96 and 144 baud
SWED-ARQ	100 baud (S, M & L groups)
FAX	120 LPM 576 IOC (printer only)
ACARS	Aviation Mode
POCSAG	Digital pagers
GOLAY	Digital pagers
DTMF	16 digits
CTCSS (PL)	41 standard frequencies
DCS (DPL)	104 standard codes
Filter tones	Low 1275Hz + fixed shift of 170, 425 & 850Hz Variable shift 100-1000Hz in 5Hz steps

Inputs

Outputs

Power
Weight

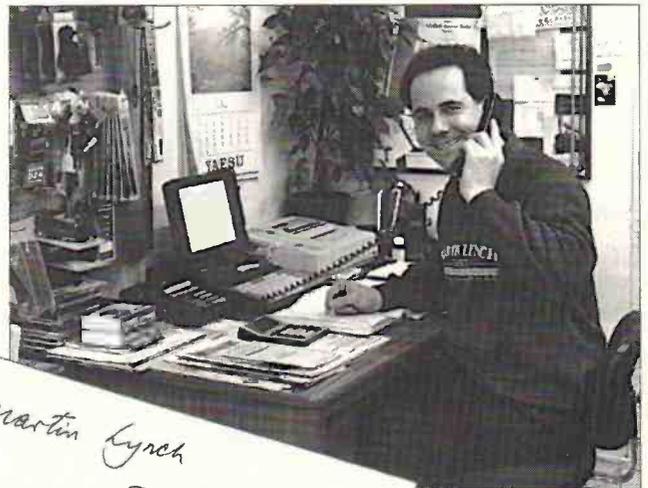
Speaker 4-16Ω 100mW max.
Disc. 250mV max in 10kΩ
Parallel printer to DB-25
11-16V d.c. at 200mA
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MARTIN LYNCH

G4HKS

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Ref: MUTEK 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 736R to be very much improved following the modification, the receiver performance is now superb, as you know I did the modification work 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,

Alan

DEAR MR. LYNCH,
JUST WRITING TO THANK YOU FOR THE COURTESY SHOWN ME DURING MY RECENT VISIT TO YOUR NORTHFIELD STORE. BEING A NOVICE DX'er FROM THE STATES, I WAS CURIOUS TO LEARN THE VARIOUS TYPES OF EQUIPMENT USED BY THE ENGLISH TO ENHANCE THEIR RECEIVING CAPABILITY. I WAS A POTENTIAL CUSTOMER AND I STILL ENJOY OFFERING A WELCOMED CUP OF HOT COFFEE TO MY AFTON-BORN WIFE. YOUR WARMTH AND SINCERITY WAS APPRECIATED AND I WISH YOU SUCCESS.

To Martin Lynch
From Bob LEASK G4CQO.

Rig arrived safely - well packed - I'm impressed
Thanks for your help

Dear Martin and Staff,
I write to express my thanks and appreciation for the prompt attention I have recently received from you with regard to the fault on my FT-107GK, having regard to your busy week end at the Rally the ten days taken to locate the problem and effect a repair was, I thought, admirable.

Yours faithfully,
Alan

Martin Lynch
286 Northfield Avenue,
Ealing, London, W5 4UB

DEAR SIR,
PLEASE FIND ENCLOSED RECEIPT FOR £74.90 FOR AN ICOM 729. THE R2000 IS OK. LOOKING FORWARD TO RECEIVING THE ICOM 5000. THANKS ALOT FOR ALL YOUR HELPFULL ADVICE AND SAVING ME SOME CASH.
YOURS,
DE G7 KIQ.
C. MARTIN

*Martin Lynch
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What Icom Power lead
many thanks for lead - it
arrived this morning
I knew I could count on
you!
When I get bored with this rig
I'll be back to you for a bigger
one!!
Martin G7OCV*

Martin Lynch started in Amateur Radio twenty four years ago and has been selling equipment for almost as long. Other companies may try and copy his ideas but they never emulate his dedication to customers. He does not offer day trips around service departments, which is probably why his turn-around & servicing rates are the best in the U.K. A team of devoted enthusiasts offer advice based on experience, six days a week, under one roof. MARTIN LYNCH. Just an up-to-date & successful business with traditional values.

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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 valved 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.

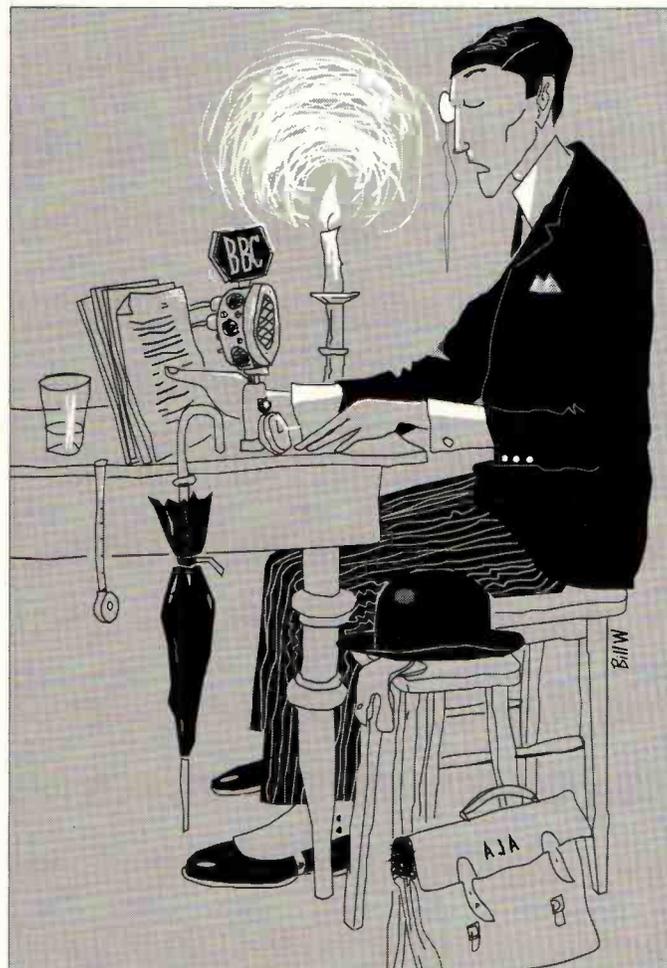
So began, on Saturday 31 January 1924, a mystery that intrigued the radio listeners of Britain during more than a decade and a half. For despite urgent entreaties, the BBC would give no information upon this teller of bizarre tales beyond his pseudonym of A J Alan. Speculation about his identity was rife. Was he an aristocrat, a famous stage performer appearing incognito, or even a member of royalty? It would be nearly seventeen years before, upon his death, the secret was revealed and 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 second sight, for on one 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 he had previously 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 ghostly 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, castle and cotter's ben. As 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. No story-teller before him had ever had so many listeners; no listeners a better story-teller. His 'Good evening everyone' had always been the precursor to an amusing and intriguing quarter of an hour. Countless listeners enjoyed his genial*

cynicisms, 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.

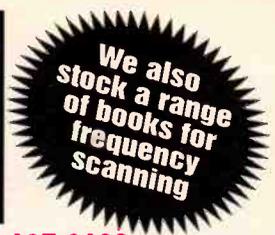
His death in 1941 at last allowed his true identity to be revealed. There was among his devotees a general feeling of let-down that A J Alan was not, after all, some important person in disguise, but merely a civil servant with a remarkable aptitude for telling his own stories.

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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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 GB0IMD.

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



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

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,

G3LIK, 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.

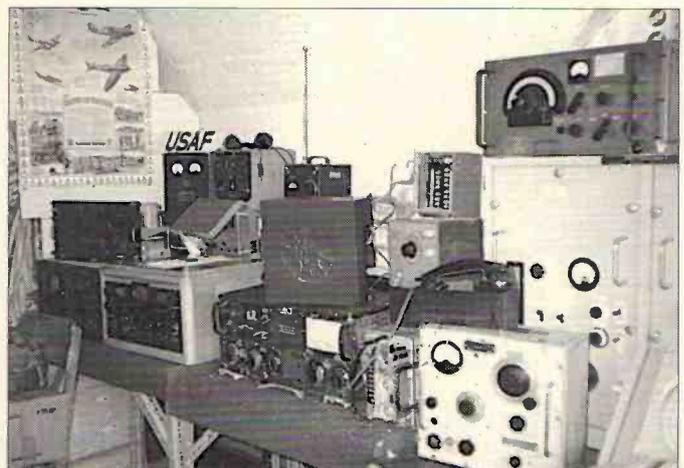
The day's event went well and were visited by many dignitaries including Lord and Lady Mottistone (Governor of the Isle of Wight) as well as Medina Borough Council Mayor, Barry Wade. The event drew a considerable number of visitors, many reminiscing on the artifacts of wartime memories and the earlier 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.

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.



Part of the display in the ammunition tunnel.



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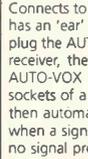
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PDSview & The Weather

Spacotech, based in Portland, Dorset have many years experience of Acorn computers in particular and weather satellites in general. Spacotech's **Planetary Data System** or **PDSview** is an image processing package. It was originally designed for use with a set of CD-ROMS containing images supplied by NASA gathered by its many spacecraft, although many image types can be enhanced by PDS View including those obtained with the weather satellite decoding package Weather Desk also produced by Spacotech. It runs on the Acorn Risc OS operating system family of computers and requires a minimum of 2Mb of RAM and the images are displayed at their best using a multi-sync monitor and one of the 24-bit graphics cards now available for the Archimedes.

Once installed, images can be loaded into PDSview in several ways; as raw data (which requires a format description), as Clear files or as Sprite files.

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

Clear files are a format found on other computer systems in which an image is held as separate red, green and blue components. Once an image is loaded, there are a great many facilities available for image processing and palette manipulation. Dithering can be applied to simulate 256 grey levels (unnecessary if you have one of the graphics cards fitted). The grey scale can be arranged in linear, histogram or logarithmic fashion.

Colour can also be applied using the RGB sliders to select a start and end colour that can be spread over a small range of intensities. This is useful if you have an image whose data falls within a restricted band within the 256 levels. By expanding the colour over the full range the image can be greatly enhanced.

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 Spacotech application, Weather Desk. This is achieved by saving the infra-red and visible images from a NOAA satellite pass and loading these into PDSview. If, after image enhancement in the primary band the infra red image is placed in the secondary red band, the visible image in the green band and

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 Spacotech 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

provided by Spacetechn 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.

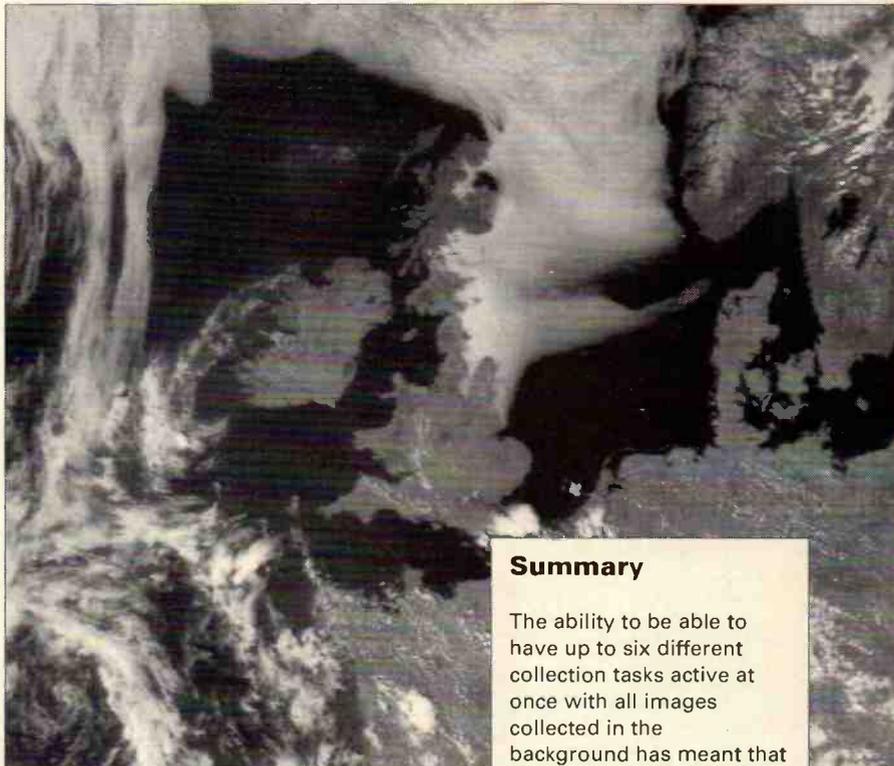
A palette can also be associated with a task, for example, to spread the available grey levels over the range of the image. The required number of frames can also be specified and can be as many, or as few, as you wish. If a hard disk is used then the limit is the capacity of the disc.

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



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 from 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 multispectral data available on CD. Prices on application.

Two disk demo for PDSview and Weather Desk. £5.00

Weather Desk
Software £99.50
Module (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

Two disk demo (refundable against purchase) £5.00

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 can also be set and automatic calibration carried out against the received signal but image collection has to be started manually as orbit times vary from day to day. WEFAX collection is suspended for the duration of an APT pass because of the different configuration, framing and engineering files needed. ■

My thanks to
**Spacetechn Space
Science Resources,
21 West Woods,
Portland,
Dorset DT5 2EA.**
Tel: (0305) 822753 for
all their help in preparing
these reviews.

NEVADA

EVERYT

YUPITERU

THE NEW MVT 7100

Set to be THE handheld scanner of 1993 this radio has to be heard to be believed! Now with SSB reception here are some of the many features:-

- ★ Covers 530KHz-16.50MHz
 - ★ Modes NFM/WFM/AM/LSB/USB
 - ★ Memories 1,000 channels
 - ★ Freq steps 0.05/0.1/1/5/6.25/9 12.5/20/25/50/100 KHz selectable
 - ★ Scan Speed 30 Ch. per second
- The set is supplied with a full compliment of accessories **NOW IN STOCK!**



MVT 7000 HANDHELD

- ★ Receives 8 to 1300 MHz 100kHz-1300MHz (at reduced sensitivity)
 - ★ 200 Memory channels
 - ★ AM/FM/NFM
 - ★ Rotary or keypad freq control
 - ★ Large display with signal strength meter EACH SET IS SUPPLIED COMPLETE WITH:-
- Full set of high power NiCads, AC charger, DC power lead and carry strap **NOW IN STOCK!**



YUPITERU

Original Leatherette soft carrying cases for MVT-7100 or MVT-7000
£13.95 plus £1.25 p&p
 State which model when ordering

MVT 8000 MOBILE/BASE

This new model is the mobile version of the popular MVT 7000 Handheld above.

- ★ Receives 8 to 1300MHz, 100kHz to 1300MHz (at reduced sensitivity)
- THIS RADIO IS ESPECIALLY SENSITIVE AT UHF FREQS. Set is supplied with mains power unit. **NOW IN STOCK!**



AIRBAND RADIOS VT-225 CIVIL/MILITARY AIRBAND

A powerful pocket scanner that leaves the competition standing. - A super sensitive set designed for optimum performance on the Civil/Military Airbands.

- ★ Receives 108-142 MHz Civil Airband 222-391MHz Military Airband 149.5-160MHz Marine Band
- ★ 100 Memory channels
- ★ AM/FM on VHF
- ★ Priority channel function



£269

VT-125 UK CIVIL AIRBAND RECEIVER

Using the same technology as the VT225, this set covers the full Civil Airband - hearing distant signals that are inaudible on some other scanners.

- ★ Covers 108-142MHz
- ★ 30 Direct entry memories
- ★ Search steps 25, 50, 100kHz SUPPLIED COMPLETE WITH NICADS AND UK CHARGER **£189**

FAIRMATE HP2000

STILL ONE OF THE MOST POPULAR HANDHELD SCANNERS ON THE MARKET. Over the last year the HP2000 has outsold almost all other models.

- ★ Continuous coverage from 500kHz to 1300MHz
- ★ 1000 channels of memory
- ★ Keypad or rotary control
- ★ AM, FM and WIDE FM modes
- ★ Search steps from 5 to 995kHz



Supplied with full set of accessories/charger **£299.99**

NEVADA

MS1000 BASE/MOBILE SCANNER

MOBILE VERSION OF THE HP2000 HANDHELD BUT WITH SEVERAL ADDITIONS:-

- ★ Switchable audio squelch
- ★ Tape recorder output socket
- ★ Automatic - signal operated tape recorder switching
- ★ Metal case for improved EMC compatibility
- ★ Receives:- 500kHz - 600MHz, 805 - 1300MHz. Supplied with mains power supply **£279**



AOR SCANNERS

NOW IN STOCK

THE NEW AR1500 EX

ENHANCED MODEL FOR THE UK. With a new circuit board and many improvements this set is better than ever. Covers 500kHz to 1300MHz receiving NFM, WFM, AM, and SSB. Supplied with a large selection of accessories including:-

- ★ Charger ★ Soft case ★ Ear piece
 - ★ Dry cell battery case ★ 5 mtr LVV antenna
- NOW IN STOCK £349**



AR3000A

NEW MULTIMODE SCANNER

- ★ Receives 100kHz - 2036MHz.
- Modes:- USB, LSB, CW, AM, FM, WFM **£899**



AR3000 COMPUTER CONTROL

With SCS Software from the USA, give comprehensive logging system, large frequency data base and runs on IBM PC **£59.95**

Send £1.00 p&p for your free 5.25/3.5 demo disk.

JAPANESE LOW LOSS COAX

Super low loss coax - essential for optimum performance with wideband UHF scanners and receivers. This cable is good for frequencies up to 3GHz.

- Model 5D (8.1mm) 75p per metre
 - Model 8D (11.1mm) £1.79 per metre
 - Model 10D (13.1mm) £2.75 per metre
- We stock a range of PL259, BNC & 'N' type connectors for the above cable **£ CALL**

BLACK JAGUAR BJ200 MKIV

A new and completely revamped version of this popular scanner. Now using surface mount technology performance is better than ever.

- ★ 50-88, 26-30, 115-178, 200-280, 360-520 MHz
 - ★ Selectable AM/FM
 - ★ 16 memories
- IDEAL FOR: Civil/Military Airbands **£239**



NEW COMMTEL SCANNERS

We are pleased to introduce a new range of scanners under the Commtel brand. Although a new name to the UK, Commtel scanners are made by one of Japan's largest and most respected manufacturers.

They have been building high quality products for the American and European markets for many years. We have tried and tested the first samples and can thoroughly recommend these scanners. They are reliable and easy to use.



COMMTEL 102

A 3-band 10-channel scanner.
 ★ Frequency coverage: 66-88MHz, 138-174MHz, 380-512MHz **£99.95**

COMMTEL 203

Easy to programme, covering all the popular bands up to 960MHz. Its double conversion receiver provides excellent reception.
 ★ 200 channels ★ Frequency coverage: 68-88MHz, 118-174MHz, 380-512MHz, 806-960MHz
 ★ Scan delay ★ Lock out **£199.00**

COMMTEL 204

Top of the range with a triple conversion receiver. Selectable AM/FM.
 ★ 200 channels mem. ★ Frequency coverage: 68-88MHz, 118-174MHz, 220-512MHz, 806-999.99MHz
 ★ Selectable AM/FM ★ Scan delay
 ★ Search function **£249.95**

COMMTEL 205

A superb base/mobile scanner with easy-to-read front panel display/control button.
 ★ 400 channel mem. ★ Frequency coverage: 25-512MHz, 760-1300MHz ★ Direct access up to 207,002 frequencies ★ Modes - AM, NFM, WFM ★ Audio squelch ★ Scan delay ★ Plus many other features..... **£344.00**

SONY

As a Sony Shortwave Centre we stock the complete range of Sony Shortwave products - here is a selection of the popular models.

SW77

One of the new additions to the Sony range, the SW77 covers 150kHz to 30MHz plus 76-108MHz. With a rotary tuning dial, 125 scan memories, reception of AM, FM, USB, LSB, CW, tape record facility, this is a superb all rounder **£399.99**

SW1E

Pocket shortwave plus VHF radio supplied with headphones, case and shortwave guide. This model won't hurt your pocket! **£179.99**

SW7600

One of Sony's most popular VHF and Shortwave radios, 76-108MHz FM, 150kHz - 30MHz Shortwave receives AM, FM, SSB..... Well Rated! **£179.99**

SONY SW55

A new multiband radio from Sony with dual conversion receiver that gives outstanding results.

- ★ 150kHz-30MHz, 76-108MHz
 - ★ All modes including SSB
 - ★ 125 multi-function memories
- Plus lots more facilities **£279.99**

AN1

An external active antenna with built-in pre-amp, covers 150kHz - 30MHz. Fully portable with easy to mount fixing brackets. **£58**

AN3

Active antenna for Aircraft and VHF reception, suitable for Sony Air 7 and others. **£58**

NEW SONY "PYXIS" GLOBAL POSITIONING RECEIVER

A portable satellite receiver that gives

- ★ Position in Lat./Long. and altitude accurate to 30-100 metres
- ★ Distance and direction to destination
- ★ Current speed and heading
- ★ Time incl. estimated time of arrival



NEW LOW PRICE £599.00

THIS MONTH'S BEST BUY

NRD-525 HF GENERAL COVERAGE RECEIVER

Considered to be one of the finest receivers ever made! We've managed to locate a limited quantity at a very special price. Now's your chance to own one of the thoroughbreds amongst receivers.

- ★ Receives 90kHz to 34 MHz
- ★ 200 channels of memory
- ★ RTTY, CW, SSB, AM, FM, FAX
- ★ Programmable memory scan
- ★ Fully solid state modular design
- ★ Pass band tuning
- ★ Microprocessor controlled, electronic tuning
- ★ Wide dynamic range
- ★ Built in Clock/Timer circuits



LIMITED QUANTITY AT £795

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THING FOR THE RADIO ENTHUSIAST

HUGE STOCKS - FAST DELIVERY - PERSONAL SERVICE

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ACCESSORIES

WIDEBAND PRE-AMPLIFIERS

These low noise pre-amplifiers are a must for the scanner enthusiast and will improve reception on many brands of base/hand-held radio.

NEW SCANMASTER GW-2

A low noise GaAs FET pre-amp covering 1-1400MHz with variable gain (-3 to +20dB). Requires PP3 battery **£59.95**



JIM M75

Similar to GW-2 above but with selectable band pass filter for improved performance and (2.5-2100MHz) freq coverage **£79.95**

JIM M100

Transmit version of the M75 above for hand-held VHF/UHF transceivers (5 Watts max.) **£89.95**

JIM PSU101 MK IV

A combined desk stand and power supply/charger for handheld scanners. Suitable for most popular models. Special versions now available please call for more details **£29.50**



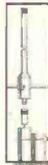
JIM PSU101 TA

A new 9V version of the popular desk stand and power supply, suitable for most Tandy and new Comitel scanners. Please advise model when ordering **£29.50**

SCANNING ANTENNAS

SCANMASTER BASE (500 kHz - 1500MHz)

New high quality wide band receiving antenna uses fibre glass/stainless steel, with 4 small radials. 'N' type connector. Length 1.1 metres. **£39.95** + £4.75 P&P



SCANMASTER MOBILE (25-1000MHz)

A wideband high-quality magnetic mount mobile antenna - wired ready to go with 12ft of low loss coax and BNC connector. Approx. 18" long **£29.95** + £4.75 P&P

SCANMASTER DISCONE (25-1300MHz)

Stainless steel top of the range 'N' type connector. Complete with short mounting pole and clamps '8 elements with vertical whip' - complete with short mounting pole and clamps etc etc. Best value at **£49.00** + £4.75 P&P

SKYBAND (25-1300MHz)

Stainless steel economy wideband Discone recommended - bargain price only **£27.50** + £4.75 P&P

CLP-5130-2 (105-1300MHz)

20-element w/b beam - transmits on VHF/UHF amateur bands. 12dB fwd. gain. **£189.95** + £4.75 P&P

DIAMOND D505 (500kHz - 1500MHz)

Mobile version of D707. **£94.95** + £4.75 P&P

DIAMOND D707 (500kHz-1500MHz)

A base ant. with 20dB pre-amp 3.5ft long fibreglass. Requires 12V DC supply. **£125.95** + £4.75 P&P

YAESU

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Call us now and be one of the first to own this brand new general coverage receiver. To the first customers we will offer a UK Mains Adaptor free of charge plus a G5RV Antenna. Order Now **£599**

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Simply divide the price into 3 equal payments. Write 3 cheques dated in consecutive months starting with todays date and post them to us enclosing your name, address, telephone number and cheque card number.

We will (subject to status) send your goods immediately we receive the cheques!
The hardest part is deciding what to buy!

IC R7100

Covers 25 - 2000MHz. Includes 900 memory channels with all mode capability. Five different scan options and an automatic record facility, what more you ask? Full brochure available. Special offer **£1395**

IC R72

Covers 100kHz to 30MHz on the HF Bands and offers all mode reception (FM, with the optional board) Easy to use and ideally suited to the new comar. A full 99 memory channels with scan facility and a 10dB pre-amp fitted as standard **£895**



IC R1

Icom's most popular pocket-sized wideband scanner Frequency from 150kHz to 1300MHz with 100 programmable memories. AM, FM and WFM Modes. Sleep timer and clock facility Optional NiCads, carry cases, and fast chargers are available. **NEW LOW PRICE** **£395**



IC R100

Mobile or base extra wideband scanning receiver covering 500kHz to 1.8GHz with 100 memory channels and receives AM, FM & WFM Modes **£629**

JUST RELEASED NEW THIRD EDITION UK SCANNING DIRECTORY

Now with spiral binder and even more frequencies! This book is the last word for scanner enthusiasts - order yours now. **Price: £16.95 plus £2.75 p&p**

BOOKS...

VHF/UHF Scanner Frequency Guide	£9.95
New 160 Page guide covers 26MHz to 12GHz	£9.99
Shortwave Confidential Frequency List. 0-30MHz	£4.95
Marine Frequency Guide Near the coast? Ideal book	£6.95
VHF/UHF Airband Guide At last, now back in print	£10.95
Scanners 2 by Peter Rouse. Both books full of good info	£8.95
Short Wave Communications	£5.95
Flight Routings Guide Book (1993 version)	£5.95

KENWOOD

R5000 RECEIVER

Based on the receive section of the TS440S HF Transceiver both in looks and design this model covers 100kHz to 30MHz all mode, 100 memories and facility for optional filtering. **RECOMMENDED** **£ CALL**

MICRO-READER ERA Microreader

Data Communications decoder - decodes RTTY, CW, AMTOR (A) & SITOR (B). 16 character LCD display needing only connection to receiver extension speaker socket. Shortly to become available will be the large 4-line LCD display with built-in parallel printer driver part. Variable in-built morse tutor. [Call and reserve your optional display now] **£169.00**



RECEIVERS

LOWE HF-225

Receiver (30kHz - 30MHz) Optional extras inc FM/AM detector, Ni-cads, Speaker, Case & Active Ant. Long standing favourite. Quality filtering included. **£479.00**

LOWE HF-150

Receiver Economy model but with an excellent set of **EARS!** LCD display. Portable or Mains Power **£359.00**

DRAKE



Drake R8E - To own one of these receivers is a dream in itself - everything you could ever want in facilities and performance is in the R8E. Drake are no newcomers to radio - they have been No.1 in the USA since 1943! Unlike other expensive receivers the Drake has all its filters fitted as standard, therefore, there are no hidden extra costs. Its performance is truly staggering! With an excellent dynamic range coupled with superb filtering it takes a lot of beating! Multiple scan facilities, easy use 100ch. memory, all mode coverage and synchronous detector for improved AM reception are just a few of its extensive range of facilities.

- ★ Twin VFOs ★ Selectable AGC ★ Passband Tuning
- ★ Timer Function ★ RS232 Interface ★ Built-in Pre-Amp
- ★ Dual Noise Blanker ★ Non-Volatile Memory ★ 100kHz - 30MHz Wide Coverage

£995

Options	
Matching Speaker	£49.95
PC Drive Software	£59.95
Full W/Stop Manual	£29.95
VHF Converter (Internal)	£225.00

SANGEAN AT5803A

Full coverage shortwave receiver with AM/FM and SSB reception, with many features and good sensitivity filtering. This has become one of our most popular low cost radios. **SPECIAL OFFER THIS MONTH:** Free post and packing **£119**



STEEPLETONE MBR7

Multi-band Radio. This radio will appeal to both Aircraft Enthusiasts and the Marine Monitors. The multi-band 'jumbo' radio has almost everything you need to monitor these bands. [V, MV, & SW plus the Marine and Aircraft Bands... Good Starter! **£76.40**



TRADING POST

As many SVWM reader 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 colour sleeve or carton.

For this month we can offer a limited quantity of fully tested scanners, **BRAND NEW WITH 1 YEARS GUARANTEE**, but with slightly damaged or missing outer packing sleeve, box, etc.

Yupiteru MVT-7100	£389.00
Yupiteru MVT-7000	£289.00
Fairmate HP2000	£269.00
AOR 2500	£379.00

Quantity is strictly limited - sold on a "first come, first served" basis.

SECONDHAND ITEMS

Yupiteru MVT-8000 Base Scanner	£225.00
Realistic 2006 Base Scanner	£215.00
Realistic PRO 2024 Base Scanner	£99.00
Yupiteru MVT-7000	£245.00
Nevada MS1000	£219.00
Fairmate HP2000	£215.00
Sony Pro 80 Handheld	£195.00
Icom R71E HF RX	£695.00
Sony Air 7 Handheld	£185.00
Realistic PRO 34	£150.00
Yupiteru VT125 Airband	£99.00
Sony 2001 HF RX	£175.00
Regency MX7000	£199.00

Stock of secondhand product changes daily - call for the latest info or P/X quotation

0% INTEREST FREE FINANCE NOW AVAILABLE ON SELECTED ITEMS

For example

Yupiteru MVT-7100

Retail Price	£449
Deposit	£53
9 x Payments of	£44

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Call or write for a quotation

SHOWROOMS:- 1A MUNSTER ROAD, PORTSMOUTH PO2 9BS

MAIL ORDER:- 189 LONDON ROAD, PORTSMOUTH PO2 9AE



PETER ROUSE GU1DKD

"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

S.R.P. TRADING



MVT 7100

Specifications

- NFM / WFM / AM / LSB / USB
- 530 KHz – 1650 MHz
- 1000 memory channels
- 500 search pass frequencies
- 10 search bands
- 30 channels per sec. scan speed
- 12v d.c. or 4 x AA power supply
- Back-lit l.c.d. & buttons

**VERY SPECIAL PRICE
RING FOR QUOTATION**

SANGEAN Portable SW Antenna ANT 60

- Greatly improve reception power of portable shortwave receiver
- Easy hookup to snap onto telescoping rod antenna or plug into radio's external AM antenna jack extends to 7 metres (23 feet).
- Portable for indoors and outdoors.
- Suitable for all kinds of shortwave radios.



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£14.99 FREE POST AND PACKING WITH THIS ISSUE ONLY

SKY SCAN

Desk Top Antenna Model Desk 1300

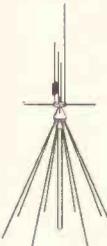
Built and designed for use with scanners. Coverage: 25 to 1300MHz. Total height – 36ins – 9ins at widest point. Comes complete with 4 metres of RG58 coax cable and BNC connector fitted.. Ideal indoor – high performance antenna and can also be used as a car antenna when your car is static. REMEMBER YOUR SCANNER IS ONLY AS GOOD AS YOUR ANTENNA SYSTEM!



£49.00 + £3.00 p&p

SKY SCAN V1300 Antenna

Most discons only have horizontal elements and this is the reason that they are not ideal for use with a scanner. Most of the transmissions that you are likely to receive on your scanner are transmitted from vertically mounted antennas. The Sky Scan V1300 discone has both vertical and horizontal elements for maximum reception. The V1300 is constructed from best quality stainless steel and aluminium and comes complete with mounting pole. Designed and built for use with scanners.



£49.95 + £3.00 p&p

SKY SCAN Magmount MKII

For improved performance, wide band reception, 25 to 1300MHz. Comes complete with protective rubber base, 4m RG.58 coax cable and BNC connector. Built and designed for use with scanners.



£24.95 + £3.00 p&p

NEW 100 Channel Scanner £199.99

Netset PRO-46. Covers 66-88, 108-136.975 (AM), 137-174, 406-512 and 806-956 MHz. LCD display with backlight, search, priority, lockout, scan-delay, memory backup circuit. Belt clip. Requires 4 "AA" batteries or Adaptor. 20-9305



NEW

50 Channel Scanner £149.99

Netset PRO-44. Covers 66-88, 108-136.975 (AM), 137-174 and 380-512 MHz. LCD display with backlight, search, lockout, scan-delay and keyboard lock. Memory backup circuit for changing batteries. Belt clip. Requires 6 "AA" batteries or AC/DC Adaptor. 20-9304



NEW 200 Channel Scanner £219.99

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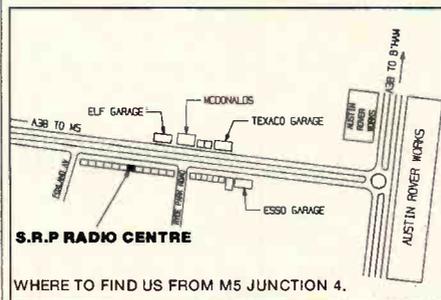
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Do-it-yourself Chart Recorder

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 is also zero. This output is connected to the motor, so nothing happens. If, however, the two voltages are not equal, the amplifier output will not 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 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

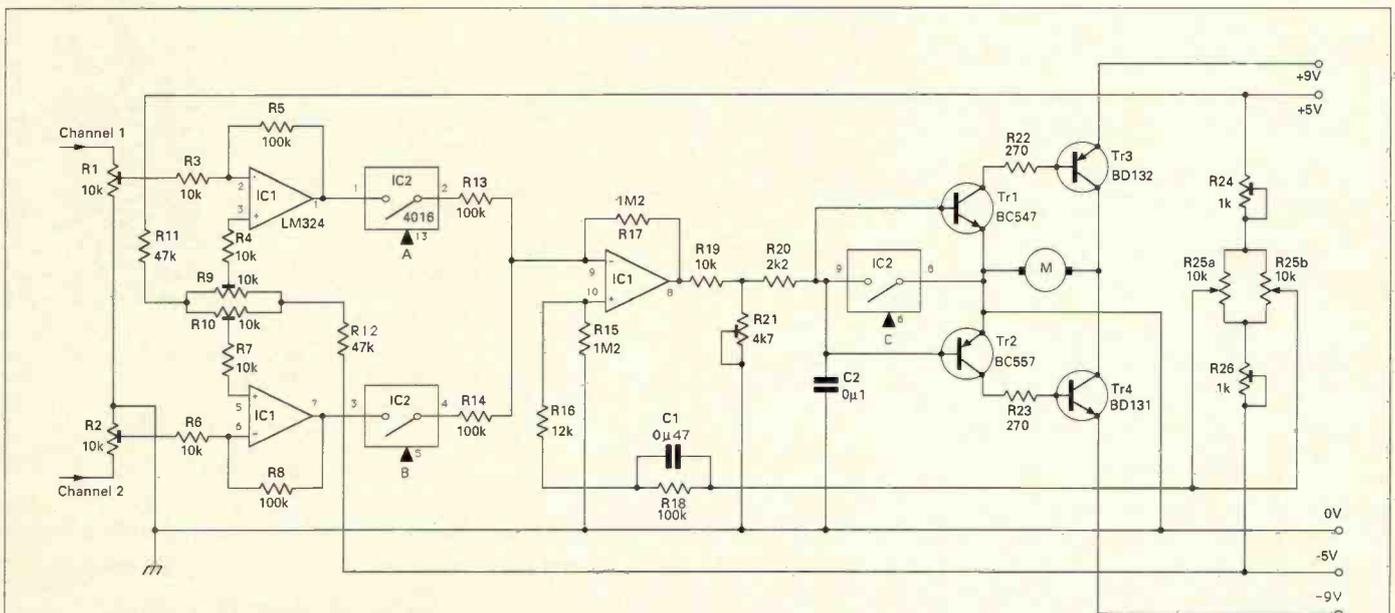


Fig. 3.1: Motor servo drive circuit.

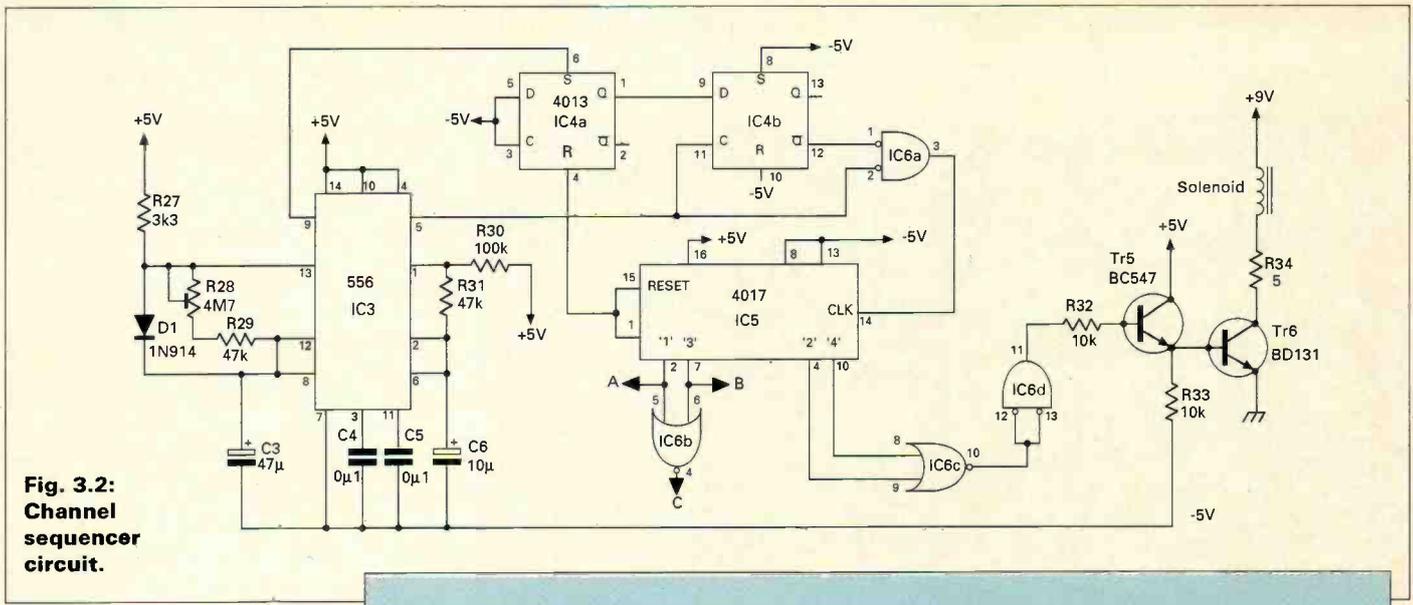


Fig. 3.2:
Channel sequencer circuit.

potentiometer feedback. The output from this feeds the transistor power amplifier driving the motor. The input to this amplifier is shorted by a third analogue switch at those times when the motor should definitely be switched off. The capacitor across the 100kΩ feedback resistor R18 provides the velocity feedback damping referred to earlier. This may need to be adjusted in value to match the characteristics of your particular construction.

The channel sequencer is driven by a 556 dual timer chip IC3. One half is set up to produce a short pulse at longish intervals adjustable by the variable resistor. The second half is arranged to produce a steady stream of faster clock pulses at about 1 - 2 second rate. The longer time interval pulse sets the first 4013 bistable IC4a, which primes the second bistable to toggle on the arrival of the next clock pulse. This then gates the clock pulses into the 4017 counter-decoder chip IC5, which starts to count through its sequence, giving positive switching levels at each of its decoded outputs in turn.

The first output on pin 2 switches channel 1 on and simultaneously, through the 4001 NOR gate IC6b, removes the short from the motor drive amplifier, allowing the pen to settle in the required position. As the counter steps to the next position these actions are reversed, disconnecting channel 1 and putting the short back on the motor drive and at the same time the output on pin 4 operates the solenoid, through the 4001 NOR gate IC6c. This drops the pen on the paper, making a mark.

You Will Need

Resistors

0.25W 5% Carbon film

270Ω	2	R22,23
2.2kΩ	1	R20
3.3kΩ	1	R27
10kΩ	7	R3,4,6,7,19,33,32
12kΩ	1	R16
47kΩ	3	R11,12,29
100kΩ	6	R5,5,13,14,18,30
1.2MΩ	2	R15,17,

1W 5% Carbon film

5Ω	1	R34
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Potentiometers

Horizontal sub-min preset

1kΩ	2	R24,26
4.7kΩ	1	R21
10kΩ	4	R1,2,9,10,
4.7MΩ	1	R28

Stereo slider

10 + 10kΩ	1	R25a & b
-----------	---	----------

Capacitors

Disc ceramic

0.1μF	5	C2,4,5,9,10
0.22μF	2	C11,12
0.47μF	1	C1

Electrolytic

10μF	1	C6
47μF	1	C3
1000μF	2	C7,8

Semiconductors

Diodes

1N914	1	D1
1N4001	4	D2,3,4,5

Transistors

BC547	2	Tr1,5
BC557	1	Tr2
BD131	2	Tr4,6
BD132	1	Tr3

Integrated circuits

556	1	IC3
4001	1	IC6
4013	1	IC4
4016	1	IC2
4017	1	IC5
7805	1	IC7
7905	1	IC8
LM324	1	IC1

Miscellaneous

Motor, see text; Printed circuit boards; Fuse 300mA slow blow; Solenoid, see text; Mains transformer 9 - 0 - 9V 20VA.

Note: A convenience kit of all mechanical parts, finished and drilled, including p.c.b.s, motor, solenoid, clock, paper roll, pen, etc., but no electronic components other than the slider potentiometer, is available from the author. SAE for details to: R & W Noble, Penbidwal House, Pandy, Abergavenny, Gwent NP7 8EA.

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.

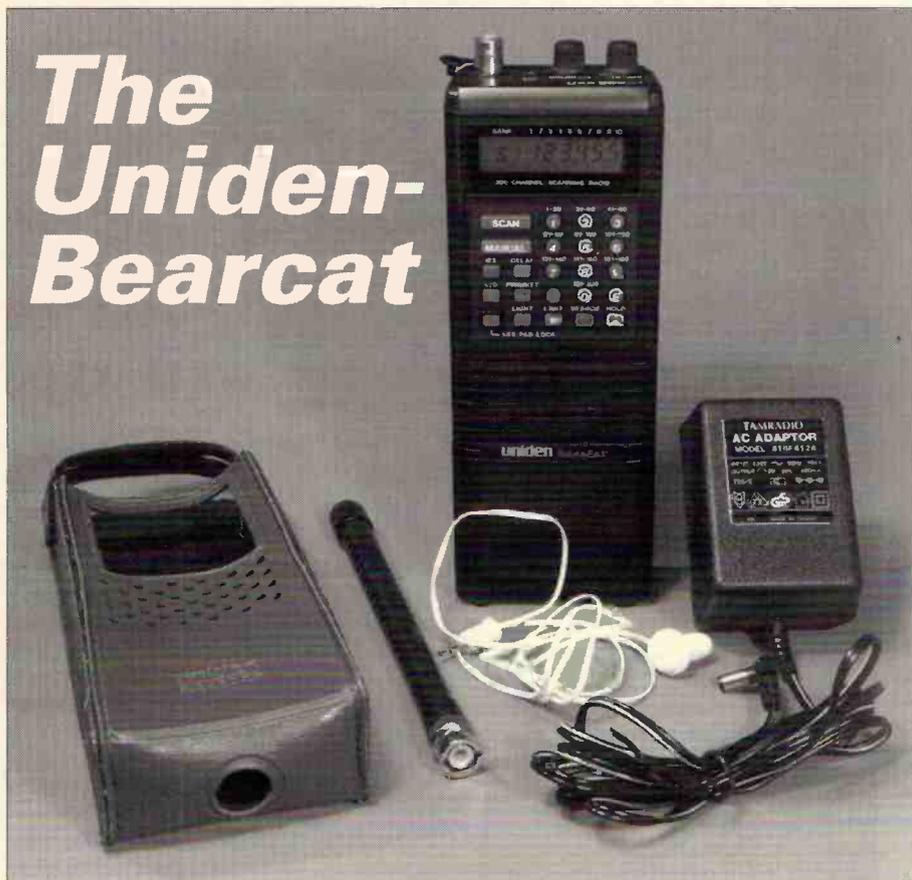
The system then goes into a rest period until the long time interval 556 timer IC3 emits another pulse, starting the entire process off again. During this rest period, however, the quartz clock will have moved the paper on so the next marks will be a tiny bit further along the paper, the whole process creating the

illusion of two separate and independent traces.

The power requirements are ±5V at about 1A and can be provided by a simple conventional power supply using 7805 and 7905 regulators IC7 & 8.

Part 4 will deal with a suitable power supply and the construction of the electronics.

The Uniden-Bearcat



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 l.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 l.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 pre-set 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 keypad 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 to press the keys to indicate which memory channel you

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 001, 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 in any of the memory channels. If the frequency already exists, the l.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 l.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.

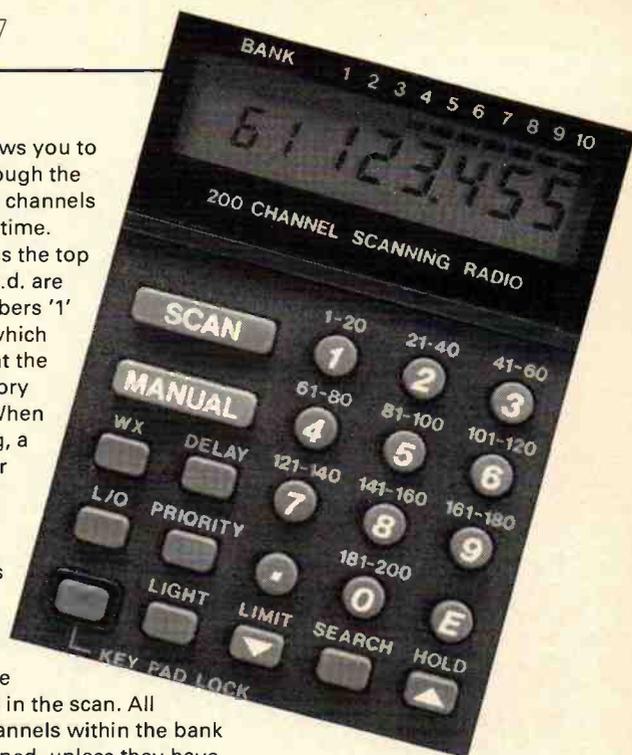
There will always be times during scanning when you wish to skip over

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 the upper and lower limits of the search range - there 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 search 'upwards' through the range, but the



Specification

Manufacturer	Uniden
Model	UBC-200XLT
Style	Hand-held a.m./f.m. scanner
Bands	9, + USA 'weather band'
Frequency ranges	66-88MHz, (5kHz steps, narrow f.m.) 118-136MHz, (25kHz steps, a.m.) 136-144MHz, (5kHz steps, narrow f.m.) 144-148MHz, (5kHz steps, narrow f.m.) 148-174MHz, (5kHz steps, narrow f.m.) 406-420MHz, (12.5kHz steps, narrow f.m.) 420-450MHz, (12.5kHz steps, narrow f.m.) 450-512MHz, (12.5kHz steps, narrow f.m.) 806-956MHz, (12.55kHz steps, narrow f.m.)
Memory channels	200 (10 banks of 20)
Scan Speed	15 channels/second (scanning) 25 frequencies/second (searching)
Display	LCD
Power	12V d.c. (internal rechargeable battery, a.c. adapter or car adapter)
Sensitivity	0.3µV 66-88MHz (12dB SINAD) 0.6µV 118-136MHz 0.4µV 136-174MHz 0.3µV 406-512MHz 0.6µV 806-956MHz
Selectivity	-55dB @ ± 25kHz
Audio Output	500µW max.
Size (approx.)	69 (W) x 186 (H) x 31.5mm(D)
Weight (approx.)	570g
Accessories	flexible 'rubber-duck' antenna operating guide a.c. adapter protective case ear-phone

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 'N' keys; pressing either of these keys again will step the scanner down (or up) by the step-size. Pressing the SEARCH button again will re-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.

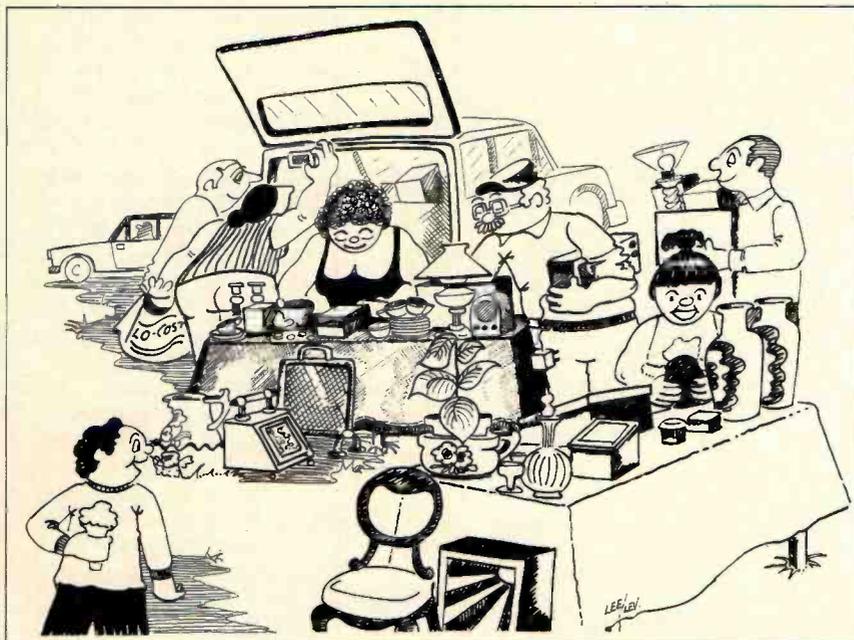
Earphone

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.



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500kHz - 1300MHz

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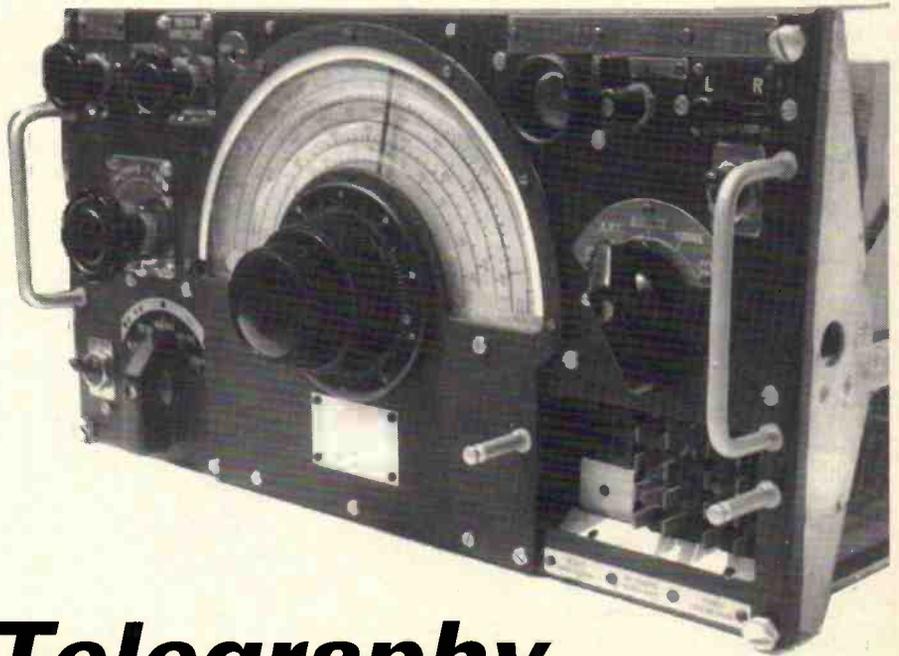
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The standard long range radio equipment fitted in Royal Air Force aircraft during WWII was the transmitter type T1154 and its associated receiver type R1155. This equipment entered service in 1941 and some 80 000 examples were produced during the war 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.

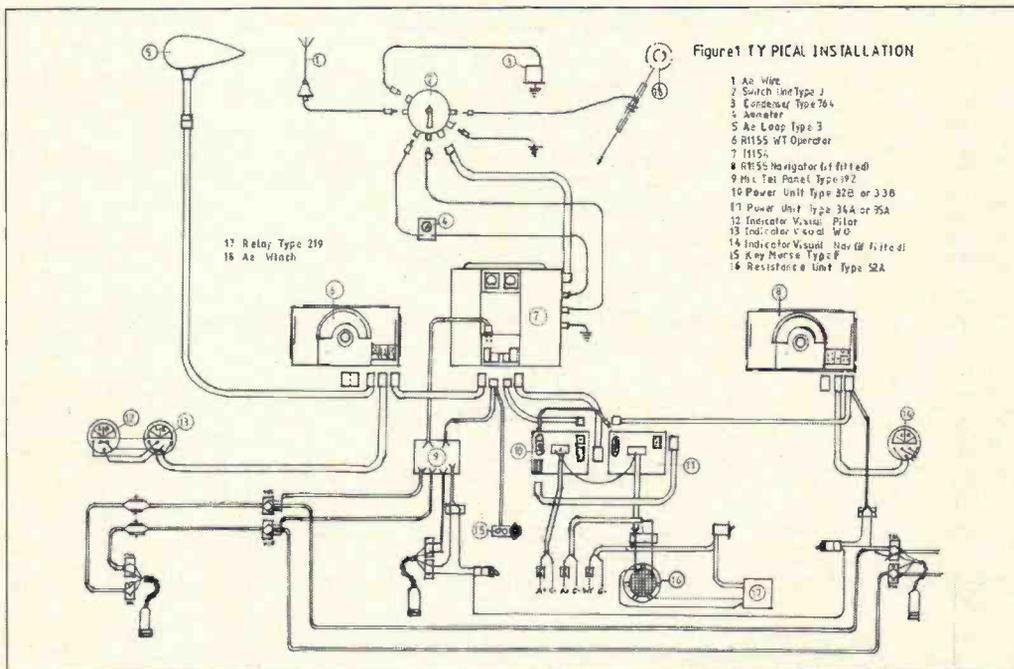
As well as manufacturing the equipment, Marconi were

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).



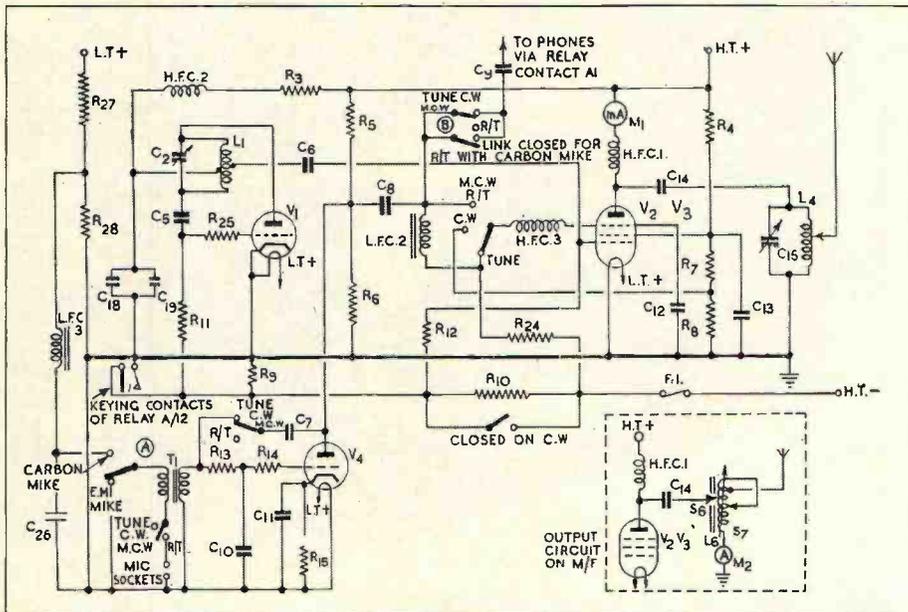


Fig. 2: Simplified circuit diagram T1154 (Crown Copyright/RAF diagram).

use in aircraft they were also to be found in ground stations, vehicles and RAF air sea 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'/'Meaconing' was a technique where transmitted signals from stations in Germany were used to mimic radio beacons in Britain giving misleading information.

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 wide spread 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

T1154/R1155 variants

Type	Sec/Ref	Features	Fitted to
T1154	10D/97	m.c.w., c.w., R/T multi click stop	Handley Page Halifax only Coastal Command aircraft Mobile Ground stations used with receiver Type R1188 Coastal Command aircraft
T1154A	10D/99	m.c.w., c.w., R/T multi click stop	
T1154B	10D/196	m.c.w., c.w., R/T multi click stop	
T1154C	10D/198	m.c.w., c.w., R/T multi click stop	
T1154D	10D/730	m.c.w., c.w., R/T multi click stop	
T1154E	10D/731	m.c.w., c.w., R/T multi click stop	
T1154F	10D/893	m.c.w., c.w., R/T multi click stop	
T1154G		Did not enter production	
T1154H	10D/1180	m.c.w., c.w., R/T uni click stop Aluminium case & circuits to reduce interference with compass	
T1154I		Did not enter production	
T1154J	10D/1329	m.c.w., c.w., R/T multi click stop	Marine craft, Training aircraft General
T1154K	10D/1330	m.c.w., c.w., R/T multi click stop Steel case version of T1154F	
T1154L	10D/1455	m.c.w., c.w., R/T uni click stop	Marine craft
T1154M	10D/1587	m.c.w., c.w., R/T as T1154K with uni click stop	
T1154N	10D/1588	m.c.w., c.w., R/T steel case version of T1154B	Handley Page Halifax
R1155	10D/98	Aluminium case	
R1155A	10D/820	Filters to prevent m.f. interference	
R1155B	10D/13045	Aluminium case h.f. choke to prevent radar interference	All bombers except Handley Page Halifax
R1155C	10D/1105	Aluminium case Modified for h.f. d.f.	
R1155D	10D/1331	Steel case	
R1155E	10D/1332	Steel case Filters to prevent m.f. interference	
R1155F	10D/1333	Aluminium case h.f. choke to prevent radar interference	
R1155G		These variants did not enter production	
R1155H			
R1155J			
R1155K			
R1155L	10D/1477	Aluminium case As R1155B or F but frequency range altered	General
R1155M	10D/1597	Aluminium case filters to prevent m.f. interference	Ground Schools only
R1155N	10D/1667	Steel case As R1155B or F but frequency range altered	General use except bombers Marine craft

Installation

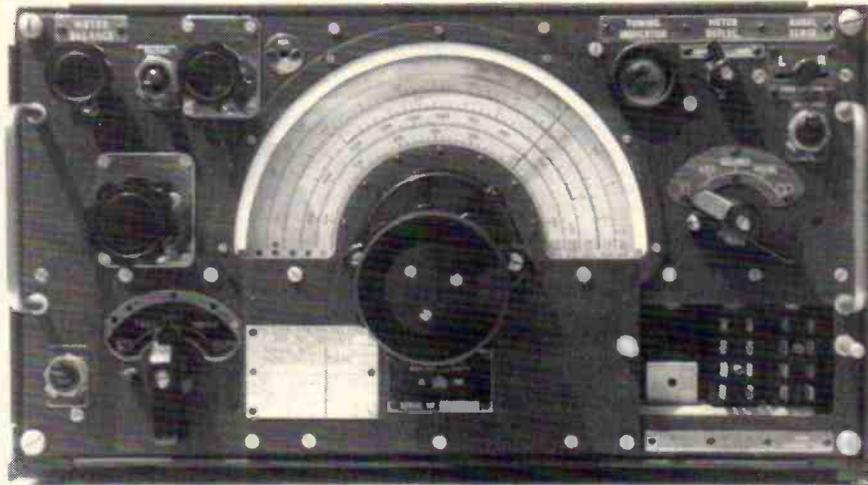
In a typical aircraft installation (**Fig. 1**) the transmitter was the focal point and was usually mounted either on top of, or to one side of, the receiver. Power was obtained from the aircraft's electrical supply of 12 or 24V through two rotary transformers. One of these power supplies, a Type 35,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

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

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 R1155 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.

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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 560kHz. 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 66.

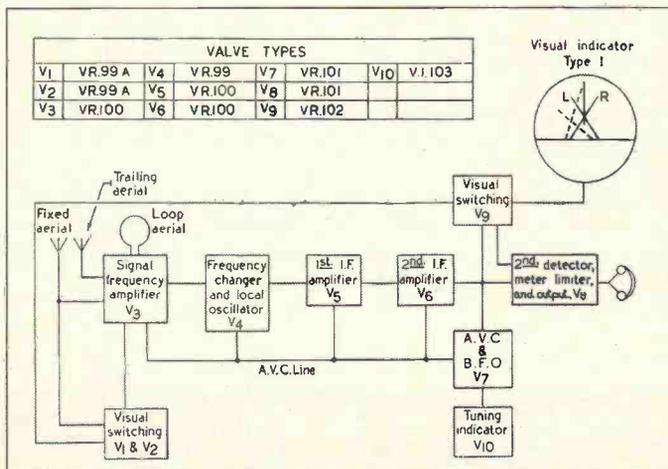


Fig. 3: Receiver schematic diagram (Crown Copyright/RAF diagram).

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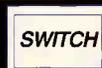
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A Thirties Radio Set

RESCUED

This is the tale of how a 50-year-old-plus receiver, consigned mute to a junk shop, was rescued, restored to its former glory - and given a name of its own by John Tuke.

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 dials - 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, but with an extra i.f. (audio) stage making 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 was 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 screwed down, both panel and board being covered with thin aluminium foil to provide an earth sheet. A copper screen separated the r.f. and detector areas.

The tuning condensers (sorry, capacitors) were 0.0005 μ F (500pF) types which had been stripped down and re-assembled with half the number of plates, doubled spaced, making about 0.00015 μ F (150pF). There was a reaction condenser (sorry again, capacitor) of about 0.00025 μ F (250pF) with integral slow motion drive, an ON/OFF switch together with loudspeaker and antenna/earth terminals. (Seeing all these items from long ago induced a severe attack of nostalgia necessitating another cup of tea!)

The wiring was carried out with square-section wire of approximately 18s.w.g. and, apart from two soldered joints, all connections were by nut and bolt; hence the square-section wire. The coil holders were of some obscure type unknown to me. There were two 1 μ F fixed decoupling capacitors (hooray, I remembered this time!) - we called them 'mainsbridge condensers' in their day - and these were the only items which were unserviceable, showing about 5k Ω on the meter!

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, checked, 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 out 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 1 μ F 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 20m!). 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 PM2DX, 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

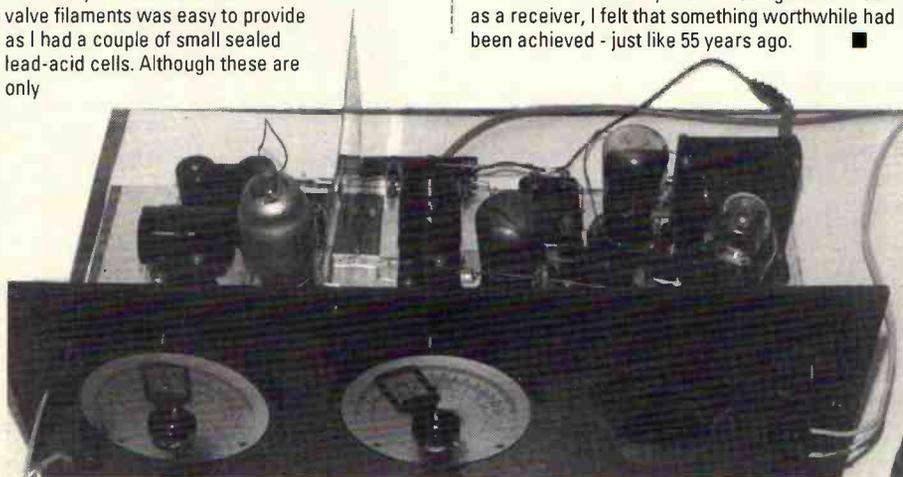
Apart from some slight adjustments to the coils to ensure that there was just a small overlap between the different ranges, everything worked first time. There will be many readers who have never handled a straight set with 'reaction' and it may come as a surprise to learn that in a strict signal/noise 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 beat note kept changing frequency in a random manner. Eventually this was traced to an unbalanced 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.

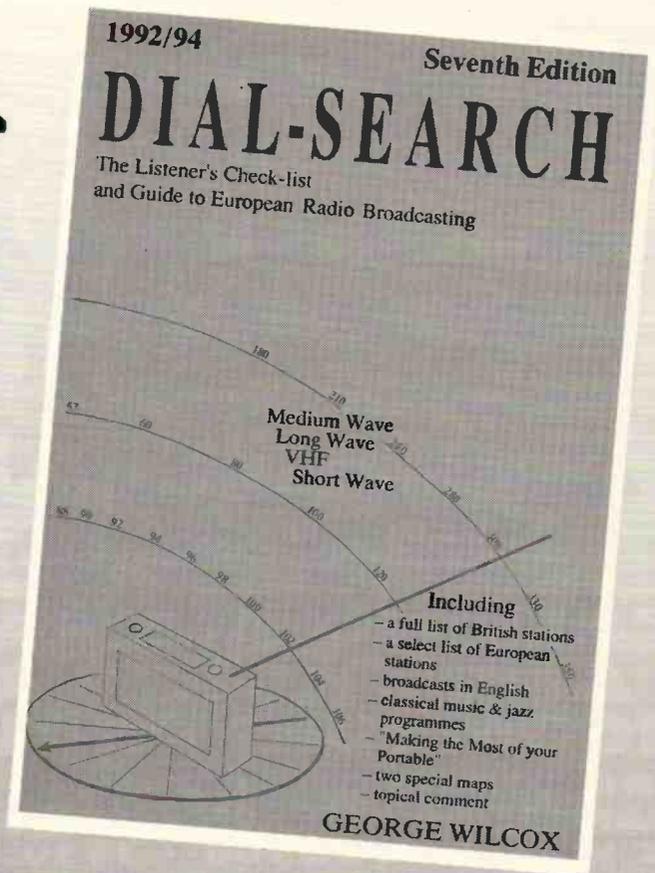
When I worked my first 'W' using the *DX-Four* as a receiver, I felt that something worthwhile had been achieved - just like 55 years ago. ■



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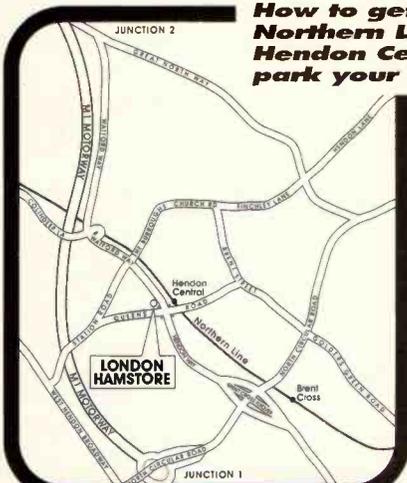
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Buying and Renovating the AR88

If you build your own receiver, it is likely to cost you a few hundred pounds. However, financially it is a dead loss as, if you fall out with your creation, you end up with something totally unsalable. If you spend a fraction of the time and expense on renovating a piece of good quality old equipment, at worst you should be able to get your money back, or you might even make a profit. At least you will have fun and it will not cost you very much.

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 - 550kHz 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 rebuilds can be the best buys, as break-down 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.

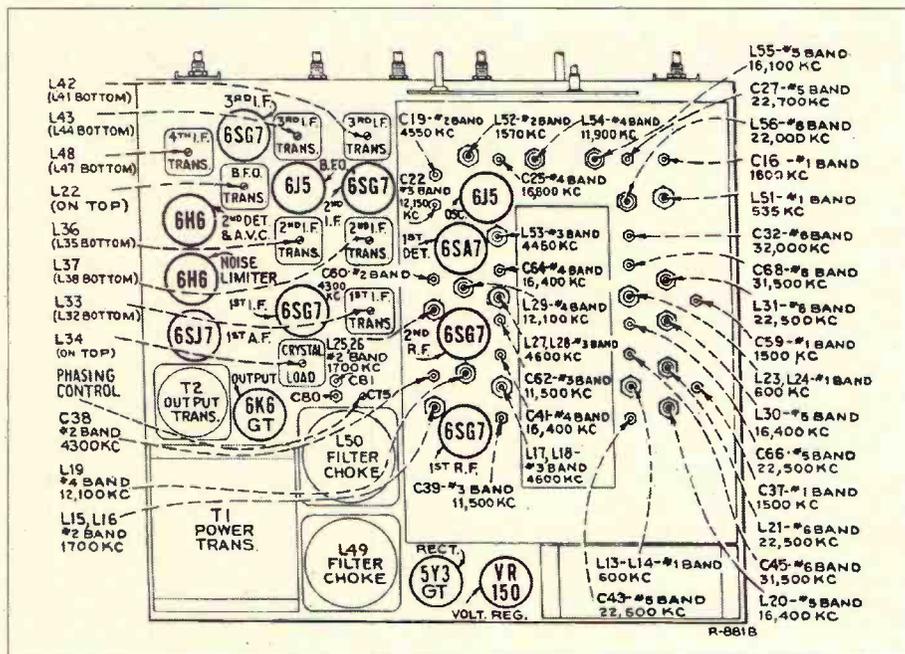
The mixer stage uses a 6SA7M frequency changer valve. (In domestic sets of this era, the same type of valve would have been used as a combined mixer and local oscillator - hence the term frequency changer). To help oscillator stability, a separate 6J5 local oscillator is used in

Fig. 1: The front panel of an AR88 showing the black crackle finish.



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

Fig. 2: The diagram of the top of the chassis of the AR88D.



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.

The power supply uses a pretty hefty transformer that may be tapped 115/230 or 110/125/150/210/240V.

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 Zenner 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, as 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 response. 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.

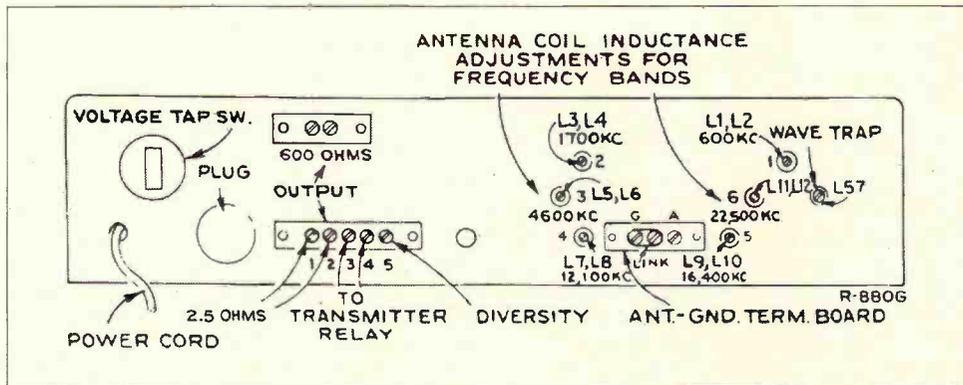
2. For better s.s.b. reception. Increase the oscillator injection, but first have a look under the set and make sure someone has not already done this. Originally, the b.f.o. injection was

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 .15in 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

Fig. 3:
Placement of
the antenna
trimmers.



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.s.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 circuited 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 oxidation 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 brade 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 in 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 swapped 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 10nF 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 0.1 μ F or three 0.25 μ F being in one can. If possible check all the block capacitors on a 500V insulation tester and reject any that read less than about 20M Ω . 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 4 μ F 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 valve.

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 should get maximum meter reading on position 2 with just a little less on

position 1 and 3. Positions 4 and 5 will give considerably less meter reading. Now listen to the audio quality of the broadcast as you try the five different positions of selectivity. Position 1 should have a full treble response, position 2 just a trace less high frequency, positions 3, 4 and 5 should become progressively more and more muffled and particularly in position 5 the reading on the meter should peak and fall very sharply as you tune slightly one way to the other.

Provided the selectivity sharpens to some extent in positions 3, 4, and 5, the crystal filter is working and you can safely go ahead with alignment without using a signal generator, if positions 3, 4 and 5 are not noticeably more selective than position 2, you will have to find out what is wrong with the crystal filter before attempting alignment.

A common fault with the filter is gross misalignment. The crystal fitted will be resonant at either 455kHz - AR88D, or 735kHz - AR88LF. If the i.f.s had been peaked at a different frequency (say 465 or 725) due to the use of an inaccurate signal generator, the filter will not function and so the first job is to check the actual i.f. frequency.

To do this, remove the local oscillator valve V3, 6J5, 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, align all 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.

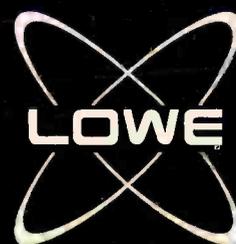
If the crystal filter still does not work and yet the receiver i.f.s are aligned to the correct frequency, check the wiring around the filter and see that C75 is about half capacity and that its blades have not been bent and short circuited. The crystal will seldom be faulty, although it has been known. 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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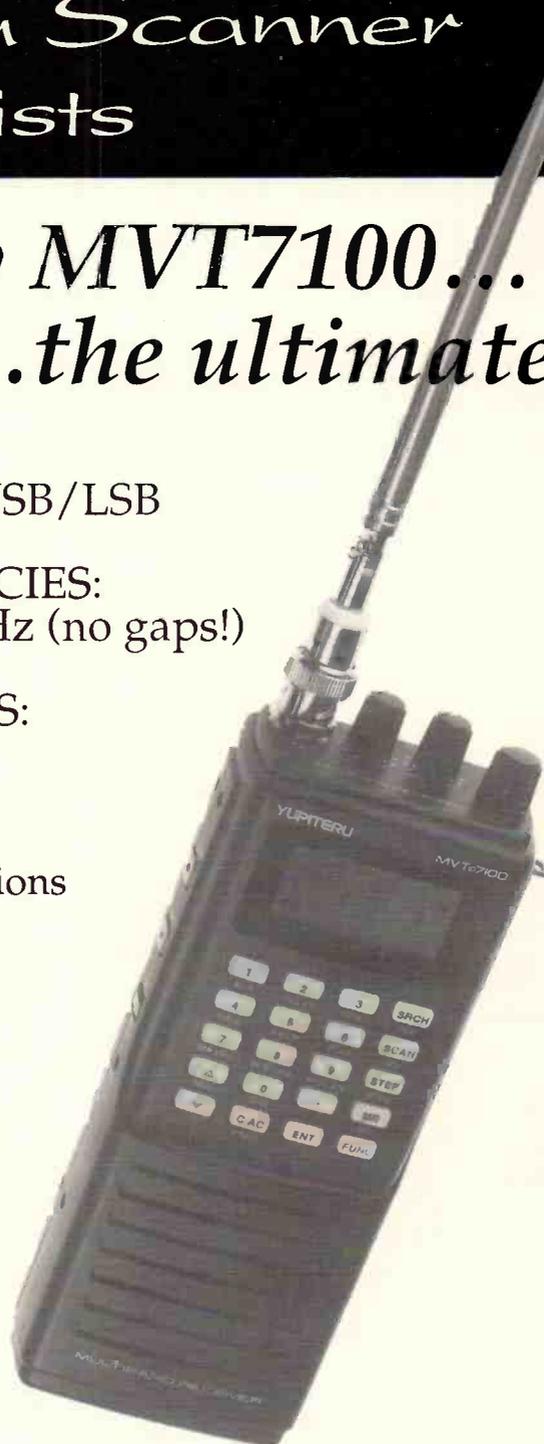
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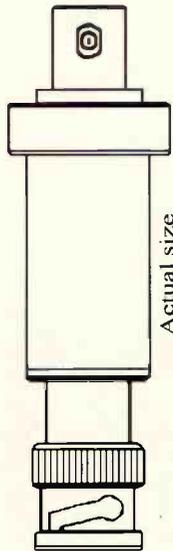
The ABF125 will provide useful additional selectivity (in many situations) to any receiver's 'front end' by reducing the multitude of unwanted strong signals from reaching and saturating the receiver's first mixer stage... this results in less interference and improved reception.

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 out of band attenuation typically of 25dB from 0.3 ~ 75 MHz and 20dB from 190 ~ 400 MHz. This makes the ABF125 suitable for connection to both external aerials 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 its effectiveness. When any connection is fitted to the aerial signal path some reduction of signal is resulting (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.

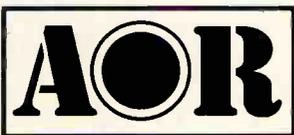
Note: Remember to remove the ABF125 from the aerial when monitoring signals other than VHF Airband or signal strength will be dramatically reduced.

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others should peak sharply. If any do not peak satisfactory, it almost certainly indicates that a fixed 390 or 680pF internal capacitor is faulty. Carefully remove and dismantle the transformer, replace the capacitors and try again.

The Crystal Filter

With C75 at half capacity, leave the meter connected to the hot end of the noise limiter control tuned to a broadcast station in selectivity 3 and adjust L34 slightly either side of maximum reading so that the selectivity (cut in h.f. response) is noticeably greater than that in position 2.

Now do the same in position 4, this time tuning C81 and again in position 5 with C80. The idea is to try and peak the output but at the same tune ensure that the selectivity gradually increases from position 2 - 5. If the response is lop-sided, try tuning C75, or better still, extend its spindle so that it can be used on the air as a phasing control to null out the QRM. Once L34 has been aligned, go back to position 2 and ensure that the peak reception occurs at the same frequency as on positions 3, 4 and 5. If it does not, tune in the station on position 3, then switch to position 2 and without altering the tuning re-peak all the i.f. transformer adjustments. To get things spot on, it might be necessary to then repeat the crystal filter adjustment again.

Getting the Calibration Correct

First you will need an accurate frequency standard as calibrating the AR88 against the average workshop generator is a kin to trying to set a micrometre against a 6in ruler! If you have or can borrow a frequency counter, use this to set your generator accurately or use the harmonic output on a 1MHz/100kHz crystal oscillator standard, or the calibrator you perhaps have built into a h.f. transceiver.

At the higher frequencies you will have difficulty deciding with 100kHz point is which - am 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 28MHz) 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 imperceptible 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.

Table of the various voltage readings.

Valve	Symbol	Plate Volts	Screen Volts	Cathode Volts
RCA 6SG7				
1st RF Amplifier	1	235	150	0
RCS 6SG7				
2nd RF Amplifier	2	235	150	0
RCA 6J5				
Oscillator	3	110	-	0
RCS 6SA7				
1st Detector	4	235	50	2
RCA 6SG7				
1st IF Amplifier	5	235	150	7
RCA 6SG7				
2nd IF Amplifier	6	235	150	1.3
RCA 6SG7				
3rd IF Amplifier	7	235	150	3.1
RCA 6H6				
2nd Det & AVC	8	-	-	-
RCA 6H6				
Noise Limiter	9	-	-	-
RCA 6SJ7				
1st Audio Amp	10	83	34	0
RCA 6V6GT/G				
Power Output	11	256	240	0
RCA 6J5				
BFO	12	40	-	0
RCA VR150				
Voltage Regulator	13	150	-	0
RCA 5Y3GT/G				
Rectifier	14	-	-	300

Propagation

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

Obviously 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 I (48-68MHz) 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 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 26th 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, on the 30th. Early in May he found 2 groups and some 11 filaments on the 4th and 5th.

At his observatory in Bristol, **Ted Waring** counted 20 sunspots on May 7, but found only 2 on the 19th. **Patrick**

Moore (Selsey), kindly sent drawings of the sunspots that appeared on his projection screen at 0940 on May 10, Fig. 1 and at 0635 on the 29th, Fig. 2.

Auroral

Ron Livesey, the auroral co-ordinator for the British Astronomical Association, received reports of auroral 'glow' for the overnight periods on April 11/12, 13/14, 20/21 & 29/30; 'quiet arc or band' on 4/5, 7/8, 16/17 & 29/30; 'ray bundles' on 4/5, 17/18, 19/20, 21/22 & 29/30; 'active, pulsing, flaming or flickering' on 14/15, 15/16, 20/21 & 24/25 and 'overhead aurora or corona' on 4/5, from observers in Canada, Ireland and Scotland. Ron also received reports of terrestrial radio signals being subject to auroral reflection on the 29th. **Tony Hopwood** (Upton-on-Severn) noted fading on the h.f. bands on days 5, 10, 13, 20, 25 & 30.

Magnetic

Strong magnetic disturbances were reported on April 4 & 5 by **John Fletcher** (Tuftley) using a twin Hall effect magnetometer, **Tony Hopwood** (suspended magnet), **Karl Lewis** (Saltash) (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.

Propagation Beacons

First, my thanks to **Gordon Foote** (Didcot), **Henry Hatfield**, **Ted Owen** (Maldon) and **Ted Waring** for their 28MHz beacon logs from which I was able to compile the table, Fig. 3, of beacons heard between April 26 and May 25. Once again the importance of this routine beacon watch has been proved.

In Scotland, **Wallace Shackleton** (Kinross) monitors the solar data transmitted by the German beacon DK0WCY on 10.144MHz and, from his report for May, I see that the solar-flux on the 9th was 129 units rising to 134 on the 11th and then gradually declining to 99 by the 17th.

Tropospheric

While on holiday in Shanklyn, IOW, **S.M. Hockenull**, using a Philips D2345 portable with its own rod antenna,

between May 8 and 15, found he could receive programmes in Band II daily from Radio Bristol (Mendip) and GLR (Crystal Palace) and occasionally from Radios Berkshire and Jersey and a few weaker stations from France. The daily atmospheric pressure readings for April 26 to May 25 can be found in my television column.

Beacon Addresses

DK0WCY, 10.144MHz, Aurora Warnbake, ueber Kappeln, D-2341 Scheggerott, Germany.

DF0AAB, 28.277MHz, Bakestation VFDB Kiel, c/o Otto Peters, Wuestenfelde 12, D-2300 Kiel 14, Germany.

DK0TEN, 28.257MHz, Bake-Konstanz, In den Dorfaeckern 47, D-7750, Konstanz, Germany.

DL0IGI, 28.205MHz, Bake VFDB Traunstein, Predigtstuhl, D-8230 Bad Reichenhall, Germany.

EA3JA, 28.247MHz, c/o Jose Ferrer Radresa, Entenza 39, 08015 Barcelona, Spain.

IY4M, 28.195MHz, ARI Bologna, Box 2128, I-4000 Bologna, Italy.

LA5TEN, 28.2375MHz, Follogruoen av NRRL, Vanntaarnet paa Vardaasen, Box 11, N-1412 Sofiemyr, Norway.

Beacon	April					May																									
	26	27	28	29	30	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	
DF0AAB													X				X			X											
DK0TEN														X			X			X											
DL0IGI																	X			X											
EA3JA																X	X	X						X							
HG5GEW																	X	X	X												X
IY4M																X	X						X	X							
LA5TEN																				X											X
OK0EG																	X			X											
OH2TEN														X				X	X	X		X	X								
OH5TEN																				X											
SK5TEN													X	X			X	X	X			X				X			X		X
VK2RSY																								X							
ZS1LA	X	X	X	X	X	X	X	X	X	X					X	X	X	X												X	
5B4CY	X	X	X	X	X	X	X	X	X					X	X	X	X	X				X	X	X							

Fig. 1.

Fig. 2.

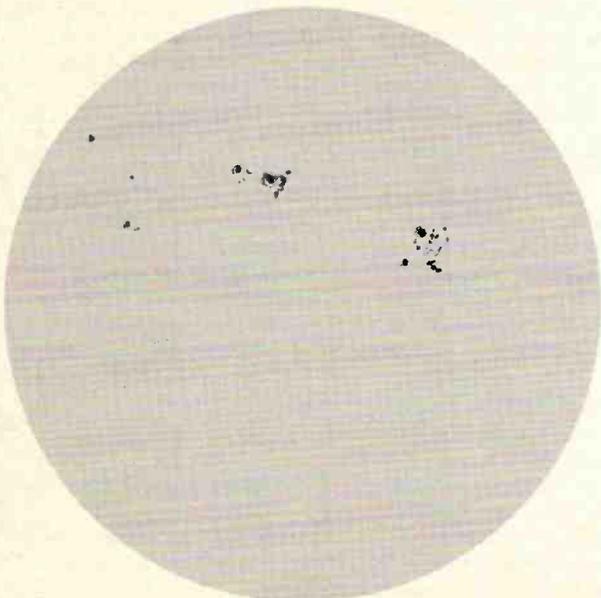
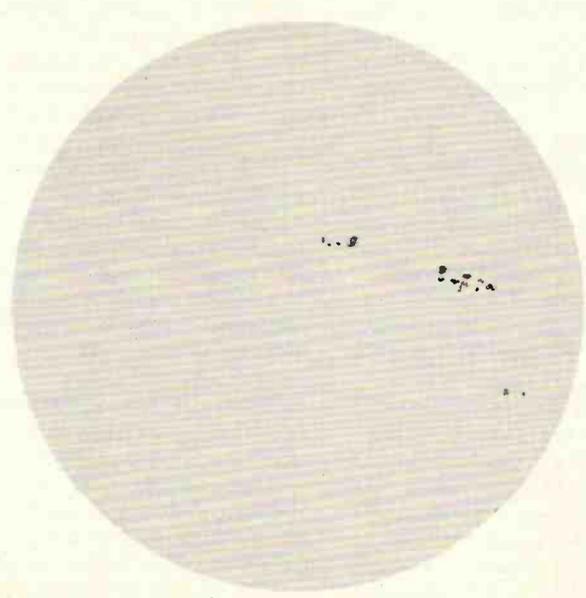


Fig. 3.



Satellite TV

Roger Bunney, 33 Cherville Street,
Romsey, Hants SO51 8FB

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 ITN's 'SNG-1 UKI 7' news gathering

point until the transmitter or network insertion point could be reached. A remote site would employ an engineer and rigger with receive 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

returned 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 6.80MHz, the video displaying a black/white pattern.

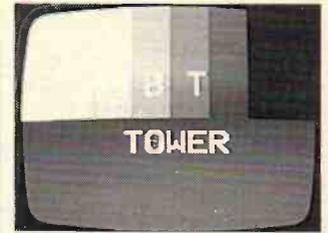
John Locker and others received the mystery 'TV Houston' and 'NASA TV' signal feeds mentioned in last month's column that featured various shots of the Space Shuttle *Columbus D2* mission and of the German involvement with that particular mission.

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 settling at the new 31°W slot. At the end of the *Columbus* mission, May 4, 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 Deutsches 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 -



Circuit originating from London's BT Tower and uplinked from the London Teleport. The DTI are restricting further 13GHz uplinks inside the M25 to minimise increasing terrestrial interference.

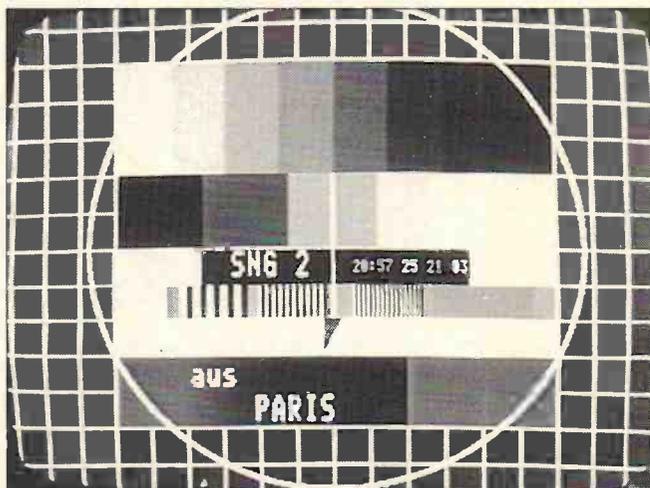
The test card from the Danish uplink station prior to the start of the hard porn programming 'Continental Television' (ex Red Hot Dutch) after midnight via Eutelsat II F1 13°E. Programming is scrambled!



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 7000 will carry a 33 transponder payload.



The FUBK test card is use from a French SNG (Satellite News Gathering) truck in Paris during elections recently over Eutelsat II F3.

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 13°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 from 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 the 16°E Eutelsat.

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 receive 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

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Liverpool sat zapper and *SWM* reader **John Locker** has just

DXTV Round-up

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

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 sunspots 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 that list 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 1800, he watched Italy's RAI showing the Italian Open Tennis Tournament from Rome.

Bob Brooks (Great Sutton) also found Italy 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 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 HOBOSTN 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 regions 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 1830.

Simon Hamer (New Radnor) received pictures from Czechoslovakia (CST), Germany (ARD1), Russia (TSS) and Yugoslavia (JRT/RTB1 & JRT/HTV) on the 12th, Norway on the 14th, Austria (ORF1), Denmark (DR1), 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 (TVPI) 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 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.

Fig. 1: Hungary.



Fig. 2: Hungary.



Fig. 3: Russian TV news.



Fig. 4: Croatian test-card.

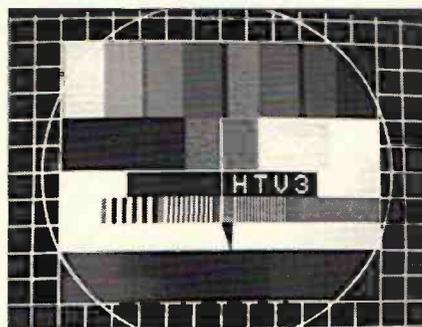
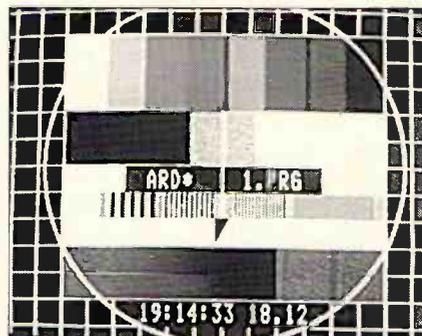


Fig. 5: Tunisian test-card.



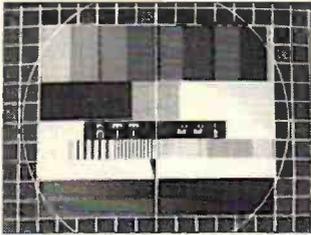


Fig. 6: Tunisian test-card.

The variations in atmospheric pressure for the period April 26 to May 25, shown on the chart in Fig. 13, were recorded at noon and midnight by the barograph installed at my home in Sussex. I recorded 1.91in of rain in May, with amounts of more than 0.25in falling on days 17, 20, 21, 27 & 30. This compares with only 0.91in 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 and added a most interesting point, "every time a warm front turns up in this area I seem to get DX, so there might just be an indicator here". Quite right David, a temperature change is an important factor as far as tropospheric openings are concerned. Look at that date readers, did those sunspots influence the weather pattern?

During the month David received pictures, for varying periods, from Belgium (BRT1) on the 19th, 22nd & 24th, Denmark (TV2) on the 12th, 17th, 19th & 24th, Germany, (mainly ARD1 & ZDF) on the 12th, 23rd & 25th and Holland (NED 1, 2 & 3) on days 3, 4, 12, 17, 19, 22, 23, 24, 25 & 29. From the UK, he logged BBC1 and HTV (Wales), Tyne Tees TV and Yorkshire TV in the evening of the 24th and most of the day on the 25th. "All stations suffered from



Fig. 7.

severe co-channel interference during the evening [25th]," said David and when it became so strong on his local BBC2 on Ch. E55, he proved that it was ARD1 (Germany) by switching over from his main antenna to the receivers own loop. He also added Germany's N3 and West 3 during the evenings of the 23rd and 25th respectively.

Openings on u.h.f. can be 'local' affairs. For instance, from Wales, **Simon Hamer** reported only fluttery u.h.f. pictures from Belgium, France, Holland and Ireland, at various times over the same period. In Scotland, **David Glenday**, found Band III open on the 11th and 12th when he logged pictures from Denmark on Ch. E10 and from Norway (NRK), on Chs. E5, 6, 8 & 9 and their TV2 from Bergen, on Ch. E12. In the u.h.f. band he logged Denmark (TV2), Germany (ARD1, NDR, SAT1 & ZDF), Holland (NED 1, 2 & 3) and the UK (Tacolneston) on the 7th, Germany and Holland on



Fig. 10: Russian SSTV.



Fig. 8: Italian SSTV.

the 8th, Belgium (BRT1), Denmark and Holland on the 11th, Denmark, Germany and Holland on the 12th and weak signals from Holland on the 29th.

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 Warmsworth Road,



Fig. 9: Russian SSTV.

Doncaster DN4 ORP. 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. John recently added an Amstrad 7286 PC to his station and says that it works well for his radio and general computing interests.



Fig. 11: Italian SSTV.



Fig. 12: Scottish SSTV.

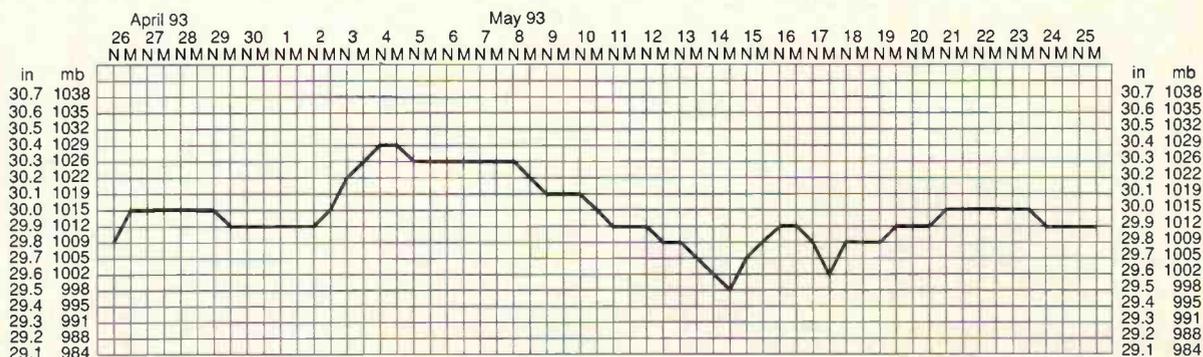


Fig. 13

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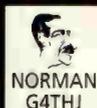
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LOWE COMMUNICATIONS

Bandscan

US

By Gerry L. Dexter

It's quite likely that the first real short wave broadcast signals to come from Hawaii in some forty years are now being heard. The LeSea Broadcasting Corporation's KWHR was due to conduct test broadcasts as early as August. The station is part of the same group that owns WHRI and will be programmed from the WHRI facility in Indiana. The 100kW transmitter in Hawaii is near South Point, on the big island of Hawaii, which is the southern most part of the United States. KWHR will be used to extend LeSea's religious broadcast programming to audiences in Asia and Australia.

As most readers probably know, WWCR short wave in Nashville, Tennessee burned to the ground on April 4, this year, losing everything but the antennas, i.e. from its three transmitters to its tape machines to the offices.

Remarkably, the station was able to get a new transmitter on site and on the air in a matter of a couple of weeks. I expect a full recovery. Incidentally, if you were receiving programme schedules from WWCR you should give them your name and address again as even the mailing lists were lost in the fire!

Keep watching 9.955MHz for tests from the long-awaited Radio Miami International. As far as I know, however, as of this writing such tests haven't materialised. Station officials say construction of the facility was delayed by last year's hurricane, but was underway as the spring season moved into summer. RMI's broadcasts will be largely in Spanish and probably between the hours of 2300 and 1300UTC, using the 50kW transmitter formerly owned by now silent Radio Clarin in the Dominican Republic.

What is perhaps North America's lowest power licensed short wave broadcast station, CKFX in Vancouver, British Columbia, Canada should be back on the air now, after the 10W transmitter failed about a year and a half ago, having operated since the early 1940s. The old transmitter has been replaced with a used transmitter that has been modified for use on the station's 6.080MHz frequency, still with 10W of power, although an increase to 100W is expected eventually. CKFX relays Vancouver medium wave station CKWX. Its 10W signal has been heard in every corner of the world over the station's 50 years on short wave.

Central America

Costa Rica - AWR Latin America has probably ended use of the Alajuela transmitter site by now and should

be operating only from Cahuita 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 05-209, San Salvador and Radio Farabundo Marti at Apartado Postal 3080, San Salvador. The government's Radio Nacional continues its long absence from short wave.

Guatemala - Look for TGNA/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 9MHz range. The station used 9.760MHz many years ago.

Nicaragua - Another former clandestine, Radio Miskut, 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 2300 to as late as past 0200UTC.

Argentina - Radio Malargue, in the city of the same name, is active again on 6.160MHz, 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-on varies between 0900 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 5.580MHz frequency, running to sign-off around 0200UTC.

Another new station is Radiodifusoras Integracion on 6.123MHz (listed for 6.120MHz) and using 5kW.

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

A new Brazilian station is Radio Eldorado FM on 6.160MHz (variable).

TRANSMITIENDO GRATIS NUEVAS ALEGRES
Telling the Good News Abroad

From: GUATEMALA
"Beautiful land of the Quetzal"

Frequencies:
730 kHz
3,300 kHz
5,655 kHz
100.7 mhz FM



Facts:

The Quetzal is the national emblem of Guatemala. The bird seldom survives in captivity, hence, symbol of liberty.

"If the Son (Christ) therefore shall make you free, ye shall be free indeed."

John 8:36

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

Long-time Costa Rican broadcaster Radio Reloj has discontinued use of 6.006MHz, at least for the moment.

The location is uncertain. Radio Ecuadora da Bahia has reactivated on 6.020MHz (variable) and is heard around 2300UTC.

Chile - The religious station Radio Esperanza, Temuco, on 6.088MHz (variable) plans to increase power from its current 1kW up to as much as 10kW. The station is sometimes heard in North America during the early morning hours.

Guyana - The Guyana Broadcasting Corporation (GBC) has returned to short wave, once again using its old 5.950MHz frequency. The power is believed to be only 10kW.

Peru - No Spanish-speaking country in the world offers more short wave stations to DX than Peru. And despite an on-going guerilla war and devastating inflation new stations continue to come and go in a continual parade. Here are a few highlights of recent activity: Radio Adventista Mundial (formerly La Voz de la Esperanza) operates from Celendin on 3.870MHz, Radio Internacional del Peru is on 3.402MHz in San Pablo; Radio Oyon on 3.800MHz has come back on the air. Another reactivated station is Radio Santa Rosa, 6.045MHz, as well as Radio Naylamp, 4.299MHz (a frequency that has had activity by a number of small South American broadcasters over the past year or so). Radio Vision dos Mil is now broadcasting from Bombamarca on 5.131MHz, rather than from Janjui where it used to be.

More new stations are Radio Reina de la Selva on 5.486MHz (variable), broadcasting from Chachapoyas, Radio Ritmo from Puerto Maldonado on 5.602MHz, Estacion X, Yurimanguas, on 4.9535MHz and Onda Verde Radio on 4.9445MHz (another very active area for South American stations). Still other new ones include Radio Popular on 5.4865MHz and Radio Interacional on 3.402MHz. Among the currently inactive stations are Radio Cobriza 2000 on 4.926MHz and the rarely reported Radio Azangaro on 7.064MHz (variable). There seem to be 40 or 50 Peruvian stations active at any one time, and the picture changes continuously.

Surinam - Seldom heard Radio Apinte is being heard on 4.991MHz (variable) around 0400, although suffering QRM from the Peruvian Radio Ancash until the latter signs off at 0430. Apinte formerly is being heard on 4.991MHz (variable) around 0400, although suffering QRM from the Peruvian Radio Ancash until the latter signs off at 0430UTC. Apinte formerly operated on 5.005MHz (variable).

Uruguay - Radio Monte Carlo, Montevideo, is sometimes heard on 11.735MHz around 2200 or later, all 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* is hosting the first World-wide SWL 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, Brasstown, NC 28902, 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.

SSB Utility Listening

Graham Tanner,
42 David Close, Harlington, Middlesex UB35EA



RC-135V 64-14844 of the 55th Wing at RAF Mildenhall during late April 1993. It flew as 'BAMA 15' on May 3 to Bosnia to oversee that night's food-drops. The 'OF' tail-code signifies Offutt AFB in Nebraska, USA where the 55th Wing is based.

As mentioned last month, this is **Graham Tanner** compiling the column once again. All your letters have been passed onto 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 GHFS frequencies are where any activity is likely to occur. One

callsign that 'appears' on an almost nightly basis is 'Bama 15'; several letters 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 **6.738**, **11.176** and **15.015MHz** 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 'Deny 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-130's (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 run-down 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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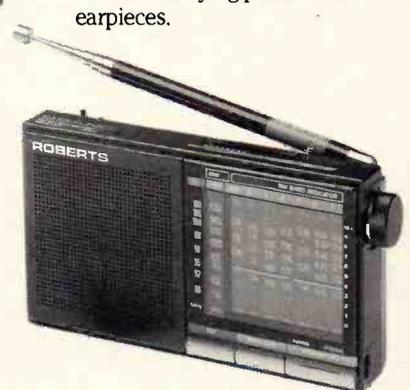
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Amateur Bands Round-up

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

The first letter this time is from **Sias Pretorius**, who lives in Brakpan, Transvaal, South Africa. Sias uses a Kenwood R600, plus converters for 220, 430 & 1296MHz; a modified Blaupunkt stereo radio giving 110.5 to 135.5MHz; and an International VFH220. Antennas include a 40m loop system for h.f., verticals for the various v.h.f. bands, and a Yagi loop design covering 1691MHz for satellite WEFAX.

Over the past few months Sias has put some 580 different stations into his computer logging system; VE3ZZT, VK6UUU, SP9AID (all 14MHz), JL1HOU & UH8EA (7MHz), G3NXR & FR6LN on 28MHz, UC2LBF & DF7UB (24MHz), plus Z2 & A22 stations many times. Incidentally, Sias notes that RSA have news bulletins on Sundays between 0830 & 1100SAST, in English on 3.718MHz & 7.080MHz lower sideband, relayed on 14.282 & 14.292, again on lower sideband.

Mark Malone lives in Great Horwood and uses an AR 1500 hand-held scanner and a random wire antenna; this has netted him such interesting stations as VE1RU, S79KMB in the Seychelles, 7X2DG in Algiers, C31HK in Andorra, 9H4CM, 4X6UA, 5B4AAJ, OD5MM in Lebanon, and shoals of Europeans. Mark listens at times varying between late morning and mid-evening, and his list reflects this.

Iceland is our next stop, where **Geoff Crowley** lives in Hafnarfjörður. At this time of year Geoff says, they are into 24-hour daylight, and this tends to give an ever-changing pattern to propagation. One nasty bit was a commercial f.m. station with Slavik language in the middle of 14MHz one day for about six hours; Geoff thought it might be a spurious output - a 'sproggy' - but somehow I doubt it.

On 3.5MHz it was mainly Europeans, though I did also notice V01FG, ZP5JCY, 4X4MS VK2CWW & VK3DZM. 7MHz was less useful with only ZP8EM to break the ranks of the Europeans. Up to 14MHz where Geoff mentions UB4QBL on the key, AMTOR from Gs & WM8J, RTTY from N8ES N03F, W2JGR, FM5DN & AC4MK. Switching to upper sideband found him loads of signals; notably VK6EV, VK7EK, VK6WC, 7X2DG, VK6IU, VK6RU, VE11MD (most of these '1MD' suffixes be it noted were on for the International Marconi Day spree), KU1Y, VK3JG, VK3CR, TA2DP, G4SMC/9M6, ZL1AV, KI7GF, HL1KFW, VU200, W20NV, JA1NVF, KH6HB, T71CE, VP5/W5D5B,

KA1USL on Nantucket Island - made famous by a series of limericks K6JAH, ZL1BIG, VP9KK, BY1QH, ZS6JHU, various TFs & lots of smaller fry.

Flipping to 18MHz Geoff noted Yanks, JA4BND PT7BZ, CE3GEI VE1MR, JO1WSO, JA1GRK, VP9HE, PJ8AD, 9Y4LD, TL8MS, VO1IA & lesser mortals. There didn't seem too much pay-dirt on 21MHz; HJ4SAN, N8BES, an odd '9AY4GR', which I think might have been a 9Y4 giving his call phonetically, US0U, 6Y5HN, W6AN, PY5EG, VB1YX working a pile-up, KE3TW, T77T, 5N8GRC, PT2BW, VO11MD, K1DJL, W3UAQ, W4ARZ, W9PHZ, TA1ZD, W1BDL, WA1HMW, EA6GVH (a G station on Majorca) and all the usual stuff. As for 24MHz, VE1DJF was all, while on 28MHz the score was zilch!

Can you help? **Justin Scott**, 1 St Davids Close, Cherry Willingham, Lincoln LN3 4LT wants to lay his hands on a program that will enable a Spectrum to receive SSTV. The one I mentioned some months back came from Sinclair Amateur Radio User Group (SARUG) Newsletter. Can anyone possibly help Justin Scott with a slow-scan TV program, from this or any other source please?

Robin Guppy in Westcliff-on-Sea looked on 14MHz to find K1PS, T14CF, NT1I, N210M, VK600, J49GI, VK6AGP working the J49 for IOTA and of course Europeans. On 80m Robin noted GB2PIH near Hickling on the Leics/Notts border working various G stations; and on 7MHz T71CE in San Marino was pleasing several Europeans. A flip back to 14MHz made it to VE2AFU & ZL400, while an early Sunday morning stint winkled out a load of Gs & GB2RS on Eighty. Then it was back down to 14MHz while 9A3IJ was doling out Croatia to such as GW3XGD, WA4AFE, FA40, 1K4IFQ, N1BRR, K8IGL & N1CZI. A final flip back to 3.5MHz found GU4WRO.

H. Richards in Barton-on-Humber now, and he seems to have found a New Jersey opening on 14MHz sideband, notably 14.197 & 14.204, centring around W20NV, as early as 1000, and continuing till noon UTC, with K2GXR, G10TC(?) G0DWD, G0PHQ, G0WVD & W2ISD getting involved.

An Eddystone 870A, an end-fed wire, and an a.t.u. comprise the station of **John Collins** in Birmingham. He noted JY3ZH on 14MHz from around 0400UTC with extremely strong signals; 9K2TL, Jim, is at the Canadian Embassy, Box 25281 Kuwait City, Kuwait. IL3/IV3UHL was on Lado Is, IOTA EU 131, ES2AW/2 on IOTA EU-149

and GB8WA (cards to G1XYP) noted on 7MHz. Back on 14MHz perhaps the pick of the crop was W4GM4KLN, plus UV1AD for IOTA EU 133, K5BDX/SV5, IT1PI Tino Island, IOTA EU 83, NA5U, TN4CR & smaller fry.

On Top Band **Gerald Bramwell** in Swinton stuck with c.w. to log G3TKF & F6CNI; on 80m the same mode yielded OH3LIM, with RTTY giving GW3LYF, G3XXF, G4ZQP, P14AA & lower sideband a couple of SM, G & GM, PT7LB, 9M6/G4SMC, KP2/K7ZSDZL4KF, VKs, ZLs, 9V1XQ, TL8NG, 9MOS, ZP5PT & EA8AE. 7MHz showed with HB9AEP, HA8FM & ZA1C/I2. RTTY gave OH2GI, and sideband GB617SQN (Commemorative station for 617 Sqn, the 'Dambusters'), other GBs, LG5LG & lesser mortals in Europe, plus YV5JFG, RH5E/UZ9XVH, US7I, CE2CC, PT7SK, PY1NEZ, LU4FHZ, RV9CIY, ULOA, YV1FYJ, 3X0HLU & VK6ACY.

The 14MHz list is quite enormous, with TA3TA on c.w., all continents save Oceania on RTTY, and some 150 non-European signals on sideband; of these perhaps the pick of the crop included 7X2s, BT2000BJ, A71BH, 5X1DX, VKs, KP2N, JAs, 5N1DMA, ZS6AKG, JT1BG, CO20M, OD5PL, XU3ENF and a whole raft of assorted Ws and lesser folk. Now on to 18MHz for JAs, Ws, PJ2MI, TAZZZ, 4X4s, 7X2VXK, FG5GA, VQ9ET, JAs, V47WC, A92BE, VO1XC, HK0HEU, S79MX, J88AQ, VQ9AC, CN8EC, VU1AK, 3X0HLU and another large raft of smaller stuff. For 21MHz another long list with E70EA on c.w. as pick of the crop. Otherwise it was ZS1GRM, 9K2ZZ, CN2AQ, VEs, ET3SID, 9J2CV, OD5ZZ, TY1IJ, VO1DLH, V51BI, RH1E/UA9XML, NC2E/KP4, CX7BF, 7X2DD, 5B4WN, 5H3LE, YC6PUP, 4X4JU/M, 5X1A, FM5DN, 3X0HLU, VU2TTC, VU2DNL, VY8OE, XX9GD, HS0/G4UAV, FG5FC, VE7IM, 3C1EA and the usual other stuff. However on 28MHz, EA8DM, 3X0HLU, C9LCK & 9J2FR plus a few f.m. signals were the total. I'm beginning to suspect Gerald has to buy log books in wholesale!

Coming Up

This section, as always, courtesy of R5GB's *DXNS*, *The DX Bulletin*, California, *The DX Magazine*, K1AR's Contest Calendar, and what you tell me in your letters.

It would be interesting to know if anyone has heard ZS8MI, Marion Island. ZS1KDK is doing a tour



there; try around 14.130, 14.168, or in the 'phone end of 7MHz. To date this one has not been heard in Europe.

Montserrat, VP5M will appear around July 25-30, featuring four YLs all signing VP5M/own call. Listen around 14.250, 21350 and 28.350MHz; c.w. addicts might find them at 21.050. There is also some RTTY on the cards.

Look out for BT2000BJ, a special event call by Tsinghua University, throughout July; this is the BY1QH club station.

That's all for this time, keep those reports flooding in and let the ever growing army of Amateur Band Round-Up readers know what you're up to each month!

Airband

Godfrey Manning G4GLM
c/o The Godfrey Manning Aircraft Museum,
65 The Drive, Edgware, Middlesex HA8 8PS

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 newsagents, *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 & Weymouth on the 18th; Fowey on the 19th; Torbay on the 20th; Alconbury on the 21st; Alconbury & Leicester on the 22nd; Clacton on the 26th; Dartmouth & 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 (0891) 664424 might have more recent news, but I'm not sure of the call charges.

Mildenhall Report

One of the largest displays takes place near the start of the season. Chris and I went down to RAF Mildenhall, near Cambridge, for one of the show days at the end of May. This display is usually noted for its range of 'heavy 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 then toured 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 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 30kt and was coming from nearly the worst direction - about 80° 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 loosen 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 crowd-line barrier 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.

Luckily, 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 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 dual 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

Beech King Air, in service with USAF at Mildenhall Air Fête 1993.

Christina Mycock.



Nine Red Arrows at Mildenhall Air Fête '93.

Christina Mycock.



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 overflowed. 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 are even tolerant of a gear-up landing, since the main wheels still project from the base of the engine nacelles when in the fully-up position. The propellers can still strike the ground and hence shock-load the engines, though.

Even older is the Ju 52, an example of which has been restored to service enabling South African Airways to operate pleasure flights. One hour in this costs less than buying four gallons of petrol in South Africa. So, is motor fuel expensive or flying cheap? Another boon for enthusiasts is the publication of airline schedules in the South African newspapers.

On our return, let's stop in Belgium where we meet **Steven De Schuiteneer**. This itinerary isn't as strange as it seems! The main airports of Holland and Belgium are making a case that they should become the major European hubs for international air transport. They typically cite the better infrastructure when compared to Heathrow and the problem of the M25 motorway is always brought up during the debate. Perhaps, though, they have a point?

Steven sends an official leaflet describing three Flemish airports: Antwerp, Kortrijk and Ostend. The leaflet dwells on the differences between Belgium and the UK, and a little interpretation of the facts makes things clearer still. It is an interesting experiment to compare the UK, where everything is privatised, to the experiences of Belgium where government control has remained more prominent.

First, Belgium seems to remain relatively prosperous. Then, as already suggested, there is a rich rail and road network which serves the airports. Antwerp Airport's car park is free. Business parks have appeared on airport land, just as in the UK, but at Kortrijk the intention is to restrict this to aviation-related industry. One further detail caught my eye: Antwerp Airport's restaurant



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Scanning

Alan Gardner
PO Box 1000, Eastleigh, Hants SO5 5HB

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 the haste 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 English 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. This will allow you 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 any duty has been paid, that the item is for your personal use and that you are not intending to import or export it for re-sale.

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'e given permission please consider other passengers and use an earphone.

Some airlines do not permit the operation of any electronic equipment on-board aircraft. This ban can include lap-top computers, broadcast radios, cellular phones, hand-held computer games and dictation 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 spent 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

callers 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 hand-held transceiver. This is designed to operate on the 144-146 & 430-440MHz amateur bands using

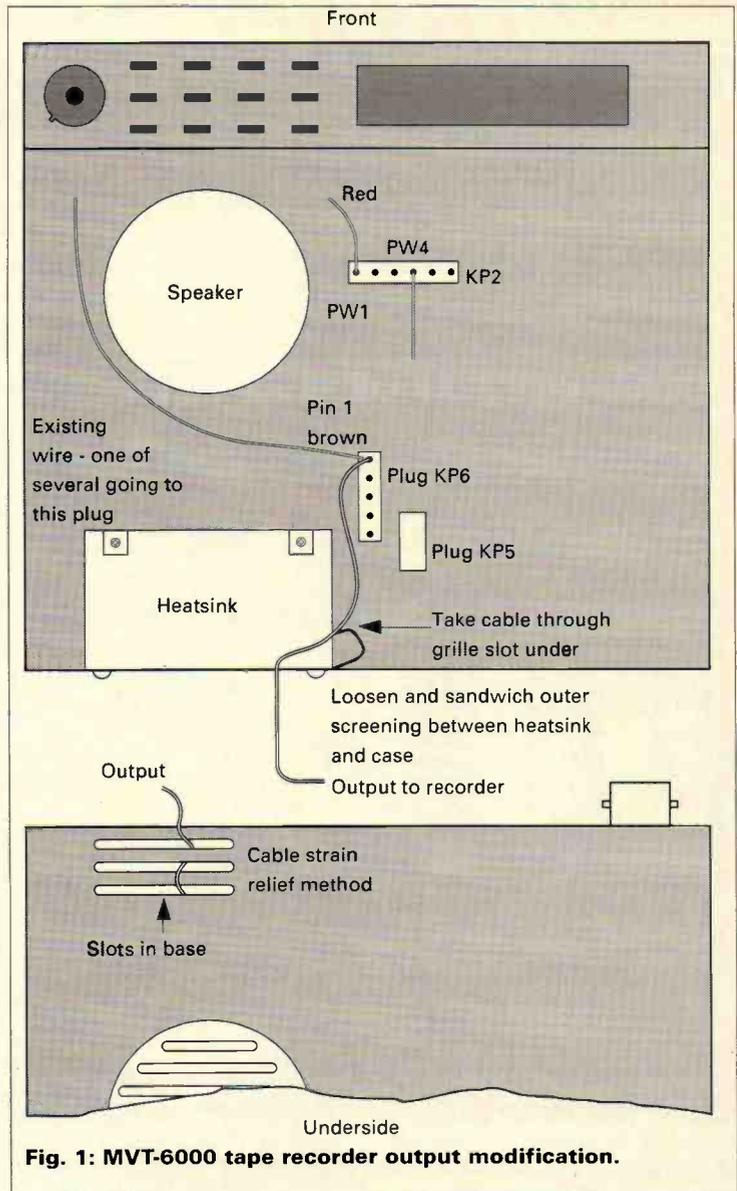


Fig. 1: MVT-6000 tape recorder output modification.

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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, 317-393, 405-485 and 800-950MHz 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 two 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 base 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 frequency c.t.c.s.s. tone is received. This is very 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 transceiver facility and message paging system may be of interest.

Kenwood are not the only company with a dual-band hand-held 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 expect the other companies to follow suit. I don't really want to go into much more detail about these particular hand-

helds, 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 time is 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, 2515, 2002 and 2500 with a possible 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, however. The first is that the receiver has to be fairly extensively modified and the second is that you need an oscilloscope to be able to display the end result.

As with most of simple spectrum displays you have got to be watching the screen when transmissions occur in order to spot

them, this becomes fatiguing after a relatively short period. However if you want to use your scanner as an additional piece of test equipment then this may just be the thing for you. You can obtain further information from: ACE Communications, 10707 East 106th Street, IN 46038, USA.

Jupiter MVT-6000

Regular reader **A. G. Rose** of Birmingham has been experimenting once again with his Jupiter MVT-6000 and has come up with a useful modification to provide a tape output from the receiver. This involves connecting a new screened lead into one of the multi-way connectors and passing it out of the case via the ventilation grill in the base of the cabinet. He has used some very thin cable for this purpose of the type normally used in record player tone arms, but Maplin Electronics sell a similar type (Part No. XR15R) which should be suitable.

The inner of the cable is connected to multi-way connector KP6 pin 1 that already has a brown wire going to it. The new connection is made by pushing a short length of suitable diameter tinned copper wire between the pin and the plastics connector shell. The outer of the screened cable is connected to the chassis of the receiver by trapping it between the chassis and a metal heatsink at the rear of the cabinet. This method means that the

modification can be quickly removed without leaving any tell-tale signs. Trim the cable to length and fit a suitably sized miniature jack plug.

Whilst you have the receiver cover removed you can also quickly perform another modification to remove the rather annoying keyboard 'beep'. This was previously suggested by Mr Rose in the March 1990 column. To do this remove and insulate the wire going to connector KP2 pin 4 (counting from the red wire in pin 1).

My thanks to Mr Rose for passing on this information and my apologies for misspelling his name the last time around.

Mailbag

Your letters and comments continue to flood in. Two subjects seem to be occurring regularly - interference problems and antennas - both of which I hope to cover in more detail in the near future. One or two readers have taken me to task for doubting the alien invader story I mentioned in the June column. You may remember the 'little green men' turned out to be the 'boys in blue'. The story also appeared in more detail in the *Guardian* 23 March 1993 - so it must be true!

All I can say is that if you hear that the Martians have landed or the teddy bears are having a picnic don't rush down to the woods - you might get a big surprise.

Until next month - Good listening.

Airband

overlooks the runway. How frustrating it is to find, elsewhere, that waiting areas are devoid of a view and seem to have been added as an afterthought! The claustrophobic effect of this tends to put you off staying (or eating) there, even non-enthusiasts noticing the difference.

Follow-Ups

Band-boxing is a procedure activated by air traffic control centres during off-peak times, such as at night. One controller can handle the workload generated by two airspace sectors, whereas during the day each sector requires its own controller. In April, Jeff Palfrey (Salisbury) asked about this and now **Richard Ware** (Gillingham, Dorset) adds some more information. If 132.6, 132.8 and 133.6MHz are cross-coupled then the same controller will be heard simultaneously on all three. An aircraft transmitting on one channel should be relayed on the other two

so as to prevent simultaneous transmissions by other traffic. If cross-coupling has not been selected, then two of the three channels will only carry the controller's transmissions with no aircraft signals.

Still in April, Richard puts in a bid on behalf of Middle Wallop as the country's largest grass airfield. Although Middle Wallop occupies a big area, it is subdivided so the runway is only 730m long as opposed to 1051m at Halton. Which is the winner?

Finally, to answer Richard's remaining question, some British Airways company operations channels do carry data as well as speech (e.g. on 131.725MHz). The aircraft sends information such as 'weight off wheels' (i.e. time of take-off) using a system a bit like packet radio. I don't know if the ground station acknowledges correct receipt of the data. This system is distinct from the automatic transmission of clearances by Shanwick.

Frequency and Operational News

Each month, the *GASIL* from the CAA contains a list 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 and also mentions short-term variations. The message for pilots and others who are responsible for flight planning is that your information should 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.

May's *GASIL* lists the following. Changes at Dunsfold: 122.55 is replaced by 125.875 (Lower Airspace Radar Service, v.h.f. Direction Finder and Approach); 119.825 is replaced by 122.55MHz (Radar). At Gatwick the Lower Airspace Radar Service has been withdrawn, but I suggest that pilots

could instead try Farnborough 125.25MHz or Dunsfold (whose 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 Wattisham might after all be temporary. At Southend, the Control Zone has been replaced by a smaller ATZ.

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** (Edgware) reckons that 135.125 replaces 120.4MHz at Heathrow. Could it be a temporary alternative frequency?

The next deadline (for topical information) 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, Edgware, Middlesex HA8 8PS. Genuinely urgent information enquiries: 081-958 5113.

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Info in Orbit

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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 in without decoding the pictures. A few are using framestores for picture 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 night-time 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 WXSATS 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 sun-lit 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 TBUS 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 continuing successful operations with NOAAs 9 through 12. He also informs me that the US Air Force has announced that some facilities at RAF Upper Heyford used to collect weather data from the DMSP satellites, will close in due course. The air drops over Yugoslavia used NOAA and DMSP satellites for mission planning.

METEOSAT 4

EUMETSAT has just announced the start of a new transmission timetable 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 WEFAX images from the geostationary GMS satellite will be transmitted on channel two, providing four different sectors around the western Pacific Ocean. All WEFA (not WEFAX!!) formats will end from August 1, and the AVHRR 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 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.

Compare them with the American NOAA WXSATS 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.

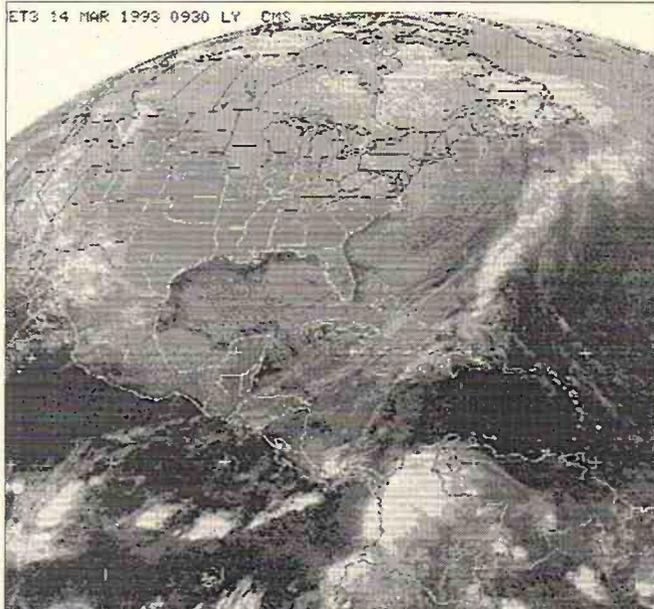


Fig. 1: METEOSAT North America from Steve Nas.

Letters

Les Sherlock is one of several readers who monitor WXSATS without having previously decoded the images. Using a general purpose AR-3000A receiver, fed by a discone and pre-amp, he can tune in to the 137MHz band. The WXSATS use right-hand circularly polarised signals, so to improve his reception, Les is building a crossed-dipole - the standard antenna used for WXSAT reception. Les should find a remarkable increase in performance, as I did when I did some comparisons a few years back.

A letter from Steve Nas of Oswestry told me that he recently registered with Compuserve (a computer BBS) and has discovered a lot of satellite information in the Hamnet and space/astronomy forum. Steve reports that many NOAA and METEOR images were down-loaded in GIF format. He enclosed one of his own images, see Fig. 1, which is the LY format - North America infra-red, and was received from METEOSAT 4 in mid-March.

Doug Harris of Neath came across an interesting problem while installing some new software on his computer. When suppliers install Windows and other programs on a new machine they may set up the AUTOEXEC.BAT file to include one or two programs that run automatically when the computer is switched on. Doug's computer always started with a program called MENU. He then installed Timestep's PROsatll which uses a program with the same name, causing problems. This was easily fixed by deleting the original MENU file from AUTOEXEC.BAT so Doug now runs PROsatll from DOS (the normal way).

Nice to hear from Laurence Patton of Perth again. Two years ago he was using Amigasat on his Amiga A500 computer. He now runs a fast 386 PC, also with Timestep's PROsatll software. Laurence enclosed some excellent pictures of the Canadian region that he collected from METEORS 3-3 and 3-4 some months ago, see Fig. 2. This image shows the south-west coast of Greenland (on the right) and the icebergs surrounding Baffin Island. Also clearly seen is the entrance to Hudson Bay - totally solidified!

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 WXSATS 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 make or buy a feed for 1.7GHz (the METEOSAT r.f. 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 WXSAT images. Notice how cloud seems to remain inside land boundaries. It covers both Britain and Europe, right up to the

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 space! 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 works reasonably well - give or take some pager interference! I've recently received some information from **Viv Williams** who has developed a system that automatically scans either a modified Dartcom, or a standard PROscan receiver; when a WXSAT signal is detected, the software (PROsatll) 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. Viv programmed the computer to then start the main (polar orbiter) software running in the correct mode. Pictures from signals lasting more than three minutes are stored automatically. **Dave Rogers** has also been running the program and comments very favourably. For full details, please send an s.a.e. to Viv at 11 Priory Green, Highworth, Swindon, Wilts.

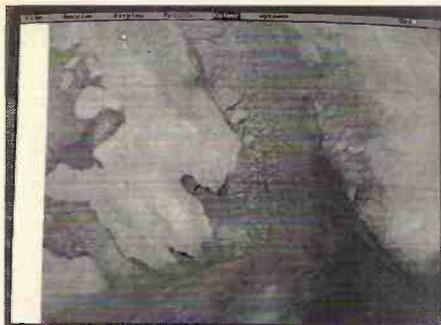


Fig. 2: Eastern coast near Canada from Laurence Patton.

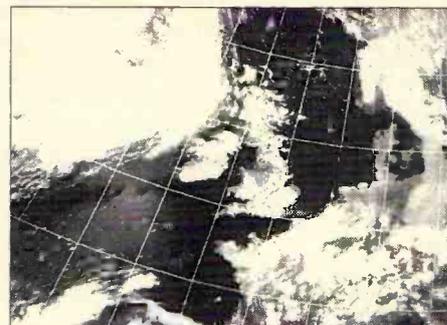


Fig. 3: Gridded image of the UK from Mike Robinson.

New Products

I have just received a copy of *TRACKII*, an upgraded version of the satellite tracking program from Timestep 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 METEOR WXSATS can be saved as group 1 and instantly called for display by pressing the selected function key. Other combinations can also be defined - I would recommend having at least 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 'hidden' commands that convert the screen image to formats for reading by other programs. GIF, SCF 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 Timestep on (0440) 820040.

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 producing 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 will be 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 format, and its content. Thirty years 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

1691 and 1694.5MHz. They are called channels A1 and A2 by EUMETSAT, which is the organisation responsible for controlling the satellites. The many other transmissions from METEOSAT 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 pre-amp will greatly improve signal reception. The 1691MHz signal is essentially a carrier and can be either converted down to the more conventional 137MHz band for picture decoding, or a 1691MHz dedicated receiver can be used. I have both types, and currently use a direct receiver without down-conversion.

The satellite transmits virtually continuously on 1691MHz, so detecting the carrier is not normally a problem. METEOSAT is around 0° longitude, so pointing your antenna due south at an elevation of about 35° (90° 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 the METEOSAT schedule is based on four-minute slots, with the odd 27 seconds being used to transmit 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 framestores 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 one of three types - visible (indicated as VIS 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 sub-satellite point, this is approximately 2.5km for the visible light images. METEOSAT 4 is positioned over the Ivory Coast of South Africa. Further north, towards the Mediterranean Sea countries, the resolution drops off considerably, and by the time we see Britain, the resolution is down to near 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 S6 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.

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

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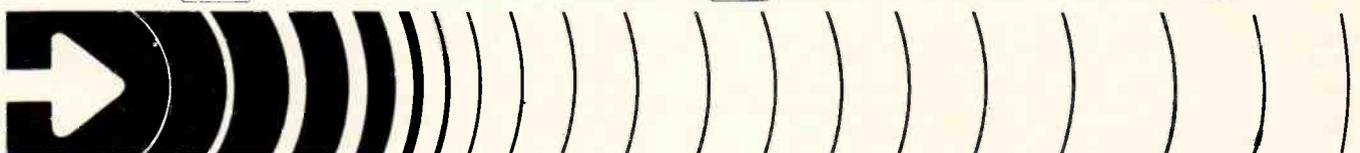
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Leeds LS16 6QE
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 — VISA AND ACCESS WELCOME — 



Decode

Mike Richards G4WNC
200 Christchurch Road, Ringwood, Hants BH24 3AS

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, Crowborough, Sussex TN6 1UL. Tel: (0892) 663298. Geoff also reports very good results from his PC HF-FAX and PC-SWL decoding packages from Comar Electronics, Unit 10, Samuel Whites Estate, Medina Road, Cowes, Isle of Wight PO31 7LP. Tel: (0983) 200308.

Capetown Radio

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 Telex frequencies - SITOR Mode A (ZSC Selcall 4331)

Chan No	Callsign	Base	Ship	Times
-	ZSC60	2.85MHz	2.502MHz	1600-0600UTC
4008	ZSC61	4.214	4.176	24hr
8025	ZSC62	8.4285	8.3885	24hr
12044	ZSC63	12.601	12.4985	24hr
16019	ZSC64	16.816	16.6925	0600-1800UTC
22064	ZSC65	22.408	22.316	0600-1800UTC

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

Navigation warnings: 0615, 0900 & 1700UTC

Weather forecasts: 0930 & 1730UTC

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

Robert has also received some hot news regarding the commen-

cement 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 650km it's unlikely to be heard in the UK.

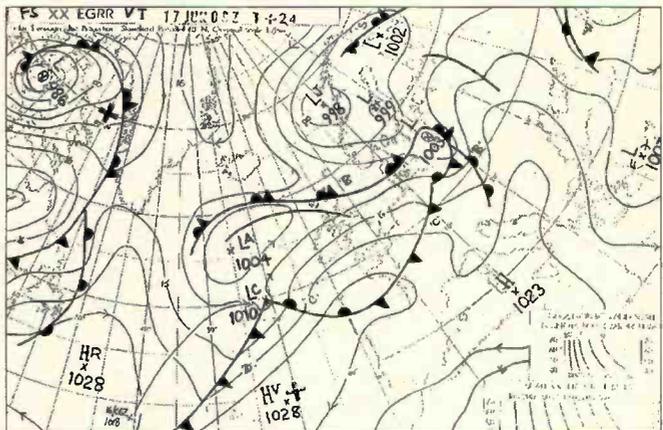
Beyond The Broadcast Bands

A new book, published by Richard Wilmot of Technical Software, *Beyond The Broadcast Bands* is aimed at the utility listener in A5 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 shan't waste 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 Llandwrog, Caernarfon LL54 7RF.

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 *Amigan Airwaves*. 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 Wonston, Winchester SO21 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 more 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	Lat	Long	Freq	Speed	Shift
Dakar	14° 34'N	17° 29'W	19.7496	50	730
Nairobi	1° 17'S	36° 48'E	17.442/13.737	100	850
Pretoria	25° 44'S	28° 12'E	18.242/13.542	75	425
Cairo	30° 1'N	31° 14'E	18.254/18.108	75	850
Jeddah	21° 29'N	39° 10'E	23.37/17.59	100	850

The station index and location indicator for these stations is:

Name	Station Index	Location Indicator
Dakar	61641	G000/GODY
Nairobi	63740/63741	HKNA/HKNC
Pretoria	68262/68263	FAPR
Cairo	62366/62371	HECA
Jeddah	41204	OEJN

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.

Colin Seear also sent me a list of software suppliers that may be able to help readers with Amiga products. The first of these is Softville Computer Supplies, Unit 5, Eletra Avenue, Waterlooville, Hants PO7 7XN. Crazy Joe's of 145 Effingham Street, Rotherham S65 1BL can supply a five disk pack with a whole range of useful programs. Included in this are Morse and RTTY programs plus a number of handy propagation predictors. If you know of any more sources of good Amiga software please write with the details.

Atari FAX

Ken Peace writes in response to Mr I Smith's request for an Atari based FAX system in the June 'Decode'. Ken reports that *Elektor Electronics* published a FAX system for the Atari ST back in January 1989. The system involves the construction of an hardware interface unit using a p.c.b. that can be supplied by *Elektor* magazine. The unit is fairly complex, so some experience of this type of construction work is essential. In addition to the hardware interface, a GFA-BASIC program is required to control the computer. This should also be available from *Elektor* magazine. Incidentally, the hardware interface can also be used with the Archimedes computer using another software package available from *Elektor*.

JVFAX

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 very much quicker. Although the tip was aimed at the JVFX program, it's likely to work with many other systems.

Martin Gerrard of Broughton reports one or two problems when running JVFX on older computers. Martin and a colleague tried to run JVFX on Amstrad 1512 and Olivetti PCS286 computers with DRDOS 6 and SuperStor. In both cases the program crashed during reception with the only escape being to power down. The crash was serious, as he had to use FDISK to correct the resultant file errors. When he later ran the program with SuperStor disabled, all was well. I've also received a number of letters with reports of this program being sold under different names. Once I've gathered all the information and checked it out I'll print more details. For those of you who like to have the latest software, the up-to-date development of JVFX is version 5.1.

MetFAX

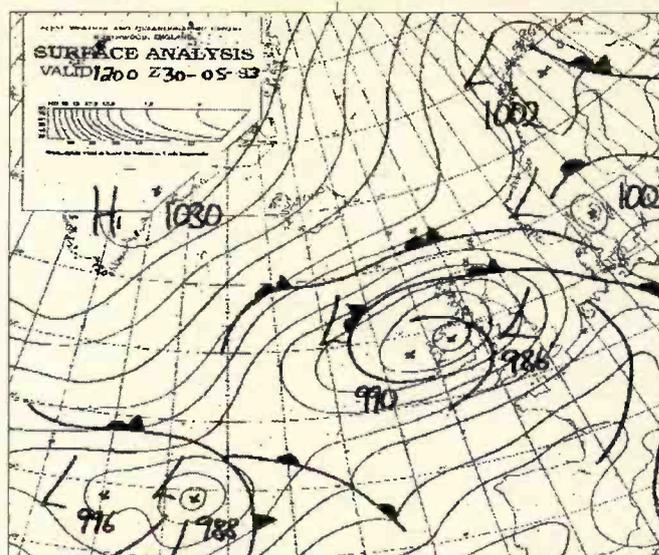
I have to thank my wife, Elaine, for spotting this one in the *Daily Telegraph* on June 5. This is an

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 cheap rate and 48p per minute at all other times (inc. VAT). However, with most of the charts 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:

0336-400-400	Index
0336-400-420	Surface Analysis Chart
0336-400-421	24hr Surface Forecast Chart
0336-400-422	Guide to Surface Charts
0336-400-423	Plotted Chart of Weather Reports
0336-400-424	Guide to Plotted Chart and Index of Locations
0336-400-428	Guide to Satellite Pictures
0336-400-429	Satellite Image (Infra-Red)

Having received a few of these charts, I thought they were very good. Of particular interest were the chart and satellite guides. These gave very simple guidance on how to interpret the charts and apply to standard h.f. charts as well as those received via MetFAX. In addition to the services described here, there are a range of specialist services available. The phone numbers for these are:

0336-400-401	Marine.
0336-400-501	Aviation.
0336-400-480	Education.



FAX chart received by Allan Grant using JVFX.

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	00Z Surface Analysis
0400	18Z Sig SU Wind and WX Prog.
0440	Satellite Pictures
0540	00Z 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	06Z Surface Analysis
1040	Satellite Pictures
1130	Gale Summary

1150	06Z Sig SU Wind and WX Prog
1210	Repeat 0950
1230	06Z Sea and Swell Prog
1300	Sea Surface Temp. Analysis
1330	Satellite Pictures
1425	NAC TAFS
1500	12Z Surface Analysis
1640	Schedule
1650	12Z Selected Upper Air Ascents
1730	Satellite Pictures
1930	Gale Summary
1950	Repeat 1500
2025	Repeat 1150
2050	Repeat 1230

The frequencies used by Northwood are: 2.374, 3.652, 4.307, 6.446, 8.3315, 12.844 and 16.912MHz.

Frequency List

Now on to this month's selection of readers logs. If you would like a copy of my Decode selection, or Day Watson's Beginner's list, just send three first class stamps to the address at the head of the column. It would speed things along at this end if you could include a self addressed sticky label and mark your envelope either DECODE or BEGINNERS.

Frequency	Mode	Speed	Shift	Callsign	Time	Notes
0.1342	FAX	120	576	DCF54	2000	Offenbach Meteo
2.754	ARQ-E	72	400	-	2300	RFFXHO
3.0355	RTTY	100	400	-	2230	Grenge Met
3.3314	AUTOSPEC	68.5	70	-	2120	Unid
4.343	CW	-	-	WLO	0103	Mobile Radio
4.7807	ARQ-342	200	400	-	1117	Unid
5.055	RTTY	50	330	-	1716	Petra Jordan
5.2202	RTTY	75	300	-	1945	MENA Cairo
7.592	RTTY	50	400	-	1950	TANJUG Belgrad
7.625	RTTY	100	700	-	2305	JEDDAH Met
8.02	RTTY	50	240	-	1930	Pyongyang Press
9.2414	FAX	60	600	-	2345	Buenos Aires
9.9943	RTTY	50	820	-	1920	Santa Maria Air
10.2986	RTTY	50	300	-	1845	Bangkok Met
10.8713	RTTY	75	850	-	2300	USAF Crawton
11.4235	SITOR B	100	170	-	1900	Warsaw Radio
11.476	RTTY	50	250	-	1800	Korea News Agency
12.148	SITOR B	100	170	-	1830	PAP Warsaw
12.2125	RTTY	50	400	-	1320	TANJUG Belgrade
13.470	FAX	120	576	-	1230	Moscow Met
13.510	FAX	120	576	CFH	2000	Halifax Met
14.367	RTTY	75	440	-	1050	XINHUA Beijing
16.8065	SITOR B	100	170	NRV	1906	USCG Guam
18.3885	RTTY	50	350	5AF	2223	Tripoli
19.8215	SITOR A	100	170	-	0938	UN Monrovia

Long Medium & Short

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

Medium Wave Chart

Freq kHz	Station	Country	Power kW	Listener
520	Hof/Hurzburg	Germany	0.2	B,R
531	Torshavn	Faeroe Is.	100	E
531	Leipzig	Germany	100	B,R*,T
531	Oviedo(RNE5)	Spain	20	R*,T*
540	Wavre	Belgium	150/50	D,G,R*,T,U*
540	Sidi Bannour	Morocco	600	T*
549	Les Trembles	Algeria	600	T*
549	Bayreuth(DFL)	Germany	200	D,G,M,R*,T,U*
549	St Petersburg	Russia	1000	R*,V
558	Espoo	Finland	100	R*
558	Irigu Jiu	Romania	200	T*
558	Valencia(RNE5)	Spain	20	R*,U*
567	Berlin	Germany	100	G,R*,T*
567	Tullamore(RTE1)	Ireland (S)	500	B,D,E*,F,G,J,N,T,U,V
567	Bologna	Italy	20	C
576	Muhlacker(SDR)	Germany	500	D,E*,R*,T
576	Riga	Latvia	500	T*
576	Barcelona(RNE5)	Spain	50	T*
585	Paris(FIP)	France	8	N,T
585	Madrid(RNE1)	Spain	200	R*,T*,V
585	Dumfries(BBCScott)	UK	2	O
594	Frankfurt	Germany	1000/400	O,G,R*,T,U*
594	Oujda-1	Morocco	100	T*
594	Muge	Portugal	100	R*,T*
603	Lyon	France	300	T*
603	Sevilla(RNE5)	Spain	50	R*,T*
603	Newcastle(BBC4)	UK	2	D
612	Kiel	Germany	10	D
612	Athlone(RTE2)	Ireland (S)	100	D,E*,F,L,T,U,V
612	Lerida	Spain	10	T*
621	Wavre	Belgium	80	B,D,G,T
621	Batra	Egypt	2000	A*
621	Barcelona(OCR)	Spain	50	R*,T*
630	Vigra	Norway	100	R*
630	Tunis-Djedeida	Tunisia	600	T*
639	La Corona	Spain	100	E*,G*,R*,T*,U*
648	Orfordness(BBC)	UK	500	D,M*,R*,T,U
657	Burg	Germany	250	D,R*
657	Madrid(RNE5)	Spain	20	G*,R*,T*
657	Wrexham(BBC)	UK	2	U
666	Bodensees dr(SWF)	Germany	300/180	G*,R*
666	Lisboa	Portugal	135	T*
675	Marseille	France	600	M,R*,T*,U*
684	Sevilla(RNE1)	Spain	500	R*,T*
683	Berlin	Germany	250	R*
693	Burghead(BBC5)	UK	50	E*
693	Droitwich(BBC5)	UK	150	F,U,V
693	Postwick(BBC5)	UK	10	D
702	Aachen/Flensburg	Germany	5	R*
711	Bannes 1	France	300	D,R*,T,U*
720	Lisnagarvey(BBC4)	Ireland (N)	10	T,V
720	Norte	Portugal	100	R*
720	Lots Rd,Ldn(BBC4)	UK	0.5	O,G*,T
729	Cork(RTE1)	Ireland (S)	10	C,G*,R*,T,U,V
729	Oviedo(RNE1)	Spain	50	R*,T*
738	Paris	France	4	R*
738	Barcelona(RNE1)	Spain	500	R*,T*
747	Flevo(Hilv2)	Holland	400	D,G,N,R*,T,U*,V*
756	Brunswick	Germany	800/200	G,L,R*,U*
756	Bilbao(EI)	Spain	5	T*
756	Redruth(BBC4)	UK	2	C*,R*,T
765	Sottens	Switzerland	500	R*,T*
774	Enniskillen(BBC4)	Ireland (N)	1	R
774	S-Sebastian(RNE1)	Spain	50	R*,T*
783	Burg	Germany	1000	R*,T,U*
783	Miramar(R.Porto)	Portugal	100	R*,T*
792	Limoges	France	300	R*,T
792	Lingen	Germany	5	T*
792	Sevilla(SER)	Spain	20	T*
801	Burgos	Spain	10	R*,T*
810	Madrid(SER)	Spain	20	R*,T*
810	Burghead(BBC)	UK	100	E*,V
810	Westerglen(BBC)	UK	100	D,J,R,U
819	Batra	Egypt	450	R*
819	Toulouse	France	50	R*
819	Trieste	Italy	25	T*
828	Hanover	Germany	100/5	R*
828	Barcelona(SER)	Spain	50	T*
837	Nancy	France	200	R*,V*
837	Sevilla(COPE)	Spain	10	R*,T*
846	Rome	Italy	540	E*,R*,T*,U*
855	Berlin	Germany	100	R*
855	Murcia(RNE1)	Spain	125	E*,R*,T*,U*
864	Paris	France	300	G,T
873	Frankfurt(AFN)	Germany	150	M*,R*,T*,U*
873	Zaragoza(SER)	Spain	20	M*,R*,T*
882	Malaga(COPE)	Spain	5	R*,T*
882	Washford(BBC)	UK	100	B,D,E*,G,L,R,T,U
891	Algiers	Algeria	600/300	R*,T*
891	Huisberg	Netherlands	20	D,R*,T,U*
900	Milan	Italy	600	E*,R*,T*
909	Mallorca(RNE5)	Spain	10	R*
909	B'mans Pk(BBC2)	UK	140	G,U,V
909	M'side Edge(BBC2)	UK	200	D,E*,F
918	Madrid(R.Int)	Spain	20	R*,T*
927	Wolvertem	Belgium	300	D,E*,G,R*,T,U*
927	Izmir	Turkey	200	A*
936	Bremen	Germany	100	D,R*
936	Venezia	Italy	20	T*
945	Toulouse	France	300	R*,T*
954	Brno(Dobrochov)	Czech Rep.	200	T*
954	Madrid(CI)	Spain	20	R*,T*
963	Pori	Finland	60	R*,T*,U*
963	Paris	France	8	T
963	Tir Chonail	Ireland (S)	10	V
972	Hamburg	Germany	300	D,R*,T*
972	Cabra(RNE1)	Spain	5	C*
972	Nikolayev	Ukraine	500	E*
981	Alger	Algeria	600/300	T*,U*
981	Megara	Greece	200	A*

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

Freq kHz	Station	Country	Power kW	Listener
990	Berlin	Germany	300	R*
990	R.Bilbao(SER)	Spain	10	R*
999	Madrid(COPE)	Spain	50	R*,V*
1008	Flevo(Hilv-5)	Holland	400	B,D,E*,G,M,R*,T,U*
1017	Rheinsender	Germany	600	R*,T*,V
1017	Burgos(RNE5)	Spain	10	R*
1026	Graz-Dobl	Austria	100	C*,R*,T*
1026	Alicante(SER)	Spain	3	T*
1035	Lisbon(Prog3)	Portugal	120	R,T*
1044	Dresden	Germany	250	M,R*,U*
1044	Sebaa-Aiou	Morocco	300	T*
1044	S-Sebastian(SER)	Spain	10	M,R*
1053	Zaragoza(COPE)	Spain	10	R*
1053	Burghead(BBC1)	UK	20	E*
1053	Droitwich(BBC1)	UK	150	F,U,V
1053	Postwick(BBC1)	UK	10	D
1062	Kalundborg	Denmark	250	D,R*,T*,U*
1071	Prague	Czech Rep.	60	R*
1071	Brest	France	20	D,G,R*,T
1071	Lille	France	4	L
1080	Katowice	Poland	1500	R*,T*
1089	B'mans Pk(BBC1)	UK	150	G,U,V
1089	M'side Edge(BBC1)	UK	150	D,E*,F
1089	Krasnodar	Russia	300	R*
1098	Nitra(Jarok)	Slovakia	1500	R*,T*
1098	Lugo(RNE5)	Spain	10	R*,T*
1107	Munich(AFN)	Germany	40	M*,R*
1107	Caceres(RNE5)	Spain	5	T*
1107	Logrono(RNE5)	Spain	25	M*,R*
1107	Wallasey(BBC1)	UK	0.5	D
1116	Bari	Italy	150	T*
1116	Pontevedra(SER)	Spain	5	R*
1125	La Louviere	Belgium	20	D,R*,T
1125	Castellon(RNE5)	Spain	10	T*
1134	Valencia	Spain	10	R*,T*
1134	Zadar	Yugoslavia	1200	E*,R*,T*,U*
1143	Stuttgart(AFN)	Germany	10	R*,T*,U*
1143	Messina	Italy	6	T*
1143	Reus(COPE)	Spain	2	R*
1152	Lerida(RNE5)	Spain	10	R*
1161	Strasbourg(Flint)	France	200	R*,T*
1170	Vila Real	Portugal	10	R*
1179	Solweby	Sweden	600	D,K*,R*,T*,U*,V
1188	Kuurne	Belgium	5	D,R*,T
1197	Munich(VOA)	Germany	300	R*
1197	Virgin via ?	UK	?	G,R,T,W
1197	Chesterton(FenV)	UK	0.2	D
1206	Bordeaux	France	100	R*
1206	Wroclaw	Poland	200	T*
1215	Virgin via ?	UK	?	E*,F,G,M,O,P,R,V,W
1215	B'mans Pk(V)	UK	125	A
1215	Droitwich(V)	UK	105	U
1215	Postwick(V)	UK	1.2	D
1215	Wrekenton(V)	UK	2.2	H
1224	Vidin	Bulgaria	500	T*
1224	S-Sebastian(COPE)	Spain	5	E*,R*
1224	Virgin via ?	UK	?	G
1233	Liege	Belgium	5	T*
1233	Nitra	Slovakia	40	E*,R*
1242	Marseille	France	150	E*
1242	Virgin via ?	UK	?	G,R*,W
1242	Sheffield(V)	UK	1	O
1242	Stockton(V)	UK	1	D
1251	Marcali	Hungary	500	R*
1251	Huisberg	Netherlands	10	T*
1251	Dubai	UAE	600	E*
1260	Valencia(SER)	Spain	20	R*,T*
1269	Neumunster	Germany	600	O,E*,M*,R*,T*,U*
1278	Dublin/Cork(RTE2)	Ireland (S)	10	E*,R*,T*,U,V
1287	Litomysl(RFE)	Czech Rep.	300/200	T*
1287	Melnik(RFE)	Czech Rep.	400	E*,R*
1296	Valencia(COPE)	Spain	10	T*
1296	Orfordness(BBC)	UK	500	B,D,E*,G,R*,T*
1305	Marche	Belgium	10/5	R*
1305	Orense(RNE5)	Spain	10	E*
1314	Kvitsoy	Norway	1200	D,E*,G,R*,T*,U*,V*
1323	Leipzig(RMWS)	Germany	150	R*
1332	Rome	Italy	300	E*,R*
1341	Lisnagarvey(BBC)	Ireland (N)	100	D,E*,L*,T*,U,V
1350	Nancy/Nice	France	100	R*,T*
1359	Berlin	Germany	250/100	R*
1368	Foxdale(Manx R)	IOI	20	L*,Q,R,T*
1368	Venice	Italy	20	E*,R*
1377	Lille	France	300	D,G,R*,T
1377	Ukraine	Ukraine	50	R*
1386	Athens	Greece	50	A*
1386	Kaliningrad	Russia	500	D,R,U*
1395	Lushnje(Tirana)	Albania	1000	D*,G,M*,R
1404	Brest	France	20	E*,G,R*,T*,V*
1413	Zaragoza(RCE)	Spain	200	T*
1413	Pristina	Yugoslavia	1000	T*
1422	Alger	Algeria	50/25	L
1422	Heusweiler	Germany	1200/600	D,E*,R*,T*
1431	Dresden	Germany	250	R*
1431	Nikolayev	Ukraine	400	E*
1440	Marnach(RTL)	Luxembourg	1200	D,E*,G,R,T,U
1440	Dammam	Saudi Arabia	1600	R*,S*
1449	Berlin	Germany	5	R*
1449	Redmoss(BBC4)	UK	2	D
1467	Monte Carlo(TVFR)	Monaco	1000/400	F,R*,T*
1476	Wien-Bisamberg	Austria	600	D,E*,R*,T*
1485	Augsburg(AFN)	Germany	1	C*
1485	Bournem th(BBC1)	UK	2	E*,V*
1494	Clermont-Ferrand	France	20	R*,T*
1494	St.Petersburg	Russia	1000	D,E*,G*,R*
1503	Stargard	Poland	300	E*,R*,T*
1512	Wolvertem	Belgium	600	D,E*,F*,M*,R*,T*,U*
1512	Jeddah	Saudi Arabia	1000	A*
1521	Kosice(Cizatek)	Slovakia	600	D,R*,T*
1521	R.Mantresal(SER)	Spain	2	T*
1530	Vatican R	Italy	150/450	D,M*,R*,T*,V*
1539	Mainflingen	Germany	700	D,E*,R*,T*,U*

Freq kHz	Station	Country	Power kW	Listener
1539	Valladolid(SER)	Spain	5	R*
1557	Nice	France	300	R*
1557	Kaunas(Vilnius)	Russia	75	R*
1566	Mayak(Stantsiya)	CIS	?	R*
1566	Sarnen	Switzerland	300	E*,R*
1575	Burg	Germany	250	D*,R*,T*
1575	Cordoba(SER)	Spain	5	E*,G*,T*
1583	Langenberg	Germany	400/800	D*,E*,G*,M*,NR*,T*,U*,V*
1602	Vitoria(EI)	Spain	10	E*,G*,T*,V*
1611	Vatican R	Italy	5	A*,R*

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- E: Geoff Crowley, Hafnarfjordur, Iceland.
- F: Martin Dale, Stockport.
- G: John Eaton, Woking.
- H: David Edwardson, Wallsend.
- I: David Forester, Newcastle-under-Lyme.
- J: Francis Hearne, Bristol.
- K: Francis Hearne, London.
- L: Simon Hockenhill, Shanklin, IOW.
- M: Sheila Hughes, Morden.
- N: Rhoderick Illman, Oxted.
- O: Cyril Kellam, Sheffield.
- P: Ross Lockley, Stirling.
- Q: Martin McKeever, Birmingham.
- R: Eddie McKeown, Newry.
- S: Roy Merrill, Dunstable.
- T: George Millmore, Wootton IOW.
- U: Sid Morris, Rowley Regis.
- V: Tom Smyth, Co.Fermanagh

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 (=GMT). Unless stated, all logs compiled in the four week period ending May 29.

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.

Reporting 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 Barty (N.London) heard the broadcasts from CJYQ in St.John's, NF on 930kHz at 0120UTC. 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 23232. At 0225 he tuned to the Caribbean Beacon, Anguilla on 1610, which was 22232. Before closing he logged VOXM in St.John's on 590 as 22332 at 0246.

Prior to the start of Virgin Radio's broadcasts on 1215, DXers often logged transatlantic signals on 1210 & 1220kHz. Ted Barty says there is no chance of hearing them now owing to the sideband splatter from Virgin's Brookmans Park outlet (125kW) on 1215. Tim Bucknall 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 (Wootton) found conditions to be above average for the time of year. After dark, he logged Algeria - Les Trembles 549 (SIO323), Alger 891 (SIO323) & Alger 981 (SIO444). Morocco - Sidi Bannour 540 (SIO222), Oujda 594 (SIO222) & Sebaa-Aiou 1044 (SIO333). Tunisia - Tunis-Djedeida 630 (SIO444). Many Spanish stations were inaudible, but he added Bilbao 756 (EI), Malaga 882 (COPE) and Lugo 1098 (RNE-5) to his list.

The complexities of the Spanish broadcast network have been attracting Roy Merrill in Dunstable. He received some detailed information from SER in Madrid. It revealed

Long Medium & Short

Local Radio Chart

Freq kHz	Station	ILR BBC	e.m.r. (kW)	Listener	Freq kHz	Station	ILR BBC	e.m.r. (kW)	Listener
558	Spectrum R	I	7.50	A,D,G,H,I,M*PRSV	1161	R.Sussex	B	1.00	G,H,P,R,V
585	R.Solway	B	2.00	D,G,H,Q,S*,T	1161	R.Tay	I	1.40	O,Q*,U
603	Cheltenham(CD603)	I	?	C,I,J,R,S,V	1161	Viking R.(Gt.Yks)	I	0.35	B,C,D,T
603	Invicta SG (Coast)	I	0.10	ADGHKIM*PQ*RV	1170	GNR Teesside	I	0.32	O*
803	R.Gloucester	B	0.10	H	1170	Portsmouth (SCR)	I	0.12	G,I,R,V
630	R.Bedfordshire(3CR)	B	0.20	A,D,G,H,I,N,PRSTV	1170	R.Orwell (SGR)	I	0.28	A,D,V
630	R.Cornwall	B	2.00	C,R,V	1170	Signal R.	I	0.20	F,H,P,S
657	R.Clywd	B	2.00	A,F,G,H,P,Q*RV	1170	Swansea Sound	I	0.58	Q
657	R.Cornwall	B	0.50	I,R	1242	Invicta Snd(Coast)	I	0.32	A,G,H,I,M*,P,V
666	DevonAir R	I	0.34	A,I,J,L,Q*,R,V	1242	Isle of Wight R.	I	0.50	H,I,P,R,V
666	R.York	B	0.80	A,D,G,H,I,P,Q*,T,V	1251	Saxon R. (SGR)	I	0.76	A,D,I,Q*,U,V
729	BBC Essex	B	0.20	A,B,D,G,H,I,PRSTUV	1260	Brunel R. (Cl.Gold)	I	1.60	I,P,R,V
738	Hereford/Worcester	B	0.037	A,D,G,H,I,J,PRSTV	1260	R.York	B	0.50	D,H,T
756	R.Cumbria	B	1.00	D,H,Q,T	1260	Sunrise R	I	0.29	A,I,P,S,V
765	BBC Essex	B	0.50	A,D,G,IPQ*RS*TV	1260	Marcher Snd (Gold)	I	0.64	H
774	R.Kent	B	0.70	A,D,G,H,I,M,P,R,V	1278	Bradford (Gt.Yks)	I	0.43	A,D,H,P,T,U
774	R.Leeds	B	0.50	B,D,F,H,S,T	1305	Barnsley (Gt.Yks)	I	0.15	A,B,D,H,T
774	Gloucester (3CSG)	I	0.14	H,J,P,R,S	1305	Red Dragon (Touch)	I	0.20	H,I,R,V
792	Chiltern (S.Gold)	I	0.27	ADGHIM*PQ*RV	1323	R.Bristol (Som.Snd)	B	0.63	H,I,P,Q*,V
792	R.Foyle	B	1.00	Q,U	1323	Brighton (SCR)	I	0.50	A,G,H,I,R,V
801	R.Devon	B	2.00	A,G,H,I,Q*,R,S*,T,V	1332	Hereward R.(WGMMS)	I	0.60	A,O,G,I,S*,T,V
828	Chiltern (S.Gold)	I	0.20	A,D,G,I,J,M*,P,V	1332	Wiltshire Sound	B	0.30	G,I,P,Q*,R,V
828	R.Aire (Magic828)	I	0.12	F,T	1359	Essex R.(BreezeAM)	I	0.28	A,O,G,I,P,V
828	R.WM	B	0.20	P,S	1359	Mercia Snd(Xtra-AM)	I	0.27	P,S,V
828	ZCR (Cl.Gold)	I	0.27	J,L,R,V	1359	R.Solent	B	0.85	R
837	R.Cumbria	B	1.50	H	1368	R.Lincolnshire	B	2.00	A,D,H,P,Q*,T,V
837	R.Furness	B	1.00	Q	1368	R.Sussex	B	0.50	A,B,D,H,T
837	R.Leicester	B	0.45	A,D,G,H,I,P,R,S,T,V	1368	Wiltshire Sound	B	0.10	H,I,P,Q*,R
855	R.Devon	B	1.00	R	1413	Sunrise R	I	0.125	A,G,H,I,P,V
855	R.Lancashire	B	1.50	F,H,I,Q,T	1431	Essex R.(BreezeAM)	I	0.35	A,H,I,P,Q*,R,V
855	R.Norfolk	B	1.50	A,D,I,P,T,V	1431	R 210 (Cl.Gold)	I	0.14	A,H,I,L,R,T,V
855	Sunshine R	I	0.15	I,P,S,V	1449	R.Peterboro/Cambs	B	0.15	B,C,DGHPQ*RTUV
873	R.Norfolk	B	0.30	A,B,D,G,H,I,PRS*TV	1458	GLR	B	50.00	A,H,L,R,T,U*,V
936	Brunel R (Cl.Gold)	I	0.18	A,G,I,P,R,S,V	1458	GMR	B	5.00	F,D
945	R.Trent (Gem AM)	I	0.20	A,B,D,H,I,P,Q*,S,T,V	1458	R.Cumbria	B	2.00	H,O,Q
954	DevonAir (Cl.Gid)	I	0.32	A,I,R,V	1458	R.Devon	B	2.50	R,V
954	R.Wyvern (WYVN)	I	0.16	D,H,I,P,S,T,V	1458	R.Newcastle	B	2.00	H
990	WABC (Nice & Easy)	I	0.09	H,P,S,V	1458	Radio WM	B	5.00	J,P,S
990	R.Devon	B	1.00	I,J,V	1476	County Sound	I	0.50	A,G,H,I,M,Q*,R,V
990	Hallam R.(Gt.Yks)	I	0.25	A,B,D,I,T,V	1485	R.Humberside	B	1.00	B,D,H,P,Q*,T,U
999	R.Solent	B	1.00	G,I,P,R,V	1485	R.Merseyside	B	1.20	C,H,O,P,Q,S,V
999	R.Trent (Gem AM)	I	0.25	A,B,D,H,I,P,T,V	1485	R.Sussex	B	1.00	A,G,I,P,R,V
999	Red Rose (Gold)	I	0.80	H,Q	1503	R.Stoke-on-Trent	B	1.00	A,D,H,O,P,Q*,S,T,V
1017	Beacon R (WABC)	I	0.70	A,D,H,I,P,Q*,R,S,T,V	1521	Reigate (Cly Snd)	I	0.64	A,G,H,I,M*O*Q*RV
1026	Downtown R	I	1.70	H,U	1530	Sheffield (Gt.Yks)	I	0.74	B,H,I,O,Q*,T,U
1026	R.Cambridgeshire	B	0.50	A,B,O,H,I,M,P,T,V	1530	R.Essex	B	0.15	A,I,P,R,V
1026	R.Jersey	B	1.00	I,L,M,R,V	1530	R.Wyvern (WYVN)	I	0.52	H,I,O,P,R,S
1035	NorthSound R	I	0.78	D,O	1548	Capital R (Cap G)	I	97.50	A,E*,GHK*M*PRV
1035	R.Kent	B	0.50	A,I,M,P,R,V	1548	R.Bristol	B	50.00	Q*
1035	R.Sheffield	B	1.00	H,T	1548	R.Forth (Max AM)	I	2.20	D,O,P,Q*,U
1107	Moray Firth R	I	1.50	A,I,Q	1548	R.Hallam (Gt.Yks)	I	0.74	B,T
1116	R.Derby	B	1.20	D,G,H,I,MOPQ*STV	1557	Chiltern R.(Gt.Yks)	I	0.76	D,I,P,Q*,S*,T,V
1116	R.Guernsey	B	0.50	I,L,M,Q,R,V	1557	Southampton (SCR)	I	0.50	Q*,R,V
1152	BRMB (Xtra-AM)	I	3.00	J,P,S	1557	R.Lancashire	B	0.25	H,Q
1152	LBC (L Talkback R)	I	23.50	A,G,K,L,M*,R,V	1557	Tendring (Mellow)	I	?	O,V
1152	Piccadilly R(Gold)	I	1.50	F	1584	Kettering (KCB)	I	0.04	I
1152	R.Broadland	I	0.83	D,J,Q*,V	1584	R.Nottingham	B	1.00	A,E*,H,I,P,Q*,T,V
1152	R.Clyde (Clyde 2)	I	3.06	O*	1584	R.Shropshire	B	0.50	H,I,S,V
1161	Brunel R (Cl.Gold)	I	0.18	C,I,P,Q*,V	1584	R.Tay	I	0.21	O
1161	R.Bedfordshire(3CR)	B	0.10	A,C,H,I,P,V	1602	R.Kent	B	0.25	A,C*,G,H,I,O*,R,V

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 C: Tim Bucknall, Congleton.
 D: Sean Cooper, Wells-next-the-Sea.
 E: Geoff Crowley, Hafnarfjordur, Iceland.
 F: Martin Dale, Stockport.
 G: John Eaton, Woking.
 H: David Forester, Newcastle-under-Lyme.
 I: Gerry Haynes, Bushey Heath.
 J: Francis Heame, N.Bristol.
 K: Francis Heame, London.
 L: Simon Hockenhill, Shanklin, IOW.

M: Sheila Hughes, Morden.
 N: Rhoderick Illman, Oxted.
 O: Ross Lockley, Stirling.
 P: Patrick McKeever, Birmingham.
 Q: Eddie McKeown, Newry.
 R: George Millmore, Wootton, IOW.
 S: Sid Morris, Rowley Regis.
 T: Harry Richards, Barton-on-Humber.
 U: Tom Smyth, Co.Fermanagh.
 V: John Wells, East Grinstead.

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

that they have no outlets on 927 or 936kHz - the latter being a group frequency for RNE-5, their only outlet on 1008 is Las Palmas, Canarias, which is regularly heard by Roy after 2230. Their outlets on 1026 are Alicante, Jaen, Jerez, Oviedo, Reus, Salamanca & Vigo. Outlets on 1260 are Algeciras, Badajoz & Valencia. Other outlets include Lerida 1287 (noted by Roy as poor until after midnight), Gerona 1485 & Albacete 1602. SER have no m.w. outlet at Malaga. Roy also received a useful map from COPE, which shows the locations of their stations and lists their frequencies.

Short Wave Reports

Daily variations in propagation were evident in the 25MHz (11m) band. Nevertheless, R.Australia's Darwin signals to NE.Africa have reached the UK quite well some mornings. In favourable conditions their signal on 25.750 (Eng 0800-0855) was 35233 at 0807 by **Eddie McKeown** in Newry, Co.Down.

Still taking advantage of this band are UAE R, Abu Dhabi 25.690 (Ar to Far East 0900-1100) 25322 at 0900 by **Eric Shaw** in Chester; DW via Julich 25.740 (Ger to E.Asia 1100-1355); also RFI via Issoudun 25.820 (Fr to Africa 0900-1545).

Long Wave Chart

Freq kHz	Station	Country	Power (kW)	Listener
153	Bechar	Algeria	1000	N*
153	Donebach	Germany	500	B,E*,G,H*,I,K*,L,M*,N,O*,QR
153	Brasov	Romania	1200	K*,L
162	Allouis	France	2000	B,D*,E*,F*,G,K,L,M,N,O*,P,QR
171	Kaliningrad	Russia	1000	O*,G*,I*,K,L,M,N,P*
171	Medi 1-Nador	Morocco	2000	N*
177	Oranienburg	Germany	750	G,I*,K*,M*,N*,O,Q
183	Saarouis	Germany	2000	B,D*,E*,F*,M*,N*,O,Q
189	Caltanissetta	Italy	10	G
198	BBC Droitwich	UK	500	A,B,D*,F*,I,K,L,M,O*,P,Q,R
207	Munich	Germany	500	A,B,G,H*,I*,K*,L,M*,N,O*,P,Q
207	Azilal	Morocco	800	Q
216	RMC Roumoules	S.France	1400	A,G,I*,J,K*,L,M,N,O*,P,Q
216	Oslo	Norway	200	A
225	Raszyn Resv TX	Poland	?	A,D*,G*,I*,K*,L,M*,N*,O*,P
234	Beidweiler	Luxembourg	2000	A,D*,G*,I*,K,L,M,N,O*,Q
234	St.Petersburg	Russia	1000	A,K*,O*
243	Kalundborg	Denmark	300	A,D*,G,I,K,L,M*,N,O*,Q,R
252	Tipaza	Algeria	1500	G,I*,N*,O*,R*
252	Atlantic 252	S.Ireland	500	A,B,D*,E*,F*,G,H,I*,KLMNO*PQ
261	Burg	Germany	200	C,D*,G,H,L,N,O,Q,R
261	Taldom(Moscow)	Russia	2000	A,G,K*,M,N*,O*
270	Topolna	Slovak Rep.	1500	A,G,I*,K*,L,M,N*,O*,P,Q
270	Orenburg	Russia	40	N
279	Minsk	Belarus	500	A,M*,N*,O*

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 K: Eddie McKeown, Newry.
 L: George Millmore, Wootton, IOW.
 M: Sid Morris, Rowley Regis.
 N: Fred Naplan, Stirling.
 O: Harry Richards, Barton-on-Humber.
 P: Tom Smyth, Co.Fermanagh.
 Q: Phil Townsend, E.London.
 R: Michael Williams, Redhill.

The 21MHz Band

Some of R.Australia's 21MHz (13m) signals have also reached here in the morning: Darwin on 21.525 (Eng to SE.Asia 0200-0800) was SIO222 at 0709 by **Bill Clark** in Rotherham & 21.745 (Eng to Asia 0800-1300) 54444 at 1000 by **Darren Beasley** in Bridgwater; 21.595 from Carnarvon (Eng to Pacific areas 0100-0900) as 24432 at 0655 by **David Edwardson** in Wallsend.

Other 13m broadcasts heard in the morning came from R.Japan via Moyabi 21.575 (Eng, Jap to Eu, M.East, Africa 0700-0900) SIO434 at 0700 by **Cyril Kellam** in Sheffield; R.Pakistan Islamabad 21.520 (Eng to Eu 0800-0845) 44444 at 0803 in Newry; R.Finland via Pori 21.550 (Eng to Aust, NZ 0800-0830) SIO333 at 0820 by **Philip Rambaut** in Macclesfield; DW via Julich 21.680 (Eng to E.Asia 0900-0950) 34444 at 0916 by **Ken Milne** in Basingstoke; BBC via Kranji 21.715 (Eng to Far East 0900-1030) 21122 at 1019 by **Harry Richards** in Barton-on-Humber; UAE R.Dubai 21.605 (Eng to Eu 1030-1055) 35444 at 1033 by **Peter Polson** in St.Andrews and 44423 at 1037 in Hafnarfjordur.

In the afternoon, R.Sweden 21.500 (Eng to Asia 1230-1300) was 44444 at 1255 by **Darran Taplin** in Brenchley; BSKSA, Saudi Arabia 21.505 (Ar [Home Service] 1100-1700) 45444 at 1330 by **John Eaton** in Woking; RCI via Sackville 21.710 (Eng to Eu 1330-1400) SIO444 at 1350 by **John Coulter** in Winchester; UAER.Dubai 21.605 (Eng to Eu 1330-1400) 44444 at 1350 by **Peter Pollard** in Rugby; R.Kuwait via Kabd 21.675 (Ar 1315-1800) SIO444 at 1400 by **Kenneth Buck** in Edinburgh; BBC via Limassol 21.470 (Eng to E.Africa 0430-1615) 44333 at 1410 by **Gerry Haynes** in Bushey Heath; SRI via Schwarzenburg 21.820 (Eng to C/SE.Asia 1500-1530) 34322 at 1511 by **Rhoderick Illman** in Oxted; HCJB, Ecuador 21.455 (world-wide u.s.b. + p.c.) SIO244 at 1530 by **Phil Townsend** in E.London; BBC via Ascension Is 21.660 (Eng to Africa 0730-1745) SIO434 at 1600 by **Sid Morris** in Rowley Regis; 21.480 (Eng to Eu 1900-2000) 33333 at 1700 by **Ron Damp** in Worthing.

Later, R.Netherlands via Bonaire 21.590 (Eng to Africa 1730-2025) was SIO444 at 1730 by **Tom Smyth** in Co.Fermanagh; WYFR via Okeechobee 21.500 (Eng to Eu, Africa 1700-1900) 33233 at 1820 by **Vera Brindley** in Woodhall Spa & 21.615 (Eng to Eu, Africa 1900-2000) 35544 at 1900 by **Ross Lockley** in Stirling; VOA via Greenville 21.485 (Eng to Africa 2000-2200) 33553 at 2000 by **John Parry** in Northwich; VOFC Taiwan via Okeechobee 21.720 (Eng to Eu 2200-

Long Medium & Short

Tropical Bands

Freq MHz	Station	Country	UTC	DXer
2310	ABC Alice Springs	Australia	1907	K,Q
2325	ABC Tennant Creek	Australia	1930	K,Q
3200	TWR	Swaziland	0305	B
3210	Em. Nacional, Maputo	Mozambique	1955	B
3220	R.Togo, Lome	Togo	2003	I
3255	BBC via Maseru	Lesotho	2059	I,K,R
3270	SWABC 1, Namibia	S.W. Africa	1859	B,I,K
3300	R.Cultural	Guatemala	0058	G
3316	SLSB Goderich	Sierra Leone	2107	G,I,R
3320	Pyeongyang	N. Korea	1858	K
3320	R.Orion	S. Africa	1954	I,R
3325	FRCN Lagos	Nigeria	2055	A,G,I,R
3330	R.Kigali	Rwanda	1912	I,K
3355	R.Botswana	Gaborone	2059	I,K,R
3355	AIR Kurseong	India	1546	I
3365	BBC R-2	Ghana	2031	A,D,E,F,G,I,K,L,P,Q,R
3377	R.Nacional, Luanda	Angola	1932	I
3380	R.Malawi	Malawi	1931	I,K
3905	AIR Delhi	India	1654	I
3915	BBC Kramji	Singapore	1857	I,K
3940	PBS Hubei Wuhan	China	2140	F
3955	BBC Skelton	England	2000	P,Q
3955	Newsbirsri A.Ata	Kazakhstan	1830	K
3965	RFI Paris	France	2220	B,F,K,L,P,Q,X
3970	R.Buea	Cameroon	1950	B
3975	BBC Skelton	England	0410	P
3980	VOA Munich	Germany	2210	B,F,K,L,P,Q,T,X
3985	China R via SRI	Switzerland	2150	B,F
3985	SRI Beromunster	Switzerland	1910	K,L,M,P,X
3990	RFE Munich	Germany	2230	L
3995	DW via Julich	Germany	2015	B,F,P,Q
4000	Bofoussam	Cameroon	1911	R
4735	Xinjijang	China	2310	A,Q
4740	R.Afghanistan, Kabul	Afghanistan	1827	K
4755	R.Educ. CP Grande	Brazil	0137	P
4755	R.Maranhao	Brazil	2240	D
4760	Yunnan PBS, Kunming	China	2204	F,I
4765	Brazzaville	PR. Congo	1829	A,D,F,I,K,P,R,X
4770	FRCN Kaduna	Nigeria	2036	A,C,F,G,I,J,K,O,P,Q,R,UX
4775	R.Gabon, Libreville	Gabon	2017	H,I,R
4780	RTD	Djibouti	1901	I
4783	RTM Bamako	Mali	2113	A,H
4790	Azad Kashmir R.	Pakistan	1713	I
4790	TWR Manzini	Swaziland	1805	R
4795	R.Douala	Cameroon	2104	A
4800	AIR Hyderabad	India	1713	I
4800	NBS Lesotho	Maseru	2001	H,I,R
4805	R.Nac Amazonas	Brazil	0138	P
4815	R.diff TV Burkina	Quagadougou	2013	A,I,R
4820	La Voz Evangelica	Honduras	2238	D
4828	R.Zimbabwe (R-1)	Zimbabwe	?	H
4830	R.Botswana, Gaborone	Botswana	1858	A,D,F,I,K,R
4830	R.Tachira	Venezuela	0143	B,P,Q
4835	RTM Bamako	Mali	2130	A,F,I,K,Q
4845	ORTM Nouakchott	Mauritania	2039	A,B,F,I,K,O,P,Q,R
4850	R.Yaounde	Cameroon	2115	A,D,P,S
4850	AIR Kohima	India	2039	R
4850	Ulan Bator 1	Mongolia	2220	F,L
4860	AIR New Delhi	India	1905	I,R,W
4865	PBS Lanzhou	China	2205	I,N
4865	L.V. del Cimarruco	Colombia	0005	B,P,Q
4870	R.Cotonou	Benin	2145	A,D,F,I,K,L,Q,X
4885	R.Clube do Para	Brazil	0130	B,P
4885	Voice of Kenya	Kenya	2027	I,K,R
4890	RFI Paris	via Gabon	0416	F,P
4895	Voz del Rio Arauca	Colombia	0004	B,P
4900	V. of the Strait 2	China	2315	A
4900	RTG Conakry	Guinea	?	H
4905	R.Nat.N'djamena	Chad	2033	A,D,F,I,K,P,Q,R,X
4910	AIR Delhi	India	1644	I
4910	R.Zambia, Lusaka	Zambia	1819	H,R
4915	R.Anhanguera	Brazil	2304	I,P
4915	PBS Guangxi, Nanning	China	2231	I
4915	Armonias del Caqueta	Colombia	0410	B
4915	GBC-1, Accra	Ghana	2116	A,D,F,G,I,J,K,L,O,P,Q,R,S
4915	Voice of Kenya	Kenya	1820	R
4920	AIR Madras	India	1733	I
4935	Voice of Kenya	Kenya	2043	A,F,I,K,O,P,Q,R
4960	AIR New Delhi	India	0200	W
4960	R. La Merced	Peru	0330	B
4965	R.Alvorada	Brazil	2228	I
4975	R.Uganda, Kampala	Uganda	2047	A,I,K,P,R
4980	PBS Xinjiang	China	1639	I
4980	Ecos del Torbes	Venezuela	0134	B,P,Q
4990	AIR via Madras	India	0038	P
4990	FRCN Lagos	Nigeria	2006	A,I,K,P,R
4990	R.Ancash, Huaraz	Peru	0340	B
5005	R.Nacional, Bata	Eq. Guinea	2019	I,K,O,P,R
5010	R.Garoua	Cameroon	2019	A,I,K,Q,R
5010	R.Madagascar	Madagascar	1745	?
5011	R.Zimbabwe (R-2)	Zimbabwe	?	H
5015	R.Brazil Tropical	Brazil	0147	D,P
5020	ORTN Niamey	Niger	1902	A,I,R
5025	R.Parakou	Benin	2020	A,F,I,L,R
5025	R.Uganda, Kampala	Uganda	2045	I,K,R
5035	R.Aparecida	Brazil	2310	F
5035	R.Bangui	C. Africa	2035	A,F,H,I,K,P,R
5045	R.Cultura do Para	Brazil	0130	L,P
5047	R.Togo, Lome	Togo	2045	A,D,F,I,K,L,R,S,X
5050	Voz de Yopal, Yopal	Colombia	0345	B
5050	SBC Singapore	Singapore	2245	I
5050	R.Tanzania	Tanzania	1820	I,K,O,P,R
5055	RFO Cayenne(Matoury)	Fr. Guiana	0350	B,I,K,P
5075	Caracol Bogota	Colombia	0400	B,K,P,Q,S,V
5097	R.Eco, Iquitos	Peru	0350	B

DXers:

- A: Darren Beasley, Bridgwater.
- B: Robert Connolly, Kilkeel.
- C: John Coulter, Winchester.
- D: Geoff Crowley, Iceland.
- E: Ron Damp, Worthing.
- F: John Eaton, Woking.
- G: David Edwardson, Wallsend.
- H: David Forester, Newcastle-under-Lyme.
- I: P. Gordon Smith, Kingston, Moray.
- J: Robin Harvey, Bourne.
- K: Gerry Haynes, Bushey Heath.
- L: Sheila Hughes, Morden.
- M: Rhoderick Illman, Oxted.
- N: Zacharias Liangas, Lithoro, Greece.
- O: Ross Lockley, Stirling.
- P: Eddis McKeown, Newry.
- Q: Sid Morris, Rowley Regis.
- R: Fred Pallant, Storrington.
- S: Roy Patrick, Derby.
- T: Peter Pollard, Horning.
- U: Eric Shaw, Chester.
- V: Chris Shorten, Norwich.
- W: Tony Singh, Hitchin.
- X: Phil Townsend, E.London.

2300) 34333 at 2250 by **Chris Shorten** in Norwich.

The 17MHz Band

Some of the **17MHz (16m)** signals in the morning come from R.Australia via Darwin 17.695 (Eng to S.Asia 0700-0900) SIO333 at 0825 in Macclesfield; SRI via Schwarzenburg 17.670 (Eng to Aust, NZ, S.Pacific 0900-0930) 41332 at 0901 in Newry; KHBI, N.Mariana Is 17.555 (Eng to NE.Asia 0800-1155) 44444 at 0953 in St.Andrews; RTV Tunisia via Sfax 17.500 (Ar [Home Service] 0700-1600) SIO444 at 1005 in Winchester; Israel R, Jerusalem 17.545 (Eng, Fr, Heb to USA, W.Eu 1000-1255) SIO434 at 1015 in Sheffield; R.Bulgaria, Sofia 17.830 (Eng to Eu 1030-1200) SIO444 at 1043 in Bushey Heath & 55555 at 1042 in Hafnarfjordur; DW via Julich? 17.860 (Eng to W.Africa 1100-1150) 32222 at 1100 by **Sheila Hughes** in Morden; R.Pakistan, Islamabad 17.900 (Eng to Eu 1100-1120) 32442 at 1112 in Basingstoke; R.Moscow Int 17.735 (WS Eng 0800?-1800) SIO444 at 1200 in Co.Fermanagh.

After mid-day, R.Romania Int, Bucharest 17.850 (Eng to Eu 1300-1355) was 43222 at 1340 in Woking; RFI via ? 17.695 (Eng to Asia, M.East 1400-1500) 55544 at 1447 by **Ronald Kilgore** in Co.Londonderry; Africa No.1, Gabon 2200-0730) 24532 at 0202 in Wallsend; R.Finland via Pori 15.400 (Fin, Eng to USA 1100-1400) 44333 at 1130 in Morden; LJB Sabrata, Libya 15.415 (Ar [Home Service] 1315-1745) 45444 at 1350 in Woking; KTW R Agana, Guam 15.610 (Eng to India, S.Asia 1500-1700) 35433 at 1500 in Stirling; SRI via ? 15.505 (Eng to C/SE.Asia 1500-1530) 34222 at 1511 in Oxted; VOA via Selebi-Phikwe 15.445 (Eng to Africa 1600-1800) SIO434 at 1705 in Rowley Regis, via Tinang 15.290 (Eng to E.Asia 2200-0100) SIO222 at 2205 by **Julian Wood** in Elgin & 15.160 (Eng to E.Asia 1400-1500) 44333 at 1426 in Co.Londonderry & via Botswana 15.495 (Eng to Africa 1900-2200) 34553 at 2030 in Northwich; KTBN, Santa Ana, 15.590 (Eng to USA 1600-0200) 31333 at 1820 in Woodhall Spa; Vatican R, Italy 15.090 (Eng, Fr to W.Africa 2000-2100) 43443 at 2022 in Brenchley; BBC via Limassol 15.575 (Eng to M.East, N.Africa 0400-1500) 45434 at 0925 in St.Andrews, via Woofferton 15.070 (Eng to N/C.Am 2100-0030) SIO444 at 2200 in Co.Fermanagh & via Ascension Is 15.400 (Eng to Africa 1500-2315) 44434 at 2303 by **Robin Harvey** in Bourne; UAE R, Abu Dhabi 15.305/15.315 (Eng to USA 2200-0000) SIO555 at 2201 in Edinburg; AIR via ? 15.265 (Eng to Aust, NZ 2045-2230) SIO422 at 2208 in Redhill.

In the evening, WCSN, Scotts Corner 17.510 (Eng to Eu 1800-2200) was SIO444 at 1818 in Rotherham; R.Algiers Int. via Bouchaoui 17.745 (Eng to Eu, E/C.Africa 1900-2000) SIO343 at 1900 by **Michael Griffin** in Ross-on-Wye; HCJB Quito 17.490 (u.s.b. + p.c.) SIO122 at 1928 by **Michael Williams** in Redhill; also 17.790 (Eng to Eu 1900-2000) SIO444 at 1930 in Edinburgh; R.Nederlands via Bonaire 17.605 (Eng to W.Africa 1930-2025) SIO443 at 2005 in Rowley Regis; VOA via Bethany 17.800 (Eng to Africa 1800-2200) 34553 at 2030 in Northwich.

After dark, RCI via Sackville 17.820 (Eng to Eu, M.East, Africa 2100-2130) was 33233 at 2115 in Barton-on-Humber; R.Havana Cuba 17.760 (Eng to Eu, M.East, Africa 2100-2200) 42323 at 2119 in Woodhall Spa; WHRI via Noblesville 17.830 (Sp to C.Am 2100-2300 Mon-Fri, Eng Sat/Sun) 25333 at 2140 in Chester; VOFC Taiwan via Okeechobee 17.750 (Eng to Eu 2200-2300) 43333 at 2240 by **Robert Connolly** in Kilkeel.

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), SIO444 at 1230 in Winchester; Voice of Turkey, Ankara 15.325 (Tur 0900-1700?) SIO333 at 1500 by **John O'Halloran** in Harrogate; WCSN, Scotts Corner 15.665 (Eng 1400-1655) 35444 at 1525 in Chester; AWR Russia 15.125 (Eng 1600-1630) 43433 at 1600 in Newry; Voice of Vietnam, Hanoi 15.010 (Eng 1800-1830) 55545 at 1810 in Norwich; UAE R.Dubai 15.435 (Eng 1330-1400) 43333 at 1350 in Rugby; R.Pakistan, Islamabad 15.550 (Eng 1700-?) SIO444 at 1700 in Sheffield; RNB Brasilia, Brazil 15.265 (Eng, Ger 1800-2100) 43543 at 1800 in Bridgwater; Israel R, Jerusalem 15.640 (Eng 1900-1930) SIO444 at 1919 in Rotherham; WINB, Red Lion 15.295 (Eng 1600-2100, also to N.Africa) 13331 at 2030 in Worthing; also 15.185 (Eng 2100-2245) SIO242 at 2100 in Ross-on-Wye; also 15.145 (Eng 2247-2345) 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) SIO211 at 0825 in Macclesfield & 15.320 (Eng to S.Asia 2200-0730) 24532 at 0202 in Wallsend; R.Finland via Pori 15.400 (Fin, Eng to USA 1100-1400) 44333 at 1130 in Morden; LJB Sabrata, Libya 15.415 (Ar [Home Service] 1315-1745) 45444 at 1350 in Woking; KTW R Agana, Guam 15.610 (Eng to India, S.Asia 1500-1700) 35433 at 1500 in Stirling; SRI via ? 15.505 (Eng to C/SE.Asia 1500-1530) 34222 at 1511 in Oxted; VOA via Selebi-Phikwe 15.445 (Eng to Africa 1600-1800) SIO434 at 1705 in Rowley Regis, via Tinang 15.290 (Eng to E.Asia 2200-0100) SIO222 at 2205 by **Julian Wood** in Elgin & 15.160 (Eng to E.Asia 1400-1500) 44333 at 1426 in Co.Londonderry & via Botswana 15.495 (Eng to Africa 1900-2200) 34553 at 2030 in Northwich; KTBN, Santa Ana, 15.590 (Eng to USA 1600-0200) 31333 at 1820 in Woodhall Spa; Vatican R, Italy 15.090 (Eng, Fr to W.Africa 2000-2100) 43443 at 2022 in Brenchley; BBC via Limassol 15.575 (Eng to M.East, N.Africa 0400-1500) 45434 at 0925 in St.Andrews, via Woofferton 15.070 (Eng to N/C.Am 2100-0030) SIO444 at 2200 in Co.Fermanagh & via Ascension Is 15.400 (Eng to Africa 1500-2315) 44434 at 2303 by **Robin Harvey** in Bourne; UAE R, Abu Dhabi 15.305/15.315 (Eng to USA 2200-0000) SIO555 at 2201 in Edinburg; AIR via ? 15.265 (Eng to Aust, NZ 2045-2230) SIO422 at 2208 in Redhill.

The 13MHz Band

Although R.Australia's **13MHz (22m)** signals have reached the UK,

reception has deteriorated. Until recently, 13.755 from Carnarvon (Eng to Asia 1430-1800) often rated 44444, but the 33323 noted at 1450 in Woodhall Spa is now typical. Whilst in Lihohoro, Greece **Zacharias Liangas** (Thessaloniki) logged it as 22232 at 1610. Their transmission to SE. Asia via Darwin 13.605 (Chin, Eng 1000-1430) peaked 43333 at 1300 in Kilkeel.

Some of the signals to Europe in this band stem from WYFR via Okeechobee 13.695 (Eng 0500-0800, also to Africa) 54444 at 0645 in Bushey Heath and 34433 at 0641 in Hafnarfjordur; R. Austria Int via Moosbrunn 13.730 (Ger, Eng, Fr, Sp 0500?-1900) 45554 at 0705 in Northwich; UAER. Dubai 13.675 (Ar, Eng 0615-2100) SIO333 at 1330 in Edinburgh; R. Pyongyang, Korea 13.785 (Eng 1500-1550, also to M. East, Africa) 34433 at 1536 in St. Andrews; R. Prague, Czech Rep. 13.600 (Eng 1700-1727) SIO555 at 1710 in Macclesfield; R. Bulgaria via Plovdiv? 13.670 (Eng 1730-1900) 54544 at 1740 in Brenchley; WHRI, South Bend 13.760 (Eng 1700-0000?) SIO333 at 1755 in Winchester; R. Kuwait via Kbad 13.620 (Eng 1800-2100) SIO444 at 2030 in Sheffield; WWCR, Nashville 13.845 (Eng 1200-0100) 35333 at 2100 by **Roy Patrick** in Derby.

Whilst beaming to other areas, SRI via Sottens? 13.685 (Eng, Fr to Australia, NZ, S. Pacific 0900-1000) 54454 at 0900 in Newry; also 13.635 (Eng, Fr to C/SE. Asia 1500-1600) 34222 at 1511 in Oxted; R. Netherlands via Flevo 13.700 (Eng to S. Asia 1330-1630) 44333 at 1600 in Bridgwater; R. Pakistan, Islamabad 13.590 (Eng to M. East 1600-1630) 44344 at 1625 in Norwich; AWR (KSDA) Agat, Guam 13.720 (Eng to Africa 1700-1900 Sat/Sun only) 24332 at 1799 in Stirling; DVV via Julich 13.790 (Eng to W. Africa 1900-1950) 44343 at 1915 in Co. Londonderry; VOA via Selebi Phikwe 13.710 (Eng to Africa 1600-2200) SIO443 at 2010 in Rowley Regis; RCI via Sackville 13.670 (Eng to M. East, Africa 2100-2130) 32222 at 2115 in Barton-on-Humber; BBC via Rampisham 13.660 (Eng to Falkland Is 2130-2145) SIO312 at 2138 in Redhill.

The 11MHz Band

In the 11MHz (25m) band Vatican R, Italy 11.625 (Port, Fr, Eng to W. Africa 0530-0700) was SIO444 at 0630 by **Francis Hearne** in N. Bristol; R. Korea via Sackville 11.715 (Eng to USA 1030-1100) SIO211 at 1030 in Macclesfield; SLBC Colombo, Sri Lanka 11.800 (Hi to Asia 1330-1730) 25333 at 1400 in Derby; Voice of the Mediterranean, Malta 11.925 (Eng, Ar to N. Africa 1400-1600) 55444 at 1550 in Woking; DW via Trimcomalee 11.785 (Eng to W. Africa 1900-1950) 33443 at 1902 in Basingstoke; R. Nac da Amazonia, Brazil 11.780 (Port 0900-0200) was heard most evenings by **John Stevens** in Largs.

During their broadcast to Europe, R. Slovakia, Bratislava 11.990 (Eng 0830-0857) was 44544 at 0840 in Wallsend; Polish R, Warsaw 11.815 (Eng 1200-1255) 44444 at 1200 in Morden; R. Romania, Bucharest 11.940 (Eng 1300-1400) SIO443 at 1328 in Redhill; AIR via Delhi? 11.620 (Eng, Hi 1745-2230) was heard at 1900 by **Tony Singh** in Hitchin; R. Damascus, Syria 12.085 (Eng 2008-2108) SIO543 at 2015 in Rowley Regis; China R, Beijing 11.500 (Eng 2000-2157) 55444 at 2048 in Woodhall Spa; R. Budapest, Hungary 11.910 (Eng 2100-2200) SIO444 at 2100 in Sheffield; R. Japan via Moyabi 11.925 (Eng 2100-2200) 43433 at 2135 in Stirling; R. Yerevan, Armenia 11.920 (Eng 2241-2300) SIO433 at 2245 in Harrogate.

The 9MHz Band

The reception of R. New Zealand's 9MHz (31m) broadcasts in the UK has often been disappointing. Under favourable conditions their 100kW signal on 9.700 (Eng to Pacific areas 0700-1200) was 32332 at 0840 in Bridgwater. Also noted were R. Australia via Carnarvon 9.645 (Eng to Asia 2100-2300) 21111 at 2105 in Worthing; AIR via Delhi 9.910 (Eng to Pacific areas 2045-2230) 43333 at 2220 in Kilkeel.

Broadcasts to Europe abound in this band. Among those noted were WCSN, Scotts Corner, 9.840 (Eng 0600-0800) SIO444 at 0730 in Harrogate; TVR Monaco 9.480 (Eng 0700?-0800) 44444 at 0724 in Basingstoke & 9.795 (Ger 0730-0745) 35344 at 0730 in Chester; SRI via Lenk 9.535 (Eng, Fr, Ger, It 0400-1945) 45444 at 1018 in St. Andrews; R. Netherlands via Flevo 9.650 (Eng 1130-1325) 55555 at 1240 in Brenchley; Polish R, Warsaw 9.525 (Eng 1500-1555) 44444 at 1500 in Morden & (Eng 1930-2025) 54444 at 2005 in Bourne; SNBC Omdurman, Sudan 9.165 (Ar 1700, Eng 1800-1900) 33433 at 1725 in Wallsend; R. Portugal, Lisbon 9.780 (Eng 1800-?) 44444 at 1800 in Derby; BBC via Skelton 9.410 (Eng 0300-2215) 55545 at 1852 in Co. Londonderry; Voice of Greece, Athens 9.425 (Gr 1800-2055) SIO555 at 1915 in Edinburgh; VOA via Gloria 9.760 (Eng 1700-2100) 32323 at 1945 by **Martin Dale** in Stockport & via Woofferton 9.760 (Eng 2100-2200) SIO333 at 2145 in N. Bristol; Voice of Israel, Jerusalem 9.388 (Heb 0400-2300, also to USA) 23552 at 1950 in Northwich; VOIRI Tehran 9.022 (Eng 1930-2030) 45354 at 2018 in Newry; R. Vilnius, Lithuania 9.710 (Eng 2130-2200) 54544 at 2135 in Stirling; R. Yerevan, Armenia 9.450 (Eng 2142-2157) SIO433 at 2142 in Redhill; R. Budapest, Hungary 9.835 (Eng 2100-2200) 33333 at 2145 by **Peter Pollard** while in Horning; R. Tirana, Albania 9.760 (Eng 2130-2200) SIO433 at 2143 in Rotherham; R. Cairo, Egypt 9.900 (Eng 2115-2245) 54344 at 2230 in Norwich; China R Int, via Russia 9.880 (Eng 2030-2255?) SIO333 at 2236 in Elgin.



Martin Dale at his listening post in Stockport.

The 7MHz Band

In the 7MHz (41m) band KTBN, Santa Ana 7.510 (Eng to USA 0200-1600) was SIO132 at 0600 in Ross-on-Wye; WJCR, Upton 7.490 (Eng to E. USA 0640-1200) 44333 at 0745 in Woking; R. Netherlands via Talata Volon 7.120 (Eng to Africa 1730-1930) 33533 at 1745 in Stirling; R. Australia via Carnarvon 7.260 (Eng to Asia 1800-2100) 43232 at 1813 in Co. Londonderry; China Radio Int, Beijing 7.800 (Fr to Africa 1830-2227) 33333 at 2030 in Horning; WHRI, South Bend 7.315 (Eng to E. USA 0000-1300) SIO444 at 0000 in Co. Fermanagh; WRNO, New Orleans 7.355 (Eng to E. USA 2300-0400) 32322 at 0104 in Thessaloniki and 43343 at 0200 in Newry.

Some of the many 41m signals to Europe came from R. Prague, Czech Rep. 7.345 (Eng 0600-0630) SIO444 at 0600 in N. Bristol; WYFR via Okeechobee 7.355 (Eng 0600-0800, also to Africa) SIO544 at 0638 in Bushey Heath and 55544 at 0642 in

Hafnarfjordur; R. Japan via Skelton 7.230 (Jap, Eng, Ger 0700?-0830) 35543 at 0750 in Wallsend; AWR Forli, Italy 7.230 (Ger, Fr, Sp, Eng, It 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 1950-2010) 43333 at 1952 in Bourne; Voice of Greece, Athens 7.450 (Eng 2000-?) SIO433 at 2000 in E. London; RCI via Skelton 7.235 (Eng 2030-2130) 54444 at 2037 in Brenchley; R. Ukraine Int, Kiev 7.240 (Eng 2100-2200) 53544 at 2100 in Bridgwater; AIR via Aligarh 7.412 (Eng, Hi 1730-2230) 44444 at 2134 in Worthing.

The 6MHz Band

Good reception of R. Australia's 6MHz (49m) broadcast to Asia has been noted in the UK. At 1855 their transmission via Carnarvon on 6.000 (Eng 1800-2100) was rated SIO444 in Bushey Heath.

Station Addresses

RTL, 45 Boulevard Pierre Frieden, L-1543 Luxembourg.

ILR Radio Clyde, Clydebank Business Park, Clydebank, Glasgow G81 2RX.

Radio Anhanguera, CP13, 74001 Goiania, Brazil.

Radio of the United Arab Emirates, PO Box 63, Abu Dhabi, UAE.

Radio Globo, Rua do Russel 434, 22210 Rio de Janeiro, Brazil.

Radio Vision (YVKG), Final Ave, La Salle Colinas de los Caobos, Caracas, Venezuela.

Watching Brief

Andy Emmerson G8PTH
71 Falcutt Way, Northampton NN2 8PH

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 G0HFL asks if a coaxial relay is the only way to switch 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 feeder - 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-amp during transmit. But in retrospect it wasn't such a good idea.

Gainiax Is Best

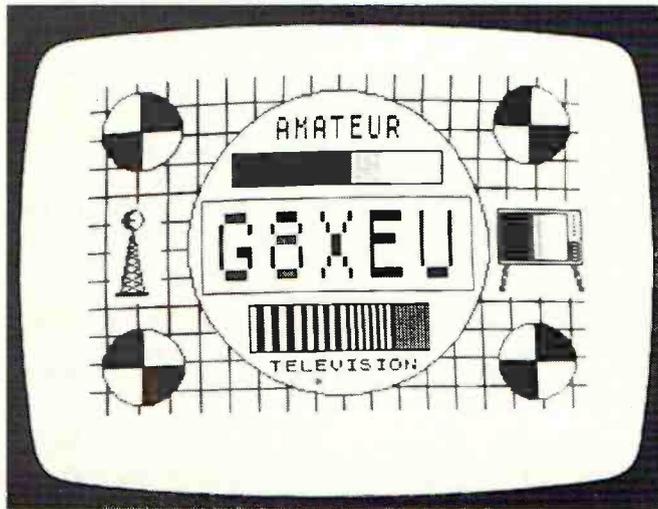
From a transmitting point of view our prime aim is to minimise feeder loss and allow the maximum transmitter power to reach the antenna. Ideally, we would put the transmitter at mast-head but this introduces many complications. It is possible but not very practical. Instead we go for really low-loss 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 mythical product that Chris Bartram calls gainiax. In all feeders, except gainiax, you have losses and by using the best possible (read most expensive) coaxial cable, you can minimise transmission losses in the feeder.

But that's not the end of the story. Feeder attenuation isn't the only problem; impedance bumps lose power as well. Multiple connectors, transitions from N-type to BNC connectors and most kinds of relays are all to be avoided

if possible. We want to launch as much of that hard-won r.f. into the antenna, whilst expecting power to worm its way through wonky connectors and across indifferent contacts inside relays is a recipe for losing a couple of dB. Perhaps superbly engineered systems 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

'fixes'. Why are they fixes or boggles? If you rely on r.f. sensing with the unpowered relay biased towards the receive path, that means that the transmitter has already keyed before the relay can change over to the transmit path. For an instant your expensive transmitter is firing into an open circuit and when the relay closes, it does so with an r.f. arc, neither of which does your hardware much good. Sure, the damage per occasion is minimal but it adds up



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-sensitising the receiver).

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 GaAsf.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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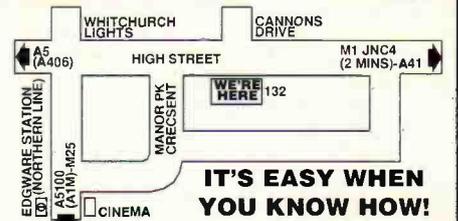
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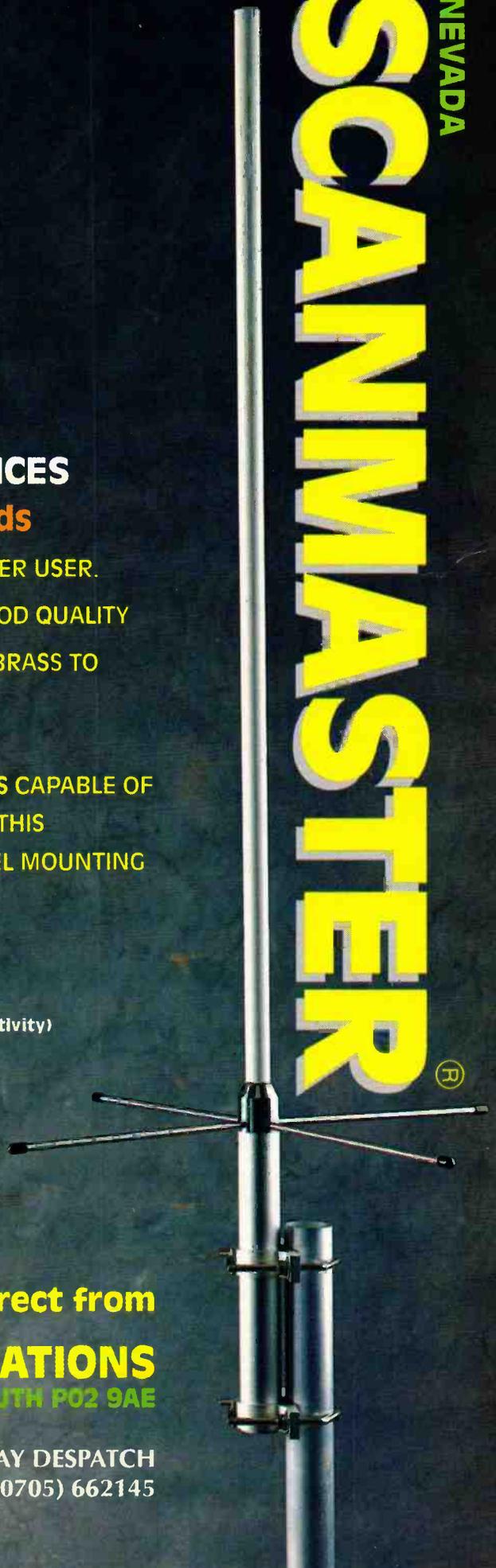
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